



Calibration of ER for TP3 stress tests

Comment #358

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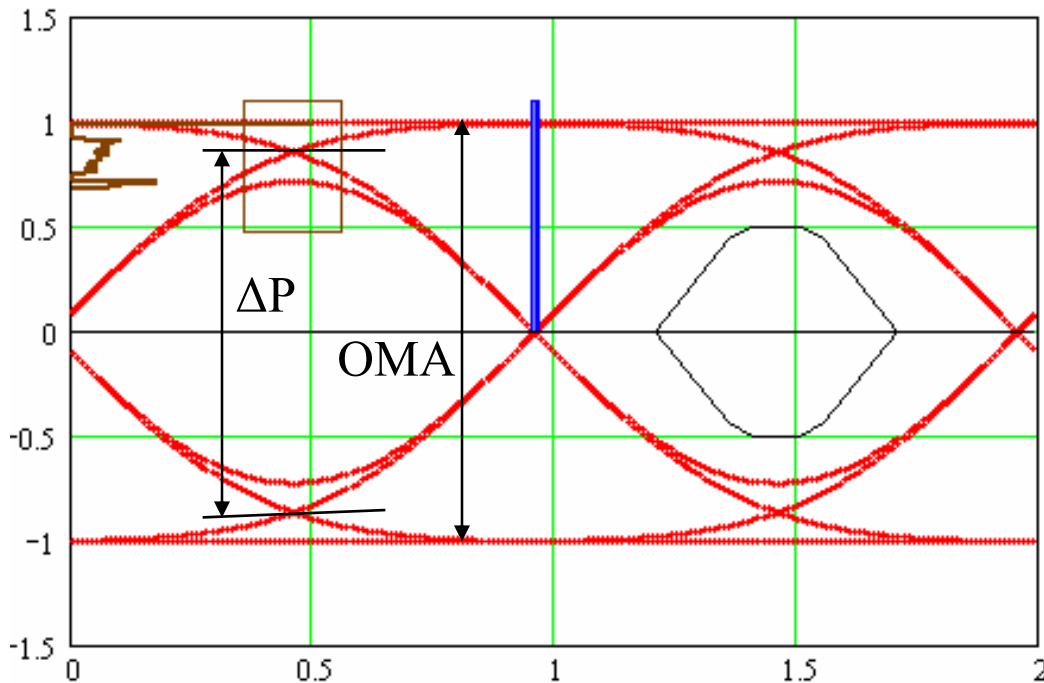
802.3aq

Austin Tx, May 2005

Purpose

- ER (3.5 dB) for the TP3 comprehensive stress test must be based on the Gaussian Tx filter response and not from the ISI caused by the fiber emulators.
- Current text in D2.0 suggests that ISI generators must be removed during calibration of ER. However, it is possible to calibrate ER without removing the ISI generators if the OMA test pattern is used. This can simplify the process and reduce errors.

Simulation of x



- Simulate basic prbs TP3 source
 - Gaussian and BT4 response
 - No ISI generators
- Determine x , where $x := \frac{\Delta P}{OMA}$
 - x relates ER values to OMA
 - ΔP is difference of ER histogram means
- Topline = 1 & logic1 histogram mean = 0.843
 - So, $x = 0.843$

Arithmetic

As above, $x := \frac{\Delta P}{\text{OMA}}$, where $\Delta P := \text{mean}(\text{logic1}) - \text{mean}(\text{logic0})$

