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 tranisent analysis for RX eye

  https://www.ieee802.org/3/da/public/100621/diminico_SPMD_01b_100621.pdf

- Capacitive compensation via inductance(s)

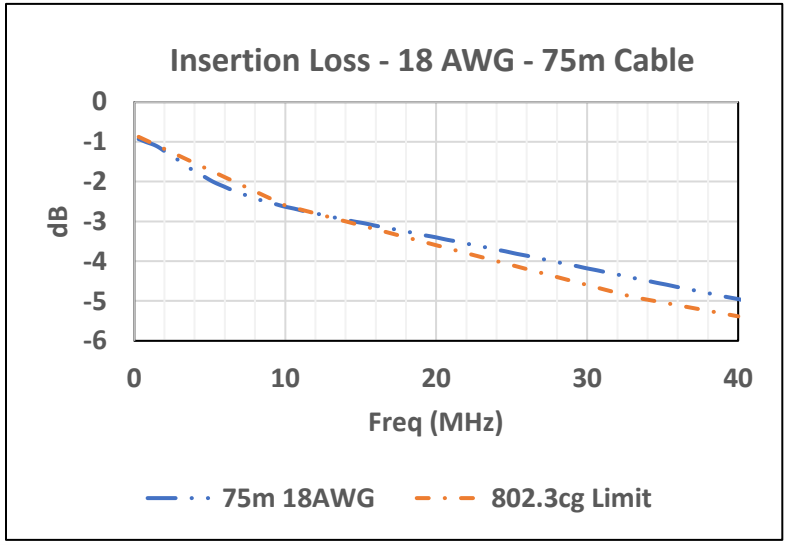
  https://www.ieee802.org/3/da/public/1121/diminico_SPMD_01_1121.pdf

Purpose

- 802.3da desired use cases may be possible to support with capacitive compensation via inductance(s).
- Does not preclude interoperability with Clause 147 multidrop

Use Cases	No. of Nodes Minimum/Desired	Length, meters Minimum/Desired
Lighting Controls	8/16	30/50
Industrial Edge Networks	8/32	50/75
Industrial In-Cabinet Usage	40/64	25/75
Elevators	16/24	50/75

Source: https://www.ieee802.org/3/SPMD/usecase/SPMD_Usecase_Library.pdf



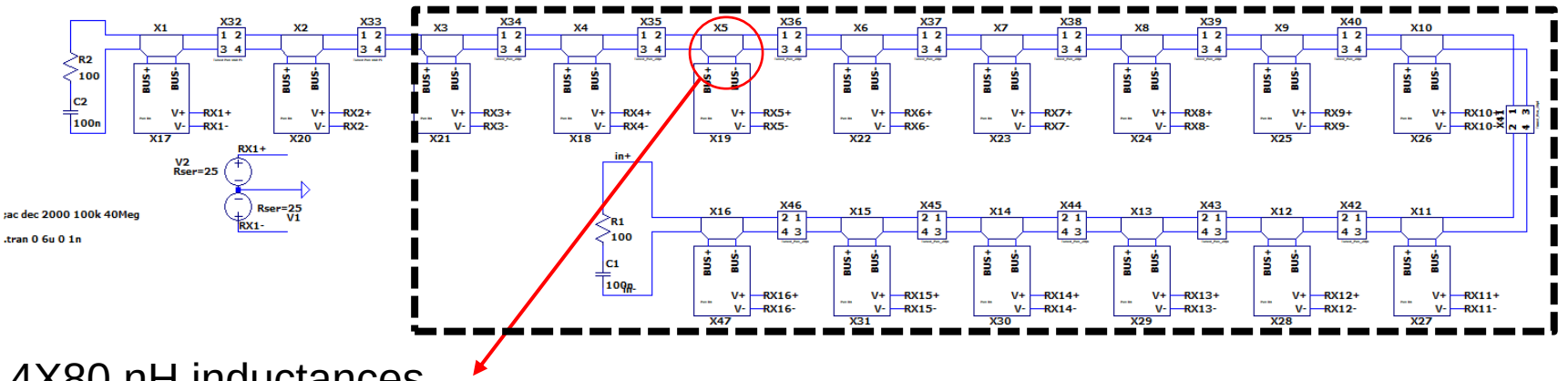
-MDI impedance limit parameters

Parameter name	Unit of measure	Minimum value	Maximum value
R	kΩ	10	—
L	μH	80	—
C_{tot}	pF	—	180
C_{node}	pF	—	15

