IEEE P802.11  
Wireless LANs

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| CC34 Comment Resolution for EMLSR – Part 1 | | | | |
| Date: 2021-2-19 | | | | |
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Abstract

This submission proposes comment resolutions for the following CIDs related to EMLSR mode enable/disable and power management received in CC34:

* 2195
* 2333
* 2552
* 2216
* 2334
* 2743
* 3401

Revisions:

* Rev 0: Initial version of the document.

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| **CID** | **Commenter** | **Clause Number** | **Page.**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 2195 | Li-Hsiang Sun | 35.3.14 | 145.01 | "The non-AP MLD shall be able to listen on the enabled links, by having its affiliated STA(s) corresponding to those links in the awake state." This sentence seems to suggest all enabled links to be in awake state | Change to "The non-AP MLD shall be able to listen on the enabled links that are in awake state" | Rejected.  Since the EMLSR operation is for a single-radio MLD, which can only exchange frames on one link at a time, there is no such case where a subset of the enabled links are in the EMLSR mode and the rest of the enabled links independently operate in the PS mode which can switch between awake and doze. |
| 2333 | Minyoung Park | 35.3.14 | 144.58 | A signaling mechanism that enables and disables the EMLSR mode is missing. | Add a signaling that enables and disables the EMLSR mode. Define an Action frame with a control field that enables/disables the EMLSR mode. A non-AP MLD that supports the EMLSR mode transmits the Action frame with the control field set to a certain value to enable the EMLSR mode and set to another value to disable the EMLSR mode. | Revised.  A signaling for enabling and disabling the EMLSR mode is defined.  TGbe editor to make the changes with the CID tag (#2333) in doc.: IEEE 802.11-21/283r0  [https://mentor.ieee.org/802.11/dcn/21/11-21-0283-00-00be-cc34-cr-emlsr-part1.docx] |
| 2552 | Robert Stacey | 35.3.14 | 144.51 | "A non-AP MLD may operate in the EMLSR mode..." | Sure it can, but a non-AP MLD doesn't just decide to start operating in this mode and off it goes. There is a handshake with the AP MLD -- both have to know that the non-AP MLD Is operating in this mode. Describe this mode in terms of the handshake. Something like: "A non-AP MLD operates in EMLSR mode if it sends blah blah in the blah blah to the AP". I would not use the term mode by rather define it as a type of STA: an EMLSR non-AP MLD. Becomes "An EMLSR non-AP MLD is a non-AP MLD that sends a blah to the an AP MLD during blah handshake". Then the requirement writing becomes: "An EMLSR non-AP STA shall do this..." instead of a non-AP MLD in EMLSR mode shall do this..." And while I'm on this train of thought... it should be "ESR non-AP MLD" since the ML is aready in the MLD.  Similarly for 145.39 and the "EMR non-AP MLD" | Revised.  A signaling for enabling and disabling the EMLSR mode is defined.  TGbe editor to make the changes with the CID tag (#2552) in doc.: IEEE 802.11-21/283r0  [https://mentor.ieee.org/802.11/dcn/21/11-21-0283-00-00be-cc34-cr-emlsr-part1.docx] |
| 2334 | Minyoung Park | 35.3.14 | 144.58 | It is unclear how the power states of the STAs of the enabled links of the non-AP MLD are set after the EMLSR mode is enabled or disabled. A non-AP MLD that opreates in the EMLSR mode is a single-radio MLD which can be in awake state on one link at a time. Before operating in the EMLSR mode, the non-AP MLD is awake on one of the enabled links. When the non-AP MLD enables the EMLSR mode, the other enabled links have to be in awake state for the listening operation. However, since the non-AP MLD is a single-radio MLD, it cannot set each enabled link's power state to awake by transmitting a frame with the PM bit set to 0 on each enabled link sequentially. Also when the non-AP MLD wants to enter PS mode and doze state on all the enabled links, setting each STA's power management mode and power state to PS mode/doze state by transmitting a frame with PM bit =1 on each link sequentially could take a long delay esp. for a busy network environment, which could cause an issue to the overall operation of the non-AP MLD. | Add the following two paragraphes after P145L35. "-- A STA of the non-AP MLD may transmit a frame with the Power Management subfield set to 1 on one of the enabled links. After successful transmission of the frame, the affiliated STAs of the non-AP MLD corresponding to the enabled links are in PS mode and in doze state. The STAs on the other links shall transition to PS mode and to doze state the transition delay after the end of the frame transmission. The transition delay is indicated by its associated AP MLD. -- A STA of the non-AP MLD may transmit a frame with the Power Management subfield set to 0 on one of the enabled links. After successful transmission of the frame, the affiliated STAs of the non-AP MLD corresponding to the enabled links are in active mode and in awake state." | Revised.  The EMLSR operation with the power management is added.  TGbe editor to make the changes with the CID tag (#2334) in doc.: IEEE 802.11-21/283r0  [https://mentor.ieee.org/802.11/dcn/21/11-21-0283-00-00be-cc34-cr-emlsr-part1.docx] |
| 2216 | Liwen Chu | 35.3 | 125.51 | The TWT, power save etc. for enhanced single radio mode is missing. | Add the related rules | Revised.  The EMLSR operation with the power management is added.  TGbe editor to make the changes with the CID tag (#2216) in doc.: IEEE 802.11-21/283r0  [https://mentor.ieee.org/802.11/dcn/21/11-21-0283-00-00be-cc34-cr-emlsr-part1.docx] |
| 2743 | Sanghyun Kim | 35.3.14 | 145.35 | There might be some accompanying procedures according to the mode transition.  Two things in the below are missing: 1) Transition method to EMLSR mode 2) Effect of the mode transition to the other MLO features, such as TID-to-Link mapping. (TID-to-Link mapping may not work for the non-AP MLD in EMLSR mode because the MLD in EMLSR mode cannot utilize each link independently.) | Add the missing parts as in the comment. | Revised.  1) A transition method to the EMLSR mode has been defined.  2) Since the EMLSR mode is for a single-radio MLD, if the TID-link mapping is used by a single-radio MLD, the effect should be the same whether the EMLSR mode is used or not.  TGbe editor to make the changes with the CID tag (#2743) in doc.: IEEE 802.11-21/283r0  [https://mentor.ieee.org/802.11/dcn/21/11-21-0283-00-00be-cc34-cr-emlsr-part1.docx] |
| 3401 | Zhou Lan | 35.3.14 | 144.49 | Please clarify the initial power mode of the STAs under a EMLSR operation | As stated in the comment | Revised.  The initial power state after enabling the EMLSR mode is added.  TGbe editor to make the changes with the CID tag (#3401) in doc.: IEEE 802.11-21/283r0  [https://mentor.ieee.org/802.11/dcn/21/11-21-0283-00-00be-cc34-cr-emlsr-part1.docx] |

