IEEE P802.11
Wireless LANs

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| 11be D6.0 CR for Miscellaneous CIDs |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel |  |  | po-kai.huang@intel.com |
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Abstract

This submission proposes resolutions for the following CIDs:

23112, 23113, 23114, 23115, 23107, 23111, 23106, 23110, 23033, 23036,

23083, 23119, 23014, 23015, 23080, 23081, 23082, 23004, 23003,

23037, 23174, 23104, 23139, 23140, 23120, 23123, 23039, 23040,

23031, 23018, 23044

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Add additional CIDs
* Rev 2: Editorial revision
* Rev 3: Changes based on the discussion during the teleconference call
* Rev 4: Add CID 23044

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 D6.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D6.0 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** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 23112 | Benjamin Rolfe | 10.3.2.14.3 | 346.30 | Table 10-6: notes to tables are informative. Which means "shall" is wrong. But this shall seems important, so should be stated in the normative text | Delete note from table. | Rejected – The cited sentence below is not a note. “RR” means “receiver requirements” and links to the label of receiver requirements in row RC16. We note that there are also RR1 to RR6 specified in Table 10-6 of revme D5.0.*RR8: The MLD shall discard a duplicated frame. The method used to handle the sequence number wrap around for duplicate detection is implementation specific.* |
| 23113 | Benjamin Rolfe | 10.3.2.14.3 | 346.28 | Table 10-6: notes to tables are informative. Which means "shall" is wrong. But this shall seems important, so should be stated in the normative text | Delete note from table. | Rejected – The cited sentence below is not a note. “RR” means “receiver requirements” and links to the label of receiver requirements in row RC17. We note that there are also RR1 to RR6 specified in Table 10-6 of revme D5.0.*RR7: The MLD shall discard the frame if the Retry subfield of the Frame Control field is 1 and it matches an entry in the cache.* |
| 23114 | Benjamin Rolfe | 10.3.2.14.3 | 343.40 | Not at all sure what "shall implement" means here: has the capability? Or uses RC16. From the the context guessing (again bad to make the user guess) that it means "shall use". If you meant shall have the capability, then "shall be capable of using" would be correct and unambiguous. | change "shall implement" to "shall use" | Rejected – We note that “shall implement” is used by the description for other receiver requirements. For example, see below.*A receiving STA shall implement the applicable receiver requirements defined in Table 10-6 (Receiver caches) with the Status indicated as Mandatory.* |
| 23115 | Benjamin Rolfe | 10.3.2.14.3 | 343.24 | what exactly is meant by "shall implement"? It could mean "shall comply with" perhaps? | Change "shall implement" to "shall comply with" | Rejected – The commenter comments on a sentence that has not changed by this amendment. |
| 23107 | Benjamin Rolfe | 11.3.5.2 | 384.12 | What does " unless specified otherwise." mean in this context? Specified how, by what means, signaling, or mechanism? Is there an MLME-ASSOCIATE.request parameter that would signal a different mandatory behavior? Which is specified somewhere already? "may" means "is permitted to" so also "is permitted not to" so presumably if some other non-optional behavior is expected it is specified somewhere (using "shall"). | delete "unless otherwise specified" | Revised – There is indeed another mandatory sentence that determines a different mandatory behavior to mandate same link exchange as authentication frame for association request. See the following in 35.3.5.1. We provide the reference.*For the (Re)Association Request frame sent by a non-AP MLD to an AP MLD:**— the A2 field shall be the same as the A2 field of the latest Authentication frame(s) sent from the nonAP MLD to the AP MLD that leads to a successful authentication to set the state to State 2 (see 11.3.1 (State variables)).**— the A1 field shall be the same as the A1 field of the latest Authentication frame(s) sent from the nonAP MLD to the AP MLD that leads to a successful authentication to set the state to State 2 (see 11.3.1 (State variables)).*TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23107 |
| 23111 | Benjamin Rolfe | 11.3.5.2 | 383.53 | "shall not" and "without" seems to suggest (but not properly state) that the requirement is to include Basic Multi-Link element in the Association Request. So better to say that directly. Break with tradition and be clear in stating the requirement ;-) | For a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD shall include a Basic Multi-Link element when sending an Association Request frame. | Rejected – The sentence is added based on the discussion whether for a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD can send an Association Request frame without Basic Multi-Link element to perform another association with say a legacy AP. The sentence is then added to directly answer the question with “shall not”.  |
| 23106 | Benjamin Rolfe | 11.3.5.4 | 388.58 | What does " unless specified otherwise." mean in this context? Suggests that there is some mandatory behavior that supersedes this optional behavior, which is (we hope) specified somewhere else? If not then this indicates a technically incomplete draft, which would mean it should not be in SA ballot yet. So lets go with the mandatory behavior is specified somewhere else ;-) | delete "unless otherwise specified" | Revised – There is indeed another mandatory sentence that determines a different mandatory behavior to mandate same link exchange as authentication frame for association request. See the following in 35.3.5.1. We provide the reference.*For the (Re)Association Request frame sent by a non-AP MLD to an AP MLD:**— the A2 field shall be the same as the A2 field of the latest Authentication frame(s) sent from the nonAP MLD to the AP MLD that leads to a successful authentication to set the state to State 2 (see 11.3.1 (State variables)).**— the A1 field shall be the same as the A1 field of the latest Authentication frame(s) sent from the nonAP MLD to the AP MLD that leads to a successful authentication to set the state to State 2 (see 11.3.1 (State variables)).*TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23106 |
