

Link performance and baseline analysis

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Jan. 21st 2021

IEEE P802.3 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force
Interim Teleconference



Outlines

- Introduction
- ER & RIN_OMA performance analysis
- Interoperability concerns: overshoot before and after fiber
- Conclusions

Introduction

- The baseline was proposed by murty_3db_adhoc_01b_121720.pdf.
- Compared with 50Gbps PAM4 specs, the extinction ratio changes from 3 to 2.5 dB, RIN_OMA evolves to -131 dB/Hz.
- Simulations indicate that the relax of ER may reduce the system margin.
- The effective reference receiver bandwidth ranges from 26.5 GHz to 15 GHz as fiber goes from 2 m to 100m.
- Pre-emphasis aiming at 100m will cause an overshoot at short distance. Analysis indicates that the overshoot may have error floor penalty, similar to rodes_3cu_adhoc_030520_v2.pdf.

Evaluation Methodology

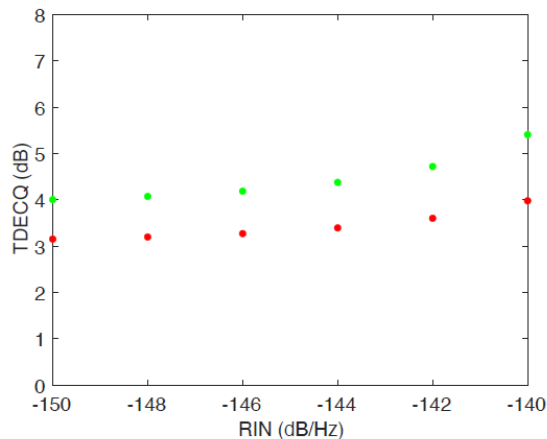
Simulations scheme for TDECQ and BER evaluations:



- To study the effect of ER and RIN alone, the DAC ENOB=4.5 bits , and BW not limited.
- For the VCSEL model, device has a bandwidth of 27 GHz as demonstrated in ingham_3db_01a_062520.pdf.

ER and RIN_OMA evaluation

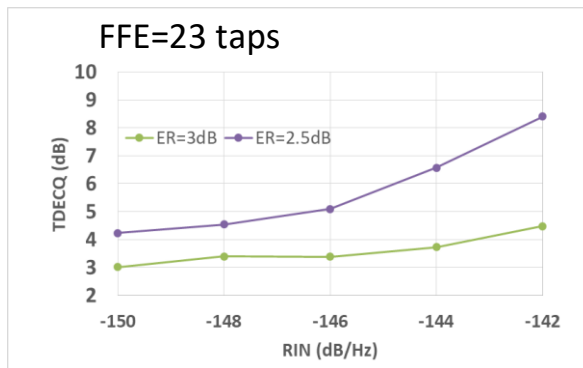
- Further decreasing the ER will result in higher requirement for RIN_OMA.
- System margin is suggested to investigate.



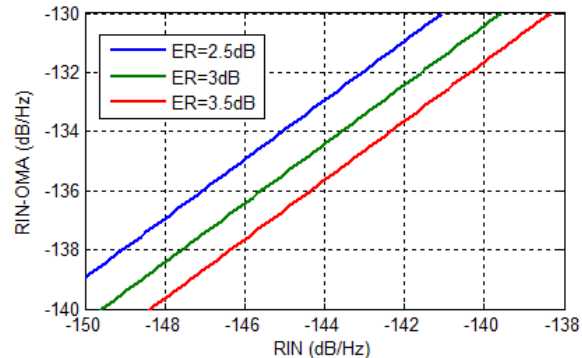
TDECQ for 100 m OM4 versus RIN for 9-tap Rx FFE (green) and 23-tap Rx FFE (red)

ingham_3db_01a_062520.pdf

simulation



simulation



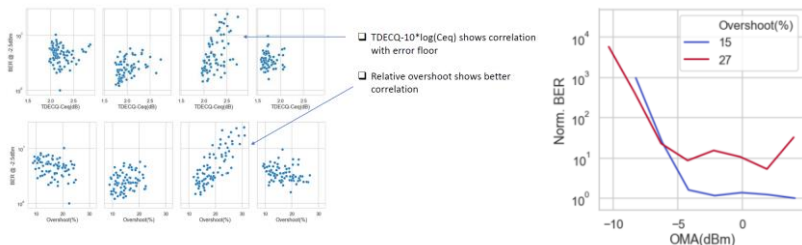
Interoperability Concerns: Overshoot before and after fiber

- The effective ref. receiver bandwidth significantly changes from 26.5GHz to 15GHz as fiber increases from btb to 100m.
- The pre-emphasis aiming at 100m will cause overshoot at short distance.
- The overshoot may further induce error floor penalty, similar to rodes_3cu_adhoc_030520_v2.pdf.

Test methodology is based on Clause 138.

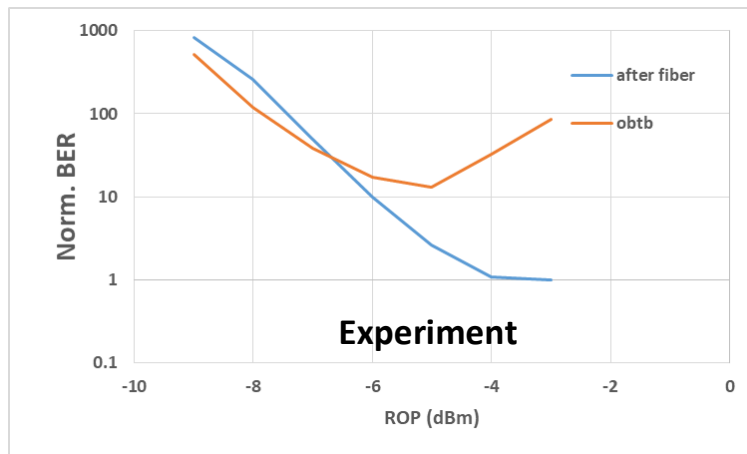
Description	Value		Unit
	OM4 50m	OM4 100m	
Half-symbol-rate filter bandwidth	26.5625		GHz
TDECQ reference response bandwidth*	21.0	15.0	GHz
Number of taps on T-spaced FFE	9		

murty_3db_adhoc_01b_121720



rodes_3cu_adhoc_030520_v2.pdf.

Pre-amphasis aiming at 50Gbps PAM4 200m OM4,
The back-to-back performance may have error floor issue.



Conclusions

- The relax of ER may have higher requirement on RIN_OMA.
- Dynamic range from 2m-100m for 100G/lane in MMF is large, the overshoot may further degrade the error floor.
- The interoperability between different distances is suggested to investigate.

Thank you

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