

PMD work area topics

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Jan 2016

Coexistence Requirements

- Which pre-existing systems need support?
 - EPON, 10GEPON, RF video, RFoG DS, RFoG return, OTDR
- How do 25G, 50G, and 100G coexist?
- What method of coexistence is desired?
 - WDMA or TDMA
- What kind of OLT rearrangement is good?
 - Side-by-side deployment, or replacement

Wavelength Plans

- Wave plan mainly driven by coexistence needs
 - Stay out of other systems' operating bands
 - Stay out of other receivers' guard-bands
 - Power dynamic range
 - Downstream: Tx output power differences
 - Upstream: Tx power and ODN loss differences
 - Reflections must be considered
- Other physical issues
 - O-band has good dispersion, but poorer loss
 - Raman interaction can be a factor
 - Cross-modulation in co-propagating case
 - Depletion in both co- and counter-prop cases
 - Guard-band sufficiency for coexistence element

ONU Tuning?

To Tune or not to Tune

25G ONUs

- Colored
 - 4 types
- Colorless
 - 4 channel tunable

50G ONUs

- Colored: combinations
 - 2 mutual exclusive types
 - 6 pairs of colors
- Colorless
 - Channels independently tuned
 - Channel pair tunable over 3 positions

Spectrum needed

- Assume that 4 channels are needed
- UltraCWDM: 20nm bands, 40nm spacing
 - Uncooled outdoor operation
- CWDM: 13nm bands, 20nm spacing
 - Uncooled indoor operation
 - High incumbent volume of components
- WideWDM: 2nm (350GHz) bands, 4.5nm (800GHz) spacing
 - Cooled operation, imprecise optics tolerated
- DWDM: 40GHz bands, 100GHz spacing
 - Relatively simple tuned operation across grid
 - High incumbent volume of components
 - Cooled operation
- Upstream and downstream could be different
 - OLT is indoors, and shared
 - ONU is outdoors (maybe), and dedicated

Line Code

- Preferably enabling 25G transmission over a 10G channel (O/E and fiber)
- Must have cost effective high loss budget
 - Simple codes are preferred
- NRZ, PAM-4, eDB, and oDB are likely candidates
- It may be possible to unite all these codes into a single transmission scheme with diverse reception technologies (unless we decide on PAM-4)

FEC Super- or Sub-rating

- Just as in 10GEPON, FEC is mandatory (disableable?)
- Use sub-rating (like 10GEPON)?
 - Optics requirements are a little easier
 - Payload rate is reduced ~15%
- Use super-rating (like 100G Eth)?
 - Maintains payload at full rate
 - Optics get stretched a little further
- Unlike 10G, the 25G system is already stretching the optics 2.5x
 - A little more won't hurt
 - Also, 100G Eth market has introduced 28Gb/s super-rating