REQUESTED REVISION:

STANDARD: IEEE Std 802.3-1998
CLAUSE NUMBER: 28.3.1, 28.3.4 and Figure 28-16
CLAUSE TITLE: State diagram variables and State diagrams

PROPOSED REVISION TEXT:

Use the np_rx variable from clause 37.

In Figure 28-16:

In the COMPLETE ACKNOWLEDGE state, add:

np_rx <= rx_link_code_word[NP].

In the transition from COMPLETE ACKNOWLEDGE to FLP LINK GOOD CHECK, replace:

rx_link_code_word[NP]=0 with np_rx=0.

In the transition from COMPLETE ACKNOWLEDGE to NEXT PAGE WAIT, replace:

rx_link_code_word[NP]=1 with np_rx=1.

Add to 28.3.1 the definition of np_rx:

np_rx

Flag to hold the value of rx_link_code_word[NP] upon entry to the COMPLETE ACKNOWLEDGE state. This value is associated with the value of rx_link_code_word[NP] when acknowledge_match was last set.

Values: ZERO; The local device np_rx bit equals logic zero.
        ONE; The local device np_rx bit equals logic one.

RATIONALE FOR REVISION:

In figure 28-16, the exit condition from COMPLETE ACKNOWLEDGE to FLP LINK GOOD CHECK contains tx_link_code_word[NP]=0 * rx_link_code_word[NP]=0. This can cause a device involved in a next page exchange to prematurely branch from COMPLETE ACKNOWLEDGE to the FLP LINK GOOD CHECK state, instead of properly proceeding to the NEXT PAGE WAIT state.

Example: Station A is going through a Next Page exchange with station B. Station A and station B are in the COMPLETE ACKNOWLEDGE state.

Station B has more pages to exchange than station A. Station A completed sending its next pages and is now sending NULL pages with NP=0. In the case where station B has more Next Pages to send, tx_link_code_word[NP]=1 * rx_link_code_word[NP]=0. Thus station A has tx_link_code_word[NP]=0 * rx_link_code_word[NP]=1. Both stations have mr_np_able=true * mr_lp_np_able=true.
Station B now transitions to NEXT PAGE WAIT first and starts sending its last next page, setting tx_link_code_word[NP]=0. Because station A is still in COMPLETE ACKNOWLEDGE, it should follow station B through this last Next Page exchange, but it is now receiving FLPs that set rx_link_code_word[NP]=0.

This completes the exit conditions and station A properly transitions to FLP LINK GOOD CHECK. Since station B receives flp_receive_idle=true it transitions to TRANSMIT DISABLE and then to ABILITY DETECT. Station A does not receive a link and sets link_status_[HCD]=FAIL and thus transitions to TRANSMIT DISABLE and back to ABILITY DETECT after link_fail_inhibit_timer and break_link_timer.

Although both stations are compliant, they can not complete the negotiation and end up back in the ABILITY DETECT state.

IMPACT ON EXISTING NETWORKS:

The standard defines incorrect behavior and _every_ existing PHY manufacturer is well aware of the issues and in all(#) cases works the way they "should" and not the way the standard says they "shall".

Please attach supporting material, if any
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For information about this Revision Request see -
http://www.ieee802.org/3/maint/requests/revision_history.html#REQ1040