Update on dispersion limits for 100 Gb/s PAM4

Frank Effenberger

Futurewei Technologies

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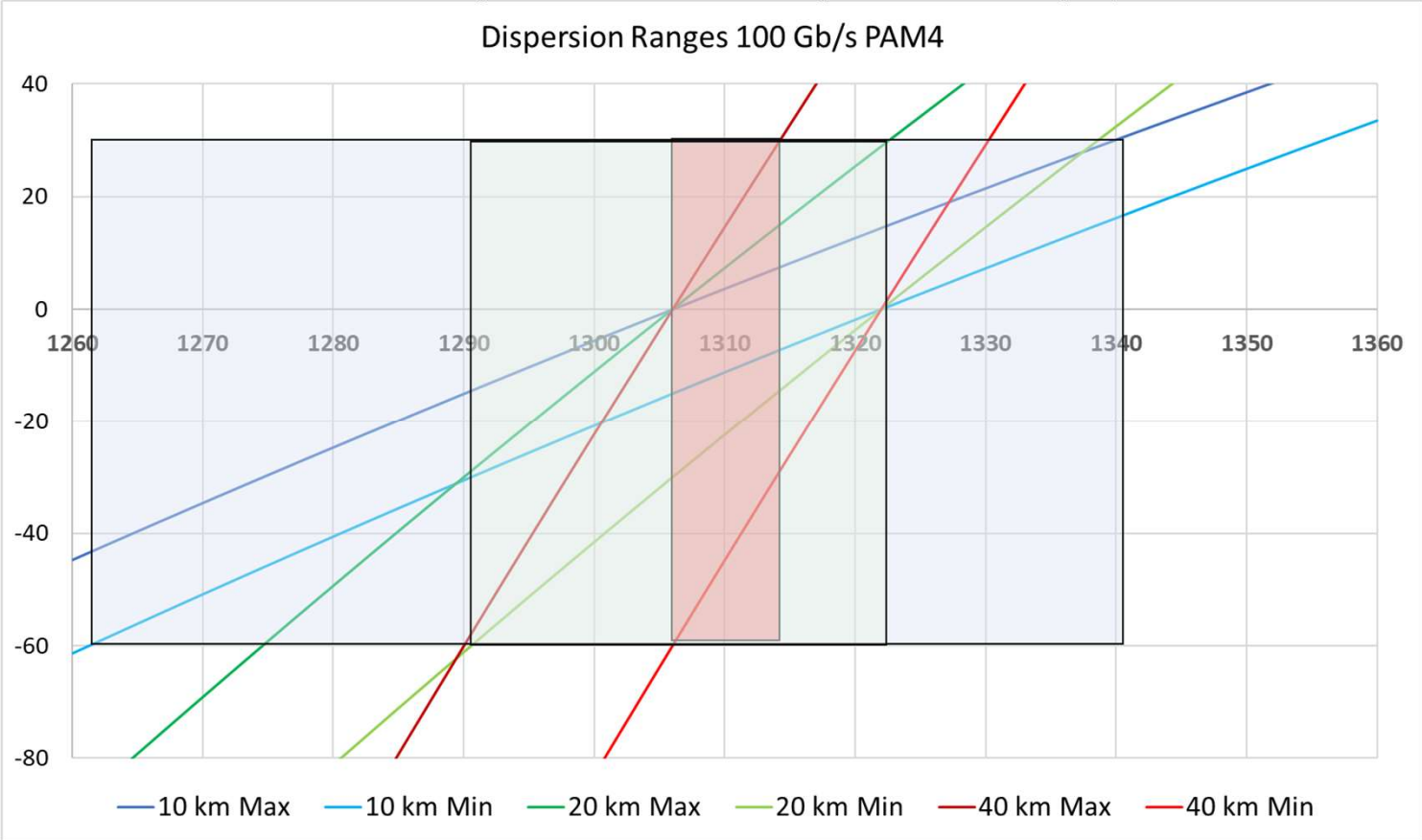
Assumptions that may be changing

- The zero dispersion wavelength in practice does not vary over as wide a range as specified in G.652
  - A more realistic range might be 1306 to 1322 nm, as explained in another contribution to this meeting
- The tolerable dispersion range depends largely on the chirp characteristics of the transmitter
  - The previously assumed range (-40 to +20 ps/nm) was quite conservative
  - It appears that this range might be increased to -60 to +30 ps/nm
  - Once again, I call on the modeling community to check all these numbers

Dispersion limitations for 100 Gb/s PAM4

- This reproduces the chart presented in January, but assuming: 1306 < ZDW < 1322 nm, and -60 < Disp.Tol < 30 ps/nm



Dispersion limitations for 100 Gb/s PAM4

- Based on the new ZDW range and dispersion tolerance range
- At 10 km, the wavelength range is 1261 to 1340 nm
  - For 100G, two channels of CWDM: 1290 and 1310 nm
  - For 200G, four channels of CWDM: 1270, 1290, 1310, 1330 nm
- At 20 km, the wavelength range is 1291 to 1322 nm
  - For 100G, two 800 GHz channels: 1304.5 and 1309 nm
  - For 200G, four 800 GHz channels: 1300, 1304.6, 1309.1, and 1313.7 nm
- At 40 km, the wavelength range is 1306 to 1314 nm
  - For 100G, two 800 GHz channels: 1309.1 and 1313.7 nm
  - For 200G, four 200 GHz channels: 1306.8, 1309.1, 1311.4, and 1313.7 nm

Speeds vs. objectives

Speed Per lane	10 km 100G	20 km 100G	40 km 100G	10 km 200G	20 km 200G	40 km 200 G
100 Gb/s	CWDM	800 GHz	NP	CWDM	800 GHz	200 GHz

- 100 Gb/s per lane is looking pretty good for all of these

A fly in the ointment

- The loss classes we need to use are:
  - 10 km: 0 to 6.3 dB
  - 20 km: 0 to 15 dB <<< So far, PIN detectors
  - 40 km: 10 to 18 dB <<< This used APDs
- Some proposals for the 20 km class have a problem with overload
  - It seems the received optical power range is ~16 dB
  - Note that Tx power tolerance has been a fat 6 dB <<< We might trim that
- Somewhat surprising, since TDM PONs are able to take 20 dB Rx power ranges with ease
  - Part of that is the use of good FEC (improving the sensitivity)
  - Part is likely the use of NRZ (PAM-4 doesn't tolerate distortion very well)
- Even if we can find a wavelength plan for 100G per channel, the overload problem might prevent it from being useful

Thank you

Any questions?