UPSTREAM RF POWER AMPLIFIER TURN ON TIME AND TURN OFF TIME PROPOSED TREATMENT

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OVERVIEW

- **Comment #3481 has a proposed reject due file not included**
- **This presentation and draft text file are put forth as a response for consideration of changing to an accept status.**

PMD TURN ON AND TURN OFF TIMES

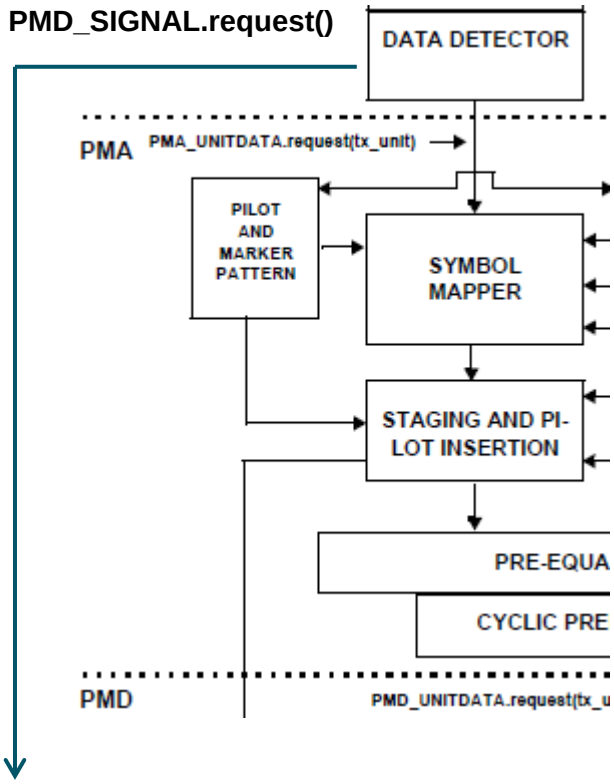
- **EPON has laser turn on and turn off times**
  - See 75.7.14 -> 60.7.13.1.1
  - Time on and off is reported by the manufacturer
    - Reported via *laserOffTimeCapability* and *laserOnTimeCapability*, see 77.3.3.1
    - Maximum 512 ns.
  - These times are included as part of MPCP burst overhead calculations
    - Different ONUs will collide and interfere
  - Power saving is included
  - Signaled via PMD_SIGNAL.request() from PCS Data Detector
    - ONU only, OLT is always “on”
- **EPoC has RF power amplifier (PA) turn on and turn off requirements**
  - Need primarily for power saving, we’ve made it a requirement
    - Secondary effect is to not create CLT receiver cumulative SNR issues from all CNU PAs being on.
  - PAs of different CNUs do not collide before or after the burst
    - PA turn on and turn off times do not need to be included in MPCP burst overhead
  - Should also be signaled via PMD_SIGNAL.request() from PCS Data Detector
    - CNU only, CLT is always “on”

RF POWER AMPLIFIER – TURN ON / OFF

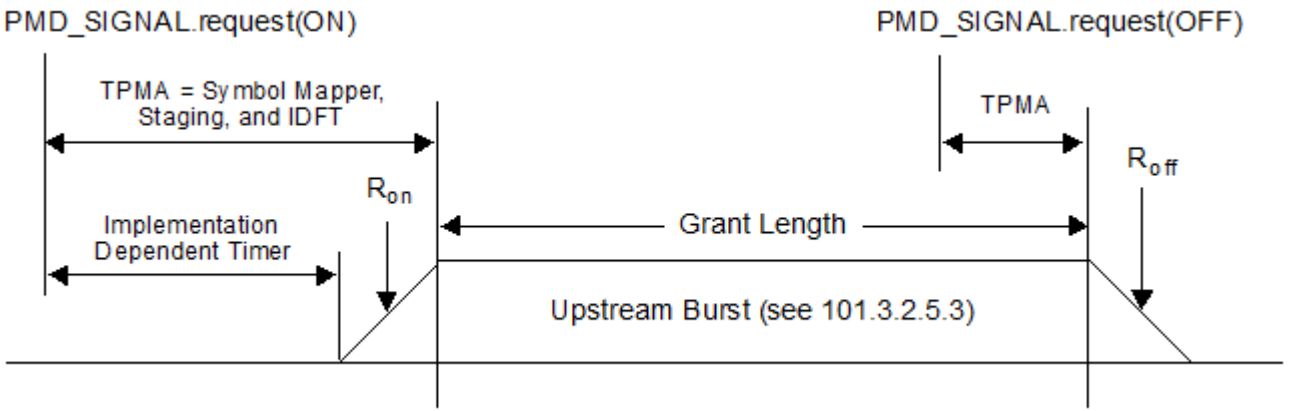
- **PA turn on includes turn on time to stabilization**
  - E.g. power supply settles, meets fidelity requirements
  - Vendor knows the time characterization of their selected PAs for this
  - Expect ≤ ~20 µs typical turn on time, maximum of 100 µs
- **PA turn off is a non-issue**
- **Assertion: both turn on and turn off times are not needed for burst overhead for scheduling**
  - They are a figure of merit for power savings
- **What about grant lead times?**
  - Should not be an issue due to PMA pipeline, see next slide

GRANT LEAD TIME – NOT AN ISSUE

- **When the CNU data detector output process begins sending a burst:**
  - PMD_SIGNAL.request() state transitions arrive “instantly” at the PMD
  - Actual burst data has to transit the PMA processes:
    - Symbol Mapper: 8 or 16 times 20 µs delay (*RBsize*)
    - IDFT: 10 µs to 40 µs delay, vendor dependent, but has to meet PMA delay variation requirements
  - Time through the PMA (TPMA) will be the sum of these two pipeline delays
    - Fixed for any upstream profile configuration
    - Ends up being included in EPON RTT
- **Grant lead time?**
  - No impact due to larger TPMA
- **TPMA**
  - Likely minimum: 8 * 20 + 10 = 170 µs
  - Likely maximum: 16 * 20 + 40 = 360 µs



PMD BURST TIMING



- **PMD burst timing diagram would look like the above**
  - We've already defined the granted upstream burst in 101.3.2.5.3
  - Vendors will know their TPMA and Ron times and internal timing for the advance turn on of their PAs
    - The requirement in the specification is that the upstream burst meets fidelity requirements, which means PA turn on to stabilization
- **This diagram and draft text will satisfying those looking at the draft for RF amplifier impact and power savings**

PMD_SIGNAL.request()

- **Works ok from PCS CNU Data Detector Output**
  - PCS data burst
  - PCS data burst + PHY Link message in same RB Frames
- **Need to add to PHY Link transmission path just before equivalent symbol mapper**
  - Same time delay as TPMA: 8 or 16 * 20 µs + IDFT time.
  - Need to add equivalent text similar to PCS text to PHY Link
- **RF PA text needs to state OR of signals from PCS and from PHY Link: either one “ON” signals on RF PA, both “OFF” signals off.**

DRAFT TEXT

- **Review comment # 3481 for consideration of overcoming rejection**
- **Review laubach_3bn_03_0515.pdf (and fm) for consideration as replacing laubach_3bn_1X_0515.pdf in the comment.**

PROPOSAL

Adopt laubach_3bn_03_0315.pdf as part of resolution for comment #

Thank you