| 23110 | Benjamin Rolfe | 11.3.5.4 | 388.38 | "shall not" and "without" seems to suggest (but not properly state) that the requirement is to include a Basic Multi-Link element in the Reassociation Request. | Change to:For a non-AP MLD associated with an AP MLD, a non-AP STA that is affiliated with the non-AP MLD and has MAC address not equal to the MLD MAC address of the non-AP MLD shall include a Basic Multi-Link element to a Reassociation Request frame sent to any AP affiliated with that AP MLD. | Rejected – The sentence is added based on the discussion whether for a non-AP MLD associated with an AP MLD, a non-AP STA that is affiliated with the non-AP MLD and has MAC address not equal to the MLD MAC address of the non-AP MLD can send a Reassociation Request frame without Basic Multi-Link element to any AP affiliated with that AP MLD. The sentence is then added to directly answer the question with “shall not”.  |
| 23033 | Joseph Levy | 11.13 | 398.40 | The "American" spelling is "signaled", the "UK" spelling is "signalled" - IEEE specifications are written in "American" English, the baseline has 83 instances of "signaled" and one incorrect instance of "signalled". The current draft of 802.11be has incorrectly changed the spelling to "signalled" in three locations. (398.40, 416.48, and 417.20), also it has spelled it incorrectly at the following additional locations (107.44, 122.18, 205.45, 301.56, 511.38, 511.44, 513.27, 514.32, 515.17, 627.62, 758.53, 822.37, 824.52, 834.14,24,25, 836.36, 837.8, 848.52, 852.64, 856.55, 895.35, and 1037.33,39. | Changes all instances of "signalled" to be "signaled" in the draft. Note the locations are given in the comment. | Accepted – |
| 23036 | Joseph Levy | 9.1 | 131.10 | The statement that an EHT STA shall not use a status code unless the corresponding condition is met, does not be long in clause 9.1, nor does it belongs where Table 9-80 is defined, as this is not a general requirement, but a requirement specific to Table-9-80 by EHT STAs. In addition this is a behavior and not a format requirement, and therefore really does not belong in clause 9 at all. Suggest moving this requirement to where it belongs in clause 35. | Delete the text from clause 9 and move it to the appropriate location in clause 35. The commenter suggests adding the text after "an appropriate rejection status code as per Table 9-80 (Status codes)." (549.14). Another possibility is to add the text following "… if the link is not accepted." (539.63). | Rejected – There is no technical reason not to include normative requirement on EHT in clause 9.1.  |
| 23083 | Abhishek Patil | 9.1 | 119.10 | The sentence is out of place and applies to clause 9.4.1.9 | Move the sentence to the end of 9.4.1.9 | Rejected – This is discussed a few times, and since it is “shall” requirement, and 9.1 allows “shall” requirement, the group decides to leave the sentence in the current place.  |
| 23119 | Benjamin Rolfe | 9.1 | 119.50 | "An EHT STA shall not use a status code unless the corresponding condition described in the meaning column of Table 9-80 (Status codes) is met" is poor specification practice (shall not). It is not entirely clear what is the desired requirement (what does "use a status code" mean?), but presuming that a status code included in some field of some frame generated by an EHT STA is one of the on-reserved values in Table 9-80. . The valid values of any field containing a status code should be described in the field definition (e.g. "and shall be set to one of the non-reserved values in table3 9-80") | Delete this sentence. | Revised –We note that it is not just about use any value defined in 9-80. It is about use the value only when the condition defined in the meaning column is met. This is a key requirement to make sure that correct status can be provided rather than just a random status. However, agree that to clarify that status code is only used in status code field.TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23119 |
| 23014 | Binita Gupta | 4.5.3.4 | 73.06 | This bullet captures moving current MLD association to a non-ML association as part of reassociation. In this case the MAC address of the non-AP STA used in the Reassociation should be same as the MLD MAC address of the non-AP MLD used in current association, as per the text on P518L7. Text seems to indicate the other way. | Suggest to modify the text to"﻿a current association of a non-AP MLD with an AP MLD to an association of a non-AP STA with anAP, where the \*MAC address of the non-AP STA is the same as the MLD MAC address of the non-AP MLD." | Accepted -  |
| 23015 | Binita Gupta | 4.5.3.4 | 73.01 | This bullet captures moving current non-ML association to an MLD association as part of reassociation. In this case the MLD MAC address of the non-AP MLD used in the Reassociation should be same as the non-AP STA MAC address used in current association, as per the text on P518L7. Text seems to indicate the other way. | Suggest to modify the text to "﻿a current association of a non-AP STA with an AP to an association of a non-AP MLD with an APMLD, where the \*MLD MAC address of the non-AP MLD is the same as the MAC address of the non-AP STA\* or" | Accepted - |
| 23080 | Xiaofei Wang | 35.1 | 511.24 | since in 802.11 RevME, the word "support" has been clarified to mean mandatory implement, this note can be removed. | as in comment. | Rejected – We note that the term “mandatory support” and “optional support” are still used in the baseline. See for example 4.3.14, 4.3.15, and 4.3.16. Hence, does not see the reasoning to remove that note. |
