IEEE P802.11
Wireless LANs

|  |
| --- |
| Proposed draft 11be spec text for MLME SAP - Association |
| Date: 2020-10-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yonggang Fang | ZTE (TX) |  |  | yfang@ztetx.com |
| Bo Sun | ZTE |  |  |  |
| Zhiqiang Han | ZTE |  |  |  |
| Liuming Lu | ZTE |  |  |  |
| Po-Kai Huang | Intel |  |  |  |
| Rojan Chitrakar | Panasonic |  |  |  |
| Jay Yang | Nokia |  |  |  |

Abstract

This contribution proposes the draft specification text of MLME SAP for TGbe draft.

Revisions:

* Rev 0: Initial version of the document.

The texts is prepared for the following motions.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Layer management | MLME SAP interface\* | Yonggang Fang | Basics (R1) | Po-Kai Huang, Rojan Chitrakar,Abhishek Patil, Jay Yang, Xiandong Dong,Subir Das | Motion 25, [5] and [120]Motion 115, #SP76, [12] and [121]Motion 115, #SP88, [12] and [123]Motion 115, #SP86, [12] and [125]Motion 115, #SP87, [12] and [125]Motion 115, #SP94, [12] and [125][Motion 50, [28] and [113] ][Motion 115, #SP90, [14] and [114]][Motion 126, [1] and [115]][Motion 131, #SP207, [19] and [115]] |

802.11be defines a multi-link setup signaling exchange executed over one link initiated by a non-AP MLD with an AP MLD as follows:

* Capability for one or more links can be exchanged during the multi-link setup.
* The AP MLD serves as the interface to the DS for the non-AP MLD after successful multi-link setup.

NOTE 1 – The link identification is TBD.

NOTE 2 – Details for non-infrastructure mode of operation TBD.

[Motion 25, [7] and [133]]

802.11be supports the following:

* Existing frames are reused for discovering APs that are affiliated with AP MLD.
* Association Request and Association Response frames are reused for multi-link setup.
* NOTE: After association, new signaling to query AP link specific parameters or AP MLD parameters by using Protected Management Frames (PMF) encrypted Management frames is TBD.

[Motion 115, #SP76, [14] and [135]]

Propose to amend the existing MLME SAP interface 6.3.7 Association according to those motions.

802.11be shall define a mechanism to teardown an existing multi-link setup agreement.

[Motion 70, [28] and [136]]

802.11be supports the following:

* Reuse disassociation frame for multi-link teardown.
* Reuse authentication frame for multi-link SAE exchange and multi-link Open System authentication.

[Motion 115, #SP88, [14] and [137]]

Propose to amend the existing MLME SAP interface 6.3.9 Deassociation according to those motions.

TGbe shall define a multi-link resetup mechanism to resetup with another AP MLD or changing configuration of existing multi-link setup with an AP MLD.

* Reassociation Request/Response frame is used for this purpose.

[Motion 115, #SP86, [14] and [139]]

When a non-AP MLD that has multi-link setup with current AP MLD sends a Reassociation Request frame to a new AP MLD, AP MLD MAC address of the current AP MLD is used in Current AP Address field of the frame.

[Motion 115, #SP87, [14] and [139]]

When a STA of a non-AP MLD that has multi-link setup with current AP MLD sends a Reassociation Request frame to a new AP that is not affiliated with an AP MLD, AP MLD MAC address of the current AP MLD is used in Current AP Address field of the frame.

* Note: Only the STA that sends the Reassociation Request frame can associate with the new AP.

[Motion 115, #SP94, [14] and [139]]

Propose to amend the existing MLME SAP interface 6.3.8 Reassociation according to those motions.

802.11be defines mechanism(s) to include MLO information that a STA of an MLD provides in its mgmt. frames, during discovery and ML setup, as described below:

* MLD (common) Information
	+ Information common to all the STAs of the MLD.
* Per-link information
	+ Capabilities and Operational parameter of other STAs of the MLD other than the advertising STA.

[Motion 115, #SP91, [14] and [120]]

Propose to amend the existing MLME SAP interface 6.3.7 Association, 6.3.8 Reassociation according to this motion.

