# “Quick and Dirty” XAUI Channel Simulation

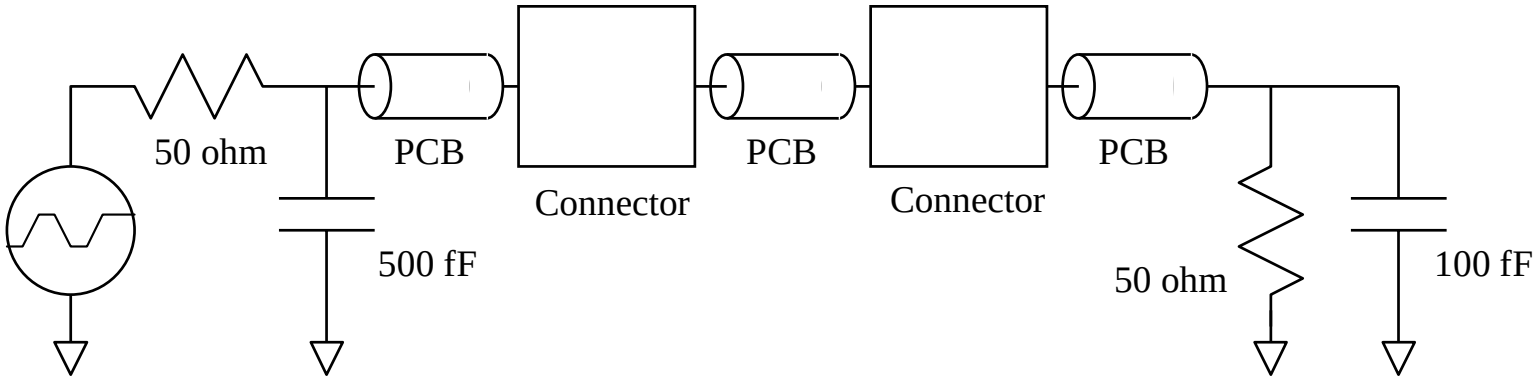
The purpose of this work is to look for any glaring compatibility problems between:

- the near-end template of D2.1,
- the compliance channel of D2.1, and
- the far-end template of D2.1

Convolution and FFT techniques have already been used to do this. This present work is a simple time-domain circuit simulation for quick verification of previous results. It handles reflections naturally and completely, and allows for future inclusion of additional real-world effects such as crosstalk, power supply noise, pre-equalization, etc.

