Canova Tech

The Art of Silicon Sculpting

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IEEE802.3cg TF

Proposal for PSD mask adoption

November 1st, 2017

Content

- Adoption of PMA electrical specifications
- Adoption of PSD mask

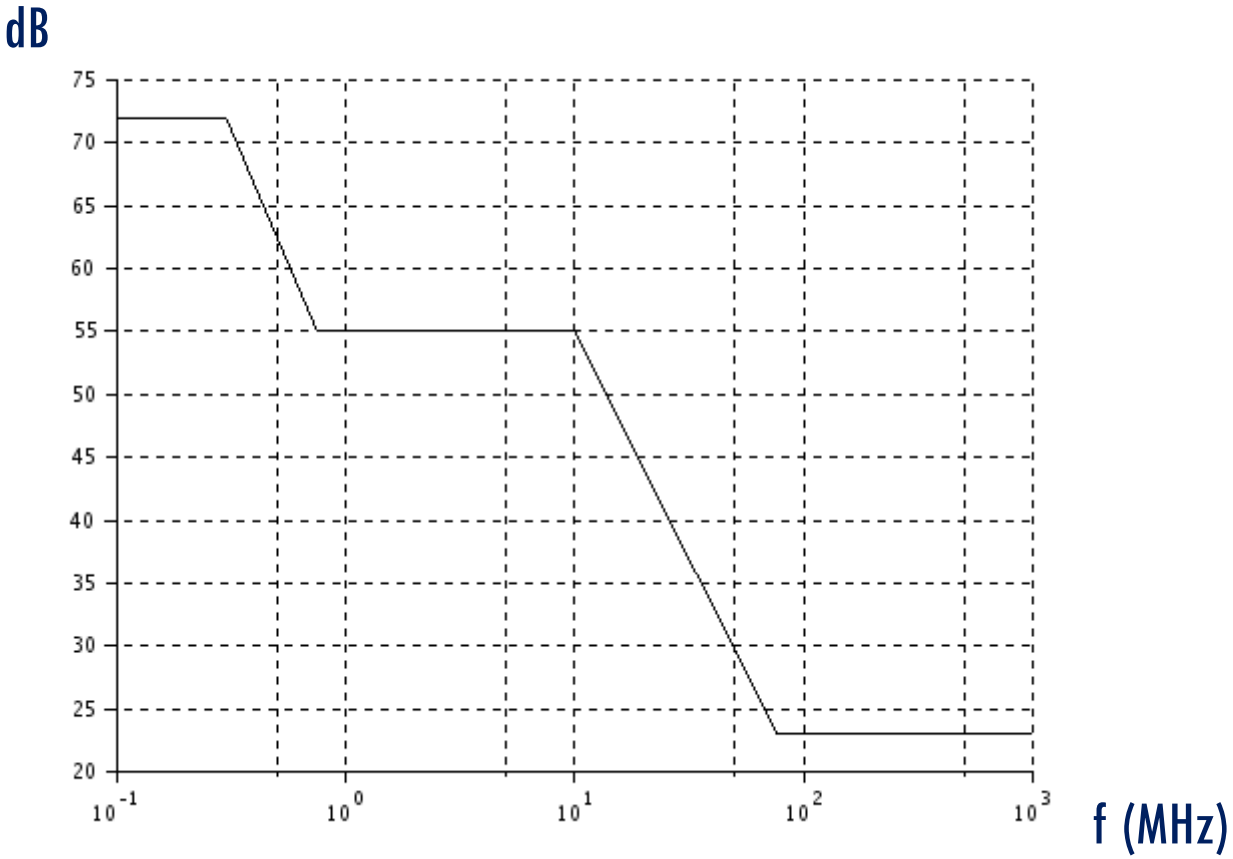
Channel Characteristics

- Channel defined as in http://www.ieee802.org/3/cg/public/Sept2017/DiBiaso_Bergner_01c_0917.pdf slide #18

Return Loss (f)	> 14 dB	for f (0.3MHz -> 10MHz)
	> 14 - 10*log10(f/10) dB	for f (10MHz -> 40MHz)
Insertion Loss (f)	< 1.0 + 1.6*(f-1)/9 dB	for f (0.3MHz -> 10MHz)
	< 2.6 + 2.3*(f-10)/23 dB	for f (10MHz -> 33MHz)
	< 4.9 + 2.3*(f-33)/33 dB	for f (33MHz -> 40MHz)
Mode Conversion Loss (f)	> 30 dB	for f (0.3MHz -> 20MHz)
	> 30-20*log10(f/20) dB	for f (20MHz -> 200MHz)

EMC requirements

- Same as 100base-T1



Line Coding

- 4B/5B coding + DME as in figure 98-4 and 98-5 of 802.3bp with the exception of timings
- Transmitter peak differential output:
  - When measured with 100 Ω termination, transmit differential signal at MDI shall be within range of 1 V ± 30% peak-to-peak

