IEEE P802.11  
Wireless LANs

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| LB271 CR for ML Reconfiguration Part 2 | | | | |
| Date: June 5, 2023 | | | | |
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Abstract

This submission proposes resolutions for following 38 CIDs received for TGbe LB271:

15610 15617 15849 15866 15990 15992 15993 15997 15998 16001

16189 16441 16442 16479 16480 16481 16482 16483 16694 17941

18021 18023 18024 18026 18027 18094 18121 18122 18123 18124

18125 18126 18266 18309 16586 15999 16000 17871

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Green tagging by Alfred. Updates based on offline feedback. Removed CID 18265, transferred to Po-kai. Added CIDs 16586, 15999, 16000 and 17871.

***TGbe editor: The baseline for this document is 11be D3.2.***

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbe Draft. This introduction is not part of the adopted material.

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

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

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| --- | --- | --- | --- | --- | --- |
| ***CID*** | ***Clause*** | ***Page*** | ***Comment*** | ***Proposed Change*** | ***Resolution*** |
| 15610 | 35.3.6.2.2 | 510.46 | If there is an AP that is announced to be deleted through the reconfiguration procedure, the negotiation procedures performed between the non-AP MLD and the AP MLD should be performed assuming that the link does not exist. If not, negotiation may need to be performed again after the AP has been removed. | Any TID-to-Link mapping negotiations performed during the announcement that an AP will be removed by reconfiguration should be restricted to not mapping TIDs to the links of the AP being removed. Also, enabling other modes of operation (e.g., eMLSR/eMLMR) for the link to be removed may not be permitted. | Rejected  The removal of an AP is advertised in advance through Reconfiguration ML element. The AP remains operational during the time period the AP removal is advertised and supports same set of features as any other AP. There is no reason to create special handling for features for an AP being removed in future. The AP Removal feature addresses how TID-to-Link Mapping and EMLSR/EMLMR features are handled when an AP is removed in clause 35.3.6.3. No additional rules are needed. |
| 15617 | 35.3.6.2.2 | 510.46 | The EMLSR/EMLMR mode of non-AP MLD, for which there are no remaining EMLSR/EMLMR links due to the reconfiguration performed by the AP MLD, should be terminated. It is necessary to define whether the termination can be done implicitly or an explicit signaling needs to be exchanged between the AP MLD and the non-AP MLD. | As in comment | Revised  Agree in principle. Added text indicating that EMLSR/EMLMR mode shall be implicitly disabled when no EMLSR/EMLMR links remain after ML reconfiguration either due to AP removal or link deletion to the ML setup, without requiring explicit transmission of an EML Operating Mode Notification frame.  **TGbe editor, please make the changes tagged by CID #15617 in 11-23/0995r1.** |
| 15849 | 9.4.2.312.4 | 266.19 | The STA Control field has 4 unused and the Presence Indication subfield as described in Figure 9-1002aa only uses 2 bits. It's wasteful to use a whole octet for another layer of presence indication. Create additional complexity in design that takes more space. | Replace the Operation Parameters Present bit with two presence bits - Maximum MPDU (A-MSDU) Length Present, and remove the Presence Indication subfield in Figure 9-1002z. | Rejected  The Reconfiguration ML element is enhanced to provide a generic framework for ML reconfiguration enabling different ML reconfiguration operations using different values of ‘Operation Update Type’ field. In this framework, the presence of subfields in STA Info can be indicated by using the value of ‘Operation Update Type’ subfield when possible. There is another CID 15952 raising that a separate ‘Operation Parameters Present’ bit is not needed since the Operation Update Type value can be used to indicate presence of Operation Parameters field. Also, the Presence Indication subfield can be extended to indicate other parameters in future. Hence, no need to move presence bits from STA Info to STA Control. |
| 15866 | 35.3.6.2.2 | 512.65 | This subclause is lack of normative text for the Operational Parameters subfield (as described in 9.4.2.312.4). | Please add. | Revised  Agree in principle. Added text to indicate that no other subfields are included in the STA Info for the AP removal. Also used this CID to reorganize the paragraph text for better readability.  **TGbe editor, please make the changes tagged by CID #15866 in 11-23/0995r1.** |
| 15990 | 35.3.6.2.2 | 511.17 | The Reconfiguration ML element definition was enhanced to add new subfields in the STA Control field. Revise requirement text for setting subfields in the STA Control field such that it specifies how new subfields are set in the Reconfig ML element for the AP removal case. | Revise requirement text for setting subfields in the STA Control field as per comment. | Revised  D3.2 already captures requirement for setting the Operation Update Type subfield to 0 for the AP removal case. CID 15952 is asking to remove the ‘Operation Parameters Present’ bit, hence do not need to add any requirement for that subfield. No further changes needed. |
| 15992 | 35.3.6.2.2 | 511.26 | Capture requirement that the AP Removal Timer in the Reconfig ML element shall be set to the corresponding parameter received in the MLME-BSS-AP-REMOVAL.request. | Capture requirement as in comment | Revised  Agree in principle. Added text to capture the requirement.  **TGbe editor, please make the changes tagged by CID #15992 in 11-23/0995r1.** |
