Power-Over-Coax Complexity and System Impact

IEEE 802.3dm

March Plenary

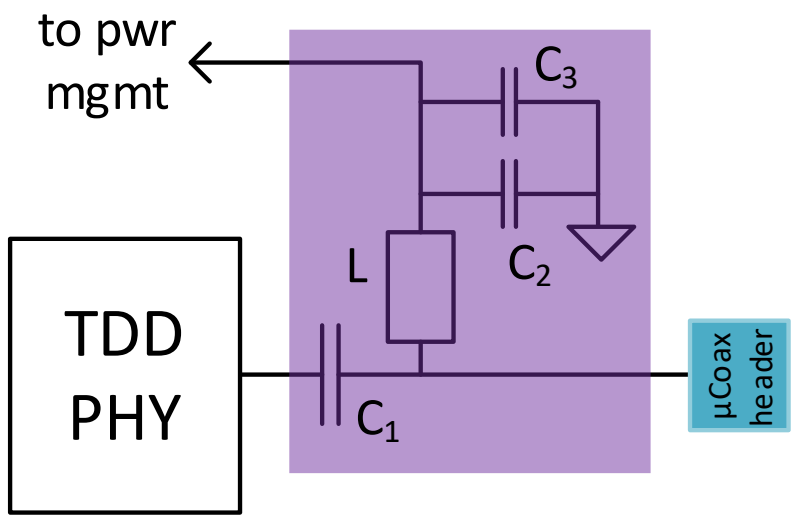
Conrad Zerna (Aviva Links Inc.)

Introduction

- Power-Over-Coax complexity … adding one additional data point
- Consideration of this effect when comparing systems

Power-Over-Coax Complexity

- Power-Over-Coax proof of concept with TDD PHY
  - Validated with
    - 2..8Gbps line rate data communication
    - Forced DC current to evaluate loading effect of inductor
  - Over
    - 20 .. 90 degC ambient temperature
    - 0 .. 1400mA PoC DC current (yes, 1.4 Ampère)



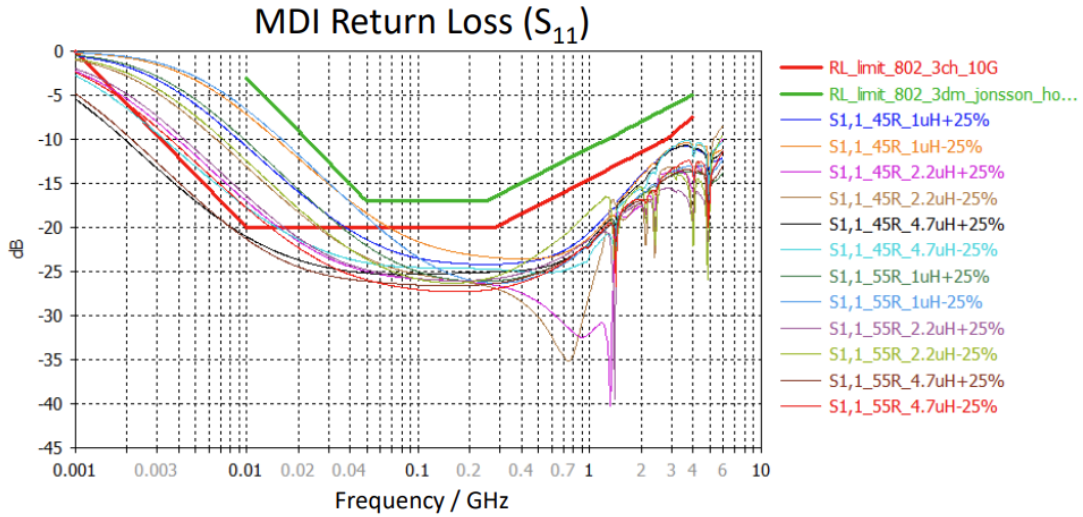
	This presentation	[1] incumbent	[1] .ch coax
PoC area [mm²]	9.5	26	32

- [1] https://ieee802.org/3/dm/public/adhoc/022725/20250227_dm_adhoc_CameraSystemComplexity_V1.0.pdf

