IEEE P802.11
Wireless LANs

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| LB 271 Resolution for comments in 35.3.12 (part 1) |
| Date: March 9th 2023 |
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 Abstract

This submission proposes resolutions for following 24 CIDs received for TGbe LB271 against D3.0:

15408 18159 16524 15868 18160 16818 16598 16525 16098 16526

17957 17958 16819 16036 16037 15540 16038 16099 16100 16101

16102 16103 16104 18168

**Revisions:**

* Rev 0: Initial version of the document.
* Rev 1: Minor editorial updates
* Rev 2: Updated resolution for CID 18168 + Green tagged CIDs from Chair
* Rev 3: CID 18168 is deferred + minor updates when the doc was presented on 3/15/23 TGbe MAC PM2 session.
* Rev 4: Updated resolution for CID 18168 based on offline discussion with Laurent. Changes w.r.t to r3 are highlighted.
* Rev 5: Minor update to the text when the SP was discussed on 3/16/23 TGbe MAC PM1 session.

***TGbe editor: the baseline for this document is TGbe D3.0***

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

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e., they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

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| **CID** | **Commenter** | **Clause** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 15408 | John Wullert | 35.3.12.1 | 537.01 | The description of Figure 35-21 illustrates non-AP STA 1 being in awake state in Active mode and being in awake state in Power-save mode, but does not describe the difference | Enhance description to note that when non-AP STA 1 indicates that it is in awake state by transmitting a PS-Poll or U-APSD trigger frame, it does not change its mode and it transitions directly to Doze state when the exchange is completed. | **Rejected**The comment fails to identify a technical issue. Please note that the intention of the example is not to specify what the difference is between two legacy power save modes, but rather to provide an illustration of the transitions.  |
| 18159 | Abhishek Patil | 35.3.12.2 | 537.40 | The term 'about' doesn't fit well with the intention of the sentence. In addition, 'on one or more link(s)' is missing what action needs to be taken. | Replace the sentence as: "A non-AP MLD shall be able to perform basic operations (such as receiving a traffic indication, time synchronization, receiving BSS parameter updates) related to operating with the AP MLD and all the APs affiliated with the AP MLD by monitoring one or more link(s) it has setup with the AP MLD." | **Revised**Agree in principle and accounted for the suggested change with some modifications for improved readability.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 18159.** |
| 16524 | Arik Klein | 35.3.12.2 | 537.38 | The basic BSS operation is done only on a setup links established between non-AP MLD and the AP MLD. Please revise the following sentence, as suggested:" A non-AP MLD shall be able to perform basic operations (such as receiving a traffic indication, time synchronization, receiving BSS parameter updates) about the AP MLD and all the APs affiliated with the AP MLD on \*one or more link(s)\*." | The sentence should be revised as follows: " A non-AP MLD shall be able to perform basic operations (such as receiving a traffic indication, time synchronization, receiving BSS parameter updates) about the AP MLD and all the APs affiliated with the AP MLD on one or more \*setup\* link(s)." | **Revised**Agree in principle. Proposed resolution is editorially different but has the same outcome as the proposed change. Alsoe please see resolution for 18159.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 18159.** |
| 15868 | Chunyu Hu | 35.3.12.2 | 537.42 | TWT, regardless individual or broadcast TWT, provides power saving benefit as intended. No need to be specific and call out individual TWT here. | Change "individual TWT agreement" to "TWT". | **Accepted** |
