OAM Data Transfer During LPI

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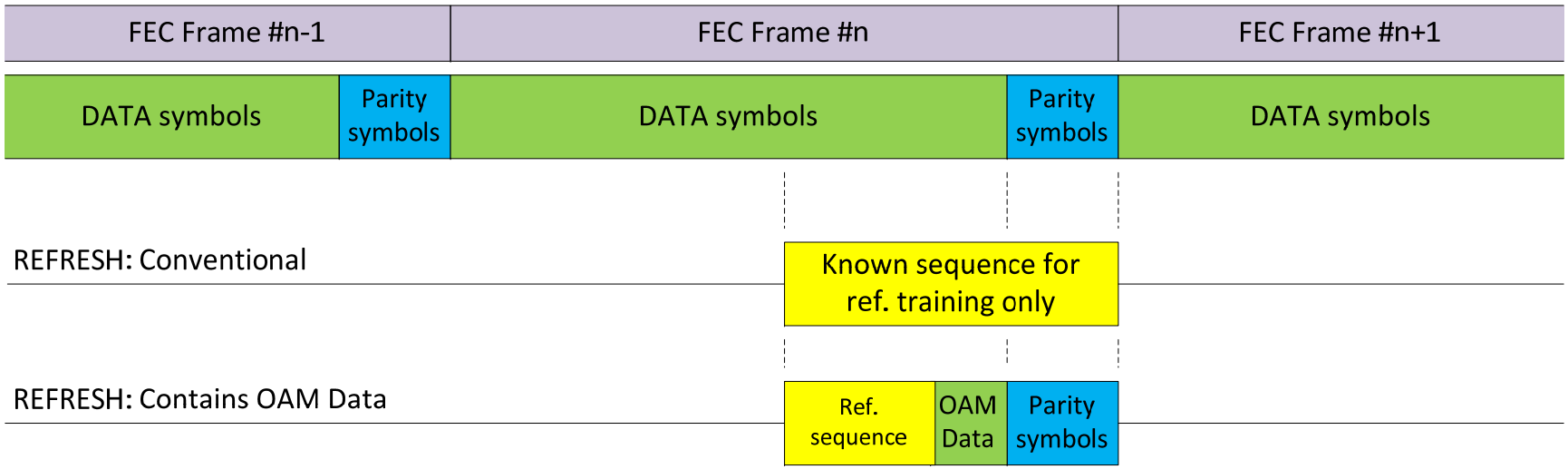
OAM During LPI

- 1000BASE-T1 Task force has agreed to send OAM data during Normal data mode
- During a dearth of user data the MAC may instruct the PHY to go to LPI mode
  - While in LPI mode there is no FEC frame and therefore no OAM data
  - Can be in LPI mode for a long time
- May need to send OAM data during LPI mode
  - OAM needs are orthogonal to user data needs
- Propose sending OAM data during LPI mode
- Transfer of data should be transparent to the upper layers