**TGbe Editor to make the following changes in Subclause 35.3.14:**

**35.3.14 Enhanced multi-link single radio operation**

A non-AP MLD may operate in the EMLSR mode on the enabled links between the non-AP MLD and its associated AP MLD.

***Editor’s Note: Per the authors of 20/1291r12, the name of the EMLSR mode is TBD.***

An MLD with dot11EHTEMLSROptionImplemented equal to true shall set the EMLSR mode subfield of the Common Info field of the Basic variant Multi-Link element to 1; otherwise, the MLD shall set the EMLSR mode subfield to 0.

A non-AP MLD with dot11EHTEMLSROptionImplemented equal to true operates in the EMLSR mode after successful transmission of an EML Operating Mode Notification frame with the EMLSR Mode subfield of the EML Control field of the frame set to 1. (#2333, 2743, 2552) After successful transmission of the frame with the Power Management subfield set to 0, the affiliated STAs of the non-AP MLD corresponding to the enabled links are in active mode and in awake state. (#2334, 2216, 3401)

A non-AP MLD with dot11EHTEMLSROptionImplemented equal to true disables the EMLSR mode after successful transmission of an EML Operating Mode Notification frame with the EMLSR Mode subfield of the EML Control field of the frame set to 0. (#2333, 2743, 2552) After the successful transmission of the frame on one of the enabled links, the STAs on the other enabled links affiliated with the non-AP MLD shall transition to PS mode and to doze state. The STAs on the other links shall transition to PS mode and to doze state a transition delay after the end of the frame transmission. The transition delay is indicated by its associated AP MLD. (#2334, 2216)

When a non-AP MLD is operating in the EMLSR mode with an AP MLD supporting the EMLSR mode the following applies:

— The non-AP MLD shall be able to listen on the enabled links, by having its affiliated STA(s) corresponding to those links in the awake state. The listening operation includes CCA and receiving the initial Control frame of a frame exchange sequence that is initiated by an AP MLD.

…

— A STA of the non-AP MLD that is in active mode may transmit a frame with the Power Management subfield set to 1 on one of the enabled links. After successful transmission of the frame, the affiliated STAs of the non-AP MLD corresponding to the enabled links are in PS mode and in doze state. The STAs on the other links shall transition to PS mode and to doze state the transition delay after the end of the frame transmission. (#2334, 2216)

— A STA of the non-AP MLD that is in PS mode may transmit a frame with the Power Management subfield set to 0 on one of the enabled links. After successful transmission of the frame, the affiliated STAs of the non-AP MLD corresponding to the enabled links are in active mode and in awake state. (#2334, 2216)