

106 Gb/s PAM4 TDECQ Measurement

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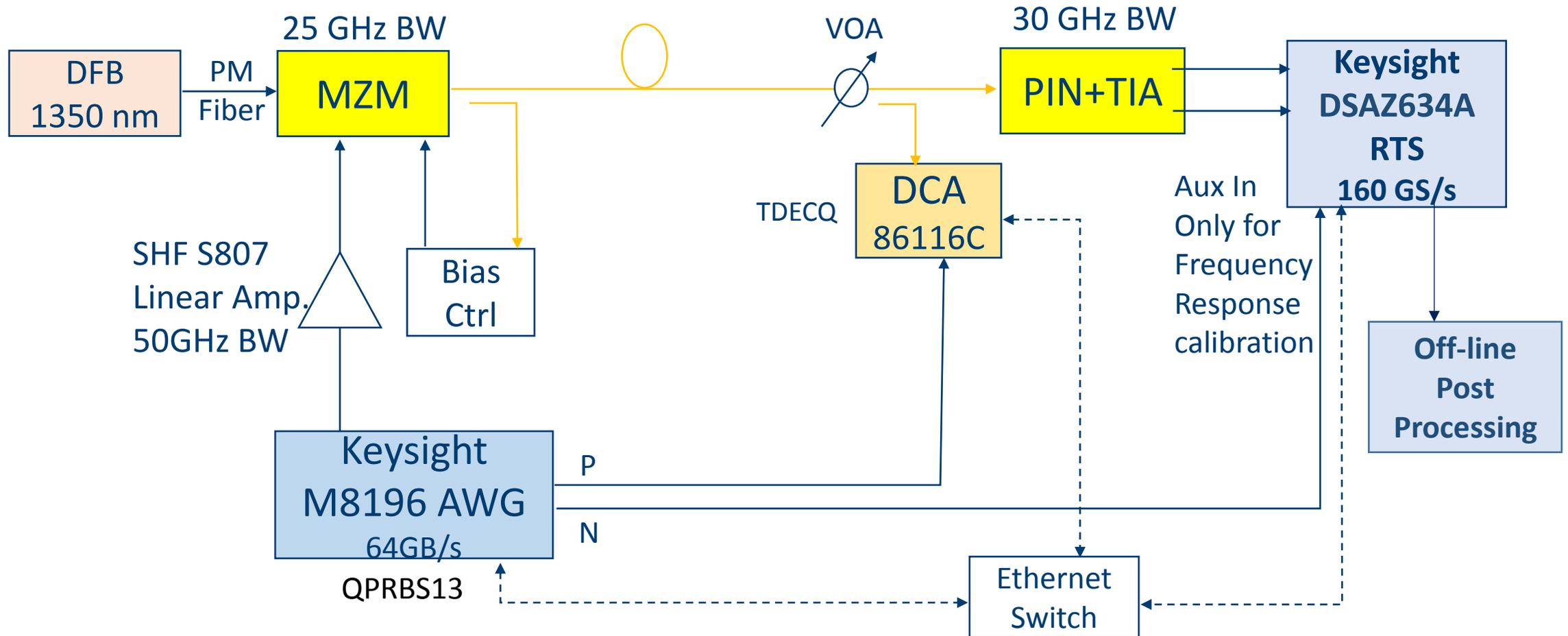