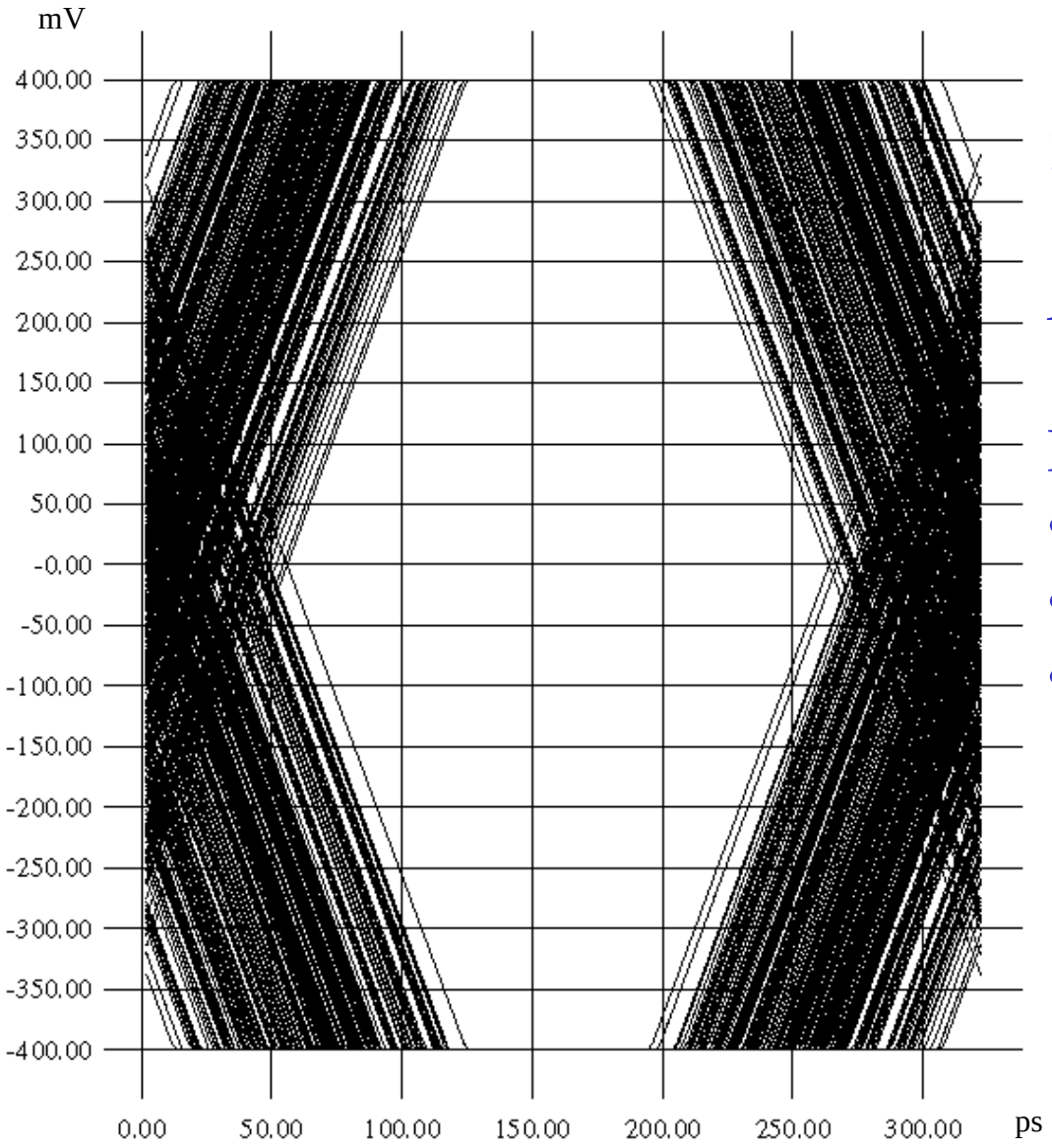
Dawson Kesling, Intel Corporation

# Method




- Matlab trapezoidal source waveform with maximum RJ
- SPICE end-to-end interconnect model
  - Single-ended in this quick effort
  - Lumped ladder PCB model – matched to compliance channel
  - Vendor-supplied and validated connector model
  - Simplified source and load model (since don't have an adequate package model yet)

