802.3cu D1.1 PMD Spec
Proposed TX Changes

P802.3cu 100 Gb/s and 400 Gb/s over SMF at
100 Gb/s per Wavelength Task Force Ad Hoc
8 January 2020

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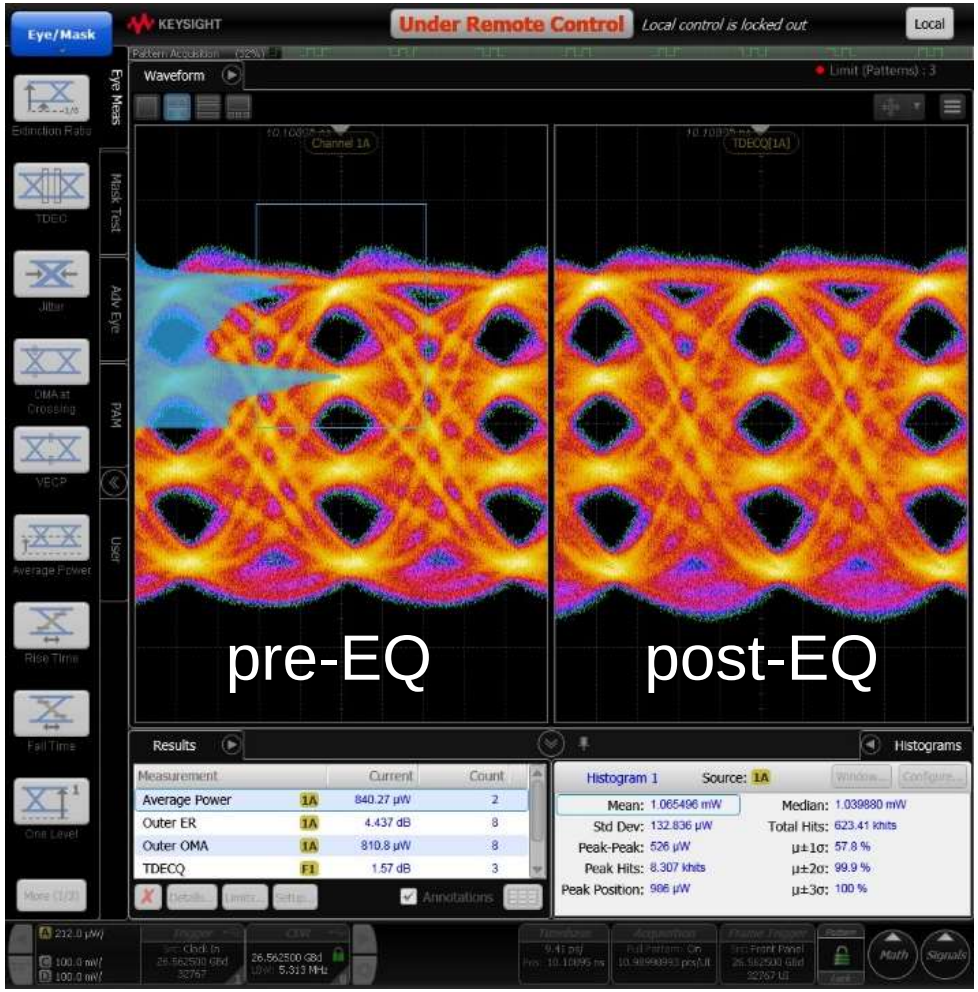
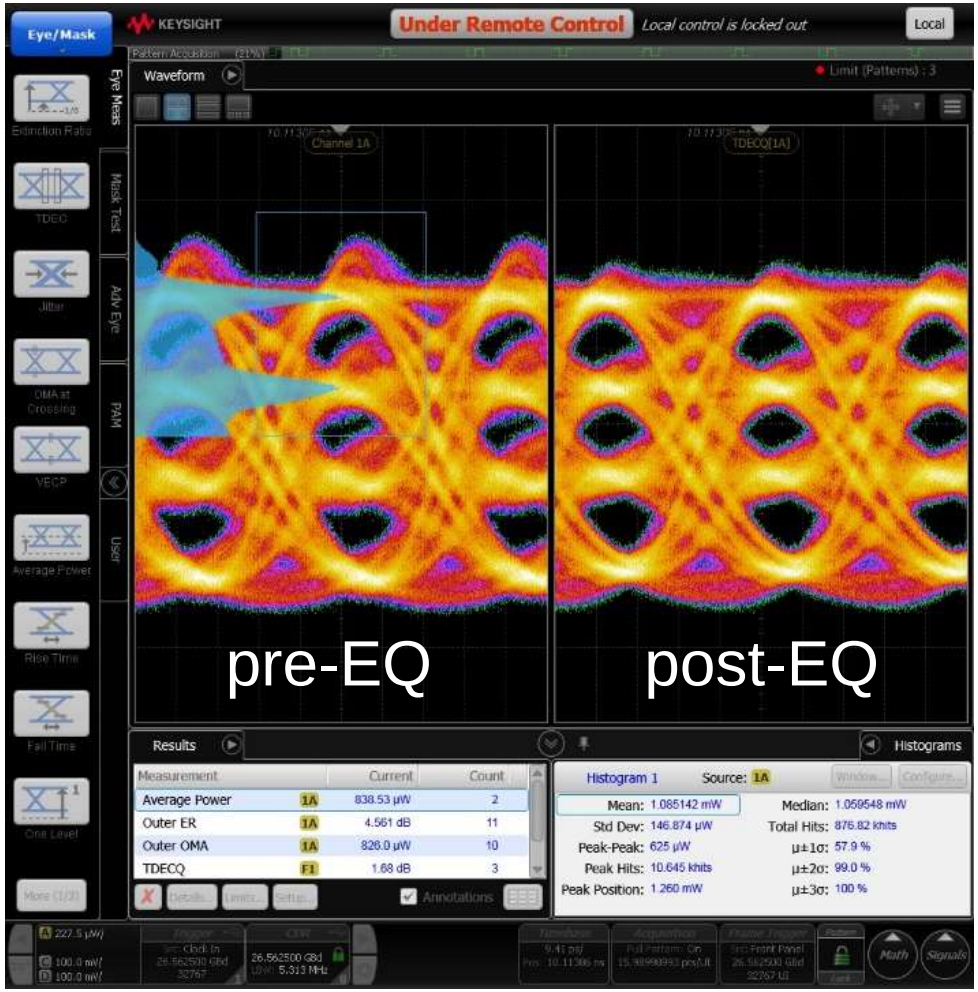
26.6 GBaud PAM4 1305nm λ 13.3GHz RX BW

