IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution for CIDs related to Multi-Link element (CC 34) – Part 1 | | | | |
| Date: Feb 9, 2021 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc. |  |  | appatil@qti.qualcomm.com |
| Gaurang Naik | Qualcomm Inc. |  |  | gnaik@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  | gcherian@qti.qualcomm.com |
| Alfred Asterjadhi | Qualcomm Inc. |  |  | aasterja@qti.qualcomm.com |
| Duncan Ho | Qualcomm Inc. |  |  | dho@qti.qualcomm.com |
| Yanjun Sun | Qualcomm Inc. |  |  | yanjuns@qti.qualcomm.com |
| Rojan | Panasonic |  |  |  |
| Ryuichi | Sony |  |  |  |
| Srinivas | Samsung |  |  |  |
| Gaurav | HPE |  |  |  |
| Tomo Adachi | Toshiba |  |  |  |
| Jarkko | Apple |  |  |  |
| Namyeong | LGE |  |  |  |
| Arik | Huawei |  |  |  |
| Laurent | Intel |  |  |  |

Abstract

This submission proposes resolutions for following 49 CIDs received for TGbe CC34:

1006, 2095, 1774, 1897, 2860, 1831, 1007, 1898, 2861, 1154, 2850, 2450, 3366, 3152, 1716, 2898, 1477, 1155, 1414, 2581, 3367, 3359, 2583, 3360, 2859, 2295, 1494, 1033, 2580, 2181, 1183, 1777, 1918, 2414, 2582, 3211, 3249, 3368, 2182, 1744, 1047, 3221, 2120, 3209, 2584, 3210, 2585, 1415, 2744

Revisions:

* Rev 0:
  + Initial version of the document.
* Rev 1:
  + Updated based on offline feedback from several members (added as co-authors)
  + Addressed comments/suggestions from doc 11-21/0218
  + Resolved 20 additional CIDs: 1047, 2120, 2584, 3209, 2585, 3210, 1033, 2580, 2181, 1183, 1777, 1918, 2414, 2582, 3211, 3249, 3368, 2182, 1415, 2744
* Rev 2:
  + Removed CIDs 2093 and 2094 since they are being resolved by Yiqing Li
  + Resolved 3 additional CIDs (no change to text): 1477, 1831 & 2860
* Rev 3:
  + Additional changes based on feedback from Laurent and Arik

