IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolutions for CC34 CIDs for MLO Discovery procedures, RNR | | | | |
| Date: 2021-03-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Laurent Cariou |  |  |  | laurent.cariou@intel.com |

1. **Introduction**

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. The introduction and the explanation of the proposed changes are 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).***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** | **Ad-hoc Notes** |
| 1015 | Abhishek Patil | 9.4.2.170.2 | 70.41 | Length 9 octet is a valid combination and not a reserved value | Fix the numbers to match the entries in Table 9-281 | Revised – agree with the commenter. Make the change marked as #1015 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1016 | Abhishek Patil | 9.4.2.170.2 | 71.40 | Fix the TBDs sizes related to the MLD Parameters subfield. | Update figure 9-632 to show MLD Parameters subfield size as 0 or 2 (consistent with entries in Table 9-281). Update Table 9-632b to show MLD ID size of 4 bits. 4 bits is sufficient to signal up to 16 MLDs. Define the size of Change Sequence field to be 1 octet - consistent with Check Beacon field of TIM frame (11.2.3.15). Remove the Reserved field. | Revised – fix the TBD is the table. Following this commenter and other commenting on this same topic. Apply the changes marked as #1016 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1017 | Abhishek Patil | 9.4.2.170.2 | 71.54 | Limit the amount of information carried in RNR IE. It is already bloated to 16 octets per reported AP. Delete the Reserved field. | As in comment | Revised – fix the TBDs. Apply the changes marked as #1017 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1018 | Abhishek Patil | 9.4.2.170.2 | 72.04 | If the reported AP is not part of an MLD, then the MLD Parameters subfield must not be carried in the element. If the MLD is within the same physical AP box, then the reporting AP is expected to have the information whether the reported AP is part of an MLD or not. | "The MLD ID subfield is set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." Make the same change for the paragraph describing Link ID subfield and the Change Sequence subfield. | Revised – the intention of the comment being to not transmit unnecessarily MLD parameters when not needed, we can add a recommendation that if, for a same channel, APs taffiliated to an MLD and APs not affiliated to an MLD are reported, they would be reported as part of separate Neighbor AP Info field. Apply the changes marked as #1018 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1019 | Abhishek Patil | 9.4.2.170.2 | 72.11 | The paragraph is describing Link ID. Fix error "The MLD ID subfield is set to TBD ..." | Should be "The Link ID subfield is set to ..." | Revised – agree with the commenter. Make the changes marked as #1019 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1124 | Alfred Asterjadhi | 9.4.2.170.2 | 70.41 | Seems the underlines in this sentence (which values are used for EHT) and the ones listed in the Table below are not consistent. Please ensure consistency between values used for EHT and their actual addition in the table below. Any backwards compatibility? | As in comment. | Revised – agree with the commenter. Similar comment as CID1015. Apply the change marked as #1124 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1125 | Alfred Asterjadhi | 9.4.2.170.2 | 71.42 | Please don't forget to fix the TBD in the figure as well when the other TBDs of the fields within this subfield are solved. | As in comment. | Revised – agree with the commenter. Apply the changes marked as #1125 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1205 | Arik Klein | 9.4.2.170.2 | 71.20 | Table 9-281: Add indication for TBTT Information Length subfield value = 14 case | Add reserved indication in the TBTT Information field contents column for the case that TBTT Information Length subfield value = 14 | Revised – agree with the commenter. Apply the changes marked as #1205 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1728 | Hanseul Hong | 9.4.2.170.2 | 71.20 | If the TBTT information Length subfield is more than 13, HE STA detects that BSSID/Short BSSID/BSS parameters/20 MHz PSD subfields are included in RNR element. However, when TBTT information Length subfield is 15, 20 MHz PSD subfield is not incluided. This may cause confilction with HE STAs | Modify the setting of TBTT Information Length subfield to prevent confliction in HE STAs. | Revised – agree with the commenter. In 11ax we defined that for all lengths above 13 will have same first 13 octets as for length 13, so the value of 15 currently described is not really possible. Propose to remove that length in the table. Apply the changes marked as #1728 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1775 | Insun Jang | 9.4.2.170.2 | 72.11 | In "The MLD ID subfield is set to TBD if the reported....", MLD ID should be changed to Link ID since TBD for MLD ID was already mentioned in line 4 | As in the comment, MLD ID should be changed to Link ID | Revised – agree with the commenter. Apply the changes marked as #1775 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1901 | Jeongki Kim | 9.4.2.170.2 | 71.56 | According to the descrition of MLD ID, the MLD ID subfield is set to the same value as in the BSSID Index field in the Multiple BSSID-Index element, which is 1 octet. The size of MLD should be 8 bits. | Change the size of MLD ID from TBD to 8. And, update the related text in the spec | Revised – agree with the commenter. Apply the changes marked as #1901 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1902 | Jeongki Kim | 9.4.2.170.2 | 71.56 | The size of the change sequence field need to be decided. Still TBD. In the baseline spec, the size of the change sequence field is 1 octet. So, 8 bits Change sequence is reasonable value | Change the size of the Change Sequence field from TBD to 8. And, update the related text in the spec | Revised – agree with the commenter. Apply the changes marked as #1902 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 1903 | Jeongki Kim | 9.4.2.170.2 | 71.56 | If the size of the MLD ID is 8 bits and the size of the Change Sequence field is 8 bits, the reserved should be 4 bits because Link ID is 4 bits. | Change the size of the reserved field from TBD to 4. And, update the related text in the spec | Revised – agree with the commenter. Apply the changes marked as #1903 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2156 | Laurent Cariou | 9.4.2.170.2 | 0.00 | "The MLD ID subfield is set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." Need to resolve the TBD by finding a value that will not be used by an MLD. Seems that using the largest value would be the best option. | as in comment | Revised – agree with the commenter. Apply the changes marked as #2156 in this document | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2157 | Laurent Cariou | 9.4.2.170.2 | 0.00 | "The Link ID subfield indicates the link identifier of the reported AP within the AP MLD to which the reported AP is affiliated. The MLD ID subfield is set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." Typo on the second sentence, which would start with the Link ID and not the MLD ID. Also, need to resolve the TBD but setting it to value 0 or to the max value. Same issue (TBD) for the change sequence in following paragraph. | as in comment | Revised – agree with the commenter. Apply the changes marked as #2157 in this document | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2494 | Po-Kai Huang | 9.4.2.170.2 | 72.10 | It is not clear if AP MLD can change link ID of a link.AP MLD shall not change the link ID of an affiliated AP, which creates complicated scenario for non-AP MLD to update link ID. | Specify that link ID of an AP in an AP MLD shall not be changed. | Revised – agree with the commenter. Define that the link ID value is unique and is not changed during the lifetime of the AP MLD in subclause 35.3.4.3. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2566 | Rojan Chitrakar | 9.4.2.170.2 | 70.41 | The newly added "TBTT information length subfield values" of 15 and 16 assumes that the "MLD Paramters" sub-field is 3 octets long; however figure 9-632 shows the size of the "MLD Paramters" sub-field is TBD. This is not consistent. | Fix the inconsistency in the size of the "MLD Paramters" sub-field. | Revised – agree with the commenter. Apply the changes marked as #2566 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2567 | Rojan Chitrakar | 9.4.2.170.2 | 70.47 | The way the presence of sub-fields are signaled in the RnR element (using different TBTT Information Length subfield value) is very inefficient. In order to maintain legacy compatibility, the minimum size of the TBTT Information field is either 15 or 16 octets if the "MLD Parameters" sub-field is to be included. More efficient signalling that de-couples the inclusion of the "MLD Parameters" subfield from the other sub-fields is desired. E.g. can values 4, 10 be used to signal inclusion of the "MLD parameters" sub-field only with the Neighbor AP TBTT Offset subfield, or only with the Neighbor AP TBTT Offset subfield and the BSSID subfield? | Use a more efficient method to signal the presence of sub-fields in the RnR element that would allow de-coupling of the inclusion of the "MLD Parameters" subfield from the other sub-fields of the RNR element. | Revised – not sure it will help that much but it is fine to define value 4 and 10 as the commenter suggests. Apply the changes marked as #2567 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2568 | Rojan Chitrakar | 9.4.2.170.2 | 72.11 | "The MLD ID subfield is set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." The MLD ID subfield is supposed to be Link ID subfield? | Change the MLD ID subfield to Link ID subfield. | Revised – agree with the commenter. Apply the changes marked as #2568 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2820 | Srinivas Kandala | 9.4.2.170.2 | 71.61 | What is the difference between Link ID and MLD ID? I read it many times but I couldn't tell. It appears that MLD ID is related to MBSSID. Please identify (no pun) clearly the differences and how they are being used (the explanation is not sufficient enough to say much right now) | As in the Comment | Revised – The MLD ID is used to determine to which AP MLD a reported AP is affiliated to. This is especially useful when multiple AP MLDs are reported in the same element, which will be the case in presence of multiple BSSID set. Add a NOTE to clarify that. Apply the changes marked as #2820 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2972 | Tomoko Adachi | 9.4.2.170.2 | 72.01 | Here, the case when the reported AP is part of another AP MLD refers to 35.3.4.1 (AP behavior). But all the other cases are also described in 35.3.4.1. Unify the description level. | As in comment. | Revised – agree with the commenter. Propose to harmonize the 2 subclauses. Also propose to resolve the TBD procedure by using unique values that are different from the ones used by a multiple BSSID set. Apply the changes marked as #2972 in this document | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2973 | Tomoko Adachi | 9.4.2.170.2 | 72.03 | "The MLD ID subfield is set to TBD if the reported AP is not part of an AP MLD, ..." The case when the reported AP is a part of another AP MLD is already described. So, is this case when the reported AP is not part of any AP MLD? If so, why does the MLD Parameters subfield need to be present? | Change it to "The MLD ID subfield is set to TBD if the reporting AP does not have that information." | Rejected – There are 2 different cases, when the reported AP is part of another AP MLD and when the reported AP is not part of an AP MLD. We therefore need to describe both. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2974 | Tomoko Adachi | 9.4.2.170.2 | 72.11 | "The MLD ID subfield is set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." Firstly, the MLD ID subfield should be Link ID subfield. Secondly, if the reported AP is not part of any AP MLD, the MLD Parameters subfield itself needs not to be present. | Change it to "The Link ID subfield is set to TBD if the reporting AP does not have that information." | Revised – change it to Link ID. With regards to the second point. When possible, if an AP is not part of an AP MLD, the MLD parameters will not be present, but if multiple APs are operating on the same channels they will be reported with the same length and will therefore have to include the MLD parameters. In that case, we need a way to discard these fields, even if they are present.  Apply the changes marked as #2974 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 3014 | Xiaofei Wang | 9.4.2.170.2 | 72.06 | The sentence "The MLD ID is unique to an AP MLD in the frame on which it is carried as it is used to identify the list of reported APs affiliated to the same AP MLD." is very confusing. What does it mean to be "unique to an AP MLD"? Does it mean the MLD ID will nto appear in any other frames sent out by another AP MLD? Please clarify | As in comment | Revised – following the rules of how to set the MLD ID. The MLD ID will be unique to an AP MLD in the frame where it is carried. However, if another AP is reporting APs affiliated to the same AP MLD, it may use another MLD ID. Clarify that in the note. Apply the changes marked as #3014 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 3015 | Xiaofei Wang | 9.4.2.170.2 | 72.11 | Why is MLD ID mentioned in a paragraph discussing Link ID? Change "MLD ID" to "Link ID" | As in comment | Revised – agree with the commenter. Apply the changes marked as #3015 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 3259 | Yuchen Guo | 9.4.2.170.2 | 72.11 | The "MLD ID" should be "Link ID" since this paragraph is talking about Link ID | as in comment | Revised – agree with the commenter. Apply the changes marked as #3259 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 3361 | Zhiqiang Han | 9.4.2.170.2 | 71.61 | MLD ID is not defined in multi-link element or other element. How to obtain the value? Please clarify it | MLD ID may be indicated in multi-link element,please clarify it. | Revised – MLD ID is not used in the Multi-link element. However, in case of multiple BSSID ID, the MLD ID is set to the nontransmitted BSSID Index, and the Multilink element will be included in the corresponding nontransmitted BSSID profile. Clarify all the rules to set the MLD ID. Apply the changes marked as 3361 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 3362 | Zhiqiang Han | 9.4.2.170.2 | 72.11 | Here should be Link ID. change MLD ID to Link ID or remove this sentence. | change MLD ID to Link ID or remove this sentence. | Revised – agree with the commenter. Apply the changes marked as #3362 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2969 | Tomoko Adachi | 9.4.2.170 | 71.20 | By the way that the TBTT Information Length subfield value is defined, the MLD Parameters subfield needs to be 2 octets. | Change the TBD in Figure 9-632 to 2. | Revised – actually the value is 3 based on the table and as suggested by many commenters. Set the corresponding value in table 9-632. Apply the changes marked as #2969 in this document. | [2021/02/07, Edward Au] Volunteers: Jason Guo, Ming Gan |
| 2184 | Li-Hsiang Sun | 9.3.3.6 | 58.28 | Association response frame contains complete ML information. However some fields/elements are timing related whose interpretation rely on TBTT offset to the reporting AP's TBTT, but this info with MLD ID/Link ID is in RNR which is not in association response frame | add timestamp information and RNR element in (re)association reponse frame, or mandate a ML probe before association if non-AP MLD does not have complete info |  | [2021/02/07, Edward Au] Volunteer: Yiqing Li |
| 1042 | Abhishek Patil | 35.3.4.2 | 129.55 | It is not clear when a STA of a non-AP MLD is allowed to send ML Probe Request frame. | Provide clear rules on when a STA of a non-AP MLD is allowed to send ML Probe Request frame to solicit complete information or partial information. | Revised – agree with the commenter. 11ax limited probing to 3 directed probes per 20TUs. Propose to reuse that same concept for MLD probe requests. Also, if during the current full scan, if a non-AP MLD has already received complete information for an AP MLD, it makes sense to not send another MLD probe request to any of the APs of the AP MLD. Apply the changes marked as #1042 in this document. |  |
| 1044 | Abhishek Patil | 35.3.4.2 | 129.55 | ML Probe Response frames sent in response to an ML Probe Request frame requesting complete information would carry a large amount of information. Therefore, spec must provide rules to limit the frequency of ML Probe Request frames STA(s) of a non-AP MLD are allowed to transmits. Such rules must be similar to those described by 802.11ax for limiting the number of probe request frames in 6 GHz can be applied to ML Probe Request frames. | As in comment | Revised – agree with the commenter. 11ax limited probing to 3 directed probes per 20TUs. Propose to reuse that same concept for MLD probe requests. Also, if during the current full scan, if a non-AP MLD has already received complete information for an AP MLD, it makes sense to not send another MLD probe request to any of the APs of the AP MLD. Apply the changes marked as #1044 in this document. |  |
| 1045 | Abhishek Patil | 35.3.4.2 | 129.60 | ML probe response frame is expected to be a long frame as it would be carrying information related to each AP of the AP MLD. The two (addressing) schemes mentioned in the 1st bullet ensure that a STA of a non-AP MLD performs ML probing with a single AP MLD. The spec shouldn't provide any scheme that enables ML probing to more than one AP or requesting information of more than one AP MLD | Delete ", or other address TBD" | Revised – agree with the commenter. Apply the changes marked as #1045 in this document. |  |
| 1046 | Abhishek Patil | 35.3.4.2 | 130.01 | The intention of the NOTE is unclear. | Delete the NOTE | Revised – agree with the commenter. Apply the changes marked as #1046 in this document. |  |
| 1047 | Abhishek Patil | 35.3.4.2 | 130.14 | This paragraph is a duplication of the 2nd paragraph in clause 35.3.2.2. | Delete the paragraph and make reference to clause 35.3.2.2: "The complete information of the requested AP is sent by following the rules in 35.3.2.2) | Revised – agree with the commenter. Move the definition of complete information into 35.3.2.2 and remove the duplicates. Apply the changes marked as #1047 in this document. |  |
