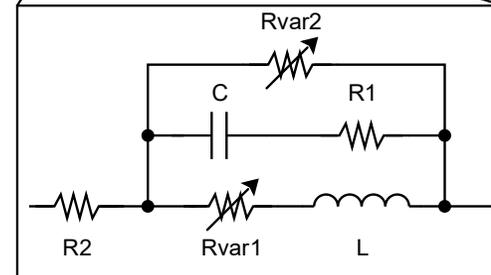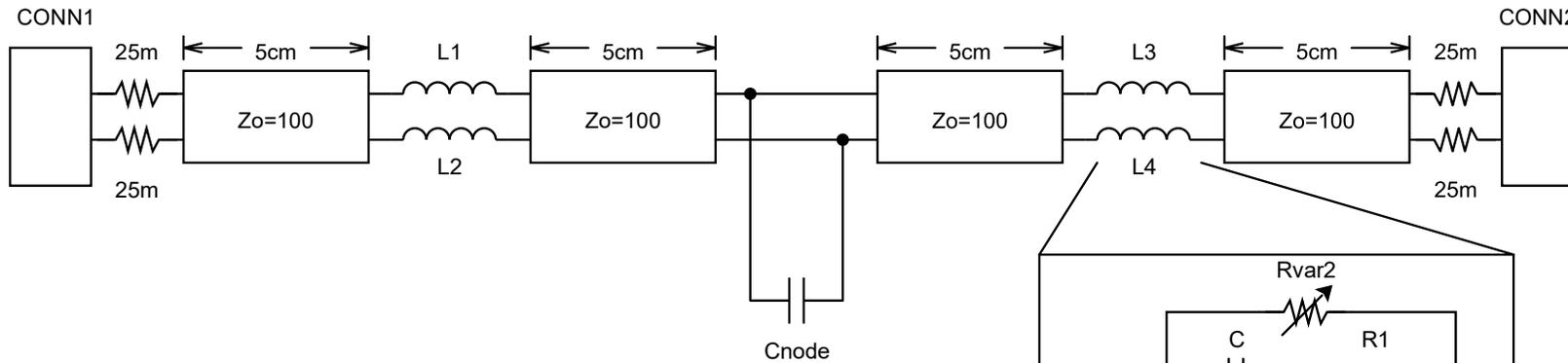# T-Connector Model Correlation

802.3da, San Antonio, TX
May 2023
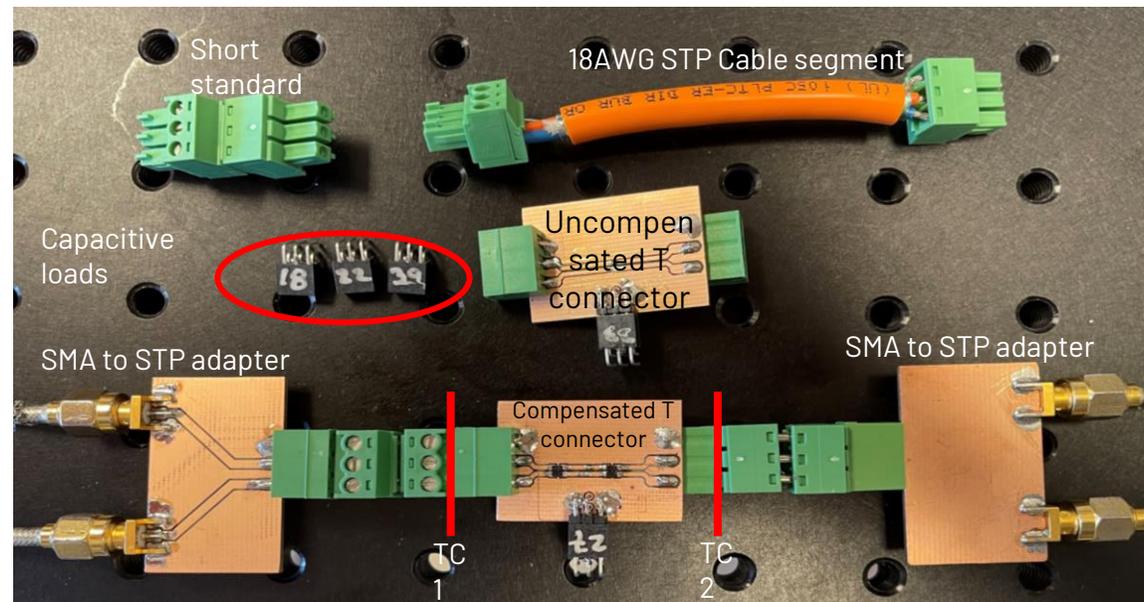Michael Paul

