Ethernet in the First Mile (EFM) Tutorial – Point to Point over Fiber
Outline

• What is Point to Point (P2P) over Fiber?
• Why do we need P2P over Fiber?
• GbE vs. P2P over Fiber
• P2P Transceiver Options
• P2P Transceiver Considerations
• Summary
What is P2P over Fiber?

• Point-to-point is the topology Ethernet has used successfully for over a decade

Multi-Port Switch

Uplink

End Stations

• Study Group Objective:
  1000BASE-X >=10km over single SM fiber
What is P2P over Fiber?

• Reuse 802.3z 1000BASE-LX specifications

But…

• Single Single-Mode Fiber (SMF)
  • ≥10km vs. 5km
  • Extended Temperature
Why P2P over Fiber?

• P2P over Fiber is Gigabit Ethernet optimized for the subscriber access market
• Each transceiver connects to one and only one transceiver
• Each link is symmetrical and capable of using the full transceiver bandwidth
GbE LX vs. Single Fiber P2P

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P2P Focus

Optical Element

Laser
DFB/FP/VCSEL

Photodiode
PIN/APD

SMF, 10km

Optical Filter

TX
RX
# Transceiver Candidates

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<th>Downstream</th>
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<tr>
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<td>13x0nm+Δ</td>
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<tr>
<td>4</td>
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<tr>
<td>5</td>
<td>15x0nm+ Δ</td>
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Transceiver Considerations

• Different up/down-stream wavelengths lead to different transceivers at each end of the link
  – Requires mechanism to manage differences

• Single wavelength solutions are not straightforward
  – Ability to bring cost effective solutions to market

• Cost/volume manufacturability of each wavelength plan
Summary

• P2P over single SM Fiber:
  – Is similar to 1000BASE-LX
    • Slight modifications to address the subscriber access market
  – Meets the 5-criteria with multiple transceiver options available
    • http://grouper.ieee.org/groups/802/3/efm/public/may01/kelly_1_0501.pdf
  – Is an important technology for subscriber access networks