### IEEE P802.11Wireless LANs

|  |
| --- |
| Proposed Draft Specification for clarification of MLD association |
| Date: 2020-12-01 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel Corporation | 2200 Mission College Blvd, Santa Clara, CA 950542200  |  | po-kai.huang@intel.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

We propose clarification of MLD association to help the creation of TGbe draft D0.3.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revision on the instruction description for the editor based on the received feedback.
* Rev 2: Revision on intended Draft to be D0.3.
* Rev 3: Further editorial revision based on the feedback received offline.

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 0.3 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D0.3 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.***

**Discussion:**

There has been confusions on whether you can do legacy STA association while there is an MLD association. We clarify that this is not allowed except roaming case based on agreed motion. Further, allowing concurrent STA association with DS mapping for affiliated STA creates problems for scheduling data under MLD association.

We propose the following texts.

* For a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD shall not send Association Request frame without Multi-link element.
* Note - A non-AP MLD can disassociate with the associated AP MLD to allow a non-AP STA that was affiliated with the non-AP MLD to send an Association Request frame without Multi-link element to perform regular STA association, i.e., non-MLD association.
* For a non-AP MLD associated with an AP MLD, if an AP affiliated with the AP MLD receives an Association Request frame without Multi-link element from a non-AP STA affiliated with the non-AP MLD, then the AP shall reject the association request.
* For a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD shall not send Reassociation Request frame without Multi-link element to any AP affiliated with that AP MLD.
* For a non-AP MLD associated with an AP MLD, if an AP affiliated with the AP MLD receives an Reassociation Request frame without Multi-link element from a non-AP STA affiliated with the non-AP MLD, then the AP shall reject the reassociation request.

**Propose:**

* Association, reassociation, and disassociation
* General

***Change the third, fourth, and fifth paragraphs as follows:***

Successful association enables a STA or an MLD to exchange Class 3 frames. Successful association sets the state for a non-FILS STA or a non-FILS MLD to State 3 or State 4. Successful association sets the state for FILS STAs to State 4.

Successful reassociation enables a STA or an MLD to exchange Class 3 frames. Unsuccessful reassociation when not in State 1 leaves the state for a STA state unchanged (with respect to the AP or PCP that was sent the Reassociation Request (which may be the current STA)) or for a non-AP MLD state unchanged (with respect to the AP MLD that was sent the Reassociation Request). Successful reassociation sets the state for a non-FILS STA to State 3 or State 4 (with respect to the AP or PCP that was sent the Reassociation Request frame) or for a non-FILS non-AP MLD to State 3 or State 4 (with respect to the AP MLD that was sent the Reassociation Request frame). Successful reassociation when not in State 1 sets the state for a STA to State 2 (with respect to the current AP or PCP, if this is not the AP or PCP that was sent the Reassociation Request frame) or for a non-AP MLD to State 2 (with respect to the current AP MLD, if this is not the AP MLD that was sent the Reassociation Request frame). Successful reassociation sets the state for a FILS STA to State 4 (with respect to the AP or PCP that was sent the Reassociation Request frame) and enables it to exchange Class 3 frames. Reassociation shall be performed only if the originating STA or non-AP MLD is already associated in the same ESS.

Disassociation notification when not in State 1 sets the state for a non-FILS STA or a non-FILS MLD to State 2. Disassociation notification when not in State 1 sets the state for a FILS STA to State 1. The STA or MLD shall become associated again prior to sending Class 3 frames. A STA or an MLD may disassociate a peer STA or a peer MLD, respectively, at any time, for any reason.

***Change the last paragraph as follows:***

Association is not applicable in an IBSS. In an infrastructure BSS, association is required. Between an AP MLD and a non-AP MLD, association is required. In a PBSS, association is optional. APs, AP MLDs, and PCPs do not initiate association.

***Change the title of the subclause 11.3.5.2 as follows:***

* Non-AP STA, non-AP MLD, and non-PCP STA association initiation procedures

***Insert the following paragraph after the first paragraph (“The SME shall delete ...”):***

The MLDME shall delete any PTKSA, GTKSA, IGTKSA, BIGTKSA and temporal keys held for communication with the AP MLD by using MLME-DELETEKEYS.request primitive (see 12.6.18 (RSNA security association termination)) before invoking MLME-ASSOCIATE.request primitive.

***Insert the following paragraph after the now fifth paragraph (“Upon receipt of an MLME-ASSOCIATE.request primitive”):***

For a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD shall not send Association Request frame without Multi-link element.