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.***

#1: indicates changes based on comments/suggestions in doc 11-21/0218r0 (Mark Rison)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 1006 | Abhishek Patil | 59/10 | 9.3.3.9 | Fix the TBD - the ML IE is present if the frame is an ML Probe Request frame. Non-ML Probe Request does not include ML IE (see 35.3.4.3). Update the variant to be ML Probe Request variant | As in comment | **Revised**  The TBD was fixed. The condition for the presence of the Multi-Link element was updated.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1006.** |
| 2095 | kaiying Lu | 59/12 | 9.3.3.10 | it is not consistent with "35.3.4.3" by "The Basic variant Multi-Link element is TBD present if the STA is affiliated with a non-AP MLD and the frame is a non-ML or ML Probe Request frame." | please clarify it | **Revised**  The Basic variant Multi-Link element was changed to Probe Request variant Multi-Link element. This makes it consistent with 35.3.4.3.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2095.** |
| 1774 | Insun Jang | 59/12 | 9.3.3.9 | For Table 9-38, in case of ML Probe Request frame, it includes Probe Request variant ML IE not Basic variant ML IE, which needs to be described in Notes | We need to add descriptions regarding Probe Request variant ML IE in Notes of Table 9-38 | **Revised**  The Basic variant Multi-Link element was changed to Probe Request variant Multi-Link element.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1774.** |
| 1897 | Jeongki Kim | 58/12 | 9.3.3.9 | The Basic variant Multi-Link element should be present in the Probe Request frame if the STA is affiliated with a non-AP MLD and the frame is a non-ML or ML Probe Request frame. So remve the TBD in the related text. If there is the case that does not include ML element, change TBD to optionally. | Either Remove the TBD or change TBD to optionally | **Revised**  The Basic variant Multi-Link element was changed to Probe Request variant Multi-Link element. The TBD was also fixed.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1897.** |
| 2860 | Stephen McCann | 59.12 | 9.3.3.9 | The sentence "The Basic variant Multi-Link element is TBD present if the STA is affiliated with a non-AP MLD" contradicts clause 9.4.2.295b.3 which implies that a ML Probe Request contains a "Probe Request variant Multi-Link element" | Change all sentences in the table to "The Basic variant Multi-Link element is present if the frame is a MLD probe request frame" | **Revised**  The Basic variant Multi-Link element was changed to Probe Request variant Multi-Link element. The TBD was also fixed.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2860.** |
| 1831 | Jarkko Kneckt | 59.29 | 9.3.3.10 | The Probe Request frame should have Probe Request variant Multi-Link element. (not basic variant) | Please change the Basic variant to probe request variant. | **Revised**  The Basic variant Multi-Link element was changed to Probe Request variant Multi-Link element. The TBD was fixed.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1831.** |
| 1007 | Abhishek Patil | 59/29 | 9.3.3.10 | Fix the TBD - the Basic variant of ML IE is optionally present in the non-ML Probe Response frame (for example when the AP support SAE authentication) | As in comment | **Revised**  The TBD was fixed. The condition for the presence of the Multi-Link element was updated.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1007.** |
| 1898 | Jeongki Kim | 58/29 | 9.3.3.10 | The Basic variant Multi-Link element should be present if the AP is affiliated with an AP MLD and the frame is a non-ML Probe Response frame to carry some ML related capabilities to the AP | Either Remove the TBD | **Revised**  The TBD was fixed. The condition for the presence of the Multi-Link element was updated.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1898.** |
| 2861 | Stephen McCann | 59/29 | 9.3.3.9 | The sentences do not make sense logically, as they state that the ML element is present for both a non-ML and ML probe. | Change all the sentences in the table to "The Basic variant Multi-Link element is present if the frame is a MLD probe response frame" | **Revised**  The sentence was revised to clarify the conditions when Multi-Link element is carried in the Probe Request frame.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2861.** |
| 1154 | Alfred Asterjadhi | 126/06 | 35.3.2.1 | Not precise enough "certain". I think it should be fine to not mention it at all here as long as Clause 6 is complete for this with the addition of the presence of ML element in the tables of clause 9. Otherwise just list all possible MGMT frames that can carry the element (AP MLD side and non-AP MLD side). | As in comment | **Revised**  Since the subsequent paragraphs in 35.3.2.1 lists the frames in which the Multi-Link element is included, the sentence was deleted.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1154.** |
| 2850 | stephane baron | 126/06 | 35.3.2.1 | the sentence "A STA of an MLD shall advertise multi-link capabilities and information of other STA of the MLD it is affiliated with by including a Basic variant Multi-Link element in certain Management frames that it transmits." looks strange to me because of the usage of the words "certain Management frames". How can we mandate an action in "certain" frames without indicating those frames, or giving additional constraints ? I think we should list those frames to clarify this mandatory behaviour, or relaxe the constraint by replacing the shall by a may. | As in comment | **Revised**  Since the subsequent paragraphs in 35.3.2.1 lists the frames in which the Multi-Link element is included, the sentence was deleted.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2850.** |
