IEEE P802.11
Wireless LANs

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| Proposed Spec TextUsage and Rules of ML element in the context of Multi-link Setup |
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Abstract

This submission proposes spec text for usage and rules of ML element in the context of multi-link setup to be incorporated into 801.11be D0.1

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Added a missed motion and Updated based on comments by some members
* Rev 2: Fixed some errors and Added a text regarding authentication (Motion 115, #SP89)
* Rev 3: Tagged with the corresponding motions and Updated based on comments by some members
* Rev 4: Reflected Motion 122, #SP133 explicitly and Updated some texts based on comments.
* Rev 5: Added a general text of single multi-link setup in the first paragraph and Updated some texts based on comments by some members

The proposed texts are based on the following motions

802.11be supports the following:

* An AP that is part of an AP MLD that supports SAE authentication shall include the MLD address in beacon and probe response frames it transmits.
* EHT MLD shall indicate its MLD MAC address during authentication request/response exchange.

[Motion 115, #SP89, [10] and [106]]

An EHT MLD shall indicate its MLD MAC address during ML setup.

[Motion 112, #SP32, [13] and [111]]

802.11be defines mechanism(s) for multi-link operation that enables the following:

* Indication of capabilities and operating parameters for multiple links of an AP MLD.
* Negotiation of capabilities and operating parameters for multiple links during a single setup signaling exchange.

[Motion 32, [5] and [112]]

802.11be supports a mechanism for multi-link operation:

* An AP affiliated with an AP MLD can indicate the capabilities and operational parameters for one or more STAs of the multi-link device.
* A non-AP STA affiliated with a non-AP MLD can indicate the capabilities for one or more non-AP STAs of the non-AP MLD.
* Specific information of capabilities and operational parameters of multi-link device is TBD.

[Motion 21, [5] and [113]]

A new element will be defined as a container to advertise and exchange capability information for multi-link setup.

[Motion 68, [21] and [114]]

802.11be supports that an STA of an MLD can provide MLD-level information that is common to all STAs affiliated with the MLD and per-link information that is specific to the STA on each link in management frames during multi-link setup.

* The specific information is TBD.

[Motion 115, #SP65, [10] and [104]]

802.11be supports that each STA of an MLD may independently select and manage its operational parameters unless specified otherwise in the 802.11be standard.

[Motion 112, #SP33, [13] and [115]]

802.11be supports that a non-AP MLD may initiate multi-link setup with an AP MLD to setup more than one link with subset of APs affiliated with the AP MLD. This is for R1.

[Motion 122, #SP133, [8] and [129]]

***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.***

***TGbe editor: Add new a subclause 33.x.y.z (Usage and Rules of ML element in the context of multi-link setup) under clause 33 as follows:***

33. Extreme High Throughput (EHT) MAC specification

33.x. Multi-link operation

33.x.y. Multi-link setup

33.x.y.z. Usage and Rules of Multi-Link element in the context of multi-link setup

 ***[Motion 32]***, ***[Motion 122, #SP133],***

When a non-AP MLD initiates a multi-link setup with an AP MLD to setup more than one link, a non-AP STA that is affiliated with the non-AP MLD shall transmit an (Re-)Association Request frame on a link only. The non-AP MLD may initiate the multi-link setup with an AP MLD to setup more than one link with a subset of APs that is affiliated with the AP MLD. When the AP MLD accepts the association request, an AP that is corresponding to that link and that is affiliated with the AP MLD shall transmit an (Re-)Association Response frame on that link.

***[Motion 21], [Motion 32], [Motion 68]***

A Multi-Link element as defined 9.4.2.x (Multi-Link element) shall be included in the (Re-)Association Request frame to indicate capabilities of reported non-AP STAs that are affiliated with the non-AP MLD.

***[Motion 112, #SP32], [Motion 115, #SP65]***

The Multi-Link element carried in the (Re-)Association Request frame shall include MLD-level information that is common to all non-AP STAs affiliated with the non-AP MLD. MLD-level information shall include at least the MLD MAC address.

The Multi-Link element carried in the (Re-)Association Request frame shall include one or more STA profile subelement(s) each of which contains the complete information of the reported non-AP STA, which is affiliated with the non-AP MLD, corresponding to the link that is requested for multi-link setup, except for the reporting non-AP STA transmitting the (Re-)Association Request frame.

***[Motion 21], [Motion 32], [Motion 68]***

A Multi-Link element as defined 9.4.2.x (Multi-Link element) shall be included in the (Re-)Association Response frame to indicate capabilities and operational parameters of reported APs that are affiliated with the AP MLD.

***[Motion 112, #SP32], [Motion 115, #SP65]***

The Multi-Link element carried in the (Re-)Association Response frame shall include MLD-level information that is common to all APs affiliated with the AP MLD. MLD-level information shall include at least the MLD MAC address.

The Multi-Link element carried in the (Re-)Association Response frame shall include one or more STA profile subelement(s) each of which contains the complete information of the reported AP, which is affiliated with the AP MLD, corresponding to the link that is accepted by the AP MLD and requested by the non-AP MLD, except for the reporting AP transmitting the (Re-)Association Response frame.

Each STA profile subelement included in the Multi-Link element carried in the (Re-)Association Request frame and the (Re-)Association Response frame shall not include another Multi-Link element.

***[Motion 115, #SP89]***

An Authentication frame transmitted by an STA affiliated with an MLD shall include its MLD MAC address in a Multi-Link element carried in the Authentication frame.

***[Motion 112, #SP33]***

An STA, which is affiliated with an MLD, may select and manage its operating parameters independently from the other STA(s) affiliated with the same MLD, unless specified otherwise.