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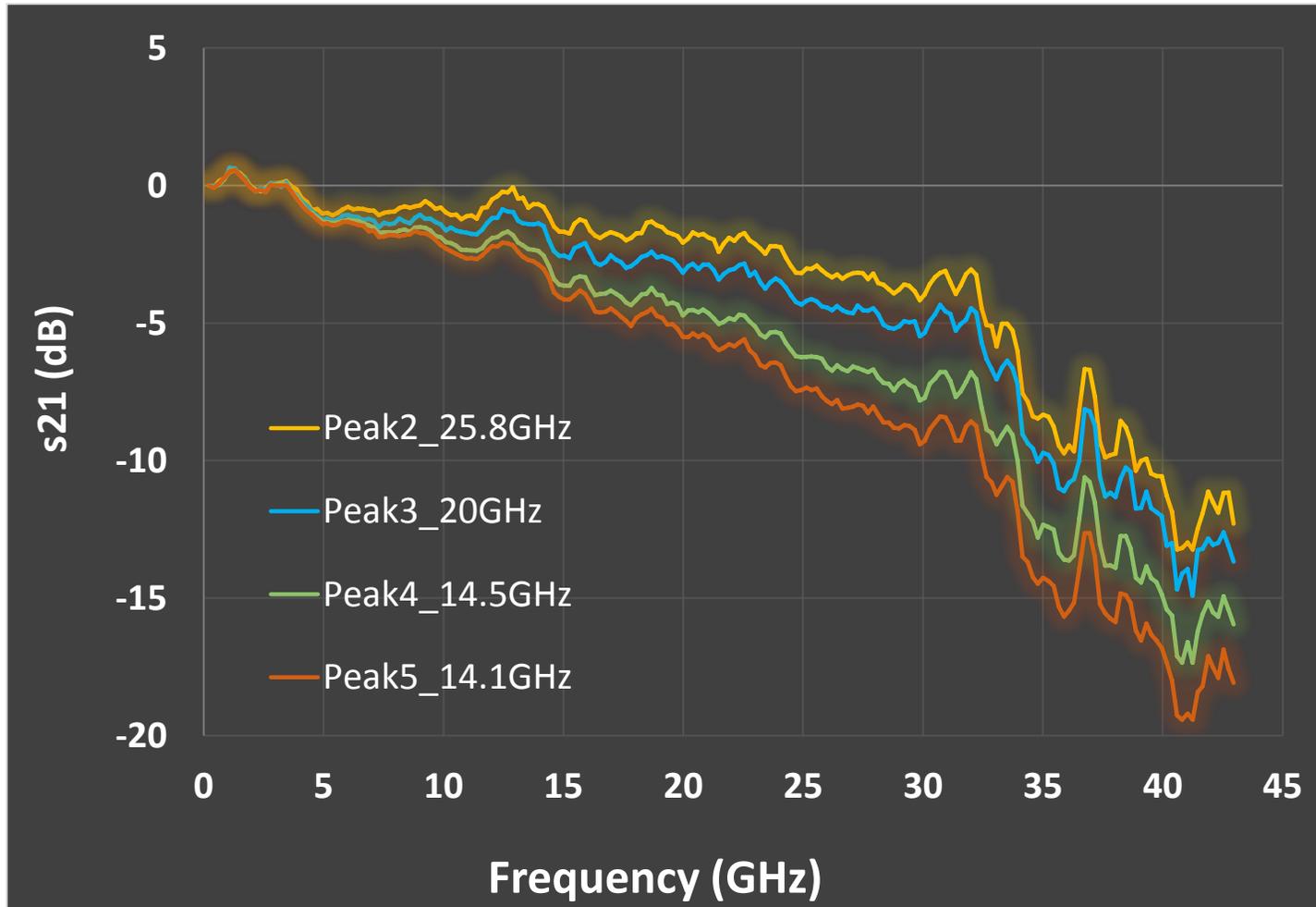
Motivation