| 1048 | Abhishek Patil | 35.3.4.2 | 130.32 | If the ML Probe Request frame includes FILS Request Parameters element, then the AP of the AP MLD shall not respond if it cannot satisfy the condition(s) such as the time constraints specified in the Max Channel Time field of the element. | An AP of an AP ML shall not respond to an ML Probe Request frame if the frame carries a FILS Request Parameters element and the AP is unable to satisfy the condition(s) such as response time constraint specified in the Max Channel Time field in the element (see 11.1.4.3.4 (Criteria for sending a response)). | Revised – agree with the commenter that the rules defined in 11.1.4.3.4 have to be respected. Apply the changes marked as #1048 in this document. |  |
| 1049 | Abhishek Patil | 35.3.4.2 | 130.36 | Add a NOTE that an AP operating in 6 GHz sets the Address 1 field of the Probe Response frame to broadcast address as defined in 26.17.2.3.2 | As in comment | Revised – agree with the commenter. This will help the reader understand why the new rules only apply to 2.4 and 5 GHz. Apply the changes marked as #1049 in this document. |  |
| 1187 | Arik Klein | 35.3.4.2 | 129.59 | In the 1st paragraph it is mentioned that MLD Probe request is Probe Request with the Address 1 \*and\* Address 3 fields set to the BSSID of an AP". Such a condition is not aligned with 802.11 REVmd section 11.1.4.3.4 where either Adress 1 or Adress 3 are checked to be equal to the BSSID of the AP | change the text to "Probe Request with the Address 1 \*or\* Address 3 fields set to the BSSID of an AP" | Revised – it is true. However, is it possible to have a probe request frame with address 1 set to the BSSID of an AP, and address 3 set to another address? Unless this is true, no changes seem needed. This sentence should however be cleaned to remove the TBD. Also, it should be clarified that ML probing is done outside the context of active scanning to clarify everything. Apply the changes marked as #1187 in this document. |  |
| 1188 | Arik Klein | 35.3.4.2 | 130.13 | It is not specified how the non-AP indicates in the MLD Probe request that it requests a complete information of the requested AP. If it is done by setting the "Complete Profile" field (in the Per-STA Control field) to 1 , it should be described in section 9.4.2.259b.2 (P75L56) as well | 1. Add description how the non-AP STA indicates that it requires a complete information on the requested AP in the MLD Probe Request. 2. If the method is by using "Complete Profile" field - add this option in section 9.4.2.259b.2 (P75L56) | Revised – this has been clarified in document 1667r5. |  |
| 1189 | Arik Klein | 35.3.4.2 | 130.23 | The TGbe D0.3 specifies that "If it receives an MLD probe request from a non-AP STA requesting partial information, it shall respond with an MLD probe response that includes a Basic variant Multi-Link element with a STA profile with at least the elements requested for each of the APs that are affiliated to the same AP MLD as the AP and \*that are requested by the MLD probe request\* " - it is not explained how the non-AP indicates which partial information it requires for the requested AP in the MLD Probe Request | Please add the explanation how the non-AP indicates which partial information it requires for the requested AP in the MLD Probe Request | Revised – this has been clarified in document 1667r5. |  |
| 1190 | Arik Klein | 35.3.4.2 | 130.34 | "If an AP that is operating in the 2.4 GHz band or the 5 GHz band that is part of an AP MLD receives an MLD probe request frame requesting complete information and responds with an MLD probe response frame (per 11.1.4.3.4 (Criteria for sending a response)), the Address 1 field of the Probe Response frame \*may be set to the broadcast address\*" - it is not aligned with the strict rule of 802.11REVmd section 11.1.4.3.9 - "A non-FILS STA that transmits a Probe Response frame shall set the Address 1 field to the address of the STA that generated the probe request" | should be either explained (in a separate note) why the Address1 may be set to broadcast address in the Probe Response frame or be modified to align with the rule in 802.11REVmd section 11.1.4.3.9 to use unicast address. | Rejected – the sentence cited in 11.1.4.3.9 is contradicting another sentence cited in 11.1.4.3.4. This comment is therefore out of the scope of 11be and should be submitted to REV group. |  |
| 1420 | Chien-Fang Hsu | 35.3.4.2 | 130.10 | Meaning of "corresponds" here is not clear. Does that mean the Link IDs are the same? | Clarify it | Revised – clarify the sentence by using the term “is equal to”. Apply the changes marked as #1420 in this document. |  |
| 1421 | Chien-Fang Hsu | 35.3.4.2 | 130.13 | if "all elements" include elements not available on the AP side? | Change to "all available elements" | Rejected – the definition of complete information is the information that would be provided if the AP was sending the frame. Per the agreed motions, that information has therefore to be available at the AP sending the probe response. |  |
| 1422 | Chien-Fang Hsu | 35.3.4.2 | 130.19 | "part of" means the same as "affliated"? If yes, unify the terminology. | change to "part of " to "affliated to" | Revised – agree with the commenter. Apply the changes marked as #1422 in this document. |  |
| 1423 | Chien-Fang Hsu | 35.3.4.2 | 130.33 | MLD probe request/response frames are not defined | change to MLD probe request and MLD probe response | Revised – agree with the commenter. Apply the changes marked as #1423 in this document. |  |
| 1673 | GEORGE CHERIAN | 35.3.4.2 | 129.58 | "with the Address 1 field set to the broadcast address and the Address 3 field set to the BSSID of an AP, or with the Address 1 and Address 3 fields set to the BSSID of an AP, or other addressing TBD". Remove the TBD. | As in the comment | Revised – agree with the commenter. Apply the changes marked as #1673 in this document. |  |
| 1675 | GEORGE CHERIAN | 35.3.4.2 | 130.06 | "The information of an AP affiliated to the same AP MLD as the AP identified in the Address 1 or Address 3 field of the Probe Request frame is requested" The above text is not clear about its intent. Please re-write | As in the comment | Revised – change the formulation of the sentence to improve its readability. Apply the changes marked as #1675 in this document. |  |
| 1676 | GEORGE CHERIAN | 35.3.4.2 | 130.01 | Specify the rules on when to send the MLD Probe Request (such as after the regular Probe Request) | As in the comment | Revised – agree with the commenter. 11ax limited probing to 3 directed probes per 20TUs. Propose to reuse that same concept for MLD probe requests. Also, if during the current full scan, if a non-AP MLD has already received complete information for an AP MLD, it makes sense to not send another MLD probe request to any of the APs of the AP MLD. Apply the changes marked as #1676 in this document. |  |
| 1782 | Insun Jang | 35.3.4.2 | 129.57 | For "An MLD probe request is a Probe Request frame" is a reqeust a frame? It is not very clear because when ML probe reqeust is performed, a non- AP MLD "uses" a Probe Request frame. Therefore, the term 'is' should be changed to "uses" | As in the comment, the term 'is' should be changed to "uses" | Rejected – we define in this paragraph what an MLD probe request is, and it is a Probe Request frame that includes some specific elements. The term “is” seems therefore well used here. |  |
| 1793 | Insun Jang | 35.3.4.2 | 129.54 | We've resolved how to signal when a critical update occurs on the side of AP MLD. However, on the side of non-AP MLD, there is no how to retrieve the udpated information for critical update yet. We need to design it (Please see Doc. 20/1737 (with the latest version)) | We need to design how to retrieve the udpated information for critical update as in the comment. For example, to retrieve the updated information, a non-AP MLD transmits a Probe Request frame by including the most recently stored change sequnce element/field in ML element. Without a change sequence element/field, it indicates that the request is critical update request as an additional signaling (Please see Doc. 20/1737 (with the latest version)). |  | [2021/02/07, Edward Au] Volunteer: Namyeong Kim |
| 1808 | James Yee | 35.3.4.2 | 129.61 | This definition of a MLD Probe Request is a bit convoluted. It lists a bunch of criteria and then states the inclusion of a Probe Request variant ML element as what makes the Probe Request a MLD Probe Request (also appears elsewhere in the draft). | Remove "to identify that ...an MLD Probe Request", and make other clarifications as needed. | Revised – agree with the commenter. Remove the end of the sentence. Apply the changes marked as #1808 in this document. |  |
| 1926 | Jeongki Kim | 35.3.4.2 | 130.31 | AP that is operating in 6GHz and that is part of an AP MLD can send the broadcast Probe Response frame in response to the MLD Probe Request Frame. Need to clarify the text although the same procedure of the AP in a single link is already defined in 11ax spec | Add the 6GHz band in the indicated text. | Revised – agree with the commenter in principle. Suggest to resolve this as suggested by the commenter in CID1049 by adding a note to clarify that this rule is already defined. Apply the changes marked as #1926 in this document. |  |
| 2124 | Laurent Cariou | 35.3.4.2 | 0.00 | reference subclause for probe request variant ml element | as in comment | Revised – agree with the commenter. Apply the changes marked as #2124 in this document. |  |
