IEEE P802.11
Wireless LANs

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| CR for Probe Request Variant MLE |
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 Abstract

This submission proposes resolutions for following CIDs received for TGbe CC36:

8060

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Update the text based on Draft 1.2, add a figure to show the use case.

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** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 8060 | Yuchen Guo | 135.59 | 9.4.2.295b.3 | The probe request variant MLE should be able to let the STA optionally NOT solicit the information of the transmitting link. | Add one field called "transmitting link info requested" in the STA Control field of the probe request variant MLE | Revised – Agree in principle with the comment. The information of the transmitting link is not always needed. Signaling is added to allow the non-AP MLD to optionally solicit the information on the transmitting link.TGbe editor:Please implement changes as shown in this document tagged as 8060. |

**Discussion**: In the current ML probe request, the information of the AP on the transmitting link (the link on which the ML probe request is sent) is always solicited, which will result in a waste of resource when the information of the transmitting link is not needed. One example is as follows. A non-AP MLD has two affiliated STAs, operating on Link 1 and Link 2, respectively. The non-AP MLD is monitoring on Link 1, and is doing power save on Link 2. When the non-AP MLD finds there’s critical update on Link 2, it wants to update the information on Link 2 without switching on the Link 2. In this case, the non-AP MLD can send a ML probe request on Link 1, only soliciting the information of Link 2. Another example is as follows. The non-AP MLD mentioned above is operating on Link 1, and receives a broadcast probe response which only carries the information of AP1 (Note: this broadcast probe response can be the response to a probe request frame sent by a single link STA). In this case, the non-AP MLD can also send a ML probe request on Link 1, only soliciting the information of Link 2.

In this CR document, we enable the above use cases by adding corresponding signaling in the probe request MLE.



***TGbe editor: Please note baselines are REVme D0.1, 11ax-2021 and 11be D1.2***

**9.4.2.295b.3 Probe Request Multi-Link element**

(#6701)The Probe Request Multi-Link element is used to request an AP to provide information of other APs affiliated with the same AP MLD as the AP. The inclusion of a (#6701)Probe Request Multi-Link element in a Probe Request frame identifies it as an ML probe request(#2583)(#3360).

(#6262)(#6237)(#6238)The format of the Presence Bitmap subfield of the Probe Request Multi-Link element is defined in Figure 9-788er (Presence Bitmap field of the Probe Request Multi-Link element format(#6262)(#6237)(#6238)).

 B0 B1 B11

|  |  |
| --- | --- |
| MLD ID Present | Reserved |

Bits: 1 11

**Figure 9-788er—** **Presence Bitmap subfield of the Probe Request Multi-Link element format(#6262)(#6237)(#6238)**

(#6262)(#6237)(#6238)The MLD ID Present subfield is set to 1 if it is present in the Common Info field. Otherwise the MLD ID Present subfield is set to 0.

(#6262)(#6237)(#6238)The format of the Common Info field of the Probe Request Multi-Link element is defined in Figure 9-788es (Common Info field of the Probe Request Multi-Link element format(#6262)(#6237)(#6238)).

|  |  |  |
| --- | --- | --- |
| Common Info Length | Transmitting Link Info | MLD ID |

Octets: 1 1 0 or 1

**Figure 9-788es—Common Info field of the Probe Request Multi-Link element format(#6262)(#6237)(#6238)(#8060)**

(#6262)(#6237)(#6238)The Common Info Length subfield indicates the number of octets in the Common Info field.

(#8060)The format of the Transmitting Link Info subfield is defined in Figure 9-788xx (Transmitting Link Info subfield format)

|  |  |
| --- | --- |
| Transmitting Link Info Requested | Reserved |

Bits: 1 7

**Figure 9-788xx—** **Transmitting Link Info subfield format (#8060)**

(#8060)The Transmitting Link Info Requested subfield is set to 1 when the information of the AP corresponding to the link on which the ML probe request is transmitted is requested. Otherwise, the subfield is set to 0.

(#6262)(#6237)(#6238)The MLD ID subfield indicates the identifier of the AP MLD that is targeted by the ML probe request.

