IEEE P802.11
Wireless LANs

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| Resolution for CIDs assigned to Abhi – Part 8 |
| Date: June 30th 2023 |
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 Abstract

This submission proposes resolutions for following 12 CIDs received for TGbe LB271:

15133 15478 16976 16977 15594 15676 15677 16790 16566 16567 16568 16569

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Updated resolution for CID 15677

***TGbe editor: Baseline for this document is 11be D3.2***

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.

***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.***

Part 1

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Pg.Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 15133 | Tomoko Adachi | 35.3.21 | 0.00 | The first paragraph in 35.3.21.1 implies that there can be Per-STA Profile subelements in the TDLS Multi-Link element but such case is not described.Allow TDLS direct link over multiple links with simple conditions based on doc.22/1796r0, i.e., limit the links that can be used for direct links the same with those of the associated AP MLD or to a portion of them. If the direct links become an NSTR link pair at either of the non-AP MLDs, rules for the NSTR mobile AP MLD may be applied with some modification (no Beacon frame transmission, but notification of the primary link). Or we may limit the multi-link only when STR link pair is achieved. Defer further enhancements until UHR activity. | As in comment. | **Revised**The comment points several items.For the first item related to inclusion of Per-STA Profile subelement, the contents of the ‘General’ clause including the cited paragraph were modified as a resolution to CID 16975. The changes clarify that for a single link TDLS, only the Common Info field carrying only the AP MLD MAC address is present and the Link Info field is not present.For the second item (related to multi-link TDLS), the group had discussed this during the previous round and concluded that multi-link TDLS may be considered in the next generation.For the third item (related to NSTR handling), since TGbe will not be pursuing multi-link TDLS, the issues pointed by the comment won’t apply.**TGbe editor, please make changes shown in 11-23/0770r4 tagged 16975** |
| 15478 | Xiandong Dong | 35.3.21.2 | 577.28 | It is inefficient for a non-AP MLD to transmit more than one TLDS Discovery Request frame when the non-AP MLD initiates a Discovery operation, especially when the TDLS respondor is a non-AP MLD. | A more efficient discovery operation should be proposed. | **Rejected**The TDLS discovery protocol is not broken. The commenter is proposing an optimization which will likely lead to a complex protocol. Furthermore, this is not going be a common occurrence to have any perceivable impact to the system performance. |
| 16976 | Mark RISON | 35.3.21.2 | 577.10 | "For ease of description in the rest of this subclause,the single link TDLS context is described with respect to a TDLS non-AP STA affiliated with the non-APMLD." is not clear. Single-link TDLS is always in the context of a TDLS non-AP STA affiliated with a non-AP MLD, no? | Delete the cited text | **Rejected**The affiliated non-AP STA that operates on the TDLS direct link transmits frames with TA set to the non-AP MLD MAC address and process frames receives with the RA set to the non-AP MAC address. This different from the behavior of an affiliated non-AP STA when it communicates with the AP. |
| 16977 | Mark RISON | 35.3.21.2 | 577.18 | "Frames that traverse the intermediate AP (MLD) are sent or received by a non-AP STA affiliated with a non-AP MLD. Frames sent over the direct link are sent or received by a TDLS non-AP STA affiliated with thenon-AP MLD." doesn't seem to be stating anything that is obvious and necessary | Delete the cited text | **Rejected**The MAC address used by a TDLS non-AP STA is different from the MAC address used by an affiliated non-AP STA that communicates with an affiliated AP. Therefore, the two sentences are needed. |
| 15594 | Bo Sun | 9.4.2.312.2.3 | 259.33 | the value 0 ,1,3 are defined for "TID-To-Link Mapping Negotiation Support" field,and value 2 is reserved; please exchange the definition for value 2 and 3, and make the value 3 reserved | change the text "The value 2 is reserved. Set to 3 if dot11TIDtoLinkMappingActivated is true and the MLD supports the mapping of each TID to the same or different link set" to "Set to 2 if dot11TIDtoLinkMappingActivated is true and the MLD supports the mapping of each TID to the same or different link set.The value 3 is reserved. " | **Rejected**The comment fails to identify a technical issue. The standard can define behavior for value 2 in the future. |
| 15676 | Yanchao Xu | 35.3.8 | 525.20 | The current BA Agreement on MLO has no special requirements about DELBA/tear down of the BA agreement.The legacy procedure of tear dwon BA agreement can be initiated by either the orginator or recipient. The corresponding DelBA can be sent on any link under MLO, and the DelBA procedure is only one way procedure.This legacy DelBA procedure can cause the Recipient sends the DelBA (e.g due to BA inactivity timer) on link0, while the Originator is transmitting a large AMPDU on link1. The deletion of BA Agreement on Recipient makes Recipient drop the (large) AMPDU on link1. | The legacy DelBA procedure has caused the unexpected drop of MPDUs, which is mainly caused by the short BA inactivity Timeout Value.So instead of changing the legacy DelBA procedure (e.g. add a two-way DelBA handshake as ADDBa Req/Rsp), the simpliest way is to disable the BA inactivity Timeout (by set the BA inactivity Timeout Value to 0) or add note to recommend to use large BA inactivity Timeout Value for the BA Agreement under MLO | **Rejected**The BlockAck Timeout is chosen by the recipient and indicates a time after which the BA session is assumed to be inactive, and as such the recipient can release the memory that was being used by that BA session. So it is beneficial in that front. The issue pointed out by the commenter of a DelBA being sent at about the same time that an A-MPDU was being sent in another link is very low and even if it occurs the originator can still re-transmit the MPDUs that did not make it through via legacy acknowledgment procedures. As for selecting large timeout values, that is up to the recipient, and will be dependent on many other parameters not only the dropping likelihood of certain MPDUs. |
| 15677 | Yanchao Xu | 35.3.8 | 526.25 | The BA Agreement under MLO allows the Recipient to send a BA on link0 to convey the reception status of MPDUs sent by Originator on other links.This can make the BA on link0 contain the (succesful) reception status of sub-MPDU(s) of which the PPDU can be still being on air. i.e. the BA is sending together with an AMPDU is on-going on other links.Usually, the Recipient has two different modules for processing the scoreboard update and the reorder procedure after the reception of BAR (and MPDU). If the Orignator sends a BAR on link0 based on the received BA infor on link0, the Originator's BAR on link0 can have SSN that larger than the SN of MPDUs that are still on air on the other links (e.g link1), which may cause the Recipient drop the received MPDUs on link1, of which the AMPDU/PPDU completes transmission later, due to the different rx time of BAR on link0 and MPDU/PPDU on link1 | The simpliest proposed change is to add requirements about the BAR transmission of Originator under MLO.Within the same paragragh, add illustrations such as, "- the Originator shall consider the SSN of BAR , if there is/are outstanding MPDU(s) on all the available links when Originator sends a BAR frame. - Noteï¼šfor example, the BAR's SSN should not exceed any SN of outstanding MPDU(s) on all the available links" | **Revised**Agree with the comment.**TGbe editor, please add the following NOTE after NOTE 5 in 35.3.8: “NOTE 6 - An originator MLD takes into account the SN of outstanding MPDU(s) on all available links when selecting the value to be carried in the SSN field of a BAR frame.”** |
| 16790 | Mark RISON | 35.3.8 | 0.00 | It is not clear whether/how BA modification is possible | Add material on how to perform BA modification in an ML context | **Rejected**The comment fails to identify a technical issue in the MLO BA procedure. Both MLDs can follow the baseline procedure (i.e., exchange ADDBA Req/Resp frames) for updating the parameters of a BA agreement. |
| 16566 | Arik Klein | 35.3.8.3 | 619.04 | Please clarify in the text of this subclause whether the "aligned schedule" of broadcast TWT is unique for R-TWT that is operated on MLD or applicable for any broadcast TWT that is operated on MLD | If it is applicable only for R-TWT - need to add it specifically in subclause 35.8.3.Otherwise - please remove this subclause to 35.3.24.3 (Broadcast TWT operation) that is specific for MLD operation | **Rejected**The cited text is already part of 35.3.24.3 per 11be D3.2No further changes needed. |
| 16567 | Arik Klein | 35.3.8.3 | 619.06 | Need to add a clear definition to the normative text for aligned schedules, since the current definition that "target wake times of the schedules on the multiple links \*are aligned\*" is too vague. | 1. Consider adding maximal time differentiation between the minimal target wake time and the maximal target wake time of the schedules (on different links of the AP MLD) that can be considered as aligned schedules.2. In addition, consider adding an identifier for all these schedules that can be considered as aligned schedules so it will facilitate the scheduled STA to identify them and easily become a member of one or more these aligned schedules. | **Rejected**The current definition of “aligned schedules” is clear from the context of the related text in the spec. Also, a similar comment was discussed in document 11-23/1125r1, and the group reached consensus on the following definition: “If the subfield is set to 1, it indicates that there is a schedule on other link(s) that is aligned within a 1 TU interval with this the schedule identified by the Broadcast TWT Parameter Set field” |
| 16568 | Arik Klein | 35.3.8.3 | 619.10 | Need to add technical details how TWT scheduled STA affiliated with non-AP MLD can identify the aligned schedules on different links, especially if there are more than a single aligned schedule on the other link | Need to add an identifier for aligned schedules on multiple links so the non-AP STA can quickly become a member of these schedules | **Rejected**The usage of “aligned schedule” is clear from the context of the related text in the spec. Also, in the current 11be spec, the “aligned schedule” uniquely identifies the context of the usage of the term. |
| 16569 | Arik Klein | 35.3.8.3 | 619.11 | Need to clarify that the scheduled STAs affiliated with non-AP MLD can become members of aligned schedules that are on multiple \*setup\* links , since from the current text is seems to be possible on any link of the MLD. | As in comment | **Revised**Agree in principle with the comment. Proposed resolution accounts for the suggested change.**TGbe editor please make changes as shown in 11-23/1098r1** |

