

Technical Feasibility of 4*100G 10km

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Background Information

- During the Ad Hoc discussion, the following objectives were proposed.
 - Define single-wavelength 100 Gb/s PHYs for operation over:
 - Duplex SMF with lengths up to at least 2 km
 - Duplex SMF with lengths up to at least 10 km
 - Define four-wavelength 400 Gb/s PHYs for operation over:
 - Duplex SMF with lengths up to at least 2 km
 - Duplex SMF with lengths up to at least 10 km

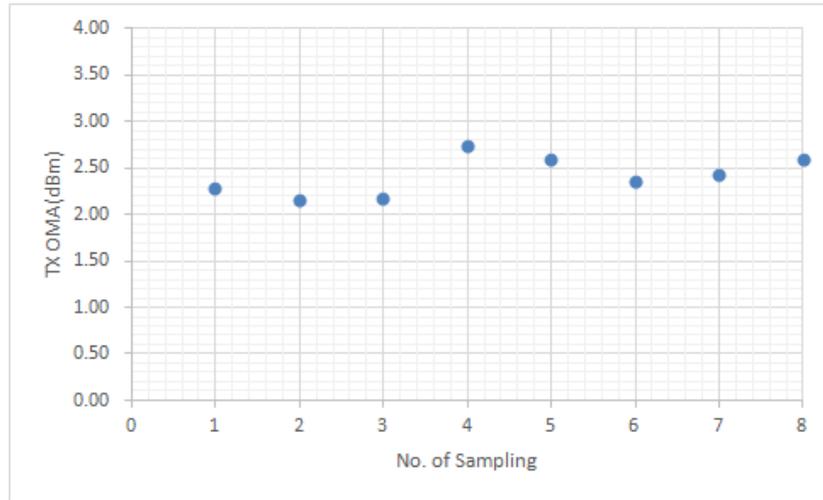
- As 4*100G PAM4 would be the most difficult to achieve from the technical point of view, in this presentation we want to provide information of the technical feasibility of the proposed objective for “Define four-wavelength 400 Gb/s PHYs for operation over: Duplex SMF with lengths up to at least 10 km”

Solutions

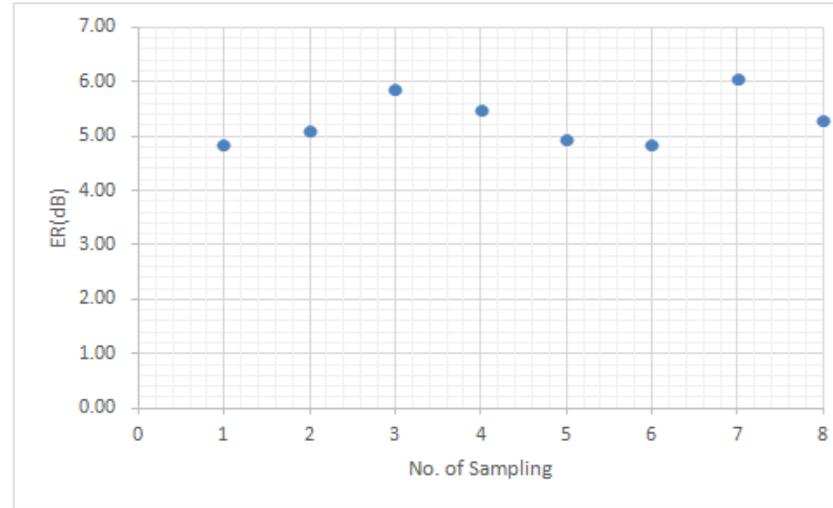
- There are several ways to achieve 400G over 10km transmission.
- PAM4
 - 4*100G PAM4
- Other modulation formats
 - 4*100G DMT
 - 4*100G Coherent
 - 1*400G Coherent
- In this presentation, we will only focus on the 4*100G PAM4.

TX with EML

4*100G PAM4 Tx output power (OMA)