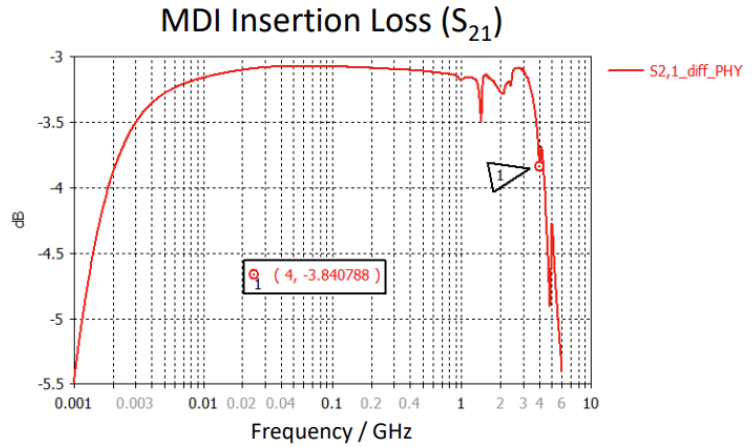
	Area [mm²]	
L	8	1210 inductor
C_1	0.5	AC coupling 0402
C_2	0.5	Filter caps 0402
C_3	0.5	

Consideration of PoC for System

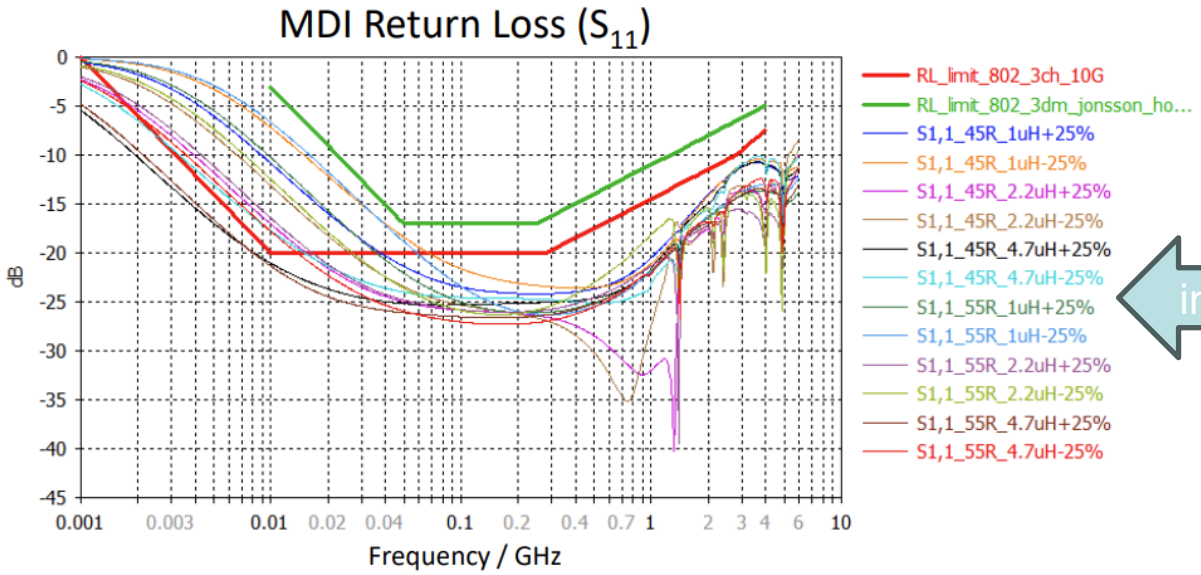
- Why does the comparison come out like that … when virtually all dm presentations on the topic show, how well the proposals can do with a relaxed RL limit?
- Because many presented system analysis lack consideration for all the effects of a PoC implementation with such an MDI limit
  - Baseline wander because of high pass cut-off
  - Insertion loss has sharp roll-off in high frequency range, impacting pulse response
  - Interaction of MDI RL and cable channel RL
  - FDD/ACT effects of (partially) overlapping signals



https://ieee802.org/3/dm/public/adhoc/101024/strohmeier_dm_measure_sim_rl_101024_v03.pdf

