SPE Multidrop Enhancements Mixing Segment Considerations Update

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Background

- IEEE P802.3da Task Force Work Items
  https://www.ieee802.org/3/da/workitems/index-word.html

Mixing Segment	specifications (IL, RL, mode conversion, etc.), MDI specs (tighter than CG?)
MDI + stub	connection (inductance, capacitance, resistance)

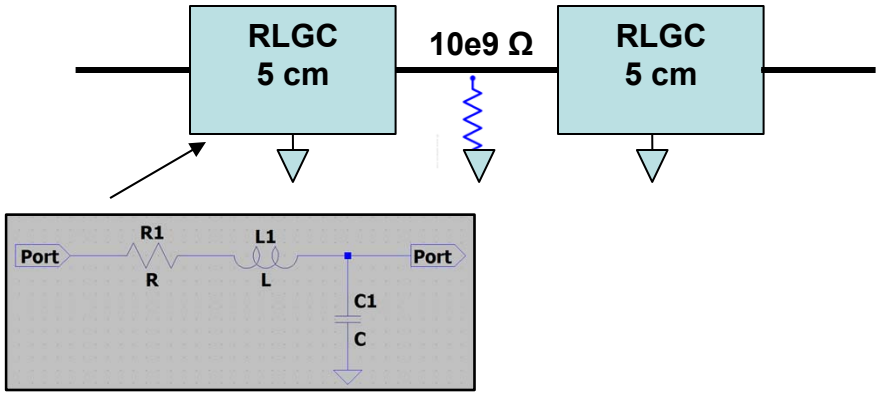
- Follow-on July 2020 Single Pair Multidrop Considerations
  - https://www.ieee802.org/3/da/public/jul20/diminico_SPMD_01_0720.pdf
- Follow-on November 2020 Single Pair Multidrop Considerations
  - https://www.ieee802.org/3/da/public/111820/diminico_SPMD_01_1120.pdf

Contributors

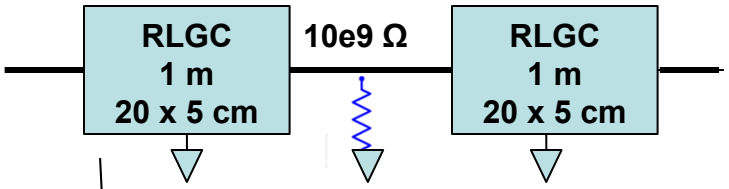
- **Paul Wachtel, Bob Voss, Ron Nordin – Panduit**

