



ACCELERANT NETWORKS

10GBASE-CX4 Study Group December Interim

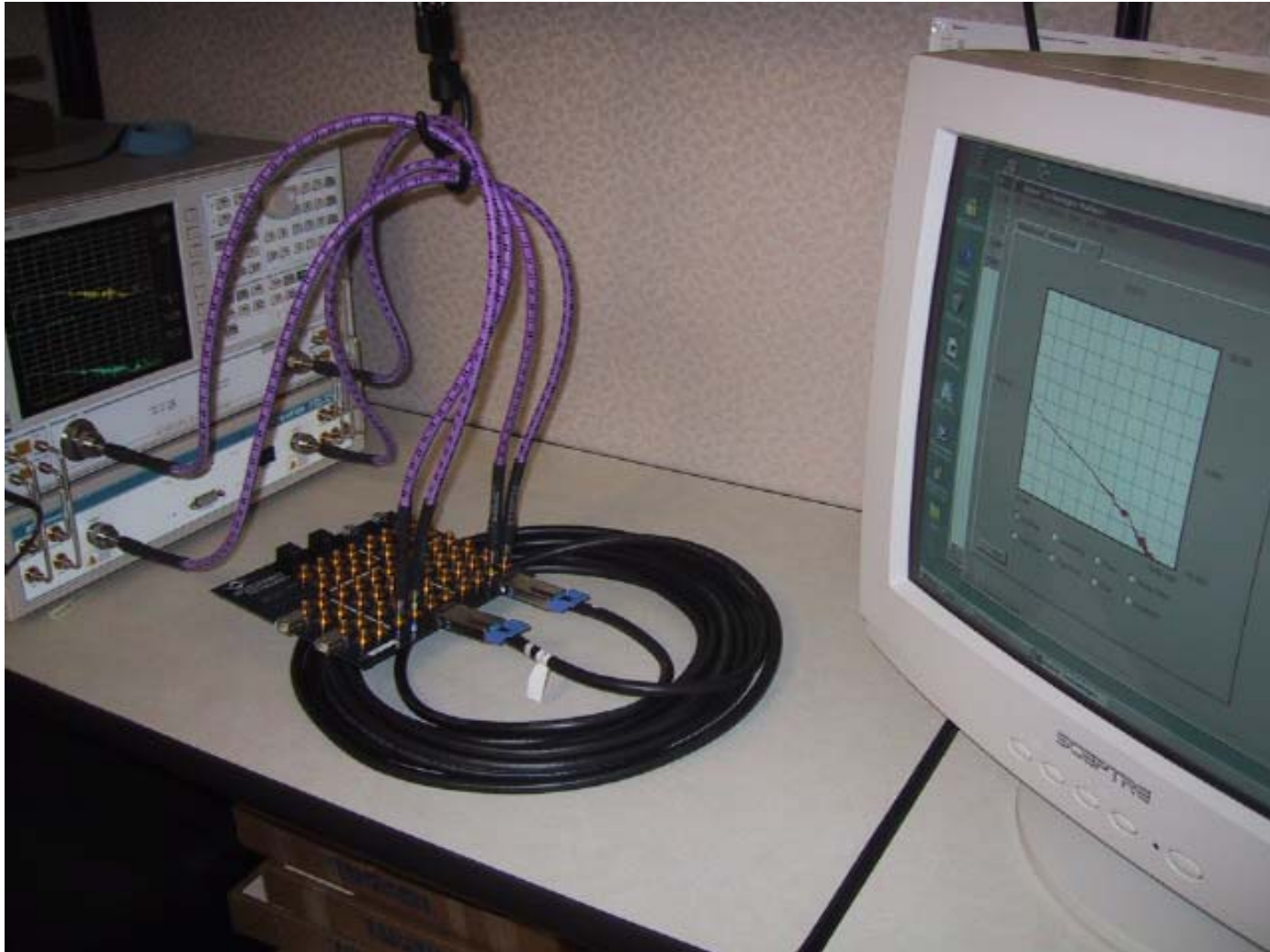
Outline

Bill Hoppin
Product Development and Strategic Sales
Accelerant Networks

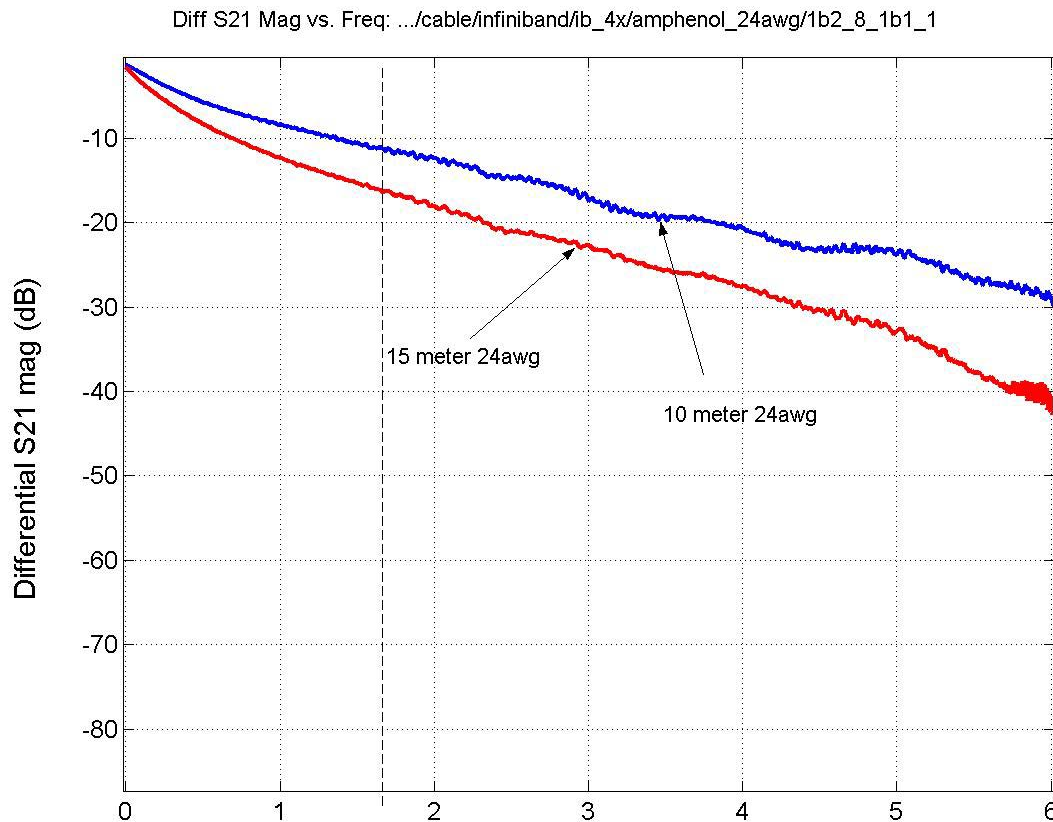
Outline

- Setup
- Channel Characteristics
