IEEE P802.11
Wireless LANs

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| CC36 CR for ML Probe request |
| Date: 2021-07-11 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Ming Gan | HuaweiHuawei |  |  | ming.gan@huawei.com |
| Jason Yuchen Guo |  |  |  |
| Yunbo Li | Huawei |  |  |  |
| Guogang Huang | Huawei |  |  |  |
| Yiqing Li | Huawei |  |  |  |
| Mengyao Ma | Huawei |  |  |  |
| Hongjia Su | Huawei |  |  |  |
| Xiangxin Gu | Unisoc |  |  | xiangxin.gu@unisoc.com |
| Jay Yang | Nokia |  |  | Zhijie.yang@nokia-sbell.com |
| Rojan Chitrakar | Panasonic |  |  | Rojan.chitrakar@sg.panasonic.com |

Abstract

This submission proposes resolutions of comments received from TGbe comment collection CC36 based on TGbe D1.1.

* 6262 6237 6238

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Change description language to normative language based on the comment from Rojan
1. **Introduction**

Interpretation of a Motion to Adopt

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

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11be 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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause**  | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 6262 | Ming Gan | 35.3.4.4 | 254.23 | Regarding the setting of ML Probe Request, please add MLD ID subfield into the common part of the ML element, the motivation and benefit are clearly described in the document 21/741r3 | as in the comment | Revised.Propose to add MLD ID into the Probe Request variant Multi-Link element to simplify the parsing at the AP MLD side. Please refer to the discussion part in this document for the detailTGbe editor to make the changes shown in 21/ 1399 r2 under all headings that include CID 6232. |
| 6237 | Ming Gan | 9.4.2.295b.3 | 135.31 | Presence Bitmap subfield for Probe Request should contain "MLD ID Present" and "Link ID Info", Please refer to the discussion part in DCN 21/741r3 | as in the comment | Revised.Propose to add MLD ID into the Probe Request variant Multi-Link element to simplify the parsing at the AP MLD side. Please refer to the discussion part in this document for the detailTGbe editor to make the changes shown in 21/ 1399 r2 under all headings that include CID 6237. |
| 6238 | Ming Gan | 9.4.2.295b.3 | 135.31 | Common info field for Probe Request should contain "MLD ID", to identify the corresponding AP MLD. Please refer to the discussion part in DCN 21/741r3 | as in the comment | Revised.Propose to add MLD ID into the Probe Request variant Multi-Link element to simplify the parsing at the AP MLD side. Please refer to the discussion part in this document for the detailTGbe editor to make the changes shown in 21/ 1399 r2 under all headings that include CID 6238. |

**Discussion:** None.

The non-AP MLD could use the following setting for the ML probe request

1. The A1 and A3 address fields are set to the MAC address of the responding AP which parses this ML Probe Request frame (from which the RNR element is received)
2. The MLD ID subfield in the common part of Probe Request variant ML element is set to MLD ID of the targeted AP MLD

Note -this basic info of the AP MLD, such as MLD ID, could be easily obtained by RNR element. And ML Probe Rquest is only used outside the context of active scanning

The benefit with MLD ID is clear (it can not be obtained by other methods)

* **ML probe request can be used to solicit the info of any single AP MLD as shown in the following figure (assume AP\_1x is the responding AP)**
	+ An AP MLD which includes the responding AP, such as MLD 1
	+ An AP MLD which contains the non-transmitted BSSID that in the same multiple BSSID set as the responding AP, such as MLD 3
	+ An AP MLD for which there is no affiliated AP working on the same link as the responding AP and there is at least one AP of the AP MLD is in the same multiple BSSID set as an AP affiliated with the AP MLD of the responding AP, such as MLD 2
* **The RA of ML probe request can always be set to the MAC address of the responding AP that responds with a ML probe response , such that to simplify the parsing at the AP MLD side**



***TGbe editor: Please modify the subclause 9.4.2.295b.3Probe Request variant Multi-Link element as follows*** (#CID 6262 6237, 6238)

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

The Probe Request variant 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 Probe Request variant Multi-Link element in a Probe Request frame identifies it as an ML probe request

The format of the Presence Bitmap subfield of the Probe Request variant Multi-Link element is defined in Figure 9-788xx (Presence Bitmap subfield of the Probe Request variant Multi-Link element format).

|  |  |  |
| --- | --- | --- |
|  | B0  | B1 B11 |
|  | MLD ID Present | Reserved |
| Bits: | 1 | 11 |
| Figure 9-788xx—Presence Bitmap subfield of the Probe Request variant Multi-Link element format |

The MLD ID Present subfield is set to 1 if the MLD ID subfield is present in the Common Info field. Otherwise the MLD ID Present subfield is set to 0.