# Near-end data eye



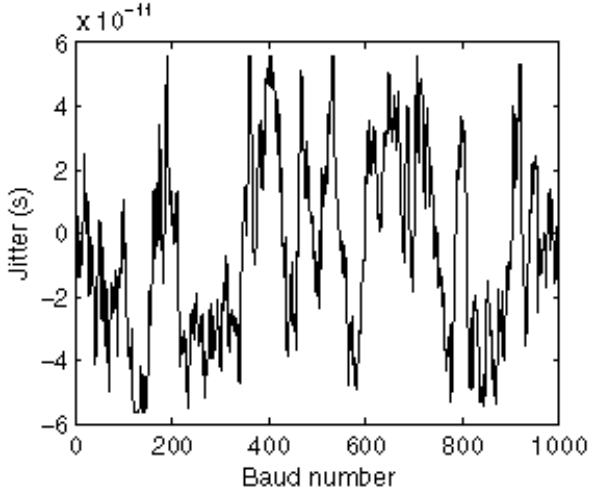

1000 buad total time

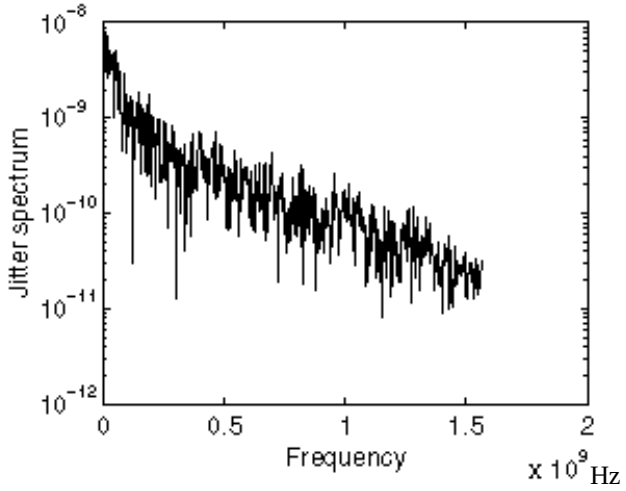
Alternating K28.5 pattern