| 15993 | 35.3.6.2.2 | 511.26 | Capture missing requirement that the AP Removal Timer shall be decremented by 1 in the Reconfig ML element in each subsequent Beacon. | Capture requirement as in comment | Revised  Agree in principle. Added text to capture the requirement.  **TGbe editor, please make the changes tagged by CID #15993 in 11-23/0995r1.** |
| 15997 | 35.3.6.2.2 | 512.40 | Capture missing requirement that at the TBTT indicated by the AP Removal Timer, the AP MLD shall also remove the Per-STA Profile subelement from the Reconfig ML element, and if no Per-STA Profile subelement remain in the Reconfig ML element, shall stop transmitting that element in Beacon and Probe Response. | Capture requirement as per comment | Revised  Agree in principle. Added text to capture the requirement.  **TGbe editor, please make the changes tagged by CID #15997 in 11-23/0995r1.** |
| 15998 | 35.3.6.2.2 | 513.06 | The 'Otherwise' part of the requirement is not needed, because if after the AP removal, all TIDs are still mapped to one or more remaining setup links, then both MLDs continue to use existing TID-to-link mapping per already defined behavior in 35.3.7. | Remove the 'Otherwise..." part of the requirement | Revised  Agree in principle. Revised text as suggested.  **TGbe editor, please make the changes tagged by CID #15998 in 11-23/0995r1.** |
| 16001 | 35.3.6.2.2 | 513.20 | When an affiliated AP is advertised to be removed through Reconfig ML element, that AP is still included in the RNR and Basic ML element as per other rules defined for the affiliated AP. Hence a non-AP MLD can still request to set up a link with that AP. It will be up to the AP MLD to accept or reject such a request. Add a note to clarify this part. | Add a note as per the comment. | Revised  Agree in principle. Revised existing note to capture that the affiliated AP advertised to be removed continue to be included in the RNR of other affiliated APs of the same AP MLD.  **TGbe editor, please make the changes tagged by CID #16001 in 11-23/0995r1.** |
| 16189 | 35.3.6.2.2 | 512.36 | In page 512 line 17, the BSS is terminated at the time indicated by the BSS Termination TSF field. However, in page 512 line 36, the SME of the affiliated AP shall terminate the corresponding BSS at the TBTT indicated by the value of the AP Removal Timer subfield. Is there any relationship between BSS Termination TSF field and AP Removal Timer subfield. | Clarify the relationship between BSS Termination TSF field and AP Removal Timer subfield | Rejected  The text on pg512 ln17 applies when the AP being removed is transmitting a BTM Request frame. The text on pg512 ln36 applies when the AP is not transmitting a BTM. In the later case there is no BSS Termination TSF, since no BTM is sent. For the case when BTM is sent, current text already captures that the BSS Termination TSF is later than the Disassociation Timer TBTT value which is >= to the TBTT pointed by the AP Removal Timer. No further changes needed. |
| 16441 | 35.3.6.2.2 | 510.46 | Please clarify that Operation Update Type and parameters are not included in the procedure defined in this subclause | as in comment | Revised  In D3.2 Operation Update Type value 0 is used for AP Removal. Added text to indicate that no other subfields are included in the STA Info for the AP removal.  **TGbe editor, please make the changes tagged by CID #16441 in 11-23/0995r1.** |
| 16479 | 35.3.6.2.2 | 511.40 | The procedure described in the paragraph at P511L40, has to be initiated by an MLME primitive (initiated by the SME of the AP MLD). Need to specify in the description the exact primitive that is used by the MLME (with a reference to clause 6.3 in accordance). | As in comment | Revised  Agree in principle. Revised text to indicate MLME primitive used for initiating BTM transmission.  **TGbe editor, please make the changes tagged by CID #16479 in 11-23/0995r1.** |
| 16480 | 35.3.6.2.2 | 511.41 | The following sentence " If the affiliated AP being removed transmits BSS Transition Management Request frame(s) ..the SME of that affiliated AP shall perform the following procedure to terminate the BSS" contradicts the reference model of MLO (see 4.9.6) where: 1. the MLME is initiating the frame exchange by the affiliated STAs, according to the primitives provided by the SME: "The SME is responsible for coordinating the MLD and each of the affiliated STAs through the MLME.." (see also 6.3.57.4.4 which clearly indicates that the MLME initiates the transmission of the BSS Transition Management Request frame). 2. According to figures 4-30b, 4-30c there is a single SME per MLD (and there is no SME for an affiliated AP) Please revise the sentence as suggested. | The sentence should be revised as follows: " If the affiliated AP being removed transmits BSS Transition Management Request frame(s) ..the SME \*of AP MLD shall initiate the MLME to\* perform the following procedure to terminate the BSS" | Revised  Agree in principle. Text has been revised to indicate \*SME of the AP MLD\* and other related edits.  **TGbe editor, please make the changes tagged by CID #16480 in 11-23/0995r1.** |
| 16481 | 35.3.6.2.2 | 512.33 | The following sentence " When the affiliated AP being removed ..., the SME of the affiliated AP shall terminate the corresponding BSS ..." contradicts the reference model of MLO (see 4.9.6) where according to figures 4-30b, 4-30c there is a single SME per MLD (and there is no SME for an affiliated AP) Please revise the sentence as suggested. | 1. The sentence should be revised as follows: " When the affiliated AP being removed ..., the SME of the \*AP MLD\* shall \*initiate the MLME to terminate the corresponding BSS\* ..." 2. Need to add a description for the primitive through which this operation is applied. | Revised  Agree in principle. Text has been revised to address the points raised.  **TGbe editor, please make the changes tagged by CID #16481 in 11-23/0995r1.** |