Experiment Setup and Spice Model

Coilcraft 8085-LS78N

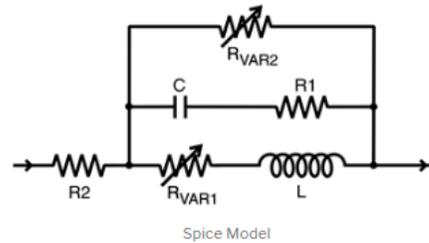Compensating Inductor Model

Spice Model

$$R_{var1} = k1 * \sqrt{f}$$
$$R_{var2} = k2 * \sqrt{f}$$

Equations

Part number	Frequency limit of model (MHz)		R1	R2	C (pF)	L (µH)	k1	k2
	Lower	Upper						
0805LS-78N	3	500	2010	0.0785	2.08	0.0762	0.00E+00	6.53E-02
0805LS-111	3	500	1590	0.142	8.53	0.108	1.29E-05	1.14E-01

These lumped-element (SPICE) models simulate the frequency-dependent behavior of Coilcraft inductors within the frequency range shown in the accompanying table for the individual selected inductor.

The models represent de-embedded measurements, as described below. Effects due to various different circuit board traces, board materials, ground planes or interactions with other components are not included and can sometimes have a significant effect when comparing the simulation results to measurements of the inductors using other production verification instruments and fixtures.

T-Connector Model / Lab Correlation (4 x 82nH Lcomp)

