### IEEE P802.11Wireless LANs

|  |
| --- |
| 11be D1.0 CR for 35.3.5.1 and 35.3.5.3 |
| Date: 2021-08-30 |
| 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

This submission proposes resolutions for the following CIDs:

4257, 4379, 5212, 5255, 6272, 5288, 5297, 5298, 6203, 5299, 5301, 5302, 5647, 5666, 5674, 5836,

5917, 6112, 6139, 6608, 8222, 6589, 6270, 6271, 6273, 6274, 6275, 8334, 8335, 8185, 6454, 6276,

8186, 8187, 6452, 6453, 7366, 7386, 7459, 8232, 8233, 4049, 6359, 6629, 6729

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Add 6629, 6729
* Rev 2: Revision to align with the resolution

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D1.0 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.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 4257 | Alfred Asterjadhi | 35.3.5.1 | 255.11 | Can an MLD request another MLD to setup links on channels that the responder has no links there? I.e., can the AP boot up a link because the STA requests it (if it can of course). Please clarify. | As in comment. | Rejected – The commenter is asking if AP MLD can add another affiliated AP while receiving the association request. This is possible because AP MLD can add affiliated AP at any time for implementation specific reasons. We also note that it is unlikely we can specify any restriction on what per-STA profile that a multi-link element in (re)association request can include because the non-AP MLD may discover outdated information or fake information and put information ther due to the discovery result. What is important is that AP MLD has no requirement that forces itself to accept whatever link if there are configuration problems. We already have the following normative behavor that captures this.*The AP MLD may not accept all the links that are requested for (re)setup.* |
| 4379 | Arik Klein | 35.3.5.1 | 254.57 | Define MLD (Re-)Association Request / Response frames , in a similar way that is defined for the MLD Probe Request (section 35.3.4.2).This way the terminlogy will be much easier to distinct between (Re-) Association Request / Response frame which does not include the MLE (and/or any other TBD elements, if needed in future) and the MLD (Re-) Association Request / Response frame which shall include the MLE (and/or any other TBD elements, if needed in future) | 1. Add section with the definition for MLD (Re-) Association Request / Response frame, as proposed.2. Change the "(Re-)Associataion Request / Response frame" throughout this section to "MLD (Re-)Association Request / Response frame" accordingly, as well as in the following sections: 11.3.5.2, 11.21.13, 35.3.2.1, 35.3.2.2, 35.3.5.4Still, the frame that will be used will be the (Re-) Association Request / response frame, but in case of Multi-link (re)setup it shall include the MLE (and/or any other TBD elements, if needed in future). | Rejected – We note that we resuse the existing (Re)association Request/Response frame based on the passed motion. In the spec, a specific management frame only has one name rather than two names. Using two names imply that we have two different management frames, which is not correct. The differentiation is (Re)association Request/Response frame with multi-link element or without multi-link element, which has been clarified across the specification.  |
| 5212 | Huizhao Wang | 35.3.5.1 | 254.50 | Is there spec text define the rule of the case that non-AP MLD request to setup MLD association with 3 links (3 STAs), but the AP MLD only wants to accept the MLD association with just 2 links (2 STAs)? | Please add the procedure in spec text for the case, non-AP MLD requests for M num of links, but AP MLD only want to accept N num of links in setup, where M > N. | Rejected – The mentioned scenario is already allowed based on the following spec texts. *The AP MLD may not accept all the links that are requested for (re)setup.* |
| 5255 | Insun Jang | 35.3.5.1 | 255.06 | It seems not to be consistent with our agreements. Although a link is not accepted, the comple profile of the link is included in the (Re)Association frame. Need to change the conditions of the links. | As in the comment, need to change the conditions the links, e.g., requested for (re)setup | Revised – We revise to align with the agreement in 35.3.5.4.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 5255. |
| 6272 | Ming Gan | 35.3.5.1 | 255.06 | It is not correct, it should be "shall indicate the same link(s) as in the received association request" | as in the comment | Revised – We revise the sentence “shall indicate the requested links”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6272. |
| 5288 | James Yee | 35.3.5.3 | 256.26 | Here it is stated that a link needs to be enabled for disassociation (and exchange of mgmt frames). Seems better to allow tear down after setup, regardless of whether an enabled link exists. | Explain why it is necessary for a link to be enabled for teardown to occur. | Rejected – The term “enabled” is added because of the technical agreement on disallowing any frame exchange in disabled link as shown below.*If a link is disabled, it shall not be used for frame exchange, including Management frames both for DL and**UL.* |
| 5297 | Jarkko Kneckt | 35.3.5 | 255.11 | The description is not general, because the sentence references to two links. | Please delete "for any two links" in the sentence | Rejected – The sentence does refer to “any” two links, so the sentence itself seems to be general.  |
| 5298 | Jarkko Kneckt | 35.3.5 | 255.14 | The sentence is long and unclear. Please clarify the sentence. | Please change the sentence to:" After successful multi-link (re)assocition, the non-AP MLD and the AP MLD are in associated state 3 with the AP MLD. | Revised – Agree in principle to use the description based on the state machine in 11.3. We note that associated state may be in state 3 (RSNE required) or state 4 (RSNE not required). We refer back to 11.3. TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 5298. |
| 6203 | Michael Montemurro | 35.3.5.1 | 255.16 | The "and is (re)associated" in the cited paragraph is redundant and should be removed. | Delete "and is (re)associated" | Revised – We revise the sentence without mentioning both associated state and “is (reassocaited) with”. Reference to 11.3 is already added.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 5298. |
| 5299 | Jarkko Kneckt | 35.3.5 | 255.11 | The ML association should clarify whether AP may accept all or selected links requested by the non-AP MLD | Please clarify: 1. Clarify whether AP accepts the link in which the assocaition request and response signaling are transmitted. 2. Allow AP MLD to setup ML association with only a single link. 3. Define AP MLD signaling in ML Response, if it does not setup all requested links in ML Association | Revised – We clarify that all requested links may be accepted by revising as “may or may not” although technically only positive tone or negative tone implies the same meaning. “may or may not” are used in the baseline 3 times. TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 5299. |
| 5301 | Jarkko Kneckt | 35.3.5.3 | 256.24 | ML Disassociation should be possible to signal from a non-AP MLD to the associated AP MLD | Please allow ML disassociation from frame transmitted by non-AP MLD. Please change setup links to ML association. | Revised – Both AP MLD and non-AP MLD are allowed to send disassociation frame as described below in 1.1*For an MLD to tear down the setup links between the MLD and an associated peer MLD, one of the STAs affiliated with the MLD shall send Disassociation frame to the STA affiliated with the peer MLD on the corresponding link that is enabled (see* [*35.3.6.1.1 (General)*](#bookmark20)*), (#1055)and the MLD and the peer MLD shall follow the MLD disassociation procedure as described in 11.3 (STA authenticationAuthentication and association(#2277)).*TGbe editor, no further changes are needed to address this comment. |
| 5302 | Jarkko Kneckt | 35.3.5.3 | 257.13 | Change "AP" to "AP affiliated with AP MLD ... as a response to (re) association request that contained ML element. | As in comment | Revised –Agree in principle with the commenter. The cited sentence has been revised by CID 7815 as follows. (#7815) *The AP that is affiliated with the AP MLD and that responds to an (Re)Association Request frame which carries a Basic variant Multi-Link element shall include a Basic variant Multi-Link element in the (Re)Association Response frame that it transmits.*TGbe editor, no further changes are needed to address this comment. |
