

A 224 Gbps-PAM4 1 Meter DAC Long Reach Channel and Its Characteristics: Design B

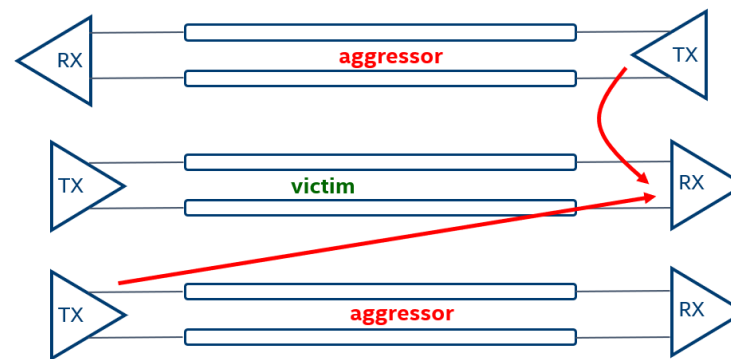
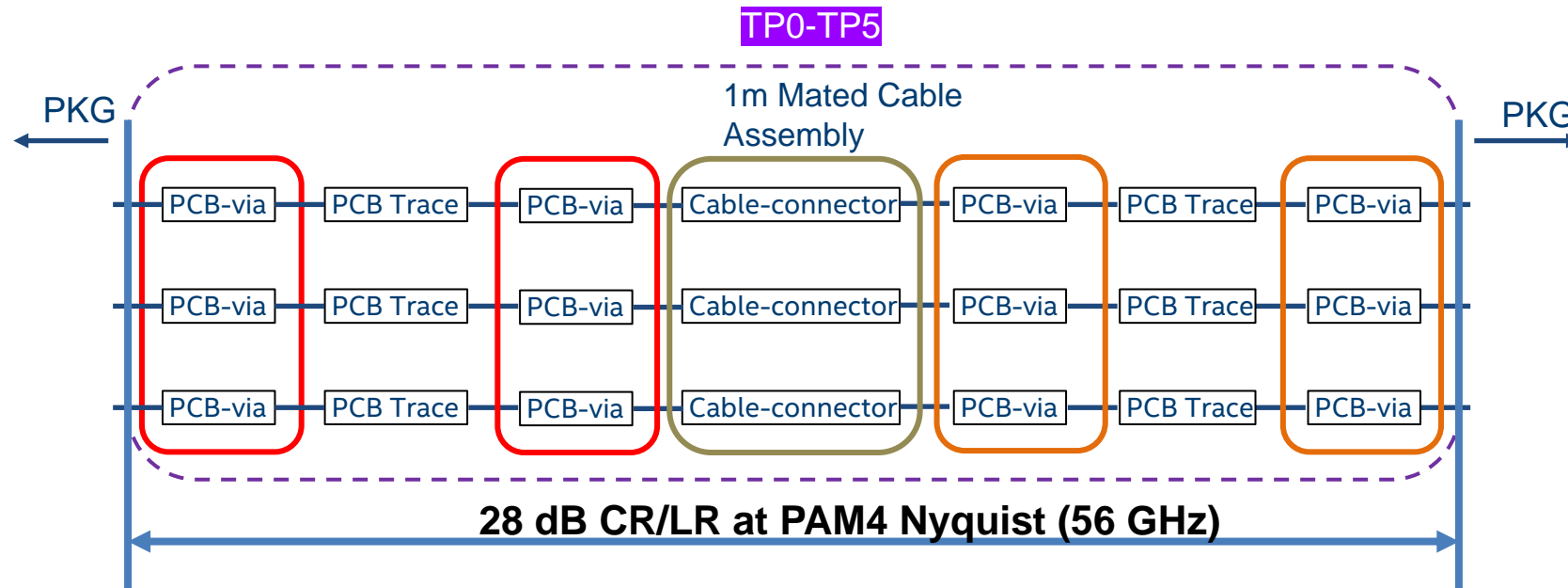
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Background and Introduction (II)