| 23081 | Xiaofei Wang | 35.1 | 511.20 | In RevME, it has been clarified that "support" means mandatory implementation (see 11-24/738r3). If an EHT STA does not need to mandatory implementation of MLO, then the word "support" needs to be changed. | Use a different word than "support" that means optionally implement. |  Revised –We note that the term “mandatory support” and “optional support” are still used in the baseline. Hence, it is not clear if the claim is true. However, to satisfy the commenter, we revise the sentence to simply say “MLO is defined for an EHT STA.”TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23081 |
| 23082 | Xiaofei Wang | 35.1 | 511.10 | in RevME, it has been clarified that the word "support" means mandatory implementation, hence the introduction part of clause 26 has been changed. Suggest to make a similar change for 35.1. | An EHT STA has a MAC and MLME that comprises the functions defined in Clause 35 (Extremely high throughput (EHT) MAC specification) as well as functions defined in Clause 26 (High efficiency (HE) MAC specification) and Clause 10 (MAC sublayer functional description), the MLME functions defined in Clause 11 (MLME) , and the security functions defined in Clause 12 (Security) except when the functions in Clause 35 (Extremely high throughput (EHT) MAC specification) supersede the functions in Clause 10 (MAC sublayer functional description) , Clause 11 (MLME) , Clause 12 (Security) , or Clause 26 (High efficiency (HE) MAC specification). | Revised – Agree to revise the describe with similar style agreed in 11-24/718r3. Note that the proposed change miss “the MAC” after “as well as”. Hence, we use “revise” rather than “accept”.TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23082 |
| 23004 | Binita Gupta | 35.15.1 | 669.34 | Change "An non-AP EHT ST" to "A non-AP EHT STA". Same change is needed on P270L15, P270L33, P271L55 and P617L5. | As in the comment. | Revised – Agree in principle with the commenter. We use “revise” because some instances the change is “an” to “a”.TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23004 |
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| 23003 | Binita Gupta | 35.3.1 | 517.14 | The term defined in clause 3.2 is 'mobile AP'. The NOTE 1 should be changed to use 'EHT mobile AP' instead of 'mobile EHT AP' | Change NOTE 1 to"﻿NOTE 1—There is no \*EHT mobile AP\* with dot11MultiLinkActivated equal to false." | Revised –Follow the suggestion without the asterisk. TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23003 |
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| 23037 | Joseph Levy | 35.3.5.1 | 538.01 | This is a resubmission of a previous Comment CID 22034. The rejection reason of "Describing the "associated state"" does not have any technical merit. There is no such thing as "associated state". The state of an AP MLD or non-AP MLD are all that exist, as these are the only two MLO entities that have a state of association. The statement that an MLO "setup link" has an associated state is incorrect only an MLD can have an associated state, its "links" do not have any associated state. The SAP to SAP connection is between the MLD SAPs and there are no other SAPs in MLO. The statement in the rejection of the prior comment that: "the “associated state” is needed to reuse all the baseline non-MLO texts which always use non-AP STA and associated AP." is of great concern. If the MLO association as provided in this draft is some how dependent on a non-existent STA or AP association to make the specification work, there are significant technical issues with the way association is being used by MLO. I don't believe this to be the case. But, if the TG believes this to be true, then a significant technical issue needs to be address that goes well beyond this comment, which seeks to remove incorrect and confusing statements in the draft. Please consider deleting this problematic text as proposed in this comment, or correct the technical issues that arise by having the concept of "associated state". | Delete the paragraph: "For each setup link, the corresponding non-AP STA affiliated with the non-AP MLD is in the same associated state as the non-AP MLD and is associated with the corresponding AP affiliated with the AP MLD. For each setup link, a mapping between the non-AP STA affiliated with the non-AP MLD and the AP affiliated with the AP MLD is not provided to the DS." | Rejected –The comment does not describe the techincial concern for “the associated state is needed to reuse all the baseline non-MLO texts which always use non-AP STA and associated AP." Based on the discussion in TG, there are preference from the TG to reuse the baseline texts as much as possible rather than create new terms and rewrite all the baseline behavior for operations like TWT, PM operatons, and so on. The following statement is added for that purpose.“For each setup link, the corresponding non-AP STA affiliated with the non-AP MLD is in the same associated state as the non-AP MLD and is associated with the corresponding AP affiliated with the AP MLD.”And the following description is provided to eliminate the technical concern of conflict of DS mapping.“For each setup link, a mapping between the non-AP STA affiliated with the non-AP MLD and the AP affiliated with the AP MLD is not provided to the DS.” |
| 23174 | Xiaofei Wang | 35.3.5.4 | 539.12 | It is unclear which MLD MAC address included in the basic ML element in the (Re)Association Request/Response should be used, the AP MLD MAC address, or non-AP MLD MAC address. This should be clearly stated in this clause, similarly as done for the Reconfiguration ML element in 35.3.6.4. This can cause confusion. | Clearly state that non-AP MLD MAC address should be used in the basic ML element in (Re)Association REqeust and AP MLD MAC address should be used in the basic ML element in (Re)association Response. | Revised – Agree in principle with the commenter.TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23174 |
| 23104 | Benjamin Rolfe | 6.5.7.2.2 | 96.16 | Unnecessary "must": "it is required" and "must match", and "must be". | Chante to:It is a requirement on the SME that the link identified by the Recommended Link parameter match the link used in a prior successful MLME-AUTHENTICATE.request transaction, and that the link is in State 2. See 35.3.5.1 (ML (re)setup procedure). | Revised – Agree in principle with the commenter.TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23104 |
