
SPE Multidrop Enhancements Mixing Segment Considerations

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Background

- Measurement configuration results for LTspice model validation demonstrated.
 - Transient analysis for RX eye
https://www.ieee802.org/3/da/public/051921/diminico_SPMD_01_0521.pdf
- New cable model developed to use with transient analysis for RX eye
 - Cable model transmission characteristics consistent with cable model developed.
https://www.ieee802.org/3/da/public/0721/diminico_SPMD_01_0721.pdf
- New cable model developed to consider Link Segment Node Distribution with transient analysis for RX eye
 - Cable model transmission characteristics consistent with prior 18 AWG cable model
 - Transient analysis of 75 m node distributions
https://grouper.ieee.org/groups/802/3/SPMD/usecase/SPMD_Usecase_Library.pdf
- Clumped distribution transient analysis for RX eye
https://www.ieee802.org/3/da/public/100621/diminico_SPMD_01b_100621.pdf
- Capacitive compensation via inductance(s)
https://www.ieee802.org/3/da/public/1121/diminico_SPMD_01_1121.pdf
- 802.3da desired use cases with capacitive compensation via inductance(s).
https://www.ieee802.org/3/da/public/0122/diminico_SPMD_01_0122.pdf
- Cable sectioning considerations
https://www.ieee802.org/3/da/public/040622/diminico_SPMD_01_0422.pdf
- Mixing segment considerations
https://www.ieee802.org/3/da/public/050422/diminico_SPMD_01_05042022.pdf

Background

- Mixing segment considerations

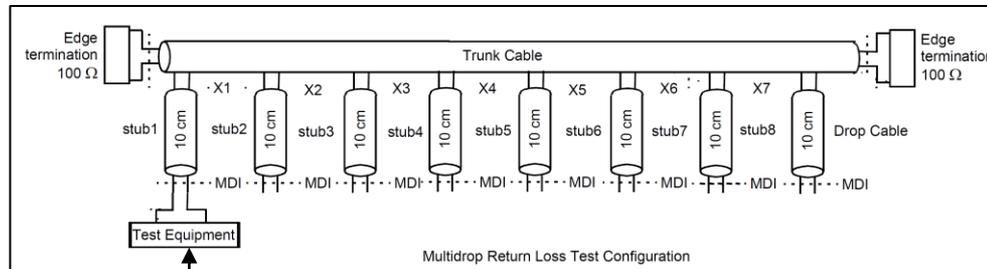
https://www.ieee802.org/3/da/public/050422/diminico_SPMD_01_05042022.pdf

147.8.2 Return loss

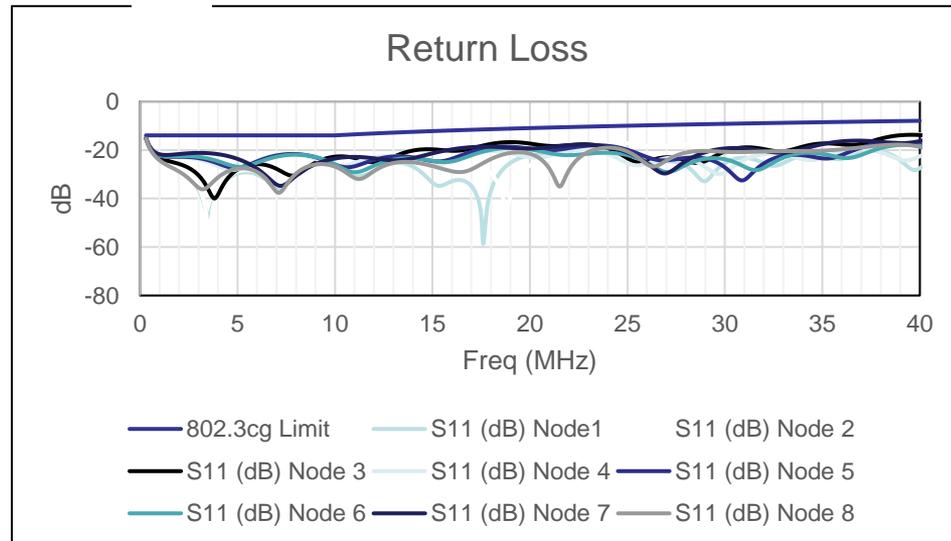
The mixing segment at any MDI attachment point shall meet the return loss characteristics specified for link segments in 147.7.2. The reference impedance for the return loss specification is 50 Ω .