Note - A non-AP MLD can disassociate with the associated AP MLD to allow a non-AP STA that was affiliated with the non-AP MLD to send an Association Request frame without Multi-link element to perform regular STA association, i.e., non-MLD association.

***Change the now-shifted sixth paragraph as follows:***

Upon receipt of an MLME-ASSOCIATE.request primitive, a non-AP, non-AP MLD, and non-PCP STA shall associate with an AP, AP MLD, or PCP, respectively, using the following procedure:

* If the state for the AP, AP MLD, or PCP is State 1, the MLME shall inform the SME of the failure of the association by issuing an MLME-ASSOCIATE.confirm primitive, and this procedure ends.
* All the states, agreements and allocations listed in both numbered lists in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures) item c) are deleted or reset to initial values.
* The MLME shall transmit an Association Request frame to the AP or PCP or the MLME shall transmit an Association Request frame with Multi-Link element in the Association Request frame that indicates the AP MLD to an AP affiliated with the AP MLD. The RSNE contained in the MLME-ASSOCIATE.request primitive shall be included in the Association Request frame. The RSNE shall specify exactly one pairwise cipher suite and exactly one AKM suite. If the MLME-ASSOCIATE.request primitive contained the EmergencyServices parameter equal to true, an Interworking element with the UESA field set to 1 shall be included in the Association Request frame.
* If an Association Response frame is received with a status code of SUCCESS, a DMG STA shall write to each of the following MIB attributes the corresponding subfield of the DMG BSS Parameter Configuration field of the DMG Operation element received from the AP or PCP to which it requested association:
* dot11PSRequestSuspensionInterval from the PSRequestSuspensionInterval subfield
* dot11MinBHIDuration from the MinBHIDuration subfield
* dot11BroadcastSTAInfoDuration from the BroadcastSTAInfoDuration subfield
* dot11AssocRespConfirmTime from the AssocRespConfirmTime subfield
* dot11MinPPDuration from the MinPPDuration subfield
* dot11SPIdleTimeout from the SPIdleTimeout subfield
* dot11MaxLostBeacons from the MaxLostBeacons subfield
* If an Association Response frame is received with a status code of SUCCESS, the state for the AP, AP MLD, or PCP shall be set to State 4 or, if dot11RSNAActivated is true, State 3. The state for any other AP, AP MLD, or PCP which is State 3 or State 4 prior to the association request shall be set to State 2, and the MLME shall issue an MLME-ASSOCIATE.confirm primitive to inform the SME of the successful completion of the association.
* If an Association Response frame is received with a status code of SUCCESS at an MM-SME coordinated STA and the Single AID field within the MMS element is equal to 1, then
* For each of its MAC entities advertised within the MMS element and for which dot11RSNAActivated is true, the state is set to State 3. Progress from State 3 to State 4 occurs independently in each such MAC entity.
* For each of its MAC entities advertised within the MMS element and for which dot11RSNAActivated is false, the state is set to State 4.
* For each of its MAC entities advertised within the MMS element the state for any other AP or PCP which is State 3 or State 4 prior to the association request shall be set to State 2.
* If an Association Response frame is received with a status code other than SUCCESS or the association fails to complete within dot11AssociationResponseTimeout the state for the AP, AP MLD, or PCP shall be set to State 2, and the MLME shall issue an MLME-ASSOCIATE.confirm primitive to inform the SME of the failure of the association. The status code returned in the Association Response frame indicates the cause of the failed association attempt. Any misconfiguration or parameter mismatch, e.g., data rates required as basic rates that the STA or a non-AP STA affiliated with the non-AP MLD did not indicate as supported in the ~~STA’s~~ Supported Rates and BSS Membership Selectors element, shall be corrected before the SME issues an MLME-ASSOCIATE.request primitive for the same AP, AP MLD, or PCP. If the status code indicates the association failed because of a reason that is not related to configuration (e.g., the AP or PCP is unable to support additional associations) and the Association Response frame does not include a Timeout Interval element with Timeout Interval Type equal to 3 the SME shall not issue an MLME-ASSOCIATE.request primitive for the same AP, AP MLD, or PCP until a period of at least 2 s has elapsed. If the status code indicates the association failed and the Association Response frame contains a Timeout Interval element with Timeout Interval Type equal to 3, the SME shall not issue an MLME-ASSOCIATE.request primitive for the same AP, AP MLD, or PCP until the period specified in the Timeout Interval element has elapsed.
* If an MLME-ASSOCIATE.confirm primitive is received with a ResultCode of SUCCESS, and RSNA is required, and FILS authentication was not used, then the SME shall perform a 4-way handshake to establish an RSNA with the STA or the AP MLD. As a part of a successful 4-way handshake, the SME shall enable protection by generating an MLME-SETPROTECTION.request(Rx\_Tx) primitive. If an MLME-ASSOCIATE.confirm primitive is received with a ResultCode of SUCCESS, and FILS authentication was used, then the SME shall enable protection by generating an MLME-SETPROTECTION.request(Rx\_Tx) primitive.
* Upon receipt of the MLME-SETPROTECTION.request(Rx\_Tx) primitive, the MLME shall set the state of the STA or the AP MLD to State 4.

