Comment
I-93 – TX BEACON Loopback Lockup

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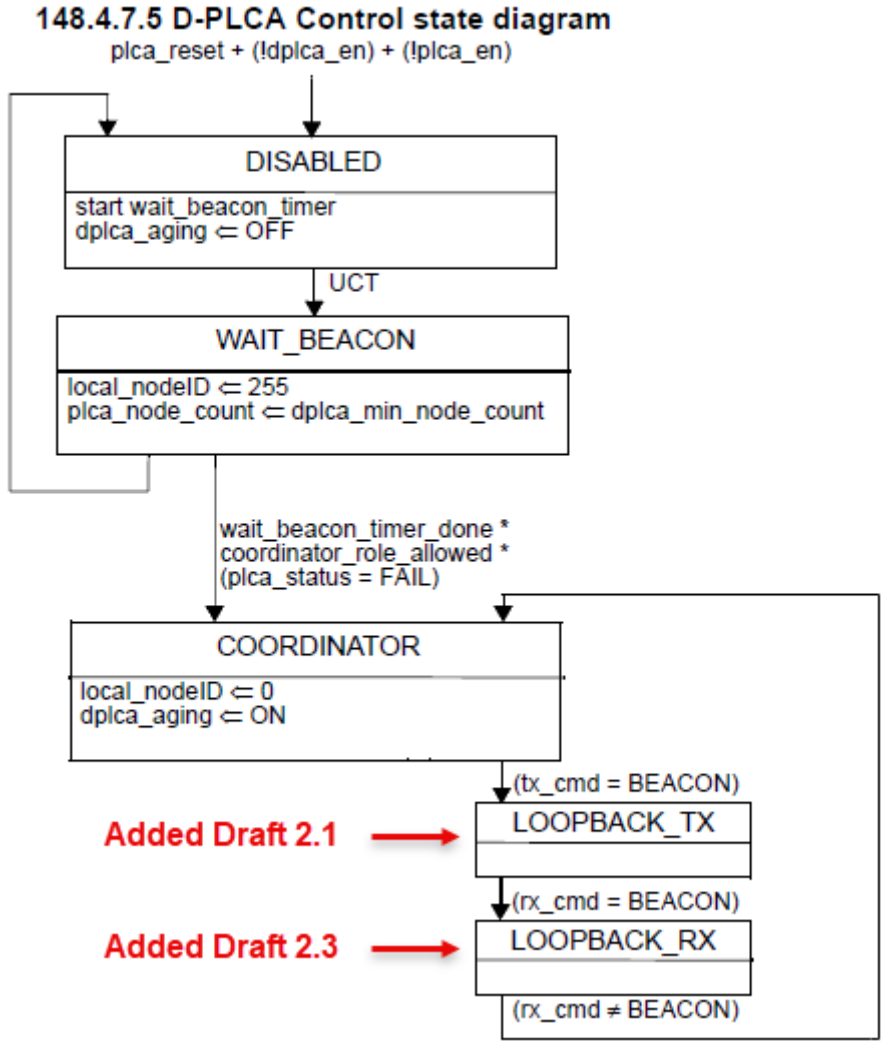
IEEE 802.3da - September 2025 Interim – Minneapolis, MN

I-93 – TX BEACON Loopback Lockup

Background

- **Draft 2.1 added LOOPBACK_TX to prevent detection of locally transmitted BEACON from forcing into FOLLOWER**