Analysis Cable Model

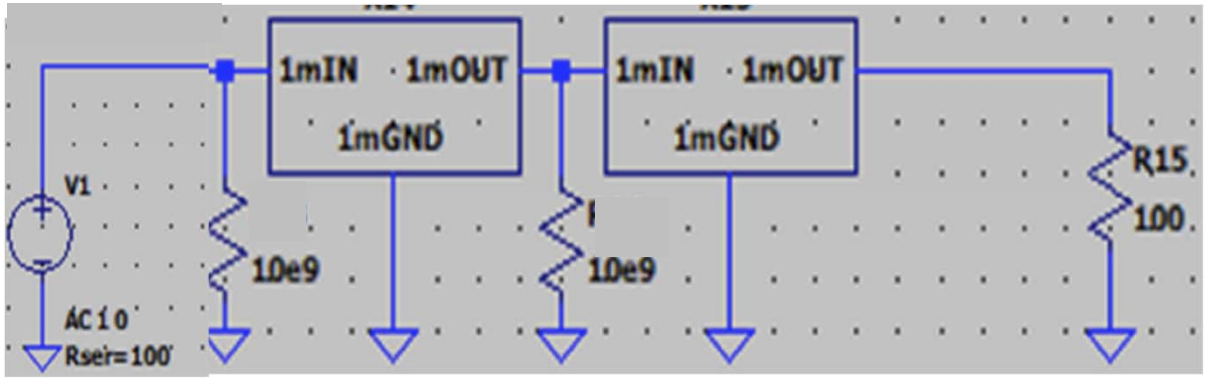
- 5 cm RLCG



- Concatenate 20*5 cm RLCG - 1 m

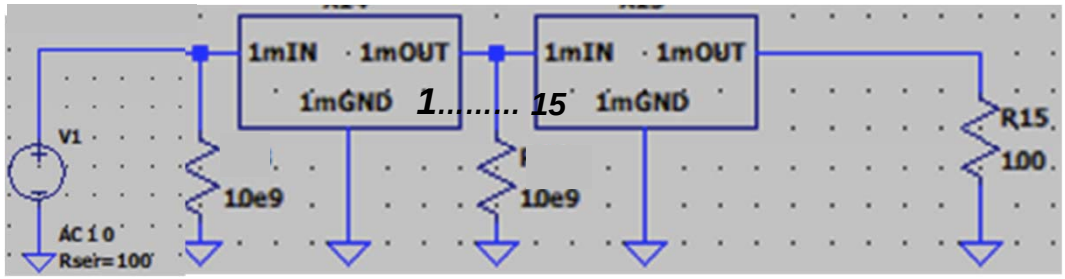


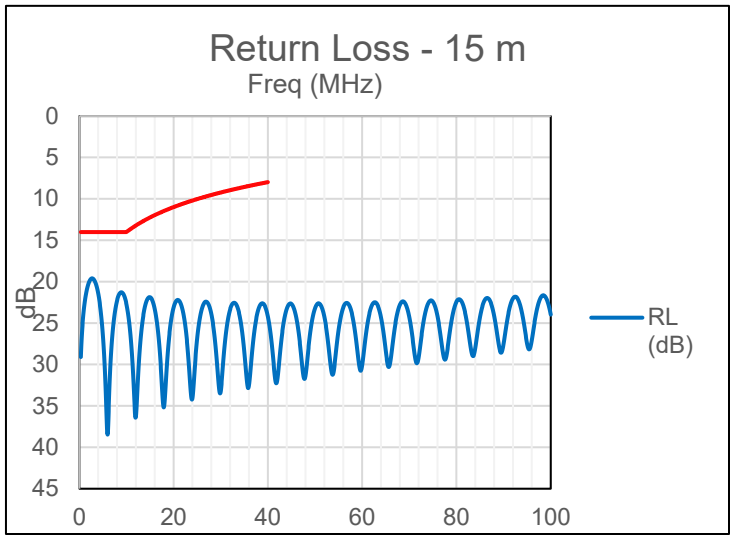
- Spice model 1 m cable sections

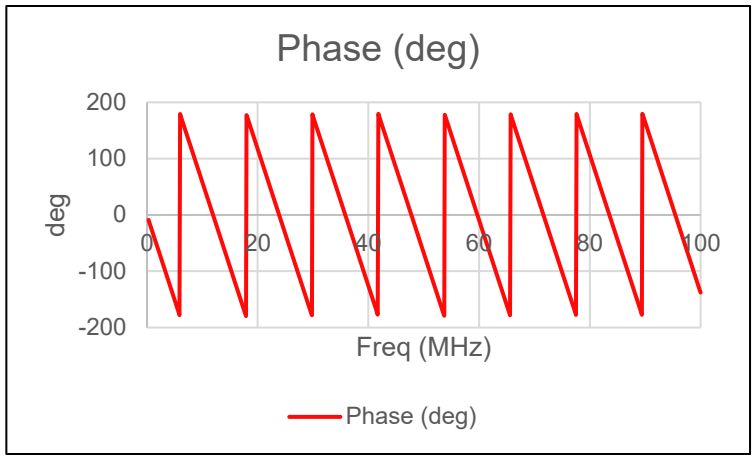


Analysis Cable model – 15 meters

- 1 m - 15 sections



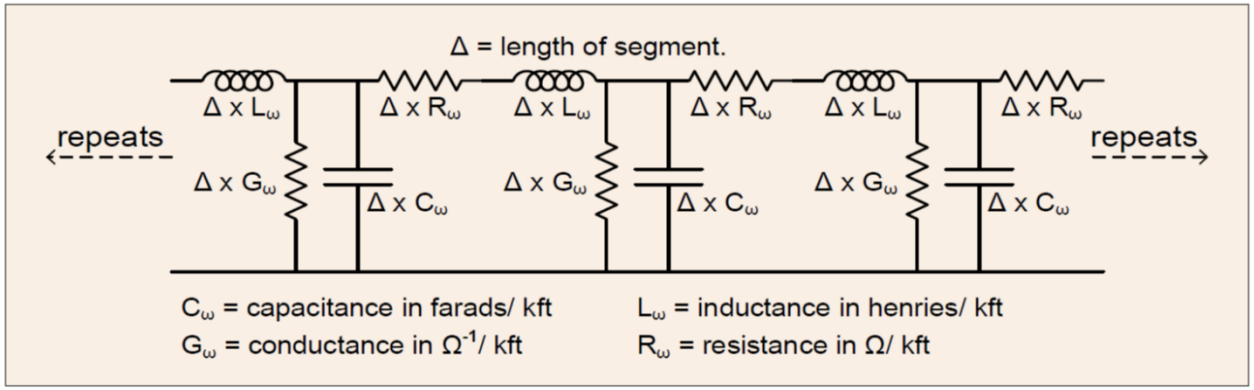