***Change the title of the subclause 11.3.5.3 as follows:***

* AP, AP MLD, or PCP association receipt procedures

***Insert the following paragraph as the first paragraph:***

For a non-AP MLD associated with an AP MLD, if an AP affiliated with the AP MLD receives an Association Request frame without Multi-link element from a non-AP STA affiliated with the non-AP MLD, then the AP shall reject the association request.

***Change as follows:***

The following procedure shall be used by an AP or PCP ~~U~~upon receipt of an Association Request frame from a STA ~~the AP or PCP shall use the following procedure~~ or by an AP MLD upon receipt of an Association Request frame with Multi-Link element indicates the AP MLD from a non-AP STA affiliated with a non-AP MLD:

* The MLME shall issue an MLME-ASSOCIATE.indication primitive to inform the SME of the association request. The SME shall issue an MLME-ASSOCIATE.response primitive addressed to the STA or MLD identified by the PeerSTAAddress parameter of the MLME-ASSOCIATE.indication primitive. If the association is not successful, the SME shall indicate a specific reason for the failure to associate in the ResultCode parameter. Upon receipt of the MLME-ASSOCIATE.response primitive, the MLME shall transmit an Association Response frame.
* If the state for the STA is 1 and the STA is a non-DMG STA or the state of the non-AP MLD is 1, the SME shall refuse the association request by issuing an MLME-ASSOCIATE.response primitive with ResultCode NOT\_AUTHENTICATED.
* AP with dot11InterworkingServiceActivated true only: If the MLME-ASSOCIATE.indication primitive has the EmergencyServices parameter set to true and the RSN parameter does not include an RSNE, the SME shall not reject the association request on the basis that dot11RSNAActivated is true, thereby granting access, using unprotected frames (see 9.2.4.1.9 (Protected Frame subfield)), to the network for emergency services purposes.
* Otherwise, in an RSNA the SME shall check the values received in the RSN parameter to see whether the values received match the security policy. If they do not, the SME shall refuse the association by issuing an MLME-ASSOCIATE.response primitive with a ResultCode indicating the security policy mismatch.
* Otherwise, if the state for the STA is 4, the STA has a valid security association, the STA has negotiated management frame protection, the STA has not performed a successful SAE authentication after the current association was established, and there has been no earlier, timed out SA Query procedure with the STA (which would have allowed a new association process to be started, without an additional SA Query procedure):
* The SME shall refuse the association request by issuing an MLME-ASSOCIATE.response primitive with ResultCode REFUSED\_TEMPORARILY and TimeoutInterval containing a Timeout Interval element with the Timeout Interval Type field set to 3 (Association Comeback time). If the SME is in an ongoing SA Query with the STA, the Timeout Interval Value field shall be set to the remaining SA Query period, otherwise it shall be set to dot11AssociationSAQueryMaximumTimeout.
* The state for the STA shall be left unchanged.
* Following this, if the SME is not in an ongoing SA Query with the STA, the SME shall issue one MLME-SA-QUERY.request primitive addressed to the STA every dot11AssociationSAQueryRetryTimeout TUs until an MLME-SA-QUERY.confirm primitive for the STA is received or dot11AssociationSAQueryMaximumTimeout TUs from the beginning of the SA Query procedure have passed. The SME shall increment the TransactionIdentifier by 1 for each MLME-SA-QUERY.request primitive, rolling it over the value to 0 after the maximum allowed value is reached.
* If no MLME-SA-QUERY.confirm primitive for the STA is received within the dot11AssociationSAQueryMaximumTimeout period, the SME shall allow a subsequent association process with the STA to be started without starting an additional SA Query procedure, except that the SME may deny a subsequent association process with the STA if an MSDU was received from the STA within this period.

NOTE 1—Reception of an MSDU implies reception of a valid protected frame, which obviates the need for the SA Query procedure.