* + - 1. **Broadcast TWT operation**

***TGbe editor: please update the paragraph as shown below [CID 16569]***

A TWT scheduling AP affiliated with an AP MLD, while announcing a broadcast TWT schedule in the AP’s BSS, may explicitly indicate whether that schedule is an aligned schedule by setting the Aligned subfield in the corresponding Broadcast TWT Parameter Set field to 1. An aligned schedule is a broadcast TWT schedule that is available across multiple links such that the target wake times of the schedules on the multiple links are aligned. Other TWT parameters of the aligned schedules on those multiple links remain the same as each other.

TWT scheduled STAs affiliated with a non-AP MLD that are interested in joining an existing aligned schedule on multiple setup links may send their requests to join the schedule on those setup links[#16569] separately as specified in 26.8.3.3 (Rules for TWT scheduled STA).

Between an AP MLD and a non-AP MLD associated with the AP MLD, if an individually addressed TWT Information frame for broadcast TWT with All TWT subfield set to 1, which is intended for one STA affiliated with the associated MLD with a setup link, is transmitted to another STA affiliated with the associated MLD with a setup link and an acknowledgement in response to the TWT Information frame is received, then the STA of the intended link shall consider all the broadcast TWT schedules as suspended starting as soon as practical after the TWT Information frame exchange rather than immediately as described in 26.8.4.3 (TWT Information frame exchange for broadcast TWT).

An example of aligned broadcast TWT operation for multiple links is shown in AF.16 (Example of aligned broadcast TWT schedule operation).