| 2150 | Laurent Cariou | 35.3.4.2 | 0.00 | Remove: "other adressing TBD" as the main usage is covered with the already defined adressings | as in comment | Revised – agree with the commenter. Other addressing would create risk for MLD probe storms. Remove the TBD. Apply the changes marked as #2150 in this document. |  |
| 2151 | Laurent Cariou | 35.3.4.2 | 0.00 | "If and how the transmitting AP info can be explicitly requested or not requested is TBD". It is much simpler if the transmitting AP info is always requested, as it is based on a regular probe request on which we provide additional information specifically for other APs. The regular probe request part therefore requests a response from the AP that is addressed by the probe request. | as in comment | Revised – agree with the commenter. Apply the changes marked as #2151 in this document. |  |
| 2310 | Ming Gan | 35.3.4.2 | 130.03 | MLD Probe Request could also be used to solicit the following two kinds of MLD: 1)An AP MLD which contains the non-transmitted BSSID that in the same multiple BSSID set as the recipient AP 2)An AP MLD for which there is no affiliated AP working on the same link as the recipient AP and there is at least one AP of the AP MLD is in the same multiple BSSID set as an AP affiliated with the AP MLD of the recipient AP | A corresponding contribution (DCN1124) is submitted | Revised – partly agree with the commenter. MLD Probe Request should surely be able to be sent to a non-transmitted BSSID. That seems however to be possible with current spec and no additional mechanism need to be defined. | [2021/02/07, Edward Au] Volunteer: Ming Gan |
| 2418 | namyeong kim | 35.3.4.2 | 130.18 | We allow that a STA can request partial information of other APs using MLD probe request in D0.3. We need to define a detail siganliing for partial information request. (Please see document 20/1667) | Please define the detail signaling for partial information request using MLD probe request. For example, a STA of a non-AP MLD may send MLD probe request including (Extended) Request element in a Per-STA Profile subelement corresponding an requeseted AP. |  | [2021/02/07, Edward Au] Volunteer: Namyeong Kim |
| 2419 | namyeong kim | 35.3.4.2 | 130.25 | Modify "a STA profile" to "a per-STA Profile". | Please see comment. | Revised – agree with the commenter. Apply the changes marked as #2419 in this document. |  |
| 2420 | namyeong kim | 35.3.4.2 | 130.30 | We need to define solicited method for critical update information of other APs. In baseline spec., a STA shall awake to gather the updated parameters from AP's Beacon and this may be inefficient when the STA is in doze state. If we can use MLD probe request to retrieve the critical update information, it is beneficial for power saving. (Please see contribution 20/1737) | Please define method to retrieve critical update information of other APs using MLD probe request as follows. a STA sends MLD probe request indicating request of critical update infomation (e.g. "critical update request" subfield in Per-STA Control field of Per-STA Profile in Probe Request variant Multi-Link element is set to 1). And, a STA may include the value of the most recently received change sequence number of the another AP in the MLD probe request to retrieve only elements that need to be updated by the STA. |  | [2021/02/07, Edward Au] Volunteer: Namyeong Kim |
| 2421 | namyeong kim | 35.3.4.2 | 130.31 | We consider an AP that is operating in the 2.4 GHz band or the 5 GHz band that is part of an AP MLD receives an MLD probe request frame requesting complete information and responds with an MLD probe response frame. However, we need to consider other band (e.g. 6GHz) in 11be. | Please add text to allow an AP is operating in the 6GHz band responses MLD probe response when it receives an MLD probe request frame requesting complete information. | Revised – the intent at the sentence is clearly not to exclude 6 GHz band from 11be. The rules defined in this sentence only apply to APs operating at 2.4 and 5 GHz as similar rules have already been defined for regular probe responses, and therefore apply also to MLD probe responses, for 6 GHz. Adding a note to clarify that such rules have been defined and to reference where to find those rules in the spec will surely help the understanding of this sentence. Apply the changes marked as #2421 in this document. |  |
| 2512 | Pooya Monajemi | 35.3.4.2 | 130.23 | In 35.3.4.1 (lin 10) spec is accomodating for an AP of an AP MLD that does not intend to be discovered by STAs. Meanwhile in 35.3.4.2, the language is mandating that all APs affiliated with the MLD be included in a probe response. | Add "and that are intended to be discovered by STAs" | Revised – Commenter of CID2968 suggests that AP MLD are the ones that can be non discoverable. Propose to therefore remove that condition. Apply the changes marked as #2512 |  |
| 2591 | Rojan Chitrakar | 35.3.4.2 | 126.57 | MLD Probe Request frame is called ML probe request in clause 9.3.3.9; which is correct? | Use consistent name for MLD probe request. | Revised – Seems that the term MLD probe request is the most used. Instruct the editor to change all occurrences of “ML probe” in D0.3 by “MLD probe”, and all occurrences of “non-ML probe” with “non-MLD probe”. |  |
| 2592 | Rojan Chitrakar | 35.3.4.2 | 130.31 | It is not clear why the 6 GHz band is left out. This paragraph seems to imply that an AP operating in the 6 GHz band shall not send a braodcasted MLD Probe resposne. If so, state that explicitely. | State explicitely that an AP operating in the 6 GHz band shall not send a braodcasted MLD Probe resposne if that is the intention. | Revised –The rules defined in this sentence only apply to APs operating at 2.4 and 5 GHz as similar rules have already been defined for regular probe responses, and therefore apply also to MLD probe responses, for 6 GHz. Adding a note to clarify that such rules have been defined and to reference where to find those rules in the spec will surely help the understanding of this sentence. Apply the changes marked as #2592 in this document. |  |
| 2760 | Sharan Naribole | 35.3.4.2 | 129.54 | Per-band rules for MLD Probe Request not defined. It is not clear if existing 802.11ax rules for Probe Request transmissions differentiated for 2.4/5 GHz and 6 GHz still apply for EHT (e.g. no wildcard Probe Requests in 6 GHz, limit on Probe Requests per 20ms, etc.) | MLD Probe Request limitations for EHT STAs need to be added | Revised – agree with the commenter. The rules defined for limiting the number of Probe Request frames and Probe Response frames do apply to MLD probe request and responses as these are Probe Request and Response frames. However, additional rules specific to MLD probes need to be defined, as suggested by commenters in CID1676, 1042, 1044. Apply the changes marked as #2760 in this document. |  |
| 2858 | Stephen McCann | 35.3.4.2 | 130.31 | Why is an AP operating in the 6 GHz band not mentioned in this sentence? | Change the text "in the 2.4 GHz band or the 5 GHz band" to "in the 2.4 GHz band, the 5 GHz band or the 6 GHz band" | Revised –The rules defined in this sentence only apply to APs operating at 2.4 and 5 GHz as similar rules have already been defined for regular probe responses, and therefore apply also to MLD probe responses, for 6 GHz. Adding a note to clarify that such rules have been defined and to reference where to find those rules in the spec will surely help the understanding of this sentence. Apply the changes marked as #2858 in this document. |  |
| 3217 | Young Hoon Kwon | 35.3.4.2 | 129.62 | Probe request frame request information "to APs of AP MLD", not "from APs of AP MLD". | Change "from which APs" to "to which APs". | Revised – this sentence is changed by resolution to CID1808 and that also resolves that comment. Apply the changes marked as #3217 in this document. |  |
| 3260 | Yuchen Guo | 35.3.4.2 | 130.01 | The transmitting AP info may be be requested sometimes. Add a bit in the common info field of the probe request variant of Multi-link element to indicate whether the transmitting AP info is requested or not. | as in comment | Rejected – other commenters were proposing to remove that note, as it is simpler to assume that as the MLD probe response is a Probe response, it will anyway include the information of the transmitting AP. There seems to be relatively little need to defining a bit to explicitly not request the information from the transmitting AP. |  |
| 1039 | Abhishek Patil | 35.3.4.1 | 129.04 | There are several long sentences describing different cases and conditions under which certain rules apply. The long sentences are harder to follow and are error prone. | Split the long sentences into smaller ones to address each condition and case separately. It will also help to separately address the MBSSID cases | Revised – agree with the commenter. Simplify the sentence by splitting non-transmitted BSSID case and other cases. Apply the changes marked as #1039 in this document. |  |