| 23139 | Benjamin Rolfe | 3.1 | 55.42 | "A type of BSS transition that minimizes the duration for which data connectivity is lost between the non-access point (non-AP) station (non-AP STA) or non-AP multi-link device (non-AP MLD) and the distribution system (DS)." is not appropriate in the definition of the term: this is describing technical characteristics (probably normative requirements) of the operation to which the term refers. Does not belong in clause 3. | Move this statement to the appropriate normative clause. Alternately, withdraw the draft from balloting and request NESCOM withdraw the PAR. | Rejected –Compare with the original definition. The revision simply adds non-AP MLD, so the description captures all the possible entities. We note that mentioning entities is allowed in the definition. Original:*Change of association by a station (STA) that is from one BSS in one extended service set (ESS) to another BSS in the same ESS and that minimizes the amount of time that the data connectivity is lost between the STA and the distribution system (DS).*Revision:*A type of BSS transition that minimizes the duration for which data connectivity is lost between the non-access point (non-AP) station (non-AP STA) or non-AP multi-link device (non-AP MLD) and the distribution sys­tem (DS).* |
| 23140 | Benjamin Rolfe | 3.1 | 55.29 | Extraneous technical details in a definition: " The change might involve modifying the operating mode from non-multi-link operation (non-MLO) to MLO or vice versa. See 4.5.3.2 (Mobility types)"This is describing technical characteristics of the thing to which the term refers, which is not part of the definition of the term. Refer to the IEEE Standards Style Manual 12.4. If this is critical information for users of the standard to know, it needs to be in the technical requirements for the operation referred to by the term. | Remove from clause 2 | Revised –We move the description to a note.TGbe editor to make the changes shown in 11-24/0991r3 under all headings that include CID 23140 |
| 23120 | Benjamin Rolfe | 3.2 | 64.31 | Way, way, way too much information for a definition in clause 3. This is describing multiple technical characteristics (requirements) of the thing (operation) to which the term refers. With at least 6 references to normative clauses (which do not belong in definitions). | Delete definition. | Rejected –The details are required to capture the definition of a setup link. Remove any specific conditions will make the definition incorrect. References are provided so that technical details can indeed be found in the normative clauses. |
| 23123 | Benjamin Rolfe | 3.2 | 63.40 | " as described in" is clearly introducing technical details about the operation to which the term refers (technical requirements). | Delete definition from clause 3. | Rejected – “as described in” has been used in the definitions of revme D5.0. See the following examples.***China millimeter-wave multi-gigabit (CMMG) beamformee:*** *[CMMG beamformee] A CMMG station (STA) that receives a CMMG physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix and that supports the CMMG transmit beamforming feedback mechanism as**described in 10.32 (CMMG beamforming).****enhanced broadcast services (EBCS) relaying station:*** *An EBCS receiver that is affiliated with an EBCS proxy and provides a relaying service as described in 4.5.12.3 (EBCS relaying service) and 34.4 (EBCS UL**procedure).(11bc)* |
| 23039 | Joseph Levy | 3.2 | 61.20 | The 802.11 architecture does not allow for a STA to be an AP. An AP is defined as an entity that contains one STA and provides access to the DSS, via the WM for associated STAs. See P802.11-REVme/D5.0 page 193, line 18. Comments on this issue have not been properly addressed in previous ballots. assertions made in a prior rejections, of a comment similar to this comment CID 22012, that the comment should be rejected because the baseline draft states "STA is an AP" are not technical justification for not correcting this definition error. The locations in the baseline using phrase, "STA is an AP" define STA behavior if the STA is contained in an AP. These poorly worded statement should be fixed in baseline standard and should not be used as an excuse to define an affiliated STA in a manner that breaks the basic 802.11 architecture. | Change the definition of affiliated station to start with "A STA, which can be contained in an access point (AP) or can be a non-access point (non-AP) STA ..." | Rejected – Agree that there is a convention of “STA is an AP” used in the existing baseline. The commenter is encouraged to submit the comments to revme to fix all the baseline description of “STA is an AP” if there is a concern on breaking 802.11 architecture in the baseline. |
| 23040 | Joseph Levy | 3.2 | 61.16 | The 802.11 architecture does not allow for a STA to be an AP. An AP is defined as an entity that contains one STA and provides access to the DSS, via the WM for associated STAs. See P802.11-REVme/D5.0 page 193, line 18. Comments on this issue have not been properly addressed in previous ballots. Assertions made in a prior rejection, of a comment similar to this comment CID 22012, that the comment should be rejected because the baseline draft states "STA is an AP" are not a technical justification for not correcting this definition error. The locations in the baseline using phrase, "STA is an AP", define STA behavior if the STA is contained in an AP. These poorly worded statement should be fixed in baseline standard and should not be used as an justification to define an affiliated AP in a manner that breaks the basic 802.11 architecture. | Change the definition of affiliated AP to "An access point (AP) that contains an affiliated station (STA) and the corresponding multi-link device (MLD) is an AP MLD." | Rejected – Agree that there is a convention of “STA is an AP” used in the existing baseline. The commenter is encouraged to submit the comments to revme to fix all the baseline description of “STA is an AP” if there is a concern on breaking 802.11 architecture in the baseline. |