| 2450 | Patrice Nezou | 126/07 | 35.3.2.1 | The word "certain" does not define any management frames. The management frames supporting the Basic variant Multi-Link element have to be specified. Otherwise remove the sentence. | Define the management frames that supports the Multi link IE. | **Revised**  Since the subsequent paragraphs in 35.3.2.1 lists the frames in which the Multi-Link element is included, the sentence was deleted.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2450.** |
| 3366 | Zhiqiang Han | 126/07 | 35.3.2.1 | Certain management frames are unclear, please clarify it | Clarify which management frame can carry the Basic variant Multi-Link element. | **Revised**  Since the subsequent paragraphs in 35.3.2.1 lists the frames in which the Multi-Link element is included, the sentence was deleted.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 3366.** |
| 3152 | Yongho Seok | 126/07 | 35.3.2.1 | "A STA of an MLD shall advertise multi-link capabilities and information of other STA of the MLD it is affiliated with by including a Basic variant Multi-Link element in certain Management frames that it transmits."  Since this is "shall" statement, it is necessary to specify which management frames correspond to certain Management frames. Otherwise, remove "shall". | As in comment. | **Revised**  Since the subsequent paragraphs in 35.3.2.1 lists the frames in which the Multi-Link element is included, the sentence was deleted.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 3152.** |
| 1716 | Hanqing Lou | 126/06 | 35.3.2.1 | It is not clear if a STA of an MLD has one active link should include the Basic variant ML element in certain Management frames. | Need clearifications | **Revised**  The cited text was deleted as resolution for other comments (CIDs 1154, 2850, 2450, 3366, 3152).  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1716.** |
| 2898 | Stephen McCann | 126/06 | 35.3.2.1 | Some of the MLD terminology is overly complex and can be simplified. | Change the cited sentence to read "An MLD shall advertise multi-link capabilities and information of all affiliated STAs by including a Basic variant Multi-Link element in certain Management frames that it transmits." | **Revised**  The cited text was deleted as resolution for other comments (CIDs 1154, 2850, 2450, 3366, 3152).  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2898.** |
| 1477 | Dibakar Das | 126.06 | 35.3.2 | Is it for just one other STA or multiple STAs ? | Change to "...and information of other STA(s) of the MLD..." | **Revised**  The cited text was deleted as resolution for other comments (CIDs 1154, 2850, 2450, 3366, 3152).  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1477.** |
| 1155 | Alfred Asterjadhi | 126/11 | 35.3.2.1 | What are non-ML Probe Response frames? Please clarify. Also in the next paragraph it specifies that the AP follows some rules defined in a subclause that deals with probe requests. Please note that AP does not send probe requests. Overall there is a lot of duplicate text in this subclause (generally it is simply saying that rules are defined elsewhere). Evaluate if it can be compressed. | As in comment. | **Revised**  Clause 35.3.4.2 is updated to differentiate between ML probe response and non-ML Probe response. Further, spec references to ML probe req/resp (including the cited reference) are updated to remove the term non-ML probe. Clause 35.3.4.3 was updated to clarify that an ML probe request includes Probe Request variant of Multi-link element. Since the container is Multi-Link element, a sentence indicating TBD container is deleted (resolves a TBD). Furthermore, the clause title is updated to ML probing to remove the ambiguity pointed by the commenter (‘an AP doesn’t send a probe request’).  **Tgbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1155.** |
| 1414 | Chien-Fang Hsu | 126/12 | 35.3.2.1 | "non-ML probe response frame" meaning is not clear since there is no ML probe response frame. | Provide definition | **Revised**  Clause 35.3.4.2 is updated to differentiate between ML probe response and non-ML Probe response. Further, spec references to ML probe req/resp (including the cited reference) are updated to remove the term non-ML probe. Clause 35.3.4.3 was updated to clarify that an ML probe request includes Probe Request variant of Multi-link element. Since the container is Multi-Link element, a sentence indicating TBD container is deleted (resolves a TBD).  **Tgbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1414.** |
| 2581 | Rojan Chitrakar | 126/12 | 35.3.2.1 | What is a non-ML Probe Response frame? Is it supposed to be the regular Probe Response frame? | Provide the definition of non-ML Probe Resonse frame. | **Revised**  Clause 35.3.4.2 is updated to differentiate between ML probe response and non-ML Probe response. Further, spec references to ML probe req/resp (including the cited reference) are updated to remove the term non-ML probe. Clause 35.3.4.3 was updated to clarify that an ML probe request includes Probe Request variant of Multi-link element. Since the container is Multi-Link element, a sentence indicating TBD container is deleted (resolves a TBD).  **Tgbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2581.** |