- While TDECQ has been introduced for PAM4 based optical links, no actual measurement has been reported to validate whether:
 - TDECQ is a valid method to predict that a PAM4 transmitter will interoperate with worst case channels and receivers, and
 - The spec values in the standard are set correctly
- This presentation, as a step towards reconciling these issues, will report the first TDECQ measurements and explore correlation with link BER penalties.

106 Gb/s PAM4 TDECQ Test Setup



Optical Tx Frequency Response vs. AWG Peaking



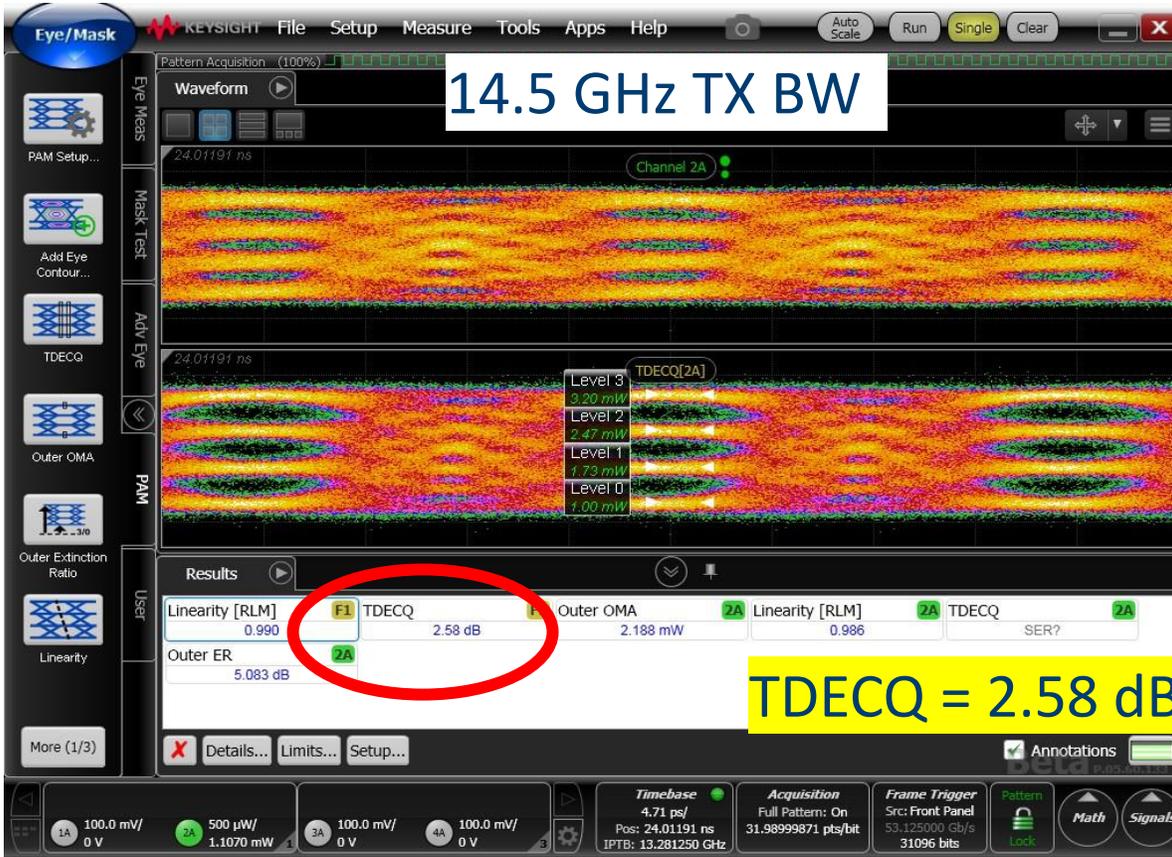
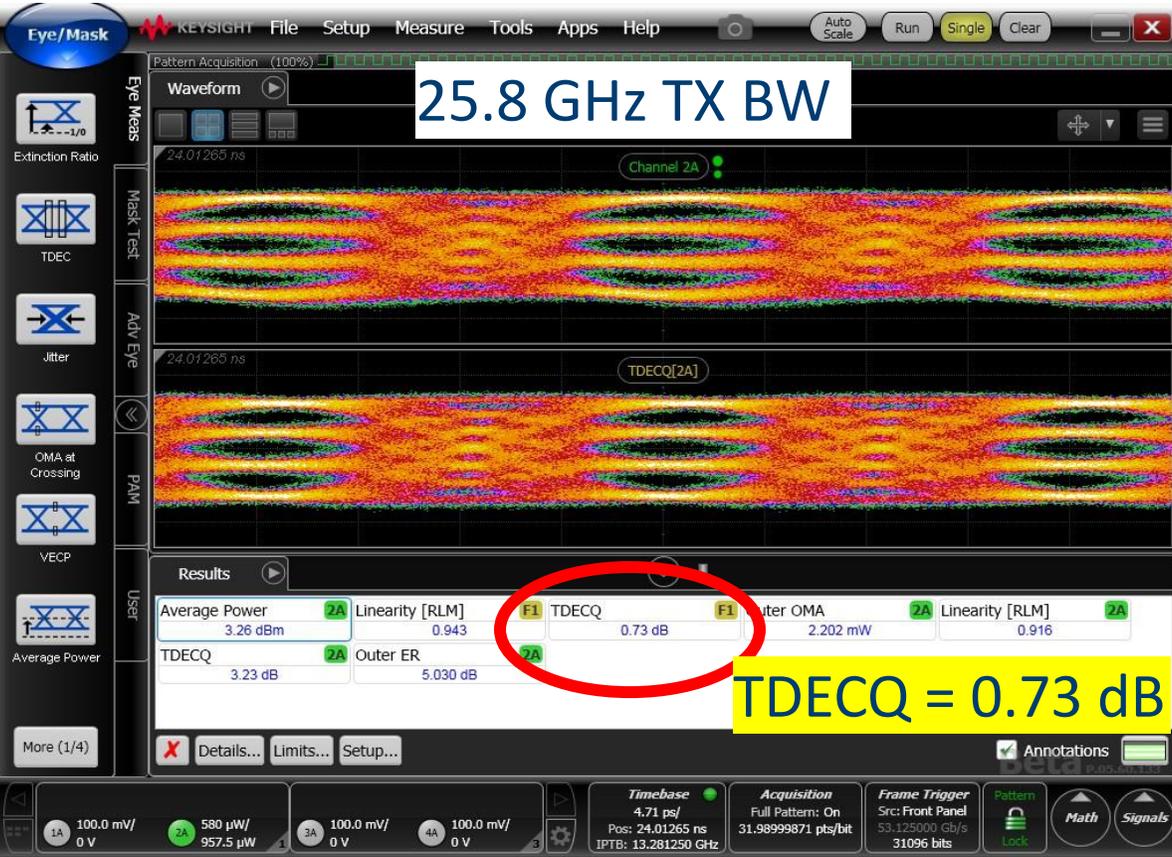
Change the Tx BW through AWG peaking