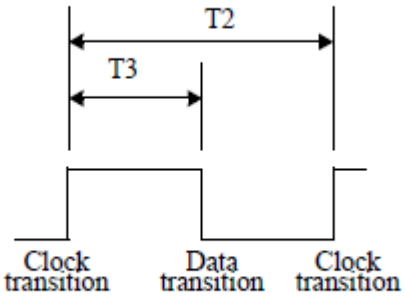


Figure 98–5—DME page transition timing

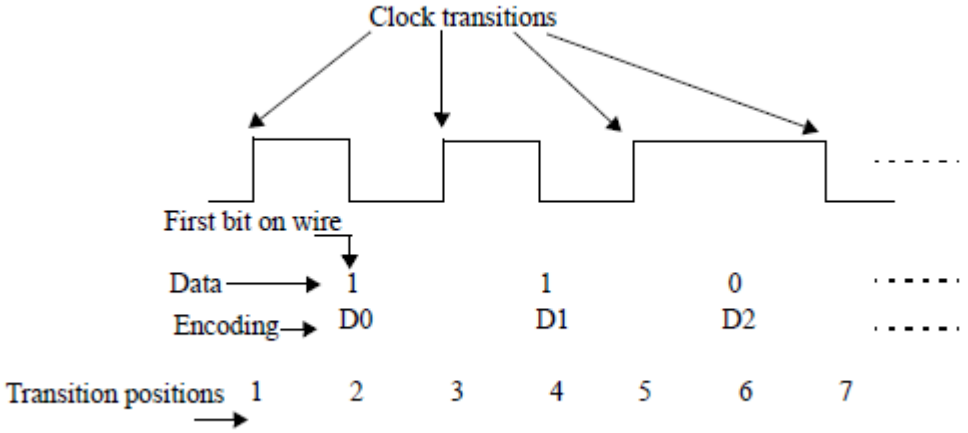


Figure 98–4—Data bit encoding within DME pages

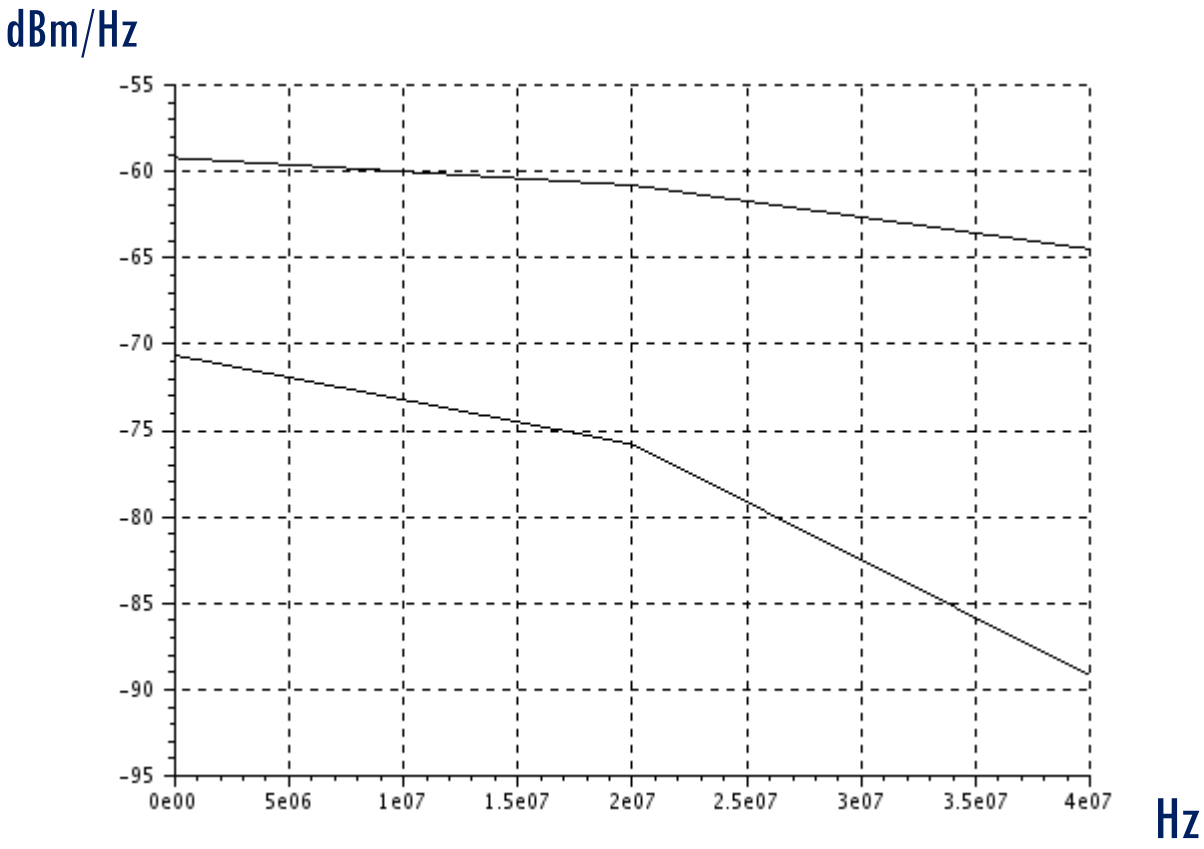
	Parameters	Min	Typ	Max	Units
T2	Clock transition to clock transition		80		ns
T3	Clock transition to data transition (data = 1)		40		ns

