IEEE P802.11
Wireless LANs

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| LB266 CR for subclause 35.3.16.8.1  |
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Abstract

This submission proposes resolutions of comments received from TGbe comment collection LB266 based on TGbe D2.0.

12671 10036 13076 11648 12172 12388 13939 11248 13407 13938 10035 14075 12427 12173 12246 (15 CIDs)

Revisions:

* Rev 0: Initial version of the document.
1. **Introduction**

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. The introduction and the explanation of the proposed changes are 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 802.11be 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** | **Clause** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 12671 | 35.3.16.8.3 | 461.06 | Can you clarify how does a non-AP STA affiliated with NSTR non-AP MLD with dot11AAROptionImplemented that is equal to true know that other non-AP STA affiliated with the same non-AP MLD and is operating on the same NSTR link pair needs assistance in frame transmission (so it can request this assistance from the corresponding affiliated AP)? | Add the clarification, as requested in the comment. | Rejected-The commenter fails to identity the technical issue. The clarification belongs to an implementation within an MLD. |
| 10036 | 35.3.16.8.3 | 461.06 | If the EMLSR uses the AP assisted medium sync recovery, when receiveing the group address frame over a link (and blind over the other link), it cannot use the AP assisted medium sync recover as there is no way for the STA to send the AAR control subfield to the AP. Please exclude this case for the AP assisted medium sync recover for EMLSR. | as in comment | Rejected-Assume there is a blindness issue on one link when there is group addressed frame reception on another link; the STA still can send an AAR Control subfield after receiving all group addressed frames.On the other hand, since both group addressed frames and initial control frames are non-HT PPDU, it is straightforward enough to decode it correctly even if the STA is in the listening operation, so there is no blindness issue in this case.  |
| 13076 | 35.3.16.8.3 | 461.06 | If the EMLSR uses the AP assisted medium sync recovery, when receiveing the group address frame over a link (and blind over the other link), it cannot use the AP assisted medium sync recover as there is no way for the STA to send the AAR control subfield to the AP. Please exclude this case for the AP assisted medium sync recover for EMLSR. | as in comment | Rejected-Assume there is a blindness issue on one link when there is group addressed frame reception on another link; the STA still can send an AAR Control subfield after receiving all group addressed frames.On the other hand, since both group addressed frames and initial control frames are non-HT PPDU, it is straightforward enough to decode it correctly even if the STA is in the listening operation, so there is no blindness issue in this case.  |
| 11648 | 35.3.16.8.3 | 461.06 | If the EMLSR uses the AP assisted medium sync recovery, when receiving the group address frame over a link (and blind over the other link), it cannot use the AP assisted medium sync recover as there is no way for the STA to send the AAR control subfield to the AP. Please exclude this case for the AP assisted medium sync recover for EMLSR. | as in comment | Rejected-Assume there is a blindness issue on one link when there is group addressed frame reception on another link; the STA still can send an AAR Control subfield after receiving all group addressed frames.On the other hand, since both group addressed frames and initial control frames are non-HT PPDU, it is straightforward enough to decode it correctly even if the STA is in the listening operation, so there is no blindness issue in this case.  |
| 12172 | 35.3.16.8.3 | 461.18 | Ii is possible that more than one bit is set to 1 in the Assisting AP Link ID Bitmap in the AAR Control subfield. But it is not clear how to use the mechanism. | Clarify how AP send multiple trigger frames. | Revised-If the received AAR Control subfield has more than one bit equal to 1, then the corresponding more then one AP will send a trigger frame independently. An example has been provided to clarify this. Apply the changes marked as #12172 in this document.  |
