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Receiver Sensitivity Measured by Block Error Ratio Method

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Introduction

- Since 802.3dj D1.1, a new block error ratio methodology was introduced for Optical Rx sensitivity measurement. However, we only saw very limited testing results for 200Gbps/L ([rodes 3dj 01b 2411](#)) before. In [mi 3dj adhoc 01a 250206](#) some qualitative results for block error ratio based Rx sensitivity of 100Gbps/L were discussed, but still no consensus was made so far

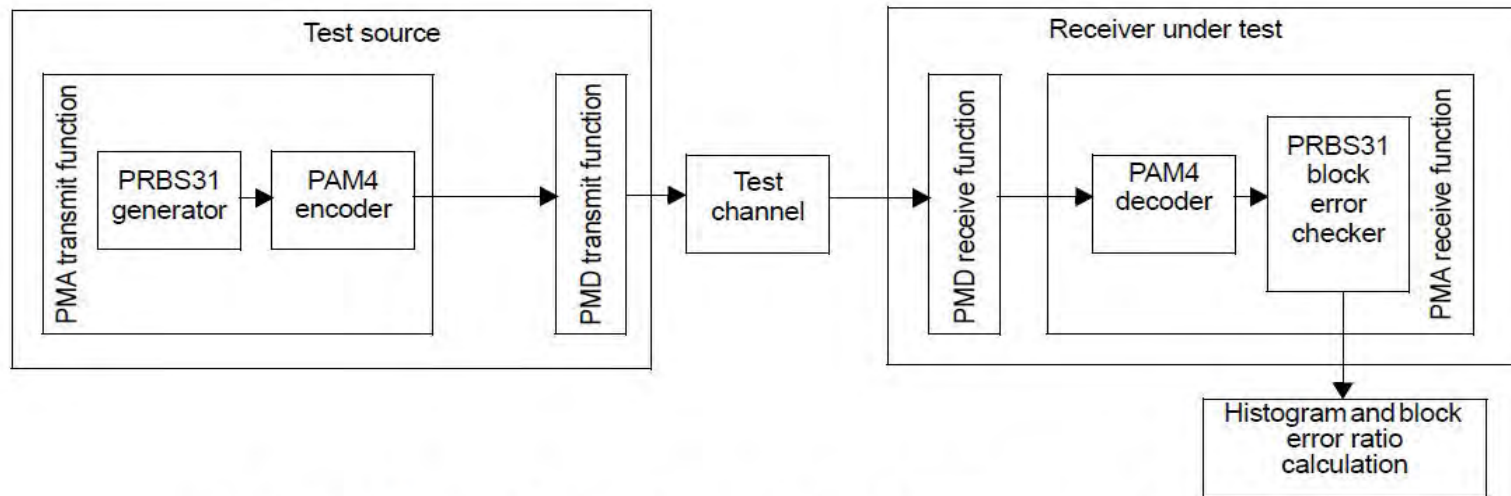
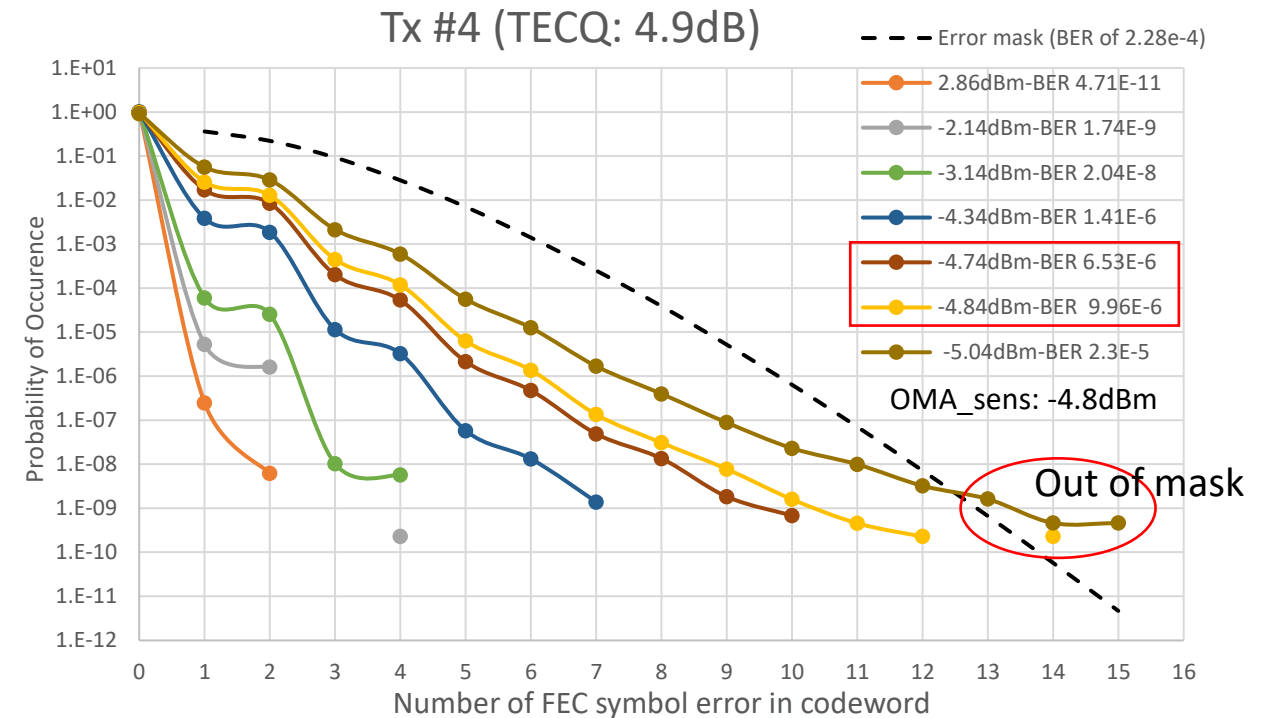
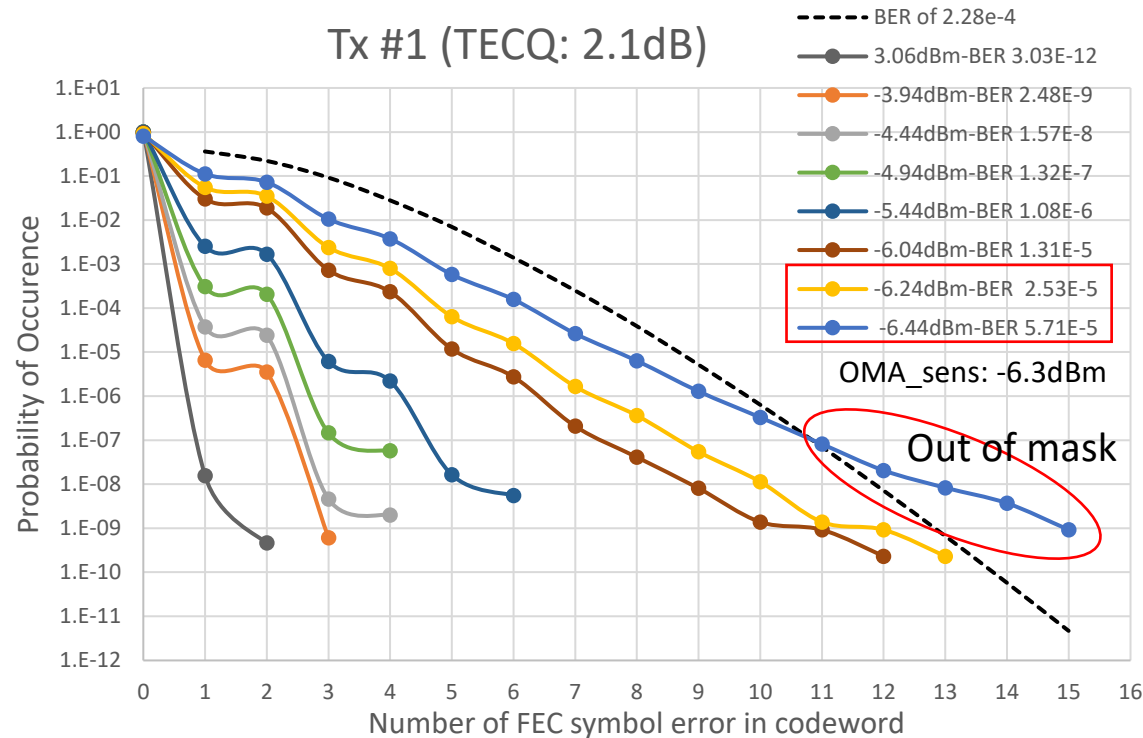


