IEEE P802.11
Wireless LANs

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| LB266 CR for CID 13756 |
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 Abstract

This submission proposes resolutions for following CID received for TGbe LB266:

13756

Revisions:

* Rev 0: Initial version of the document.

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** |
| 13756 | Yuchen Guo | 223.21 | 9.4.2.312.3 | The probe request Multi-Link element 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 Multi-Link element | 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 13756 |

**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 Draft P802.11be\_D2.1 and REVme D1.3***

**9.4.2.312.3 Probe Request Multi-Link element**

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 Probe Request Multi-Link element in a Probe
Request frame identifies it as a (#11318)multi-link probe request (#11182)(see 35.3.4 (Discovery of an AP
MLD)).

The format of the Presence Bitmap subfield of the (#11182)Multi-Link Control field in a Probe Request
Multi-Link element is defined in Figure 9-1002q (Presence Bitmap field of the Probe Request Multi-Link
element format).

 B0 B1 B11

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

Bits: 1 11

**Figure 9-1002q—Presence Bitmap field of the Probe Request Multi-Link element format**

The (#10453)AP MLD ID Present subfield is set to 1 if (#11395)the (#10453)AP MLD ID subfield is present in the Common Info field. Otherwise the (#10453)AP MLD ID Present subfield is set to 0.

The format of the Common Info field of the Probe Request Multi-Link element is defined in Figure 9-1002r
(Common Info field of the Probe Request Multi-Link element format).

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

Octets: 1 1 0 or 1

**Figure 9-1002r—Common Info field of the Probe Request Multi-Link element format** **(#13756)**

(#11396)The Common Info Length subfield indicates the number of octets in the Common Info field,
including the one octet for the Common Info Length subfield

(#13756)The format of the Transmitting Link Info subfield is defined in Figure 9-1002xx (Transmitting Link Info subfield format)

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

Bits: 1 7

**Figure 9-1002xx—** **Transmitting Link Info subfield format (#13756)**

(#13756)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.

The (#10453)AP MLD ID subfield(#10563), if present, indicates the identifier of the AP MLD that is targeted by the (#11318)multi-link probe request, as described in 35.3.4.2 (Use of multi-link probe request and
response(#11318)).
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**35.3.4.2 Use of multi-link probe request and response(#11318)**

(#11728)(#11318)A multi-link 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 the AP(s) affiliated with the targeted AP MLD in the response frame. (#11413)The complete profile and partial profile of a requested AP are defined in 35.3.3.3 (Advertisement of complete or partial per-link information).

(#11411)NOTE 1—If an AP MLD has only one affiliated AP, a multi-link probe response will not provide additional information compared to a Probe Response frame that is not a multi-link probe response.

(#10310)An MLD SME may generate a multi-link probe request by calling MLME-SCAN.request with the ScanType set to MULTI\_LINK PROBE. A (#11318)multi-link probe request is a Probe Request frame that is sent as a non-scanning probe request transmission (see 11.1.4.3.8 (Non-scanning probe request transmission))(#11410)(#11317). The Probe Request frame shall be formatted as follows:
— (#11727)either 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 (#10453)AP MLD ID subfield (if present (#10311)in the Probe Request Multi-Link element) set to the (#10453)AP MLD ID that identifies the targeted AP MLD with which the requested AP(s) are affiliated.
— including a Probe Request Multi-Link element defined in 9.4.2.312.3 (Probe Request Multi-Link element).
— (#13350)If a non-AP MLD is sending a multi-link probe request, it shall follow the rules defined in 9.3.3.9 (Probe Request frame format) regarding the inclusion of the SSID element, the SSID List element, the rules defined in 35.3.4.2 (Use of multi-link probe request and response(#11318)) regarding the inclusion of the Request element, the Extended Request element, and the Probe Request Multi-Link element, and shall follow the rules for sending a Probe Request frame outside the context of active scanning as defined in 35.3.4.5 (Probe Request frame content for a non-AP EHT STA(#13357)) regarding the inclusion of the other elements.

If either the Address 1 field or the Address 3 field of the (#11318)multi-link probe request is set to the MAC
address of the AP affiliated with an AP MLD that corresponds to the nontransmitted BSSID, then the
(#10453)AP MLD ID subfield shall not be present in the Probe Request Multi-Link element of the
(#11318)multi-link probe request and the AP MLD is the targeted AP MLD.

If either the Address 1 field or the Address 3 field of the (#11318)multi-link probe request is set to the MAC
address of the responding AP that operates on the same link where the multi-link probe request is sent, then
the (#10453)AP MLD ID subfield shall be present in the Probe Request Multi-Link element of the multi-link
probe request and the targeted AP MLD is identified by the (#10453)AP MLD ID subfield,
(#11519)(#11560)which is set to the same MLD ID value as the one used by the AP that is addressed by the
multi-link probe request to identify the AP MLD in the Beacon and Probe Response frames that it transmits.

If the (#10413)Probe Request Multi-Link element in the (#11318)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 or (#10453)AP MLD ID of the (#11318)multi-link probe request shall be requested APs.