$$x = 0.843$$

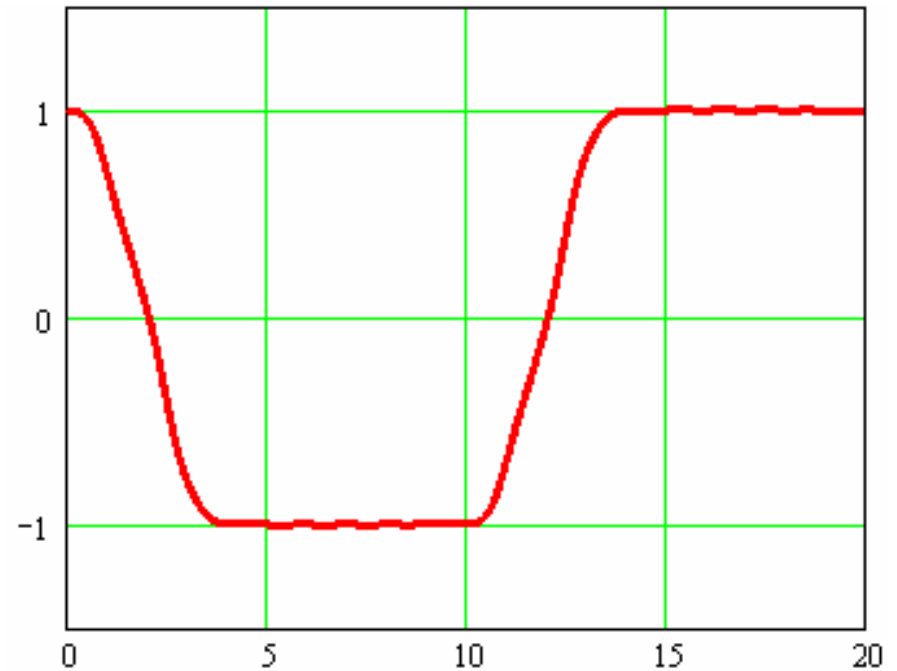
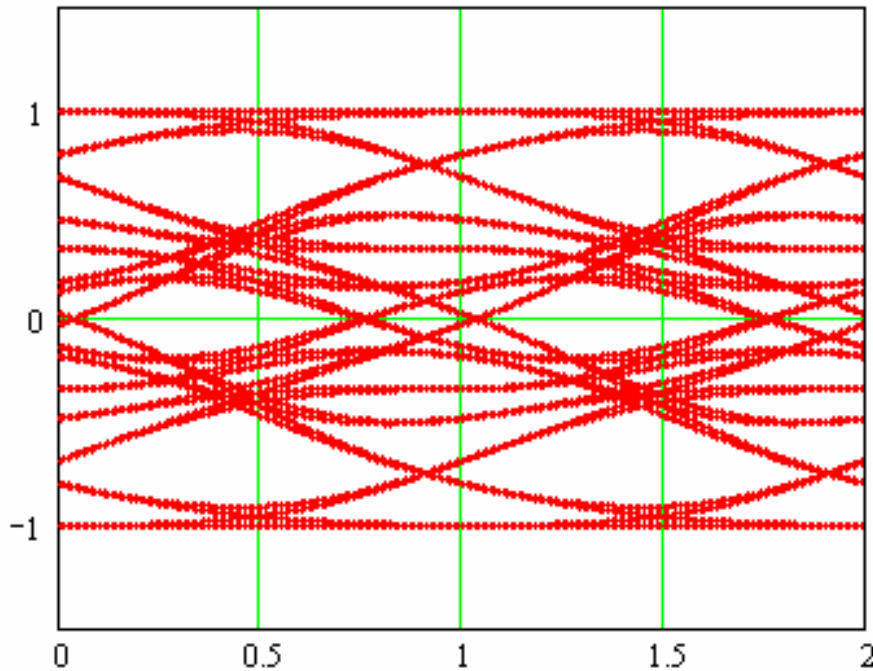
$$\text{ER} := \frac{(2 \cdot P_{\text{avg}} + \Delta P)}{(2 \cdot P_{\text{avg}} - \Delta P)}; \quad \text{Including } x \text{ and OMA, } \text{ER} := \frac{(2 \cdot P_{\text{avg}} + x \cdot \text{OMA})}{(2 \cdot P_{\text{avg}} - x \cdot \text{OMA})}$$

For TP3 calibration, define $\text{ER}_{\text{OMA}} := \frac{(2 \cdot P_{\text{avg}} + \text{OMA})}{(2 \cdot P_{\text{avg}} - \text{OMA})}$ *where, unlike ΔP , OMA is measured with a square wave*

$$\text{Combining terms, } \text{ER}_{\text{OMA}} := \frac{x \cdot (\text{ER} + 1) + (\text{ER} - 1)}{x \cdot (\text{ER} + 1) - (\text{ER} - 1)}$$

If $\text{ER} = 3.5$ (in dB), $10 \cdot \log(\text{ER}_{\text{OMA}}) = 4.25$ dB

Is OMA visible through ISI generators?



- Case 1 from D2.0 (~5.1 dB PIE-D)
 - Includes Gaussian and BT4 filters
- prbs data eye closed, but 20 bit square wave is clearly visible for OMA histograms

Conclusions

- ER for TP3 tester can be calibrated with OMA of square wave cal pattern
 - No need to remove ISI generators
- Set $ER_{OMA} = 4.3$ dB with square wave
 - Use OMA values (not eye histograms)
- For standard
 - Add text in stress test calibration clause
 - Do *not* change Table 68-3
 - *Should* be added to informative test...