The 802.11be amendment shall define mechanism(s) in support of priority access to a non-AP STA for national security (NS)/emergency preparedness (EP) Priority Service

NOTE – A non-AP STA for NS/EP Priority Service is a regular non-AP STA authorized to NS/EP service.

[Motion 50, [28] and [113]]

The NS/EP Priority Service if supported by a non-AP STA, shall use an action frame to indicate the need for priority access to its associated AP STA and to be included in Release 1 specification.

[Motion 115, #SP90, [14] and [114]]

[Motion 126, [1] and [115]]

The Priority Service Information shall be defined in EHT MAC Capability Information Element to exchange the NS/EP Priority Service capability information between AP STA and non-AP STA

[Motion 131, #SP207, [19] and [115]]

Propose to amend the existing MLME SAP interface 6.3.7 Association, 6.3.8 Reassociation according to those motions.

**Proposed spec text:**

The baseline for this text is 802.11 REVmd draft 5.0.

**6.3.7 Associate**

***TGbe editor: Modify the following subclauses as follows***

**6.3.7.1 Introduction**

The following primitives describe how a STA becomes associated with an AP and how a non-AP MLD becomes associated with an AP MLD.

**6.3.7.2 MLME-ASSOCIATE.request**

**6.3.7.2.1 Function**

This primitive requests association with a specified peer MAC entity that is within an AP or an AP MLD.

**6.3.7.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-ASSOCIATE.request(

PeerSTAAddress,

…

EHTCapabilities,

MultiLink,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity with which to perform theassociation process.  |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.7.2.3 When generated**

This primitive is generated by the SME when a STA wishes to establish association with an AP or PCP, or when a non-AP MLD wishes to establish association with an AP MLD.

**6.3.7.2.4 Effect of receipt**

This primitive initiates an association procedure. In the case that a response is received from the responder STA or responder MLD, the MLME subsequently issues an MLME-ASSOCIATE.confirm primitive that reflects the results.

**6.3.7.3 MLME-ASSOCIATE.confirm**

***TGbe editor: Modify the following subclauses as follows***

**6.3.7.3.1 Function**

This primitive reports the results of an association attempt with a specified peer MAC entity that is in an AP or PCP, or in an AP MLD.

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-ASSOCIATE.confirm(

ResultCode,

…

EHTCapabilities,

MultiLink,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| ResultCode | Enumeration | SUCCESS,REFUSED\_REASON\_UNSPECIFIED,REFUSED\_NOT\_AUTHENTICATED,REFUSED\_CAPABILITIES\_MISMATCH,REFUSED\_EXTERNAL\_REASON,REFUSED\_AP\_OUT\_OF\_MEMORY,REFUSED\_BASIC\_RATES\_MISMATCH,REJECTED\_EMERGENCY\_SERVICES\_NOT\_SUPPORTED,REFUSED\_TEMPORARILY | Indicates the result of the MLMEASSOCIATE.request primitive. |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.7.3.3 When generated**

This primitive is generated by the MLME as a result of an MLME-ASSOCIATE.request primitive or receipt of an Association Response frame from the peer MAC entity to associate with a specified peer MAC entity that is in an AP or PCP, or in an AP MLD.

**6.3.7.3.4 Effect of receipt**

The SME is notified of the results of the association procedure.

**6.3.7.4 MLME-ASSOCIATE.indication**

***TGbe editor: Modify the following subclauses as follows***

**6.3.7.4.1 Function**

This primitive indicates that a specific peer MAC entity is requesting association with the local MAC entity, which is in an AP or PCP, or in an AP MLD.

**6.3.7.4.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-ASSOCIATE.indication(

PeerSTAAddress,

…

EHTCapabilities,

MultiLink,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MAC entityfrom which the association was received. |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.7.4.3 When generated**

This primitive is generated by the MLME as a result of the receipt of an association request from a specific peer MAC entity.

**6.3.7.4.4 Effect of receipt**

The SME is notified of the receipt of the association request.