Proposal for PSD mask

$$Upper\ PSD(f) = \begin{cases} -59.3 - 1.5 * \dfrac{f\ -1}{19} & \text{f} < 20\ \text{MHz} \\ -60.8 - 3.7 * \dfrac{f\ -20}{20} & 20\ \text{MHz} < \text{f} < 40\ \text{MHz} \\ -64.5 - 8.0 * \dfrac{f-40}{17} & \text{f} > 40\ \text{MHz} \end{cases}$$

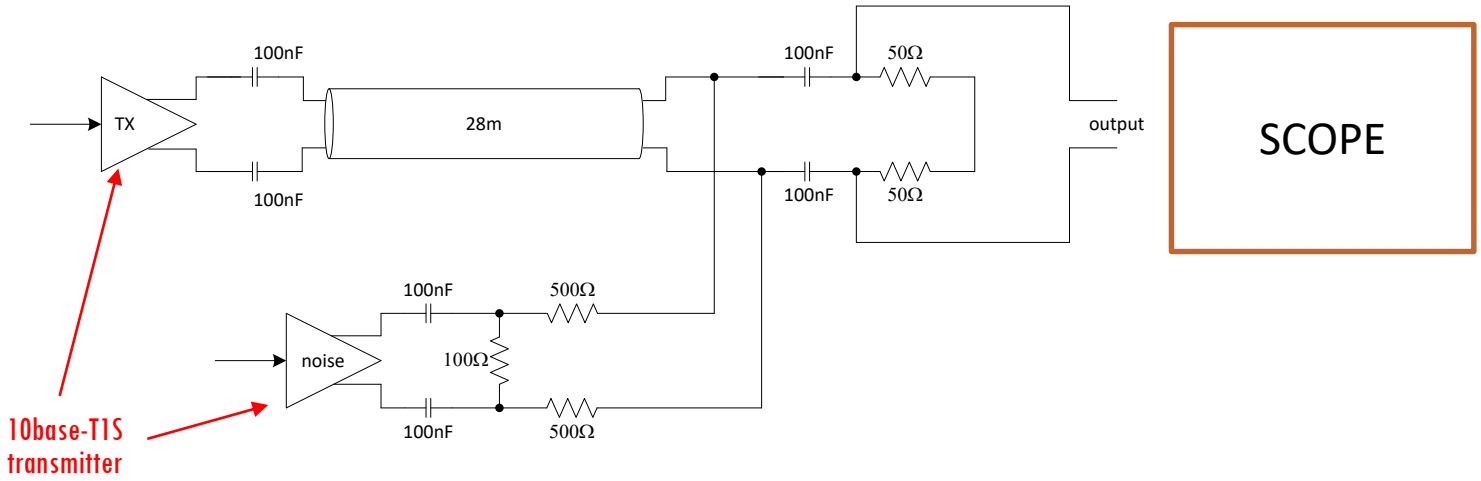
$$Lower\ PSD(f) = \begin{cases} -70.9 - 4.9 * \dfrac{f\ -1}{19} & \text{f} < 20\ \text{MHz} \\ -75.8 - 13.4 * \dfrac{f-20}{20} & \text{f} > 20\ \text{MHz} \end{cases}$$