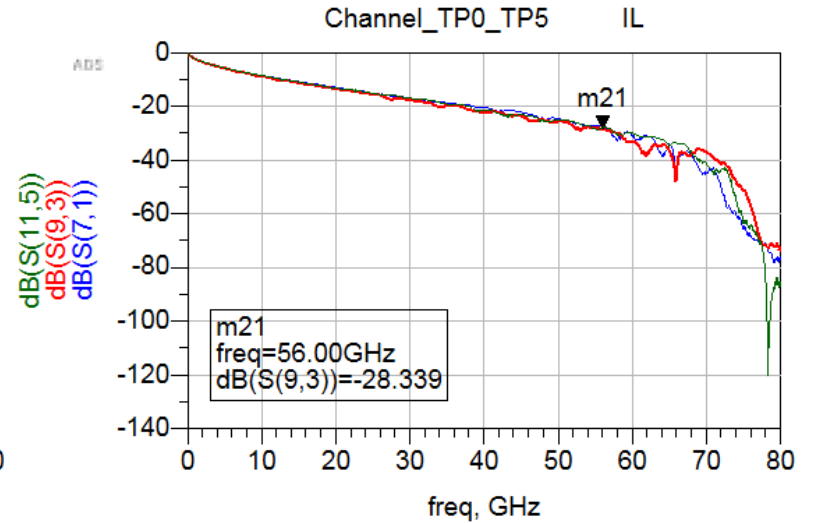
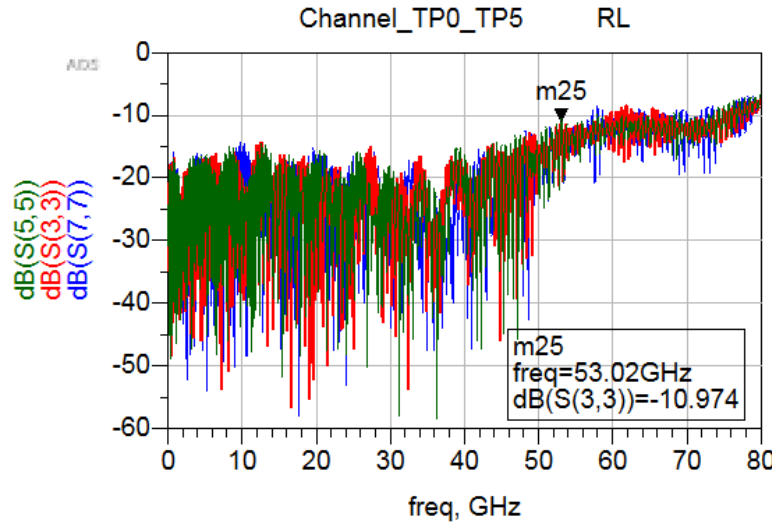
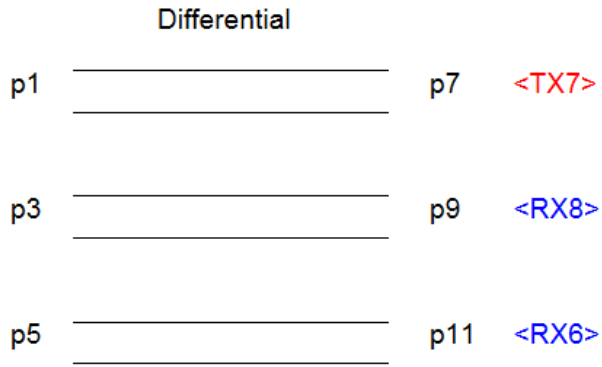
- We leveraged our established/validated CR channel design tool-flow-methodology (TFM) (e.g., oif2022.066.00) and the latest connector and DAC technologies to create this CR ball-to-ball channel Design B to support 1 Meter DAC with 224Gbps-PAM4 signaling.

