D-PLCA Comment #47
Blocking Detection Of Own Transmitted Beacons

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Introduction

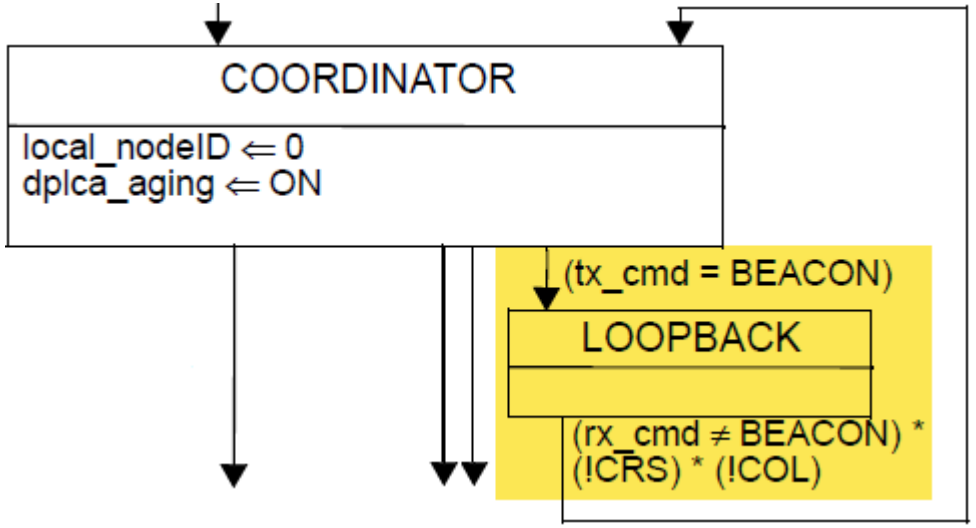
- **D-PLCA enables nodes may self elect as the coordinator, if allowed, when no BEACONs are heard**
  - Allows for plug-and-play self-configuration
  - Allows for a new coordinator to “step in” if the original coordinator fails
- **When the D-PLCA coordinator hears a BEACON on the line, it will automatically re-configure as a Follower with a non-zero local_nodeID by selecting an unused Transmit Opportunity**

Problem

- **As identified by David Law during the January 2025 Interim meeting (Draft 2.0 comment #333), Clause 147 and 188 PHYs are defined to loop back from the transmit MII path to the receive MII path.**
  - When coordinator_role_allowed is TRUE, the D-PLCA node may become a coordinator and begin transmitting BEACONs
  - Transmitted BEACONs are looped back to MII setting rx_cmd = BEACON causing the coordinator to switch out of coordinator mode and into follower node.