| 16482 | 35.3.6.2.2 | 512.42 | Need to add a paragraph for the removal of the affiliated AP indicated by the Link ID subfield in the STA Control field of the Per-STA Profile subelement of the Basic MLE which is carried in the subsequent Beacon and Probe Response frames. Please add the sentence, as suggested. | Consider revise the sentence as follows: “At the TBTT indicated by the value of the AP Removal Timer subfield in transmitted Reconfiguration Multi-Link elements, the AP MLD shall remove the affiliated AP indicated by the Link ID subfield in the STA Control field of the Per-STA Profile subelement of the Basic Multi-Link element which is carried in the subsequent Beacon and Probe Response frames” | Revised  Agree in principle. Added text to indicate that after an AP is removed, that AP is removed from the Basic ML element.  **TGbe editor, please make the changes tagged by CID #16482 in 11-23/0995r1.** |
| 16483 | 35.3.6.2.2 | 512.48 | The following sentence “ At the TBTT indicated by the value ..., and the SME of the affiliated non-AP STA associated with the removed affiliated AP shall delete ...” contradicts the reference model of MLO (see 4.9.6) where according to figures 4-30b, 4-30c there is a single SME per MLD (and there is no SME for an affiliated AP) Please revise the sentence as suggested. | The sentence should be revised as follows: “ At the TBTT indicated by the value ..., and the SME of the \*non-AP MLD associated with the AP MLD with which the removed AP is affiliated\* shall delete ..." | Revised  Revised the text to indicate the \*SME of the non-AP MLD\*.  **TGbe editor, please make the changes tagged by CID #16483 in 11-23/0995r1.** |
| 16586 | 35.3.6.2.2 | 512.07 | Rephrase the sentence for clarity, as suggested: "The Disassociation Timer field in all subsequent transmitted BSS Transition Management Request frames shall be set to the value of this timer." | Revise the sentence as follows: " In all subsequent transmitted BSS Transition Management Request frames, the Disassociation Timer field shall be set to the value of this timer." | Revised  This is editorial clarification. Revised as per suggestion.  **TGbe editor, please make the changes tagged by CID #16586 in 11-23/0995r1.** |
| 16694 | 35.3.6.2.2 | 510.61 | Change the “transmitted BSSID” to “transmtting BSSID” in “the Reconfiguration Multi-Link element carrying information of the removed AP(s) shall be included within the nontransmitted BSSID profile of the Multiple BSSID element contained in the Beacon frame and Probe Response frame transmitted by the transmitted BSSID in the same multiple BSSID set. | See in the comment | Rejected  The \*transmitted BSSID\* term is correct usage and is used in many other places in the draft spec. |
| 17941 | 35.3.6.2.2 | 511.49 | please use normative language for “are set to 1”, which is “shall be set to 1”. Same for many other places in this page. | Change “are set to 1” to “shall be set to 1”, and make corresponding changes to other places in this page. | Revised  Agree in principle. Revised text as per suggestion.  **TGbe editor, please make the changes tagged by CID #17941 in 11-23/0995r1.** |
| 18021 | 35.3.6.2.2 | 510.46 | The use of the term “remove” is very odd in the phrase “... until the affiliated AP has been removed.” The AP MLD is redefining the set of affiliated APs by removing it from the “list” of affiliated APs that define the AP MLD at the non-AP MLD. The action of removal is an act of the non-AP MLD to remove the affiliated AP from its list of affiliated APs, which will result in the link provided by the affiliated AP to no longer be active. However, the AP MLD does not know when all the associated non-AP MLDs have completed this task. So it has no knowledge of when the affiliated AP has been removed. The requirement on the AP MLD to transmit the Reconfiguration Multi-Link element should be until the affiliated AP is no longer an affiliated AP, when affiliated AP will not support reception or transmission of MLD traffic and will no longer send Beacon frames or probe request containing the Multi-Link element for the MLD.  In 802.11 remove is usually used to describe an action to update parameters in a BSS. An affiliated AP is not a parameter. | Where remove is used to describe the point in time when the affiliated AP no longer supporting MLO for the MLD, change “remove” to be “stops supporting MLO for the AP MLD”. | Rejected  The ‘Removing affiliated APs’ procedure indicates the operation of removing an affiliated AP from the AP MLD, and not the \*act of the non-AP MLD to remove the affiliated AP from its list of affiliated APs\* as mentioned in the comment. The group has adopted removing affiliated AP terminology for many drafts and it is well understood what it means. Hence, no change is needed. |
| 18023 | 9.4.2.312.2 | 267.28 | The AP Removal Timer field can not contain the number of TBTTs until the AP specified in the Per-STA Profile subelement is removed. The act of removal is an action of the non-AP MLD removing the affiliated AP from the MLD. It is not the act of the AP MLD of no longer supporting MLO over the affiliated AP that it has informed the non-AP MLD to remove. The AP has no knowledge of when the non-AP MLD will remove the AP, it only knows when it the AP MLD will no longer support MLO on that AP. Therefore, the timer should provide the time when the AP MLD will no longer support MLO on the AP corresponding the Per-STA Profile subelement. | Replace: “... until the AP specified in the Per-STA Profile subelement is removed.” With: “... until the AP specified in the Per-STA Profile subelement stops supporting MLO for the AP MLD.” | Rejected  The ‘Removing affiliated APs’ procedure indicates the operation of removing an affiliated AP from the AP MLD, and not the \*act of the non-AP MLD to remove the affiliated AP from its list of affiliated APs\* as mentioned in the comment. The group has adopted removing affiliated AP terminology for many drafts and it is well understood what it means. Hence, no change is needed. |
