IEEE P802.11
Wireless LANs

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| CR for Error Recovery of NSTR MLD  |
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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.

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| **CID** | **Commenter** | **Clause**  | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 8196 | Yunbo Li | 35.3.14.x | 274.18 | There is a passed Motion (Motion 146, #SP346) hasn't convert into spec text. It is about error recovery when the TXOP holder STAs on a NSTR link pair of a MLD. | the solution was provided in doc 11-21/826, I volunter to continue to resove this CID. | RevisedPIFS Error recovery procedure for NSTR MLD is added accordingly base on Motion 146, #SP346. TGbe editor to make the changes shown in doc 21/1329r1 |
| 7887 | Yongho Seok | 10.23.2.8 | 180.16 | PIFS recovery procedure of the non-STR MLD should be modififed to avoid the IDC interference. | As in the comment. | RevisedPIFS Error recovery procedure for NSTR MLD is added accordingly base on Motion 146, #SP346.  TGbe editor to make the changes shown in doc 21/1329r1 |

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

*In R1, after two PPDUs with end time alignment (and the PPDUs carrying the expected response frames are also with end time alignment) are transmitted by a NSTR MLD on link 1 and link 2 respectively, STA 1 affiliated with this NSTR MLD may use an IFS greater than SIFS between the ending time of PPDU carrying the successful response frame and a following PPDU within a TXOP on link 1 when PHY-RXSTART.indication is received but FCS is not correct for response frame on link 2.*

* + *STA 1 shall transmit the following PPDU only if the ED CS mechanism indicates that the medium is idle;*
	+ *The concrete value for the IFS greater than SIFS is TBD, with an upper limit of PIFS;*
	+ *The response frames are frames sent from STAs affiliated with the peer MLD in the TXOP in response to the frames carried in the previous PPDUs.*
	+ *[Motion 146, #SP346, [30] and [263]]*

Discussion:

When a NSTR MLD transmit two PPDUs with ending time alignment on a NSTR link pair, if at least one of of the response of the two PPDUs is not correctly received, the following should be used.

For the link that the response frame is ended earlier,

* if the response is correctly received (and the response frame on another link is failed), PIFS should be used so the IFS on another link could be more closer to PIFS;
* if the response is not correctly received, PIFS should be used according to exsiting rule;

In conclusion, for the link that response frame is ended earlier, PIFS should be used.

For the link that the response frame is ended later, if the response is correctly recived, an IFS between [SIFS PIFS] can be used.

For the link that the response frame is ended later, if the response is not correctly recived, an IFS between [PIFS-4us PIFS] is good enough to cover all possible cases. The reason that the IFS is shorter than PIFS is needed is that the difference between the ending time of response frame may be 8us, while the RXTXTurnaroundTime before PPDU transmission is 4us. So an IFS shorter than PIFS may be needed when the response frames are not correctly received both links.

More detailed analysis can be found in doc 11/21-0062r1.



Considering that crossing link information exchange delay will be different in different implementions a more practical solution is also provided which relaxes the requirement of cross link information exchange delay, but it has higher granularities for the PPDU end time alignment (from <=8 us to <=4 us).

1. **Proposed spec text**

***TGbe editor: add the following subclause after 35.3.13.6(Start time sync PPDUs medium access)***

**35.3.13.7 Error recovery on a NSTR link pair within PIFS**

After two PPDUs with end time alignment (and the PPDUs carrying the expected response frames also have end time alignment) are transmitted by each STA affiliated with an MLD on two links that belong to a NSTR link pair of the MLD, if the two STAs intends to transmit more PPDUs on both links in their respective TXOPs, when a failure happens on at least one of the two links, the MLD conducts the procedures described in this sub-clause.

If the MLD ensures that the difference between the end times of the two PPDUs carrying the expected response frames is less than or equal to 4us, the MLD may use either SIFS or PIFS between the end time of the PPDU carrying the response frame and the next PPDU sent in the same TXOP on the link where the response frame is received correctly, regardless of the PPDU receive status of the other link of the NSTR link pair.

NOTE 1 -- The value of 4 μs is derived from aRxTxTurnaroundTime used in 35.3.15.5 (PPDU end time alignment).

NOTE 2 – It is stricter to maintain the difference between the end times of the two PPDUs carrying the expected response frame be less than or equal to 4 μs, compare with the requirement of PPDU end time alignment in 35.3.15.5 (PPDU end time alignment).

If the MLD ensures that the difference between the end times of the two PPDUs carrying the expected response frames is less than or equal to 8 μs (see 35.3.15.5 (PPDU end time alignment)), after two PPDUs with end time alignment (and the PPDUs carrying the expected response frames also have end time alignment) are transmitted by STAs affilicatd with the MLD on two links that belongs to a NSTR link pair of the MLD, if PHY-RXSTART.indications are received on both links, but the response frames contained in the corresponding PPDUs are not successfully received in at least one of the links of the NSTR link pair, then:

* On the link that the response frame ends last, if the response frame is successfully received, the time from the end of the PPDU carrying the response frame to the next PPDU sent in the same TXOP should be larger than or equal to SIFS and smaller than or equal to PIFS;
* On the link that the response frame ends last, if the response frame is not successfully received (i.e., FCS fails), the time from the end of the PPDU carrying the response frame to the next PPDU sent in the same TXOP should be larger than or equal to PIFS-4 us and smaller than or equal to PIFS;
* On the link that the response frame ends first, the time from the end of the PPDU carrying the response frame to the next PPDU sent in the same TXOP should be PIFS.

If the time from the end of the received PPDU carrying the response frame to the next PPDU sent in the same TXOP is larger than SIFS and less than PIFS, then the STA affiliated with the MLD shall ensure that the medium is idle through an ED-based CCA before the transmission of the next PPDU.

***End of change***