Matches near-end template

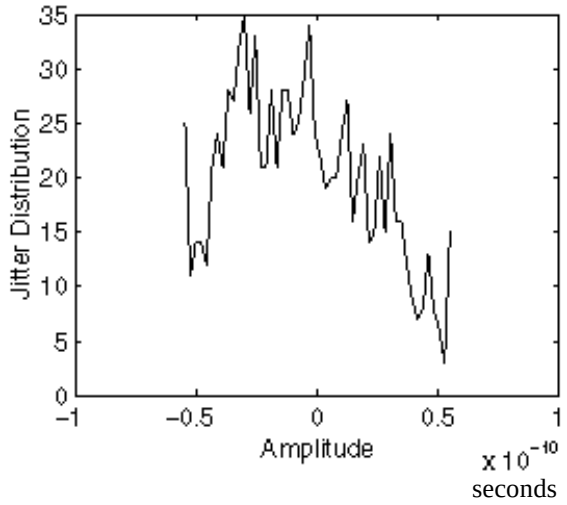
- Amplitude
- Risetime
- RJ

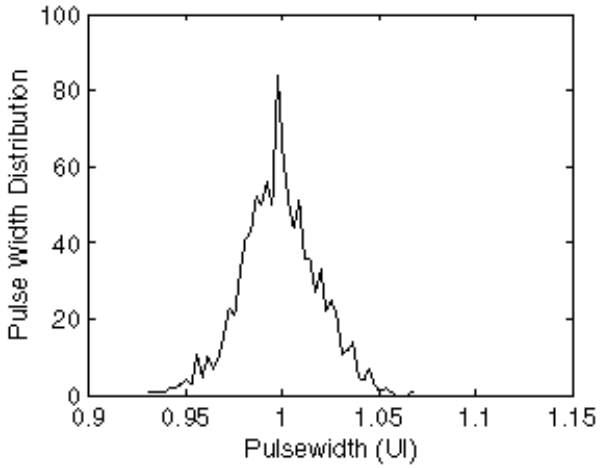
# Source Jitter



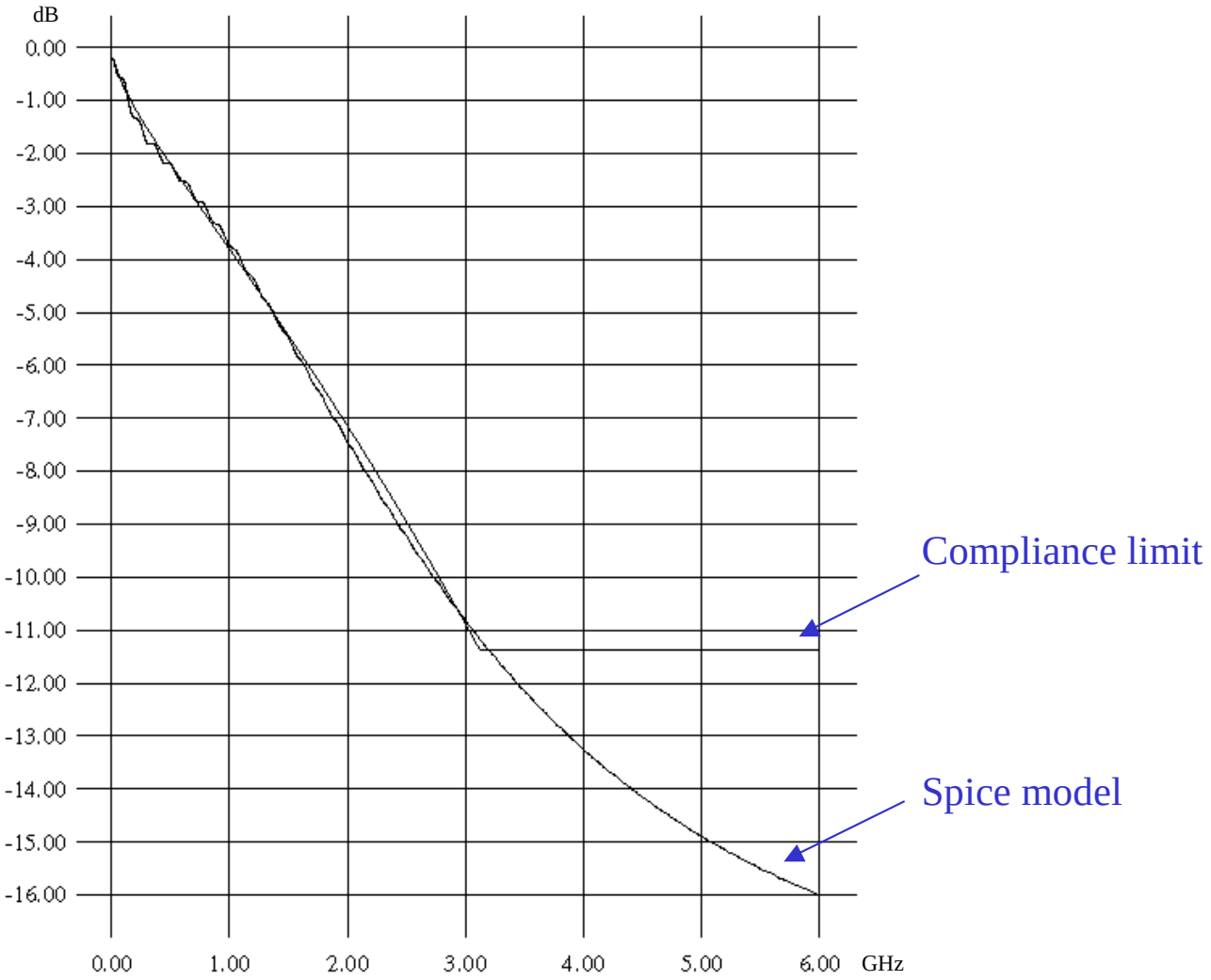