| 1040 | Abhishek Patil | 35.3.4.1 | 129.44 | If the reported AP is not part of an MLD, then the MLD Parameters subfield must not be carried in the element. If the MLD is within the same physical AP box, then the reporting AP is expected to have the information whether the reported AP is part of an MLD or not. Same comment applies to the next bullet on Link ID. | Delete the sentence (P129L44): "Otherwise, the MLD ID subfield shall be set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." Delete the sentence (P129L51): "The Link ID subfield shall be set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." | Rejected – as explained in a previous resolution, it is possible that the MLD information has to be included in the RNR for a reported AP that is not part of an AP MLD, and we therefore need a way for the receiver to ignore these fields. These values are the way to achieve this. |  |
| 1041 | Abhishek Patil | 35.3.4.1 | 129.42 | Remove the TBD condition. | Delete: "and shall be selected with additional TBD rules" | Revised – define these rules and remove the TBD rules. Apply the changes marked as #1041 in this document. |  |
| 1186 | Arik Klein | 35.3.4.1 | 129.15 | The content of the RNR transmitted by the reporting AP (or by the AP corresponding to the transmitted BSSID of the same multiple BSSID set as the reporting AP) shall include TBTT Information field with Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield, the BSS Parameters subfield and the MLD Parameters subfield - but the 20MHz PSD subfield is missing..... | Need to add the 20MHz PSD subfield to this list. Specifically, if TBTT Information field type = 16, the 20MHz PSD subfield shall be included.... | Revised – agree with the commenter. Originally the intent was to be able to use length 15 for an AP not operating at 6 GHz, but as stated in several CIDs, we can not use value 15. Apply the changes marked as #1186 in this document | [2021/02/07, Edward Au] Volunteer: Arik Klein |
| 1418 | Chien-Fang Hsu | 35.3.4.1 | 129.20 | The conditions mix the colocated set and multiple BSSID set. The collocate set appears first and the MBSSID set appears last. The descrption is hard to understand. | Put all the conditons at the same loactions of the descrption and give an example to illustrate which APs are included in the RNR | Revised – agree with the commenter. Simplify the sentence by splitting non-transmitted BSSID case and other cases. Apply the changes marked as #1418 in this document. |  |
| 1671 | GEORGE CHERIAN | 35.3.4.1 | 129.14 | "If an AP is affiliated to an AP MLD then the Beacon and Probe Response frames transmitted by the AP or by the AP corresponding to the transmitted BSSID of the same multiple BSSID set as the AP shall include a TBTT Information field in a Reduced Neighbor Report element with the Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield, the BSS Parameters subfield, and the MLD Parameters subfield, for each of the other APs affiliated to the same AP MLD."  The above text does not read correctly. Please fix | As in the comment | Revised – agree with the commenter. Simplify the sentence by splitting non-transmitted BSSID case and other cases. Apply the changes marked as #1671 in this document. |  |
| 1672 | GEORGE CHERIAN | 35.3.4.1 | 129.20 | "If a reporting AP is part of an AP MLD and is in the same collocated set as APs affiliated with another AP MLD for which there are no affiliated APs operating on the same channel as the reporting AP, each AP of the other AP MLD shall be reported in the Reduced Neighbor Report element that is included in the Beacon frames and broadcast Probe Response frames transmitted by the reporting AP if at least one AP of the other AP MLD is in the same multiple BSSID set as an AP affiliated with the AP MLD of the reporting AP, unless the APs of the other AP MLDs are already reported in Beacon frames and broadcast Probe Response frames transmitted by an AP in the same collocated set as the reporting AP"  This text is not clear. Please re-write | As in the comment | Rejected – the sentence is indeed complex, but reflects the complexity of the case and condition that some contributors insisted on having in the specification. The sentence is hard to make less complex as it is the conditions under which the “shall” statement applies that are complex. |  |
| 1780 | Insun Jang | 35.3.4.1 | 129.14 | "If an AP is affiliated to an AP MLD then the Beacon and Probe Response frames transmitted by the AP or....". What condiition the AP is on seems to be missing. Accoridng to the SFD, it should be the AP which is not part of a mulitple BSSID set | As in the comment, the AP should be the AP which is not part of a mulitple BSSID set | Revised – agree with the commenter. Simplify the sentence by splitting non-transmitted BSSID case and other cases. Apply the changes marked as #1780 in this document. |  |
| 1781 | Insun Jang | 35.3.4.1 | 129.29 | A case that RNR element shall include APs that are part of the same MLD as a non-transmitted BSSID and that are collocated with the non-transmitted BSSID (which is based on SFD) is missing. Note that for MLD ID setting rule, the case is included | As in the comment, the case needs to be added (i.e., for non-transmitted BSSID case) | Revised – this is included in the current sentences but is hard to read and comprehend as mentioned by several commenters.  Split the sentence in 2 parts for the 2 different cases. Apply the changes marked as #1781 in this document |  |
| 1865 | Jarkko Kneckt | 35.3.4.1 | 129.07 | Please clarify what is the purpose of the sentence. It seems very niche case that STA has transmitted probe request on a channel in which it is not able to operate. Why do we have such condition? | Please clarify the purpose of the sentence or delete the sentence. | Revised – agree with the commenter. As suggested by other commenters, it is possible to simplify the rules by removing these sentences. Apply the changes marked as #1865 in this document. |  |
| 1866 | Jarkko Kneckt | 35.3.4.1 | 129.10 | The AP MLD should control whether it intents to make its affiliated APs discoverable, itshould not be the affiliated APs that control the operation. | Please change to"The AP MLD does not intend to make the affiliated APs to be discovered by STAs" | Revised – Commenter of CID2968 suggests that AP MLD are the ones that can be non discoverable. Propose to therefore remove that condition. Apply the changes marked as #1866 |  |
| 1867 | Jarkko Kneckt | 35.3.4.1 | 129.05 | The AP MLD may desire to add an affiliated AP. The process of adding a new affiliated AP and making the new AP discoverable for STAs should be specified in 802.11be. | Please add description how AP MLD adds a new AP and makes it discoverable. | Rejected – There is already a way to discover that the AP MLD has added an AP. It is mandated for the AP to report in RNR all its affiliated APs, so when adding a new AP, the AP MLD will include a new report in the RNR and the non-AP MLD that anyway needs to parse the RNR to check Critical Updates will discover that the AP MLD added a new AP. Furthermore, it is also possible send a BTM request with a neighbor report element for all APs affiliated to an AP MLD, which would be a unicast information that a new AP got added, in case the broadcast version was not sufficient. The commenter is right that there should be a mechanism for this discovery, but that mechanism is already defined and therefore no additional action is needed to satisfy this comment. |  |
| 1873 | Jarkko Kneckt | 35.3.4.1 | 130.35 | There are many APs here: responding AP, reported AP(s). Please clarify which AP is meant in:"unless the AP is not..." | Please change to: unless the responding or the reported AP is not..." | Rejected – this sentence only talks about the AP that is addressed by the Probe Request frame. |  |
| 1890 | Jarkko Kneckt | 35.3.4.1 | 129.05 | An AP MLD should have means to hide some of its links from all non-AP MLDs. For instance, if AP MLD adds an AP, there is a risk that all non-AP MLDs will try to create a link to the new AP at the same time. This will cause high number of management frames to be transmitted. To mitigate this, the AP should be able to gradually make the new AP available. | Please allow AP MLD to hide its AP. AP MLD may selectively allow non-AP STAs and non-AP MLDs to find the AP and to establish a link to it. | Revised – Based on other comments, making an AP of an AP MLD non-discoverable is suggested to be removed, as this AP should not be part of an AP MLD in that case. If an AP is newly added, it will be discoverable in the RNR. The problem of storm seems fine as anyway, STAs will be initiating the (re)association if they are interested to include the new AP as well to its ML setup, and they would naturally spread based on when they learn that information, when would be the right time to do it, and the (re)association frame can be sent on any link, which further reduces the issue. Recommendations/guidance through BTM requests can be used to further guide the STAs to do an ML (re)setup. No additional mechanisms seem needed compared to what is available right now. |  |
| 1923 | Jeongki Kim | 35.3.4.1 | 129.42 | What is the additional TBD rule? Define the additional TBD rule or remove the text "and shall be selected with additional TBD rules" | Define the additional TBD rule or remove the text "and shall be selected with additional TBD rules | Revised – agree with the commenter. Define the rules and remove the TBD. Apply the changes marked as #1923 in this document. |  |
| 1924 | Jeongki Kim | 35.3.4.1 | 129.44 | "Otherwise, the MLD ID subfield shall be set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." This text has TBD value. Resolve the TBD. In this case which value is the MLD ID set to? | Define the TBD value of MLD ID subfield in the indicated condition. | Revised – agree with the commenter. Apply the changes marked as #1924 in this document. |  |