Key Components

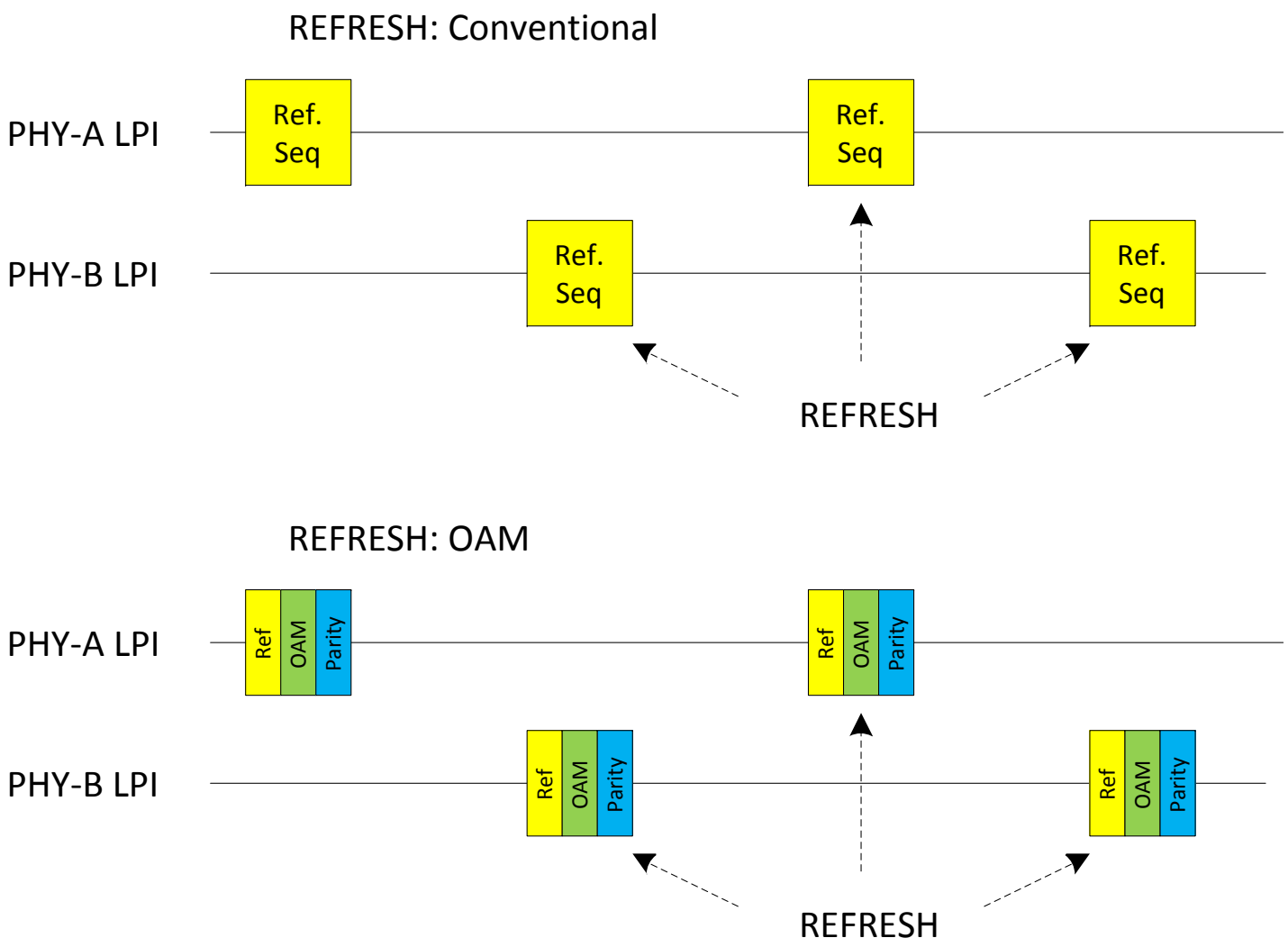
- Optional employment of the existing systematic block forward error correcting code (FEC).
- Align the LPI REFRESH signal with the FEC frame so that it consists of 3 sections:
  - Known reference sequence
  - Part of the FEC systematic symbols
  - The entire FEC parity symbols
- Apply punctured FEC encoding and decoding on the OAM data symbols and the parity symbols.



Advantages

- Enable robust OAM channel during LPI mode
  - REFRESH signals always starts with known reference sequence for maintaining link integrity
  - Rest of REFRESH signal aligned to FEC data and parity symbols, which enabled FEC error protection
- Reduced latency and power consumption when transferring OAM data ➔ no need to exit LPI mode
- Mechanism for passing user data at a reduced rate while in LPI mode
  - For example: 0.36 us (OAM + Parity) + 0. 72 us (User data) + 0.36 us (Reference data) => 9.259 Mbps
  - Future proofing for highly asymmetrical data transfer requirements

Comparing LPI REFRESH Signals



Conclusion

- Can provide OAM during LPI mode transparent to layers above the physical layer
- We propose this be included in the standard