| 5647 | Joseph Levy | 35.3.5.1 | 255.17 | The statement that a non-AP MLD is associated with an AP MLD is very confusing. A non-AP MLD is not associated with an AP MLD. Because in an typical 802.11 infrastructure configuration a non-AP STA is associated with the BSS or ESS not the AP, the association is know by the DS which allows the DS to send frames for the non-AP STA to the correct AP, so they can be forwarded to the non-AP STA. Even though, the concept of BSS or ESS for MLO is not currently defined, the process of association must work in a similar manner so that the DS can forward frames appropriately and mobility can be supported. It is assumed throughout clause 11 and 12 that a STA associates to the BSS or ESS and that the DS is aware of this association and keeps track of the status of the association (which AP can forward frames to the non-AP STA). Abandoning this basic assumption will break many of the basic 802.11 functions and will completely undermine the 802.11 mobility. | Either define the concept of a MLO BSS or ESS or provide a way it indicate that non-AP MLD association involves the DS. | Rejected –We note that in the baseline non-AP STA is associated with the AP. Quotes are provide below. *The QoS enhancements are available to QoS STAs associated with a QoS access point*Non-AP MLD association is already clarified in 4.5.3 and defined in 11.3.  |
| 5666 | Julien Sevin | 35,3,5,1 | 254.50 | Is it necessary the same affiliated AP of the AP MLD which performs the ML discovery and the ML setup ? | Indicating that another affiliated AP my perform the ML setup after a ML discovery | Rejected – ML probe request response can be done with any AP affiliated with the AP MLD and is independent of the ML setup.  |
| 5674 | Julien Sevin | 35.3.5.1 | 255.06 | It is not clear whether it is possible to accept only a sub-set of the requested links. If yes, what is the corresponding status code of the Association Response frame | As in comment | Rejected – It is possible to accept only a sub-set of the requested links based on the following spec texts. The definition of status code is already defined in 35.3.5.4. *The AP MLD may not accept all the links that are requested for (re)setup.* |
| 5836 | Lei Wang | 35.3.5.1 | 255.26 | What happens when a non-AP MLD is using the procedure as specified in Section 35.3.5.1 to set-up multi-link with an AP MLD, where the non-AP MLD and the AP MLD have different numbers of affiliated STAs or more generally they have different sets of links/affiliated STAs? The current Section 35.3.5.1 has not mentioned such cases. The "Figure 35-5" shows an Example of multi-link setup where the non-AP MLD and the AP MLD have the same set of multi-link associated STAs. In practical, there will be cases where AP MLDs and non-AP MLDs have different sets of multi-links/associated STAs, certainly not just some corner cases. | Please address the cases where the non-AP MLD and the AP MLD have different sets of links/affiliated STAs when conducting multi-link setup. | Revised – It is already clarified in D1.1 that the non-AP MLD may only request to (re)setup links with a subset of APs affiliated with the AP MLD.*(#2063)In the (Re)Association Request frame, the non-AP MLD indicates the links that are requested for**(re)setup (#1805)and the capabilities and operational parameters of the requested links as described in**35.3.5.4 (Usage and rules of Basic variant Multi-Link element in the context of multi-link (re)setup).**(#2475)The non-AP MLD may request to (re)setup links with a subset of APs affiliated with the AP MLD.*TGbe editor, no further changes are needed to address this comment. |
| 5917 | Li-Hsiang Sun | 35.3.5.3 | 256.24 | If a non-AP receives a broadcast disassociation on a setup link, it should not perform ML teardown | clarify the broadcast disassociation does not trigger ML teardown | Rejected – Any disassociation frame triggers disassociation procedure as defined in 11.3.  |
| 6112 | Mark Hamilton | 35.3.5.1 | 255.19 | "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, without providing the corresponding non-AP STA to the corresponding AP mapping to the DS, and enables the functionalities between a non-AP STA and its associated AP unless the functionalities have been extended to (#1442)the MLD level and specified otherwise." --- What??? | Break this up, and re-write to clarify what this is trying to say. | Revised – We break the sentence as suggested by the commente.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6112. |
| 6139 | Matthew Fischer | 35.3.5.1 | 254.56 | Allow the association to be changed dynamically from MLO to non-MLO and vice versa. | Add an action frame that changes the association from MLO to non-MLO and vice versa. | Rejected – Reassociation to legacy AP can already be done without additional action frame. See 4.5.3 and 11.3.  |
| 6608 | Po-Kai Huang | 11.3.1 | 186.20 | multi-link setup in the following place needed to be replaced with MLD association: 206.46, 206.50, 260.34, 264.41, 283.14. Add MLD associaiton to the following place. 253.42, 253.51, 254.61, | As in comment. | Revised –Agree in principle with the commenter. Multi-link setup is introduced on top of MLD association to elaborate how to determine the setup links. This is different from STA association which only has one link all the time. When the context is about state machine (authticated, associated, or 4-way done), MLD association should be used. When the context is about determine which link to setup, then multi-link setup is used.  TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6608. |
| 8222 | Yuxin LU | 9.4.1.6 Listen Interval field | 110.12 | Change "associated with the multi-link (re)setup" to "associated with the AP MLD" | As in comment | Revised –Agree in principle with the commenter. Multi-link setup is introduced on top of MLD association to elaborate how to determine the setup links. This is different from STA association which only has one link all the time. When the context is about state machine (authticated, associated, or 4-way done), MLD association should be used. When the context is about determine which link to setup, then multi-link setup is used.  TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6608. |
| 6589 | Payam Torab Jahromi |   | 0.00 | Change Multi-link (re)setup procedure name to Multi-link (re)association; there is no confusion, and the procedure is simply using a (Re)Association Request/Response exchange. |   | Revised –Multi-link setup is introduced on top of MLD association to elaborate how to determine the setup links. This is different from STA association which only has one link all the time. When the context is about state machine (authticated, associated, or 4-way done), MLD association should be used.  TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6608. |
| 6270 | Ming Gan | 35.3.5.1 | 254.50 | Setup is not correct terminology | Please change "multi-link setup" to "multi-link association" | Revised –Multi-link setup is introduced on top of MLD association to elaborate how to determine the setup links. This is different from STA association which only has one link all the time. When the context is about state machine (authticated, associated, or 4-way done), MLD association should be used.  TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6608. |
| 6271 | Ming Gan | 35.3.5.1 | 254.61 | It not clear for "if both the frames carried Basic variant Multi-Link element". It should be if both the frames carried Basic variant Multi-Link element and at least additional one link is accepted | as in the comment | Revised – Successful or not is not the focus of the sentence. We revise the sentence to focus on the fact that carrying multi-link element TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6271. |
| 6273 | Ming Gan | 35.3.5.1 | 255.48 | Regarding "The Association Request frame includes complete information of non-AP STA 1, non-AP STA 2, and non-AP STA 3" Please specify it location-the link info field in the ML element | as in the comment | Revised –To be precise, complete information of non-AP STA2 and non-AP STA3 are provided in per-STA profile, and complete information of non-AP STA 1 is provided in the frame body of association request frame. We revise toward this direction. TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6273. |