- Rx Eye Mask Fit to sim
- Simulation
- Conclusions and Items for Discussion

ATN Test Setup



Vector analyzer summary results



Length	Loss (S21) @ 1.625 GHz
10 meter	11.2 dB
15 meter	16.1 dB

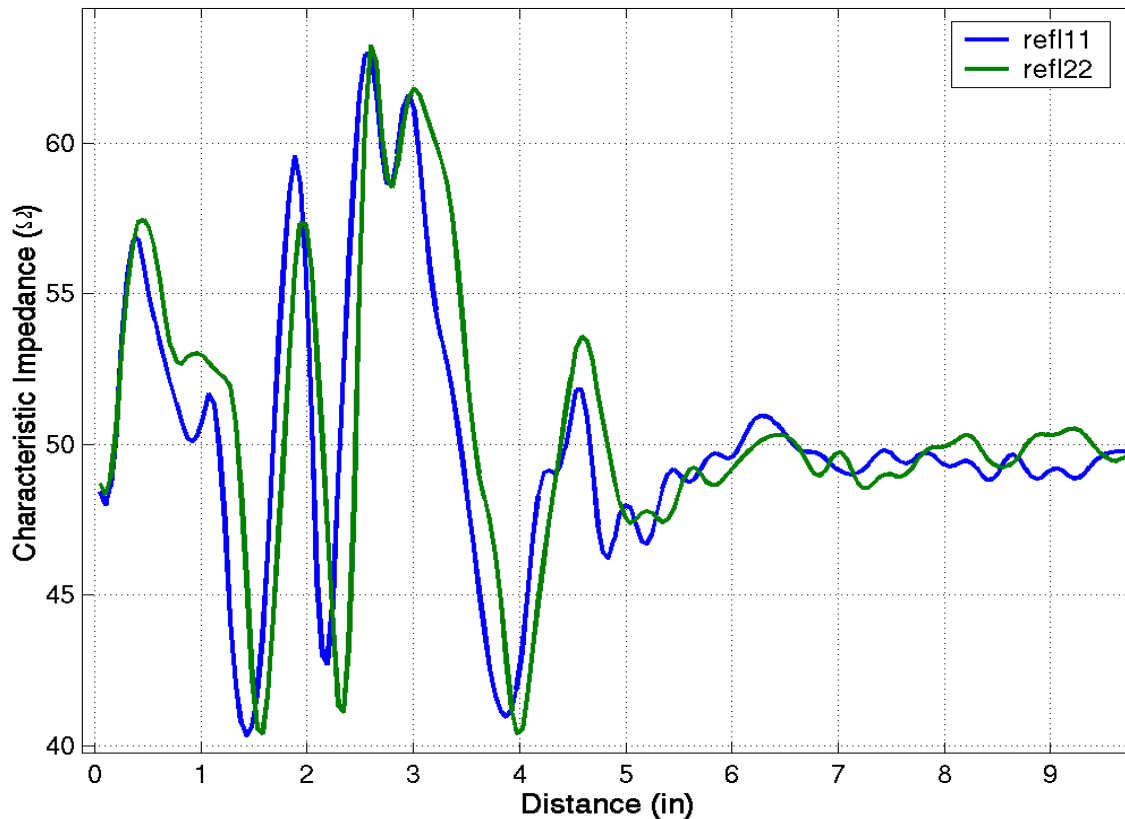
Typical cable response
To that previously presented