**6.3.7.5 MLME-ASSOCIATE.response**

***TGbe editor: Modify the following subclauses as follows***

**6.3.7.5.1 Function**

This primitive is used to send a response to a specific peer MAC entity that requested an association with the STA that issued this primitive, which is in an AP or PCP, or a response to a specific peer MAC entity that requested an association with the AP MLD that issued this primitive.

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-ASSOCIATE.response (

PeerSTAAddress,

…

EHTCapabilities,

MultiLink,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity from which the association requestwas received. |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Specifies the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true; Otherwise not present. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.7.5.3 When generated**

This primitive is generated by the SME of a STA that is in an AP or PCP as a response to an MLME-ASSOCIATE.indication primitive, or by the SME of an AP MLD as a response to an MLME-ASSOCIATE.indication primitive.

**6.3.7.5.4 Effect of receipt**

This primitive initiates transmission of an AssociationResponse to the specific peer MAC entity that requested association.

**6.3.8 Reassociate**

***TGbe editor: Modify the following subclause as follows***

**6.3.8.1 Introduction**

The following primitives describe how a STA becomes associated with another AP or PCP, or how a non-AP MLD becomes associated with another AP MLD.

**6.3.8.2 MLME-REASSOCIATE.request**

**6.3.8.2.1 Function**

This primitive requests a change in association to a specified new peer MAC entity that is in an AP or PCP, or in an AP MLD.

**6.3.8.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-REASSOCIATE.request(

NewPCPorAPAddress,

…

EHTCapabilities,

MultiLink,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| NewPCPorAPAddress | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity with which to perform thereassociation process.  |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.8.2.3 When generated**

This primitive is generated by the SME for a STA to change association to a specified new peer MAC entity that is in an AP or PCP, or in an AP MLD.

**6.3.8.2.4 Effect of receipt**

This primitive initiates a reassociation procedure. In the case that a response is received from the responder STA or MLD, the MLME subsequently issues an MLME-REASSOCIATE.confirm primitive that reflects the results.

**6.3.8.3 MLME-REASSOCIATE.confirm**

***TGbe editor: Modify the following subclauses as follows***

**6.3.8.3.1 Function**

This primitive reports the results of a reassociation attempt with a specified peer MAC entity that is in an AP or PCP, or in an AP MLD.

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-REASSOCIATE.confirm(

ResultCode,

…

EHTCapabilities,

MultiLink

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| ResultCode | Enumeration | SUCCESS,REFUSED\_REASON\_UNSPECIFIED,REFUSED\_NOT\_AUTHENTICATED,REFUSED\_CAPABILITIES\_MISMATCH,REFUSED\_EXTERNAL\_REASON,REFUSED\_AP\_OUT\_OF\_MEMORY,REFUSED\_BASIC\_RATES\_MISMATCH,REJECTED\_EMERGENCY\_SERVICES\_NOT\_SUPPORTED,REFUSED\_TEMPORARILY | Indicates the result of the MLMEREASSOCIATE.request primitive. |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.8.3.3 When generated**

This primitive is generated by the MLME as a result of an MLME-REASSOCIATE.request primitive to reassociate with a specified peer MAC entity that is in an AP or PCP, or in an AP MLD.

**6.3.8.3.4 Effect of receipt**

The SME is notified of the results of the reassociation procedure.

**6.3.8.4 MLME-REASSOCIATE.indication**

***TGbe editor: Modify the following subclauses as follows***

**6.3.8.4.1 Function**

This primitive indicates that a specific peer MAC entity is requesting reassociation with the local MAC entity, which is in an AP or PCP.

**6.3.8.4.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-REASSOCIATE.indication(

PeerSTAAddress,

CurrentAPAddress,

…

EHTCapabilities,

MultiLink

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity from which the reassociation requestwas received. |
| CurrentAPAddress | MacAddress  | Any valid individual MAC address | Specifies the address of the AP or PCP or AP MLD with which the peer STA is currently associated. |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| MultiLink | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.8.4.3 When generated**

This primitive is generated by the MLME as a result of the establishment of a reassociation with a specific peer MAC entity that resulted from a reassociation procedure that was initiated by that specific peer MAC entity.

**6.3.8.4.4 Effect of receipt**

The SME is notified of the establishment of the reassociation.