Gaussian RJ
Clipped at 0.35 UI



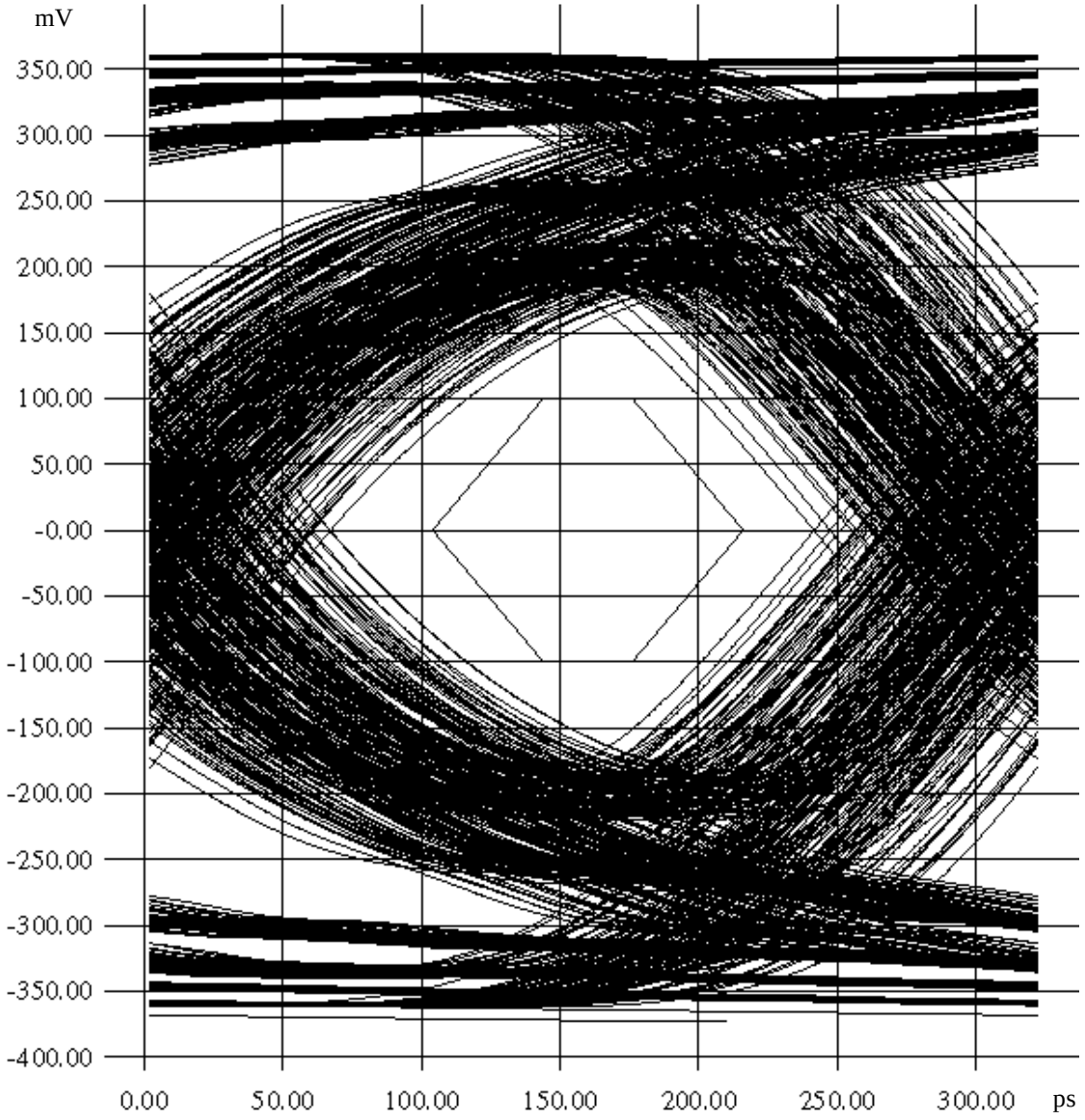



# Compliance channel



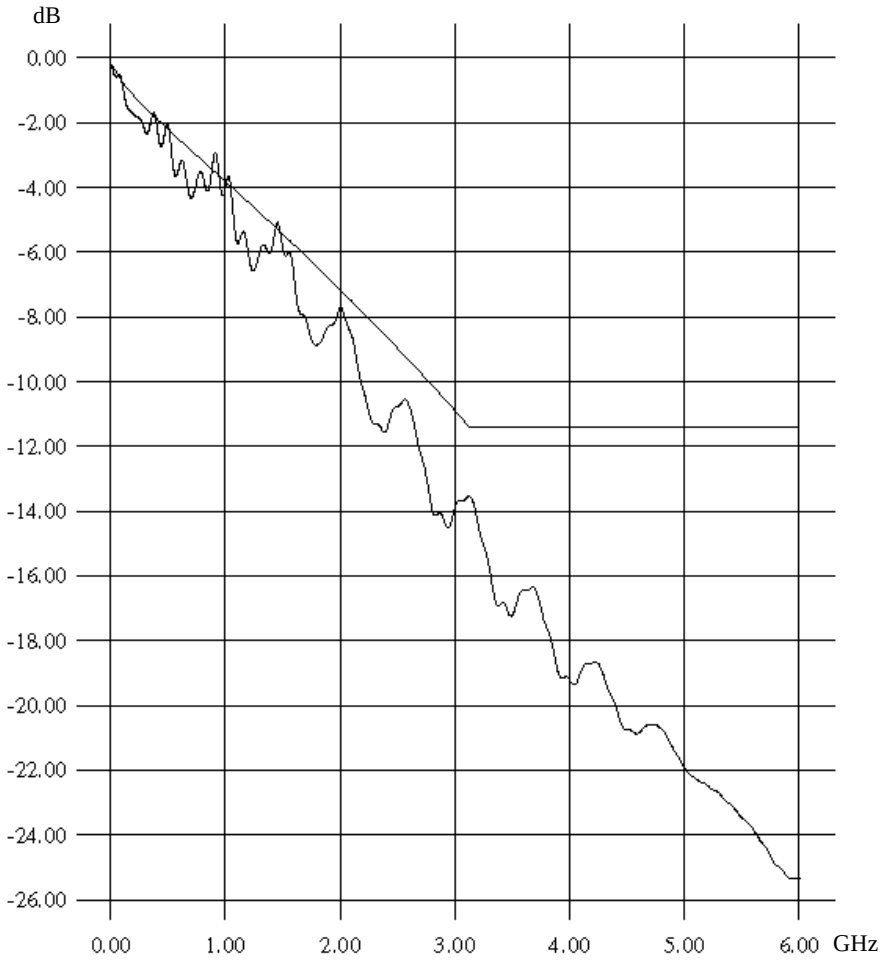