Approximately
1dB/Meter loss

Vector analyzer summary results

■ TDR of connector interface

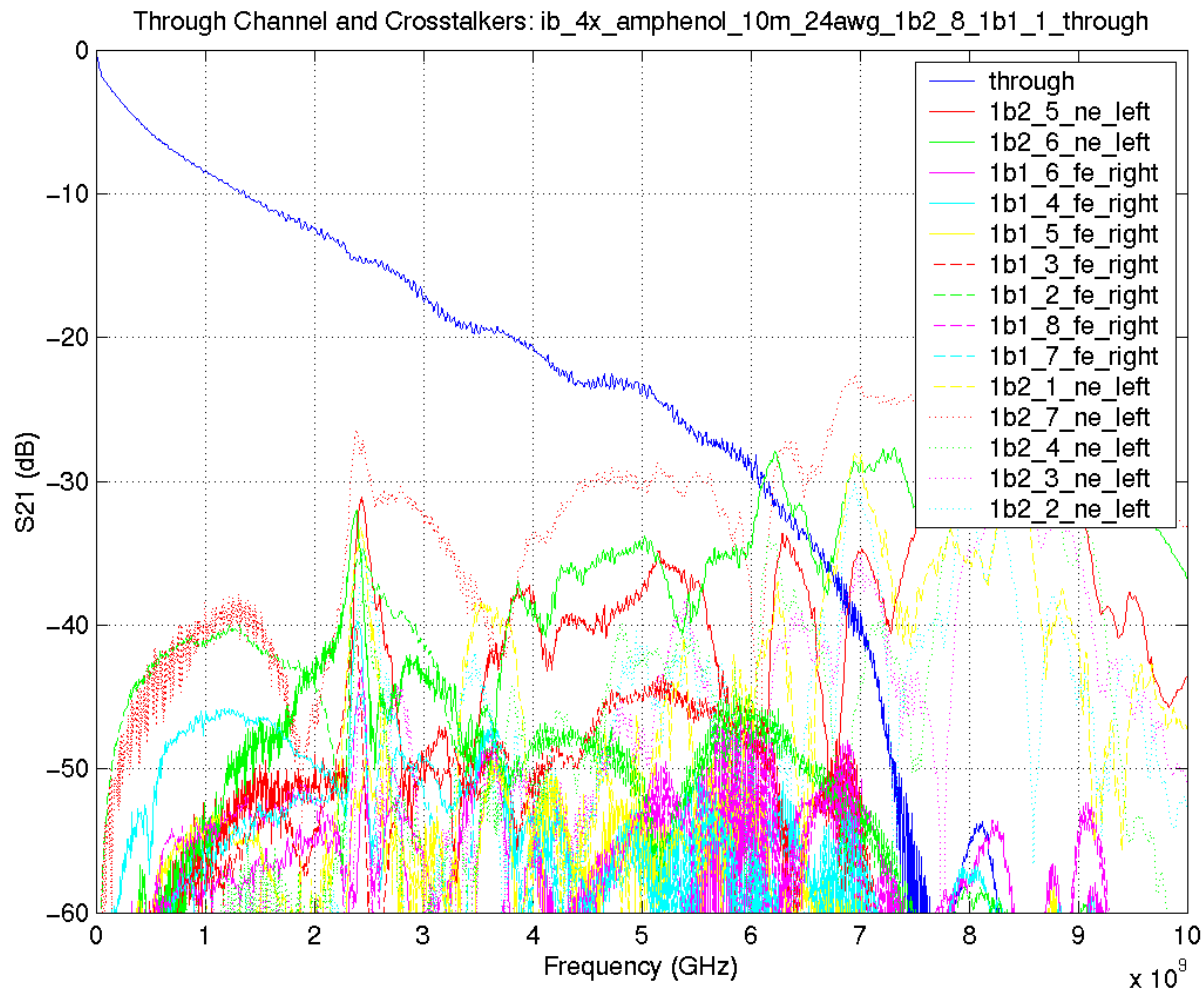
Impedance Profile: .../cable/infiniband/ib_4x/amphenol/10m_24awg/1b2_8_1b1_1