RL without MDI's or tuning inductors attached

1 m 2 m 3.5 m 0.5 m 0.5 m 3.5 m 14 m



RL



Contributors

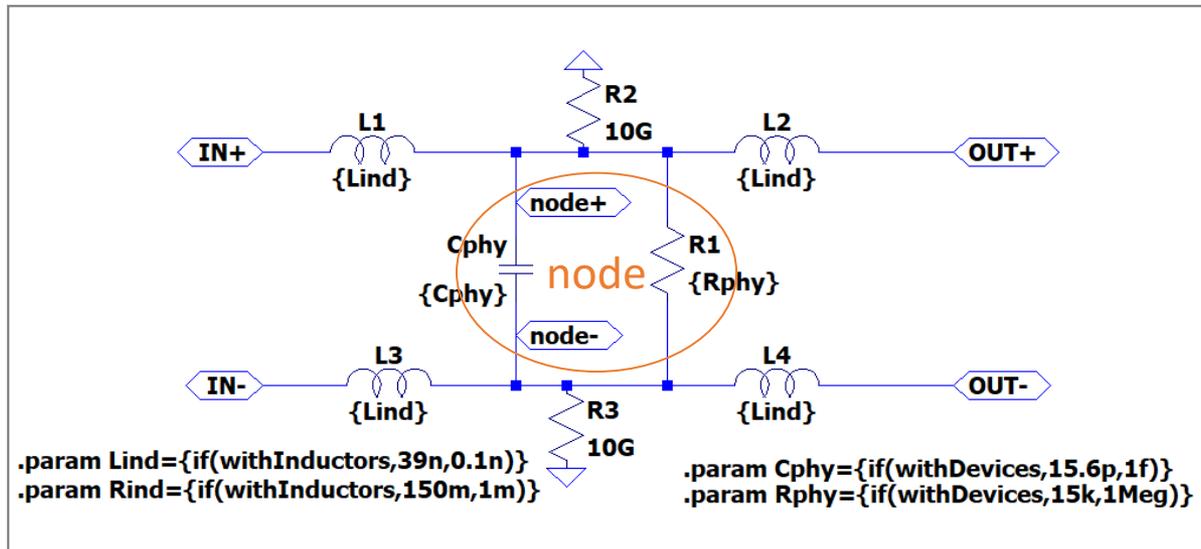
- Bob Voss/Paul Wachtel/Panduit
- Wojciech Koczwara, David Brandt/Rockwell

Purpose

- Review mixing segment specifications; MDI attachments/tuning inductors.

MDI attachment points:

- simulated with and without node attached
- simulated with and without inline inductors

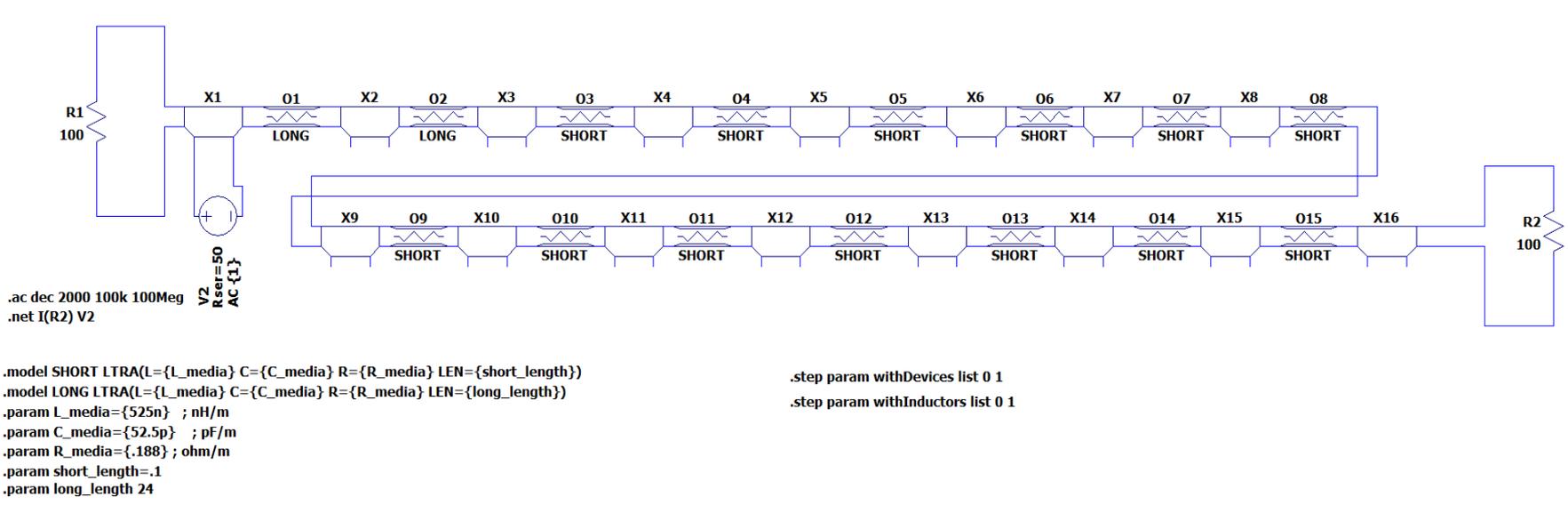


Source: Wojciech Koczwar/Rockwell

Return Loss

Return Loss (S11) simulation at MDI 1 attachment point:

- with and without MDIs attached on the bus
- with and without inline inductors at the connectors

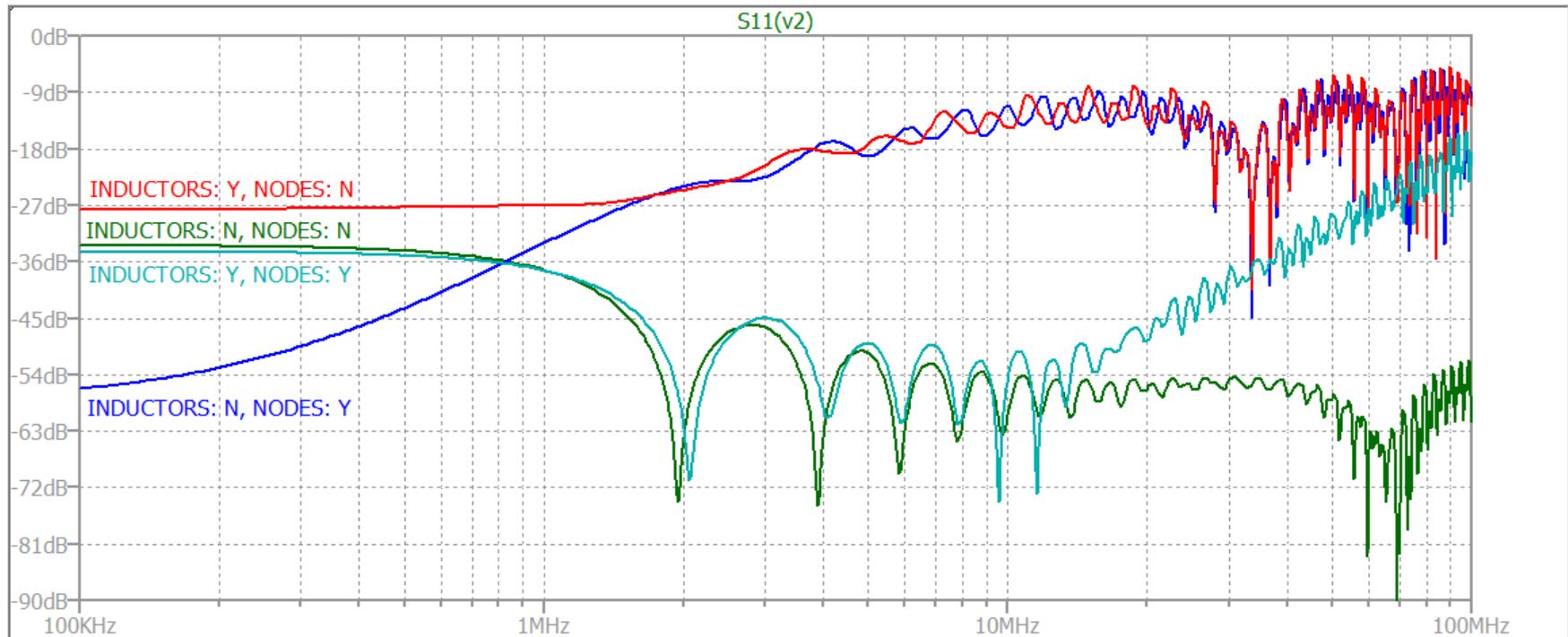


Source: Wojciech Koczwar/Rockwell

Return Loss

Return Loss (S11) simulation at MDI 1 attachment point:

- when not using inductive compensation (green and blue), removing nodes improves S11
- after the inductors are installed, measuring with nodes attached improves S11 (cyan)
- detaching nodes, but leaving inductors on the link is harmful to S11 (red)



Source: Wojciech Koczwaro/Rockwell

Summary

- Mixing segment RL specifications; MDI attachments/tuning inductors.

Inductors	MDI Attachment	RL
Y	Y	spec supported
N	N	spec supported
Y	N	spec can be supported with an implementation that enables first two conditions
N	Y	NA