| 18024 | 9.4.2.312.2 | 267.34 | The AP Removal Timer field can not contain the number of TBTTs until the AP specified in the Per-STA Profile subelement is removed. The act of removal is an action of the non-AP MLD removing the affiliated AP from the MLD. It is not the act of the AP MLD of no longer supporting MLO over the affiliated AP that it has informed the non-AP MLD to remove. The AP has no knowledge of when the non-AP MLD will remove the AP, it only knows when it the AP MLD will no longer support MLO on that AP. Therefore, the timer should provide the time when the AP MLD will no longer support MLO on the AP corresponding the Per-STA Profile subelement. | Replace: “... until the AP specified in the Per-STA Profile subelement is removed.” With: “... until the AP specified in the Per-STA Profile subelement stops supporting MLO for the AP MLD.” | Rejected  The ‘Removing affiliated APs’ procedure indicates the operation of removing an affiliated AP from the AP MLD, and not the \*act of the non-AP MLD to remove the affiliated AP from its list of affiliated APs\* as mentioned in the comment. The group has adopted removing affiliated AP terminology for many drafts and it is well understood what it means. Hence, no change is needed. |
| 18026 | 35.3.6.2.2 | 511.20 | The AP Removal Timer field can not contain the number of TBTTs until the AP specified in the Per-STA Profile subelement is removed. The act of removal is an action of the non-AP MLD removing the affiliated AP from the MLD. It is not the act of the AP MLD of no longer supporting MLO over the affiliated AP that it has informed the non-AP MLD to remove. The AP has no knowledge of when the non-AP MLD will remove the AP, it only knows when it the AP MLD will no longer support MLO on that AP. Therefore, the timer should provide the time when the AP MLD will no longer support MLO on the AP corresponding the Per-STA Profile subelement. | Replace: “... that affiliated AP before it is removed ...” With: “... that affiliated AP before it stops supporting MLO ...” | Rejected  The ‘Removing affiliated APs’ procedure indicates the operation of removing an affiliated AP from the AP MLD, and not the \*act of the non-AP MLD to remove the affiliated AP from its list of affiliated APs\* as mentioned in the comment. The group has adopted removing affiliated AP terminology for many drafts and it is well understood what it means. Hence, no change is needed. |
| 18027 | 35.3.6.2.2 | 511.25 | The AP Removal Timer field can not contain the number of TBTTs until the AP specified in the Per-STA Profile subelement is removed. The act of removal is an action of the non-AP MLD removing the affiliated AP from the MLD. It is not the act of the AP MLD of no longer supporting MLO over the affiliated AP that it has informed the non-AP MLD to remove. The AP has no knowledge of when the non-AP MLD will remove the AP, it only knows when it the AP MLD will no longer support MLO on that AP. Therefore, the timer should provide the time when the AP MLD will no longer support MLO on the AP corresponding the Per-STA Profile subelement. | Replace: “... before the AP is removed.” With: “... before the AP stops supporting MLO.” Also correct the notes at 512.56, 512.64, | Rejected  The ‘Removing affiliated APs’ procedure indicates the operation of removing an affiliated AP from the AP MLD, and not the \*act of the non-AP MLD to remove the affiliated AP from its list of affiliated APs\* as mentioned in the comment. The group has adopted removing affiliated AP terminology for many drafts and it is well understood what it means. Hence, no change is needed. |
| 16442 | 35.3.6 | 510.03 | A new procedure has been defined using ML reconfiguration element to update a very limited set of parameters in 35.3.16.2.2. This solution is so limited to it is not useful. ML Reconfiguration framework allows to define a completely generic solution where a non-AP STA can update all sorts of fields/elements. Please define such a mechainsm | as in comment | Rejected  The comment fails to identify specific use cases or scenarios for which fields and elements need to be updated using a generic reconfiguration update solution. Suggest to raise comment in the next round identifying specific fields and elements for which updates should be supported through a generic mechanism. |
| 17871 | 9.4.2.312.2 | 9.4.2.312.2 | Why only Max MPDU Length and Max A-MSDU Length can be updated by the non-AP MLD? Other parameters can also change after the addition or deletion of a setup link. Please check if other parameters need to be updated. | As in comment | Rejected  The comment fails to identify which other parameters (fields/elements) can change after the addition or deletion of a setup link. Suggest to raise comment in the next round identifying specific parameters for which updates should be supported. |