If the (#10413)Probe Request Multi-Link element in the (#11318)multi-link probe request includes one or
more per-STA profiles, then only APs affiliated with the same AP MLD as the AP identified in the Address
1 or Address 3 field or (#10453)(#10616)in the AP MLD ID subfield (if present) 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
(#10413)Probe Request Multi-Link element in the multi-link probe request shall be requested APs.

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 (#11318)multi-link probe request.

(#13756) 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 request 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 0. Otherwise, the STA shall set it to 1.

(#11129)A multi-link probe request allows a non-AP STA to request an AP to include the partial profile for
a requested AP affiliated with the targeted AP MLD if the Probe Request Multi-Link element carries a PerSTA Profile subelement for the requested AP to retrieve partial profile. To do so, the STA shall include the
(Extended) Request element in the frame body of the (#11318)multi-link probe request and/or in a Per-STA
Profile subelement in a Probe Request Multi-Link element carried in the multi-link probe request, and:
— the Complete Profile (#10564)Requested subfield of the STA Control field in the Per-STA Profile
subelement shall be set to 0.
— the (Extended) Request element, if carried in the per-STA profile corresponding to the requested AP,
specifies the partial profile.
— the (Extended) Request element, if not carried in the per-STA profile corresponding to the requested
AP that requests the same partial profile as the AP addressed by the multi-link probe request can be
inherited from the (Extended) Request element in the frame body, subject to the rules defined in
35.3.3.6.2 (Inheritance in the per-STA profile of Probe Request Multi-Link element).

(#11318)A multi-link probe request allows a non-AP STA to request an AP to include the complete profile
of all (#11129)requested APs affiliated with the targeted AP MLD if the Probe Request frame does not
include the (Extended) Request element in the frame body and the Probe Request Multi-Link element in the
Probe Request frame does not include any per-STA profile.

(#11318)A multi-link probe request allows a non-AP STA to request an AP to include the same requested
partial profile for all (#11129)requested APs affiliated with the targeted AP MLD if the Probe Request frame
includes the (Extended) Request element in frame body and the Probe Request Multi-Link element in the
Probe Request frame does not include any per-STA profile.

(#11318)A multi-link probe response is a Probe Response frame:
— that is transmitted in response to (#11554)a received (#11318)multi-link probe request
— and that includes Basic Multi-Link element which can carry complete or partial (#11414)profile(s),
based on the soliciting request, for each of the requested AP(s) affiliated with the targeted AP MLD.

If an AP that is affiliated with an AP MLD receives a (#11318)multi-link probe request from a non-AP STA
affiliated with a non-AP MLD requesting complete profile for a requested AP, possibly among other
requests for other requested APs, it shall respond with a (#11318)multi-link probe response that includes a
Basic Multi-Link element with a per-STA profile with complete profile for the requested AP subject to the
rules defined in 11.1.4.3.4 (Criteria for sending a response). If it receives a (#11318)multi-link probe request
from a non-AP STA affiliated with a non-AP MLD requesting partial profile for a requested AP, possibly
among other requests for other requested APs, it shall respond with a (#11318)multi-link probe response that
includes a Basic Multi-Link element with 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
profile for the requested AP and subject to the rules defined in 11.1.4.3.4 (Criteria for sending a response).

(#11607)If an AP that is affiliated with an AP MLD receives a (#11318)multi-link probe request requesting
complete profile and responds with a multi-link 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(#10621).

NOTE 2—An AP operating in the 6 GHz band (#10226)is allowed to set 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).

(#13756)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.

An AP corresponding to the transmitted BSSID in a multiple BSSID set shall transmit a (#11318)multi-link
probe response in response to a multi-link probe request that is soliciting information of an MLD with which
an AP corresponding to the nontransmitted BSSID in the same multiple BSSID set is affiliated. Such a
(#11318)multi-link probe response shall carry a Basic Multi-Link element containing information of the
solicited AP MLD and one or more APs affiliated with it. The Basic Multi-Link element shall be carried in
the frame body of the (#11318)multi-link probe response, whose location is outside of the Multiple BSSID
element carried in the frame (#10621)and the (#10453)AP MLD ID Present subfield of the Presence Bitmap
subfield of the Basic Multi-Link element shall be set to 1. The (#10453)AP MLD ID subfield of the
Common Info field of the Basic Multi-Link element (#10621)shall be set to the same value as the BSSID
Index subfield of the Multiple-BSSID Index element carried in the Nontransmitted BSSID Profile
subelement of the Multiple BSSID element(#10622).

(#13785)(#10105)NOTE 3—A (#11318)multi-link probe request can only solicit information of only one AP MLD and
one or more APs affiliated with that MLD.

(#10105)NOTE 4—A multi-link probe response carries complete information for only one AP MLD and one or more
APs affiliated with that MLD.

(#12796)NOTE 5—A non-AP STA affiliated with a non-AP MLD that receives such a (#11318)multi-link probe
response identifies that the Basic Multi-Link element in the frame, outside the Multiple BSSID element, corresponds to
an AP MLD with which the AP corresponding to the nontransmitted BSSID is affiliated with based on the presence of
the MLD ID subfield.