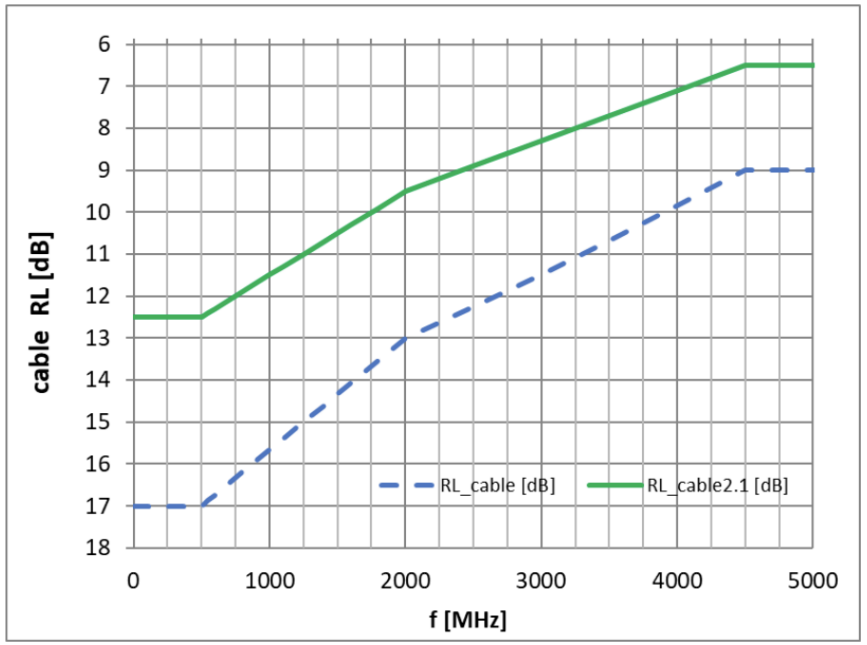


Consideration of PoC for System



https://ieee802.org/3/dm/public/adhoc/101024/strohmeier_dm_measure_sim_rl_101024_v03.pdf

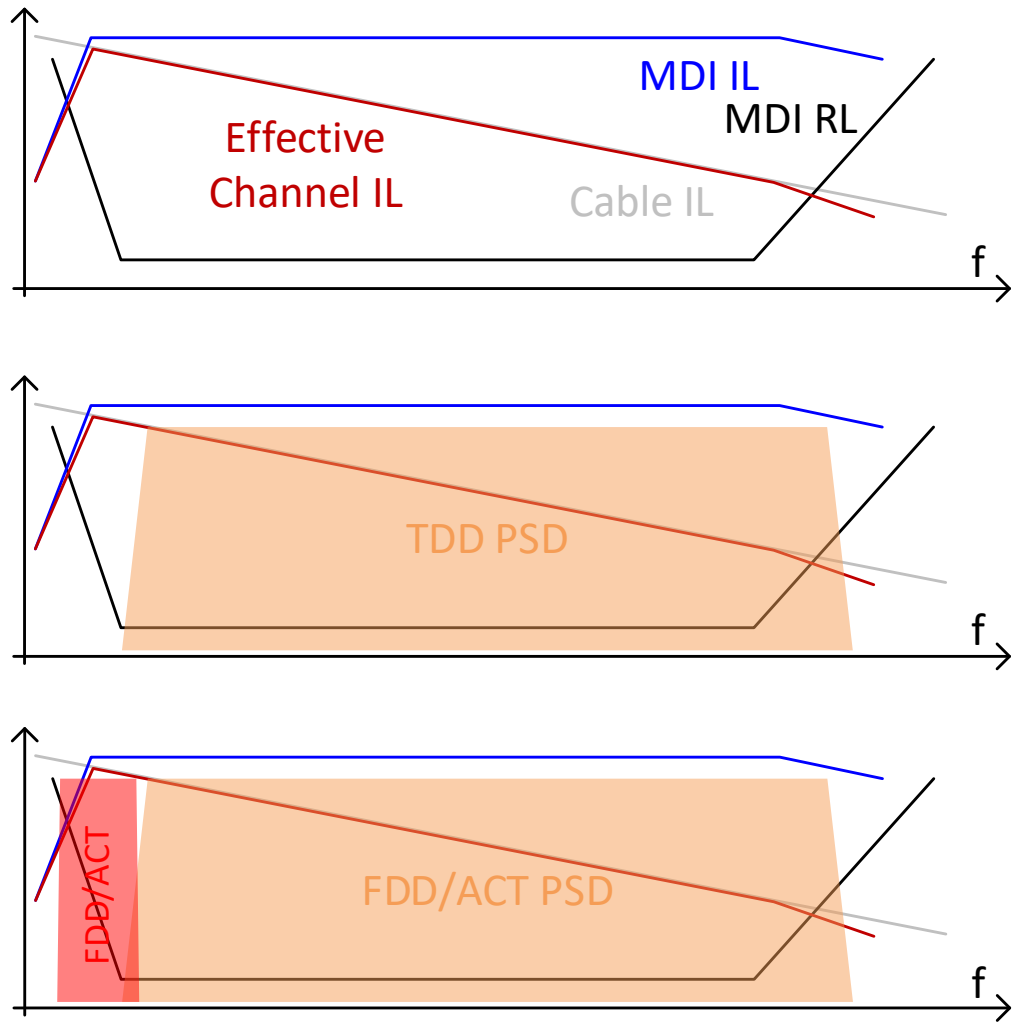
interfacing



https://ieee802.org/3/dm/public/0125/Zerna_802.3dm_01_250122_IL_RL.pdf

Consideration of PoC for System

- Systematically, a TDD / half-duplex system is going to have the better performance in a PoC system



Summary

- This presentation added a Power-Over-Coax complexity data point for a TDD PHY
  - Showing less than half the area footprint

- Pointed to several aspects in the system consideration to take into account for a fair comparison

Thank You!