Eyes with TDECQ Measurements

Testing Conditions:

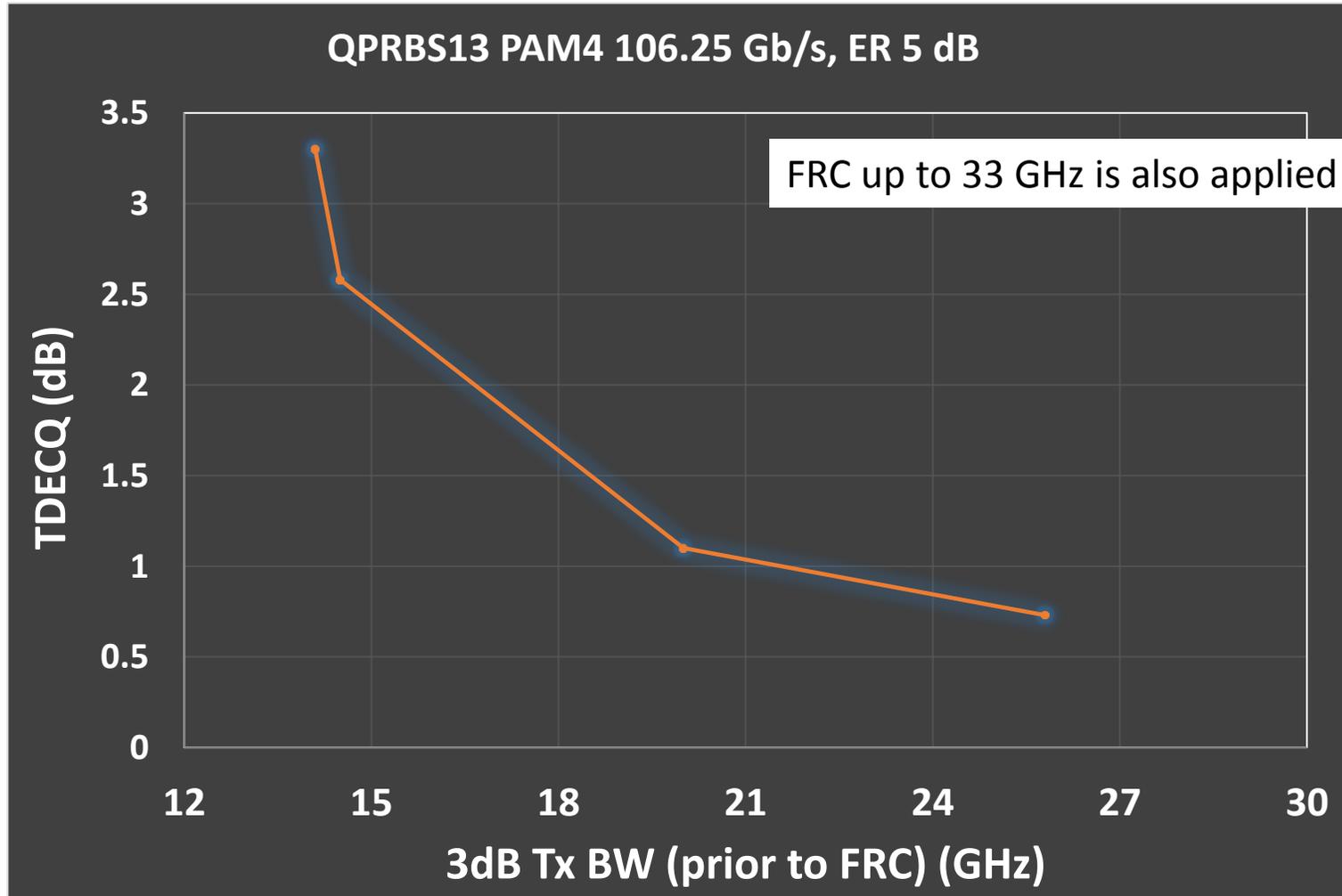
106 Gbs/ QPRBS13 Data Pattern
3 dBm OMA

5 dB ER
5 tap FFE with T/2 spacing (by scope)