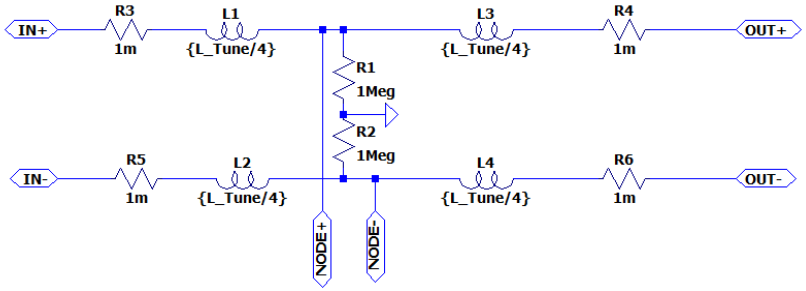
Source: IEEE Std 802.3cg™-2019

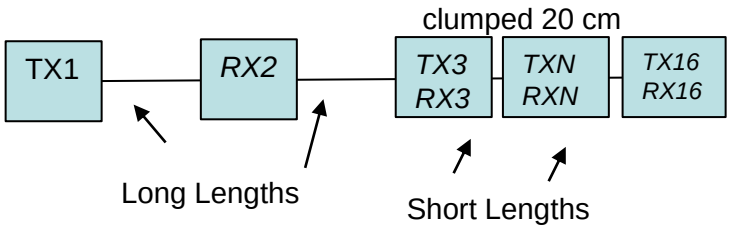
Multidrop Topology - clumped compensated