* The SME shall refuse an association request from a STA or a non-AP MLD that does not support all of the rates in the BSSBasicRateSet parameter and all of the membership selectors in the BSSMembershipSelectorSet parameter of the AP or of the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* The SME shall refuse an association request from an HT STA or a non-AP MLD that does not support all of the MCSs in the Basic HT-MCS Set field of the HT Operation parameter of the AP or of the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* The SME shall refuse an association request from a VHT STA or a non-AP MLD that does not support all of the <VHT-MCS, NSS> tuples indicated by the Basic VHT-MCS And NSS Set field of the VHT Operation parameter of the AP or the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* The SME shall refuse an association request from a HE STA or a non-AP MLD that does not support all of the <HE-MCS, NSS> tuples indicated by the Basic HE-MCS And NSS Set field of the HE Operation parameter of the AP or the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* An AP or PCP may refuse GLK association based on local policy and, if so, shall return the GLK\_NOT\_AUTHORIZED ResultCode.

NOTE 2—For example, there might be a list of authorized GLK peers or clients or a limit on the number of GLK peers or clients and the peer or client is not on that list or its acceptance would exceed the limit.

* The SME shall generate an MLME-ASSOCIATE.response primitive with the PeerSTAAddress parameter set to the MAC address of the STA identified by the PeerSTAAddress parameter of the MLME-ASSOCIATE.indication primitive. If the ResultCode in the MLME-ASSOCIATE.response primitive is SUCCESS, the SME has an existing SA with the STA, and an SA Query procedure with that STA has failed to receive a valid response (i.e., has not received an MLME-SA-QUERY.confirm primitive within the dot11AssociationSAQueryMaximumTimeout period), the SME shall issue an MLME-DISASSOCIATE.request primitive addressed to the STA with ReasonCode INVALID\_AUTHENTICATION.

NOTE 3—This MLME-DISASSOCIATE.request primitive generates a protected Disassociation frame. If the association request was genuine, the STA has deleted the PTKSA by this point and so the protected Disassociation frame is ignored. The purpose is to inform a STA which has for some reason failed to respond to an SA Query procedure triggered by a forged association request.

* If the ResultCode in the MLME-ASSOCIATE.response primitive is SUCCESS, all the states, agreements and allocations pertaining to the associating STA or the associating non-AP MLD and listed in both numbered lists in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures) item c) are deleted or reset to initial values.
* If the ResultCode in the MLME-ASSOCIATE.response primitive is SUCCESS, the SME shall delete any PTKSA, GTKSA, IGTKSA, BIGTKSA and temporal keys held for communication with the STA or non-AP MLD by using the MLME-DELETEKEYS.request primitive (see 11.5.18 (RSNA security association termination)).
* If the MLME-ASSOCIATE.indication primitive includes an MMS parameter, the AP or PCP shall generate the MLME-ASSOCIATE.response primitive directed to the MLME of the STA identified by the PeerSTAAddress parameter of the MLME-ASSOCIATE.request primitive and take the following additional action, as appropriate:
* If the Single AID field in the MMS parameter of the MLME-ASSOCIATE.indication primitive is equal to 1, the AP or PCP may allocate a single AID for all of the STAs included in the MMS element. If the AP or PCP allocates the same AID to each STA whose MAC address was included in the MMS element, it shall include the MMS element received from the MM-SME coordinated STA in the MLME-ASSOCIATE.response primitive.
* If the Single AID field is 0, the AP or PCP shall allocate a distinct AID for each STA specified in the MMS element.

NOTE 4—When the Single AID field is 0, a separate association request/response exchange is performed for each STA specified in the MMS element, and this assigns the multiple AIDs for the STAs.

* If an Association Response frame with a status code of SUCCESS is acknowledged by the STA or the non-AP MLD, the state for the STA or for the non-AP MLD shall be set to State 4 or, if dot11RSNAActivated is true, State 3.
* If the ResultCode in the MLME-ASSOCIATE.response primitive is not SUCCESS and management frame protection is in use the state for the STA or for the non-AP MLD shall be left unchanged. If the ResultCode is not SUCCESS and management frame protection is not in use the state for the STA or for the non-AP MLD shall be set to State 3 if it was State 4.
* If the ResultCode in the MLME-ASSOCIATE.response primitive is SUCCESS and RSNA establishment is required, and FILS authentication was not used, the SME shall attempt a 4-way handshake with the STA or with the non-AP MLD. Upon a successful completion of the 4-way handshake, the SME shall enable protection by issuing an MLME-SETPROTECTION.request(Rx\_Tx) primitive. If FILS authentication was used, the SME shall enable protection by generating an MLME-SETPROTECTION.request(Rx\_Tx) primitive. In either case, upon receipt of the MLME-SETPROTECTION.request(Rx\_Tx) primitive, the MLME shall set the state for the STA or with the non-AP MLD to State 4.
* AP or AP MLD only: The SME shall inform the DS of any changes in the state of the STA or of the non-AP MLD.