| 3367 | Zhiqiang Han | 126/12 | 35.3.2.1 | What is non-ML Probe Response? define it | as the comment | **Revised**  Clause 35.3.4.2 is updated to differentiate between ML probe response and non-ML Probe response. Further, spec references to ML probe req/resp (including the cited reference) are updated to remove the term non-ML probe. Clause 35.3.4.3 was updated to clarify that an ML probe request includes Probe Request variant of Multi-link element. Since the container is Multi-Link element, a sentence indicating TBD container is deleted (resolves a TBD).  **Tgbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 3367.** |
| 3359 | Zhiqiang Han | 59/31 | 9.3.3.10 | What is non-ML Probe Response? define it | as the comment | **Revised**  Clause 35.3.4.2 is updated to differentiate between ML probe response and non-ML Probe response. Further, spec references to ML probe req/resp (including the cited reference) are updated to remove the term non-ML probe. Clause 35.3.4.3 was updated to clarify that an ML probe request includes Probe Request variant of Multi-link element. Since the container is Multi-Link element, a sentence indicating TBD container is deleted (resolves a TBD).  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 3359.** |
| 2583 | Rojan Chitrakar | 126/57 | 35.3.2.2 | ML Probe Response frame is called MLD probe response in 35.3.4.2; which is correct? | Use consistent name for MLD probe response. | **Revised**  Agree with the comment. The standard must use consistent terms throughout the spec.  The name is revised to ML probe req/resp. MLD probing gives the impression that the information requested or provided is that of the MLD. However, the mechanism is designed to provide information for one or more requested link (not necessarily that of the MLD) – e.g., during critical updates. Therefore, the term multi-link (ML) probe is more appropriate.  **TGbe editor please change all occurrences of the term ‘MLD probe request’ to ‘ML probe request’ and ‘MLD probe response’ to ‘ML probe response’ throughout the draft.**  **TGbe editor, not all the changes related to name change are shown in doc 11-21/0242r3.** |
| 3360 | Zhiqiang Han | 59/33 | 9.3.3.10 | Change ML Probe Response frame to MLD Probe Response frame as defined in 35.3.4.2 Use of MLD probe request | as the comment | **Revised**  The name is revised to ML probe req/resp (instead of MLD probe req/resp). MLD probing gives the impression that the information requested or provided is that of the MLD. However, the mechanism is designed to provide information for one or more requested link (not necessarily that of the MLD) – e.g., during critical updates. Therefore, the term multi-link (ML) probe is more appropriate.  **TGbe editor please change all occurrences of the term ‘MLD probe request’ to ‘ML probe request’ and ‘MLD probe response’ to ‘ML probe response’ throughout the draft.**  **TGbe editor, not all the changes related to name change are shown in doc 11-21/0242r3.** |
| 2859 | Stephen McCann | 59/12 | 9.3.3.9 | What is a non-ML probe request? I think this is a "probe request"? In addition, an "ML probe" should be "MLD probe". | Delete all occurances of "non-ML" in the draft. | **Revised**  Clause 35.3.4.2 is updated to differentiate between ML probe response and non-ML Probe response. Further, spec references to ML probe req/resp (including the cited reference) are updated to remove the term non-ML probe. Clause 35.3.4.3 was updated to clarify that an ML probe request includes Probe Request variant of Multi-link element.  The name is revised to ML probe req/resp (instead of MLD probe req/resp). MLD probing gives the impression that the information requested or provided is that of the MLD. However, the mechanism is designed to provide information for one or more requested link (not necessarily that of the MLD) – e.g., during critical updates. Therefore, the term multi-link (ML) probe is more appropriate.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2859.**  **TGbe editor, not all the changes related to name change are shown in doc 11-21/0242r3.** |
| 2295 | Michael Montemurro | 126.06 | 35.3.2.1 | A STA of an MLD is really a STA affiliated with an MLD. | Change "STA of an MLD" to "STA affiliated with an MLD" at 126.6, 126.32, 126.44,  Change "STA of a non-AP MLD" to "STA affiliated with a non-AP MLD" at 126.24, 126.27, 139.9, 139.42, 140.3, 140.5  Change "STA of an MLD" to "MLD" at 126.44, 127.25  Change "STA of a non-AP MLD" to "non-AP MLD" at 1  Change "STA of the MLD it is affiliated" to "STAs affiliated with the MLD" at 125.6  Change "AP of an AP MLD" to "AP affiiated with an MLD" at 126.10, 126.15, 126.19, 126.37, 129.31, 138.51, 139.60, 139.61, 146.24, 387.60 .  Change "AP of the AP MLD" to "AP affiiated with the MLD" at 138.39, 139.61  Change "AP of an AP MLD" to "AP MLD" at 126.56, 126.60  Change "affiliated AP of the AP MLD" to "AP affiliated with the AP MLD" at 108.8, 138.55, 138.60 | **Accept**  **TGbe editor, please note, the changes are not shown in doc 11-21/0242r3.** |
| 1494 | Dibakar Das | 28.28 | 35.3.2 | Both sentences after L27 is pointing to same section. | Change to "A STA of a non-AP MLD shall follow the rules in 35.3.5.4 (Usage and rules of Basic variant Multi-link element in the context of multi-link setup) for including a Basic variant Multi-Link element in the (Re-)Association Request and Authentication frame that it transmits" | **Revised**  Agree with the commenter. The same change would apply for the AP MLD.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 1494.** |