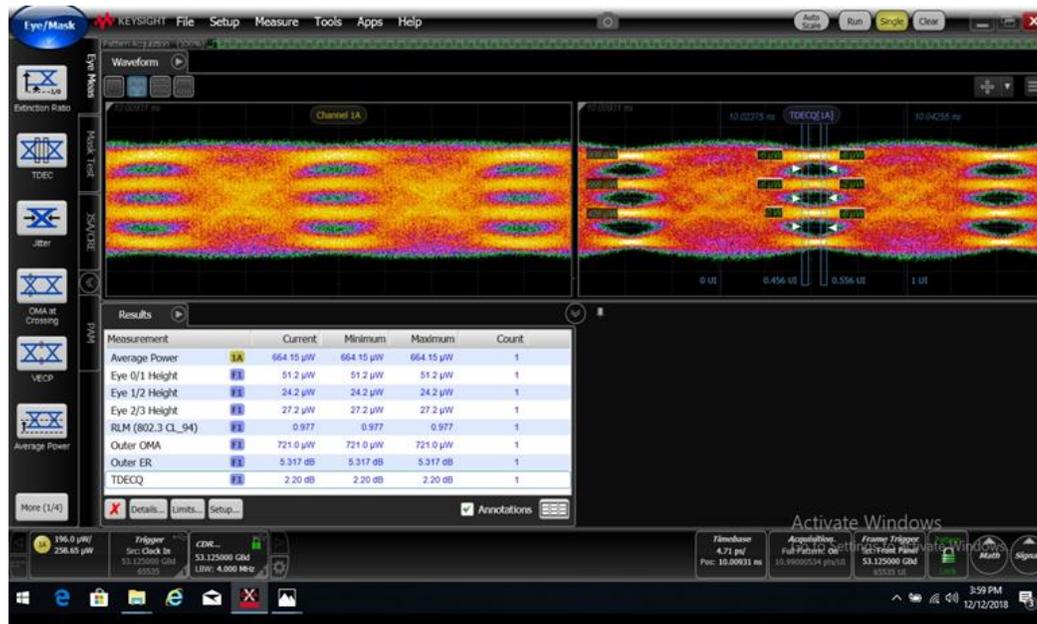
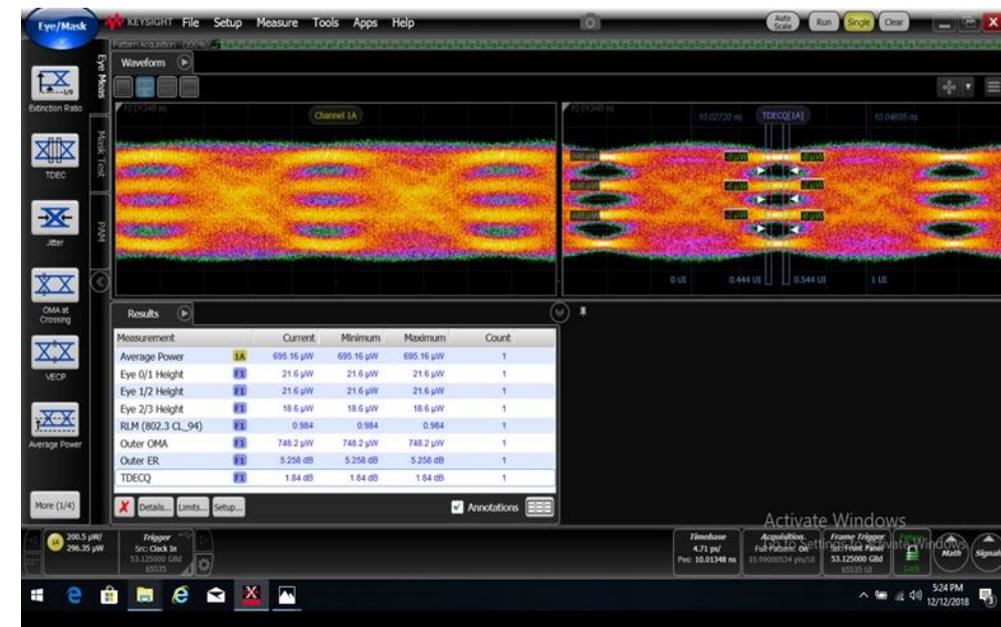
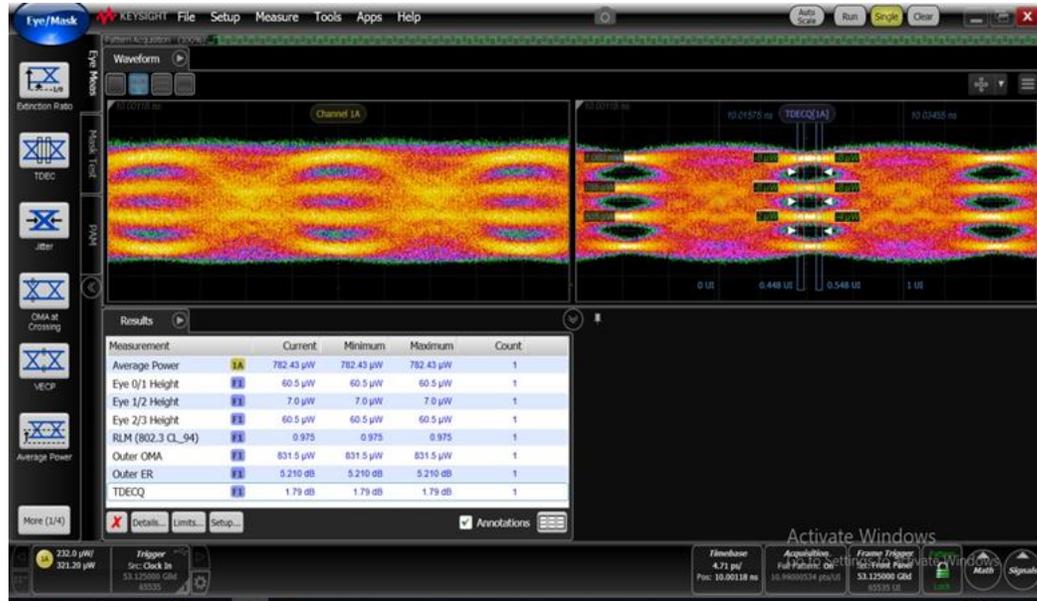