inductances incorporated in stub connectors



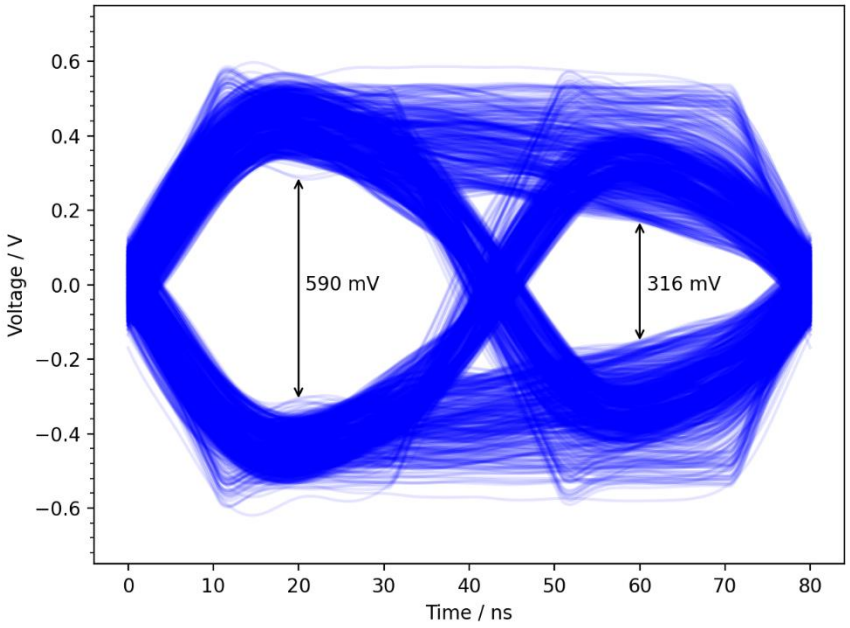
4X80 nH inductances



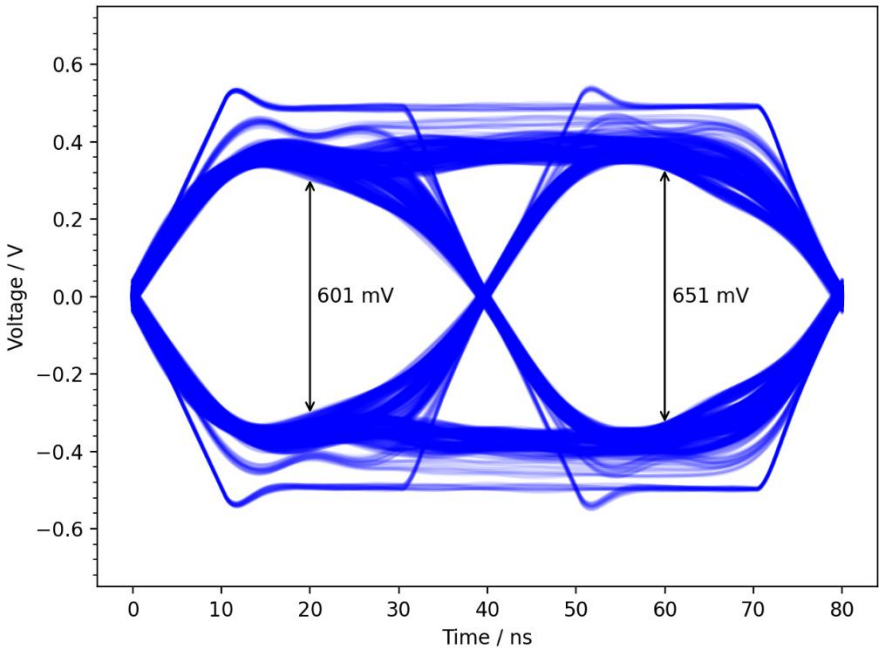


- x m, x node, clumped topology
- 80 uH, 30 pF node parasitics
- 10 cm stub lengths
- 4X80 nH inductances