Proposal for PSD mask



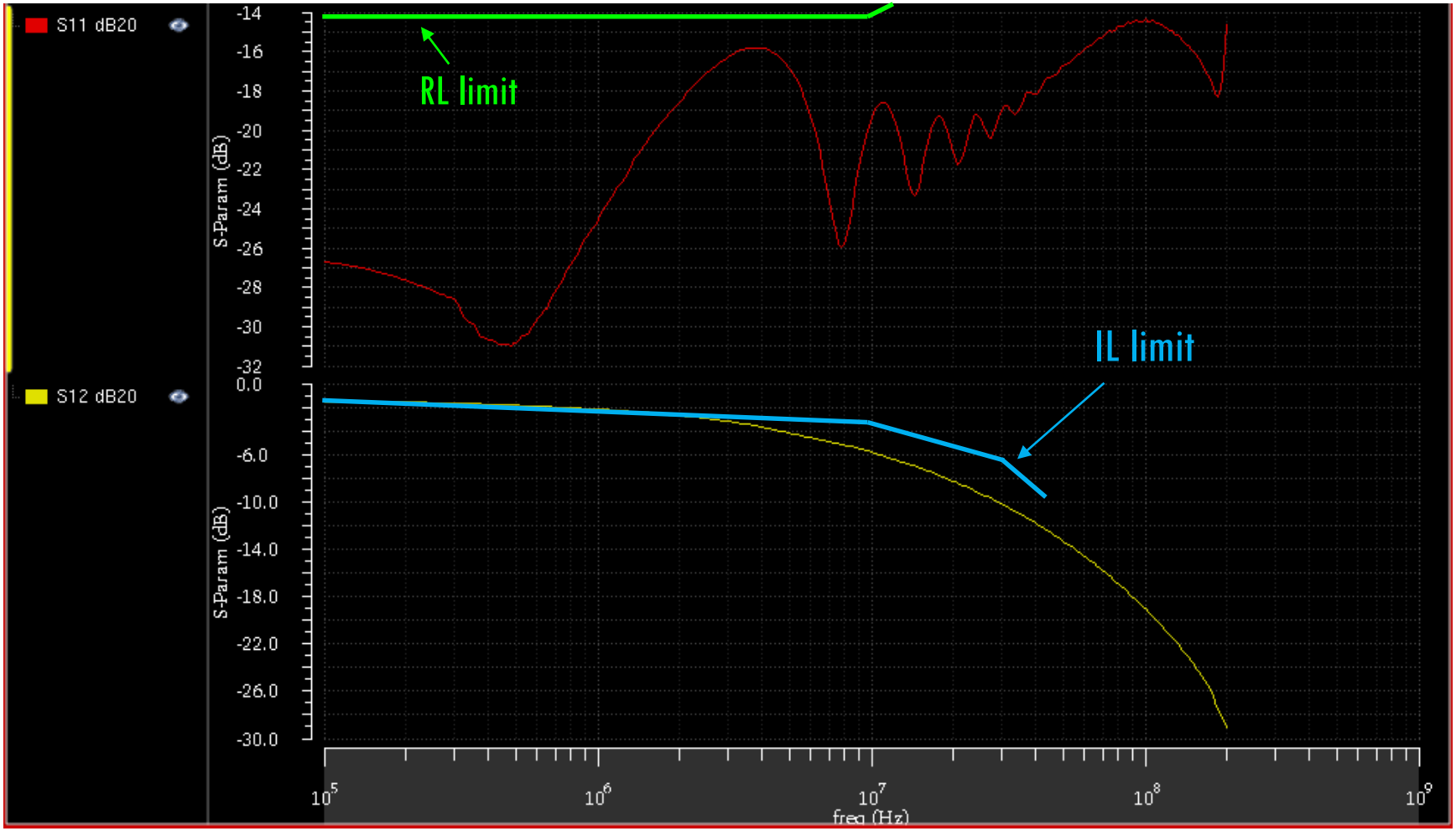
POINT TO POINT simulations

Simulations: P2P link segment Test Bench

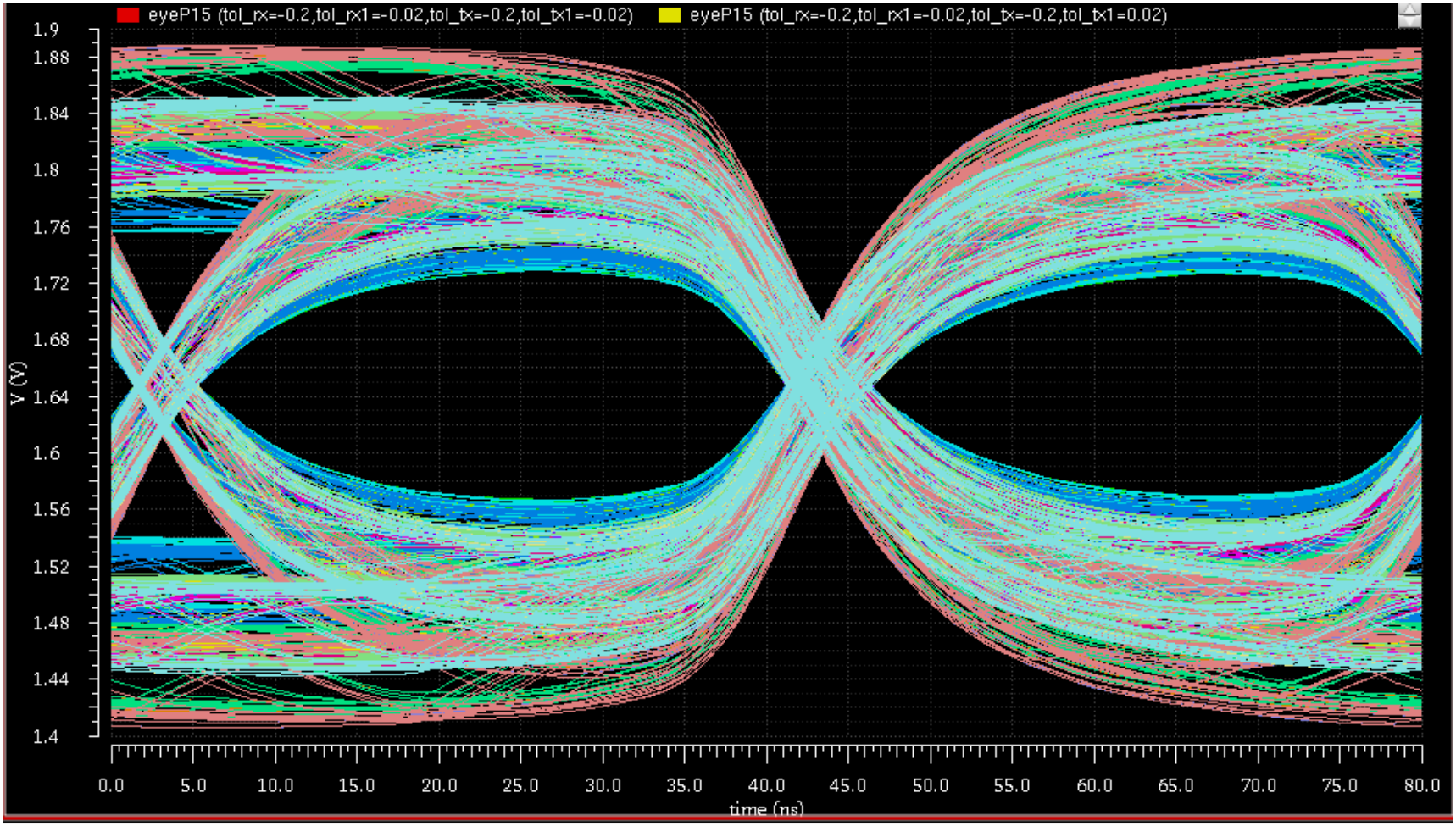


- 100Ω TX termination resistance with 20% of tolerance, ±2% mismatch
- 100Ω RX termination resistance with 20% of tolerance, ±2% mismatch
- Alien Crosstalk Noise (~100mV P-P)