| 6274 | Ming Gan | 35.3.5.3 | 256.19 | Change "send Disassociation frame" to "send a Disassociation frame" | as in the comment | Accepted -  |
| 6275 | Ming Gan | 35.3.5.3 | 256.25 | Change "send disassociation frame" to "send a Disassociation frame" | as in the comment | Revised – The text has been modified in D1.1. We do the editorial fix to add “a”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6274. |
| 8334 | Zhiqiang Han | 35.3.5.3 | 256.19 | Change "Disassociation frame " to "a Disassociation frame " | as in comment. | Accepted -  |
| 8335 | Zhiqiang Han | 35.3.5.3 | 256.25 | Change "disassociation frame " to "a Disassociation frame " | as in comment. | Revised – The text has been modified in D1.1. We do the editorial fix to add “a”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6274. |
| 8185 | Yunbo Li | 35.3.5.3 | 256.25 | disassociation frame --> Disassociation frame | as in comment | Revised – The text has been modified in D1.1. We do the editorial fix to add “a”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6274. |
| 6454 | namyeong kim | 35.3.5.3 | 256.25 | It's editorial change. Change "disassociation frame" to "Diassociation frame". | Please see the comment. | Revised – The text has been modified in D1.1. We do the editorial fix to add “a”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6274. |
| 6276 | Ming Gan | 35.3.5.3 | 256.31 | "same" is vague. There is only one association state. It should be "both affiliated STAs and the non-AP MLD are in unassociated state" | as in the comment | Revised – We revise toward what the commenter suggests. TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6276. |
| 8186 | Yunbo Li | 35.3.5.3 | 256.30 | "After multi-link teardown, all the non-AP STAs affiliated with the non-AP MLD are in the same unassociated state as the non-AP MLD." The word "same" is redundant. | as in comment | Revised – We revise the sentence to remove “same”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6276. |
| 8187 | Yunbo Li | 35.3.5.3 | 256.18 | The first two paragraphes could be combined to make it cleaner | as in comment | Revised – The two paragraphs have been combined in D1.1.TGbe editor, no further changes are needed to address this comment. |
| 6452 | namyeong kim | 35.3.5.1 | 255.15 | It's editorial change. Change "setup" to "set up" | Please see the comment. | Accepted - |
| 6453 | namyeong kim | 35.3.5.1 | 255.51 | It's editoril change. Change "ML element" to "Multi-Link element" or "Basic variant Multi-Link element". | Please see the comment. | Revised – The cited text has been changed to Basic variant Multi-Link element in D1.1.TGbe editor, no further changes are needed to address this comment. |
| 7366 | Stephen McCann | 35.3.5.1 | 255.43 | typo "on 2.4 GHz" | Change the cited sentence to "In this example, the AP MLD has three affiliated APs: AP 1 operates in the 2.4 GHz band, AP 2 operates in the 5 GHz band, and AP 3 operates in the 6 GHz band" | Accepted -  |
| 7386 | Stephen McCann | 35.3.5.1 | 255.27 | In Figure 35-5, the Association Request/Response frame exchange should be between the non-AP MLD and the AP MLD (in other words between the outer rectangles). The Association Request/Response frame exchange does not occur between AP 1 and non-AP STA 1. | The two arrows on the left hand side of Figure 35-5 need to be shortened so that they connect the outer rectangles only. The text describing Figure 35-5 also needs to be updated to explain that the Association Request/Response frames are exchanged between the non-AP MLD and the AP MLD. The affiliated STAs transport the frames but are not involved in the association. | Revised – The cited figure has been updated in D1.1 that is outside the box.TGbe editor, no further changes are needed to address this comment. |
| 7459 | Thomas Derham | 35.3.5.3 | 0.00 | is this "teardown" actually disassociation? If so then need to be explicit, since if STA disassociates (from the ESS) then it's can't subsequently roam using reassociation procedure (it has to do association again). | Clarify | Rejected – The answer is yes. The text clarifies that it follows the MLD disassociation procedure as described in 11.3. *For an MLD to tear down the setup links between the MLD and an associated peer MLD, one of theSTAs affiliated with the MLD shall send Disassociation frame to the STA affiliated with the peer MLD onthe corresponding link that is enabled (see 35.3.6.1.1 (General)), (#1055)and the MLD and the peer MLDshall follow the MLD disassociation procedure as described in 11.3 (STA authenticationAuthentication andassociation(#2277))* |
| 8232 | Yuxin LU | 35.3.5.3 Multi-link tear down procedure | 256.19 | Simplify "on the corresponding link that is enabled" to "on its enabled link" | As in comment | Revised – We revise as “on the corresponding enabled link”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 8232. |
| 8233 | Yuxin LU | 35.3.5.3 Multi-link tear down procedure | 256.26 | Simplify "the corresponding link that is enabled" to "its enabled link" | As in comment | Revised – We revise as “on the corresponding enabled link”.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 8232. |
| 4049 | Abhishek Patil | 35.3.5.1 | 255.10 | What is the reason to limit the links to nonoverlapping channels? A link is defined as a Tuple consisting of <Operating Class, Channel and BSSID>. Therefore, it is possible to have two different BSSIDs operating on the same channel. Also, if there is to be a limit then it should be only for baseline features i.e., tied to dot11EHTBaselineFeaturesImplementedOnly equal to true | As in comment | Revised – The original reason for this sentence is to explain that we need STR requirement from AP MLD. Note that nonoverlapping certainly does not completely guarantee STR on AP MLD (ex. Consider the 80 MHz configuration right next to each other and the leakage.)*All pairs of links where an AP MLD that is not an NSTR soft AP MLD operates shall beSTR link pairs.* Since STR definition is already provided in other places of the specification. There is no need to have these additional sentence that does not help further on the STR requirement. Suggest to remove the sentence.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 4049. |
| 6359 | Morteza Mehrnoush | 35.3.5.1 | 255.11 | Do we need to add "shall" as below?"An MLD that requests or accepts multi-link (re)setup for any two links shall ensure that each link is located on different nonoverlapping channels." | as in comment | Revised – The original reason for this sentence is to explain that we need STR requirement from AP MLD. Note that nonoverlapping certainly does not completely guarantee STR on AP MLD (ex. Consider the 80 MHz configuration right next to each other and the leakage.)*All pairs of links where an AP MLD that is not an NSTR soft AP MLD operates shall beSTR link pairs.* Since STR definition is already provided in other places of the specification. There is no need to have these additional sentence that does not help further on the STR requirement. Suggest to remove the sentence.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 4049. |
| 6629 | Po-Kai Huang | 35.3.5.1 | 254.50 | Clarify that the setup is successful if any link is accepted and a failure if none of the links is accepted. | As in comment. | Revised – We clarify that the multi-link setup is a failure if the status code carried in the association response frame is not set to success. Otherwise, the multi-link setup is successful.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6629. |
| 6729 | Rojan Chitrakar | 35.3.5.4 | 257.34 | What about the link in which the (Re-)Association Response frame is sent in? In this case a per-sta profile for that link is not carried in the (Re-)Association Response frame. I assume if a Association response frame is sent with a status of "Success" in a link, that link is always accepted by the AP MLD. | Clarify that the link in which an Association response frame is sent with a status of "Success" is always accepted by the AP MLD. | Revised – We clarify that the multi-link setup is a failure if the status code carried in the association response frame is not set to success. Otherwise, the multi-link setup is successful.TGbe editor to make the changes shown in 11-21/1426r2 under all headings that include CID 6629. |