***Change the title of the subclause 11.3.5.4 as follows:***

* Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures

***Change the first paragraph as follows:***

Except when the association is part of a fast BSS/ML transition, the SME shall delete any PTKSA, GTKSA, IGTKSA, BIGTKSA and temporal keys held for communication with the AP, AP MLD, or PCP by using the MLME-DELETEKEYS.request primitive (see 12.6.18 (RSNA security association termination)) before invoking an MLME-REASSOCIATE.request primitive.

***Insert the following paragraph after the fourth paragraph (“Upon receipt of an MLME-REASSOCIATE.request primitive …”):***

For a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD shall not send Reassociation Request frame without Multi-link element to any AP affiliated with that AP MLD.

***Change the fifth paragraph as follows:***

Upon receipt of an MLME-REASSOCIATE.request primitive, a non-AP, non-AP MLD, and non-PCP STA shall reassociate with an AP, AP MLD, or PCP, respectively, using the following procedure:

* If the STA (with respect to the AP or PCP) or non-AP MLD (with respect to the AP MLD) is not associated in the same ESS or the state for the new AP, AP MLD, or PCP is State 1, the MLME shall inform the SME of the failure of the reassociation by issuing an MLME-REASSOCIATE.confirm primitive, and this procedure ends.
* The MLME shall transmit a Reassociation Request frame to the new AP or PCP or the MLME shall transmit a Reassociation Request frame with Multi-Link element in the Reassociation Request frame that indicates the new AP MLD to an AP affiliated with the new AP MLD. The RSNE contained in the MLME-ASSOCIATE.request primitive shall be included in the Reassociation Request frame. The RSNE shall specify exactly one pairwise cipher suite and exactly one AKM suite. If the MLME-REASSOCIATE.request primitive contained the EmergencyServices parameter equal to true, an Interworking element with the UESA field set to 1 shall be included in the Reassociation Request frame.
* If a Reassociation Response frame is received with a status code of SUCCESS, the state variable for the new AP, AP MLD, or PCP shall be set to State 4 or to State 3 if dot11RSNAActivated is true and the FT protocol is not used with respect to the new AP, AP MLD, or PCP and, unless the old AP, AP MLD, or PCP and new AP, AP MLD, or PCP, respectively, are the same, to State 2 with respect to the old AP, AP MLD, or PCP, and the MLME shall issue an MLME-REASSOCIATE.confirm primitive to inform the SME of the successful completion of the reassociation.

If the MLME-REASSOCIATION.request primitive has the new AP’s, AP MLD’s, or PCP’s MAC address in the CurrentAPAddress parameter (reassociation to the same AP, AP MLD, or PCP), the following states, agreements and allocations shall be deleted or reset to initial values:

* All EDCAF state
* Any block ack agreements that are not GCR agreements
* Sequence number
* Packet number
* Duplicate detection caches
* Anything queued for transmission
* Fragmentation and reassembly buffers
* Power management mode
* WNM sleep mode
* TPKSAs established with any peers
* TSPECs
* DMG TSPECs
* GLK-GCR agreement
* MSCS
* SCS

If the reassociation is to the same AP (as described above), the following states, agreements and allocations are not affected by the reassociation procedure:

* PSMP sessions
* Enablement/Deenablement
* GDD enablement
* TDLS agreements
* MMSLs
* GCR agreements that are not GLK-GCR agreements
* DMS agreements
* TFS agreements
* FMS agreements
* Triggered autonomous reporting agreements
* FTM sessions
* DMG SP and CBAP allocations
* PTP TSPECs.

In the case of reassociation to a different AP or PCP (the CurrentAPAddress parameter is not the new AP’s or PCP’s MAC address), all the states, agreements and allocations listed above are deleted or reset to initial values.