Simulations: P2P link segment RL, IL

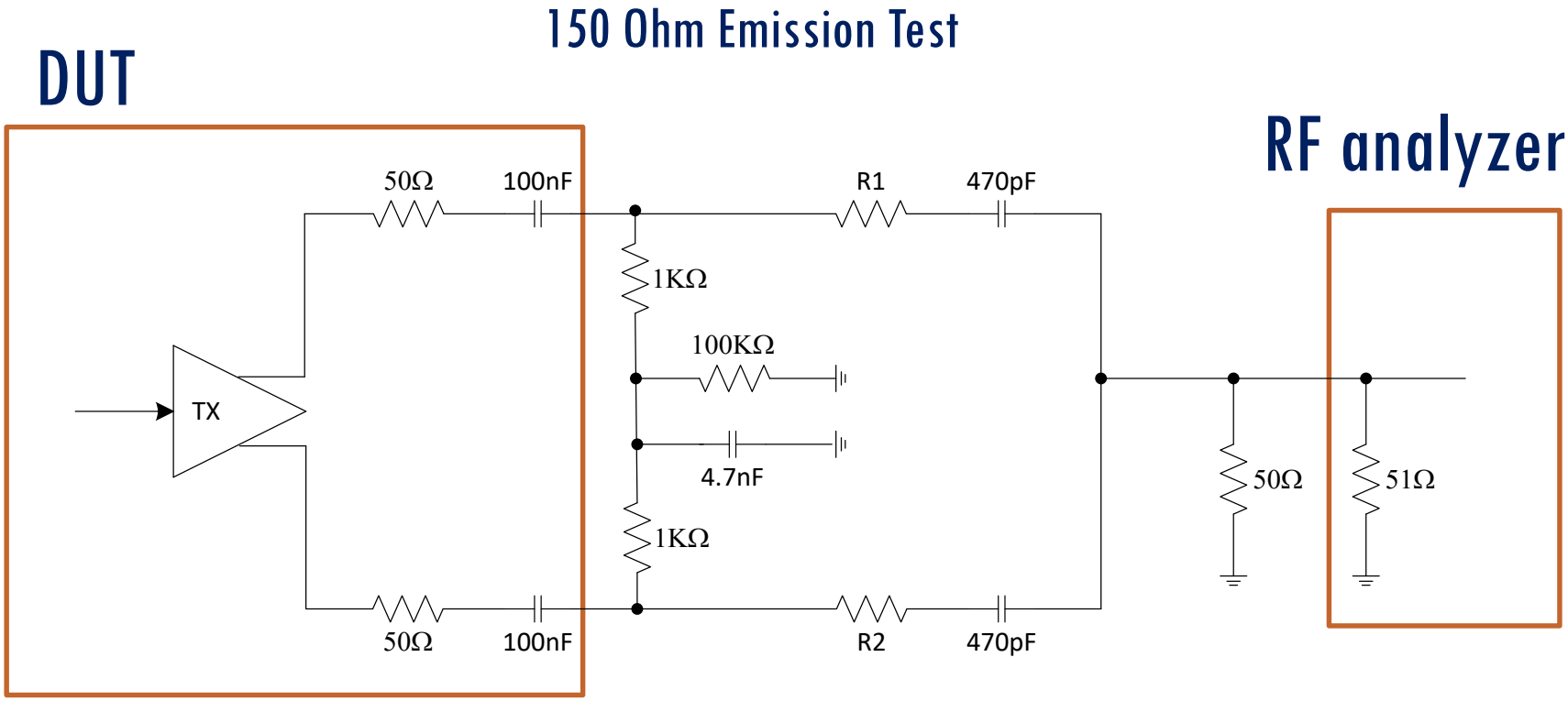


Simulations: P2P link segment eye diagram



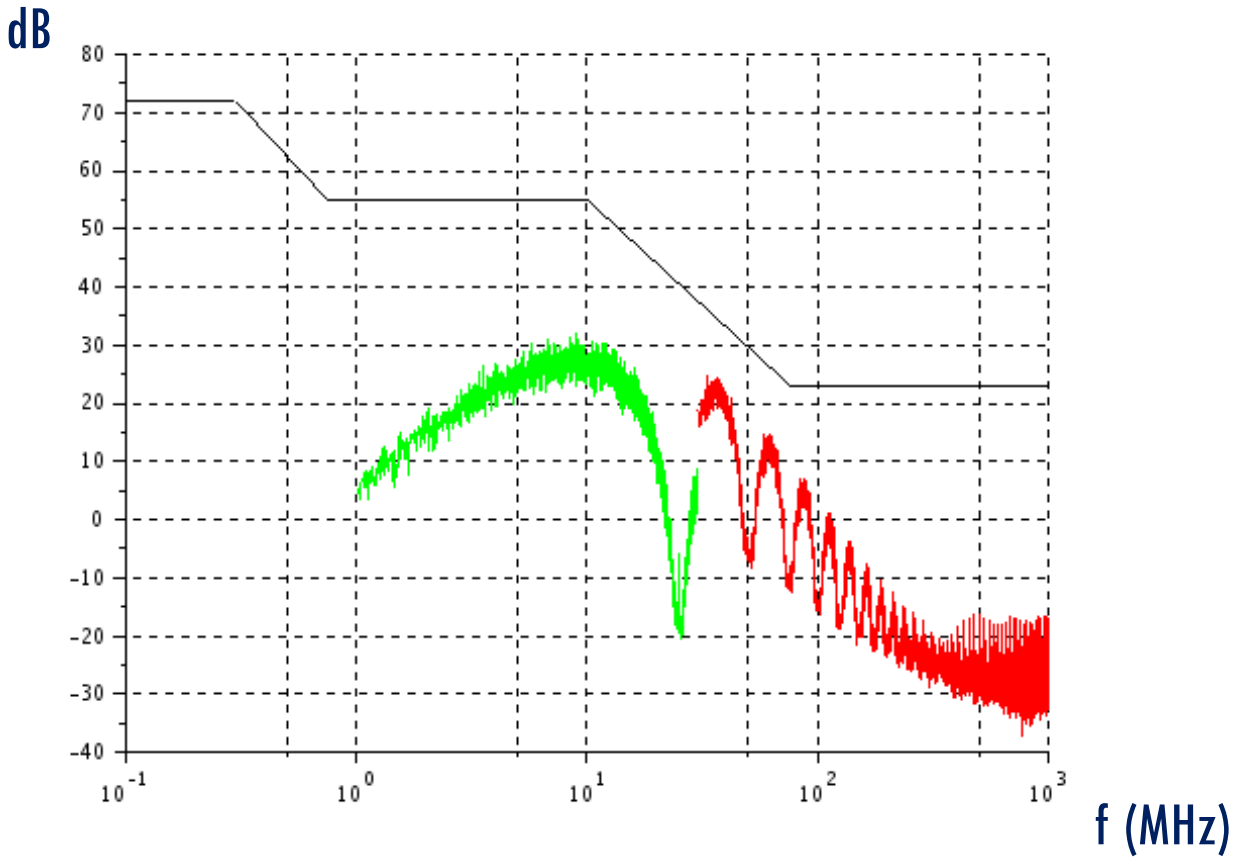
Eye diagram at max impedance mismatch (20%) and alien noise crosstalk

Simulations: EMC tests



- Direct Power Injection (DPI) and 150 Ohm emission tests for noise immunity and emission may be used to establish a baseline for PHY EMC performance