| 23031 | Joseph Levy | 35.3.1 | 517.06 | This sentence is poorly formed and is difficult to parse, hence the meaning is not clear. | Change: "MLO enables operations such as, but not limited to, discovery, authentication, ­ML setup, and frame exchanges, between two MLDs as described in 35.3 (Multi-link operation (MLO))."To: "MLO enables operations between two MLDs as described in 35.3 (Multi-link operation (MLO)) such as, but not limited to, discovery, authentication, ML setup, and frame exchange." | Revised – Agree in principle with the commenter. During the discussion, strong preference to reduce the wording and remove examples since it is already defined in 35.3.Update similar sentence in the definition as well. TGbe editor to make the changes shown in 11-24/0991r4 under all headings that include CID 23031 |
| 23018 | Binita Gupta | 35.3.5.1 | 536.36 | NOTE 5 is the only place where "resetup" is explicitly mentioned separate from the (re)setup. First, suggest changing it to "ML resetup" to be explicit. Second, "ML resetup" as an operation is not explicitly defined anywhere. What is the difference between ML setup and ML resetup? Suggest to add a NOTE or descriptive text at the beginning of the clause 35.3.5.1 to clarify the "ML resetup" operation and difference with the ML setup. | Add clarification text or NOTE as per comment. | Revised – We change “resetup” to “ML resetup” in note 5.ML resetup is defined in the first paragraph.*The ML (re)setup procedure sets up link(s) between a non-AP MLD and an AP MLD and is completed through the exchange of (Re)Association Request and (Re)Association Response frames. The non-AP MLD and AP MLD shall follow the (re)association procedure between MLDs as described in 11.3 (STA authenticationAuthentication and association).*TGbe editor to make the changes shown in 11-24/0991r4 under all headings that include CID 23018 |
| 23044 | Michael Montemurro | 35.3.5 | 535.18 | While the use of the term "ML (re)setup" might have been useful at the beginning of the project, it really just refers to association procedures for MLDs. Note that most of the occurences in the draft are cross-references to clause titles). | Replace "ML (re)setup as follows:At 68.62, change "ML (re)setup procedure" to "ML (re)association procedure"At 427.36, change "ML (re)setup" to " ML (re)association"At 522.51, change "during ML (re)setup" to "during ML (re)association"At 531.6, change "performing ML (re)setup" to "performing ML (re)association"At 535.18, change "ML (re)setup" to "ML (re)association"At 535.20, change "ML (re)setup procedure" to "ML (re)association procedure"At 535.23, change "The ML (re)setup procedure" to "The ML (re)association procedure"At 535.28, change "perform ML (re)setup" to "perform ML (re)association"At 535.32, change "an ML (re)setup to (re)set up" to "an ML (re)association to set up"At 535.33, change "an ML (re)setup" to "an ML (re)association"At 535.36, change "to be part of the ML (re)setup" to "to be a setup link"At 535.38, change "is for an ML (re)setup" to "is for an ML (re)association" At 537.14, change "requests or accepts ML (re)setup" to "successfully completes ML (re)association"At 537.14, change "that for any two links that are part of the links requested or accepted by the ML (re)setup, each link is located" to "that for any two negotiated links, each link is located"At 537.19, change "If the link on which the (Re)Association Request frame was received cannot be accepted by the AP MLD, the AP MLD shall treat the ML (re)setup as a failure and shall not accept any requested links. If the link on which the (Re)Association Request frame was received is accepted by the AP MLD, the ML (re)setup is successful." to "If the link on which the (Re)Association Request frame was received cannot be accepted by the AP MLD, the AP MLD shall not accept any of the requested links and shall reject the (re)association request. If the link on which the (Re)Association Request frame was received is accepted by the AP MLD, the ML (re)association is successful.At 537.46, change "the ML (re)setup" to "the ML (re)association"At 537.53, change "an ML (re)setup with the AP MLD" to "an ML (re)setup with the AP MLD"At 537.52, change "An AP affiliated with an AP MLD does not assign, to a non-AP STA or a non-AP MLD that has an ML (re)setup with the AP MLD and has a setup link on which the AP operates, to "An AP affiliated with an AP MLD does not assign, to a non-AP STA that is part of a setup link,"At 537.58, change "successful ML (re)setup" to "successful ML (re)association"At 539.1, change "ML (Re)Setup" to "Association"At 539.4, change "A non-AP STA affiliated with a non-AP MLD that initiates an ML (re)setup with an AP MLD shall include a Basic Multi-Link element in a (Re)Association Request frame it transmits." to "A non-AP MLD that initiates ML (re)association with an AP MLD shall include a Basic Multi-Link element in a (Re)Association Request frame, transmitted through an affiliated STA."At 538.23, 552.44, 555.13, 555.55(2x), 555.59, 575.53, 575.57, 575.59, 575.62, and 973.47, change "ML (re)setup" to "ML (re)association" | Revised – 35.3.5 describes how to setup links, where non-AP MLD can request links to setup, and AP MLD has specific rules to accept or reject certain requested links. Then both sides will eventually determine how many links are setup. These specific rules are not just about association to progress state machine from state 2 to state 3 or establish DS mapping. We just piggyback that procedure on the (re)association frame to save additional frame exchange. However, if there are places where the context is just about association to progress state machine and is not specific about the setup links or there are places where it is relevant to mention both, then we can indeed just use association between two MLDs or describe both. We go over the instances to do corresponding changes if that is the case.TGbe editor to make the changes shown in 11-24/0991r4 under all headings that include CID 23044 |