| 1925 | Jeongki Kim | 35.3.4.1 | 129.51 | "The Link ID subfield shall be set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information" This text still has TBD value. Resolve the TBD. In this case which value is the Link ID set to? | Define the TBD value of Link ID subfield in the indicated condition. | Revised – agree with the commenter. Apply the changes marked as #1925 in this document. |  |
| 1973 | Jinjing Jiang | 35.3.4.1 | 131.41 | If the reported AP is affiliated to another AP MLD and the reporting AP intends to carry MLD information for that AP, the MLD ID for this AP MLD shall be unique in the frame that carries the Reduced Neighbor Report element and shall be selected with additional TBD rules. | If the AP MLD has a AP which is in the same Multiple BSSID set as the reporting AP, MLD ID should be the BSSID index; if not, MLD ID should be set as a specific value (1111) that is indicating to the reporting AP is a "co-hosted" BSSID to some AP of the reported AP MLD. In addition, the whole paragraph is quite confusing, need better wording... | Revised – clarify the rules and remove the TBD. Apply the changes marked as #1973 in this document. |  |
| 2186 | Li-Hsiang Sun | 35.3.4.1 | 129.14 | 11ax has defined mutiple BSSID configuration element that allows some non-TXBSSID not advertised in some beacons. In the case that non-TXBSSID is not included in a beacon, can reporting AP aslo omit the TBTT info field for the APs in the same MLD as the non-TXBSSID? | allow reporting AP to omit the TBTT info field for the APs in the same MLD as the non-TXBSSID not included in the Multiple BSSID element in the current beacon | Rejected – there is no need to report in RNR the non-transmitted BSSIDs because they are described in the Multiple BSSID element. On the contrary, APs affiliated to the same MLD as a non-transmitted BSSID have to be included in the RNR as this is the container we chose in 11be to do basic discovery. The paragraph therefore explicitly includes these APs. | [2021/02/07, Edward Au] Volunteer: Abhishek Patil |
| 2187 | Li-Hsiang Sun | 35.3.4.1 | 129.26 | 1) "the APs of the other AP MLDs are already reported in Beacon frames and broadcast Probe Response frames transmitted by an AP in the same collocated set as the reporting AP" 2) "if at least one AP of the other AP MLD is in the same multiple BSSID set as an AP affiliated with the AP MLD of the reporting AP" Is there a case that 2) is satisfied but 1) is not satisfied? | add a note to clarify the case at L26 "unless" refers to | Rejected – a Note would not really improve the readability. |  |
| 2298 | Michael Montemurro | 35.3.4.1 | 129.03 | AP behavior for AP MLD discovery is overly complex and can be significantly simplified. | An MLD AP is identified by an MLD AP address. The MLD AP address represents the BSSID for the MLD BSS.  The MLD AP Address is included in the ML element and advertised by APs affiliated with the MLD AP. The Affiliated AP filters probe requests directed to the MLD AP BSSID and responds with an MLD Probe Response.  An MLD STA (or a STA affiliated with the non-AP MLD) sends probe requests and discovers an AP affiliated with an AP affiliated with an MLD. The non-AP MLD sends an MLD probe request to the MLD AP and receives an MLD probe response.  MBSSID elements and RNR elements can be used as described.  The commenter is willing to work to create a contribution to resolve this comment. | Revised – this sentence and procedure is not about MLD probing, but about the mandate by APs of an AP MLD to provide in all its beacons and probe responses a basic set of information about the AP MLD (and other APs of the AP MLD). To not bloat beacons, we are using the RNR to carry that basic information.  Agree that the sentences are not easy to parse. As suggested by other commenters, split the sentences into the 2 cases of interest (AP is nonTxBSSID or not).  Apply the changes marked as #2298 in this document. |  |
| 2299 | Michael Montemurro | 35.3.4.1 | 129.10 | APs do not practice intent. | Change "do not intend to be discovered by STAs" to "are configured not discoverable to STAs" | Revised – Commenter of CID2968 suggests that AP MLD are the ones that can be non discoverable. Propose to therefore remove that condition. Apply the changes marked as #2299 |  |
| 2589 | Rojan Chitrakar | 35.3.4.1 | 129.20 | What is a "collocated set"? | Provide clear definition of a collocated set. | Revised – correct named defined in 11ax is co-located AP set. Change to that term. Apply the changes marked as #2589 in this document. |  |
| 2590 | Rojan Chitrakar | 35.3.4.1 | 129.34 | The MLD Parameters subfield should also carry the MLD MAC Address of the AP MLD with which the reported AP is affiliated with, especially for the case where the reported AP is affiliated to the same AP MLD as a nontransmitted BSSID that is in the same multiple BSSID set as the reporting AP. | Include the MLD MAC Address of the AP MLD with which the reported AP is affiliated with in the MLD Parameters subfields of the reported AP, especially for the case where the reported AP is affiliated to the same AP MLD as a nontransmitted BSSID that is in the same multiple BSSID set as the reporting AP. | Rejected – the MLD MAC address of the AP MLD is included in the ML element under specific conditions. It therefore does not need to be added to the RNR. |  |
| 2854 | Stephen McCann | 35.3.4.1 | 129.07 | According to 9.4.2.53 (Supported Operating Classes element), STAs do not transmit information about bands that they do not support. Therefore the sentence is not valid, as a STA does not signal negative information to the AP. In addition, what does a "given band" mean and where is it decided what the "given band" is. It appears that "given band" is not defined in 11be or REVmd. | Delete the cited sentence. | Revised – agree with the commenter. The added value for this sentence is anyway very limited. Delete the cited sentence. Make the changes marked as #2854 in this document. |  |
| 2867 | Stephen McCann | 35.3.4.1 | 129.20 | Is the "same collocated set" an ESS? If not, I think it needs to be defined. | Replace "same collocated set" with "ESS" | Revised – it is not the same as ESS. Actually the right definition is co-located AP set and was defined in 11ax. Use the correct name. Apply the changes marked as #2867 in this document |  |
| 2876 | Stephen McCann | 35.3.4.1 | 129.22 | The text "the other AP MLD" implies that there are only 2 AP MLDs in the Reduced Neighbor Report. | Change "the other AP MLD" to "another AP MLD" | Rejected – if we say another AP MLD, it’s hard to do the connection with the first another AP MLD”. Better to keep this like this, as anyway this would apply to each AP MLD individually if there are more than 1. |  |
| 2968 | Tomoko Adachi | 35.3.4.1 | 128.10 | "the APs affiliated to the AP MLD do not intend to be discovered by STAs" I think it won't be used as MLO anyway. Why is this allowed? | Delete pp.ll 128.10. | Revised – agree with the commenter. It is true that the fact of being “non discoverable by non-AP STAs” should apply to an AP MLD and not to an AP. Suppress that condition. Apply the changes marked as #2968 in this document. |  |
| 2975 | Tomoko Adachi | 35.3.4.1 | 129.44 | "Otherwise, the MLD ID subfield shall be set to TBD if the reported AP is not part of an AP MLD, ..." The case when the reported AP is a part of another AP MLD is already described. So, is this case when the reported AP is not part of any AP MLD? If so, why does the MLD Parameters subfield need to be present? | Change it to "Otherwise, the MLD ID subfield shall be set to TBD if the reporting AP does not have that information." | Rejected – same resolution as CID2973 |  |
| 2976 | Tomoko Adachi | 35.3.4.1 | 129.51 | "The Link ID subfield shall be set to TBD if the reported AP is not part of an AP MLD, or if the reporting AP does not have that information." If the reported AP is not part of any AP MLD, the MLD Parameters subfield itself needs not to be present. | Change it to "The Link ID subfield shall be set to TBD if the reporting AP does not have that information." | Revised – same resolution as CID2974. Apply the changes marked as #2976 in this document. |  |
| 3215 | Young Hoon Kwon | 35.3.4.1 | 129.27 | "... unless the APs of the other AP MLDs are already reported..." part is not clear. For example, the APs of the other AP MLDs are in the same multiple BSSID set as an AP affiliated with the AP MLD of the reporting AP, which implies that a Beacon frame from an AP corresponding to transmitted BSSID will include the information of the APs of the other AP MLD, and this can be considered as "the other AP MLDs are already reported". Therefore, with this "unless ..." text, the whole bullet point is vague. Further clarification is needed. | As shown in the comment. | Rejected – the sentence is indeed complex, but it is the conditions that are relatively complex to parse. |  |
| 3216 | Young Hoon Kwon | 35.3.4.1 | 129.44 | The following case is missing: If the reporting AP does not intend to carry MLD information for that AP. Further clarification is needed. | As shown in the comment. | Rejected – That condition would fall under the condition that the AP does not have the information, As the result would be the same, we don’t need to complexify further these rules. |  |