| 18094 | 9.4.2.312.4 | 267.11 | Why is Operation Parameters field carried within STA Info field? Tgbe should not take a narrow view and limit the parameter updating scheme to just a couple of variable (in this case Max MPDU length and Max A-MSDU length). There can be several other parameters that can be updated with this mechanism. Define a broad framework to perform such updates. | Allow Reconfig ML IE to carry STA Profile field (similar to Basic variant) in the Per-STA Profile subfield. Enable the Per-STA Profile subfield to carry variable fields/elements that can be updated via the Update Request/Response frames. | Rejected  The comment fails to identify what specific fields and elements need to be updated using this broad framework to perform parameter updates. To support updating fields by including them in the STA Profile, further analysis is needed to identify the initial set of fields/elements. Also, what specific fields are updated in an Update request frame need to be indicated through a presence bitmap, to allow a non-AP MLD to update a subset of fields in a request. Suggest to raise comment in the next round identifying specific fields and elements for which updates should be supported through a broad mechanism. |
| 18121 | 35.3.6.2.2 | 511.34 | Upon receiving a Reconfiguration ML IE, an associated non-AP MLD will determine that an affiliated AP is being removed. Therefore, the ‘or’ part is not needed. | Delete the text ‘or’ onwards. Same comment for the next sentence. | Revised  Agree in principle. The text is revised to indicate that the BTM frame may be transmitted to non-AP STAs that are affiliated with non-AP MLDs associated with the AP MLD of the affiliated AP.  **TGbe editor, please make the changes tagged by CID #18121 in 11-23/0995r1.** |
| 18122 | 35.3.6.2.2 | 511.35 | This is a repetition of the previous sentence with the ‘may’ changed to a ‘shall’. Delete one of the sentence. | As in comment | Revised  Deleted the first sentence and clarified that ’may’ requirement applies for BTM transmission to associated non-AP STAs that are affiliated with non-AP MLDs associated with the AP MLD.  **TGbe editor, please make the changes tagged by CID #18122 in 11-23/0995r1.** |
| 18123 | 35.3.6.2.2 | 511.54 | Clarify that the STA in the 3rd bullet is a non-MLO STA (consistent with the previous paragraph). | Add ‘non-MLO’ before ‘STA(s)’ | Revised  Agree in principle. Revised text as per suggestion.  **TGbe editor, please make the changes tagged by CID #18123 in 11-23/0995r1.** |
| 18124 | 35.3.6.2.2 | 511.54 | There can be more than one non-MLO STA associated with the AP that is being removed. In such case, the AP would need to transmit more than one Disassociation frame. | Replace ‘a Disassociation frame’ to ‘Disassociation frame(s)’ | Revised  Agree in principle. Revised text as per suggestion.  **TGbe editor, please make the changes tagged by CID #18124 in 11-23/0995r1.** |
| 18125 | 35.3.6.2.2 | 512.33 | The SME of the affiliated AP that is being removed shall terminate the AP’s BSS at the specified TBTT regardless of BTM Request frames transmissions. The relationship with transmissions of BTM Request frames is unclear. Revise the text to clarify the intention. | As in comment | Revised  When BTM is transmitted, the BSS is terminated at the BSS Termination TSF field indicated in the BTM as captured in bullet “4” earlier in the subclause. Added a Note to clarify this.  **TGbe editor, please make the changes tagged by CID #18125 in 11-23/0995r1.** |
| 18126 | 35.3.6.2.2 | 512.59 | There is only one txBSSID in a multiple BSSID set. | Remove the ‘s’ from ‘BSSIDs’ | Revised  The text is referring to transmitted BSSIDs for more than one multiple BSSID sets which correspond to the APs affiliated with the AP MLD of the removed AP. Hence there can be more than one transmitted BSSID, Revised text to further clarify.  **TGbe editor, please make the changes tagged by CID #18126 in 11-23/0995r1.** |
| 18266 | 35.3.6 | 510.08 | When the link is added or removed, the non-AP MLD should be able to switch the operating link. For example, the non-AP MLD supports one link and it operates on 2.4GHz. When 5GHz link is added, it should be able to switch the current operating link to 5GHz link without additional resources (e.g., MAC address). One solution is to perform the link addition and link removal in the same transaction. | As in the comment. | Revised  Agree in principle. This is already supported in D3.2 where a non-AP MLD can delete a link and add a new link for the same non-AP STA MAC address in a single request. This can be used to replace the current link with a new link. No further changes needed. |
| 18309 | 35.3.6.2.2 | 512.19 | Non-AP STAs that are affiliated with non-AP MLDs can discover and associate with the AP affiliated with NSTR mobile AP MLD operating on the nonprimary link through primary link. | Delete the note. | Revised.  The Note is referring to the non-MLD non-AP STAs. Revised the Note to clarify this.  **TGbe editor, please make the changes tagged by CID #18309 in 11-23/0995r1.** |
| 15999 | 35.3.6.2.2 | 513.19 | Specify behavior for the non-AP MLD and the AP MLD when an affiliated AP is removed and that results in a single EMLSR link remaining for that non-AP MLD. Does the non-AP MLD and AP MLD continue to operate in EMLSR mode on the single remaining link? | Capture behavior when a single EMLSR link is remaining for a non-AP MLD after an AP removal. | Revised  Added NOTE to indicate that if only a single EMLSR link remains after ML reconfiguration operations, then both AP MLD and the non-AP MLD continue to operate in EMLSR mode.  **TGbe editor, please make the changes tagged by CID #15999 in 11-23/0995r1.** |
| 16000 | 35.3.6.2.2 | 513.19 | Specify behavior for the non-AP MLD and the AP MLD when an affiliated AP is removed and that results in a single EMLMR link remaining for that non-AP MLD. Does the non-AP MLD and AP MLD continue to operate in EMLMR mode on the single remaining link? | Capture behavior when a single EMLMR link is remaining for a non-AP MLD after an AP removal. | Revised  Added NOTE to indicate that if only a single EMLMR link remains after ML reconfiguration operations, then both AP MLD and the non-AP MLD continue to operate in EMLMR mode.  **TGbe editor, please make the changes tagged by CID #16000 in 11-23/0995r1.** |