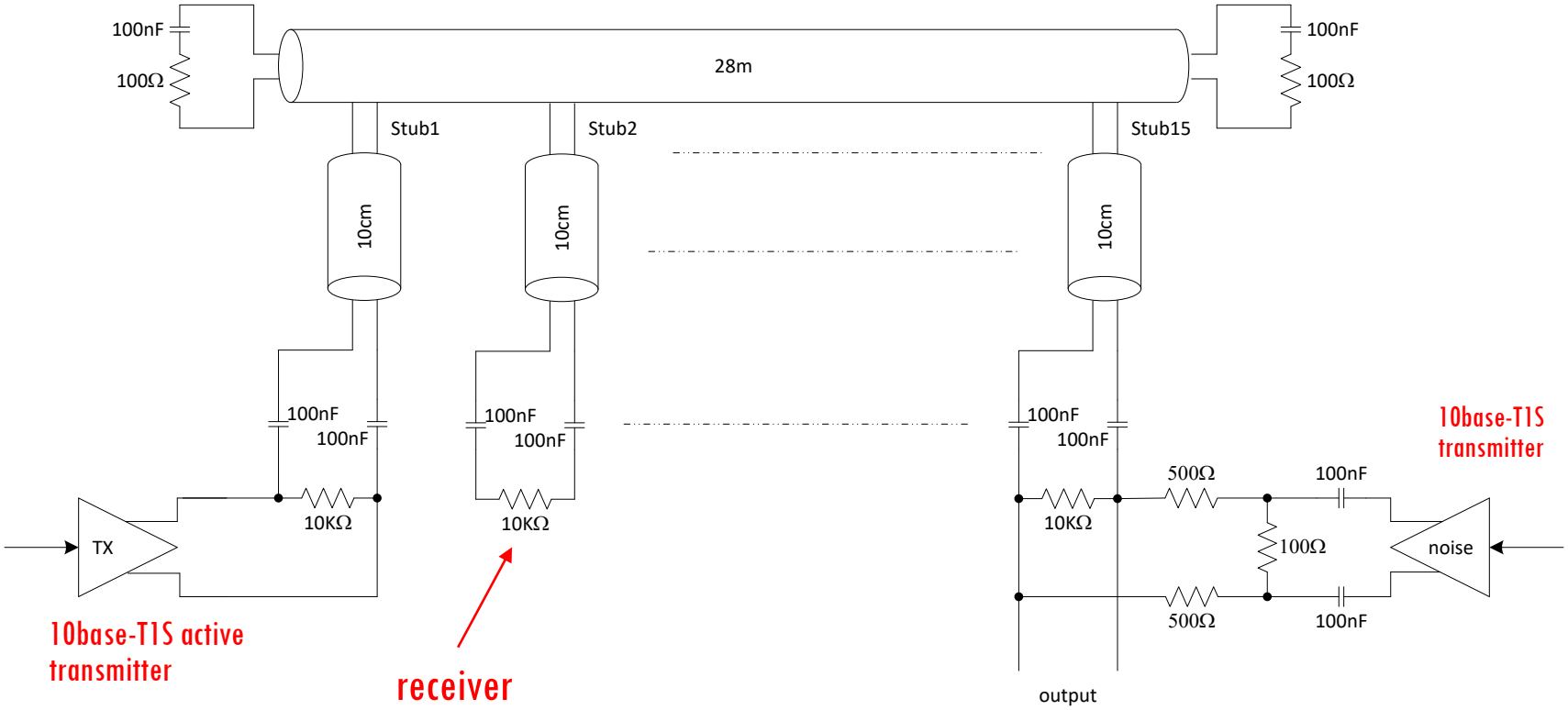
Simulations: P2P Link EMC performance



EMC performance at max PSD

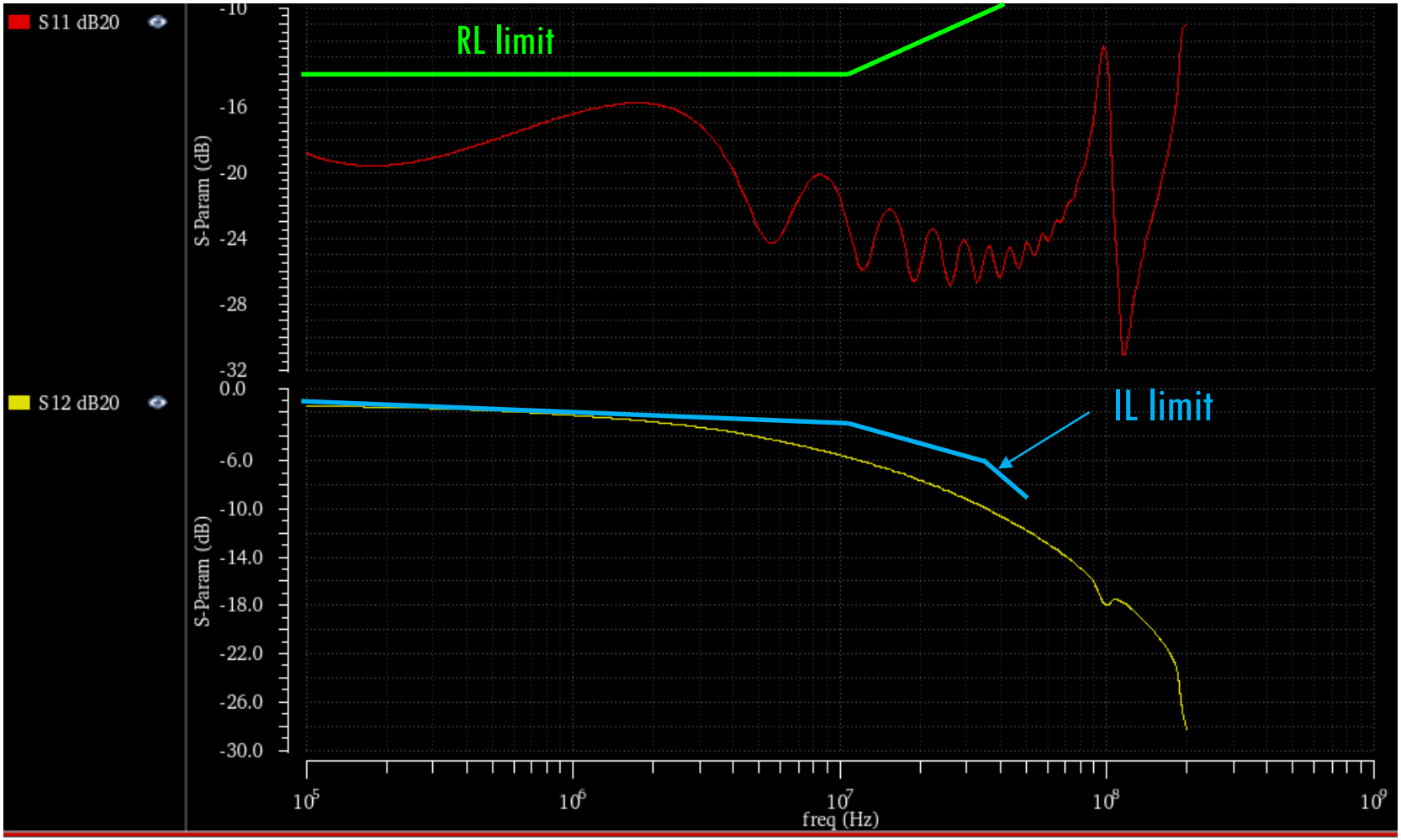
MULTIDROP simulations

Simulations: Multidrop link segment Test Bench

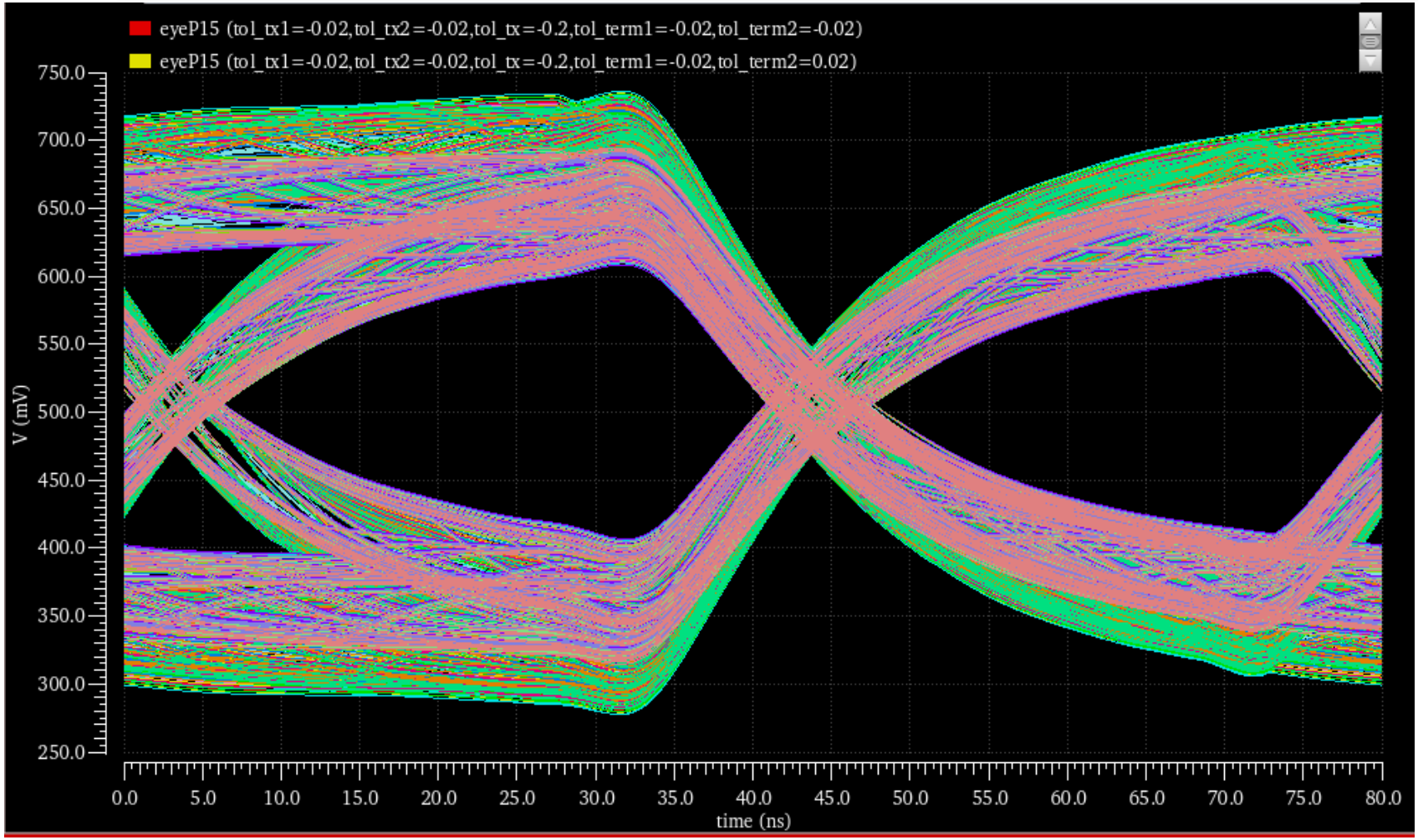


- 16 Nodes
- 100Ω ±1% line termination resistance
- 50Ω ± 20% transmitters (high-Z when silent)
- Alien Crosstalk Noise (~100mV P-P)

Simulations: Multidrop link segment RL, IL



Simulations: Multidrop link segment eye diagram



Eye diagram at max impedance mismatch (20%) and alien noise crosstalk

Thank You !