

# Extended-Wavelength-MMF Update

Jack Jewell

CommScope

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# Assumptions

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- 1) Back compatibility is desired
  - Endemic to F-C; new to Ethernet at 10/40G, desired at 100/400G
  - Best to coordinate F-C and Ethernet specs
  
- 2) Imminent-future MMF standards will take advantage of extended wavelength
  - e.g. 860-1200nm VCSELs, lower chromatic dispersion, etc

# Fibre-Channel Update

- June 5 F-C presentation, similar to one at May 30 MMF Ad Hoc, was well received – much discussion
- 32GFC was already through letter ballot – unsurprisingly too late!
- Nothing to prevent vendors from supplying extended-Rx 32GFC modules when the detectors are available
- Significant interest to implement extended-Rx in 128GFC, which is just getting kicked off
- 128GFC (FC-PI-6P) will be 4X32GFC parallel, w/ tweaks on specs due to parallel channels
- Expect 128GFC (FC-PI-6P) and 100G-SR4 to be embodied in the (almost) same modules/products
- Makes sense for extended-Rx spec to be implemented in both

# 100m on OM4 at longer wavelengths

- Interest expressed at May 30, 2013 MMF Ad Hoc
- Would be great if 950nm (940-960nm range) could reach 100m
- Took “Example MMF Link Model” spreadsheet by John Petrilla, posted on May 2013 Interim Meeting Material
  - 100m w/ Wavelength 960nm, MBW 1700(1600)MHz-km, R/F 17(16)ps
  - Also made Rx 0.4dB more sensitive (lower photon energy at 960nm)
  - Pisi < 3.6, Margin > 0
  - Need input from fiber and VCSEL vendors
  - Shorter wavelengths → easier
- At 1060nm w/ “OM4-like” MBW=4400MHz-km, r/f 17ps, Rx sensitivity -12.2dBm, spectral width 0.6nm -- reaches >230m
- Such a fiber should support 56Gb/s over 100m w/ fast VCSEL
- 940-960nm may reach 100m over OM4 and new MMF

# Recommended Ethernet Activities

- 802.3bm
  - Spec Rx wavelength range 840-1200nm
  - Consider adding 940-960nm (or slightly shorter) spec to Tx
- 400G HSSG
  - Spec Rx wavelength range 840-1200nm
  - Spec longer Tx wavelength range on OM4, e.g. 840-960nm
  - Consider 200m reach objective
- Future
  - Extended-Rx-wavelength assumed
  - 940-960nm for 100m over OM4 and new MMF (25Gb/s)
  - 940-1060+ for 100m over new MMF (25Gb/s)
  - 1060nm  $\pm$ XXnm for >200m over new MMF (25Gb/s)
  - 1060nm  $\pm$ XXnm for >100m over new MMF (50Gb/s)