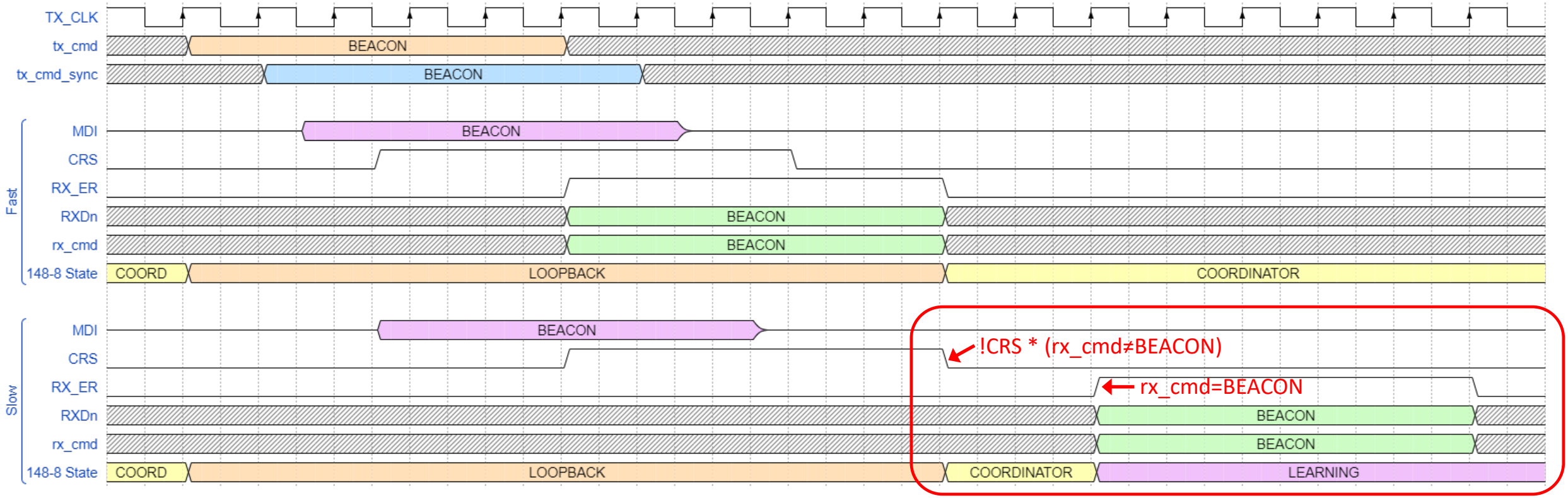
D2.1 Comment #333 Resolution

- **Resolution for D2.1 from the January Interim**
  - When a beacon is transmitted (tx_cmd=BEACON), exit COORDINATOR for LOOPBACK.
  - Return to COORDINATOR state when reception of our own beacon is finished (rx_cmd≠BEACON) … and no collision or carrier sense



(Only the relevant portion of the D-PLCA Control State Diagram (Figure 148-8) shown)

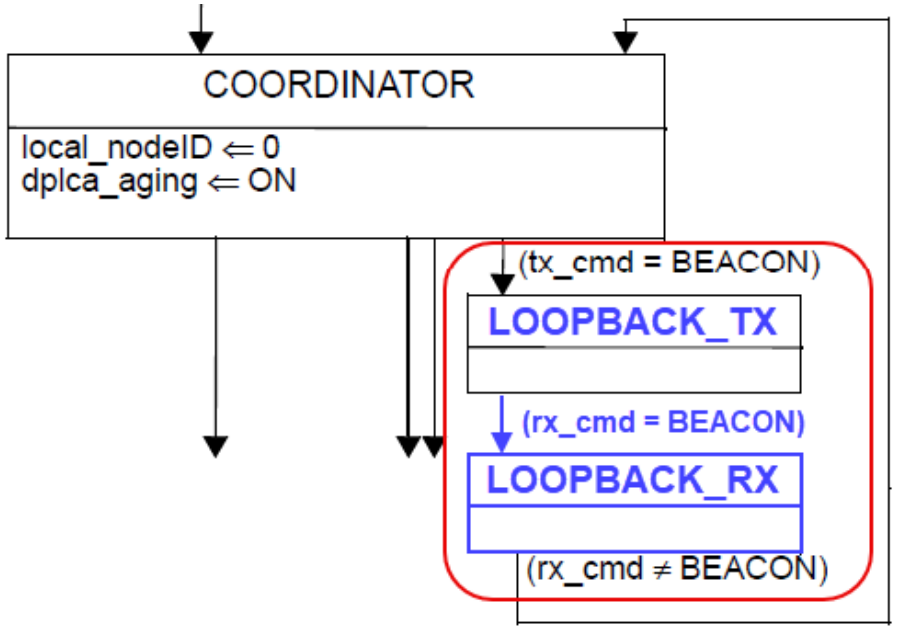
Timing of tx_cmd and rx_cmd



- **Given the delay constraints in Clauses 147 and 188, the timing of rx_cmd and CRS from tx_cmd may vary significantly.**
- **At the slow end of the constraints, the current algorithm to block loopback reception of transmitted BEACONs will not work.**
  - Carrier sense goes away before the BEACON is decoded and placed on the MII prematurely moving from LOOPBACK back into COORDINATOR
  - The BEACON is then decoded and on the MII (rx_cmd=BEACON) causing incorrect transition from COORDINATOR to LEARNING

