VCSEL Wavelength for Automotive Links (in support of comment 32)

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850 nm VCSEL Lifetime

- Long lifetime for 25G and higher speed 850 nm VCSELs, adequate for automotive links, has been presented in 802.3cz and elsewhere

  L. Giovane and Ramana Murty, 850 nm VCSEL for automotive links,
  https://www.ieee802.org/3/cz/public/15_jun_2021/giovane_3cz_01a_150621.pdf

  N. Ledentsov, Jr., Technical feasibility and reliability of quantum-dot 850-nm VCSELs operating up to and above 25 Gbaud with a high temperature stability beyond 150°C,
  https://www.ieee802.org/3/OMEGA/public/28_apr_2020/ledentsovJr_OMEGA_01_280420_VCSEL.pdf

  M. Hoser et al., Highly Reliable 106 Gb/s PAM-4 850 nm Multi-Mode VCSEL for 800G Ethernet Applications,
  OFC 2022 Paper TuD2.5

- Only 850 nm VCSELs have the demonstrated low random failure rate below 1 FIT in data links (cw operation). There is no comparable data at 980 nm.

- Analysis presented to reject 850 nm in Ref. [1] is invalid

  Ref [1] states that bias current must be less than 5 mA to meet automotive lifetime
  (and later further conclusions are drawn about optical power and RIN based on bias current below 5 mA)

  ➢ Data presented in the three presentations above (they are from different vendors) disagrees with this conclusion.

1. R. Perez-Aranda, https://www.ieee802.org/3/cz/public/22_dec_2020/perezaranda_3cz_02a_221220_reliability_linkbdget.pdf

Wavelength for a Low Cost Link

Data communications links today use 850 – 940 nm VCSELs. Photodetectors covering this wavelength range have been in the field for many years. All IEEE 802.3 standards and MSAs for multimode links are written for these wavelengths.

The very short links considered in .3cz means the OM3 fiber bandwidth is not a limitation (except at 50G where 850 nm operation is advantageous over 980 nm). This allows the adoption of a wide source wavelength from 840 – 990 nm.