Reasonable
response

Well behaved

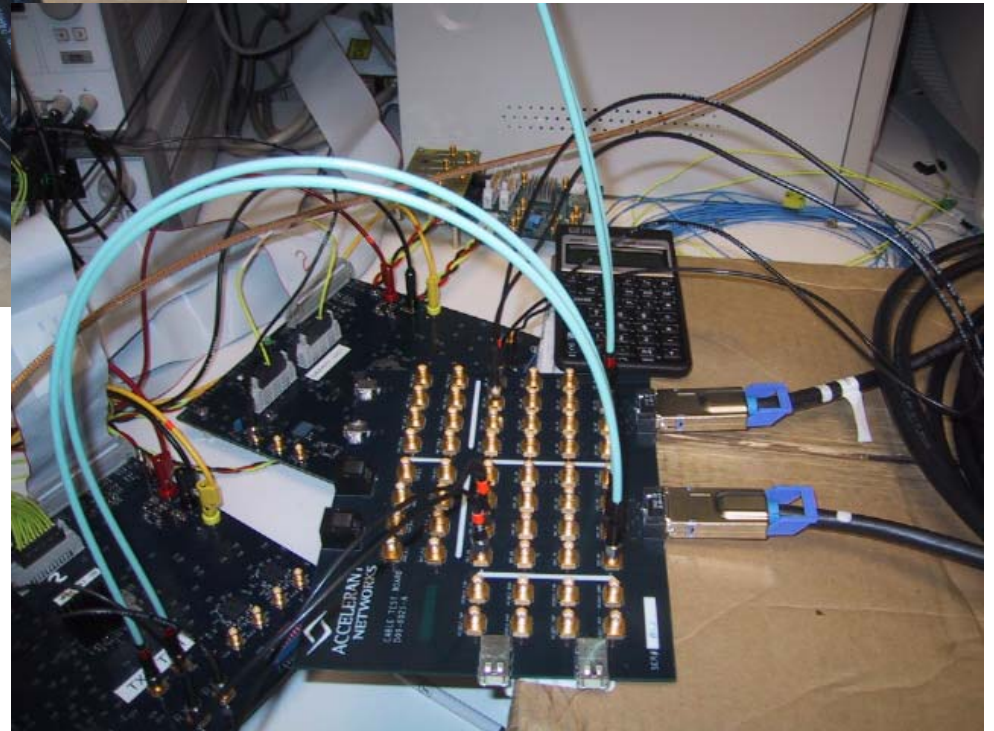
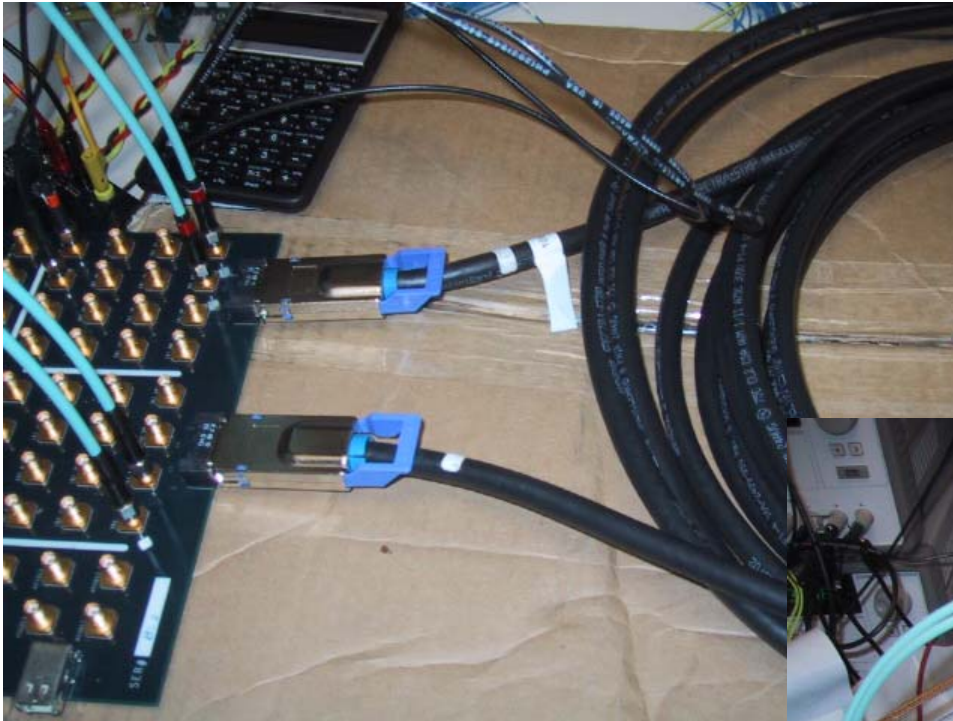
Channel Loss & Crosstalk