1. **Proposed spec text**

TGbe editor: Please update the following subclause (9.4.2.170 Reduced Neighbor Report element) as shown below

**9.4.2.170 Reduced Neighbor Report element**

25

26

27 **9.4.2.170.2 Neighbor AP Information field**

28

29

30 ***Change the sixth paragraph and*** [***Table 9-281 (TBTT Information field contents)***](#bookmark33) ***as follows:***

31

32 The TBTT Information Length subfield is 1 octet in length and indicates the length of each TBTT

33

1. Information field included in the TBTT Information Set field of the Neighbor AP Information field. If the
2. TBTT Information Field Type subfield is 0, the TBTT Information Length subfield:

36

37

1. — contains the length in octets of each TBTT Information field that is included in the TBTT Informa-
2. tion Set field of the Neighbor AP Information field
3. — is set to 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, ~~or~~ 12, 13, 15, or 16; other values are reserved. (#1015, #1124, #2567)

41

42

43 indicates the TBTT Information field contents as shown in [Table 9-281 (TBTT Information field contents)](#bookmark33).

44

45

46 **Table 9-281—TBTT Information field contents**

47

48

|  |  |
| --- | --- |
| **TBTT Information Length subfield value** | **TBTT Information field contents** |
| 1 | The Neighbor AP TBTT Offset subfield |
| 2 | The Neighbor AP TBTT Offset subfield and the BSS Parameters subfield |
| 4 | The Neighbor AP TBTT Offset subfield and the MLD Parameters subfield |
| 5 | The Neighbor AP TBTT Offset subfield and the Short SSID subfield |
| 6 | The Neighbor AP TBTT Offset subfield, the Short-SSID sub- field, and the BSS Parameters subfield |
| 7 | The Neighbor AP TBTT Offset subfield and the BSSID subfield |
| 8 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, and the BSS Parameters subfield |

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

1 **Table 9-281—TBTT Information field contents (#1205, #1728, #2567)**

2

3

|  |  |
| --- | --- |
| **TBTT Information Length subfield value** | **TBTT Information field contents** |
| 9 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, the BSS Parameters subfield, and the 20 MHz PSD subfield |
| 10 | The Neighbor AP TBTT Offset subfield, the BSSID subfield and the MLD Parameters subfield |
| 11 | The Neighbor AP TBTT Offset subfield, the BSSID subfield and the Short SSID subfield |
| 12 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield and the BSS Parameters subfield |
| 0, 3, 14, 15 | Reserved |
| 13 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield, the BSS Parameters subfield and the  20 MHz PSD subfield |
|  |  |
| 16 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield, the BSS Parameters subfield, the 20 MHz PSD subfield and the MLD Parameters subfield |
| 17~~4~~–255 | The first 16~~3~~ octets of the field contain the Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield the BSS Parameters subfield, ~~and~~ the 20 MHz PSD subfield and the MLD Parameters subfield (i.e., same contents as when the length of the TBTT Information field is 16~~3~~). The remaining octets are reserved |

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36 ***Change*** [***Figure 9-632 (TBTT Information field format)***](#bookmark34) ***as follows:***

37

38

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Neighbor AP TBTT Offset | BSSID  (optional) | Short SSID (optional) | BSS parame- ters | 20 MHz PSD | MLD Parame- ters |
| Octets: | 1 | 0 or 6 | 0 or 4 | 0 or 1 | 0 or 1 | 0 or 3 |

39

40

41

42

43 **Figure 9-6****32—TBTT Info****rmation field****format (#1901, #1902, #2566, #2969, #1016, #1017, #1125)**

44

45

46 ***Insert the following at the end of this subclause:***

47

48 The format of the MLD Parameters subfield is defined in [Figure 9-632b (MLD Parameters subfield format)](#bookmark35).

49

50

51 B0 B7 B8 B11 B12 B19 B20 B23

52

|  |  |  |  |
| --- | --- | --- | --- |
| MLD ID | Link ID | Change Sequence | Reserved |

53

54

55

56 Bits: 8 4 8 4

57

58 **Figure 9-632b—MLD Parameters subfield format (#1901, #1902, #1016, #1017)**

5, #19039

60

1. The MLD ID subfield indicates the identifier of the AP MLD to which the reported AP is affiliated. If the
2. reported AP is affiliated to the same MLD as the reporting AP, the MLD ID subfield is set to 0. If the
3. reported AP is affiliated to the same MLD as a nontransmitted BSSID that is in the same multiple BSSID set

64

65 as the reporting AP, the MLD ID subfield is set to the same value as in the BSSID Index field in the Multiple

1. BSSID-Index element in the nontransmitted BSSID profile corresponding to the nontransmitted BSSID. If
2. the reported AP is part of another AP MLD, the MLD ID subfield is set to a value higher than 0 or lower than 255 if no Multiple BSSID element is carried in the same frame or a value higher than 2*n* – 1 and lower than 255 if a Multiple BSSID element is carried in the same frame, where *n* is the value contained in the MaxBSSID Indicator field in the Multiple BSSID element. (#2972, #3361, #1041, #1923, #1973) The MLD ID subfield is set to 255 if the reported AP is not part of an AP MLD, or
3. if the reporting AP does not have that information. (#2156)

5

1. NOTE 1—The MLD ID is used to identify the list of reported APs affiliated to the same AP MLD, especially when APs from multiple AP MLDs are reported, and is uniquely given to an AP MLD only in the frame which carries the Reduced Neighbor Report element describing reported APs affiliated to the AP MLD. Following the rules to set the MLD ID field, another AP may use a different MLD ID for the same AP MLD. (#3014) 8

9

1. The Link ID subfield indicates the link identifier of the reported AP within the AP MLD to which the
2. reported AP is affiliated. The Link ID subfield is set to 15 and ignored if the reported AP is not part of an AP MLD,
3. or if the reporting AP does not have that information. (#1019, #1775, #2157, #2568, #2974, #3015, #3259, #3362, #2976)

13

14 NOTE 2—The link identifier is unique to an AP within an AP MLD. 15

1. The Change Sequence subfield is an unsigned integer, initialized to 0, that increments when a critical update
2. to the Beacon frame of the reported AP occurs. The critical updates are defined in 11.2.3.15 (TIM Broad-

18

1. cast). The Change Sequence subfield is set to 255 and ignored if the reported AP is not part of an AP MLD, or if the
2. reporting AP does not have that information.

### 1 35.3.4 Discovery of an AP MLD

TGbe editor: Please update the following subclause (35.3.4.1 AP behavior) as shown below

2

### 3 35.3.4.1 AP behavior

4

5

(#2854, #2299, #1866, #2968, #2512, #1865)

13

1. If an AP is affiliated to an AP MLD and is not a nontransmitted BSSID then the Beacon and Probe Response frames transmitted by the AP shall include a TBTT Information field in a Reduced Neighbor Report element with the Neighbor AP
2. TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield, the BSS Parameters subfield, the 20 MHz PSD subfield, (#1186) and the MLD Parameters subfield, for each of the other APs affiliated to the same AP MLD. (#1671, #1418, #1039, #1780, #1781, #2298)

18

If an AP is affiliated to an AP MLD and is a nontransmitted BSSID then the Beacon and Probe Response frames transmitted by the AP corresponding to the transmitted BSSID of the same multiple BSSID set as the AP

1. shall include a TBTT Information field in a Reduced Neighbor Report element with the Neighbor AP
2. TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield, the BSS Parameters subfield, the 20 MHz PSD subfield, (#1186) and the MLD Parameters subfield, for each of the other APs affiliated to the same AP MLD. (#1671, #1418, #1039, #1780, #1781, #2298)

18

1. If a reporting AP is part of an AP MLD and is in the same co-located AP set (#2589) as APs affiliated with
2. another AP MLD for which there are no affiliated APs operating on the same channel as the
3. reporting AP, each AP of the other AP MLD shall be reported in the Reduced Neighbor Report

23

1. element that is included in the Beacon frames and broadcast Probe Response frames transmitted by
2. the reporting AP if at least one AP of the other AP MLD is in the same multiple BSSID set as an AP
3. affiliated with the AP MLD of the reporting AP, unless the APs of the other AP MLDs are already
4. reported in Beacon frames and broadcast Probe Response frames transmitted by an AP in the same
5. co-located AP set (#2589) as the reporting AP.