224 Gbps-PAM4 CR Channel Structure



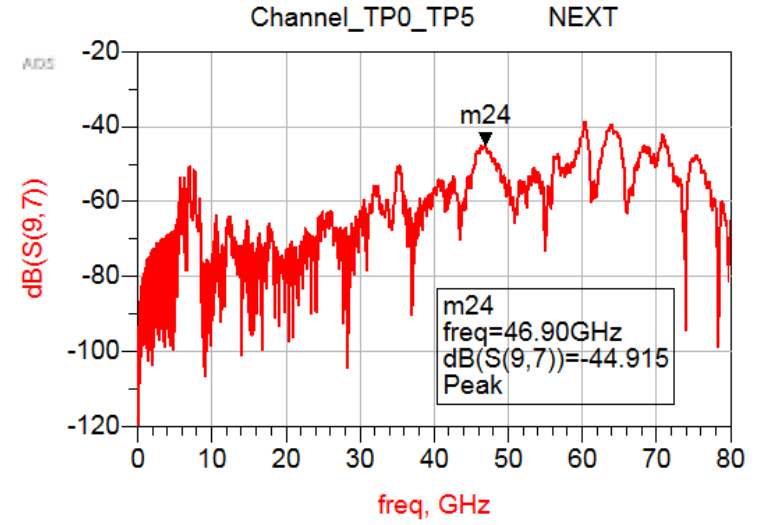
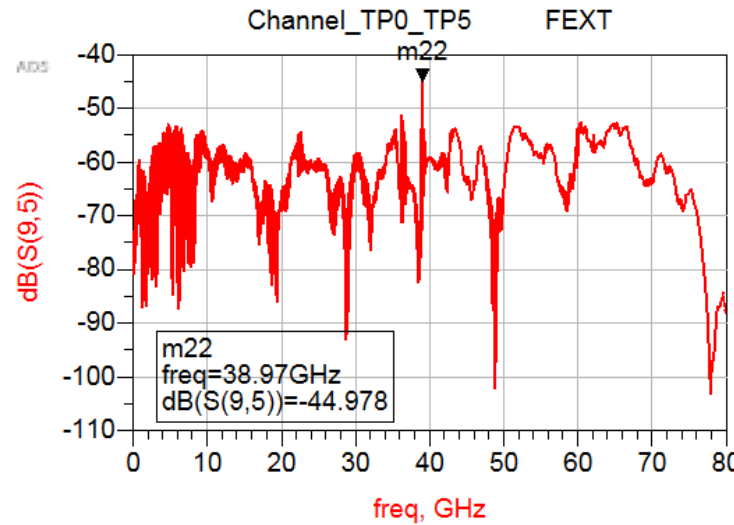
Component	TP0-TP5 Insertion Loss (dB) @ 56GHz
	<i>Design B</i>
PCB via	1.7 dB
PCB Trace	7.5 inch (TX+RX, 1.3 dB/inch)
Mated Cable Assembly	17.0 dB
Total	28.3 dB

224 Gbps-PAM4 CR Channel Characteristics (I)

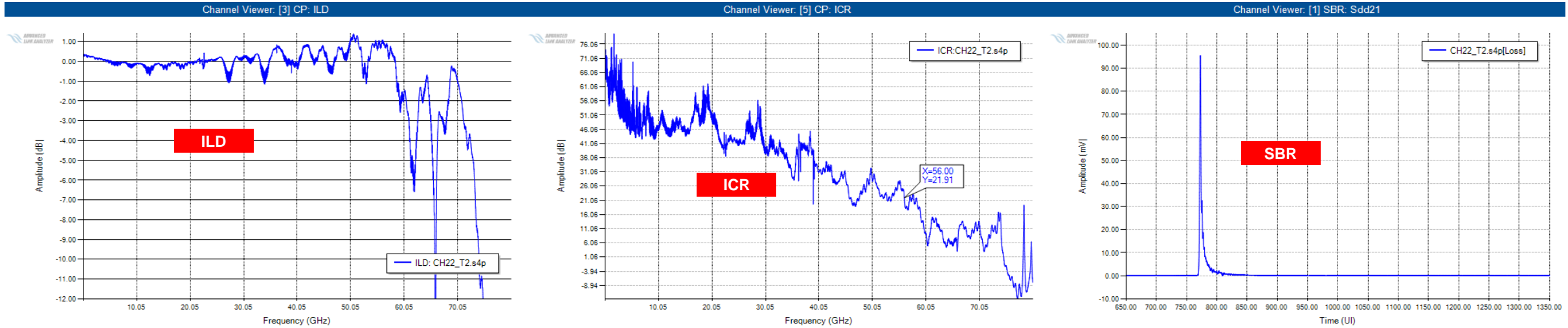


TP0-TP5 Characteristics (DC-56GHz)