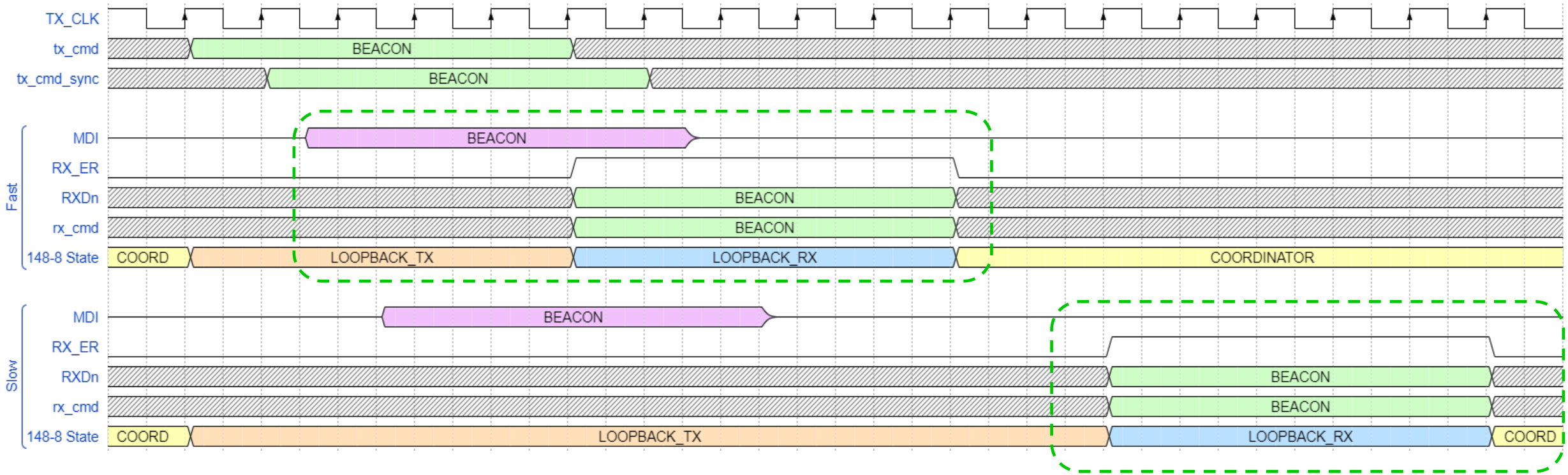
Proposed solution

- **Use two loopback states:**
  - The current loopback state is renamed LOOPBACK_TX
    - Entered when a BEACON is being transmitted (tx_cmd=BEACON)
  - The new, second loopback state is LOOPBACK_RX
    - Entered when the loopback BEACON is being detected (rx_cmd=BEACON)
    - Exited to COORDINATOR when the loopback BEACON is no longer detected (rx_cmd≠BEACON)



(Only the relevant portion of the D-PLCA Control State Diagram (Figure 148-8) shown)