Multidrop Topology - 75m - 30 node



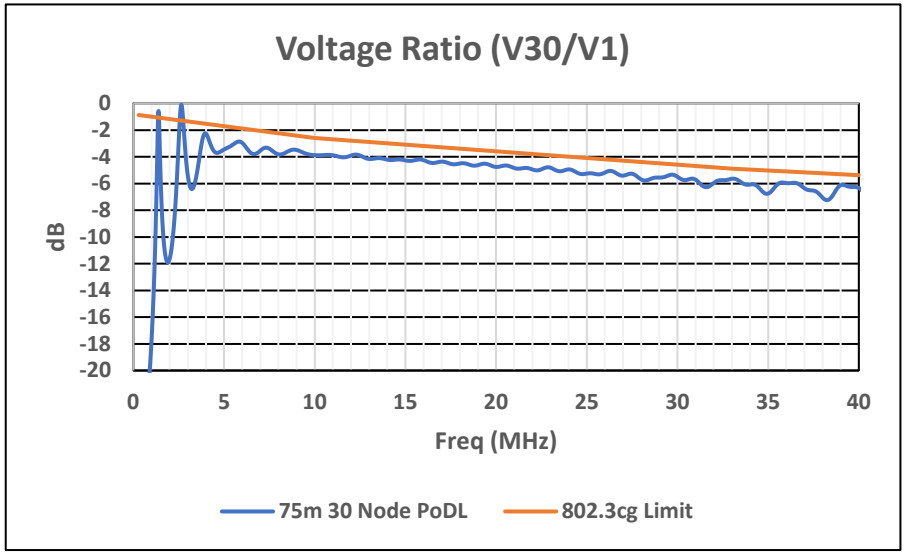
PoDL



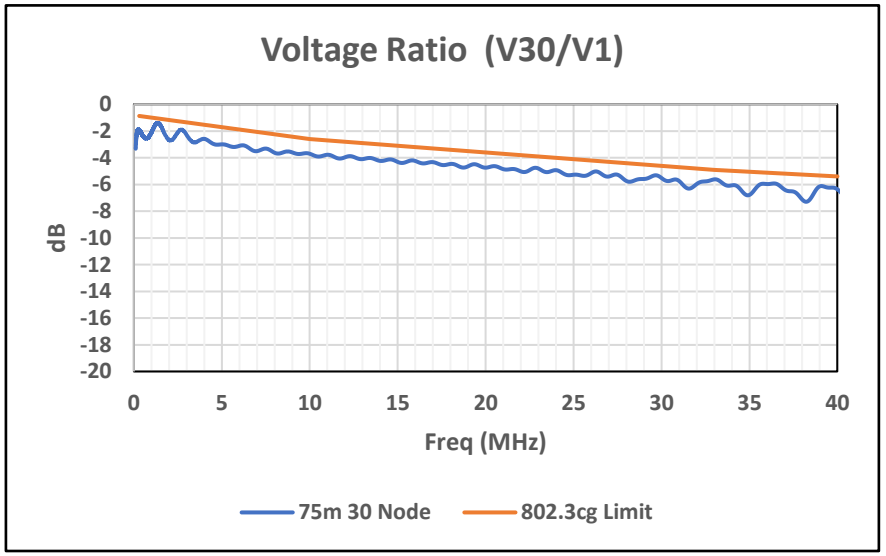
No PoDL

- 75 m, 30 node, clumped topology
- 80 uH, 30 pF node parasitics
- 10 cm stub lengths
- 4X80 nH inductances

Multidrop Topology - 75m - 30 node



PoDL



No PoDL

- 75 m, 30 node, clumped topology
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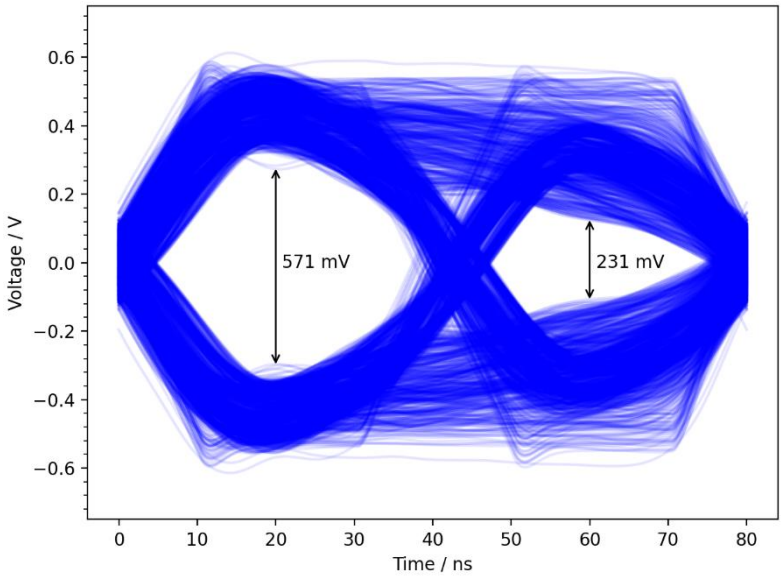
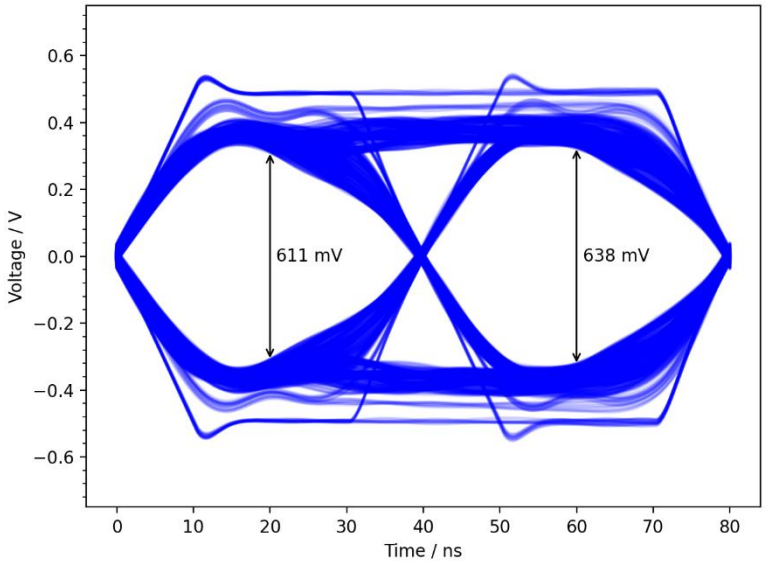
Multidrop Topology - 75m - 35 node