| 1033 | Abhishek Patil | 126.11 | 35.3.2.1 | 35.3.4.3 does not provide guidance on whether the Beacon frame includes ML IE. | Update the content of 35.3.4.3 to state that a Beacon frame transmitted by an AP of an AP MLD optionally includes ML IE (depending on conditions such as support for SAE authentication). | **Revised**  Agree with the comment. Editor had accidently deleted text from clause 35.3.4.3 due incorrect/insufficient instructions in a PDT. The text related to inclusion of MLD MAC address when the MLD supports SAE authentication was missing in D0.3. This has been fixed in approved doc 11-21/0290 (which is one of the baselines for this document). Therefore, no further changes are needed to address this comment. |
| 2580 | Rojan Chitrakar | 126.11 | 35.3.2.1 | 35.3.4.3 mentions nothing about Beacon or Probe Response frames. Perhaps the reference should be 35.3.4.1 instead? | Provide correct reference else delete the sentence. | **Revised**  Agree with the comment. Editor had accidently deleted text from clause 35.3.4.3 due incorrect/insufficient instructions in a PDT. The text related to inclusion of MLD MAC address when the MLD supports SAE authentication was missing in D0.3. This has been fixed in approved doc 11-21/0290 (which is one of the baselines for this document). Therefore, no further changes are needed to address this comment. |
| 2181 | Li-Hsiang Sun | 126.11 | 35.3.2.1 | "An AP of an AP MLD shall follow the rules defined in 35.3.4.3", but 35.3.4.3 has no AP behavior | add the agreed AP behavior | **Revised**  Agree with the comment. Editor had accidently deleted text from clause 35.3.4.3 due incorrect/insufficient instructions in a PDT. The text related to inclusion of MLD MAC address when the MLD supports SAE authentication was missing in D0.3. This has been fixed in approved doc 11-21/0290 (which is one of the baselines for this document). Therefore, no further changes are needed to address this comment. |
| 1183 | Arik Klein | 126.24 | 35.3.2.1 | Incorrect sentence: "A STA of a non-AP MLD shall follow the rules in 35.3.4.2 (Use of MLD probe request) for including a \*Basic variant\* Multi-Link element in the Probe Request frame that it transmits" | Correct the sentence as follows: "A STA of a non-AP MLD shall follow the rules in 35.3.4.2 (Use of MLD probe request) for including a \*Probe Request\* variant Multi-Link element in the Probe Request frame that it transmits" | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 1183.** |
| 1777 | Insun Jang | 126.25 | 35.3.2.1 | Instead of Basic varaint, it should be Probe Request variant since the rule refers to Use of MLD probe reqeust section | As in the comment, Basic variant should be Probe variant | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 1777** |
| 1918 | Jeongki Kim | 126.25 | 35.3.2.1 | In 35.3.4.3, A Probe Request frame shall not include a Basic variant Multi-Link element. But, the indicated text mentions that Probe Request frame includes the Basic variant Multi-Link element. Probe Request variant Multi-Link element is correct. Replace the "Basic variant Multi-link element" with the "Probe Request variant Multi-link element" into the related text. | Replace the "Basic variant Multi-link element" with the "Probe Request variant Multi-link element" into the indicated sentence. | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 1918** |
| 2414 | namyeong kim | 126.25 | 35.3.2.1 | A Probe Request frame shall not include a Basic variant Multi-Link element. Change "Basic variant Multi-Link element" to "Probe Request variant Multi-Link element". | Please see comment. | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 2414** |
| 2582 | Rojan Chitrakar | 126.25 | 35.3.2.1 | Basic Variant ML element should be Probe Request variant Multi-Link element | Change Basic variant ML element to Probe Request variant Multi-Link element | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 2582** |
| 3211 | Young Hoon Kwon | 126.24 | 35.3.2.1 | Why Basic variant Multi-Link element is included in the Probe Request frame? It should be a Probe Request variant ML element. | As shown in the comment. | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 3211** |
| 3249 | Yuchen Guo | 126.25 | 35.3.2.1 | "Basic variant of Multi-Link element" should be "probe request variant Multi-Link element" because it is carried in the Probe Request frame | change "Basic" to "probe request" | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 3249** |
| 3368 | Zhiqiang Han | 126.25 | 35.3.2.1 | Probe Request frame carries a Basic variant Multi-Link element?Please clarify it. | Please clarify it. | **Revised**  Agree with the comment. The cited sentence is fixed to indicate Probe Request variant Multi-link element.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 3368** |
| 2182 | Li-Hsiang Sun | 126.24 | 35.3.2.1 | "A STA of a non-AP MLD shall follow the rules in 35.3.4.2 (Use of MLD probe request) for including a Basic variant Multi-Link element in the Probe Request frame that it transmits". The sentence is in conflict with the requirement in 35.3.4.3 | remove the sentence | **Revised**  The cited sentence incorrectly referred to Basic variant instead of Probe Request variant Multi-link element. The error is fixed in this document.  **TGbe editor, please note, the changes are shown in doc 11-21/0242r3 tagged as CID 2182** |