| 18160 | Abhishek Patil | 35.3.12.3 | 537.60 | The 2nd sentence conflicts with the 1st sentence. For an MLD, the BSS max idle period always applies to the MLD level (i.e., there is no such thing as 'when'. It is always the case). | Replace the first and second sentence as: "During multi-link setup, if the AP affiliated with an AP MLD includes a BSS Max Idle Period element in the (Re)Association Response frame sent to a non-AP STA affiliated with a non-AP MLD, then the value carried in the Max Idle Period field is applied at the MLD level and is referred to as the MLD max idle period." | **Accepted****TGbe editor, please note the ‘accepted’ changes are shown in 11-23/0303r3 since the same resolution applies to CIDs 16818 and 16598** |
| 16818 | Mark RISON | 35.3.12.3 | 537.60 | "When the max idle period value in the BSSMax Idle Period element is applied at the MLD level, it is referred to as the MLD max idle period." seems to suggest that you can have a per-BSS MIP in MLO, but as far as I can tell this is not the case | Clarify that in MLO you only have a MLD MIP, not any BSS MIPs | **Revised**Agree with the comment. Proposed resolution for CID 18160 revises the sentence and clarifies that it is at MLD level.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 18160.** |
| 16598 | Arik Klein | 35.3.12.3 | 537.60 | change "max idle period value" to "Max Idle Period field value", since it relate to a specific field value | As in comment | **Revised**Agree with the comment, however that portion of the sentence is now removed as part of proposed resolution for CID 18160. **TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 18160.** |
| 16525 | Arik Klein | 35.3.12.3 | 538.01 | Revise the following sentence as suggested, since the (Re)Association Response frame is sent to the non-AP STA affiliated with the non-AP MLD (and not to the non-AP MLD). | Revise the sentence in either of the options:1. Option 1: replace "sent" with "intended", thus the revised sentence should be: "The AP MLD shall use this timeout value for making disassociation decisions for the non-AP MLD to which the (Re)Association Response frame is intended."2. Option 2: Add "through the link on which the (Re)Association Request frame was received" at the end of the sentence, thus the revised sentence should be: "The AP MLD shall use this timeout value for making disassociation decisions for the non-AP MLD to which the (Re)Association Response frame is sent through the link on which the (Re)Association Request frame was received." | **Revised**Agree with the comment. Went with option 1. **TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 16525.** |
| 16098 | Insun Jang | 35.3.12.3 | 537.55 | In this subcaluse, there are some "BSS Max Idle Period" not indicating element name. It would be good for them to be changed to "BSS max idle period" if each one is not the name of element | As in the comment | Revised –Agree in principle with the comment. Used the term Max Idle Period which is the name of the field anywhere an inconsistency was found.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 16098.** |
| 16526 | Arik Klein | 35.3.12.3 | 538.05 | The keepalive frame should be sent within a period that is indicated by the BSS Max Idle Period field value. Please revise the wording of the sentence, as suggested | The sentence should be revised as follows: "The non-AP MLD shall send, to its associated AP MLD, at least one keepalive frame (such as Data frame, PS-Poll frame, or Management frame), via one of its affiliated non-AP STAs, \*within a period indicated by the\* BSS Max Idle Period \*field\* if the non-AP MLD intends..." | **Accepted****TGbe editor, please note the ‘accepted’ changes are shown in 11-23/0303r3 for clarity sake.** |
| 17957 | yan li | 35.3.12.3 | 538.07 | It says 'due to nonreceipt of frames',please clarify whether it is on the AP side or STA side and what the frames are.I think the condition is AP does not receive any keepalive frame from the STA during the period; But this sentence indicates STA is the recipient of the frames | as the comment | **Revised**It is the AP MLD. Added the clarification.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 17957.** |
| 17958 | yan li | 35.3.12.3 | 538.12 | the word 'or' should be replaced with 'of'.That is 'the AP MLD has not received a Data frame, a PS-Poll frame, or a Management frame (protected or unprotected as specified in this paragraph) of a frame exchange sequence ...'.Otherwise, control frame exchange(e.g.,RTS/CTS) may be permitted | as the comment | **Accepted**The proposed change is consistent with baseline (see REVme D2.1 P2605L49)**TGbe editor, please note the ‘accepted’ changes are shown in 11-23/0303r3 since it impacts the resolution for CIDs 16819 and 16036.** |