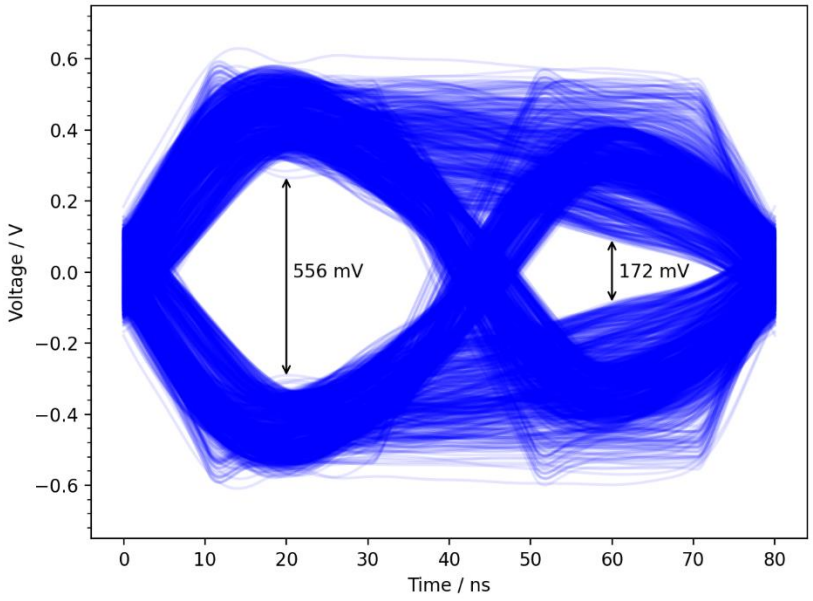
PoDL



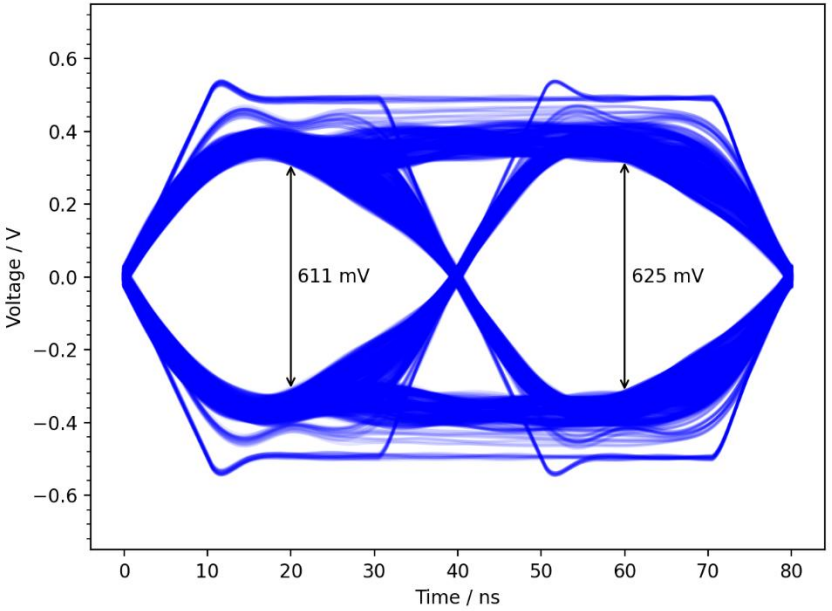
No PoDL

- 75 m, 35 node, clumped topology
- 80 uH, 30 pF node parasitics
- 10 cm stub lengths
- 4X80 nH inductances

Multidrop Topology - 75m - 40 node



PoDL



No PoDL

- 75 m, 40 node, clumped topology
- 80 uH, 30 pF node parasitics
- 10 cm stub lengths
- 4X80 nH inductances

Summary

- 802.3da desired use cases may be possible to support with capacitive compensation via inductance(s).
- Does not preclude interoperability with Clause 147 multidrop

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- 75 m - 30 nodes supportable with PoDL
- 75 m - > 30 nodes supportable without PoDL