Magnitude response

# Far-end eye

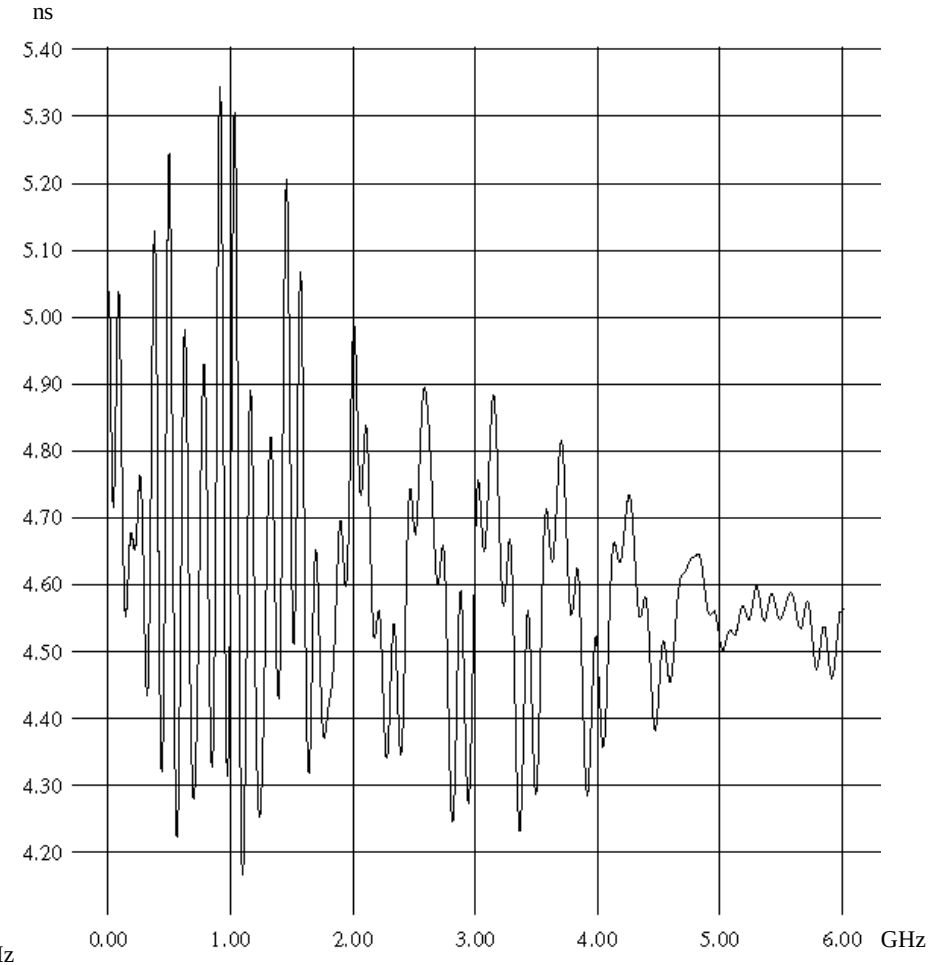



Results from using the method, source waveform and channel of the preceeding slides