**Discussion:** *None.*

**Propose:**

***TGbe editor: Modify 35.3.5 Multi-link (re)setup as follows: (track change on)***

**35.3.5 Multi-link (re)setup**

**35.3.5.1 Multi-link (re)setup procedure**

Before a non-AP MLD performs multi-link (re)setup with an AP MLD, the non-AP MLD and AP MLD shall follow MLD authentication procedure as described in 11.3 (STA authenticationAuthentication and association(#2277)).

For a non-AP MLD to perform multi-link (re)setup with an AP MLD, the non-AP MLD and the AP MLD shall exchange (Re)Association Request/Response frames and shall follow the MLD (re)association procedure as described in 11.3 (STA authenticationAuthentication and association(#2277)). (#1027)A (Re)Association Request/Response frame exchange is for a multi-link setup if both the frames carried Basic variant Multi-Link element. Otherwise, the (Re)Association Request/Response frame exchange is not for a multi-link setup.(#6271)

(#2063)In the (Re)Association Request frame, the non-AP MLD indicates the links that are requested for (re)setup (#1805)and the capabilities and operational parameters of the requested links as described in

[35.3.5.4 (Usage and rules of Basic variant Multi-Link element in the context of multi-link (re)setup)](#bookmark17). (#2475)The non-AP MLD may request to (re)set up(#6452) links with a subset of APs affiliated with the AP MLD.

(#1847)NOTE—The links that are requested for resetup and the capability and operation parameters of each link that are requested for resetup are independent of the existing setup links with an associated AP MLD and the capability and operation parameters of each setup link with an associated AP MLD.