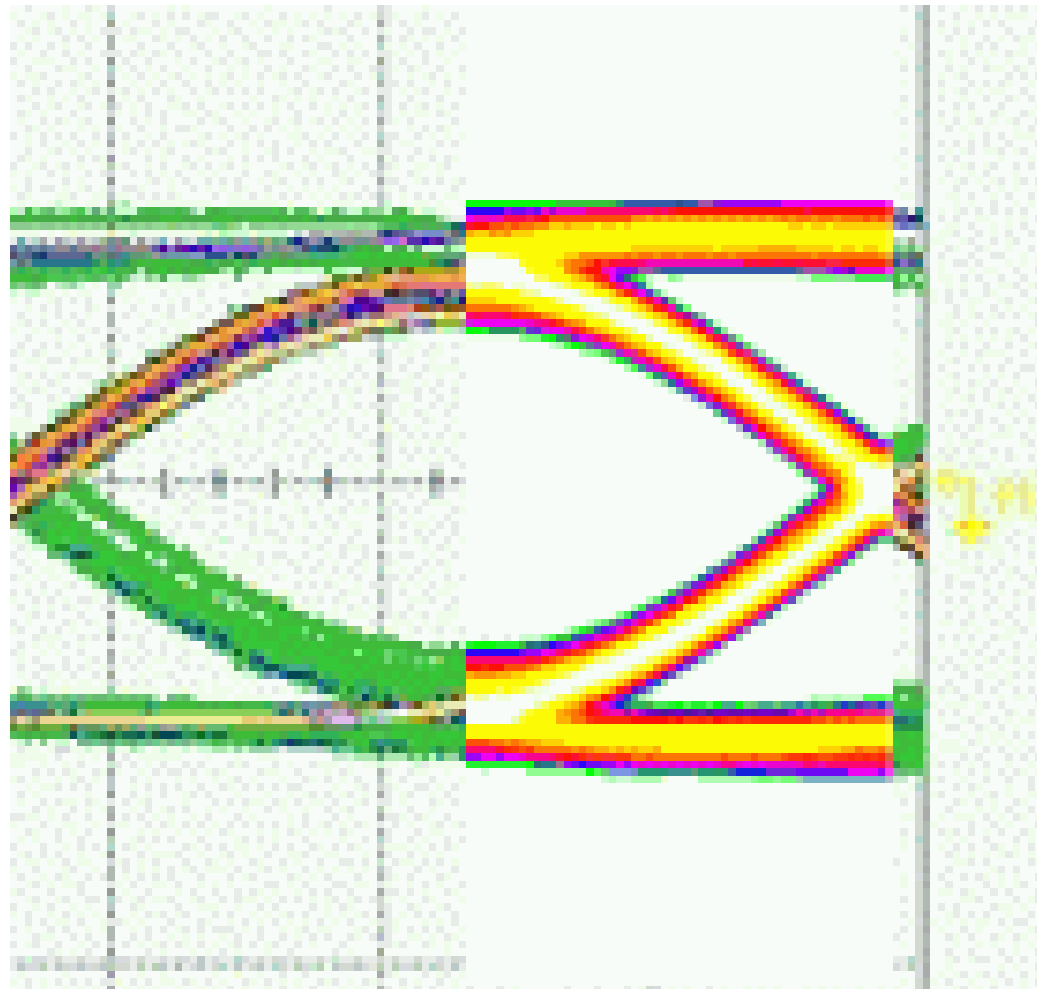
< 40dB at Nyquist

SNR of 30dB

Lab Test Setup

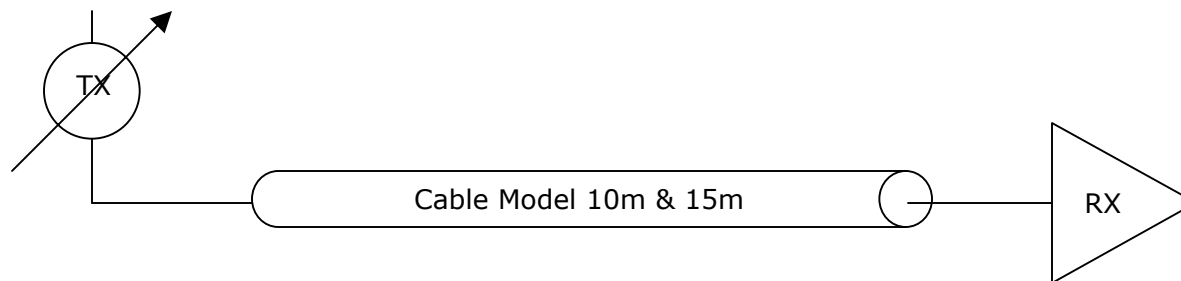


15 Meter Eye at RX, Sim vs Meas



Simulation Model

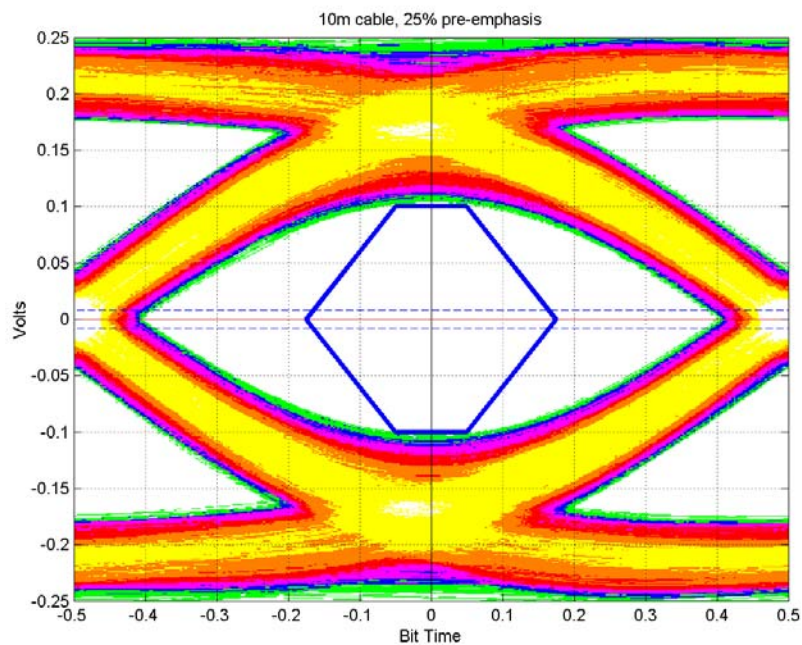
- Programmable Transmit EQ Setting
 - CX4 Setting 25%, 35% & 50%
- S-parameter characterization of Tx, Rx and cable
- DJ, RJ, Noise, etc incorporated into simulator
- Simulator performance well-verified