- IL: 28.3dB @ 56GHz
- RL <~ 11dB (<56GHz)
- FEXT < 45dB (<56GHz)
- NEXT < 45dB (<56GHz)

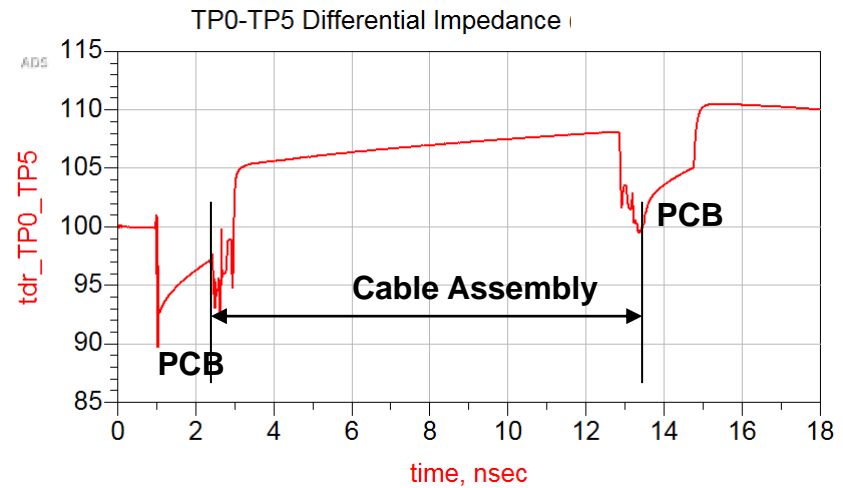


224 Gbps-PAM4 CR Channel Characteristics (II)

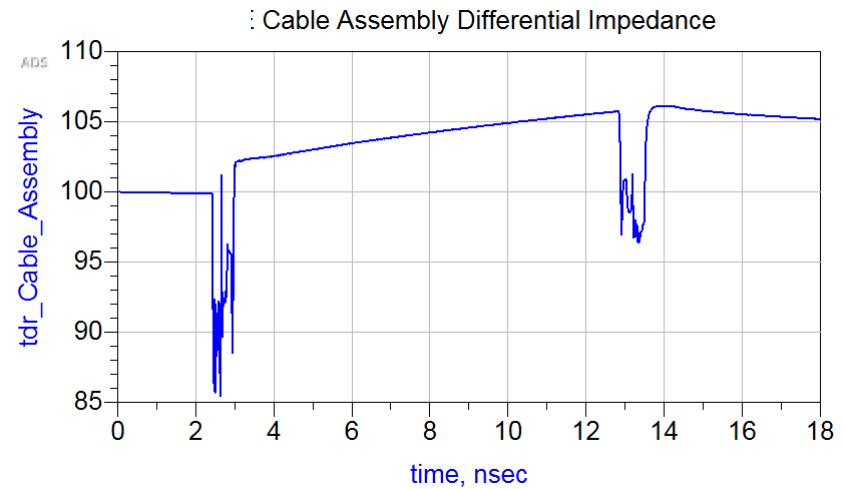


- **ILD ~ +/- 1 dB (<56GHz)**
- **ICR > 21.9 dB (<56GHz) (2FEXT+1NEXT used)**

224 Gbps-PAM4 CR Channel Characteristics (III)



- Cable p-p discontinuity $15.9\ \Omega$
- PCB p-p discontinuity $11.5\ \Omega$



[S] parameter BW DC-80GHz

Summary

- We have created a CR channel Design B supporting 1 Meter DAC.
- This CR channel includes PCB-Vias, PCB traces, connectors, and 1 Meter DAC.
- This CR channel has:
 - An IL (TP0-TP5) of 28.3 dB at 56 GHz
 - RL $< \sim 11$ dB at ≤ 56 GHz
 - FEXT < 45 dB, NEXT < 45 dB, at ≤ 56 GHz