**6.3.8.5 MLME-REASSOCIATE.response**

***TGbe editor: Modify the following subclauses as follows***

**6.3.8.5.1 Function**

This primitive is used to send a response to a specific peer MAC entity that requested a reassociation with the STA that issued this primitive, which is in an AP or PCP, or in an AP MLD.

* Semantics of the service primitive

The primitive parameters are as follows:

MLME-REASSOCIATE.response(

PeerSTAAddress,

ResultCode,

EHTCapabilities,

Multi-Link,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity from which the reassociationrequest was received.  |
| ResultCode  | Enumeration  | SUCCESS,REFUSED\_REASON\_UNSPECIFIED,REFUSED\_CAPABILITIES\_MISMATCH,REFUSED\_EXTERNAL\_REASON,REFUSED\_AP\_OUT\_OF\_MEMORY,REFUSED\_BASIC\_RATES\_MISMATCH(#4742),REJECTED\_EMERGENCY\_SERVICES\_NOT\_SUPPORTED,REFUSED\_TEMPORARILY | Res Indicates the result response to thereassociation request from the peer MAC entity. |
| … |  |  |  |
| EHTCapabilities |  |  | TBD |
| Multi-Link | Multi-Link element | As defined in 9.4.2.247b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.8.5.3 When generated**

This primitive is generated by the SME of a STA that is in an AP or PCP, or in an AP MLD as a response to an MLME-REASSOCIATE.indication primitive.

**6.3.8.5.4 Effect of receipt**

This primitive initiates transmission of a response to the specific peer MAC entity that requested reassociation.

**6.3.9 Disassociate**

***TGbe editor: Modify the following subclauses as follows***

**6.3.9.1 MLME-DISASSOCIATE.request**

**6.3.9.1.1 Function**

This primitive requests disassociation with a specified peer MAC entity.

**6.3.9.1.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-DISASSOCIATE.request(

PeerSTAAddress,

ReasonCode,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity with which to perform thedisassociation process.  |
| ReasonCode | Reason Code field | As defined in9.4.1.7 (ReasonCode field) | Specifies the reason the disassociationprocedure was initiated. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.9.1.3 When generated**

This primitive is generated by the SME for a STA to disassociate from a STA with which it has an association, or by the SME for a MLD to disassociate from a MLD with which it has an association.

**6.3.9.1.4 Effect of receipt**

This primitive initiates a disassociation procedure. The MLME subsequently issues an MLME-DISASSOCIATE.confirm primitive that reflects the results.

**6.3.9.2 MLME-DISASSOCIATE.confirm**

**6.3.9.2.1 Function**

This primitive reports the results of a disassociation procedure with a specific peer MAC entity.

**6.3.9.2.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-DISASSOCIATE.confirm()

**6.3.9.2.3 When generated**

This primitive is generated by the MLME as a result of an MLME-DISASSOCIATE.request primitive to

disassociate with a specified peer MAC entity.

**6.3.9.2.4 Effect of receipt**

The SME is notified of the results of the disassociation procedure.

**6.3.9.3 MLME-DISASSOCIATE.indication**

**6.3.9.3.1 Function**

This primitive reports disassociation with a specific peer MAC entity.

**6.3.9.3.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-DISASSOCIATE.indication(

PeerSTAAddress,

ReasonCode,

VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid range | Description |
| PeerSTAAddress  | MacAddress  | Any valid individual MAC address | Specifies the address of the peer MACentity with which the associationrelationship was invalidated. |
| ReasonCode | Reason Code field | As defined in9.4.1.7 (ReasonCode field) | Specifies the reason the disassociationprocedure was initiated. |
| VendorSpecificInfo | A set of elements | As defined in 9.4.2.25(Vendor Specific element) | Zero or more elements. |

**6.3.9.3.3 When generated**

This primitive is generated by the MLME as a result of the invalidation of an association relationship with a specific peer MAC entity.

**6.3.9.3.4 Effect of receipt**

The SME is notified of the invalidation of the specific association relationship.

**Straw Poll: Do you support to incorporate the proposed draft text in this document to the TGbe Draft 0.1?**

**Result: Yes/No/Abstain**