| 1744 | Hanseul Hong | 126/44 | 35.3.2.1 | Neighbor Report element is not needed to be included in Basic variant Multi-Link element | Add the "Neighbor Report element" in the sentence | **Revised**  The Neighbor Report element was added in the sentence. In addition, a duplicate paragraph in clause 35.3.4.2 was deleted (also resolves a TBD).  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1744.** |
| 1047 | Abhishek Patil | 130.14 | 35.3.4.2 | 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**  The paragraph was deleted and a new sentence referencing clause 35.3.2.2 was added with minor edits.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1047.** |
| 3221 | Young Hoon Kwon | 132/57 | 35.3.5.4 | What if the size of the ML element is greater than 256Byte? | As shown in the comment. | **Rejected**  The Multi-Link element is already listed as fragmentable (see Table 9-92 in D0.3). When fragmented, the transmitting STA follows the rules defined in 10.28.11 (Element fragmentation) and the receiving STA follows the rules defined in 10.28.12 (Element defragmentation). |
| 2120 | Laurent Cariou | 0.00 | 11.21.13 | BSS MAX Idle Period element shall not be included in ML element | as in comment | **Revised**  The comment was discussed during TGbe MAC telco on 2/25/21 and deferred from doc 11-21/0250. Since the values carried in the BSS Max Idle Period element apply at the MLD level, the group agreed to the commenters request to add text in clause 35.3.2.2 to clarify that the element is not carried in the ML IE as a subelement even if the IE carries complete profile. A NOTE was added to clarify this behavior.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2120.** |
| 3209 | Young Hoon Kwon | 126.60 | 35.3.2.2 | It is not clear if the AP of the AP MLD shall include all other APs of its MLD in the (re)Association Response frame or not. Further clarification is needed. | As shown in the comment. | **Revised**  The sentence was revised to clarify that it is mandatory for an AP affiliated with an AP MLD to provide complete information of the other APs affiliated with the same AP MLD and that are operating on the links that are accepted as part of the multi-link setup.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 3209.** |
| 2584 | Rojan Chitrakar | 126.60 | 35.3.2.2 | "An AP of an AP MLD shall include complete profile of another AP of its MLD..." use of the normative verb shall is ambiguous. What is mandatory: to include the complete provide of another (which one?) AP of the MLD or to follow the rule in 35.3.5.4? 35.3.5.4 states that inclusion of an AP's (complete) information is conditional. Perhaps it should be a "may"? | Rephrase the sentence to clarify what is the mandatory behaviour for the AP; else change shall to may. | **Revised**  The sentence was revised to clarify that it is mandatory for an AP affiliated with an AP MLD to provide complete information of the other APs affiliated with the same AP MLD and that are operating on the links that are accepted as part of the multi-link setup.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2584.** |
| 3210 | Young Hoon Kwon | 127.01 | 35.3.2.2 | It is not clear if the STA of the non-AP MLD shall include all other STAs of its MLD in the (re)Association Request frame or not. Further clarification is needed. | As shown in the comment. | **Revised**  The sentence was revised to clarify that it is mandatory for a STA affiliated with a non-AP MLD to provide complete information of other STAs affiliated with the same non-AP MLD and that are operating on the links that are requested to be as part of the multi-link setup. The sentence was moved before a similar sentence that covers AP side actions since the non-AP MLD initiates a multi-link setup.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 3210.** |
| 2585 | Rojan Chitrakar | 127.01 | 35.3.2.2 | "A STA of a non-AP MLD shall include complete profile of another STA of its MLD..." use of the normative verb shall is ambiguous. What is mandatory: to include the complete provide of another (which one?) STA of the MLD or to follow the rule in 35.3.5.4? 35.3.5.4 states that one or more STA's (complete) information is included. Perhaps it should be a "may"? | Rephrase the sentence to clarify what is the mandatory behaviour for the STA; else change shall to may. | **Revised**  The sentence was revised to clarify that it is mandatory for a STA affiliated with a non-AP MLD to provide complete information of other STAs affiliated with the same non-AP MLD and that are operating on the links that are requested to be as part of the multi-link setup. The sentence was moved before a similar sentence that covers AP side actions since the non-AP MLD initiates a multi-link setup.  **TGbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2585.** |
| 1415 | Chien-Fang Hsu | 126/39 | 35.3.2.1 | reported AP coverage/meaning? |  | **Revised**  The definition of a reported AP is provided in 11ax D8.0 Clause 3.2, Page 46, line 64.  **Tgbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 1415.** |
| 2744 | Sanghyun Kim | 127/09 | 35.3.2.3 | There is no definition of "reported STA". Need to define the meaning of "reported STA". | As in comment. | **Revised**  The definition of reporting STA and reported STA was added in clause 3.2.  **Tgbe editor please implement changes as shown in doc 11-21/0242r3 tagged as 2744.** |

