IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MLO – 35.3.4.2 | | | | |
| Date: 2020-07-0 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Laurent Cariou |  |  |  | laurent.cariou@intel.com |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Assignee** | **Resolution** | **Ad-hoc Notes** |
| 7455 | Thomas Derham | 35.3.4.2 | 0.00 | The note in this subclause seems to be misleading, since the A1=bcast requirement in 6 GHz applies to active scan, yet the ML probe request is not used in active scan context. | Remove the note and replace with a mandatory requirement to send ML probe requests to bcast address in 6 GHz, unless there is a strong need to allow unicast | Laurent Cariou | Reject – A1=Bcast requirement is not only for active scanning. We however discovered that things in baseline and 11ax are a bit misleading, and comments should be submitted to REVmd to clarify the intent. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 6195 | Michael Montemurro | 35.3.4.2 | 251.55 | Presumably ML stands for Multi-Link. Expand it out at least once. | Change "ML probe request" to "Multi-Link (ML) probe request" at cited location. | Laurent Cariou | Revised – Change “ML probe” to “Multi-Link probe” throughout the spec. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 8046 | Yuchen Guo | 35.3.4.2 | 251.55 | Currently in ML probe request, the information of the transmitting link is always solicited. However, in some cases, the information of the transmitting link may not be needed, e.g., the STA may only want to update some information of other links. The current text in this subclause fails to provide this functionality. | The commenter will bring a contribution to resolve it. | Laurent Cariou | Rejected – this was discussed during CC34 and the TBD related to that addition has been removed as a resolution to this comment. The resolution for this CID assumes that the resolution in CC34 applies to CC36. | Volunteers: Jason Guo, Xiaofei Wang, Gaurang Naik |
| 4254 | Alfred Asterjadhi | 35.3.4.2 | 251.57 | Add a sentence that specifies under what rules a STA sends probe requests in different bands (citing baseline 11.smth, and 26.smt for 6GHz). | As in comment. | Laurent Cariou | Revised – add a reference to 11.1.4.3.8 which defines probing outside the context of active scanning. Apply the changes marked as #4254 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 4042 | Abhishek Patil | 35.3.4.2 | 251.58 | A1 is set to broadcast address during active scanning. Since ML probe is a directed probe and sent outside the context of active scanning, A1 must not be set to broadcast address. Furthermore, setting A1 to an individual address ensure the ML probe request frame is ACK-ed. | As in comment | Laurent Cariou | Reject – See 11.1.4.3.8, it is possible to set A1 to broadcast outside the context of active scanning. The 2 options are therefore possible. If a STA prefers to get an Ack to the probe request, then it will set A1 to individual address. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 6264 | Ming Gan | 35.3.4.2 | 251.58 | What does it mean by "outside the context of active scanning", how does the non-AP MLD get the info, like BSSID of the other AP, does that follow discovery phase? Please specify it. | as in the comment | Laurent Cariou | Revised – add a reference to 11.1.4.3.8 which defines probing outside the context of active scanning.  The BSSID has been received already in a previous beacon/probe response from the AP or in the RNR of a previous beacon/probe response from another AP, prior to sending the ML probe.  Apply the changes marked as #6264 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5973 | Liwen Chu | 35.3.4.2 | 251.59 | The AP is already discovered through scanning. ML Probe Request is used to discover the AP1 affiliared with the AP2 identified by RA or ADDR 3. | As in comment | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #5973 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 4253 | Alfred Asterjadhi | 35.3.4.2 | 251.61 | probe requests with A1 set to the MAC address of the AP are not sent as part of scanning. Add a note to clarify the distinction between them and directed probes. | As in comment. | Laurent Cariou | Revised – agree with the commenter. Add a reference to the relevant subclause (outside the context of active scanning). Apply the changes marked as #4253 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 8333 | Zhiqiang Han | 35.3.4.2 | 251.62 | In the latter case, Address 3 field also set to the BSSID of the AP, please add it. | Please clarify it | Laurent Cariou | Reject – we originally had the mention of A3 field set to BSSID, but it got removed in previous comment collection, in order to match with how it is currently described in baseline. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 6196 | Michael Montemurro | 35.3.4.2 | 252.07 | APs are affiliated "with an AP MLD, not to an AP MLD. | Change "AP affiliated to" to "AP affiliated with" at 252.7, 264.58, 265.26, 277.36, 277.39, 277.22  Change "STA affiliated to" to "STA affiliated with" at 105.52, 106.26, 106.55, 107.27, 161.13, 162.3, 162.5, 162.54, 277.40 | Laurent Cariou | Revised – change “affiliated to” to “affiliated with” throughout the subclause 35.3.4.2. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5604 | John Wullert | 35.3.4.2 | 252.08 | The phrase "is a requested AP" gives the impression that there is only one, as opposed to the idea that the AP is included in the set of requested APs | Revise requirements into two statements: "If the Multi-Link element in the Probe Request frame does not include any per-STA profiles, all APs affiliated with the AP MLD are requested APs. If the Multi-Link element in the Probe Request frame includes one or more per-STA profiles, only APs affiliated with the AP MLD whose Link IDs are equal to the value of the Link ID field in one of the per STA Profile subelements are requested APs." | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #5604 in this document | Volunteers: Xiaofei Wang, Gaurang Naik |