In the (Re)Association Response frame, the AP MLD shall indicate(#6272) the requested links that are accepted and the requested links that are rejected for (re)setup (#1805)and the capabilities and operational parameters of the requested links as described in [35.3.5.4 (Usage](#bookmark17) [and rules of Basic variant Multi-Link element in the context of multi-link (re)setup)](#bookmark17).(#5255) (#2475)The AP MLD may or may not accept all the links that are requested for (re)setup. (#2593)(#5299) The (Re)Association Response frame shall be sent to the non-AP STA affiliated with the non-AP MLD that sent the (Re)Association Request frame.

A multi-link (re)setup shall be treated as failure if the Status Code field carried in the (Re)Association Response frame is not set to SUCCESS (0). Otherwise, multi-link (re)setup shall be treated as successful.(#6629)

If the link on which the (Re)Association Request frame was received cannot be accepted by the AP MLD, the AP MLD shall not set the Status Code field carried in the (Re)Association Response frame to SUCCESS (0) and shall not accept any requested links. (#6629)

NOTE – if the a multi-link (re)setup is successful, then the link on which the (Re)Association Request frame was sent is accepted. (#6629)

(#1025)The AP MLD shall not accept a link that is requested for (re)setup if any of the following condition is true:

* The non-AP STA affiliated with the non-AP MLD corresponding to the link does not support all of the rates in the BSSBasicRateSet parameter and all of the membership selectors in the BSSMembershipSelectorSet parameter of the AP affiliated with the AP MLD corresponding to the link in the MLME-START.request primitive.
* The non-AP STA affiliated with the non-AP MLD corresponding to the link does not support all of the MCSs in the Basic HT-MCS Set field of the HT Operation parameter in of the AP affiliated with the AP MLD (if present) corresponding to the link in the MLME-START.request primitive.
* The non-AP STA affiliated with the non-AP MLD corresponding to the link 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 affiliated with the AP MLD (if present) corresponding to the link in the MLME-START.request primitive.
* The non-AP STA affiliated with the non-AP MLD corresponding to the link 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 affiliated with the AP MLD corresponding to the link in the MLME- START.request primitive.
* The non-AP STA affiliated with the non-AP MLD corresponding to the link does not support all of the <EHT-MCS, NSS> tuples indicated by the Basic EHT-MCS And NSS Set field of the EHT Operation parameter of the AP affiliated with the AP MLD corresponding to the link in the MLME- START.request primitive.

(#4049)

After successful multi-link (re)setup between a non-AP MLD and an AP MLD, the non-AP MLD and the AP MLD set up(#6452) links for multi-link operation (#1783)(see [35.3 (Multi-link operation)](#bookmark5) and the rest of the subclause [35.3 (Multi-link operation)](#bookmark5)), and the non-AP MLD is (re)associated with the AP MLD (i.e., in state 3 or state 4 see 11.3.2 (State variables)).(#5298)

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, without providing the corresponding non-AP STA to the corresponding AP mapping to the DS.For each setup link, the functionalities between a non-AP STA and its associated AP is enabled unless the functionalities have been extended to (#1442)the MLD level and specified otherwise.(#6112)

An example of multi-link setup is shown in [Figure 35-6 (Example of multi-link setup(#2899))](#bookmark16).

**Figure 35-6—Example of multi-link setup(#2899)**

(#1052)In this example, (#2042)the AP MLD has three affiliated APs: AP 1 operates in the 2.4 GHz band, AP 2 operates in the 5 GHz band, and AP 3 operates in the(#7366) 6 GHz band. (#2899)Non-AP MLD initiates the multi-link setup procedure and non-AP STA 1 affiliated with the non-AP MLD sends an Association Request frame to AP 1 affiliated with the AP MLD, i.e., the TA field of the Association Request frame is set to the MAC address of the non-AP STA 1 and the RA field of the Association Request frame is set to the MAC address of the AP 1. The Association Request frame includes (#6273) (#1053)a Basic variant Multi-Link element that indicates the MLD MAC address of the non-AP MLD and complete information of non-AP STA 1 (in the frame body of the Association Request frame), non-AP STA 2 (in a Per-STA Profile subelement carried in the Basic variant Multi-Link element), and non-AP STA 3 (in a Per-STA Profile subelement carried in the Basic variant Multi-Link element) to request three links to be setup (one link between AP 1 and non-AP STA 1, one link between AP 2 and non-AP STA 2, and one link between AP 3 and non-AP STA 3)(#6273). (#2899)AP MLD then responds to the requested multi-link setup, and AP 1 affiliated with the AP MLD sends an Association Response frame to non-AP STA 1 affiliated with the non-AP MLD, i.e., the TA field of the Association Response frame is set to the MAC address of the AP 1 and the RA field of the Association Response frame is set to the MAC address of the non-AP STA 1, to indicate successful multi-link setup. The Association Response frame includes (#6273)a (#1785)Basic variant Multi-Link element that indicates the MLD MAC address of the AP MLD and complete information of AP 1 (in the frame body of the Association Response frame), AP 2 (in a Per-STA Profile subelement carried in the Basic variant Multi-Link element), and AP 3 (in a Per-STA Profile subelement carried in the Basic variant Multi-Link element) (#6273). After successful multi-link setup between the non-AP MLD and AP MLD, three links are setup (link 1 between AP 1 and non-AP STA 1, link 2 between AP 2 and non-AP STA 2, and link 3 between AP 3 and non-AP STA 3).

**35.3.5.3 Multi-link tear down procedure**

(#2377)For an MLD to tear down the setup links between the MLD and an associated peer MLD, one of the STAs affiliated with the MLD shall send a(#6274) Disassociation frame to the STA affiliated with the peer MLD on the corresponding enabled link (#8232) (see [35.3.6.1.1 (General)](#bookmark20)), (#1055)and the MLD and the peer MLD shall follow the MLD disassociation procedure as described in 11.3 (STA authenticationAuthentication and association(#2277)).