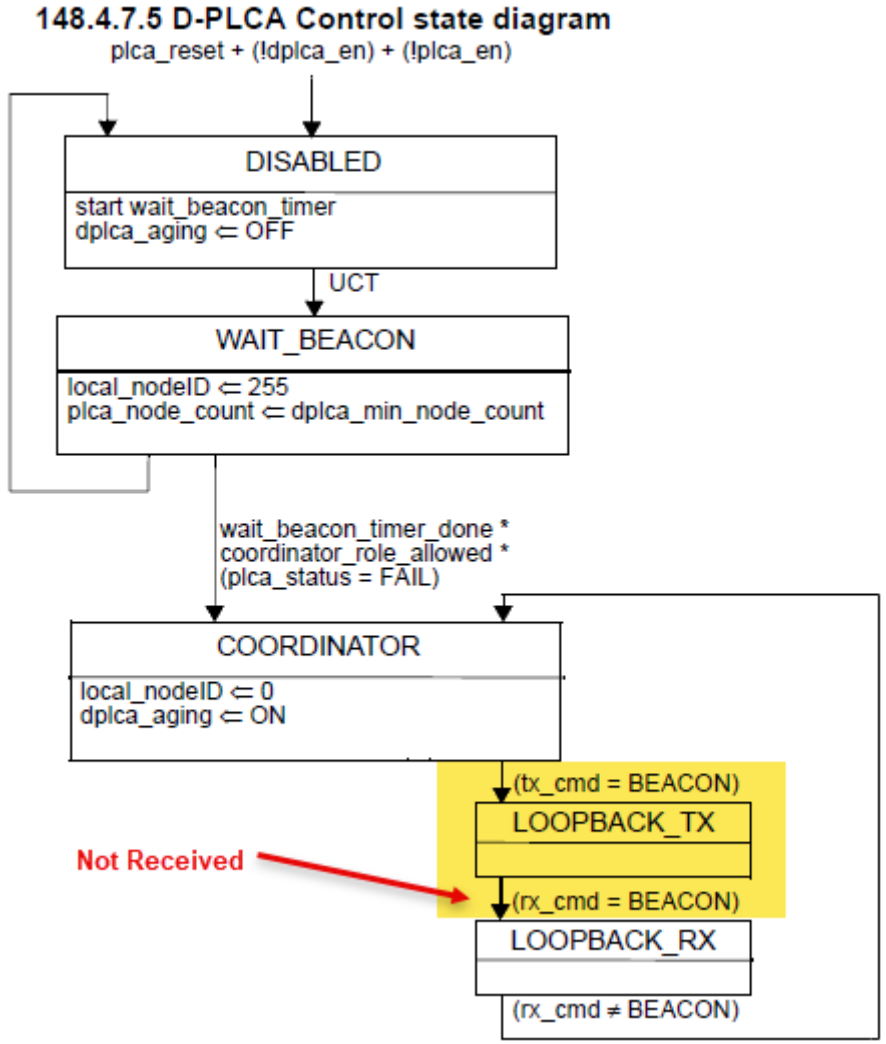
- **Draft 2.3 added LOOPBACK_RX to wait until locally transmitted BEACON was fully received before returning to coordinator. This was to meet PHY timing requirements**



I-93 – TX BEACON Loopback Lockup

- **Current D-PLCA Control State Diagram can remain stuck in LOOPBACK_TX state if the locally transmitted BEACON is not detected due to noise or interference**

- **Credit to Pablo Ventura (ADI) for identifying this corner case**

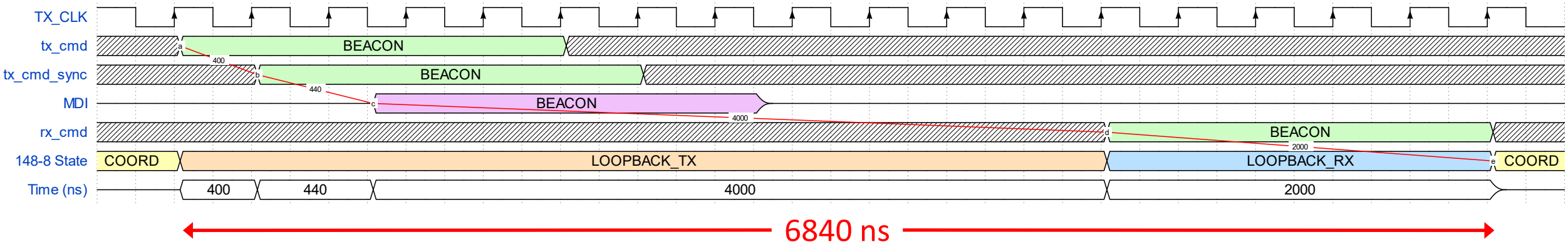


Missing TX BEACON loopback

- **Why would a node not receive back the BEACON it transmitted?**
  - Brief interference from some other node or EMC
    - Rare event & should recover quickly in next cycle(s)
  - Perfect synchronization/collision with another coordinator
    - Unlikely, given the random wait_beacon_timer