(#1732)(#1834)(#3247)(#2587)The Link Info field contains zero or more (#5833) subelements. The subelement format and ordering of subelements are defined in 9.4.3 (Subelements). The Subelement ID field values are defined in Table 9-322an (Optional subelement IDs for Multi-Link element(#5833)).

(#5833) Zero or more Per-STA Profile subelements are included in the list of subelements.

(#3247)The format of a Per-STA Profile subelement is defined in Figure 9-788et (Per-STA Profile subelement of the Probe Request Multi-Link element format(#6701)(#6451)(#6865)(#3247)).

|  |  |  |  |
| --- | --- | --- | --- |
| Subelement ID | Length | STA Control | STA Profile |

Octets: 1 1 2 variable

**Figure 9-788et—Per-STA Profile subelement of the Probe Request Multi-Link element format(#6701)(#6451)(#6865)(#3247)**

(#5833)(#3247)(#6451)The format of the STA Control field is defined in Figure 9-788eu (STA Control field of the Probe Request Multi-Link element format(#6701)(#6451)(#6865)(#3247)).

B0 B3 B4 B5 B15

|  |  |  |
| --- | --- | --- |
| Link ID | Complete Profile | Reserved |

Bits: 4 1 11

**Figure 9-788eu—STA Control field of the Probe Request Multi-Link element format(#6701)(#6451)(#6865)(#3247)**

(#3247)The Link ID subfield specifies a value that uniquely identifies the AP (#7585) whose information is requested.

(#5737)(#2164)The Complete Profile subfield is set to 1 when complete profile (#7586)of the AP identified by the Link ID subfield is requested as defined in 35.3.4.2 (Use of ML probe request and response(#2583)(#3360)). Otherwise, the subfield is set to 0.

(#6130)(#6131)(#5737)(#2164)If the Complete Profile subfield is set to 0, the STA Profile field, if present in a Per-STA Profile subelement (see 35.3.4.2 (Use of ML probe request and response(#2583)(#3360)) and 35.3.2.3.2 (Inheritance in the per-STA profile of Probe Request Multi-Link element(#2416)(#6700))), includes exactly one of the following:

* (#5834)one Request element (see 9.4.2.9 (Request element)), or
* (#5834)one Extended Request element (see 9.4.2.10 (Extended Request element)), or
* (#7587) one Request element and one Extended Request element

 If the Complete Profile subfield is set to 1, the STA Profile field is not present in a Per-STA Profile subelement.

**35.3.4.2 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 that is used to discover an AP:
— (#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.

—(#6262)(#6237)(#6238)with the MLD ID subfield (if present) set to the MLD ID that identifies the targeted AP MLD with which the requested AP(s) are affiliated.
— (#1808)(#2124)(#3217)and that includes a (#6701)Probe Request Multi-Link element defined in 9.4.2.295b.3 (Probe Request Multi-Link element(#6701)).

(#6262)(#6237)(#6238)If either the Address 1 field or the Address 3 field of the ML probe request is set to the MAC address of the AP affiliated with an AP MLD that corresponds to the nontransmitted BSSID, then the MLD ID subfield shall not be present in the Probe Request Multi-Link element of the ML probe request and the AP MLD is the targeted AP MLD.

 (#6262)(#6237)(#6238)If either the Address 1 field or the Address 3 field of the ML probe request is set to the MAC address of the responding AP that operates on the same link where the ML probe request is sent, then the MLD ID subfield shall be present in the Probe Request Multi-Link element of the ML probe request and the targeted AP MLD is identified by the MLD ID subfield.

(#1046)(#2151)(#2583)(#3360)(#1675)An ML probe request allows a non-AP STA to request an AP to include the complete or partial set of capabilities, parameters and operation elements of (#6262)(#6237)(#6238)the AP(s) affiliated with the targeted AP MLD in the response frame. An AP affiliated with the targeted AP MLD is a requested AP if one of the following conditions is met:
— the Probe Request Multi-Link element in the Probe Request frame does not include any per-STA profile.
— (#1420)the link ID of the AP is equal to the value in the Link ID field in a Per-STA Profile subelement in the Probe Request Multi-Link element in the Probe Request frame.