10/15 Meter Eye with 25% Pre-Emphasis

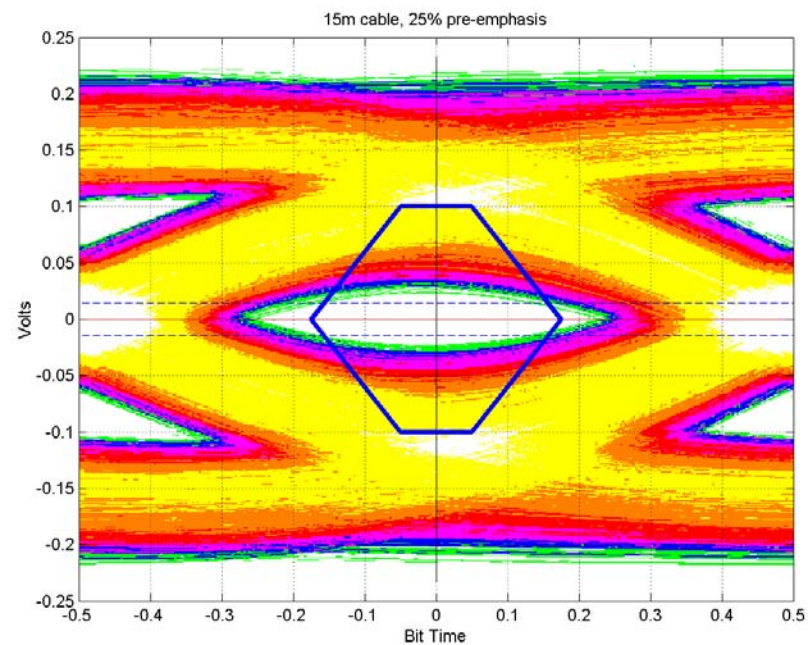
BER < 1e-50

10 meter



BER < 1e-21

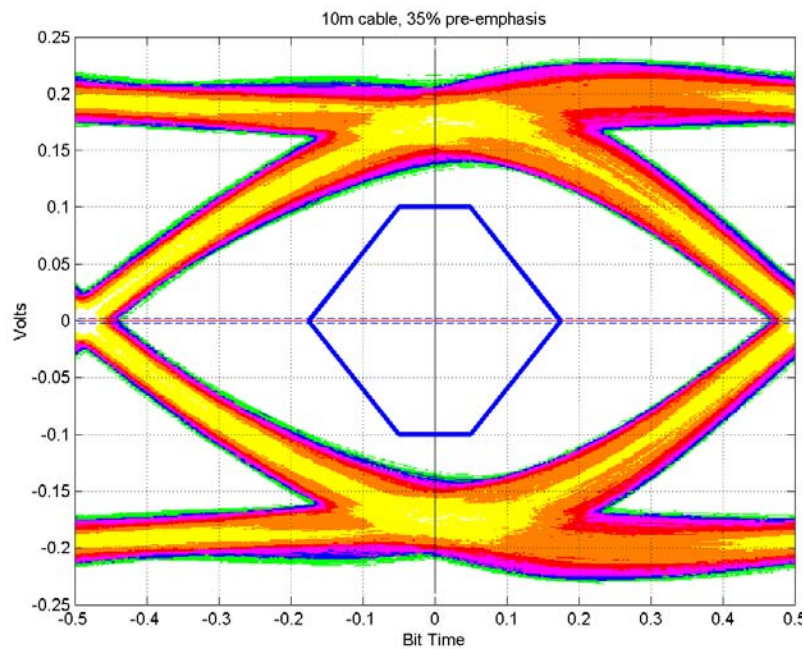
15 meter



10/15 Meter Eye with 35% Pre-Emphasis

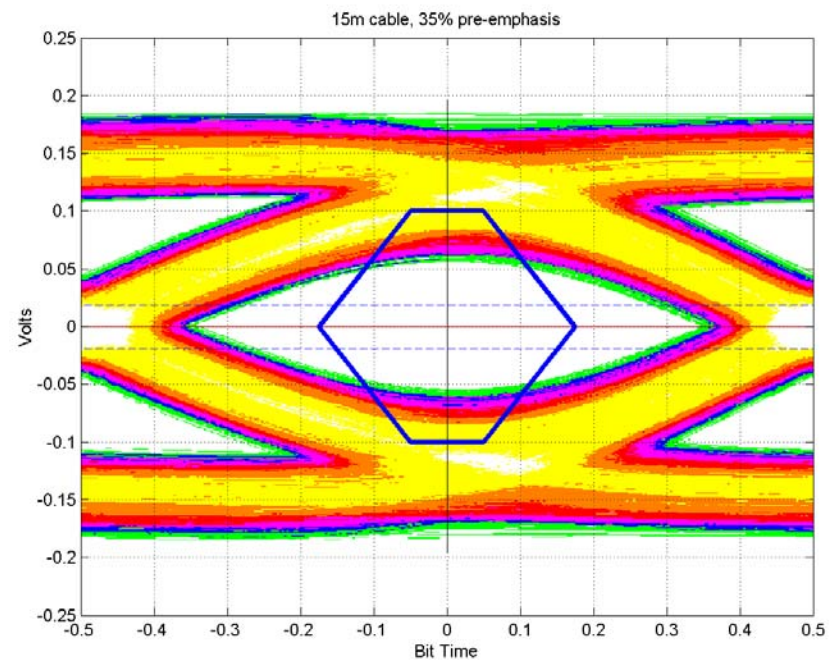
BER < 1e-50

10 meter



BER < 1e-50

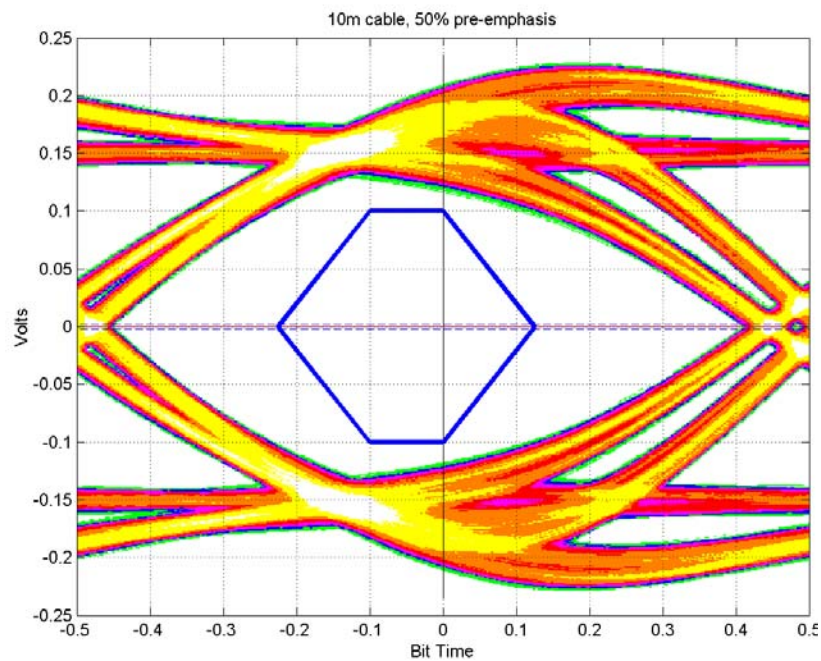
15 meter



10/15 Meter Eye with 50% Pre-Emphasis

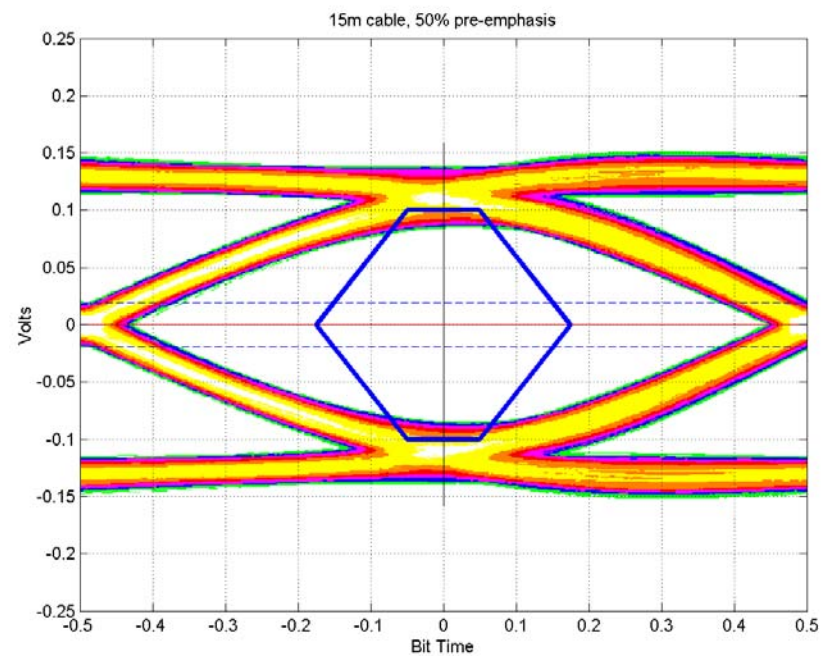
BER < 1e-50

10 meter



BER < 1e-50

15 meter



What is Best Pre-Emphasis ?

- All presented cases allow present XAUI eye mask fit @ 10M
- With 1-Vp-p launch can not quite meet present XAUI mask at 15M with any case
- More pre-emphasis means cleaner eye for long cable
- More pre-emphasis over-equalizes eyes for shorter cables
- Q: How bad are eyes for "shortest cable"?
- Q: How big do eyes need to be for 15m?

Proposal/Food for Thought

- Define Tx level that is more consistent with newer processes (1-Vp-p?)
- Define shortest cable length for operation
 - Need to guarantee pre-emphasis does not kill operation
- Define a new mask that can be met for 15M
 - Smaller mask = less pre-emphasis = easier for shorter cables
 - Bigger mask = more pre-emphasis = harder for shorter cables
 - Accommodate cable manufacture variation