Reference Package Model Updates for 200G/Lane Electrical I/Os

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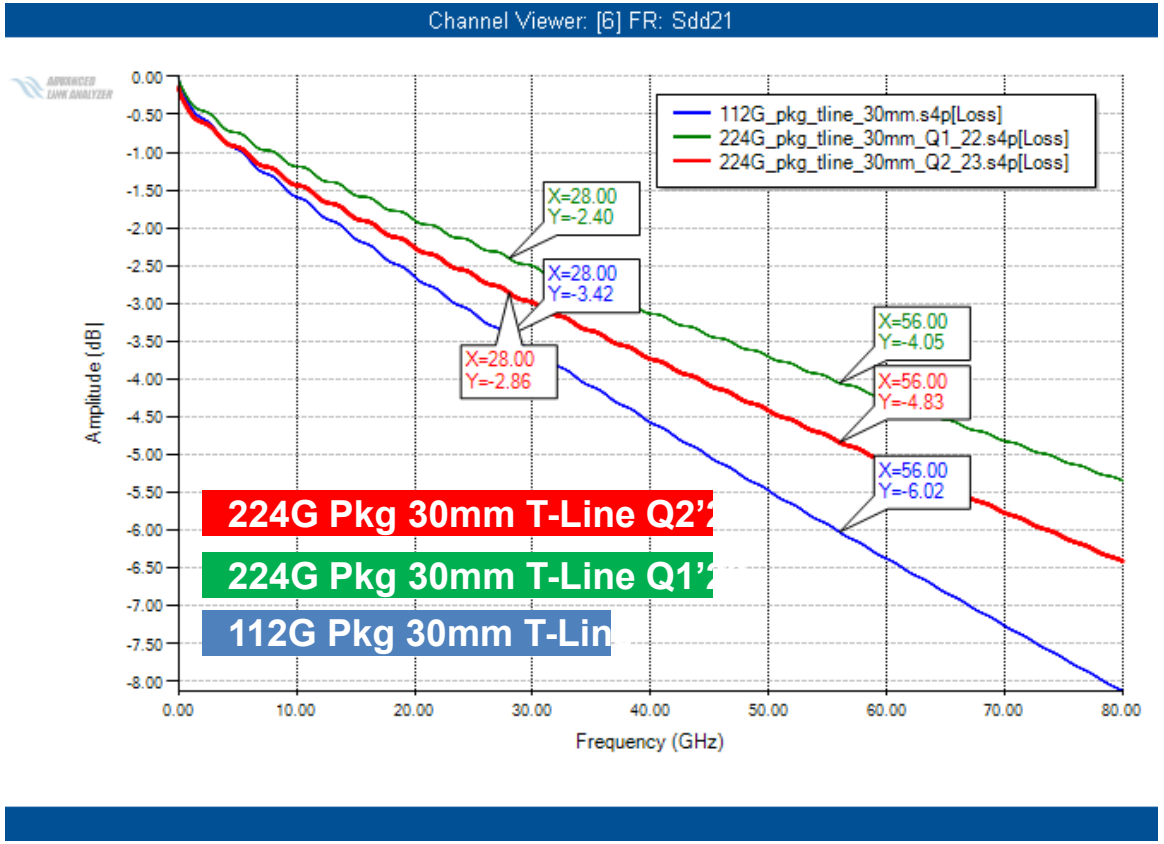
Method and Objectives

- This presentation intents to provide a 224 Gbps-PAM4 reference package model and parameter updates which are extracted from latest test/design packages for high radix switch and ASICs, as well as roadmap at 2024+[1], [2], [3].
- Those reference package models are required as the basis/foundation for 200G/Lane Electrical I/Os COM simulations and specification developments.