After multi-link teardown, all the non-AP STAs affiliated with the non-AP MLD and the non-AP MLD are in the unassociated state.(#6276)

***TGbe editor: Modify the subclause 35.3.5.4 (Usage and Rules of Multi-Link element in the context of multi-link (re)setup) as follows:***

**35.3.5.4. Usage and Rules of Multi-Link element in the context of multi-link (re)setup**

(…existing texts….)

For each requested link in addition to the link on which the (Re)Association Request frame is transmitted, the Link Info field shall contain the corresponding Per-STA Profile subelement(s). For each Per-STA Profile subelement included in the Link Info field, the Complete Profile subfield of the STA Control field shall be set to 1 (see 35.3.2.2 (Advertisement of complete or partial per-link information)) and the Status Code field included in the STA Profile subfield of the Per-STA Profile subelement shall indicate SUCCESS (0), if the link is accepted as part of a successful multi-link (re)setup,­­­ or shall provide the failure cause if the link is not accepted.(#6629)

(#6629)

(…existing texts….)

***TGbe editor: Modify 4.3.19.2 BSS max idle period management as follows: (track change on)(#6608)***

**4.3.19 Wireless network management**

**4.3.19.2 BSS max idle period management**

***Change as follows:***

(#1027)When association is not for a MLD assocaition (see 11.3 (Authentication and association)) (#6608), BSS max idle period management enables an AP to indicate a time period during which the AP does not disassociate a STA due to nonreceipt of frames from the STA (also see [4.3.19.23a (MLD max idle period management](#bookmark0)) for the case when the association is for a MLD assocaition(#6608))(#2561). This supports improved STA power saving and AP resource management.

**4.3.19.23 WNM sleep mode**

***Change as follows:***

WNM sleep mode is an extended power save mode ~~for non-AP STAs~~ in which a non-AP STA or STAs affil- iated with a non-AP MLD need not listen for every DTIM Beacon frame, and need not perform GTK/IGTK/ BIGTK updates. For an association that is not a MLD association(#6608), WNM sleep mode enables a non-AP STA to signal to an AP that it might sleep for a specified length of time. For an association that is a MLD assocaition(#6608) between an AP MLD and a non-AP MLD, WNM sleep mode enables a STA affiliated with the non- AP MLD to signal to an AP affiliated with the AP MLD that all the STAs affiliated with the non-AP MLD might sleep for a specified length of time. This enables a non-AP STA or a non-AP MLD to reduce power consumption and remain associated while the non-AP STA or a non-AP MLD has no traffic to send to or receive from the AP or AP MLD.

***Insert the following new subclause at the end of subclause 4.3.19:***

**4.3.19.23a MLD max idle period management**

(#1027)When association is for a MLD association(#6608), MLD max idle period management service enables an AP MLD to indicate a time period during which the AP MLD does not disassociate the non-AP MLD(#2090)(#1108) due to nonreceipt of frames from the non-AP MLD on any setup link. This supports improved power saving at the non-AP MLD and resource management at the AP MLD.

***TGbe editor: Modify 6.3.7.2 (MLME-ASSOCIATE.request) as follows: (track change on)***

**6.3.7.2 MLME-ASSOCIATE.request**

**6.3.7.2.1 Function**

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

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**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-ASSOCIATE.request(

...

EHTCapabilities, MultiLink, VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| ListenInterval | Integer |  0 | Specifies how often the STA awakens and listens for the next Beacon frame, if it enters power save mode when an association is not for a MLD association (see 11.3 (Authentication and association)) .(#6608)Specifies how often at least a STA affili- ated with the MLD awakens and listens for the next Beacon frame, if all STAs affiliated with the MLD enter power save mode when an association is for a MLD association (see 11.3 (Authentication and association)).(#6608) |
| ... |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| EHTCapabilities | As defined in EHT Capabilities element | As defined in 9.4.2.295c (EHT Capabilities element) | Specifies the parameters in the EHT Capabilities element that are supported by the STA. The parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |
| MultiLink | Basic variant Multi- Link element | As defined in 9.4.2.295b (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 in9.4.2.25 (Vendor Specific element) | Zero or more elements. |

***TGbe editor: Modify 6.3.7.3 (MLME-ASSOCIATE.confirm) as follows: (track change on)***

**6.3.7.3 MLME-ASSOCIATE.confirm**

**6.3.7.3.1 Function**

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

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.

**6.3.7.3.2 Semantics of the service primitive**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-ASSOCIATE.confirm(

...

EHTCapabilities, EHTOperation, MultiLink,

VendorSpecificInfo)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| BSSMaxIdlePeri od | As defined in BSS Max Idle Period element | As defined in 9.4.2.78 (BSS Max Idle Period element) | Indicates the BSS max idle period parameters of the AP or PCP (#1027)when association is not for a MLD association (see 11.3 (Authentication and association)) (#6608); otherwise indicates the MLD max idle period parameter of the AP MLD. This parameter is present if dot11WirelessManagementImple mented is true and is not present otherwise. |
| ... |  |  |  |
| EHTCapabilities | As defined in EHT Capabilities element | As defined in 9.4.2.295c (EHT Capabilities element) | Specifies the parameters in the EHT Capabilities element that are supported by the STA. The parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |
| EHTOperation | EHT Operation element | As defined in 9.4.2.295a (EHT Operation element) | Provided additional information for operating the EHT BSS. This parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |
| MultiLink | Basic variant Multi-Link element | As defined in 9.4.2.295b (Multi-Link element) | Indicates the Multi-Link parameters of the MLD. This parameter is present if dot11MultiLinkActivated is true and is absent otherwise. |
| VendorSpecificIn fo | A set of elements | As defined in 9.4.2.25 (Vendor Specific element) | Zero or more elements. |

***TGbe editor: Modify 6.3.7.4 as follows: (track change on)***

**6.3.7.4 MLME-ASSOCIATE.indication**

**6.3.7.4.1 Function**

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

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**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-ASSOCIATE.indication(

...

