Power Coupling Networks

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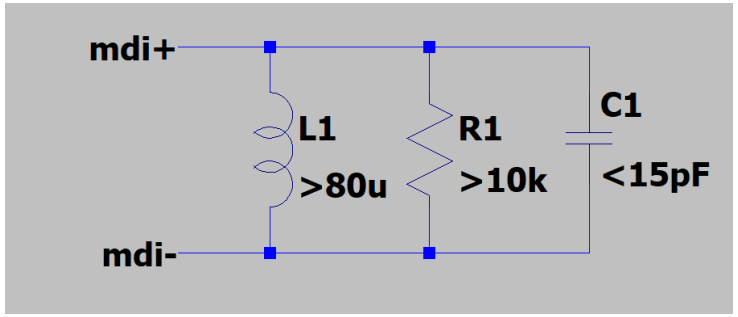
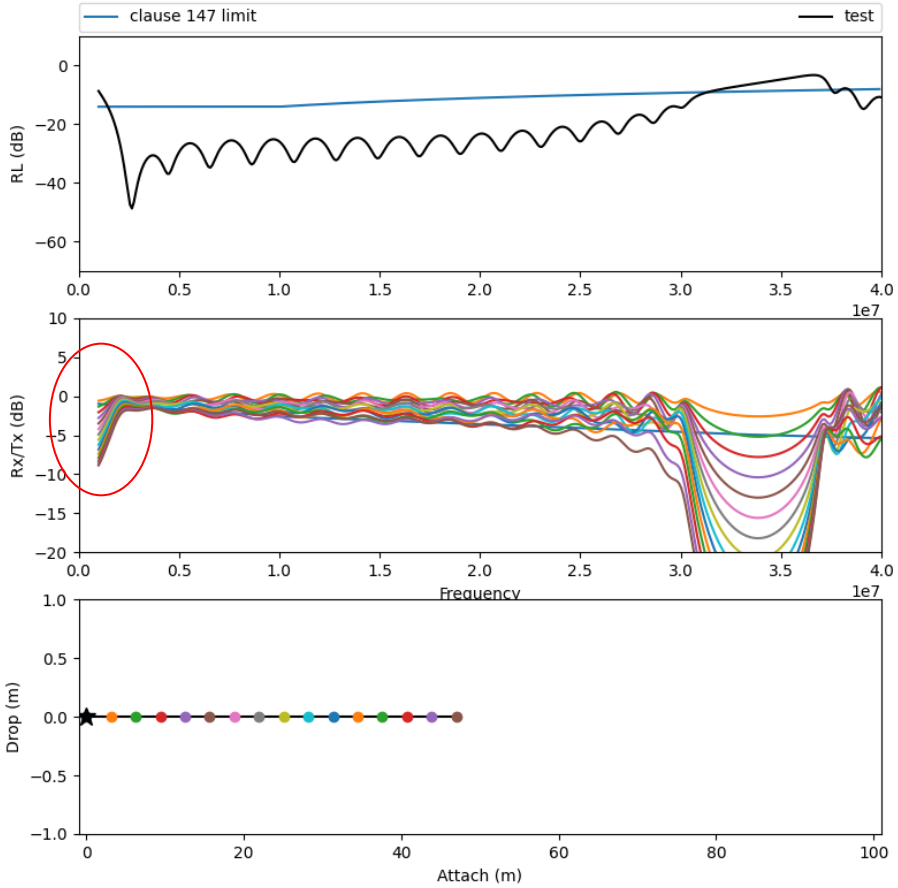
ANALOG DEVICES

AHEAD OF WHAT'S POSSIBLE™

Power Coupling Inductance

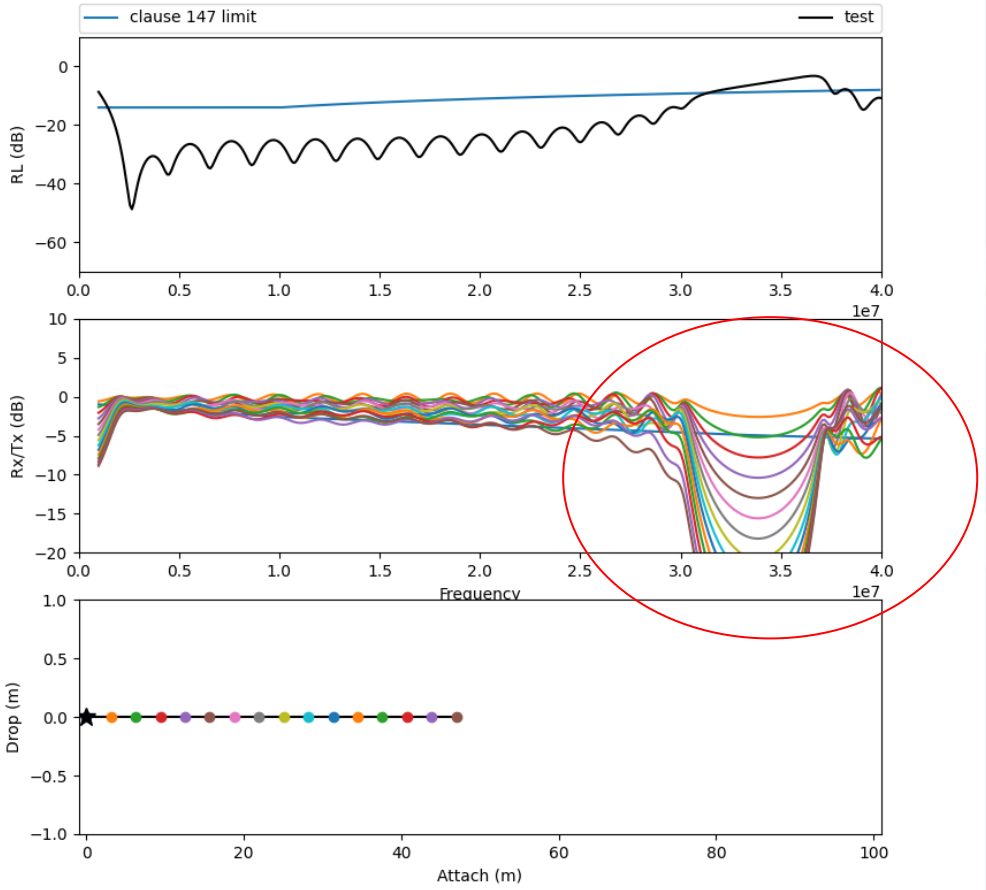
- Most models have been using 80uH L_{PoDL}
- L_{PoDL} causes
  - Droop in the data eyes
  - Notch in IL / RL at low frequency
- Lower L_{PoDL} is better for Power Path





Cnode

- Far bigger problem is Cnode
- Drop Length acts like Cnode
- Difficult / Impossible to reduce
- Need 25pF-30pF allowance for practical PDs
  - Clause 146/147 PHYs will not be usable 802.3da



Power Coupling Network Cnode Measurement

- Presented previously
  - Paul_da_031721.pdf
- Measurement of an example power coupling network
  - No PHY in measurement
  - Power Coupling Inductance Alone
    - 112uH +/- 20%
    - Measured Cnode = 4.02pF
  - Power Coupling Inductance + Common Mode Choke
    - 100uH CMC
    - Measured Cnode = 13.47pF
  - Estimate 12.5pF per node for PHY
    - Estimation from “Koczwara_Griffiths_Brandt_MultidropNodeDistributionChallenges_20201202_v1.1.pdf”
    - (Measured + Expected) Cnode = 25.97pF

Conclusion

- How do we address mixing segment impedance disruption caused by Cnode?