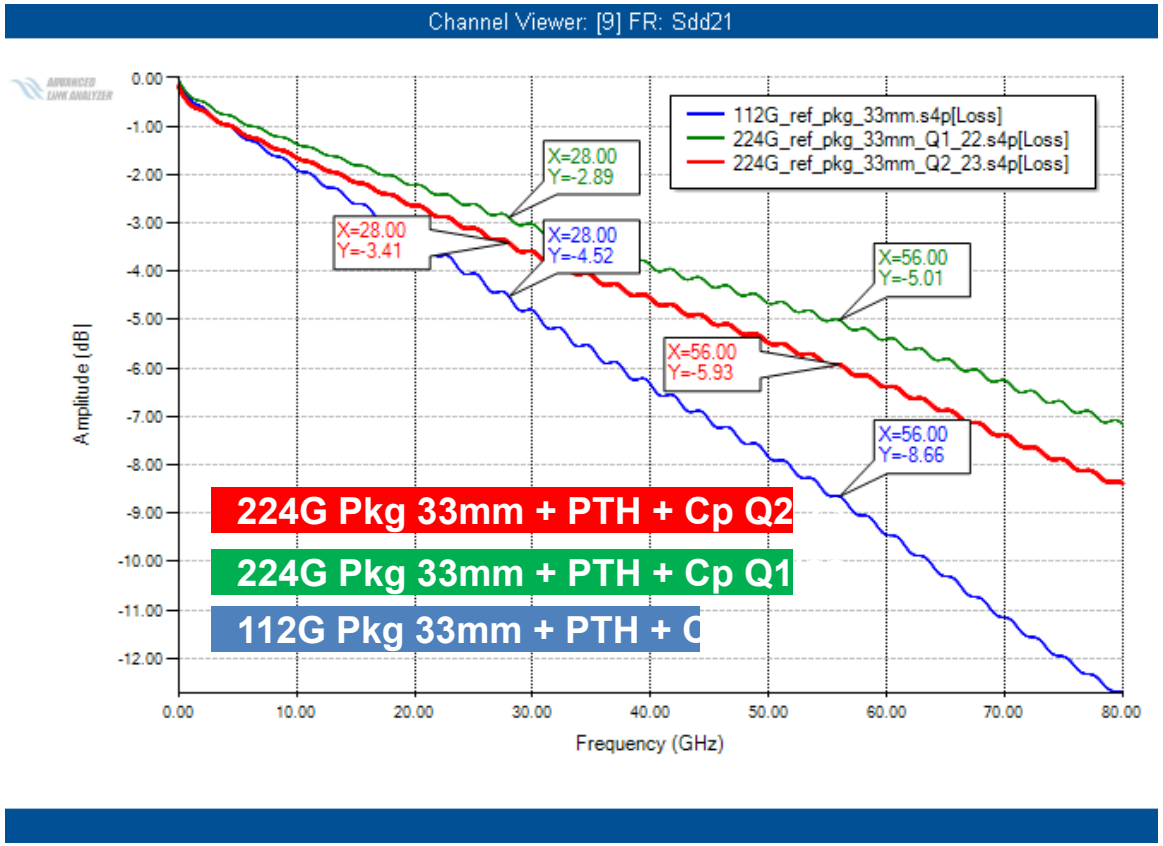
A Proposed Host Reference Package Model for 200G/Lane Electrical I/Os (1/2)

Param	112G Package T-Line Model Parameters	224G Package T-Line Model Parameters (Q1'22 [3])	224G Package T-Line Model Parameters (Q2'23)
Z_p	30 mm	30 mm	30 mm
γ_0	0 /mm	0 /mm	**5e-4 /mm**
τ	6.141e-3 ns/mm	6.141e-3 ns/mm	6.141e-3 ns/mm
a_1	9.909e-4 $ns^{1/2}$/mm	8.9e-4 $ns^{1/2}$/mm	8.9e-4 $ns^{1/2}$/mm
a_2	2.772e-4 ns/mm	1.55e-4 ns/mm	**2.0e-4 ns/mm**
Z_c	87.5 Ω	87.5 Ω	87.5 Ω
R_o	50 Ω	50 Ω	50 Ω



A Proposed Host Reference Package Model for 200G/Lane Electrical I/Os (2/2)

Param	112G Package T-Line Model Parameters	224G Package T-Line Model Parameters (Q1'22[3])	Proposed 224G Package T-Line Model Parameters
Z_p	33 mm	33 mm	**33 mm**
γ_0	0 /mm	0 /mm	**5e-4 /mm**
τ	6.141e-3 ns/mm	6.141e-3 ns/mm	6.141e-3 ns/mm
a_1	9.909e-4 $ns^{1/2}$/mm	8.9e-4 $ns^{1/2}$/mm	8.9e-4 $ns^{1/2}$/mm
a_2	2.772e-4 ns/mm	1.55e-4 ns/mm	**2.0e-4 ns/mm**
Z_c	87.5 Ω	87.5 Ω	87.5 Ω
Z_{p2}	1.8	1.8	1.8
Z_{c2}	92.5 Ω	92.5 Ω	92.5 Ω
R_o	50 Ω	50 Ω	50 Ω
Cp	87 fF	40 fF	40 fF



References

[1] J. Jiang et al, “Designing 224G PAM4 High Performance FPGA Package and Board with Confidence”, *Designcon*, 2021.

[2] M. Li et al. “224G Package Investigations and COM Reference Model”, OIF (https://www.oiforum.com, oif2021.263.00), Nov, 2021

[3] M. Li et al. “Reference Die and Package Models for CEI-224G-PAM4”, OIF (https://www.oiforum.com, oif2022.065.01), Feb, 2022