| 16819 | Mark RISON | 35.3.12.3 | 538.10 | "A non-AP MLD is considered inactive by its associated AP MLD if the AP MLD has not received a Dataframe, a PS-Poll frame, or a Management frame" but the bullets below allow any frame for the unprotected case | Clarify whether it's all frames (including e.g. RTS/CTS/BA/BAR) or only those | **Revised**The text is updated as a resolution to CID 17958. The change clarifies that only Data, Mgmt or PS-Poll frames that are initiated by a non-AP are considered as keepalive (also see REVme D2.1 P2605L49).TGbe editor, please apply changes as shown in 11-23/0303r3 tagged 17958 |
| 16036 | Binita Gupta | 35.3.12.3 | 538.13 | Needs to indicate that '..no frame exchange sequence initiated by any of the STAs affiliated with the non-AP MLD..". "No" is missing. | Modify "or a frame exchange sequence initiated by any of the STAs affiliated..." to "or no frame exchange sequence initiated by any of the STAs affiliated" | **Revised**The text is updated as a resolution to CID 17958. The change clarifies that only Data, Mgmt or PS-Poll frames that are initiated by a non-AP are considered as keepalive (also see REVme D2.1 P2605L49).TGbe editor, please apply changes as shown in 11-23/0303r3 tagged 17958 |
| 16037 | Binita Gupta | 35.3.12.3 | 538.16 | Since BSS Max Idle Period can be different per non-AP MLDs, indicate that in the text. | Modify to "...Max Idle Period subfield of the BSSMax Idle Period element for that non-AP MLD" | **Revised**Agree in principle and accounted with minor editorial changes.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 16037.** |
| 15540 | Chaoming Luo | 35.3.12.3 | 538.18 | Change: no protected frames are receivedTo: no PS-Poll frame or protected frames are received | As in comment | **Rejected**When the Idle options specifies that protected keepalive frames are required then the determination cannot be based on the PS-Poll frame, since this frame cannot be protected. Hence the proposed change is incorrect.  |
| 16038 | Binita Gupta | 35.3.12.3 | 538.20 | The BSS Max Idle Period is an element. The subfield which carries the idle duration is Max Idle Period. Change 'BSS Max Idle Period' to 'Max Idle Period'. Same comment for line 23 in next para. | As in comment | **Accepted****TGbe editor, please note the ‘accepted’ changes are shown in 11-23/0303r3 since the resolution is same as that for CID 16098** |
| 16099 | Insun Jang | 35.3.12.3 | 538.60 | "and" should be removed | As in the comment | Revised –Agree in principle and accounted for the suggestion with some modification for improved readability.**TGbe editor: please implement changes as shown in 11-23/0303r3 tagged 16099.** |
| 16100 | Insun Jang | 35.3.12.3 | 539.08 | "Per-Link Traffic Indication Bitmap List field" is incorrect name. Please remove "Bitmap" | As in the comment | **Accepted** |
| 16101 | Insun Jang | 35.3.12.3 | 540.55 | "Per-Link Traffic Indication Bitmap List field" is incorrect name. Please remove "Bitmap" | As in the comment | **Accepted** |
| 16102 | Insun Jang | 35.3.12.3 | 540.21 | "Indication" is missing in "Multi-link Traffic element" is incorrect name. Please correct it | As in the comment | **Accepted** |
| 16103 | Insun Jang | 35.3.12.3 | 540.36 | Please change "carry he MLO Link ~" to "carry the MLO Link ~" | As in the comment | **Accepted** |
| 16104 | Insun Jang | 35.3.12.3 | 540.57 | Please change "Multi-Link Traffic Control field" to "Multi-Link Traffic Indication Control field" | As in the comment | **Accepted** |
| 18168 | Abhishek Patil | 35.3.12.5 | 541.51 | The WNM frame can't be sent on a disabled link or on a link where the corresponding non-AP STA is in doze state. Same comment and proposed resolution for the next sentence. | Add "that is operating on an enabled link and subject to power-save state (see 35.3.12.1), " after 'one of its affiliated APs' and before the ',' (comma). | **Revised**Agree with the comment. The proposed changes are made with a few editorial updates.**TGbe editor, please apply the changes as shown in 11-23/0303r5 tagged 18168.** |