| 12388 | 35.3.16.8.3 | 461.18 | It would help to have an example with figure to understand the mechanism. | Provide an example with figure to illustrate the mechanism. | Revised-An example has been provided to illustrate this. Apply the changes marked as #12388 in this document. |
| 13939 | 35.3.16.8.3 | 461.18 | Re CID 7577 and 6322 in CC36, By this "should", the AP can always be irresponsible and the mechanism will be in no use. It needs to be a shall. | change "should" to "shall" | Revised-Agree with the comment in principle. Apply the changes marked as #13939 in this document.  |
| 11248 | 35.3.16.8.3 | 461.18 | schedule for a transmission a trigger frame.. This statement needs some correction | correct the line to state -> schedule for a transmission of a Trigger frame to the assisted STA... | Rejected-The statement is correct, as similar wording is used in the baseline. For example, "schedule for transmission a PS-Poll or U-APSD trigger frame" is used on page 4203 line 2 of 802.11REVme draft 1.4 |
| 13407 | 35.3.16.8.3 | 461.05 | The AAR should be also applied to eMLSR/eMLMR. | Fix the issues mentioned in the comment | Revised-Agree with the comment in principle. Apply the changes marked as #13407 in this document.  |
| 13938 | 35.3.16.8.3 | 461.09 | The cases of EMLSR and EMLMR are missing | please complete the missing case | Revised-Agree with the comment in principle. Apply the changes marked as #13938 in this document.  |
| 10035 | 35.3.16.8.3 | 461.06 | The current text defines the AP assisted medium sync recovery for NSTR. We should add EMLSR to use this medium sync recovery procedure. | please add EMLSR to use the AP assisted medium sync recovery | Revised-Agree with the comment in principle. Apply the changes marked as #10035 in this document.  |
| 14075 | 35.3.16.8.3  | 460.60 | When a STA of a non-AP MLD is exchanging frames with an AP affiliated with an AP MLD on one of the EMLSR links, the other STAs affiliated with the same non-AP MLD on the EMLSR links lose medium synchronization. This is similar to the blindness issue of the NSTR non-AP MLD operation. The AP assisted medium synchronization recovery procedure has been specified for non-AP MLD with a NSTR pair in IEEE 802.11be Draft 2.0. But the AP assisted medium synchronization recovery procedure or rules for non-AP MLD in EMLSR mode need to be clarified. | Suggest to specify the AP assisted medium synchronization recovery procedure or rules for non-AP MLD operating in EMLSR mode. | Revised-Agree with the comment in principle. Apply the changes marked as #14075 in this document.  |
| 12427 | 35.3.16.8.2 | 461.05 | Similar to NSTR STA MLD, EMLSR STA MLD also suffers from lost medium synchronization problem and also applies MediumSyncDelay after returning to EMLSR listening operation. AAR can also be applied to EMLSR operation. In case of EMLSR uplink transmission, the current AAR method of NSTR can be applied. In EMLSR downlink reception case, QoS Null with AAR control may be transmitted with BA. | As in comment | Revised-Agree with the comment in principle. Apply the changes marked as #12427 in this document.  |
| 12173 | 35.3.16.8.3 | 461.18 | The description of "AP MLD should schedule" is not clear how AP determines the resource unit and UL\_length in the Trigger frame. So inefficient assignement of resource unit may occur. | Clarify what information STA should(may) send with the AAR Control subfield. | Rejected-The UL\_length in the trigger frame depends on a few factors, such as the received buffer status report from a non-AP MLD. This mechanism is independent from the assisted medium sync recovery procedure. So no extra info is needed. |
| 12246 | 35.3.16.8.3 | 460.59 | The term "AP assisted" is only used to describe the "AP assisted medium synchronization recovery procedure". However, this term is not explained and appears to be redundant. | Change each occurence of "AP assisted medium synchronization recovery procedure" to "AP medium synchronization recovery procedure" throughout the draft. | Rejected-This is not a term. Instead, it is general wording that is used in a similar manner to the Non-AP-STA-initiated TS setup in 802.11 Revme draft 1.4. |