***TGbe editor: Please note baselines are REVmd D5.0, 11ax D8.0, 11be D0.3 and doc 11-21/0290r0***

**9.3.3.9 Probe Request frame format**

***TGbe editor: Please update the third column of Table 9-38 (Probe Request frame body) as shown below:***

### Table 9-38—Probe Request frame body

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | Multi-Link | The Probe Request variant Multi-Link element is present if the STA is affiliated with a non-AP MLD and the Probe Request frame is an ML probe request as defined in 35.3.4.2. Otherwise the Probe Request variant Multi-Link element is not present.[CID 1006, 2095, 1774, 1897, 2860, 1831, 1155, 1414, 2581, 3367, 3359, 2859] |

**9.3.3.10 Probe Response frame format**

***TGbe editor: Please update the third column of Table 9-39 (Probe Response frame body) as shown below:***

### Table 9-39—Probe Response frame body

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| <ANA> | Multi-Link | The Basic variant Multi-Link element is optionally present if the AP is affiliated with an AP MLD and the soliciting Probe Request frame is not an ML probe request as defined in 35.3.4.2. The Basic variant Multi-Link element is present if the AP is affiliated with an AP MLD and the soliciting Probe Request frame is an ML probe request. Otherwise it is not present.[CID 1007, 2861, 1898, 1155, 1414, 2581, 3367, 3359, 2859] |

**35.3.2 Container for multi-link information**

**35.3.2.1 General**[#1]

***TGbe editor: Please modify this clause as shown below:***

[CID 1154, 2850, 2450, 3366, 3152, 1716, 2898]

[CID 1155, 1414, 2581, 3367, 3359, 2859]An AP of an AP MLD shall follow the rules defined in 35.3.4.3 (Multi-link element usage rules in the context of discovery) for including a Basic variant Multi-Link element in a Beacon frame that it transmits or in a Probe Response frame, which is not an ML probe response, that it transmits.

[CID 1155, 1414, 2581, 3367, 3359, 2859]An AP of an AP MLD shall follow the rules in 35.3.4.2 (Use of ML probe request and response) for including a Basic variant Multi-Link element in a Probe Response frame, which is an ML probe response, that it transmits.

An AP of an AP MLD shall follow the rules in 35.3.5.4 (Usage and rules of Basic variant Multi-link element in the context of multi-link setup) for including a Basic variant Multi-Link element in a (Re-)Association Response frame [CID 1494]and in an Authentication frame that it transmits.

A STA of a non-AP MLD shall follow the rules in 35.3.4.2 (Use of ML probe request and response) for including a [CID 1183, 1777, 1918, 2414, 2582, 3211, 3249, 3368, 2182]Probe Request variant Multi-Link element in a Probe Request frame that it transmits.

A STA of a non-AP MLD shall follow the rules in 35.3.5.4 (Usage and rules of Basic variant Multi-link element in the context of multi-link setup) for including a Basic variant Multi-Link element in the (Re-)Association Request frame [CID 1494]and in an Authentication frame that it transmits.

[CID 1494]An AP of an AP MLD shall not include a [CID 1744]Neighbor Report element, a Reduced Neighbor Report element or a Multiple BSSID element or another Basic variant Multi-Link element in the Per-STA Profile subelement of the Basic variant Multi-Link element for a reported AP.

