

# UPSTREAM PHY BLOCK DIAGRAM BASELINE PROPOSAL



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- **Reference: upstream PHY Path block diagram**
  - laubach\_3bn\_02\_0314.vsd (and .pdf)
- **Socialized on weekly conference calls**
  - Adjust to indicate PHY Link uses the same IFFT process however details of the PHY Link path are in Clause 102
- **This PHY diagram is similar in format to the downstream PHY diagram. Used to help focus Task Force efforts.**
  - Expect diagram to change for IEEE normalization for TF Draft 1.0

## ■ PCS

- 64B/66B -> 65B encoder same as downstream
- FEC Codeword Builder and Data Detector
  - Data Detector - must detect start and end of burst from MAC
  - FEC encoding, codeword filling
- Scrambler – T.B.D.
- Gearbox –T.B.D.

## ■ PMA\_UNITDATA.request ( tx\_unit )

- tx\_data\_group<15:0> as in 10GEPON or <64:0> for EPoC? (CL Figure 76–7)
- Need to examine any other signals and potential timing diagrams

## ■ Symbol Mapper (Part 1 RB Builder)

- Determines Resource Block (RB) usage within an OFDMA frame
  - Indicates RB's containing start Burst Marker (BM) and end BM
- Aligns first bit of burst to first bit of first data RE
- Allocates data bits to Data Resource Elements (REs) inside based on RB frame configuration and bit loading using 1D-to-2D
  - Does not allocate data bits to REs designated as pilots or markers
- Maps bits to Data RE QAM constellations
- Padding? – needs more discussion

- **Interleaver and OFDM Framer (Part 2 RB Builder)**
  - Prepares OFDMA frame preceding handoff to IFFT
    - Pre-staged frame building described in specification
  - Time Interleaver processing
- **Pilot and Marker Patterns**
  - Works in conjunction with OFDMA Frame Configuration
  - Indicates position of pilots within and OFDMA Frame
  - And if an RB contains a Burst Marker
    - Indicates which REs in the RB will be used for start/stop BM
- **Pilot and Marker Insertion**
  - Insertion after interleaving, prior to IFFT, as indicated
- **Pre-Equalization and IFFT**
  - Digital pre-eq and IFFT processing
- **Cyclic Prefix and Windowing**
  - Per OFDMA symbol processing



- **OFDMA Frame Configuration and Bit Loading**
  - Shared information between the CLT and each CNU
  - Indicates all RB allocation within each OFDMA Frame
  - Defines start, stop symbol for each frame:
    - RB frame (note: RB is always contiguous symbols)
    - Probing
  - Defines sub-carrier assignment per frame / symbol:
    - RB (note: each RB is always contiguous sub-carriers)
    - Excluded
    - Zero-bit loaded
    - PHY Link Discovery
    - PHY Link Fine Ranging
    - PHY Link Channel
    - Probing
  - Bit loading and QAM constellation of all data REs
- **Frame Timing**
  - Work in conjunction with OFDMA Frame Configuration and Bit Loading
    - OFDMA frame time reference
    - Symbol time reference

## ■ **Probe Generator**

- Works in conjunction with OFDMA Frame Configuration and Bit Loading
- Inserts Probes as required in sub-carriers / symbols
- NOTE: probes required for per-CNU pre-equalization coefficient adjustment

## ■ **PHY Link**

- Specified in Clause 102
- Uses same IFFT, CP, and Windowing as data channel

## Move to:

- **Adopt the Upstream PHY Block Diagram for Clause 100 as presented in laubach\_3bn\_02\_0314.vsd as shown in laubach\_3bn\_02\_0314.pdf as a baseline figure. Editors to place in appropriate place in draft.**



Thank you