8% overshoot BtB 3.3V 25ºC



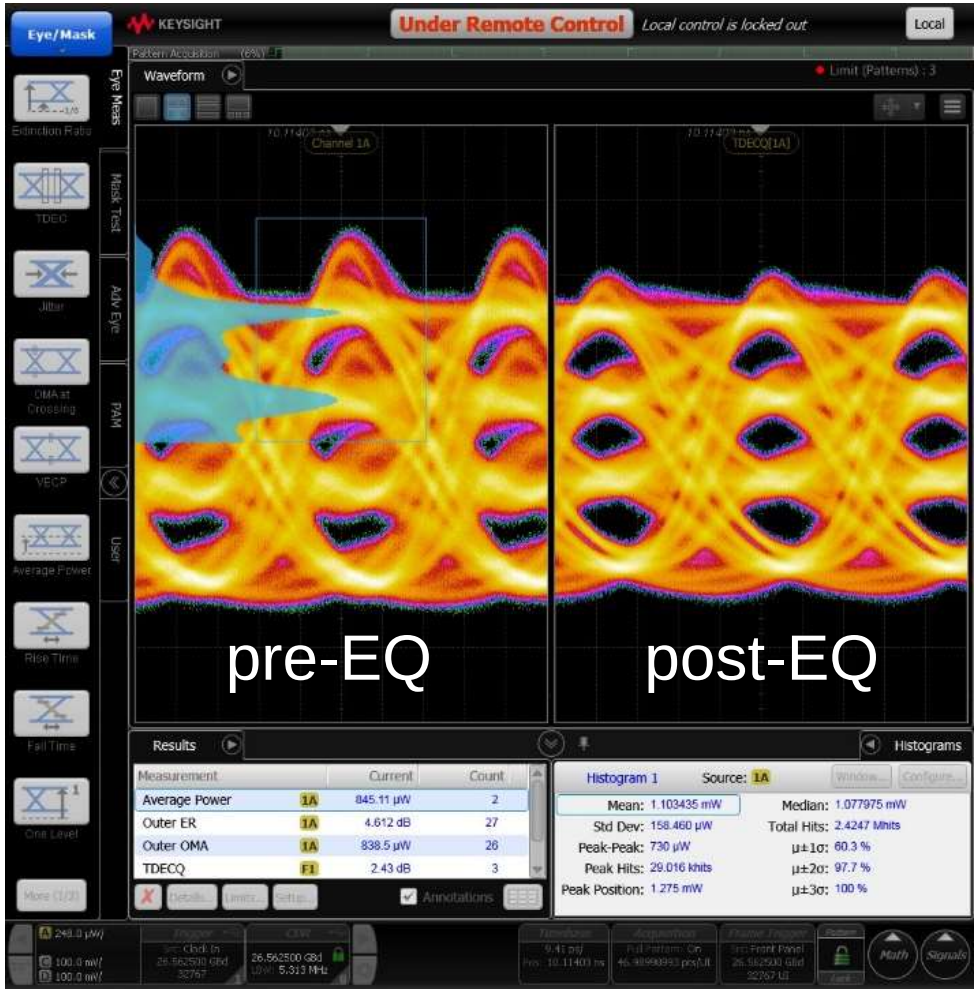
26.6 GBaud PAM4 1305nm λ 13.3GHz RX BW

13.5% overshoot BtB 3.3V 25ºC



26.6 GBaud PAM4 1305nm λ 13.3GHz RX BW

19% overshoot BtB 3.3V 25ºC



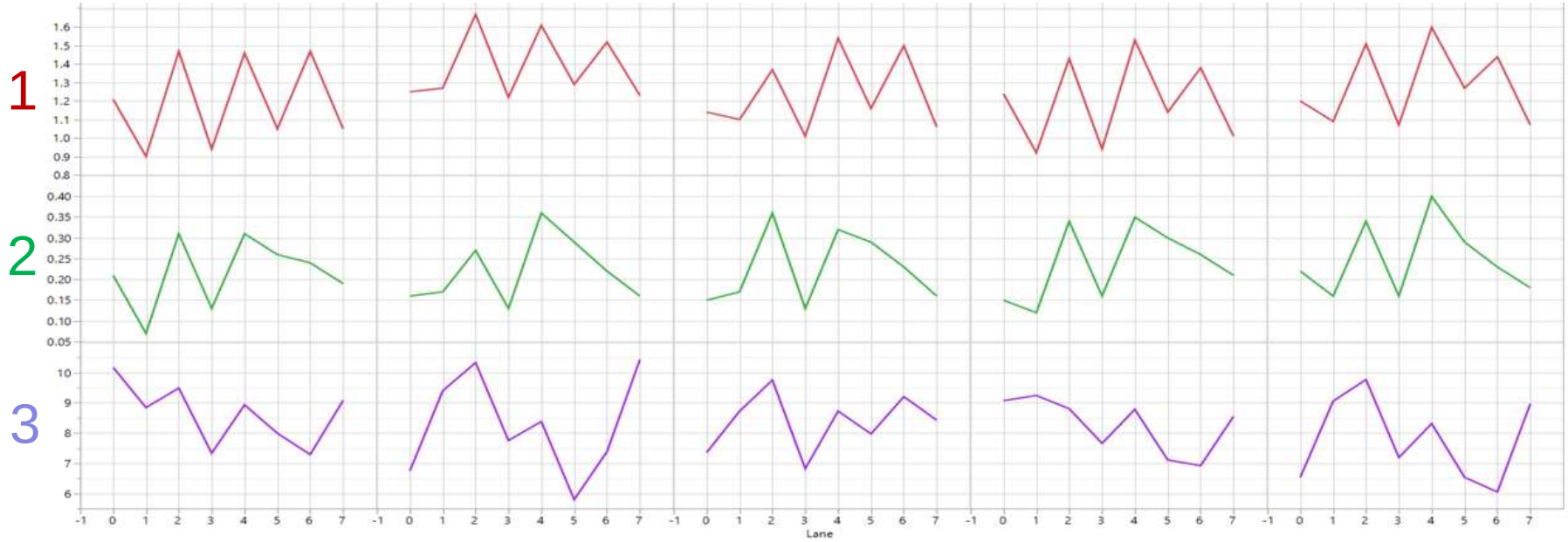
26.6 GBaud PAM4 1305nm λ Link Operation

Overshoot (13.3GHz RX BW) %	TECQ (BtB) dB	TECQ - 10log10 (Ceq) dB	TDECQ (disp. = -30ps/nm) dB	TDECQ - 10log10 (Ceq) dB	Operation (BtB)
8	1.5	1.3	1.2	1.4	normal
13.5	1.45	1.7	1.5	2.1	LOL
19	1.3	2	2.2	3.2	LOL

Production units are set-up for ≤12% overshoot over 5 corners

26.6 GBaud PAM4 1300nm λ 5 Corner Data

3.1V, -5ºC 3.1V, 75ºC 3.3V, 25ºC 3.5V, -5ºC 3.5V, 75ºC



1: TECQ (dB) 2: $10\log_{10}C_{EQ}$ (dB) 3: Overshoot (%)

- There is only sign correlation between C_{EQ} and Overshoot
- TDECQ is not sufficient to screen out problematic TXs

TECQ Problem Condition

- TX with negative dispersion penalty (D) over max. reach, i.e. TX chirp pre-compensates for fiber dispersion:
  - TDECQ = TECQ + D
  - D < 0
  - TDECQ < TECQ
- Most PMDs are used at reaches shorter than max. spec.
- Most datacenter reaches are <500m, i.e. dispersion is ~0
- If TX D < 0, most applications will operate with
  - TECQ (TX BtB) > TDECQ (TX over max fiber)
- TECQ limit prevents interoperability problems for TX D < 0
- TECQ is free because it's required for TDECQ – TECQ
- Cloud operator recommendation is TECQ (max) = 3dB

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Thank You