**Discussion:**

**Proposal:**

*TGbe editor: Modify Clause 11.3.5.2 as follows (track change on):*

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

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

(…existing texts…)

c) The ~~MLME~~non-AP STA shall transmit an Association Request frame to the AP or PCP, or a nonAP STA affiliated with the non-AP MLD shall transmit an Association Request frame with Basic

Multi-Link element to an AP affiliated with the AP MLD. The non-AP STA affiliated with a nonAP MLD may initiate the transmission of the Association Request frame on the recommended link

included in the MLME-ASSOCIATE.request primitive, unless specified otherwise (see 35.3.5.1 (ML (re)setup procedure))(#23107). 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.

(…existing texts…)

*TGbe editor: Modify Clause 11.3.5.4 as follows (track change on):*

(…existing texts…)

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

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

(…existing texts…)

b) The ~~MLME~~non-AP STA shall transmit a Reassociation Request frame to the new AP or PCP, or a

non-AP STA affiliated with the non-AP MLD shall transmit a Reassociation Request frame with

Basic Multi-Link element in the Reassociation Request frame to an AP affiliated with the new AP

MLD. The non-AP STA affiliated with a non-AP MLD may initiate the transmission of the

Reassociation Request frame on the recommended link included in the MLMEREASSOCIATE.request primitive, unless specified otherwise (see 35.3.5.1 (ML (re)setup procedure))(#23106). The RSNE contained in the MLMEASSOCIATE.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 MLMEREASSOCIATE.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.

*TGbe editor: Modify Clause 9.1 as follows (track change on):*

9.1 General requirements

Insert the following paragraph at the end of the subclause:

An EHT STA shall not include a status code in a Status Code field (#23119)unless the corresponding condition described in the meaning col­umn of Table 9-80 (Status codes) is met.

*TGbe editor: Modify Clause 4.5.3.4 as follows (track change on):*

4.5.3.4 Reassociation

***Change and split the second paragraph as follows:***

The reassociation service (see 11.3.5 (Association, reassociation, and disassociation)) is invoked to “move”:

* a current association (see 4.5.3.3 (Association) and 11.3 (STA authenticationAuthentication and association)) of a non-AP STA with an AP from ~~one~~the AP to the same AP or another AP or~~.~~
* a current association (see 4.5.3.3 (Association) and 11.3 (STA authenticationAuthentication and association)) of a non-AP MLD with an AP MLD from the AP MLD to the same AP MLD or another AP MLD or
* a current association of a non-AP STA with an AP to an association of a non-AP MLD with an AP MLD, where the MLD MAC address of the non-AP MLD is the same as the MAC address of the non-AP STA or (#23015)
* a current association of a non-AP MLD with an AP MLD to an association of a non-AP STA with an AP, where the MAC address of the non-AP STA is the same as the MLD MAC address of the non-AP MLD.(#23014)

*TGbe editor: Modify Clause 35.1 as follows (track change on):*

**35.1 Introduction**

An EHT STA has a(#23082) MAC and MLME that comprises the(#23082) functions defined in Clause 35 (Extremely high throughput (EHT) MAC specification) as well as(#23082) the MAC functions defined in Clause 26 (High efficiency (HE) MAC specification) and Clause 10 (MAC sublayer functional description), the MLME functions defined in Clause 11 (MLME), and the security functions defined in Clause 12 (Security) except when the functions in Clause 35 (Extremely high throughput (EHT) MAC specification) supersede the functions in Clause 10 (MAC sublayer functional description), Clause 11 (MLME), Clause 12 (Security), or Clause 26 (High efficiency (HE) MAC specification).

MLO is defined for an EHT STA(#23081) in 35.3 (Multi-link operation (MLO)). MLO allows an AP MLD and a non-AP MLD to set up multiple links between them. A reference model for MLO is described in 4.9.6 (Reference model for multi-link operation (MLO)).

NOTE—Mandatory or optional support for the main MAC and PHY features are described in 4.3.16a (Extremely high throughput (EHT) STA).

*TGbe editor: Modify Clause 35.15.1 as follows (track change on):*

(…existing texts…)

A(#23004) non-AP EHT STA follows the procedures in 11.1.3.8.3 (Discovery of a nontransmitted BSSID profile) for efficient discovery during scanning and to save power after association if the peer AP is operating as an EMA AP.

(…existing texts…)

*TGbe editor: Modify Clause 35.5.1.2 as follows (track change on):*

(…existing texts…)

In a 40 MHz, 80 MHz, 160 MHz or 320 MHz EHT MU PPDU, an AP shall not allocate to a 20 MHz operating non-AP STA an RU or MRU that is not supported by the STA as indicated in 36.3.2.6 (RU and MRU restrictions for 20 MHz operation). An AP shall follow the rules in 36.3.2.5 (20 MHz operating non-AP EHT STAs participating in wider bandwidth OFDMA), 36.3.2.7 (80 MHz operating non-AP EHT STAs participating in wider bandwidth OFDMA), and 36.3.2.8 (160 MHz operating non-AP EHT STAs participating in wider bandwidth OFDMA) if allocating RU(s) or MRU(s) to a(#23004) non-AP EHT STA whose operating bandwidth is smaller than the BSS operating channel width.