4*100G PAM4 Tx output ER



- ❑ Measured with 4*100G TOSA one channel, after MUX.
- ❑ On line test
- ❑ Signaling rate: 53.125GBaud
- ❑ Room Temperature

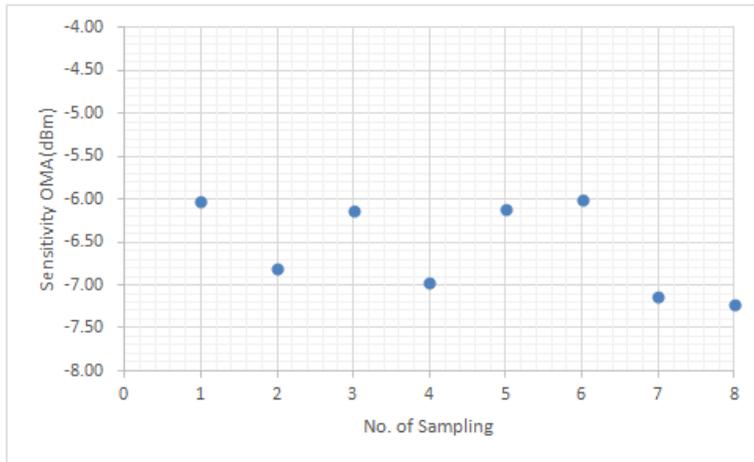
TX Eye Examples



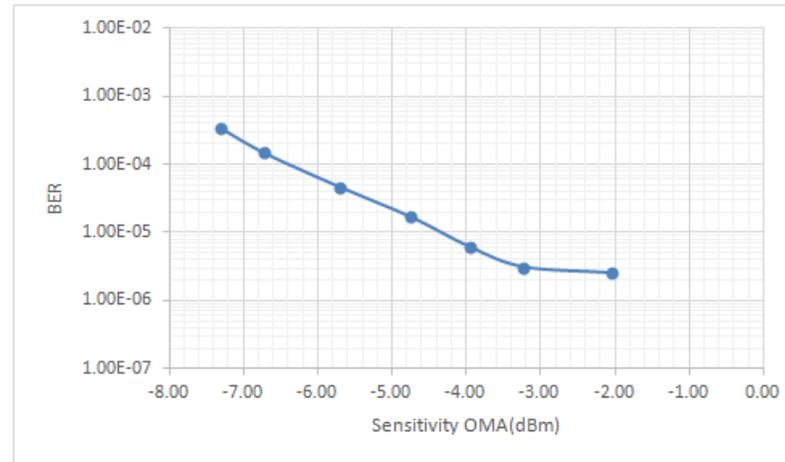
- Measured with 4*100G TOSA one channel
- Signaling rate: 53.125Gbaud
- SSPRQ pattern
- Room Temperature
- SECQ < 2.2dB

RX with PIN

4*100G PAM4 Rx sensitivity (OMA)



4*100G PAM4 BER curve



- ❑ Measured with 4*100G ROSA one channel, before DeMUX
- ❑ On line test
- ❑ Signaling rate: 53.125GBaud
- ❑ Room Temperature

10km transmission LWDM

10km transmission Fiber

Channel	Wavelength	Unit
Reach	10	km
Attenuation	6.3	dB
L0	1294.53-1296.59	nm
L1	1299.02-1301.09	nm
L2	1303.54-1305.63	nm
L3	1308.09-1310.19	nm
MPI	0.5	dB
Dispersion (min)	-28.4	ps/nm
Dispersion (max)	9.5	ps/nm

10km transmission Link

Channel	Wavelength	Unit
Tx OMA outer	2.72	dBm
Attenuation	6.3	dB
Dispersion penalty reserved	0.5	dB
SECQ tested	2.9	dB
MPI	0.5	dB
ER tested	5.4	dB
Rx Sensitivity tested @ SECQ 2.9dB	-7	dBm
Rx Sensitivity calculated @ SECQ 1.4dB	-8.5	dBm
Required Rx sensitivity @ SECQ 1.4dB	-6.08	dBm
Extra margin	2.42	dB

Conclusion

- Information in this presentation supports the technical feasibility of the proposed objective of 4x100G PAM4 for 10km when using LWDM configuration.