EHTCapabilities, MultiLink VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| ListenInterval | Integer |  0 | Specifies how often the STA awakens and listens for the next Beacon frame, if it enters power save mode when an association is not for a MLD association (see 11.3 (Authentication and association)). (#6608)Specifies how often at least a STA affiliated with the MLD awakens and listens for the next Beacon frame, if all STAs affiliated with the MLD enter power save mode when an association is for a MLD association (see 11.3 (Authentication and association)) (#6608). |
| ... |  |  |  |
| EHTCapabilities | As defined in EHT Capabilities element | As defined in 9.4.2.295c (EHT Capabilities element) | (#1004)(#2246)Specifies the parameters in the EHT Capabilities element that are supported by the peer STA. The parameter is present if dot11EHTOptionImplemented is true and the EHT Capabilities element is present in the Association Request frame received from the STA; otherwise not present. |
| MultiLink | Basic variant Multi-Link element | As defined in 9.4.2.295b (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 in9.4.2.25 (Vendor Specific element) | Zero or more elements. |

***TGbe editor: Modify 6.3.7.5 as follows: (track change on)***

**6.3.7.5 MLME-ASSOCIATE.response**

**6.3.7.5.1 Function**

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

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.

**6.3.7.5.2 Semantics of the service primitive**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-ASSOCIATE.response(

...

EHTCapabilities, EHTOperation, MultiLink,

VendorSpecificInfo

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| BSSMaxIdlePeriod | BSS Max Idle Period element | As defined in 9.4.2.78 (BSS Max Idle Period element) | Indicates the BSS max idle period parameters of the AP or PCP (#1027)when association is not for a MLD association (see 11.3 (Authentication and association)) (#6608); otherwise indicates the MLD max idle period parameter of the AP MLD. This parameter is present if dot11WirelessManagementImplemented is true or dot11S1GOptionImplemented is true; otherwise not present. |
| ... |  |  |  |
| EHTCapabilities | As defined in EHT Capabilities element | As defined in 9.4.2.295c (EHT Capabilities element) | Specifies the parameters in the EHT Capabilities element that are supported by the STA. The parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |
| EHTOperation | EHT Operation element | As defined in 9.4.2.295a (EHT Operation element) | Provides additional information for operating the EHT BSS. This parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |
| MultiLink | Basic variant Multi-Link element | As defined in 9.4.2.295b (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 in9.4.2.25 (Vendor Specific element) | Zero or more elements. |

)

***TGbe editor: Modify 6.3.8.2 as follows: (track change on)***

**6.3.8.2 MLME-REASSOCIATE.request**

**6.3.8.2.1 Function**

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

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**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-REASSOCIATE.request(

...

EHTCapabilities,

MultiLink,

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| ListenInterval | Integer |  0 | Specifies how often the STA awakens and listens for the next Beacon frame, if it enters power save mode when an association is not for a MLD association (see 11.3 (Authentication and association)) (#6608).Specifies how often at least a STA affili- ated with the MLD awakens and listens for the next Beacon frame, if all STAs affili- ated with the MLD enter power save mode when a reassociation is for a MLD association (see 11.3 (Authentication and association)) (#6608). |
| ... |  |  |  |
| EHTCapabilities | As defined in EHT Capabilities element | As defined in 9.4.2.295c (EHT Capabilities element) | Specifies the parameters in the EHT Capabilities element that are supported by the STA. The parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |
| MultiLink | Basic variant Multi- Link element | As defined in 9.4.2.295b (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 in9.4.2.25 (Vendor Specific element) | Zero or more elements. |

VendorSpecificInfo

***TGbe editor: Modify 6.3.8.3 as follows: (track change on)***

**6.3.8.3 MLME-REASSOCIATE.confirm**

**6.3.8.3.1 Function**

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

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.

**6.3.8.3.2 Semantics of the service primitive**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-REASSOCIATE.confirm(

...

EHTCapabilities, EHTOperation, MultiLink, VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| BSSMaxIdlePeriod | BSS Max Idle Period element | As defined in 9.4.2.78 (BSS Max Idle Period element) | Indicates the BSS max idle period parameters of the AP or PCP (#1027)when association is not for a MLD association (see 11.3 (Authentication and association)); otherwise indicates the MLD max idle period parameter of the AP MLD. This parameter is present if dot11WirelessManagementImplemented is true or dot11S1GOptionImplemented is true; otherwise not present. |
| ... |  |  |  |
| EHTCapabilities | As defined in EHT Capabilities element | As defined in 9.4.2.295c (EHT Capabilities element) | Specifies the parameters in the EHT Capabilities element that are supported by the STA. The parameter is present if dot11EHTOptionImplemented is true; otherwise not present. |

***TGbe editor: Modify 6.3.8.4 as follows: (track change on)***

**6.3.8.4 MLME-REASSOCIATE.indication**

**6.3.8.4.2 Semantics of the service primitive**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-REASSOCIATE.indication(

...

EHTCapabilities, MultiLink, VendorSpecificInfo

)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| CurrentAPAddress | MAC address | Any valid individual MAC address | Specifies the address of the AP or PCP or MLD with which the peer STA is currently associated. |
| ListenInterval | Integer |  0 | Specifies how often the STA awakens and listens for the next Beacon frame, if it enters power save mode when an association is not for a MLD association (see 11.3 (Authentication and association)) (#6608).Specifies how often at least a STA affiliated with the MLD awakens and listens for the next Beacon frame, if all STAs affiliated with the MLD enter power save mode when a reassociation is for a MLD association (see 11.3 (Authentication and association)) (#6608). |
| ... |  |  |  |

***TGbe editor: Modify 6.3.8.5 as follows: (track change on)***

**6.3.8.5 MLME-REASSOCIATE.response**

**6.3.8.5.1 Function**

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

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.

**6.3.8.5.2 Semantics of the service primitive**

***Change the primitive parameters as follows (not all existing parameters are shown):***

The primitive parameters are as follows: MLME-REASSOCIATE.response(

...

