
Waveform Capture Data for TP2 Penalty Test Development

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Source Information and Test Conditions

All data is for a 10G FP source in module configuration (in TOSA driven by Laser Driver IC).

Eye Diagrams and Averaged Pattern Capture are PRBS9 @ 10.3125 Gb/s

- $x^9 + x^5 + 1$, from ITU-T V.52

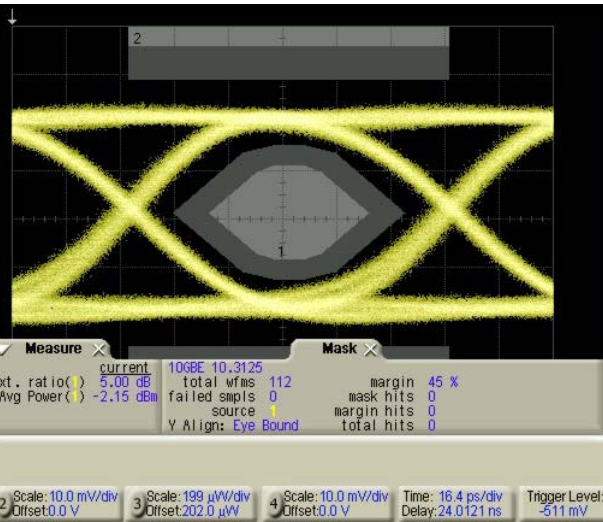
All cases are ~ Room Temperature (laser probably ~ 35C)

Waveform captures are 4050 points over a time range of 55 ns (~ 567 bits),
Averaged over 16 captures.

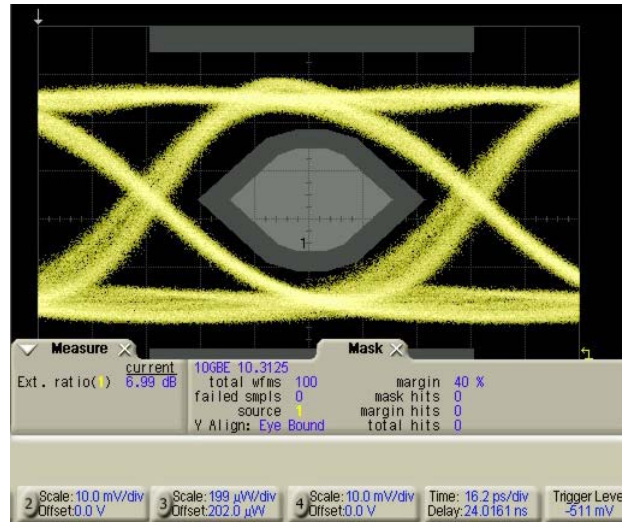
Cases:

- **Case 1: 'Normal' biasing conditions (35 mA average bias) - 5 dB ER**
 - Likely -LRM setup if no pre-emphasis
- **Case 2: Same as Case 1 but higher modulation - 7 dB ER**
 - Chosen to show a small degree of overshoot, turn-on jitter
- **Case 3: Same as Case 1 but very underbiased (25 mA, same modulation) – 9.2 dB ER**
 - Chosen to show much more overshoot, slower laser response and turn-on jitter.
- **Case 4: Same as Case 1 but Laser Driver slowed down considerably**
 - Chosen to show a very slow overall laser response or poor packaging
- **Case 5: An even more extreme example of Case 4**
 - Seems to show a very low bandwidth transmitter
- **Case 6: High biasing conditions (45 mA average bias) - 5 dB ER**
 - Shows a particularly fast laser response

