IEEE P802.11
Wireless LANs

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| EMLSR link change with AP MLD's link enablement/disablement operation |
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Abstract

This submission proposes to resolve issue of EMLSR link change operation related to link disablement/enablement operation (CID 16310).

R0: Initial version.

R1: Modified discussion and proposed text.

R2: Corrected typo and modified discussion.

## Related Comment

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| **CID** | **Commeter** | **Subclause** | **Page.****Line** | **Comment** | **Proposed Change** | **Resolution** |
| 16310 | Juseong Moon | 35.3.7.3.2 | 523.54 | When a link is disbled/enabled by an AP MLD, EMLSR/EMLMR operation of associated non-AP MLD related to the disabled/enabled link shall be clarifyed. When one or more links in the multi-link are disabled, the EMLSR/EMLMR operation of the non-AP MLD that is related to the disabled link(s) can be automatically modified or disabled. Alternatively, the non-AP MLD can transmit an EML OMN frame to modify or disable the EMLSR/EMLMR operation. Similarly, when a link is re-enabled, the non-AP MLD's EMLSR/EMLMR operation can be automatically enabled or modified, or the non-AP MLD can transmit an EML OMN frame to enable or modify the EMLSR/EMLMR operation. | Please clarify EMLSR/EMLMR operation that may be affected by link disablement/enablement. | Revised:Agree with the principle.There was the similar comment and discussions in the group, but the group could not reach a consensus because the situation of only one enabled link among the EMLSR links can be beneficial for power saving. However, there is still inefficiency of initial Control frame transmission procedure. To mitigate inefficiency without harming power saving, we have added dynamic SMPS operation when only one EMLSR link is enabled.**TGbe editor: Please make the changes tagged with (#16310)** |

## Discussions

* In this document, the operation of the non-AP MLD is discussed when the non-AP MLD has only one available EMLSR link.
* If some of link(s) of EMLSR link are disabled and only one EMLSR link is available, we can give some options for a non-AP MLD which is operating in the EMLSR mode with only one EMLSR link:
	+ Option 1. Maintaining EMLSR operation: operation of the current draft
	+ Option 2. Disabling EMLSR: can be achieved by transmitting EML OMN
	+ Option 3. Enabling Dynamic SMPS operation: currently not allowed in EMLSR mode
* The option 1 can offer power efficiency to a non-AP MLD, but an AP MLD shall transmit an initial Control frame even if only one EMLSR link is available. Although this operation can improve power efficiency of the non-AP MLD, the initial Control frame transmission sequence is an overhead.
* The option 2 can reduce overhead of an initial Control frame. However, it has no power saving effect. Moreover, EML OMN frame shall be transmitted in order to disable EMLSR mode.
* The option 3 can reduce overhead of an initial Control frame. Also, it has power saving effect from the dynaminc SMPS operation. However, the current draft does not allow this option.
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* Because the option 3 can reduce the overhead of the initial Control frame, by allowing dynamic SMPS operation in case of one available EMLSR link, both power efficiency and overhead reduction can be achieved. In this document, enabling dynamic SMPS operation is proposed when only one EMLSR link is enabled.



* If the link 1 is disabled by an AP MLD, its associated non-AP MLD 1 which is operating in the EMLSR mode can enable the SMPS and suspend the EMLSR operation in the link 2, until the link 1 is re-enabled. When the SMPS is enabled in link 2, the STA 2 affiliated with non-AP MLD 1 can receive its frame(s) without an initial Control frame. Similarly, the AP 2 can transmit its frame(s) to the STA 2 without an initial Control frame.
* When the link 1 is re-enabled, the STA MLD1 shall disable SMPS in the link 2. The STA MLD 1 shall perform the EMLSR operation in the link 1 and the link 2.
* This operation can avoid inefficiency of initial Control frame transmission procedure. A non-AP MLD operating in EMLSR mode can improve its utilization without harming its power efficiency.

## Proposed Changes to 11be Draft 3.1

35.3.17 Enhanced multi-link single radio operation

***TGbe editor: make the following changes at 570L19 of 11be draft 3.1:***

When a non-AP MLD is operating in EMLSR mode on the EMLSR links, (#16310) and only one link is enabled among the EMLSR links, the non-AP STA can operate in dynamic SM power save mode (11.2.6 (SM power save)) and suspend the EMLSR operation on the link until two or more EMLSR links are (re)enabled.

(#16310) Otherwise, the non-AP STAs operating on the EMLSR links and affiliated with the non-AP MLD shall not operate in dynamic SM power save mode (#16310) on the EMLSR links.