EHTCapabilities, EHTOperation, MultiLink,

VendorSpecificIno

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| ... |  |  |  |
| BSSMaxIdlePeriod | BSS Max Idle Period element | As defined in 9.4.2.78 (BSS Max Idle Period element) | Indicates the BSS max idle period parameters of the AP or PCP (#1027)when association is not for a MLD association (see 11.3 (Authentication and association)) (#6608) (#6608); otherwise indicates the MLD max idle period parameter of the AP MLD. This parameter is present if dot11WirelessManagementImplemented is true or dot11S1GOptionImplemented is true; otherwise not present. |
| ... |  |  |  |

)

***TGbe editor: replace “multi-link setup” with “MLD association (see 11.3 (Authentication and association))” in Table 9-34 —Association Request frame body(#6608)***

***TGbe editor: replace “multi-link setup” with “MLD association (see 11.3 (Authentication and association))” in Table 9-36 — Reassociation Request frame body (#6608)***

***TGbe editor: Modify 9.4.1.6 as follows: (track change on)***

**9.4.1.6 Listen Interval field**

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

When a (re)association is not for a MLD association (see 11.3 (Authentication and association)) (#6608), the~~The~~ Listen Interval field is used to indicate to the AP how often an S1G STA with dot11NonTIMModeActivated equal to false or a non-S1G STA in power save mode wakes to listen to Beacon frames. It is also used to indicate to an AP the duration during which an S1G STA with dot11NonTIMModeActivated equal to true is required to transmit at least one frame that is addressed to the associated AP. This field is derived from the ListenInterval parameter when present as a parameter of an MLME primitive. The value is in units of beacon interval if dot11ShortBeaconInterval is false and in units of short beacon interval if dot11ShortBeaconInterval is true (see 11.1.3.10.2 (Generation of S1G Beacon frames)).

When a (re)association is for a MLD association (see 11.3 (Authentication and association)) (#6608), the Listen Interval field is used to indicate to the AP MLD how often at least a STA affiliated with a non-AP MLD wakes to listen to Beacon frames if all STAs affiliated with the non-AP MLD (#6608)are in power save mode. This field is derived from the ListenInterval parameter when present as a parameter of an MLME primitive. The value is in units of the maximum value of beacon intervals corresponding to the links that the non-AP MLD intends to setup in the (Re)Association Request frame.

The length of the Listen Interval field is 2 octets. The Listen Interval field is shown in Figure 9-88 (Listen Interval field format carried in a non-S1G PPDU).

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

NOTE—The value 0 might be used by a STA that is not affiliated with an MLD or all STAs affiliated with an MLD that never enters power save mode.

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

When a (re)association is not for a MLD association (see 11.3 (Authentication and association)) (#6608), an~~An~~ AP uses the listen interval in determining the lifetime of frames that it buffers for a STA.

An AP MLD uses the listen interval in determining the lifetime of frames that it buffers for a non-AP MLD.

***TGbe editor: Modify 9.4.2.78 as follows: (track change on)***

**9.4.2.78 BSS Max Idle Period element**

***Change as follows:***

(#3203)When association is not for a MLD association (see 11.3 (Authentication and association)) (#6608), the~~The~~ BSS Max Idle Period element contains the time period a non-AP STA can refrain from transmitting frames to the AP before the AP might disassociates the STA due to inactivity.

(#3203)When association is for a MLD association (see 11.3 (Authentication and association)) (#6608), the BSS Max Idle Period element contains the time period a non-AP MLD can refrain from transmitting frames to the AP MLD before the AP MLD might dis- associate the non-AP MLD due to inactivity.

***TGbe editor: Modify 11.2.3.16.3 as follows: (track change on)***

**11.2.3.16.3 WNM sleep mode AP operation**

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

When the association is not a MLD association (see 11.3 (Authentication and association)) (#6608):

If RSN is used with management frame protection and a valid PTK is configured for the STA, the current GTK, IGTK, and BIGTK shall be included in the WNM Sleep Mode Response frame.

If a GTK/IGTK/BIGTK update is in progress, the pending GTK, IGTK, and BIGTK shall be included in the WNM Sleep Mode Response frame.

If RSN is used without management frame protection and a valid PTK is configured for the STA, the current GTK shall be sent to the STA using a group key handshake (see 12.7.7 (Group key handshake)) immediately following the WNM Sleep Mode Response frame.

When the association is a MLD association (see 11.3 (Authentication and association)) (#6608):

If RSN is used with management frame protection and a valid PTK is configured between the MLDs, the current GTK, IGTK, and BIGTK for each the links shall be included in the WNM Sleep Mode Response frame.

If a GTK/IGTK/BIGTK update is in progress for one or more links, the pending GTK(s), IGTK(s), and BIGTK(s) for the affected link(s) shall be included in the WNM Sleep Mode Response frame.

If RSN is used without management frame protection and a valid PTK is configured for the STA, the current GTK for all the links shall be sent to the STA using a group key handshake (see 12.7.7 (Group key handshake)) immediately following the WNM Sleep Mode Response frame.

***TGbe editor: Modify 11.21 Wireless network management procedures as follows: (track change on)***

**11.21 Wireless network management procedures**

**11.21.13 BSS max idle period management**

***Change the first paragraph, including splitting it into the three paragraphs as follows:***

If dot11BssMaxIdlePeriod is nonzero or dot11MldMaxIdlePeriod is nonzero, an AP shall include the BSS Max Idle Period element in the (Re)Association Response frame. Otherwise, the AP shall not include the BSS Max Idle Period element in the (Re)Association Response frame.

(#1027)When association is for a MLD association (see 11.3 (Authentication and association)) (#6608), the values carried in the BSS Max Idle Period element apply at the MLD level and the associated MLDs follow the MLD max idle period procedure defined in 35.3.11.3 (MLD max idle period management). The rest of this subclause defines the procedure for the BSS max idle period when the association is not for a MLD association (see 11.3 (Authentication and association)) (#6608).

A non-S1G STA may send protected or unprotected keepalive frames, as indicated in the Idle Options field.