**35.3.6.3 Removing affiliated APs(#18115)**

***TGbe editor: Please modify the 1st paragraph in this subclause as follows:***

(#15992) The SME of an AP MLD may remove one or more of its affiliated AP by initiating the MLME-BSS-AP-REMOVAL.request primitive (see 6.3.136.2 (MLME-BSS-AP-REMOVAL.request)) for each affiliated AP to be removed. Upon receiving an MLME-BSS-AP-REMOVAL.request primitive, an AP MLD shall follow the procedures defined in this subclause to remove the affiliated AP indicated by the BSSID parameter in that primitive. An AP MLD that is an NSTR mobile AP MLD shall not remove the affiliated AP operating on the primary link (see 35.3.19 (NSTR mobile AP MLD operation)). The AP MLD shall announce the removal of any affiliated AP through a Reconfiguration Multi-Link element (see 9.4.2.312.4 (Reconfiguration Multi-Link element)) in all Beacon frames transmitted by its affiliated APs, as well as in all Probe Response frames it transmits, until the affiliated AP has been removed.

***TGbe editor: Please modify the 5th paragraph in this subclause as follows (#15866):***

(#15985)In the Reconfiguration Multi-Link element, the EML Capabilities Present subfield and the MLD Capabilities And Operations Present subfield shall be set to 0. For each affiliated AP that the AP MLD intends to remove, the Reconfiguration Multi-Link element shall include a Per-STA Profile subelement with the subfields of the STA Control field and the STA Info fields set as following:

* The Link ID subfield shall be set to the link identifier of the AP being removed
* The Complete Profile subfield shall be set to 0 and the STA MAC Address Present subfield shall be set to 0
* (#15991)(#16433)The AP Removal Timer Present subfield shall be set to 1 and the Operation Update Type subfield shall be set to 0.
* The AP Removal Timer subfield in the STA Info field shall be set to the number of TBTTs of the affiliated AP before it is removed or for the NSTR mobile AP MLD the AP Removal Timer subfield shall be set to the number of the TBTTs of the AP operating on the primary link before the affiliated AP operating on the nonprimary link is removed. The initial value of the AP Removal Timer subfield should point to a TBTT value that provides (#17937)sufficient time to announce the removal of (#17939)the affiliated AP such that all associated non-AP MLDs including the ones (#15992)which have all affiliated non-AP STAs in power save mode and doze state have the opportunity to receive (#17940)the Reconfiguration Multi-Link element at least once before the AP is removed(#15994). (#15992) The initial value of the AP Removal Timer subfield shall be set to at least the value of the APRemovalTimer parameter of the MLME-BSS-AP-REMOVAL.request primitive (#15993)and the AP Removal Timer value shall be decremented by 1 in each subsequent Beacon frame.
* (#15866)(#16441)No other subfields shall be included in the STA Info field.