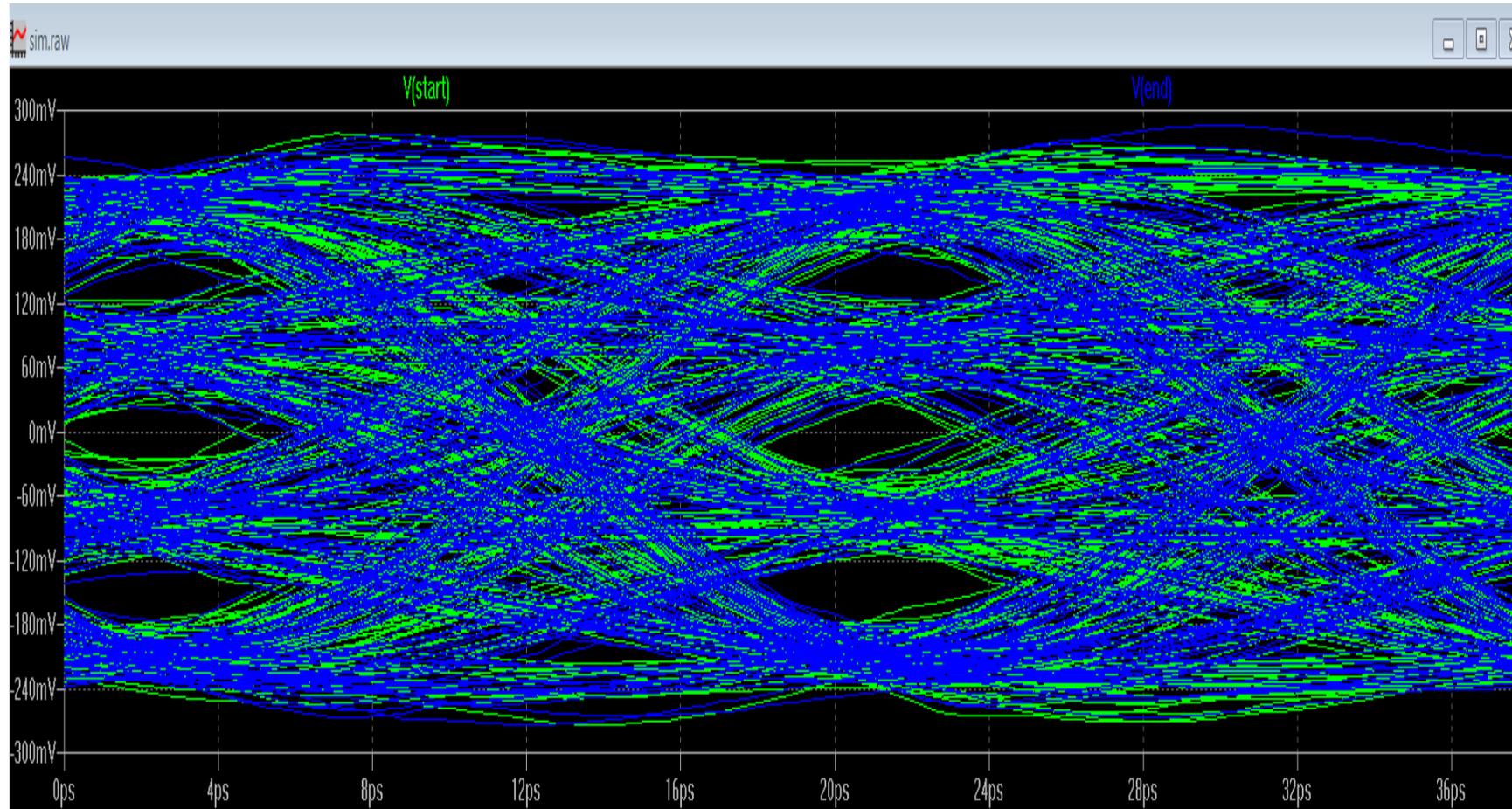


TDECQ degrades with a reduction in Tx BW

Measured TDECQ vs. Tx BW

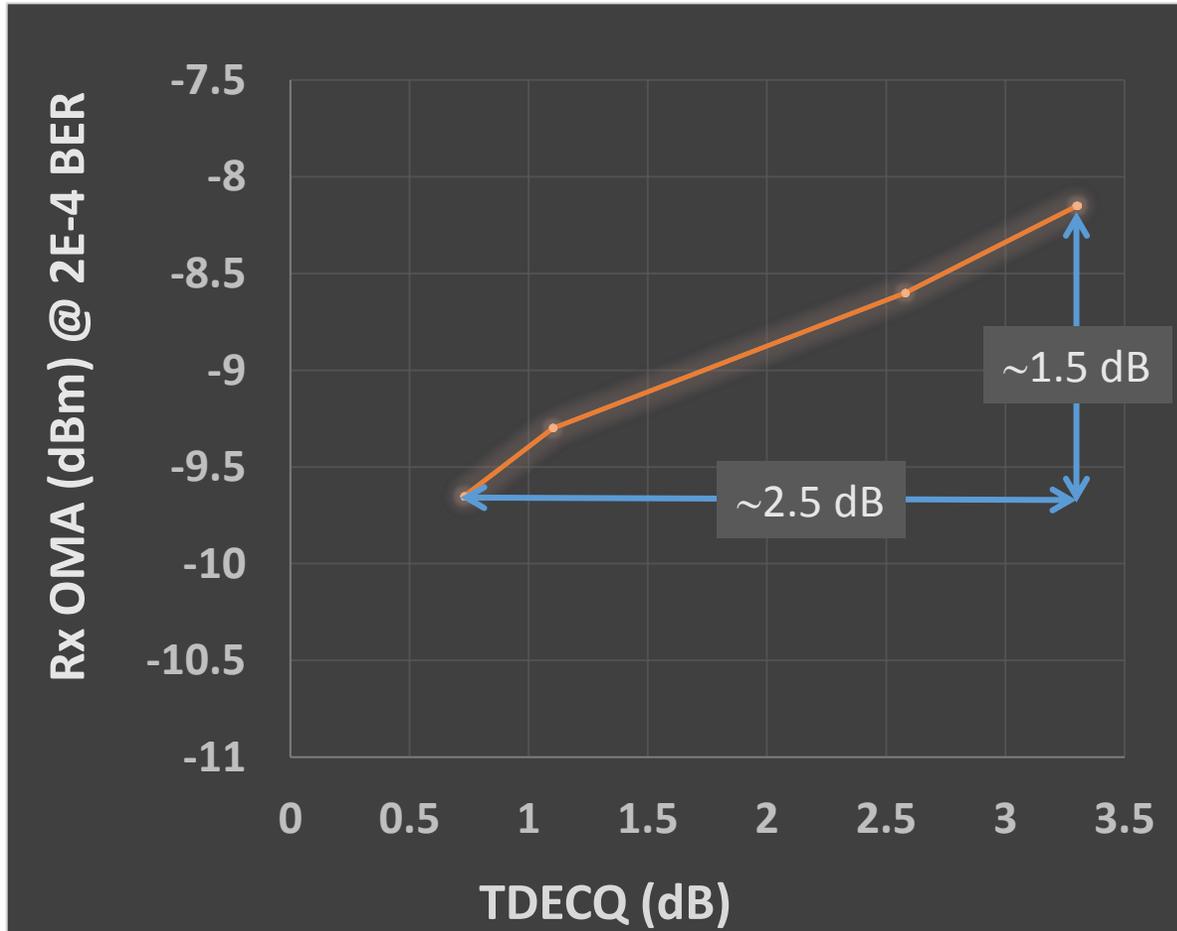


Typical Recovered Rx Eye by Post-Processing



16 taps for adaptive EQ (5 pre and 10 post)

Correlation between BER Penalty and TDECQ