(…existing texts…)

*TGbe editor: Modify Clause 9.4.2.322.2 as follows (track change on):*

**9.4.2.322.2 EHT MAC Capabilities Information field**

(…existing texts…)

**Table 9-417m—Subfields of the EHT MAC Capabilities Information field**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| (..existing rows…) |
| TXS Mode 1 Support | Indicates support for transmitting or responding to an MU-RTS TXS Trig- ger frame with the TXS Mode field equal to 1. | For an EHT AP:Set to 1 to indicate that the AP is capable of transmitting an MU-RTS TXS Trigger frame that allocates time to a STA to transmit non-TB PPDUs to the EHT AP (i.e., with TXS Mode field equal to 1 (see35.2.1.2 (Triggered TXOP sharing (TXS) procedure))).Set to 0 otherwise.For a(#23004) non-AP EHT STA:Set to 1 to indicate that the non-AP STA is capable of responding to an MU-RTS TXS Trigger frame that allocates time to the STA to transmit non-TB PPDUs to the EHT AP (i.e., with TXS Mode field equal to 1 (see 35.2.1.2 (Triggered TXOP shar- ing (TXS) procedure))).Set to 0 otherwise. |
| TXS Mode 2 Support | Indicates support for transmitting or responding to an MU-RTS TXS Trig- ger frame with the TXS Mode field equal to 2. | For an EHT AP:Set to 1 to indicate that the AP is capable of transmitting an MU-RTS TXS Trigger frame that allocates time to a STA to transmit non-TB PPDUs to other STAs or to the AP (i.e., with TXS Mode field equal to 2 (see 35.2.1.2 (Triggered TXOP shar- ing (TXS) procedure))).Set to 0 otherwise.For a(#23004) non-AP EHT STA:Set to 1 to indicate that the non-AP STA is capable of responding to an MU-RTS TXS Trigger frame that allocates time to the STA to transmit non-TB PPDUs to other STAs or to its associated AP (i.e., with TXS Mode field equal to 2 (see35.2.1.2 (Triggered TXOP sharing (TXS) procedure))).Set to 0 otherwise. |
| (..existing rows…) |
| Two BQRs Support | For an AP, indicates support for receiving a frame with two BQR Con- trol subfields.For a non-AP STA, indicates support for generating a frame with two BQR Control subfields. | For an EHT AP:If the +HTC-HE Support subfield in the HE Capabilities element is set to 1:Set to 1 to indicate that the AP is capable of receiving a frame with two BQR Con- trol subfields.Set to 0 otherwise.Reserved if the +HTC-HE Support sub- field in the HE Capabilities element is set to 0.For a(#23004) non-AP EHT STA:If the +HTC-HE Support subfield in the HE Capabilities element is set to 1:Set to 1 to indicate that the non-AP EHT STA is capable of transmitting a frame with two BQR Control subfields.Set to 0 otherwise.Reserved if the +HTC-HE Support subfield in the HE Capabilities element is set to 0. |

*TGbe editor: Modify Clause 35.3.1 follows (track change on):*

*35.3.1 General*

MLO enables operations between two MLDs as described in 35.3 (Multi-link operation (MLO))(#23031). Each STA affiliated with an MLD shall be an EHT STA.

An EHT AP shall set dot11MultiLinkActivated to true and shall be affiliated with an AP MLD. An AP MLD and all of its affiliated AP(s) shall follow the rules defined in 35.3 (Multi-link operation (MLO)).

NOTE 1—There is no EHT mobile (#23003)AP with dot11MultiLinkActivated equal to false.

(..existing texts…)

*TGbe editor: Modify Clause 3.2 follows (track change on):*

**3.2 Definitions specific to IEEE 802.11**

(..existing texts…)

**multi-link operation:** [MLO] Operations (#23031)between two multi-link devices (MLDs) as described in 35.3 (Multi-link operation (MLO)).

(..existing texts…)

*TGbe editor: Modify Clause 35.3.5.1 follows (track change on):*

*35.3.5.1 General*

(..existing texts…)

NOTE 5—The link(s) that are requested for ML(#23018) resetup by a non-AP MLD are independent of the existing setup link(s) between the non-AP MLD and the associated AP MLD. The capability and operation parameters of each requested link during ML resetup are independent of the capability and operation parameters of each existing setup link with an associated AP MLD.

(..existing texts…)

*TGbe editor: Modify Clause 35.3.5.4 follows (track change on):*

35.3.5.4 General

A non-AP STA affiliated with a non-AP MLD that initiates an ML (re)setup with an AP MLD shall include a Basic Multi-Link element in a (Re)Association Request frame it transmits.

(...existing texts…)

The Basic Multi-Link element carried in the (Re)Association Request frame shall include the Common Info field with the MLD MAC Address subfield set to the MLD MAC address of the non-AP MLD(#23174) and may include the Link Info field.

(...existing texts…)

The AP that is affiliated with the AP MLD and that responds to a (Re)Association Request frame that carries a Basic Multi-Link element shall include a Basic Multi-Link element in the (Re)Association Response frame that it transmits.

(...existing texts…)

The Basic Multi-Link element carried in the (Re)Association Response frame shall include the Common Info field with the MLD MAC Address subfield set to the MLD MAC address of the AP MLD(#23174) and may include the Link Info field.

(…existing texts…)

*TGbe editor: Modify Clause 6.5.7.2.2 as follows (track change on):*

**6.5.7.2.2 Semantics of the service primitive**

(…existing texts…)

NOTE—It is a requirement on the SME that the link identified by the Recommended Link parameter matches the link used in a prior successful MLME-AUTHENTICATE.request transaction, and the link is in State 2. See 35.3.5.1 (ML (re)setup procedure).(#23104)

*TGbe editor: Modify Clause 3.1 as follows (track change on):*

**3.1 Definitions**

(…existing texts…)

**basic service set (BSS) transition:** [BSS transition] The Changechange of association by a station (STA) or non-access point (non-AP) multi-link device (non-AP MLD) from one BSS or access point (AP) multi-link device (AP MLD) to another BSS or AP MLD in the same extended service set (ESS).