***TGbe editor: Please modify the 7th paragraph in this subclause as follows:***

(#18121)(#18122)The affiliated AP that is being removed shall transmit BSS Transition Management Request frame(s) if it has associated non-AP STAs that are not affiliated with a non-AP MLD and that support BTM to notify such non-AP STAs of the termination of its BSS. The affiliated AP being removed may transmit BTM Request frame to associated non-AP STAs that are affiliated with non-AP MLDs associated with the AP MLD of the affiliated AP.

***TGbe editor: Please modify the 8th and 9th paragraph in this subclause as follows:***

If the affiliated AP (#15402)that is being removed transmits BSS Transition Management Request frame(s) to notify (#15865)of the termination of its BSS, the SME of (#16480)the AP MLD shall (#16479)initiate the MLME-BTM.request primitive (see 6.3.57.4 (MLME-BTM.request)). Upon receiving an MLME-BTM.request primitive, the AP MLD shall perform the following procedure to terminate the BSS:

1. (#16480)It shall follow the procedure in 11.21.7.3 (BSS transition management request) and 35.3.23 (BSS transition management for MLDs) to transmit BSS Transition Management Request frame(s) by the affiliated AP that is intended to be removed. It shall set the fields in the BSS Transition Management Request frame(s) as follows:

— The Disassociation Imminent, BSS Termination Included, and Link Removal Imminent subfields of the Request Mode field (#17941)shall be set to 1; the Preferred Candidate List Included field (#17941)shall be set per 9.6.13.9 (BSS Transition Management Request frame format) if the BSS Transition Candidate List Entries field is included; other subfields of the Request Mode field are reserved.

— The Disassociation Timer field (#17941)shall be set to the number of TBTTs of the affiliated AP before it transmits (#18124) Disassociation frame(s) to the (#18123)non-MLD non-AP STA(s) receiving the BSS Transition Management Request frame. The Disassociation Timer field value shall point to a TBTT at or later than the TBTT pointed to by the value of the AP Removal Timer field of the Reconfiguration MultiLink element in transmitted beacons.

— The BSS Termination Duration field shall be present and contain a BSS Termination Duration subelement (see 9.4.2.35 (Neighbor Report element)), with the BSS Termination TSF field of the subelement set to the value of the TSF timer when the BSS (#16585)corresponding to the affiliated AP will be terminated. The BSS Termination TSF field value shall indicate a time that is later than the TBTT the Disassociation Timer field value points to.

— The BSS Transition Candidate List Entries field may be included specifying one or more

Neighbor Report elements to provide BSS transition candidate list.

— No other optional fields shall be present in the BSS Transition Management Request frame.

1. It shall start a disassociation timer with the initial value set to the value of the Disassociation Timer field, and shall decrement the timer by one after (#16480) each Beacon frame transmission by the affiliated AP that is intended to be removed, until the timer has the value of 0. (#16586)In all subsequent transmitted BSS Transition Management Request frames the Disassociation Timer field shall be set to the value of this timer.
2. Once the disassociation timer reaches a value of 0, and before the TSF indicated by the BSS Termination TSF field, it shall follow the procedure in 11.3.6.8 (AP, AP MLD, or PCP disassociation initiation procedure) to transmit Disassociation frame(s) to all non-AP STAs associated with the AP being removed that are not affiliated with a non-AP MLD. The affiliated AP shall not transmit Disassociation frames until the disassociation timer has a value of 0.
3. (#16481)Upon receiving the MLME-Stop.request primitive (see 6.3.12.2 (MLME-Stop.request)) from the SME for the affiliated AP , the AP MLD shall terminate the BSS corresponding to the affiliated AP at the time indicated by the BSS Termination TSF field.

NOTE 2—(#18309)Since the non-MLD non-AP STAs cannot discover or associate with the AP affiliated with NSTR mobile AP MLD operating on the nonprimary link, the NSTR mobile AP MLD does not transmit BTM Request frame(s) when it is removing the AP operating on the nonprimary link.

***TGbe editor: Please modify the 12th and 13th paragraphs in this subclause as follows:***

When the affiliated AP being removed (#15403)does not transmit BSS Transition Management Request frame(s) to notify of the termination of its BSS, the SME of the (#16481)AP MLD shall terminate the BSS corresponding to the affiliated AP being removed at the TBTT indicated by the value of the AP Removal Timer subfield by initiating the MLME-Stop.request primitive (see 6.3.12.2 (MLME-Stop.request)).

(#18125)NOTE-- If the affiliated AP that is being removed transmits a BTM Request framethen the BSS corresponding to the affiliated AP is terminated at the time indicated in the BSS Termination TSF field of the BTM Request frame.