2.5 dB change in TDECQ vs. 1.5 dB BER penalty

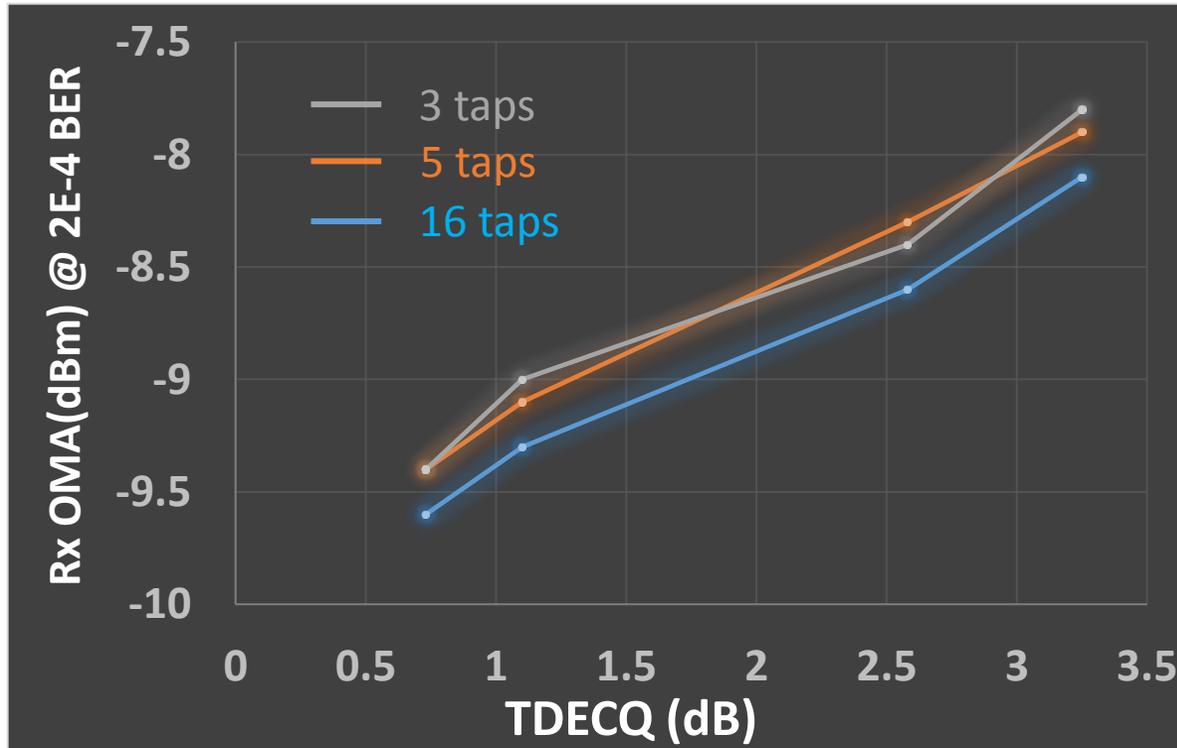
- Different optical Rx used
- Different EQ setting
- Rx with AGC used in BER testing

Consistent trend in measured TDECQ change and BER penalty

Summary

- Measured TDECQ for 106 Gb/s PAM4 Signal for the first time
- Confirmed good correlation between TDECQ with link BER penalty through TDECQ and BER measurements at different Tx BWs.

Post-Processing Tap # Dependence



Similar results with 3 taps and 5 taps. ~ 0.2 dB improvement with 16 taps