* If a Reassociation Response frame is received with a status code of SUCCESS, a DMG STA shall write to each of the following MIB attributes the corresponding subfield of the DMG BSS Parameter Configuration field of the DMG Operation element received from the AP or PCP to which it requested reassociation:
* dot11PSRequestSuspensionInterval from the PSRequestSuspensionInterval subfield
* dot11MinBHIDuration from the MinBHIDuration subfield
* dot11BroadcastSTAInfoDuration from the BroadcastSTAInfoDuration subfield
* dot11AssocRespConfirmTime from the AssocRespConfirmTime subfield
* dot11MinPPDuration from the MinPPDuration subfield
* dot11SPIdleTimeout from the SPIdleTimeout subfield
* dot11MaxLostBeacons from the MaxLostBeacons subfield
* If an Association Response frame is received with a status code of SUCCESS at an MM-SME coordinated STA and the Single AID field within the MMS element is equal to 1, then
* For each of its MAC entities advertised within the MMS element and for which dot11RSNAActivated is true, the state is set to State 3. Progress from State 3 to State 4 occurs independently in each such MAC entity.
* For each of its MAC entities advertised within the MMS element and for which dot11RSNAActivated is false, the state is set to State 4.
* For each of its MAC entities advertised within the MMS element the state for any other AP or PCP which is State 3 or State 4 prior to the association request shall be set to State 2.
* If a Reassociation Response frame is received with a status code other than SUCCESS or the reassociation fails to complete within dot11AssociationResponseTimeout:
* Except when the association is part of a fast BSS/ML transition, the state for the AP, AP MLD, or PCP shall be set to State 2 with respect to the new AP, AP MLD, or PCP.
* The MLME shall issue an MLME-REASSOCIATE.confirm primitive to inform the SME of the failure of the reassociation. The ResultCode returned in the MLME-REASSOCIATE.confirm primitive indicates the cause of the failed reassociation attempt. Any misconfiguration or parameter mismatch, e.g., data rates required as basic rates that the STA did not indicate as supported in the STA’s Supported Rates and BSS Membership Selectors element, shall be corrected before the SME issues an MLME-REASSOCIATE.request primitive for the same AP, AP MLD, or PCP. If the status code indicates the reassociation failed because of a reason that is not related to configuration (e.g., the AP or PCP is unable to support additional associations) and the Reassociation Response frame does not include a Timeout Interval element with Timeout Interval Type equal to 3 the SME shall not issue an MLME-REASSOCIATE.request primitive for the same AP, AP MLD, or PCP until a period of at least 2 s has elapsed. If the status code indicates the reassociation failed and the Reassociation Response frame contains a Timeout Interval element with Timeout Interval Type equal to 3, the SME shall not issue an MLME-REASSOCIATE.request primitive for the same AP, AP MLD, or PCP until the period specified in the Timeout Interval element has elapsed.
* If an MLME-REASSOCIATE.confirm primitive is received with a ResultCode of SUCCESS, and RSNA is required, and FILS authentication was not used, and the STA or the non-AP MLD is in State 3, then the SME shall perform a 4-way handshake to establish an RSNA with the STA or the AP MLD. As a part of a successful 4-way handshake, the SME shall enable protection by generating an MLME-SETPROTECTION.request(Rx\_Tx) primitive. If an MLME-REASSOCIATE.confirm primitive is received with a ResultCode of SUCCESS, and FILS authentication was used, and the STA is in State 3, then the SME shall enable protection by generating an MLME-SETPROTECTION.request(Rx\_Tx) primitive.
* Upon receipt of the MLME-SETPROTECTION.request(Rx\_Tx) primitive, the MLME shall set the state of the STA or of the AP MLD to State 4.

***Change the title of the subclause 11.3.5.5 as follows:***

* AP, AP MLD, or PCP reassociation receipt procedures

***Insert the following paragraph as the first paragraph:***

For a non-AP MLD associated with an AP MLD, if an AP affiliated with the AP MLD receives an Reassociation Request frame without Multi-link element from a non-AP STA affiliated with the non-AP MLD, then the AP shall reject the reassociation request.