Consistent with >>10SPE Study Group Automotive Channel for Multi-Drop Stefan Buntz, Daimler AG http://www.ieee802.org/3/10SPE/public/adhoc/buntz_10SPE_03_1005.pdf

Analysis Cable model

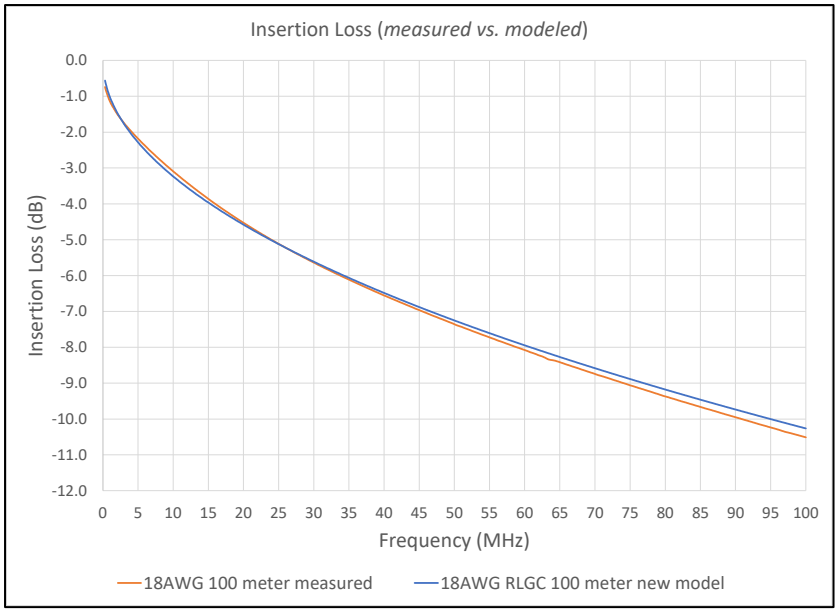
- SPICE's built in transmission line models or lumped component sub-circuit approximations not sufficient for transient analysis