At the TBTT indicated by the value of the AP Removal Timer subfield in transmitted Reconfiguration Multi-Link elements, the AP MLD shall remove the affiliated AP indicated by the Link ID subfield in the STA Control field of the Per-STA Profile subelement that includes the AP Removal Timer subfield. (#15997) After removing the affiliated AP, the AP MLD shall remove the Per-STA Profile subelement from the Reconfiguration ML element corresponding to the removed AP, and if no more Per-STA Profile subelement remain in the Reconfiguration ML element, the AP MLD shall stop transmitting the Reconfiguration ML element in the subsequent Beacon and Probe Response frames of the remaining affiliated APs. (#16482)After the affiliated AP is removed, the AP MLD shall remove the Per-STA Profile subelement for that affiliated AP (if any) from the Basic ML element.

***TGbe editor: Please modify the 15th and 16thparagraphs in this subclause as follows:***

At the TBTT indicated by the value of the AP Removal Timer subfield in transmitted Reconfiguration Multi-Link elements, an associated non-AP MLD shall consider the link corresponding to the removed AP nonexistent, and the SME of the (#16483)non-AP MLD shall delete any information maintained for that link. After a non-AP MLD deletes any information maintained for the link corresponding to the removed AP, if there are no other setup links with the AP MLD, then the non-AP MLD shall consider that it has been disassociated from the AP MLD and shall delete MLD association information.

NOTE 3—(#16001)When an affiliated AP of an AP MLD is advertised to be removed in a Reconfiguration ML element, the other APs affiliated with the same AP MLD continue to include the TBTT Information field corresponding to that AP in the Reduced Neighbor Report element. Once an AP affiliated with an AP MLD is removed, the other APs affiliated with the same AP MLD do not include the TBTT Information field for the removed AP in the Reduced Neighbor Report element. Further, the removed AP is not included by (#18126)any of the transmitted BSSIDs of the multiple BSSID sets (if any) corresponding to the APs affiliated with the AP MLD of the removed AP.

***TGbe editor: Please modify the 18th paragraph in this subclause as follows:***

If a non-AP MLD removes a setup link (#15998) from its multi-link setup as a result of the removal of an AP affiliated with its associated AP MLD, and that results in a TID not being mapped to any of the remaining setup links (if exists) in either direction for that non-AP MLD, then the non-AP MLD and the AP MLD shall operate with that TID mapped to all remaining enabled links for that direction after the removal of the setup link, until a new TID-to-link mapping is established for that TID. (#15998)

***TGbe editor: Please add following paragraphs at the end of this clause:***

(#15999) NOTE: If the removal of an AP as per procedures defined in this subclause results in only a single EMLSR link remaining for an associated non-AP MLD, both the AP MLD and the non-AP MLD continue to operate in the EMLSR mode as per procedures described in clause 35.3.17 (Enhanced multi-link single radio operation).

(#16000) NOTE: If the removal of an AP as per procedures defined in this subclause results in only a single EMLMR link remaining for an associated non-AP MLD, both the AP MLD and the non-AP MLD continue to operate in the EMLMR mode as per procedures described in clause 35.3.18 (Enhanced multi-link multi-radio operation).

(#15617)If the removal of one or more APs as per procedures defined in this subclause results in no EMLSR links remaining for an associated non-AP MLD, both the AP MLD and the non-AP MLD shall disable the EMLSR mode for that non-AP MLD without requiring transmission of an EML Operating Mode Notification frame from the non-AP MLD.

(#15617)If the removal of one or more APs as per procedures defined in this subclause results in no EMLMR links remaining for an associated non-AP MLD, both the AP MLD and the non-AP MLD shall disable the EMLMR mode for that non-AP MLD without requiring transmission of an EML Operating Mode Notification frame from the non-AP MLD.

**35.3.6.4 ML reconfiguration to the ML setup(#15985)**

**…**

**…**

***TGbe editor: Please add following paragraphs at the end of this clause:***

(#15999) NOTE: If the deletion of one or more links from the ML setup of a non-AP MLD as per procedures defined in this subclause results in only a single EMLSR link remaining for an associated non-AP MLD, both the AP MLD and the non-AP MLD continue to operate in the EMLSR mode as per procedures described in clause35.3.17 (Enhanced multi-link single radio operation).

(#16000) NOTE: If the deletion of one or more links from the ML setup of a non-AP MLD as per procedures defined in this subclause results in only a single EMLMR link remaining for an associated non-AP MLD, both the AP MLD and the non-AP MLD continue to operate in the EMLMR mode as per procedures described in clause 35.3.18 (Enhanced multi-link multi-radio operation).

(#15617)If the deletion of one or more links from the ML setup of a non-AP MLD as per procedures defined in this subclause results in no EMLSR links remaining for that non-AP MLD, both the AP MLD and the non-AP MLD shall disable the EMLSR mode for that non-AP MLD without requiring transmission of an EML Operating Mode Notification frame from the non-AP MLD.

(#15617)If the deletion of one or more links from the ML setup of a non-AP MLD as per procedures defined in this subclause results in no EMLMR links remaining for that non-AP MLD, both the AP MLD and the non-AP MLD shall disable the EMLMR mode for that non-AP MLD without requiring transmission of an EML Operating Mode Notification frame from the non-AP MLD.