NOTE - The change might involve modifying the operating mode from non-multi-link operation (non-MLO) to MLO or vice versa. See 4.5.3.2 (Mobility types).(#23140)

(…existing texts…)

*TGbe editor: Modify Clause 12.6.1.1.8 as follows (track change on):*

**12.6.1.1.8 GTKSA**

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

The GTKSA results from a successful 4-way handshake, FT 4-way handshake, FT protocol, FT resource request protocol, group key handshake, or FILS authentication, and is unidirectional. In an infrastructure BSS, there is one GTKSA, used exclusively for encrypting group addressed MPDUs that are transmitted by the AP and for decrypting group addressed transmissions that are received by the STAs. Between an AP MLD and a non-AP MLD that have completed a successful (re)association and corresponding(#23044) ML (re)setup, for each setup link there is one GTKSA used exclusively for encrypting group addressed MPDUs that are transmitted by the affiliated AP operating on the link and for decrypting group addressed transmissions that are received by the affiliated non-AP STA operating on the link.

(…existing texts…)

*TGbe editor: Modify Clause 35.3.3.4 as follows (track change on):*

**35.3.3.4 Fields and elements not carried in a Per-STA Profile subelement**

(…existing texts…)

NOTE 6—No RSNE/RSNXE is included in the Basic Multi-Link element carried in a (Re)Association Request frame because there is only one RSNE/RSNXE provided by the non-AP MLD(#23044). See 12.6.3.1 (General). An AP MLD can have a different MFPR carried in the RSNE for each of its affiliated APs and in such case, the (Re)Association Response frame includes the RSNE in the corresponding STA Profile field of Basic Multi-Link element. See 12.6.2 (RSNA selection).

*TGbe editor: Modify Clause 35.3.4.3 as follows (track change on):*

**35.3.4.3 Non-AP MLD behavior**

(…existing texts…)

A non-AP MLD can use the information it receives from a Neighbor Report element to make a decision on performing (re)association (See 11.3) and corresponding(#23044) ML (re)setup (see 35.3.5 (ML (re)setup)) or BSS transition (see 4.5.3.2 (Mobility types) and 35.3.23 (BSS transition management for MLDs)).

*TGbe editor: Modify Clause 35.3.5.2 as follows (track change on):*

**35.3.5.2 ML security**

After a successful (re)association and corresponding(#23044) ML (re)setup between a non-AP MLD and an AP MLD, a PMKSA and a PTKSA are established between the non-AP MLD and the AP MLD.

(…existing texts…)

*TGbe editor: Modify Clause 35.3.7.2.1 as follows (track change on):*

**35.3.7.2 TID-To-Link Mapping (TTLM)**

**35.3.7.2.1 General**

(…existing texts…)

An AP MLD may support TTLM negotiation. A non-AP MLD that performs (re)association and corresponding(#23044) ML (re)setup on at least two links with an AP MLD that sets the TID-To-Link Mapping Negotiation Support subfield of the MLD Capabilities And Operations field of the Basic Multi-Link element to a nonzero value shall support TTLM negotiation by setting the TID-To-Link Mapping Negotiation Support subfield of the MLD Capabilities And Operations field of the Basic Multi-Link element it transmits to a nonzero value.

(…existing texts…)

*TGbe editor: Modify Clause 35.3.7.2.3 as follows (track change on):*

**35.3.7.2.3 Negotiation of TTLM**

(…existing texts…)

During an (re)association and corresponding ML (re)setup(#23044) procedure, a non-AP MLD may initiate a TTLM negotiation by including one or two TID-To-Link Mapping elements, depending on the TTLM Negotiation Support subfield indicated by the peer MLD, in the (Re)Association Request frame if the AP MLD has indicated support for TTLM negotiation. Otherwise, the non-AP MLD shall not include any TID-To-Link Mapping element in the (Re)Association Request frame.

(…existing texts…)

NOTE 1—A (re)association and corresponding ML (re)setup can be successful even if the embedded TTLM negotiation (#23044) is not successful.

After the (re)association and corresponding(23044) ML (re)setup is successful and 4-way handshake is complete (if RSNA is required), to negotiate a TTLM, an initiating MLD with dot11TIDtoLinkMappingActivated equal to true shall send an individually addressed TID-To-Link Mapping Request frame through an affiliated STA, on any enabled link, to a peer MLD that has indicated support of TTLM negotiation.

(…existing texts…)

*TGbe editor: Modify Clause 35.3.12.6 as follows (track change on):*

**35.3.12.6 Operation for MLD listen interval**

During (re)association and corresponding ML (re)setup between a non-AP MLD and an AP MLD(#23044), the value carried in the Listen Interval field in the (Re)Association Request frame sent by a non-AP STA affiliated with a non-AP MLD to an AP affiliated with an AP MLD represents a request by the non-AP MLD at the MLD level. The Listen Interval value included by the non-AP MLD in a (Re)Association Request frame shall be in units of the maximum beacon interval of the requested links (see 9.4.1.6 (Listen Interval field)). The AP MLD, via the affiliated AP, may reject the (re)association(#23044) because the listen interval requested by the non-AP MLD is too large. After successful (re)association(#23044), the AP MLD shall use the listen interval in determining the lifetime of frames that it buffers for the non-AP MLD.

NOTE—The value of the listen interval negotiated during successful (re)association(#23044) remains unchanged for the duration of the association.

(…existing texts…)