ROSNR and EVM Correlation Study for 400G ZR Modules

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Background

- Motivation

  - Evaluate EVM's suitability in predicting 400G ZR module interop performance

- Samples

  - A total of 9 modules from 3 vendors. All modules pass the 26.0dB ROSNR spec in loopback with > 1 dB margin

- Test conditions

  - Channel = 193.1 THz, Prx = -6 dBm, 1x400G ZR mode, CFEC

  - Tx waveform captured by Keysight N4391A OMA. Offline processing with Keysight contribution OIF2018.391.04 Matlab script

  - 7-tap equalizer, real valued, block size 1000

- ROSNR test

  - Vary the amount of ASE loading to find the threshold value where traffic is error-free for at least 120 second. 400GbE ethernet traffic is generated and checked by Viavi ONT.

ROSNR and EVM Correlation

Waveform processed with root raised-cosine (rrc) 0.2 filter
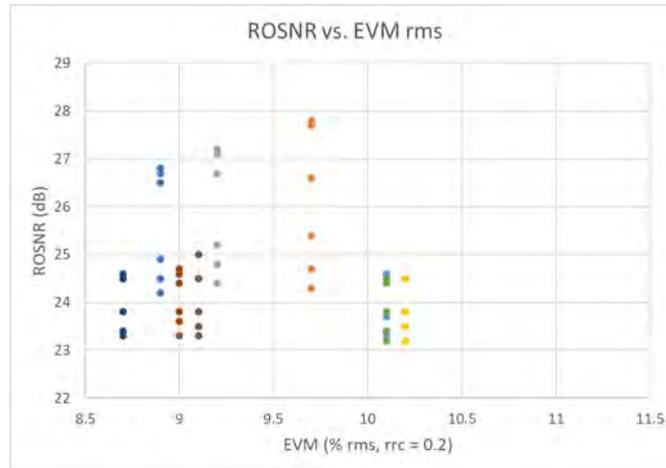
Waveform processed with no filter
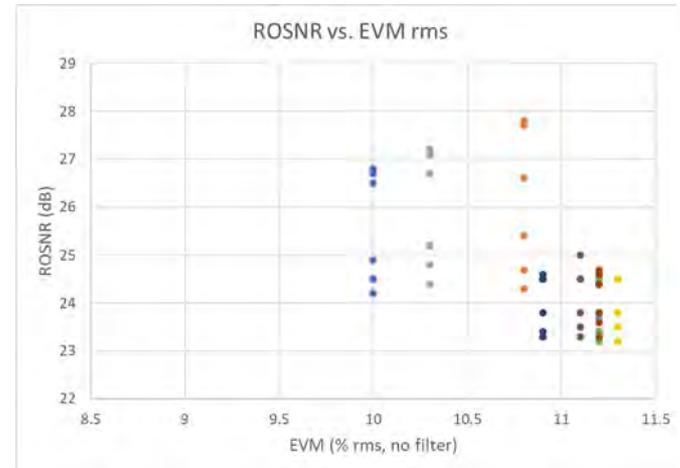
Tx EVM is shown on the X-axis. Each column of points is the ROSNR result of the same Tx going into the Rx of different modules.

Observations

- Interop ROSNR values were sometimes significantly worse than same-vendor Tx and Rx

- We are unable to predict the pairing of modules with bad ROSNR performance, based on Tx EVM information

- Tx EVM also did not predict which modules would give the worst loopback ROSNR

- It is possible that all vendors' modules in this study have good enough Tx EVM, and the overall performance is dominated by assumptions in the DSP design

Thank you!