50 GbE 40 km Objective

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Proposed Objective (from lewis_01_b10k_0917)

- Define a single-lane 50 Gb/s PHY for operation over
  - SMF with lengths up to at least 40 km

- Is this the right objective?
  - Should we aim for 80 km reach?
- If adopted as an objective, will the resulting project be able to satisfy the "Criteria for Standards Development (CSD)"?
  - Broad Market Potential
  - Compatibility
  - Distinct Identity
  - Technical Feasibility
  - Economic Feasiblity

Broad Market Potential

- Multiple applications?
  - Mobile backhaul
  - Internet exchanges
  - Financial industry

- Multiple vendors and numerous users?
  - Multiple vendors already for components of PCS, PMA and PMD layers for 50 Gb/s per lane PHYs
  - Multiple users are asking for longer reach 50 Gb/s per lane PHYs

Technical Feasibility

- Is there demonstrated system feasibility?
  - 50 Gb/s PAM4 feasibility demonstrated by several vendors (OFC 2017)
- Has similar technology been proven by testing, modeling, simulation etc.?
  - 26 Gbaud APD demonstrated for NRZ as part of completed P802.3cc
  - Extension to PAM4 demonstrated experimentally
- Can we be confident it is reliable?
  - All technologies needed are deployed in high volume data center applications and already demonstrated to be reliable

- Straw poll from Sept
  - I believe a PAM4 approach, based on 50 Gb/s PAM4, targeting 40km would be technical feasible at
    - 50 Gb/s Yes 18 No 0 Need more info 15
    - 200 Gb/s Yes 8 No 0 Need more info 22
    - 400 Gb/s Yes 0 No 0 Need more info 32

Economic Feasibility

- Will this be available at reasonable costs?
  - More data needed on relative costs for 50G-40km using different approaches
    - 1310 nm vs 1550 nm
    - Optical link budget optimized for different Tx and Rx technologies
      - InP versus SiP
      - Temperature controlled
    - Existing FEC (KP4) versus stronger FECs
  - Target to be significantly lower (< 0.5X) cost relative to e.g. 100G 40km solutions

Thanks!