Proposed solution - timing

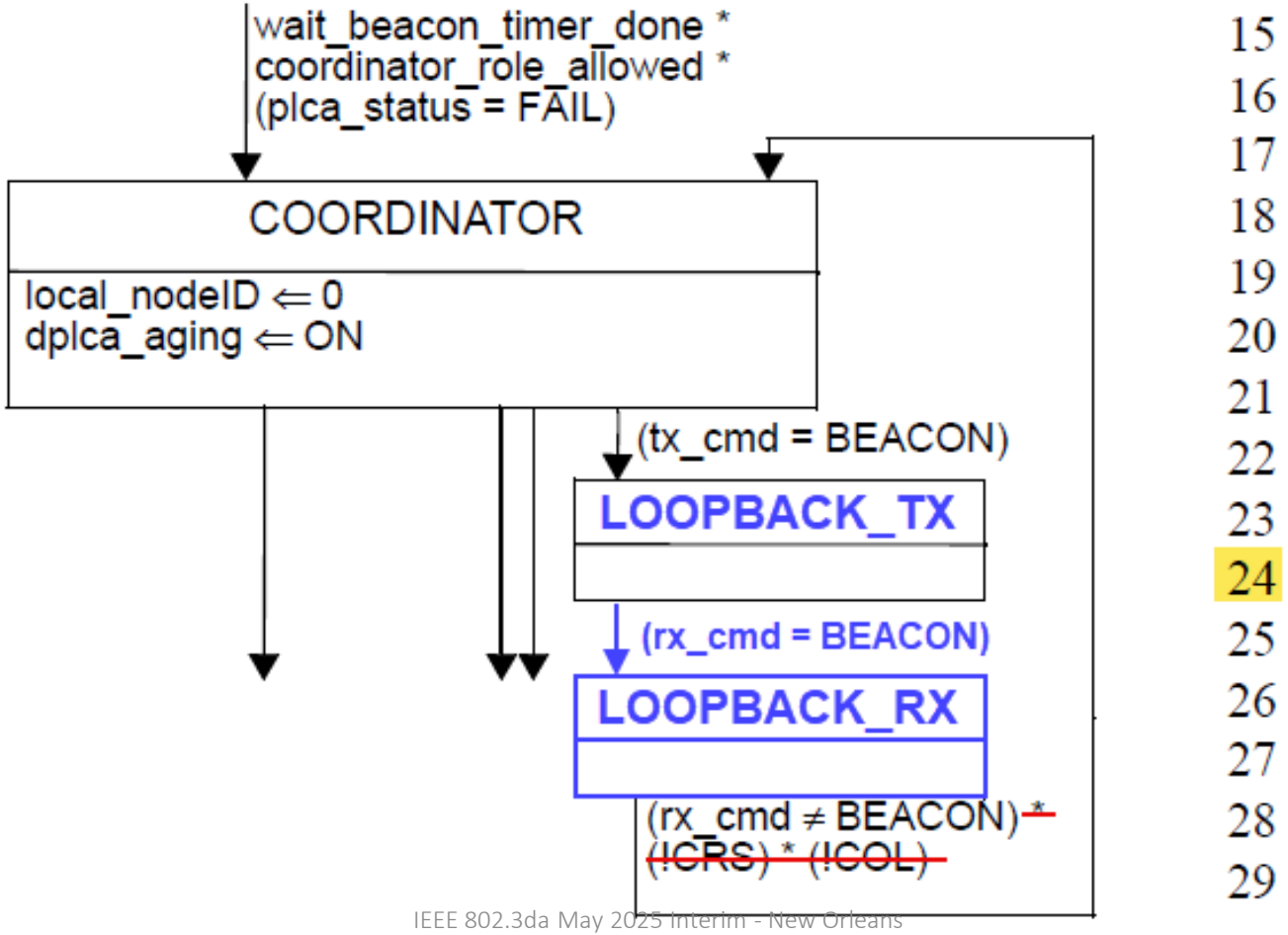


- **Once command to transmit a BEACON starts, enter the LOOPBACK_TX state**
- **Remain in LOOPBACK_TX until the loopback BEACON is detected**
- **Enter and remain in the LOOPBACK_RX state until end of loopback BEACON detection**
- **Once end of the loopback BEACON detection has ended, return to the COORDINATOR state**

Editing Instructions - 1

- **148.4.7.5 (P79 L22) Update Fig 148-8 D-PLCA Control State Diagram**

  (Only the COORDINATOR state and new/changed states are shown. All other portions have been cropped for brevity.)



15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

Editing Instructions - 2

- **148.4.7.2 (P76 L9) Delete COL from D-PLCA variables**
- **148.4.7.2 (P76 L18) Remove CRS from D-PLCA variables**

148.4.7.2 D-PLCA variables

~~COL~~

~~The MII signal COL (see 22.2.2.12).~~
~~Values: TRUE or FALSE~~

coordinator_role_allowed

This variable controls whether the local node is allowed to take the coordinator role (local_nodeID = 0) during the D-PLCA node assignment procedure. This variable maps on the aDPLCACoordinatorRoleAllowed attribute in 30.16.1.1.10.
Values: TRUE or FALSE

~~CRS~~

~~The MII signal CRS (see 22.2.2.11).~~
~~Values: TRUE or FALSE~~

dplca_aging

This variable controls the state of the D-PLCA aging state diagram.
Values: ON or OFF

Thank You

Questions?