Figure 174A–1—Test configuration for a PMD without Inner FEC

- On Tx side, TDECQ/TECQ definition is almost unchanged, except a Ref Rx with 15-tap FFE Eq is defined instead of a 5-tap FFE Eq for 100G/L before. And the target PAM4 symbol error ratio (SER) is 4.56×10^{-4} . The correlation btw block error ratio based Rx sensitivity with TDECQ/TECQ is a critical foundation for 200Gbps/L PMD optical specifications

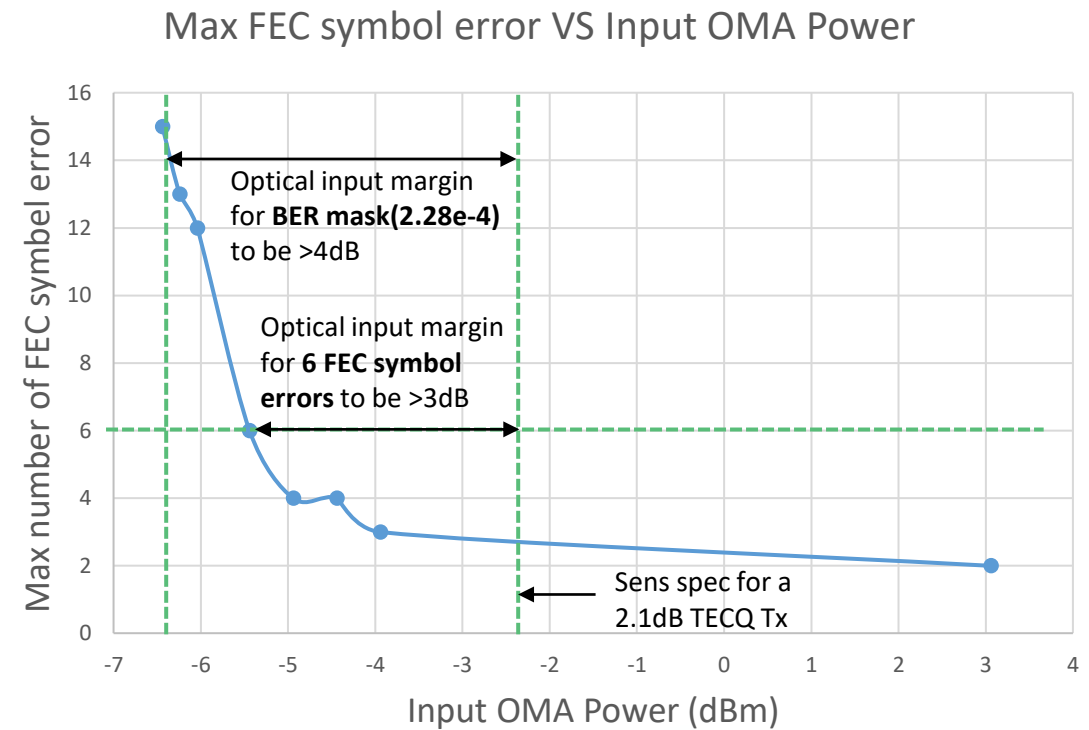
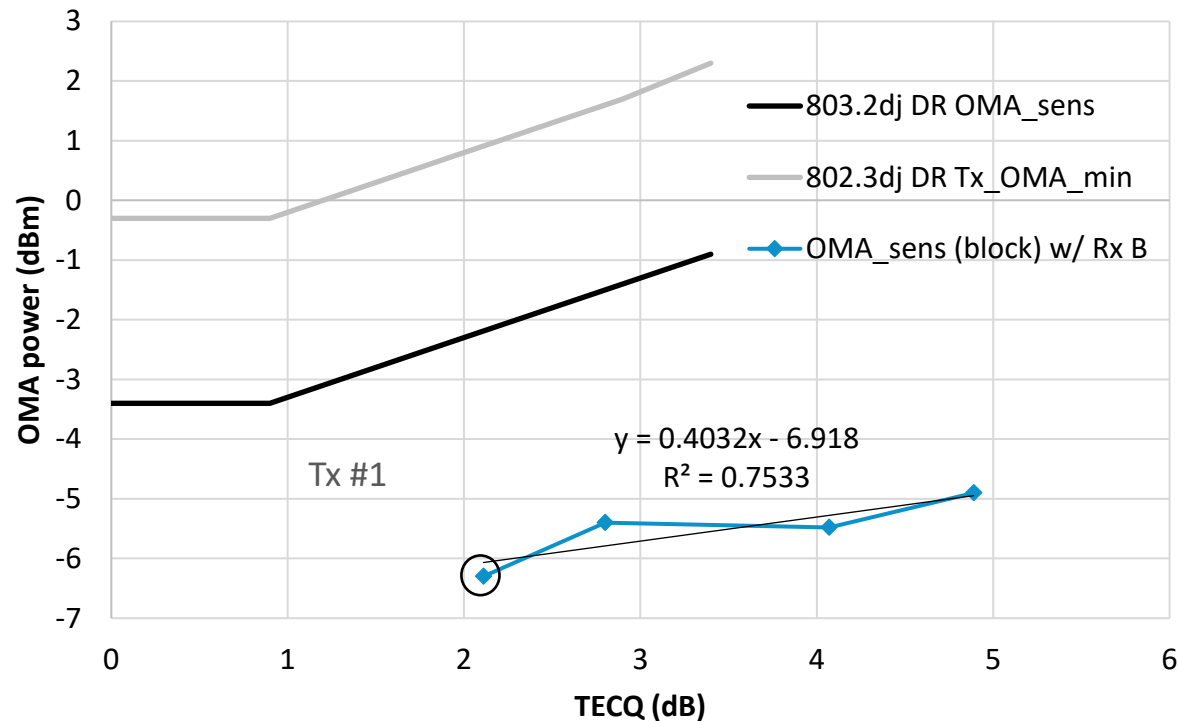
Rx sensitivity compliance determined by error histogram mask

- It's indicated in [healey 3dj_02a_2409](#) that given the measured error histogram, compliance can be verified via a comparison of the error histogram to a mask
- The error histogram curves below or above the mask will determine the corresponding Rx input power(OMA) passes or fails the Rx sensitivity spec



Block error ratio based OMA_sens vs TECQ

- Measured Rx sensitivities show adequate margin for 802.3dj PMD (DR) spec
- The OMA_sens VS TECQ does not follow 1dB to 1dB rule (the fitting slope is <1)
- However, the block error method is much more time consuming (6mins for one histogram curve) comparing with BER method
- Could # of FEC symbol error in codeword vs input OMA power curve be helpful to identify Rx performance, and how to implement?



I Conclusion and Discussion

- The real Rx sensitivity measured by block error ratio method is promising for 802.3dj defined spec
- The OMA_sens vs TECQ does not follow 1dB to 1dB rule (the fitting slope is <1), which makes Tx OMA spec to be conservative
- The block error ratio method for Rx sensitivity measurement is difficult to implement for mass production due to its time consuming

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THANK YOU