IEEE P802.11
Wireless LANs

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| MLO Multi-Link Start-time Sync PPDUs |
| Date: 2020-11-11 |
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Abstract

This document contains draft text for MLO Multi-Link start-time sync PPDUs, for inclusion into TGbe draft D0.2.

Revisions:

* Rev 0: Initial version of the document.

The texts is prepared for the following motions.

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| **Layer** | **SFD Topic** | **POC** | **TTT** | **R1/R2** | **Notes** |
| MAC | MLO-Multi-link channel access: Synch Start of PPDU | Duncan Ho | Yongho Seok, Yunbo Li, Insun Jang, Matthew Fischer, Akhmetov Dmitry, Minyoung Park, Liwen Chu, Dibakar Das, Jarkko Kneckt, Chunyu Hu, Tomo Adachi, Jeongki Kim, NEZOU Patrice, Sharan Naribole, Yonggang Fang, Zhou Lan, Akhmetov Dmitry, PEYUSH Agarwal, Liuming Lu, Ryuichi Hirata Sanghyun Kim,Xin Zuo, Sebastian Max, Laurent Cariou, Jonghun Han, Youhan Kim, John Yi, Hanseul Hong, Rana Abdelaal | R1 | Motion 135, #SP240Motion 142, #SP310 |

A non-STR MLD that intends to align the start time of the PPDUs sent on more than one link shall ensure that EDCA count down procedure is completed on all the links.

* NOTE 1 – The above restriction only applies to the case when the non-STR MLD is the TXOP initiator.
* NOTE 2 – Whether to extend this mechanism to STR MLD is TBD.
* NOTE 3 – This is an R1 feature.

[Motion 135, #SP240, [25] and [240]]

An STA that is affiliated with a non-STR MLD shall follow the channel access procedure described below.

1. The STA may initiate transmission on a link when the medium is idle and one of the following conditions is met:
2. The backoff counter of the STA reaches zero on a slot boundary of that link.
3. The backoff counter of the STA is already zero, and the backoff counter of another STA of the affiliated MLD reaches zero on a slot boundary of the link that the other STA operates.
4. When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero.
5. If the backoff counter of the STA has already reached zero, it may perform a new backoff procedure. CW[AC] and QSRC[AC] is left unchanged.

[Motion 142, #SP310, [23] and [241]]

**Proposed spec text:**

The baseline for this text is 802.11 REVmd draft 3.4 and 802.11ax D6.1.

***TGbe editor: Add new a subclause 33.3.12.6 (PPDU start time alignment) under clause 33.3.12 as follows:***

**33.3.12.6 PPDU start time alignment**

In this subclause “simultaneous transmission” refers to the transmission of multiple PPDUs over multiple links, wherein each PPDU is transmitted over a single link, and the transmissions of these PPDUs overlap, at least in part, in time.

Simultaneous PPDU transmission helps reducing self-interference that might be generated by the STAs that are affiliated with the same non-STR non-AP MLD. Alignment of the start times of these PPDUs additionally helps the STAs to count down in their respective links without any impact from the self-induced interference. If a STA affiliated with the non-STR non-AP MLD initiates the transmission of a PPDU in a link and a second STA affiliated with the non-STR non-AP MLD has not initiated its transmission of a PPDU, then the second STA will not be able decrement its backoff counter since the physical CS will indicate a busy state due to the cross-interference causes by the first STA affiliated with the same non-STR non-AP MLD.

A non-STR non-AP MLD contending for the WM to become a TXOP holder and that intends to align the start times of the PPDUs that are scheduled for transmission on more than one link shall ensure that the EDCA count down procedure is completed in all the links.

NOTE 1—The backoff counters for each link count down as specified in 10.23.2.4 (Obtaining an EDCA TXOP).

NOTE 2—Whether to extend this mechanism to STR MLD is TBD.

A STA that is affiliated with a non-STR non-AP MLD shall follow the channel access procedure described below:

* The STA may initiate transmission on a link when the medium is idle and one of the following conditions is met:
* The backoff counter of the STA reaches zero on a slot boundary of that link.
* The backoff counter of the STA is already zero, and the backoff counter of another STA of the affiliated MLD reaches zero on a slot boundary of the link that the other STA operates.
* When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero.
* If the backoff counter of the STA has already reached zero, it may perform a new backoff procedure. CW[AC] and QSRC[AC] are left unchanged.

**Straw Poll: Do you support to incorporate the proposed draft text in this document 11-20/1910r0 to the TGbe Draft 0.2?**

**Result: Yes/No/Abstain**