29

30

1. If an AP of an AP MLD is reported in a Reduced Neighbor Report element with the MLD Parameters

subfield present in the TBTT Information field for that AP, the MLD ID, the link ID and the Change Sequence subfields shall be set as described in 9.4.2.170.2 (Neighbor AP Information field). (#2972, #3361, #1041, #1923, #1973, #1924, #1925)



53NOTE – The MLD ID subfield in the Reduced Neighbor Report element is used to determine to which AP MLD a reported AP is affiliated to, especially when multiple AP MLDs are reported in the same frame. (#2820)

TGbe editor: Please update the following subclause (35.3.4.2 Use of MLD probe request) as shown below

### 54 35.3.4.2 Use of MLD probe request

55

56

1. An MLD probe request is a Probe Request frame that is sent outside the context of active scanning (#1187):
2. — with the Address 1 field set to the broadcast address and the Address 3 field set to the BSSID of an
3. AP, or with the Address 1 and Address 3 fields set to the BSSID of an AP. (#1045, #1187, #1673, #2150)

60

1. — and that includes a Probe Request variant Multi-Link element defined in 9.4.2.295b.3 (Probe Request variant Multi-Link element). (#1808, #2124, #3217)

64

65

(# 1046, #2151)

2

1. An MLD probe request allows a non-AP STA to request an AP to include the complete set of capabilities,
2. parameters and operation elements of other APs affiliated to the same AP MLD as the AP. An AP affiliated to the same AP MLD as the AP identified in the Address 1 or Address 3 field of the Probe
3. Request frame is a requested AP if one of the following conditions is met (#1675):
4. — the Multi-Link element in the Probe Request frame does not include any per-STA profile.

9

1. — the Link ID of the AP is equal to the value in the Link ID field in a per-STA profile in the Multi-Link
2. element in the Probe Request frame. (#1420)

12

1. The complete information of a requested AP sent by a reporting AP is defined in 35.3.2.2 (Complete or partial per-STA profile). (#1047)

18

1. If an AP that is affiliated to (#1422) an AP MLD receives an MLD probe request from a non-AP STA requesting complete
2. information, it shall respond with an MLD probe response, which is a Probe Response frame that includes a

21

1. Basic variant Multi-Link element with a per-STA (#2419) profile with complete information for each of the APs that are
2. affiliated to the same AP MLD as the AP and that are requested by the MLD probe request, subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response). (#1048) If it receives an
3. MLD probe request from a non-AP STA requesting partial information, it shall respond with an MLD probe
4. response that includes a Basic variant Multi-Link element with a per-STA (#2419) profile with at least the elements
5. requested for each of the APs that are affiliated to the same AP MLD as the AP and that are requested by the

27

1. MLD probe request, unless the elements requested are not part of the complete information for each of the
2. APs, and subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response). (#1048)

30

1. If an AP that is operating in the 2.4 GHz band or the 5 GHz band that is part of an AP MLD receives an
2. MLD probe request requesting complete information and responds with an MLD probe response

33

1. (per 11.1.4.3.4 (Criteria for sending a response)), the Address 1 field of the Probe Response frame
2. may be set to the broadcast address unless the AP is not including its actual SSID in the SSID element of its
3. Beacon frames. (#1423)
4. NOTE - An AP operating in 6 GHz sets the Address 1 field of the Probe Response frame to broadcast address as defined in 26.17.2.3.2 (AP behavior for fast passive scanning). (#1049. #1926, #2421, #2592, #2858)
5. A non-AP STA affiliated with a non-AP MLD shall not transmit more than three ML Probe Requests during each 20 TU period scanning the channel. None of the non-AP STAs of a non-AP MLD shall send an MLD probe request to an AP of the AP MLD in the corresponding link if any non-AP STA of the same non-AP MLD has already received a MLD probe response including complete information from any of the AP of the AP MLD in any link, since the MLME-SCAN.request primitive with ScanType parameter indicating an Active scan was issued. (#1676, #1042, #1044, #2760).

37

TGbe editor: Please update the following subclause (35.3.4.3 Multi-link element usage rules in the context of discovery) as shown below

### 38 35.3.4.3 Multi-link element usage rules in the context of discovery

39

40

41 A Probe Request frame that is a non-ML probe request shall not include a Multi-Link element.

42

43 A Probe Request frame shall not include a Basic variant Multi-Link element.

An AP of an AP MLD shall have a unique Link ID that shall not change during the lifetime of the AP MLD. The Link ID field in the per-STA profile corresponding to this AP in the Multi-Link element corresponding to this AP MLD shall be set to the unique Link ID value of this AP. (#2494)

TGbe editor: Please update the following subclause (35.3.2.2 Complete or partial per-STA profile) as shown below (#1047)

### 35.3.2.2 Complete or partial per-STA profile

43

1. A STA of an MLD may provide complete or partial information of another STA of its MLD in the Per-STA
2. Profile subelement of the Basic variant Multi-Link element that it transmits. The exact set of

46

47 elements/fields that constitute partial information is TBD.

1. The complete information from a STA for a frame is defined as all the elements and fields that would be
2. provided if the STA was transmitting the frame, except the following elements, if

15

1. present: the Reduced Neighbor Report element, the Multiple BSSID element, the Multi-Link element, other

exceptions TBD.

48

1. A STA of an MLD shall set the Complete Profile subfield of the Per-STA Control field in the Per-STA
2. Profile subelement to 1 if the Per-STA Profile subelement carries the complete information (subject to the inheritance
3. rules as defined in [35.3.2.3 (Inheritance in a per-STA profile)](#bookmark1)) for the frame that carried the Basic variant Multi-Link element. Otherwise the STA shall set the

52

1. subfield to 0.

55

1. An AP of an AP MLD shall follow the rules defined in [35.3.4.2 (Use of MLD probe request)](#bookmark3) to include
2. complete or partial profile of another AP of its MLD in ML Probe Response frame.

58

59

1. An AP of an AP MLD shall include complete profile of another AP of its MLD in its (Re-)Association
2. Response frame by following the rules defined in [35.3.5.4 (Usage and rules of Basic variant Multi-link](#bookmark7)
3. [element in the context of multi-link setup)](#bookmark7).

63

64

65

1. A STA of a non-AP MLD shall include complete profile of another STA of its MLD in its (Re-)Association
2. Request frame by following the rules defined in [35.3.5.4 (Usage and rules of Basic variant Multi-link](#bookmark7)
3. [element in the context of multi-link setup)](#bookmark7).

**11.49 Reduced neighbor report**

[…]

TGbe editor: Please update the following paragraph as shown below (#1018)

A STA that receives a Neighbor AP Information field with a recognized TBTT Information Field Type subfield but an unrecognized TBTT Information Length subfield ~~shall ignore that Neighbor AP Information field and continue to process remaining Neighbor AP Information fields.~~has three possible ways of processing the received information: (1) ignore that Neighbor AP Information field and continue to process the subsequent Neighbor AP Information fields or (2) process the first 13 octets of each TBTT Information field of the Neighbor AP Information field as if the TBTT Information Length subfield had value 13, ignore the remaining TBTT Information Length minus 13 octets of each TBTT Information field of the Neighbor AP Information field, and continue to process the subsequent Neighbor AP Information fields or (3) process the first 16 octets of each TBTT Information field of the Neighbor AP Information field as if the TBTT Information Length subfield had value 16, ignore the remaining TBTT Information Length minus 16 octets of each TBTT Information field of the Neighbor AP Information field, and continue to process the subsequent Neighbor AP Information fields. If the unrecognized TBTT Information Length value is less than or equal to 13, the STA shall follow alternative (1). If the unrecognized TBTT Information Length value is greater than 13, an HE STA shall follow alternative (2) and a non-HE STA shall follow either alternative (1) or (2). If the unrecognized TBTT Information Length value is greater than 16, an EHT STA shall follow alternative (3) and a non-EHT STA shall follow either alternative (1) or (2) or (3).

TGbe editor: Add the following at the end of the subclause 11.49 Reduced neighbor report (#1018)

An EHT AP shall follow the procedure defined in 35.3.4 (Discovery of an AP MLD) for including a Reduced Neighbor Report element in Beacon and Probe Response frames.

An AP that reports in a Reduced Neighbor Report element multiple APs operating on the same operating class/channel, some affiliated to an AP MLD and some not affiliated to an AP MLD should include two Neighbor AP Information fields for the same operating class/channel, one for the set of APs that are affiliated to an AP MLD (for which the MLD Parameters subfield is included in the TBTT Information field of a reported AP) and one for the set of APs that are not affiliated to an AP MLD (for which the MLD Parameters subfield is not included in the TBTT Information field of a reported AP).