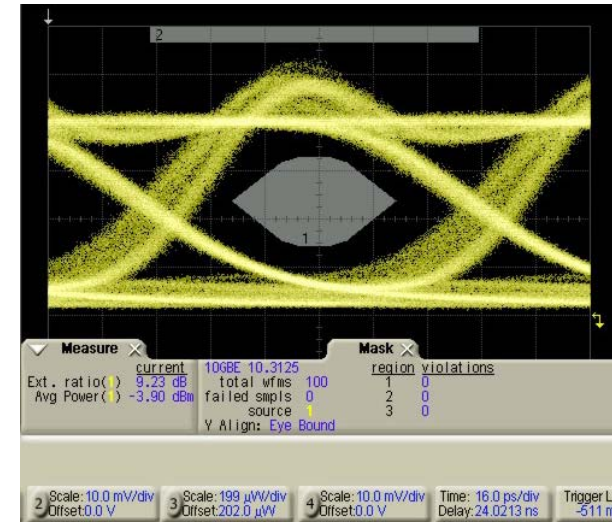
Eye Diagrams



Case 1: 5 dB ER, Normal Bias



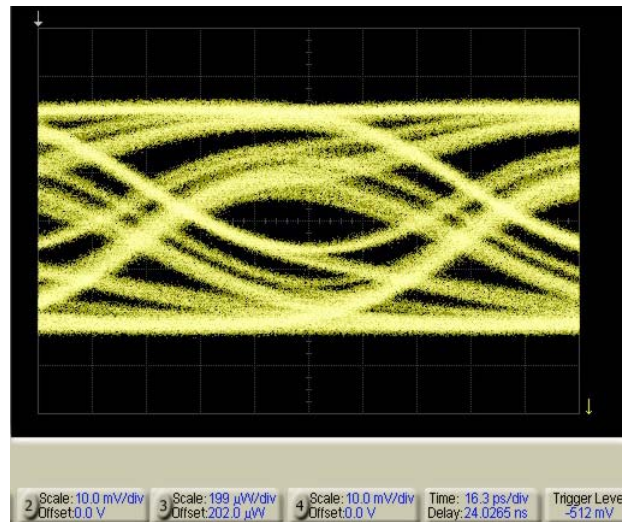
Case 2: 7 dB ER, Normal Bias



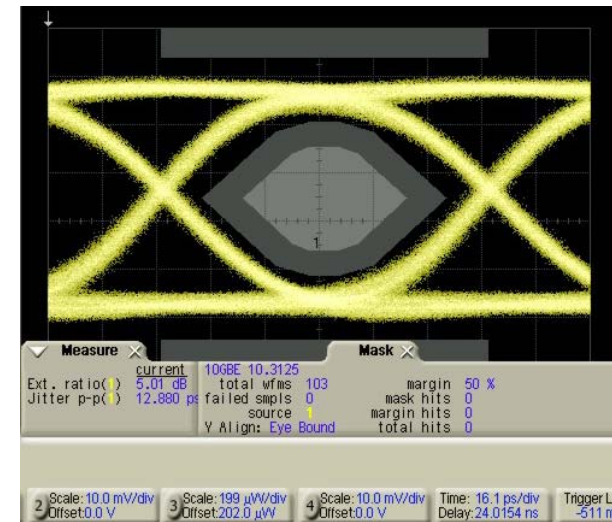
Case 3: 9.2 dB ER, Low Bias



Case 4: Case 1 + Slow Drive

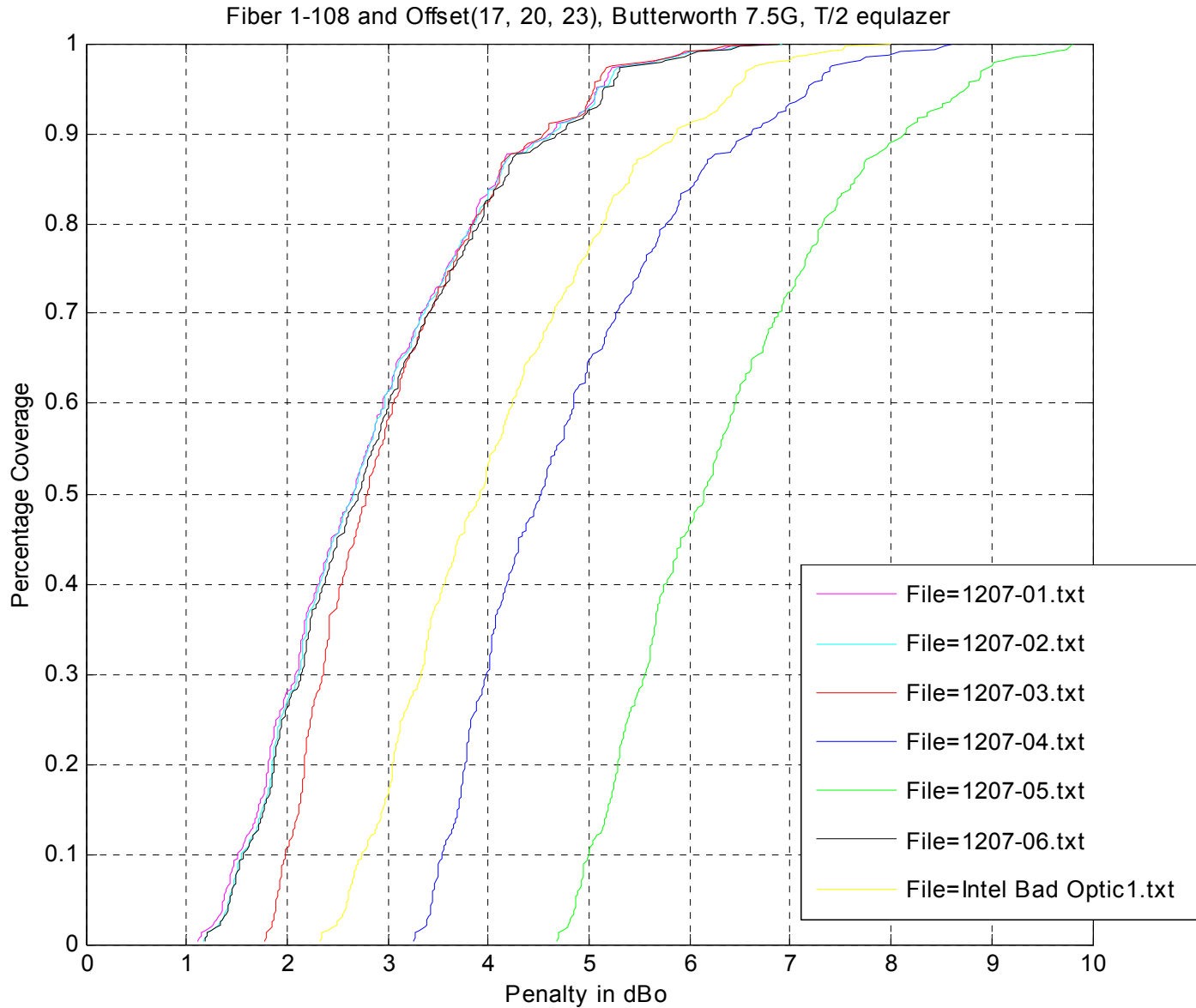


Case 5: Case 1 + Very Slow Drive



Case 6: 5 dB ER, High Bias

Penalty analysis



- Slow lasers do not as well.

- Overshoot has no negative effect with bad fibers, where things count. If you look closely, case 3 has a slight advantage up around 90%.

- BadOptic from Intel not plotted yet as eye. It's penalty is moderate.