(#5737)(#1744)(#1047)The complete profile of a requested AP is defined in 35.3.2.2 (Advertisement of complete or partial per-link information(#1859)).

(#5737)(#2416)The partial profile 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.

(#5737)(#2416)If a STA affiliated with a non-AP MLD sends an ML probe request to an AP to retrieve partial profile for AP(s) affiliated with the (#6262)(#6237)(#6238)targeted AP MLD, the STA shall include the (Extended) Request element in the Probe Request frame body and/or a Per-STA Profile subelement in a (#6701)Probe Request Multi-Link element carried in the Probe Request frame. In this case, the Complete Profile subfield of the STA Control field in the Per-STA Profile subelement shall be set to 0. (#5737)The (Extended) Request element carried in the per-STA profile corresponding to the requested AP that requests the same partial profile as the AP can be inherited from the (Extended) Request element in the frame body, subject to the rules defined in 35.3.2.3.2 (Inheritance in the per-STA profile of Probe Request Multi-Link element(#2416)(#6700)).

(#8060) If a STA affiliated with a non-AP MLD sends an ML probe request to an AP affiliated with an AP MLD which does not retrieve the information of the AP operating on the link that the ML probe request is sent, the STA shall set the Transmitting Link Info Requested subfield in the Common Info field of the Probe Request Multi-Link element in the ML probe request to 1. Otherwise, the STA shall set it to 0.

(#5737)(#2416)An ML probe request allows a non-AP STA to request an AP to include the complete profile of all APs affiliated with the (#6262)(#6237)(#6238)targeted AP MLD if the Probe Request frame does not include the (Extended) Request element in the frame body and the (#6701)Probe Request Multi-Link element in the Probe Request frame does not include any per-STA profile.

(#5737)(#2416)An ML probe request allows a non-AP STA to request an AP to include the same requested partial profile for all APs affiliated with the (#6262)(#6237)(#6238)targeted AP MLD as the AP if the Probe Request frame includes the (Extended) Request element in frame body and the (#6701)Probe Request Multi-Link element in the Probe Request frame does not include any per-STA profile.

 (#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 (#6700)Basic 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 (#6262)(#6237)(#6238)targeted AP MLD.

 (#5737)(#2416)(#2583)(#3360)(#1422)If an AP that is affiliated with an AP MLD receives an ML probe request from a non-AP STA requesting complete profile, it shall respond with an ML probe response, which is a Probe Response frame that includes a (#6700)Basic Multi-Link element with (#2419)a per-STA profile with complete profile for each of the APs that are affiliated (#6262)(#6237)(#6238)with the targeted AP MLD and that are requested by the ML probe request, subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response)(#1048). (#5737)If it receives an ML probe request from a non-AP STA requesting partial profile, it shall respond with an ML probe response that includes a (#6700)Basic Multi-Link element with (#2419)a per-STA profile with at least the elements requested from the (Extended) Request element for each of the APs that are affiliated (#6262)(#6237)(#6238)with the targeted AP MLD and that are requested by the ML probe request, unless the elements requested are not part of the complete profile for each of the APs and subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response)(#1048).

(#8060)If an AP that is affiliated with an AP MLD receives an ML probe request with the Transmitting Link Info Requested subfield in the Common Info field of the Probe Request Multi-Link element set to 1, it shall respond with an ML probe response carrying the information of the AP in the frame body of the ML probe response. Otherwise, it may not carry the information of the AP in the frame body of the ML probe response.

(#5737)(#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 profile 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.

 (#1049)(#1926)(#2421)(#2592)(#2858)NOTE—An AP operating in 6 GHz sets the Address 1 field of the Probe Response frame to broadcast address as defined in 26.17.2.3.2 (AP behavior for fast passive scanning).

(#5737)(#1676)(#1042)(#1044)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 profile 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.

**Straw Poll: Do you support to incorporate the proposed draft text in this document 11-21/1452r1 to the next revision of TGbe Draft?**

**Result: Yes/No/Abstain**