# Channel with connectors




Magnitude response

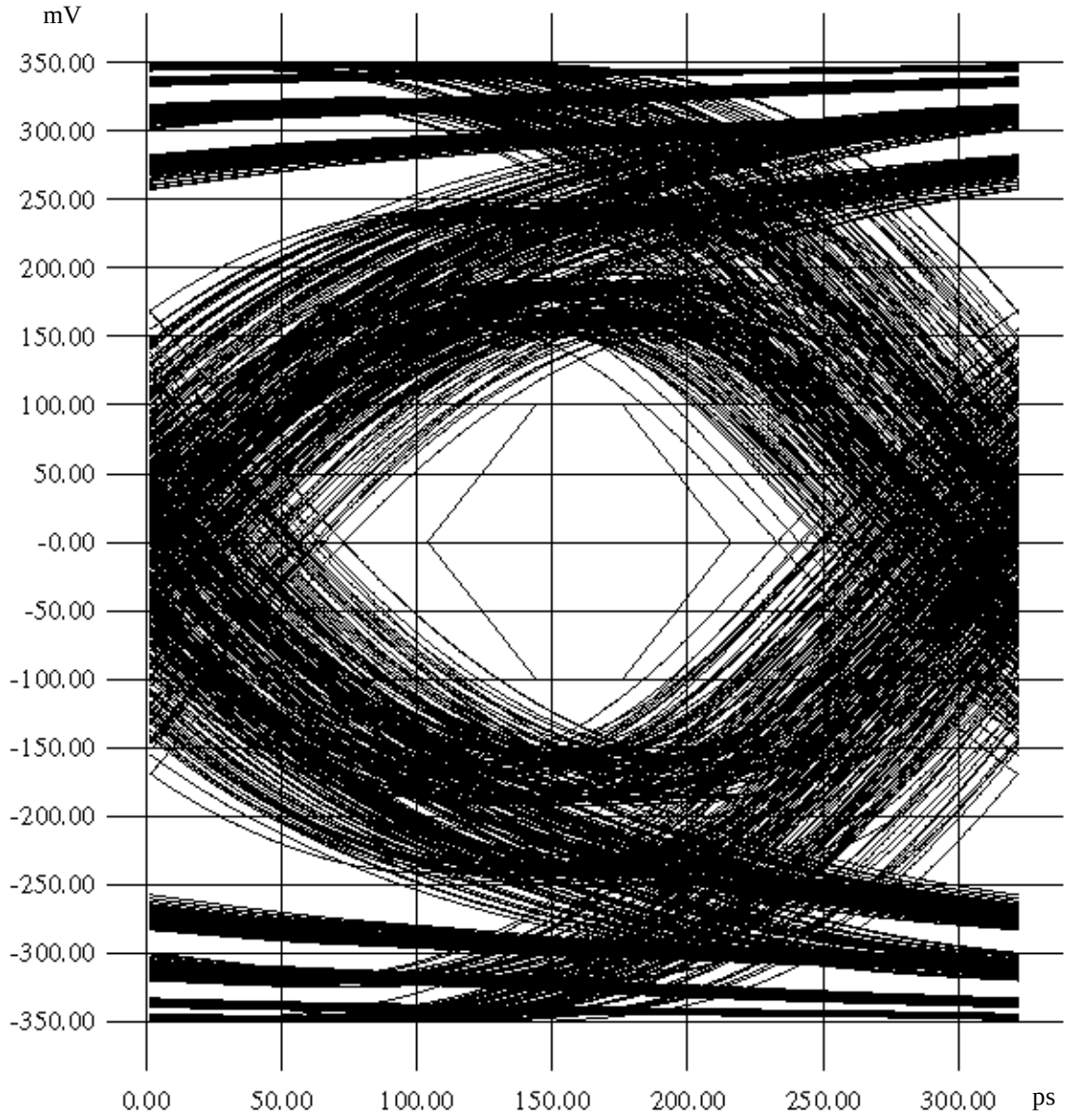



Group Delay

(no smoothing)

Connectors are 5” from the ends of a 20” total channel in this case.
Different locations can affect response significantly.

# Far-end eye with connectors




Results from using the same method and source data, but the channel with connectors.

Different connector placement can result in different channel characteristics and better or worse eyes.

# Conclusions

- Near-end template, compliance channel and far-end template are compatible
- There is some margin for additional real-world effects, but not enough to allow easing of component spec's
- These sim's confirm earlier results of Agilent, Mysticom and Infineon in these regards.
- This is a "quick and dirty" simulation useful for "reasonableness" checking; real measurements will be the final word.