| 4043 | Abhishek Patil | 35.3.4.2 | 252.10 | Which variant of Multi-Link element is this referring to? | In the two bullets, replace "Multi-Link element" with "Probe Request variant of Multi-Link element" | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #4043 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5972 | Liwen Chu | 35.3.4.2 | 252.10 | The first bullet says that the ML IE doesn't include any Per STA Profile. The second bullst sanys that the Link ID is in Pre STA Profile. They are contradictory. | Address the inconsistence. | Laurent Cariou | Revised – those are not contradictory, but 2 possible ways to identify requested APs. Modify the sentence to clarify the meaning. Apply the changes marked as #5972 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5974 | Liwen Chu | 35.3.4.2 | 252.10 | the type of ML IE should be accurate | As in comment | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #5974 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 6265 | Ming Gan | 35.3.4.2 | 252.15 | Change "complete information" to "complete or partial information" | as in the comment | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #6265 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5050 | Gaurang Naik | 35.3.4.2 | 252.23 | Replace "requested AP(s) of the AP MLD" with "requested AP(s) affiliated with the AP MLD" | As in comment | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #5050 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5910 | Li-Hsiang Sun | 35.3.4.2 | 252.30 | What is the procedure that triggers a non-AP to send a ML probe request for a specific element? Is the identity of changed element derived from the change sequence counter? | add the detection mechanism in 35.3.4.3 | Laurent Cariou | Rejected – this subclause defines the procedure to send/receive ML probes. Subclause xxx may give some ideas on how a STA would use the different tools provided by ML probes. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5975 | Liwen Chu | 35.3.4.2 | 252.30 | clarify that the Probe Request in this paragraph is ML Probe Request frame. | As in comment | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #5975 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 4044 | Abhishek Patil | 35.3.4.2 | 252.52 | An earlier paragraph in this subclause defines what is an ML probe response | Delete "which is a Probe Request frame". Change the text to "... shall respond with an ML probe response that includes a ..." | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #4044 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5605 | John Wullert | 35.3.4.2 | 252.52 | This paragraph includes a second definition of ML Probe Response. Given that it is defined above (starting on line 18), it is not required here. Note that the two defintions are not identical and should be checked for consistency. | Remove in-line definition of ML Probe Response. If necessary, add reference to rules in 11.1.4.3.4 to defintion on line 18. | Laurent Cariou | Revised – agree with the commenter. Apply the changes marked as #5605 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5976 | Liwen Chu | 35.3.4.2 | 252.59 | "...for each of the APs that are affiliated to the same AP MLD..." This text is problematic. A non-AP MLD can request different elements for different links. | As in comment | Laurent Cariou | Revised – agree with the commenter. Modify both sentences in the paragraph so that it talks only about a particular requested AP. Apply the changes marked as #5976 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 4378 | Arik Klein | 35.3.4.2 | 253.04 | "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. | Laurent Cariou | Revised – the commenter identified an issue in baseline in 11.1.4.3.9, which does not align with other parts of the specification in 11ax for instance. A submission to REVme is encouraged to fix that issue. In the meantime, in 11be, we can clarify that in that case, the rules defined for a FILS STA are ignored. Apply the changes marked as #4378 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5361 | Jay Yang | 35.3.4.2 | 253.05 | the Address 1 field of the Probe Response frame may be set to the broadcast address unless the AP is not including its actual SSID in the SSID element of its Beacon frames. what's the "actual SSID" here? there is no such concept in baseline. | if it means hidden SSID, we can replace it with hidden SSID directly. Otherwise, please clarify it. | Laurent Cariou | Rejected – it is indeed meant for the concept identified as “hidden SSID”, but not described in 802.11, and this way of writting the spec for such concept has been used in baseline. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 7359 | Stephen McCann | 35.3.4.2 | 253.07 | typo "in 6 GHz" | Change "in 6 GHz" to "in the 6 GHz band". Also make the same change at P144L52 (2nd column of table only), P313L1 and P601L57. | Laurent Cariou | Revised – agree with the commenter. Apply the changes in this subclause. The name in other locations needs to be discussed separately. Apply the changes marked as #7359 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 6197 | Michael Montemurro | 35.3.4.2 | 253.10 | This requirement makes no sense and needs to be reworded. "None of the non-AP STAs of a non-AP MLD shall send an ML 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 ML 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." | I actually attempted to fix this but the behavior is too badly broken. First of all, ML Probe Request should be issued by the non-AP MLD by calling the SCAN.request primitive on an affiliated STA. In that way, you can restrict the non-AP MLD from issuing a scan request primitive concurrently on multiple affiated STA links to the same AP MLD simultaneously. Secondly, SCAN.request primitive should be modified to add a new ActivseScanType value of ML. In that way, its much easier to define unique behavior.  The commentor is willing to collaborate on a contribution to address this issue. | Laurent Cariou | Revised – since this sentence was written, ML probing has been characterized as not being part of active scanning. Such restrictions are therefore not needed. Remove the sentence. Apply the changes marked as #6197 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |
| 5977 | Liwen Chu | 35.3.4.2 | 253.11 | The first praragraph of the subclause mentioned that ML Probe Request is ontside the context of active scanning. The text here mentioned that "...MLME-SCAN.request primitive with ScanType parameter indicating an active scan was issued." Clarify it. | As in comment | Laurent Cariou | Revised – since this sentence was written, ML probing has been characterized as not being part of active scanning. Such restrictions are therefore not needed. Remove the sentence. Apply the changes marked as #5977 in this document. | Volunteers: Xiaofei Wang, Gaurang Naik |