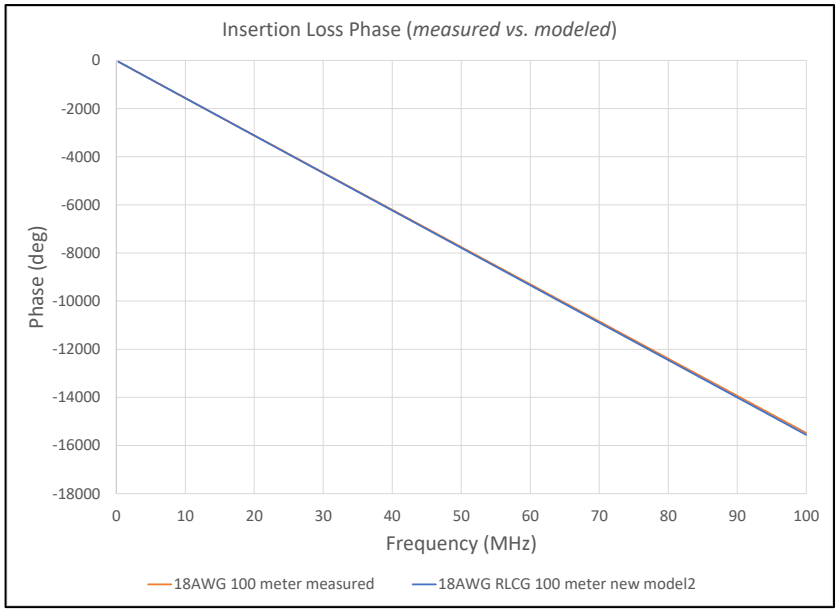


SPICE Circuit Model

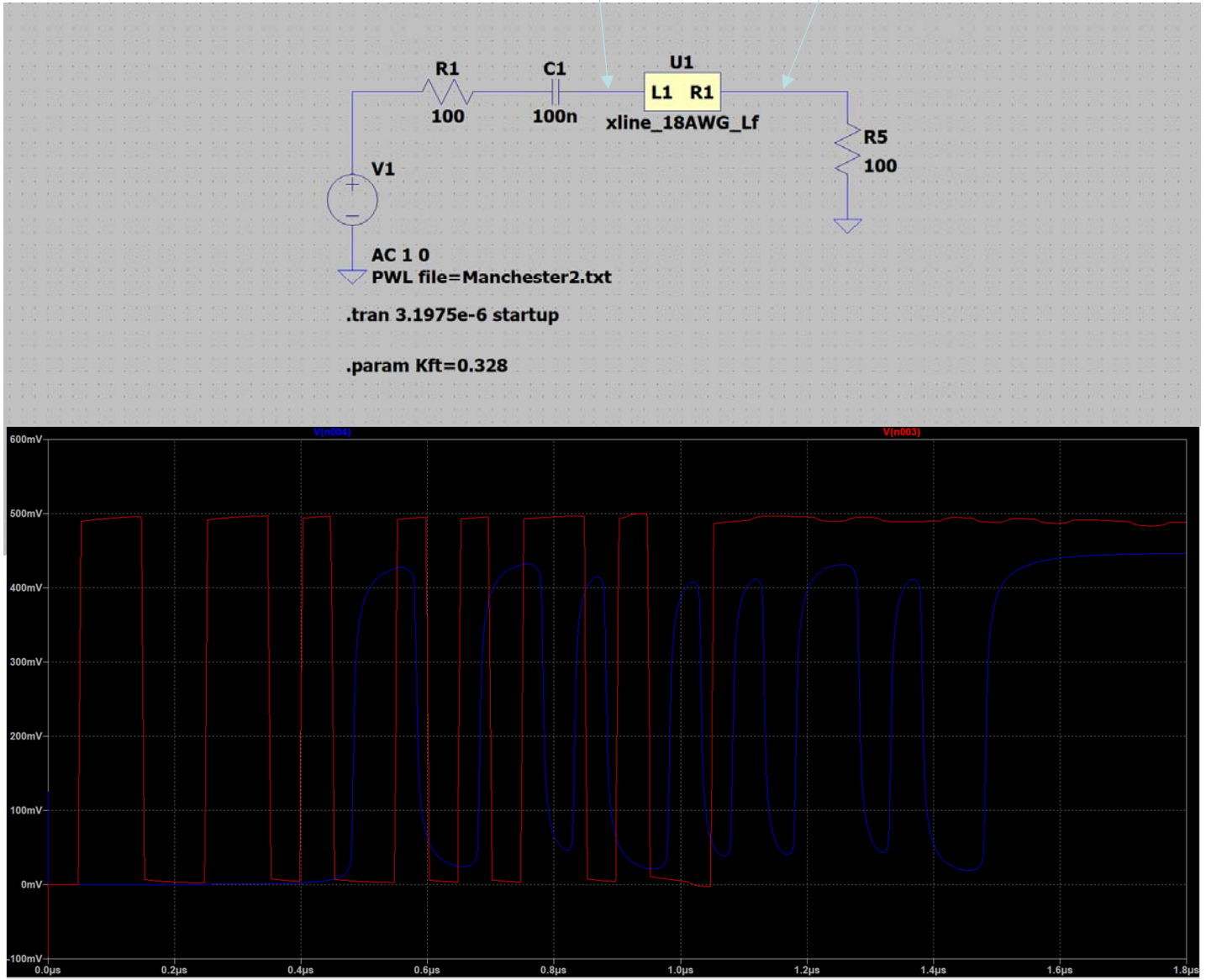
Analysis Cable model – New

- SPICE Circuit Model

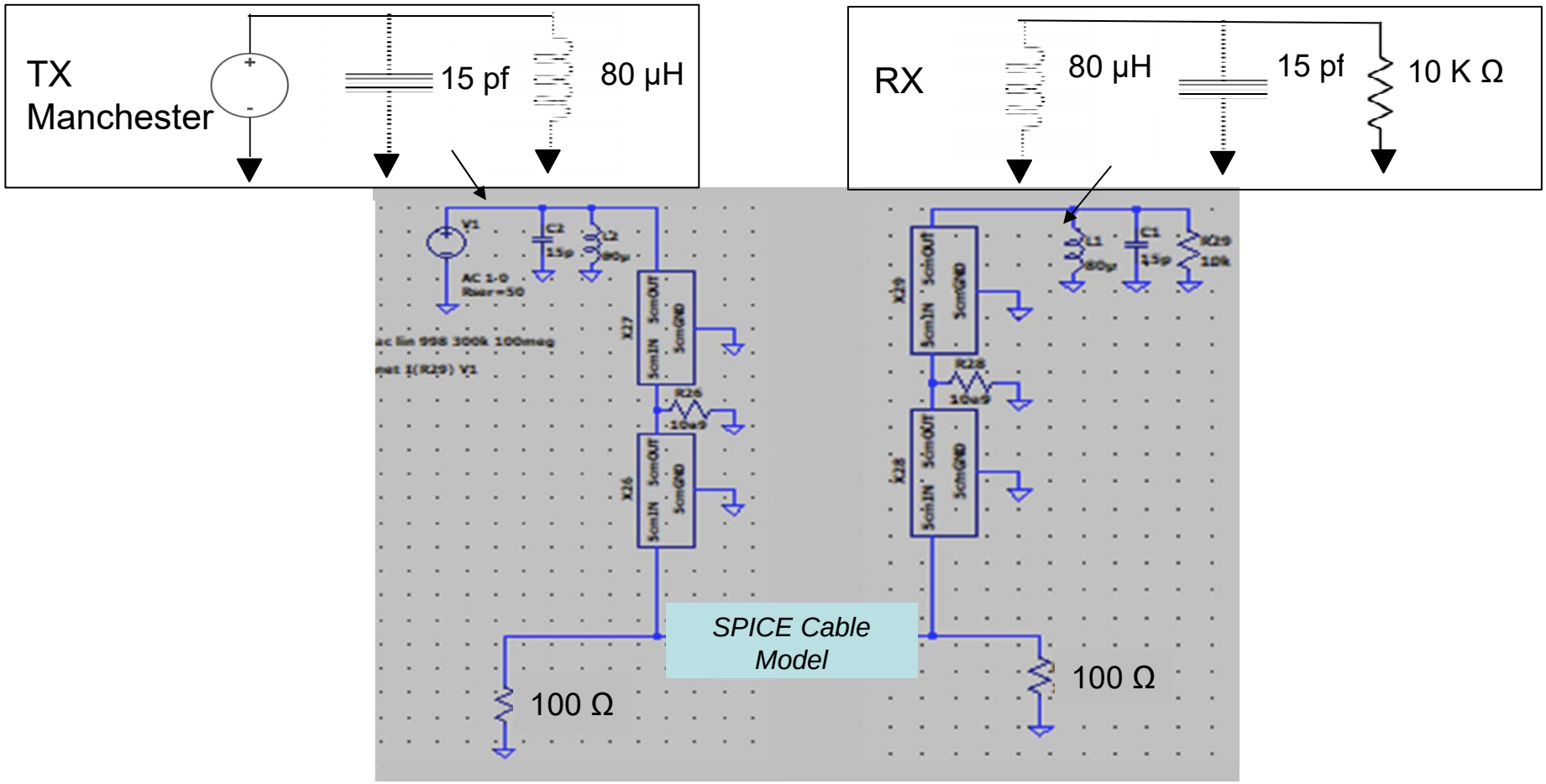




Analysis Cable model



Source and Load with PoDL



Summary recommendations

- Cable spice model introduced
- Analysis to follow
  https://www.ieee802.org/3/da/workitems/index-word.html

Mixing Segment Recommendation Follow-on	Specifications (IL, RL, mode conversion, etc.), MDI specs (tighter than CG?) – - Consider 802.3cg link segment as baseline with adjusted IL/RL > 20 MHz (TBD). - IL, RL- worse case tap spacing versus frequency
MDI + stub Recommendation Follow-on	Connection (inductance, capacitance, resistance) – - Change MDI electrical minimum inductance for each MDI attachment point from 80 µH to 1000 µH (TBD). - Further considerations inductance, capacitance, resistance