**Discussion:** None.

***TGbe editor: Please modify the subclause as follows***

**35.3.16.8 Medium access recovery procedure**

**35.3.16.8.1 General**

…

When a non-AP MLD is operating in the EMLSR/EMLMR mode, a non-AP STA affiliated with a non-AP MLD that is operating on one of the EMLSR/EMLMR links is considered to have lost medium synchronization if it is not able to perform CCA during frame exchanges that includes the link switch delays between an AP affiliated with an AP MLD and one of the other STAs operating on the other EMLSR/EMLMR links, which are affiliated with the same non-AP MLD. The STA that has lost medium synchronization shall start a MediumSyncDelay timerand begin counting down immediately after returning to the listening operation if the duration of the loss of medium synchronization is longer than aMediumSyncThreshold; otherwise, the STA may not start the MediumSyncDelay timer. (#13407, 13938, 10035, 14075, 12427)

NOTE 2—The link switch delays include the delay switching from the listening operation to the frame exchanges and the delay switching from the frame exchanges to the listening operation.

A STA shall not start a MediumSyncDelay timer unless the STA is one of the following:

—a non-AP STA affiliated with a non-AP MLD operating on an NSTR link pair,

—a non-AP STA affiliated with a non-AP MLD operating on an EMLSR link,

—a non-AP STA affiliated with a non-AP MLD operating on an EMLMR link or (#13407, 13938, 10035, 14075, 12427)

—an AP affiliated with an NSTR mobile AP MLD operating on the nonprimary link of an NSTR link pair.

**35.3.16.8.3 AP assisted medium synchronization recovery procedure**

AP assisted medium synchronization recovery procedure is a service provided by an AP MLD to help a non-AP STA affiliated with a non-AP MLD that has lost medium synchronization to transmit a frame without causing the collision with the existing transmission.

An AP affiliated with an AP MLD with dot11AAROptionImplemented that is equal to true shall set the AAR Support subfield in the MLD Capabilities and Operations field in a Basic Multi-Link element it transmits to 1; otherwise the AP shall set the AAR Support subfield to 0.

A STA affiliated with a non-AP MLD with dot11AAROptionImplemented that is equal to true and that belongs to an NSTR link pair or that operates on an EMLSR/EMLMR link shall transmit the AAR Control subfield in a frame that solicits an immediate response to its associated AP affiliated with an AP MLD if it has received a Basic Multi-Link element from the AP with the AAR Support subfield equal to 1 and an assisted STA that belongs to the NSTR link pair or that operates on another EMLSR/EMLMR link needs assistance in transmitting frames to its associated AP in the other link. (#13407, 13938, 10035, 14075, 12427)

The AAR Control subfield transmitted by the STA shall indicate the link identifier(s) of the other assisting AP(s) affiliated with the same AP MLD operating on the enabled link(s) by setting the corresponding bits to 1.

 Each of the other assisting AP(s) affiliated with the AP MLD that intends to help the assisted STA that is associated with it and affiliated with the non-AP MLD to recover medium synchronization, shall schedule for a transmission a Trigger frame to it (13939) to solicit an UL frame(s) after the AP affiliated with the same AP MLD successfully received the AAR Control subfield in a frame if it does not have frame exchanges already scheduled with another STA. If the non-AP MLD is operating in EMLSR mode, the Trigger frame sent by each of the assisting AP(s) affiliated with the AP MLD to the assisted STA that is associated with it and affiliated with the non-AP MLD shall be an initial control frame (see 35.3.17 (Enhanced multi-link single radio operation)). (#13407, 13938, 10035, 14075, 12427)

NOTE—If the CS Required subfield in a Trigger frame is 1, then the non-AP STA uses CCA-ED threshold as defined in 36.3.20.6 (CCA sensitivity) during the SIFS between the Trigger frame and the PPDU sent in response to the Trigger frame.

A non-AP STA with dot11AAROptionImplemented that is equal to false shall not transmit a frame containing an AAR Control subfield to its associated AP.A non-AP STA shall not transmit a frame containing an AAR Control subfield with a value of 1 in the bit identifying the link identifier of the associated AP.

An AP shall not transmit the AAR Control subfield in a frame to its associated non-AP STAs.

Figure 35-xx (Example of an AP assisted medium synchronization recovery procedure) provides an illustration of the AP assisted medium synchronization recovery procedure, where AP 2 and AP 3 are requested to help STA 1 and STA 2 that have lost medium synchronization to transmit a frame, respectively. In this example, for the non-AP MLD, link 1 and link 2 are an NSTR link pair, link 2 and link 3 are an NSTR link pair, and link 2 and link 3 are a STR link pair. At the beginning, STA 1 transmits Data frames to AP 1, while transmitting the AAR control subfield carried in the Data frames to AP 1, requesting AP 2 and AP 3 to provide the medium synchronization recovery service to help STA 2 and STA 3 transmit uplink frames, respectively. In this case, the bits corresponding to link 2 and link 3 in the AAR Control subfield are set to 1. Because of the interference caused by the transmission from STA 1, STA 2 and STA 3 lose medium synchronization. Then STA 2 and STA 3 start the MediumSyncDelay timer at the end of the transmission of STA 1. After receiving Data frames at AP 1, AP 2 and AP 3 transmit Trigger frames to STA 2 and STA 3, soliciting uplink frames transmission, respectively. Once STA2 and STA3 sucessfully receive these Trigger frames they can reestablish medium synchronisation. (#12172, 12388)



Figure 35-xx**—**Example of an AP assisted medium synchronization recovery procedure