**35.3.2.2 Complete or partial per-STA profile**[#1]

***TGbe editor: Please update the 3rd, 4th and 5th paragraph as shown below:***

A reporting STA affiliated with an MLD shall set the Complete Profile subfield of the Per-STA Control field in the Per-STA Profile subelement to 1 if the Per-STA Profile subelement carries complete information (subject to the inheritance rules as defined in 35.3.2.3 (Inheritance in a per-STA profile)) of the reported STA. Otherwise the reporting STA shall set the Complete Profile subfield of the Per-STA Control field in the Per-STA Profile subelement to 0.

The complete information of a reported STA in a Management frame, carrying Basic variant Multi-Link element, is defined as all the elements and fields that would be included in the frame if the reported STA were to transmit that Management frame. For example, when an AP affiliated with an AP MLD transmits an Association Response frame, the Per-STA Profile subelement corresponding to another AP affiliated with the AP MLD carries complete information of the other AP, subject to inheritance rule. The complete information consists of elements and fields that would be included in the frame if the reported AP were to transmit the Association Request frame.

[CID 2585, 3210]affiliated with , in (Re)Association Request frame it transmits, as affiliated with, that are capable of operating on the links that it is requesting to be part of a multi-link setup(also see )

[CID 2584, 3209]An AP affiliated with an AP MLD shall include, in (Re)Association Response frame it transmits, a complete profile of other APs affiliated with its MLD, that are operating on the links that are accepted as part of a successful multi-link setup (also see 35.3.5.4 (Usage and rules of Basic variant Multi-link element in the context of multi-link setup)).

NOTE – The values carried in fields of the BSS Max Idle Period element apply at the MLD level (see 35.3.10.3). Therefore, all APs affiliated with an AP MLD provide the same values at the time of an association for a multi-link setup. As a result, the BSS Max Idle Period element is not carried in per-STA profile of Basic variant Multi-Link element in an (Re)Association Response frame.[CID 2120]

[CID 2585, 3210]

**35.3.4.2 Use of** [CID 2583, 3360]**ML probe request and response**[#1]

***TGbe editor: Please update the 3rd paragraph and add a new paragraph in this subclause as shown below***

[CID 1744, 1047] The complete information of the requested AP is defined in 35.3.2.2.

[CID 1155, 1414, 2581, 3367, 3359, 2859]An ML probe response is a Probe Response frame:

* that is transmitted in response to receiving an ML probe request
* and that includes Basic variant Multi-Link element which can carry complete or partial per-STA profile(s), based on the soliciting request, for each of the requested AP(s) of the AP MLD.

**35.3.4.3 Multi-link element usage rules in the context of discovery**[CID 1155, 1414, 2581, 3367, 3359, 2859, #1]

***TGbe editor: Please update the subclause as shown below***

An AP affiliated with an AP MLD should include, in a Beacon frame or a Probe Response frame, that is not an ML probe response, only the Common Info field of the Basic variant Multi-Link element as defined in 9.4.2.247b (Multi-Link element).

NOTE—Whether the Basic variant Multi-Link element is always present in a Beacon frame or a Probe Response frame, that is not an ML probe response, or is optionally present is TBD.

An AP affiliated with an AP MLD that supports SAE authentication shall include the MLD MAC address of that AP MLD in the Beacon and Probe Response frames it transmits in the Common Info field of the Basic variant of the Multi-Link element.

A Probe Request frame that is not an ML probe request shall not include a Multi-Link element of any type.

A Probe Request frame that is an ML probe request shall not include a Basic variant Multi-Link element.

A Probe Request frame that is an ML probe request shall include a Probe Request variant Multi-Link element.

**3.2 Definitions specific to IEEE 802.11**[CID 1415, 2744]

***TGbe editor: Please update the definitions and insert new definitions after “reporting access point (AP): An AP that is …” as shown below***

**reported access point (AP):** An AP that is described in an element such as a Neighbor Report element or a

Reduced Neighbor Report element or Multi-Link element.

**reporting access point (AP):** An AP that is transmitting an element, such as a Neighbor Report element or

a Reduced Neighbor Report element or Multi-Link element, describing a reported AP.

**reported station (STA):** An AP STA or a non-AP STA that is described in an element such as a Basic variant Multi-Link element

**reporting station (STA):** An AP STA or a non-AP STA that is transmitting an element, such as a Basic variant Multi-Link element, describing a reported STA