**35.3.12.2 Basic BSS operation**

***TGbe editor: Please update the contents of this paragraph in this subclause as shown below:***

A non-AP MLD shall be able to perform basic operations (such as receiving a traffic indication, time synchronization, receiving BSS parameter updates) related to the AP MLD and all the APs affiliated with the AP MLD by monitoring one or more of the link(s) it has setup with the AP MLD[18159]. This is accomplished in addition to other power save mechanisms (such as [15868]TWT or U-APSD), if setup, between the non-AP STA affiliated with the non-AP MLD and the corresponding AP affiliated with the AP MLD with which the non-AP MLD has performed association. With these mechanisms, a non-AP MLD can receive basic information about the AP MLD and all the APs affiliated with the AP MLD on a single link while the other non-AP STA(s) affiliated with the non-AP MLD are in doze state.

**35.3.12.3 MLD max idle period management**

***TGbe editor: Please update the contents of the following paragraphs in this subclause as shown below:***

During multi-link setup, if the AP affiliated with an AP MLD includes a BSS Max Idle Period element in the (Re)Association Response frame sent to a non-AP STA affiliated with a non-AP MLD, then the value carried in the Max Idle Period field is applied at the MLD level and is referred to as the MLD max idle period.[18160] The AP MLD shall use this timeout value for making disassociation decisions for the non-AP MLD to which the (Re)Association Response frame is [16525]intended. An AP MLD may provide different [16098]Max Idle Period values for different non-AP MLDs.

The non-AP MLD shall send, to its associated AP MLD, at least one keepalive frame (such as Data frame, PS-Poll frame, or Management frame), via one of its affiliated non-AP STAs, [16526]within a period indicated by the[16098] Max Idle Period field[16526] if the non-AP MLD intends to avoid getting disassociated from the AP MLD due to nonreceipt of frames by the AP MLD[17957]. A keepalive frame shall be protected or unprotected as indicated in the Idle Options subfield.

A non-AP MLD is considered inactive by its associated AP MLD if the AP MLD has not received a Data frame, a PS-Poll frame, or a Management frame (protected or unprotected as specified in this paragraph) [17958]of a frame exchange sequence initiated by any of the STAs affiliated with the non-AP MLD on any enabled link for a time period greater than or equal to the time specified by the Max Idle Period subfield of the BSS Max Idle Period element that is sent to that non-AP MLD[16037]. An AP MLD may disassociate a non-AP MLD if:

* the Idle Options subfield of the BSS Max Idle Period element requires protected keepalive frames and no protected frames are received from any non-AP STA affiliated with the non-AP MLD for a duration of the [16098]Max Idle Period.
* the Idle Options subfield allows unprotected or protected keepalive frames and no protected or unprotected frames are received from any non-AP STA affiliated with the non-AP MLD for a duration of the [16098]Max Idle Period.

**35.3.12.4 Traffic indication**

***TGbe editor: Please update the contents of this paragraph in this subclause as shown below:***

[16099]An AP MLD shall buffer an MMPDU (see Table 11-3 (Bufferable/nonbufferable classification of MMPDUs)) that is intended for a non-AP STA affiliated with a non-AP MLD when all non-AP STAs affiliated with the non-AP MLD are in power save mode. In this case, the bit in the partial virtual bitmap of the TIM element that corresponds to the AID of the non-AP MLD shall be set to 1. An AP MLD shall not buffer a TPC Request frame or a Link Measurement Request frame.

**35.3.12.5 WNM sleep mode in multi-link operation**

***TGbe editor: Please update the contents of this paragraph in this subclause as shown below:***

[18168]If an AP MLD received a WNM Sleep Mode Request frame from a non-AP MLD via one of its affiliated non-AP STAs, the AP MLD shall send in response a WNM Sleep Mode Response frame, via one of its affiliated APs operating on a link that is enabled for the non-AP MLD and subject to the power state of the non-AP STA affiliated with the non-AP MLD and operating on that link. An AP MLD may send, via one of its affiliated APs that is operating on an enabled link for the non-AP MLD and subject to the power state of the non-AP STA affiliated with the non-AP MLD and operating on that link, the WNM Sleep Mode Response frame without solicitation upon the AP MLD’s deletion of all traffic filter sets established according to the traffic filtering agreement between the AP MLD and the non-AP MLD (see 9.6.13.20 (WNM Sleep Mode Response frame format)).