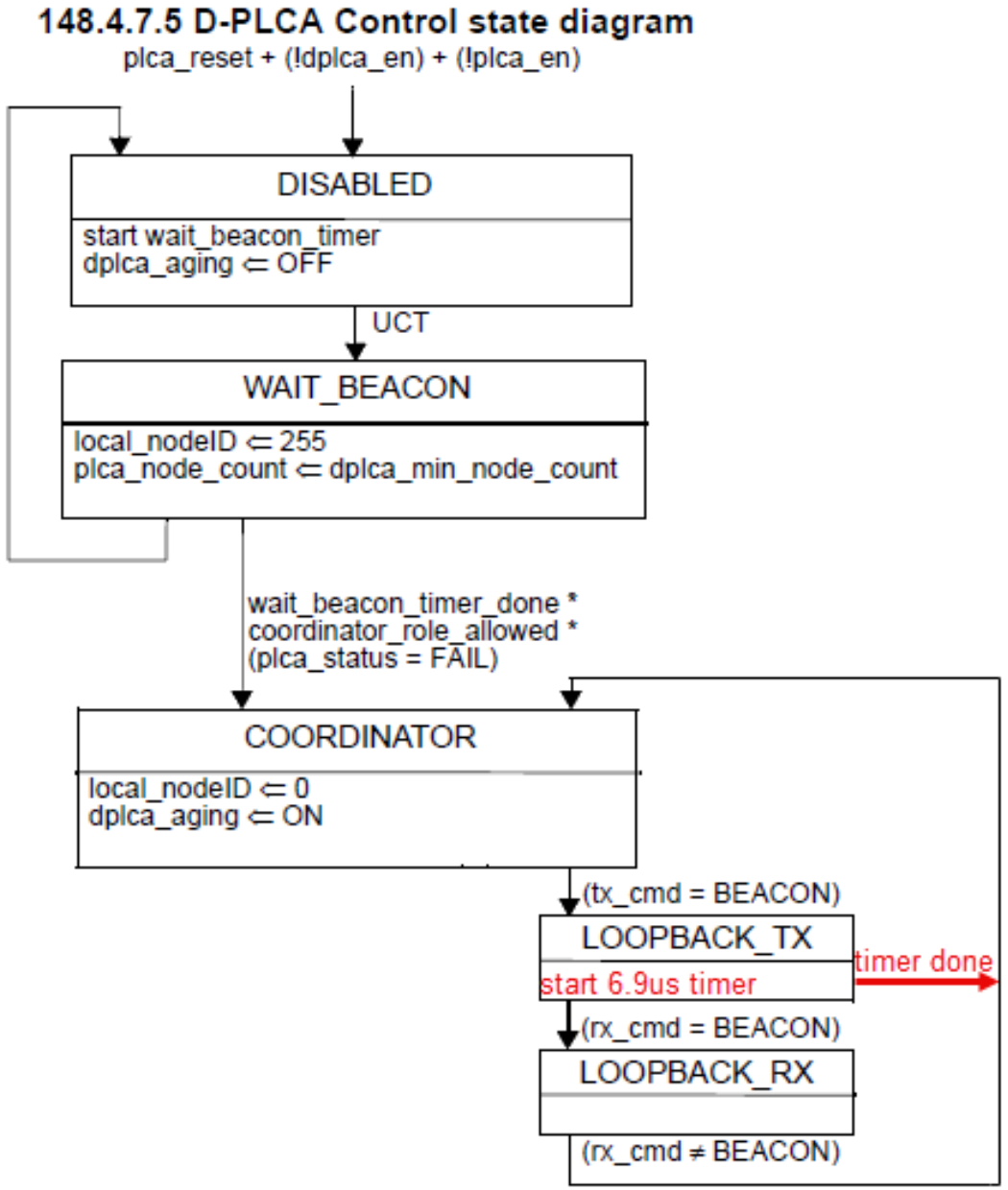
Proposed Solution

- **Add a timer to limit how long the state diagram can remain in LOOPBACK_TX**
- **How long should the timer be?**
  - Slide 7 https://www.ieee802.org/3/da/public/0525/Baggett_3da_Cmt47_DPLCA_Block_Own_BEACONs_v01.pdf
  - 6.9 µs using PHY delay constraints in Tables 147-6 and 188-5
    - Time from setting tx_cmd=BEACON to last possible time to receive rx_cmd=BEACOM



Proposed Solution

- **Start 6.9 µs timer on entry to LOOPBACK_TX**
- **Exit LOOPBACK_TX back to COORDINATOR on timer done**



I-93 Editing Instructions

Add new timer to 148.4.7.4 "Timers" on P81 L22:

beacon_timeout_timer

Limits the time the D-PLCA control state diagram may remain in the LOOPBACK_TX state waiting for the self-detection of a transmitted BEACON.

Duration: the duration of this timer is 69 bit times.

Tolerance: 1 BT

I-93 Editing Instructions

P82 L24 Figure 148-8 – D-PLCA Control State Diagram

- **Inside LOOPBACK_TX state add the action**

  start beacon_timeout_timer

- **Add transition from LOOPBACK_TX to COORDINATOR with condition**

  beacon_timeout_timer done

Thank You

Questions?