***Change as follows:***

The following procedure shall be used by an AP or PCP u~~U~~pon receipt of a Reassociation Request frame from a STA ~~the AP or PCP shall use the following procedure~~ or by an AP MLD upon receipt of a Reassociation Request frame with Multi-Link element indicates the AP MLD from a non-AP STA affiliated with a non-AP MLD:

* The MLME shall issue an MLME-REASSOCIATE.indication primitive to inform the SME of the reassociation request. The SME shall issue an MLME-REASSOCIATE.response primitive addressed to the STA or the non-AP MLD identified by the PeerSTAAddress parameter of the MLME-REASSOCIATE.indication primitive. If the reassociation is not successful, the SME shall indicate a specific reason for the failure to reassociate in the ResultCode parameter. Upon receipt of the MLME-REASSOCIATE.response primitive, the MLME shall transmit a Reassociation Response frame.
* If the state for the STA is 1 and the STA is a non-DMG STA or the state for the non-AP MLD is 1, the SME shall refuse the reassociation request by issuing an MLME REASSOCIATE.response primitive with ResultCode NOT\_AUTHENTICATED.
* AP with dot11InterworkingServiceActivated true only: If the MLME-REASSOCIATE.indication primitive has the EmergencyServices parameter set to true and the RSN parameter does not include an RSNE, the SME shall not reject the reassociation request on the basis that dot11RSNAActivated is true and dot11PrivacyInvoked is true thereby granting access, using unprotected frames (see 9.2.4.1.9 (Protected Frame subfield)), to the network for emergency services purposes.
* Otherwise, in an RSNA the SME shall check the values received in the RSN parameter to see whether the values received match the security policy. If they do not, SME shall refuse the reassociation by issuing an MLME-REASSOCIATE.response primitive with a ResultCode indicating the security policy mismatch.
* Otherwise, if the state for the STA is 4, the STA has a valid security association, the STA has negotiated management frame protection, the reassociation is not a part of a fast BSS transition, the STA has not performed a successful SAE authentication after the current association was established, and there has been no earlier, timed out SA Query procedure with the STA (which would have allowed a new reassociation process to be started, without an additional SA Query procedure):
* The SME shall refuse the reassociation request by issuing an MLME-REASSOCIATE.response primitive with ResultCode REFUSED\_TEMPORARILY and TimeoutInterval containing a Timeout Interval element with the Timeout Interval Type field set to 3 (Association Comeback time). If the SME is in an ongoing SA Query with the STA, the Timeout Interval Value field shall be set to the remaining SA Query period, otherwise it shall be set to dot11AssociationSAQueryMaximumTimeout.
* The state for the STA shall be left unchanged.
* Following this, if the SME is not in an ongoing SA Query with the STA, the SME shall issue one MLME-SA-QUERY.request primitive addressed to the STA every dot11AssociationSAQueryRetryTimeout TUs until an MLME-SA-QUERY.confirm primitive for the STA is received or dot11AssociationSAQueryMaximumTimeout TUs from the beginning of the SA Query procedure have passed. The SME shall increment the TransactionIdentifier by 1 for each MLME-SA-QUERY.request primitive, rolling it over to 0 after the maximum allowed value is reached.
* If no MLME-SA-QUERY.confirm primitive for a STA is received within the dot11AssociationSAQueryMaximumTimeout period, the SME shall allow a subsequent reassociation process to be started without starting an additional SA Query procedure, except that the SME may deny a subsequent reassociation process with the STA if an MSDU was received from the STA within this period.

NOTE 1—Reception of an MSDU implies reception of a valid protected frame, which obviates the need for the SA Query procedure.

* The SME shall refuse a reassociation request from a STA or a non-AP MLD that does not support all the rates in the BSSBasicRateSet parameter and all of the membership selectors in the BSSMembershipSelectorSet parameter of the AP or of the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* The SME shall refuse a reassociation request from an HT STA or a non-AP MLD that does not support all of the MCSs in the Basic HT-MCS Set field of the HT Operation parameter of the AP or of the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* The SME shall refuse a reassociation request from a VHT STA or a non-AP MLD that does not support all of the <VHT-MCS, NSS> tuples indicated by the Basic VHT-MCS And NSS Set field of the VHT Operation parameter of the AP or of the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* The SME shall refuse a reassociation request from a HE STA or a non-AP MLD that does not support all of the <HE-MCS, NSS> tuples indicated by the Basic HE-MCS And NSS Set field of the HE Operation parameter of the AP or of the corresponding AP in each setup link, respectively, in the MLME-START.request primitive.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS, the SME has an existing SA with the STA, and an SA Query procedure with that STA has failed to receive a valid response (i.e., has not received an MLME-SA-QUERY.confirm primitive within the dot11AssociationSAQueryMaximumTimeout period), the SME shall issue an MLME-DISASSOCIATE.request primitive addressed to the STA with ReasonCode INVALID\_AUTHENTICATION.

NOTE 2—This MLME-DISASSOCIATE.request primitive generates a protected Disassociation frame. If the reassociation request was genuine, the STA has deleted the PTKSA by this point and so the protected Disassociation frame is ignored. The purpose is to inform a STA which has for some reason failed to respond to an SA Query procedure triggered by a forged reassociation request.

* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS and the reassociation is not part of a fast BSS/ML transition, the SME shall delete any PTKSA, GTKSA, IGTKSA, BIGTKSA and temporal keys held for communication with the STA or the non-AP MLD by using the MLME-DELETEKEYS.request primitive (see 11.5.18 (RSNA security association termination)).
* If the MLME-REASSOCIATE.indication primitive includes an MMS parameter, the AP or PCP shall take the following additional action, as appropriate:
* If the Single AID field in the MMS parameter of the MLME-REASSOCIATE.indication primitive is equal to 1, the AP or PCP may allocate a single AID for all of the STAs included in the MMS element. If the AP or PCP allocates the same AID to all STAs whose MAC address was included in the MMS element, it shall include the MMS element received from the MM-SME coordinated STA in the MLME-REASSOCIATE.response primitive.
* If the Single AID field is 0, the AP or PCP shall allocate a distinct AID for each STA specified in the MMS element.

NOTE 3—When the Single AID field is 0, a separate reassociation request/response exchange is performed for each STA specified in the MMS element, and this assigns the multiple AIDs for the STAs.

* If a Reassociation Response frame with a status code of SUCCESS is acknowledged by the STA or an STA affiliated with the non-AP MLD, the state for the STA or the non-AP MLD shall be set to State 4, or to State 3 if dot11RSNAActivated is true and the reassociation is not part of a fast BSS/ML transition.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is not SUCCESS and management frame protection is in use the state for the STA or the non-AP MLD shall be left unchanged. If the ResultCode is not SUCCESS, management frame protection is not in use, and the reassociation is part of a fast BSS/ML transition, the state for the STA or the non-AP MLD shall be left unchanged. If the ResultCode is not SUCCESS, management frame protection is not in use, and the reassociation is not part of a fast BSS transition, the state for the STA or the non-AP MLD shall be set to State 3 if it was State 4.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS, RSNA establishment is required, and the reassociation is not part of a fast BSS/ML transition, and FILS is not in use, the SME shall attempt a 4-way handshake with the STA or with the non-AP MLD. Upon a successful completion of a 4-way handshake, the SME shall enable protection by issuing an MLME-SETPROTECTION.request(Rx\_Tx) primitive. If FILS authentication was used, the SME shall enable protection by generating an MLME-SETPROTECTION.request(Rx\_Tx) primitive. In either case, upon receipt of the MLME-SETPROTECTION.request(Rx\_Tx) primitive, the MLME shall set the state for the STA or the non-AP MLD to State 4.
* AP or AP MLD only: The SME shall inform the DS of any changes in the state of the STA or the non-AP MLD.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS and the CurrentAPAddress parameter in the MLME-REASSOCIATION.indication primitive is this AP’s or PCP’s MAC address (reassociation to the same AP or PCP), the AP or PCP shall match the non-AP STA’s treatment of the listed agreements and allocations as described in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures)item c). The AP or PCP deletes or resets to initial values those items that the non-AP STA is required in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures)item c) to delete or reset to initial values, and the AP or PCP does not modify the states, agreements and allocations that are listed as not affected by the reassociation procedure.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS and the CurrentAPAddress parameter in the MLME-REASSOCIATION.indication primitive is this AP MLD’s MAC address (reassociation to the same AP MLD), the AP MLD shall match the non-AP MLD’s treatment of the listed agreements and allocations as described in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures) item c). The AP MLD deletes or resets to initial values those items that the non-AP MLD is required in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures) item c) to delete or reset to initial values, and the AP MLD does not modify the states, agreements and allocations that are listed as not affected by the reassociation procedure.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS and the CurrentAPAddress parameter in the MLME-REASSOCIATION.indication primitive is not this AP’s or PCP’s MAC address (reassociation to a different AP or PCP), all the states, agreements and allocations pertaining to the associating STA and listed in both numbered lists in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures)item c) are deleted or reset to initial values.
* If the ResultCode in the MLME-REASSOCIATE.response primitive is SUCCESS and the CurrentAPAddress parameter in the MLME-REASSOCIATION.indication primitive is not this AP MLD’s MAC address (reassociation to a different AP MLD), all the states, agreements and allocations pertaining to the associating non-AP MLD and listed in both numbered lists in 11.3.5.4 (Non-AP, non-AP MLD, and non-PCP STA reassociation initiation procedures) item c) are deleted or reset to initial values.