1. **Introduction**
2. **Proposed spec text**
   * + 1. **Use of ML probe request and response(#2583)(#3360)**

(#2583)(#3360)(#1187)An ML probe request is a Probe Request frame that is sent outside the context of active scanning (#6264, #4254, #4253) (see 11.1.4.3.8 (Non-scanning probe request transmission)) and that is used to discover (#5973)APs of an AP MLD:

* + - * + (#1045)(#1187)(#1673)(#2150)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 field set to the BSSID of an AP’s BSS.
        + (#1808)(#2124)(#3217)and that includes a Probe Request variant Multi-Link element defined in 9.4.2.295b.3 (Probe Request variant Multi-Link element).

(#1046)(#2151)(#2583)(#3360)(#1675)An ML probe request allows a non-AP STA affiliated with a non-AP MLD to request an AP affiliated with an AP MLD to include the complete or partial set of capabilities, parameters and operation elements of other APs affiliated to the same AP MLD as the AP. (#5604, #5972)

(#5604, #4043, #5972, #5974)If the Probe Request variant Multi-Link element in the Multi-Link probe request does not include any per-STA profile, then all APs affiliated with the same AP MLD as the AP identified in the Address 1 or Address 3 field of the Multi-Link probe request are requested APs.

(#5604, #4043, #5972, #5974)If the Probe Request variant Multi-Link element in the Multi-Link probe request includes one or more per-STA profiles, only APs affiliated with the same AP MLD as the AP identified in the Address 1 or Address 3 field of the Multi-Link probe request and whose link ID is equal to the value in the Link ID field in a Per-STA Profile in the Probe Request variant Multi-Link element in the Multi-Link probe request are requested APs.

(6265)(#1744)(#1047)The complete information and the partial information of a requested AP are defined in [35.3.2.2 (Advertisement of](#bookmark6) [complete or partial per-link information(#1859))](#bookmark6).

(#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) (#5050) affiliated with the AP MLD.

(#1034)(#2149)(#1861)(#2831)The partial information of a requested AP sent by a reporting AP consists of one or more elements that are requested in the (Extended) Request element carried in the ML probe request(#2583)(#3360).

(#1035)If the (Extended) Request element is present in a Per-STA Profile subelement of a Probe Request variant Multi-Link element of a (#5975) Multi-Link probe request, then the (Extended) Request element requests the partial information for the requested AP that corresponds to the Link ID field of the STA Control field in the Per-STA Profile subelement. In this case, the Complete Profile subfield of the STA Control field in the Per- STA Profile subelement is set to 0.

(#1035)If the (Extended) Request element is present in the Probe Request frame body and the (Extended) Request element is not present and a Complete Profile subfield of a STA Control field is set to 0 in a Per- STA Profile subelement of a Probe Request variant Multi-Link element of a Probe Request frame, the (Extended) Request element corresponding to the per-STA profile is inherited from the (Extended) Request element in the body of the Probe Request frame.

(#1035)If the (Extended) Request element is not present and a Complete Profile subfield of a STA Control field is set to 1 in a Per-STA Profile subelement of a Probe Request variant Multi-Link element of a Probe Request frame, the non-AP STA requests complete information of the AP corresponding to the per-STA profile.

(#5976)(#2583)(#3360)(#1422)If an AP that is affiliated with an AP MLD receives an ML probe request from a non-AP STA affiliated with a non-AP MLD requesting complete information for a requested AP, possibly among other requests for other requested APs, it shall respond with an ML probe response (#4044, #5605) that includes a Basic variant Multi-Link element with (#2419)a per-STA profile with complete information for the requested AP, subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response)(#1048). If it receives an ML probe request from a non-AP STA affiliated with a non-AP MLD requesting partial information for a requested AP, possibly among other requests for other requested APs, it shall respond with an ML probe response that includes a Basic variant Multi-Link element with (#2419)a per-STA profile with at least the elements requested from the (Extended) Request element for the requested AP, unless the elements requested are not part of the complete information for the requested AP and subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response)(#1048).

(#2583)(#3360)(#1423)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 ML probe request requesting complete information and responds with an ML probe response (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 unless the AP is not including its actual SSID in the SSID element of its Beacon frames, disregarding the addressing rules defined for a FILS STA in 11.1.4.3.9 (Contents of a probe response) if the AP is a FILS STA. (#4378)

(#1049)(#1926)(#2421)(#2592)(#2858) (#7359)NOTE—An AP operating in the 6 GHz band 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).

(#5977, #6197)