The format of the Common Info field of the Probe Request variant Multi-Link element is defined in Figure 9-788yy (Common Info field of the Probe Request variant Multi-Link element).

|  |  |  |
| --- | --- | --- |
|  | Common Info Length | MLD ID |
| Octets: | 1 | 0 or 1 |
|  | Figure 9-788yy—Common Info field of the Probe Request variant Multi-Link element |

The Common Info Length subfield indicates the number of octets in the Common Info field.

The MLD ID subfield indicates the identifier of the AP MLD to which the ML probe request that carries the Probe Request variant Multi-Link element is targeted. The Link Info field contains zero or more Per-STA Profile subelements.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Subelement ID | Length | STA Control | STA Profile |
| Octet: |  | 1 |  | 1 | 2 | variable |

**Figure 9-788er—Per-STA Profile subelement of the Probe Request variant Multi-Link element format**

The Subelement ID field value is defined in Table 9-322ap (Optional subelement IDs for Basic variant Multi-Link element). The subelement format and ordering of subelements are defined in 9.4.3 (Subelements).

The format of the STA Control field is defined in Figure 9-788es ([STA Control of the Probe Request variant Multi-Link element field format)](#bookmark46). (#3247)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 |  | B3 | B4 | B5 B15 |
|  | Link ID | CompleteProfile | Reserved |
| Bits: |  | 4 |  | 1 | 11 |

### Figure 9-788es—STA Control field of the Probe Request variant Multi-Link element format

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

The Complete Profile subfield is set to 1 when complete information is requested from the AP as defined in 35.3.4.2 (Use of ML probe request and response). Otherwise the subfield is set to 0.

The STA Profile field of a Per-STA Profile subelement includes only an (Extended) Request element if the non-AP STA requests partial information from the AP corresponding to the per-STA profile, and is not present if the non-AP STA requests complete information from the AP.

***TGbe editor: Please modify the subclause 35.3.4.2 Use of ML probe request and response as follows*** (#CID 6262 6237, 6238)

**35.3.4.2 Use of ML probe request and response**

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:

—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.

—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.

—and that includes a Probe Request variant Multi-Link element defined in 9.4.2.295b.3 (Probe Request variant Multi-Link element).

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 variant Multi-Link element of the ML probe request and the AP MLD is the targeted AP MLD.

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 which operates on the same link where the ML probe request is sent, then the MLD ID subfield shall be present in the Probe Request variant Multi-Link element of the ML probe request and the targeted AP MLD is identified by MLD ID subfield.

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 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 variant Multi-Link element in the Probe Request frame does not include any per-STA profile.

—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 variant Multi-Link element in the Probe Request frame.(#1744)(#1047)The complete information of a requested AP is defined in 35.3.2.2 (Advertisement of complete or partial per-link information (#1859)).

(#2416)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.

(#2416)If a STA affiliated with a non-AP MLD sends an ML probe request to an AP to retrieve partial information for AP(s) affiliated with the 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 Probe Request variant 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. The (Extended) Request element carried in the per-STA profile corresponding to the requested AP that requests the same partial information 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 variant Multi-Link element(#2416)).

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

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 targeted AP MLD.

If an AP that is affiliated with an AP MLD receives an ML probe request from a non-AP STA requesting complete information, it shall respond with an ML probe response, which is a Probe Response frame that includes a Basic variant Multi-Link element with (#2419)a per-STA profile with complete information for each of the APs that are affiliated 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). If it receives an ML probe request from a non-AP STA requesting partial information, 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 each of the APs that are affiliated with the targeted AP MLD and that are requested by the ML probe request, unless the elements requested are not part of the complete information for each of the APs 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.

(#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).

(#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 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.