Return loss Model Correlation

Insertion loss Model Correlation
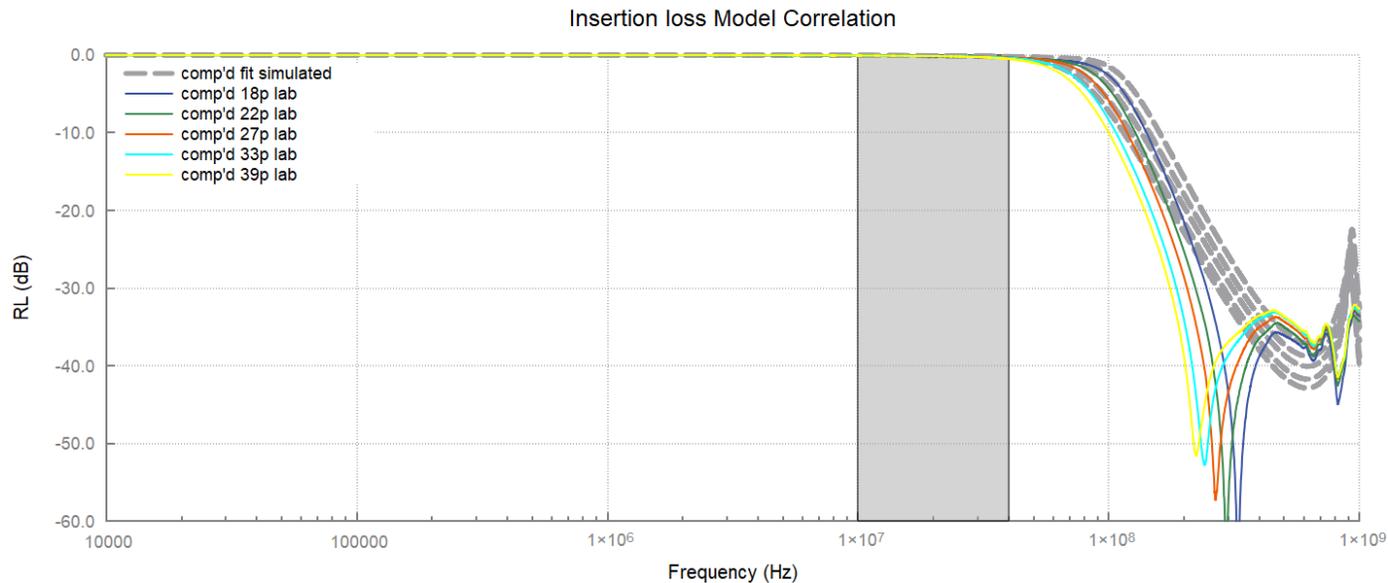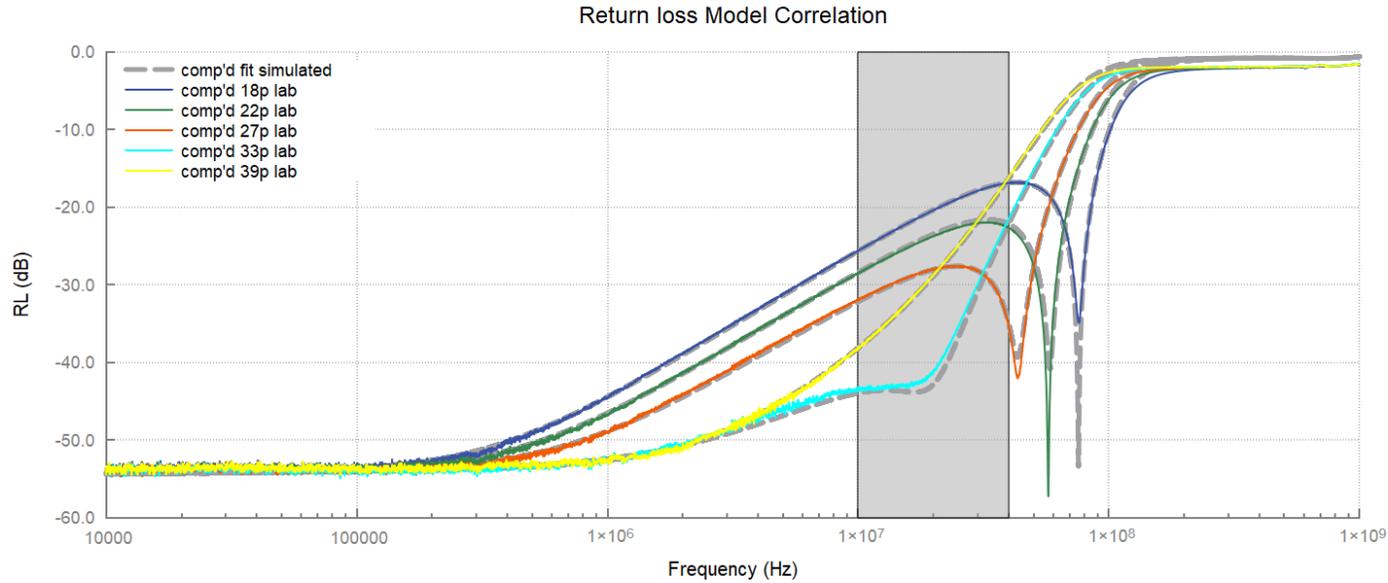
Lab Cnode	Sim Cnode
18p	16.8p
22p	21.3p
27p	25.5p
33p	31.7p
39p	36.8p

Conclusion

► Very good correlation achieved between s-parameter measurements and discrete spice models of an example t-connector

► Components inside t-connector can easily be varied to check effects on full mixing segment using the consensus model

Compensating Inductor Model

Acknowledgement
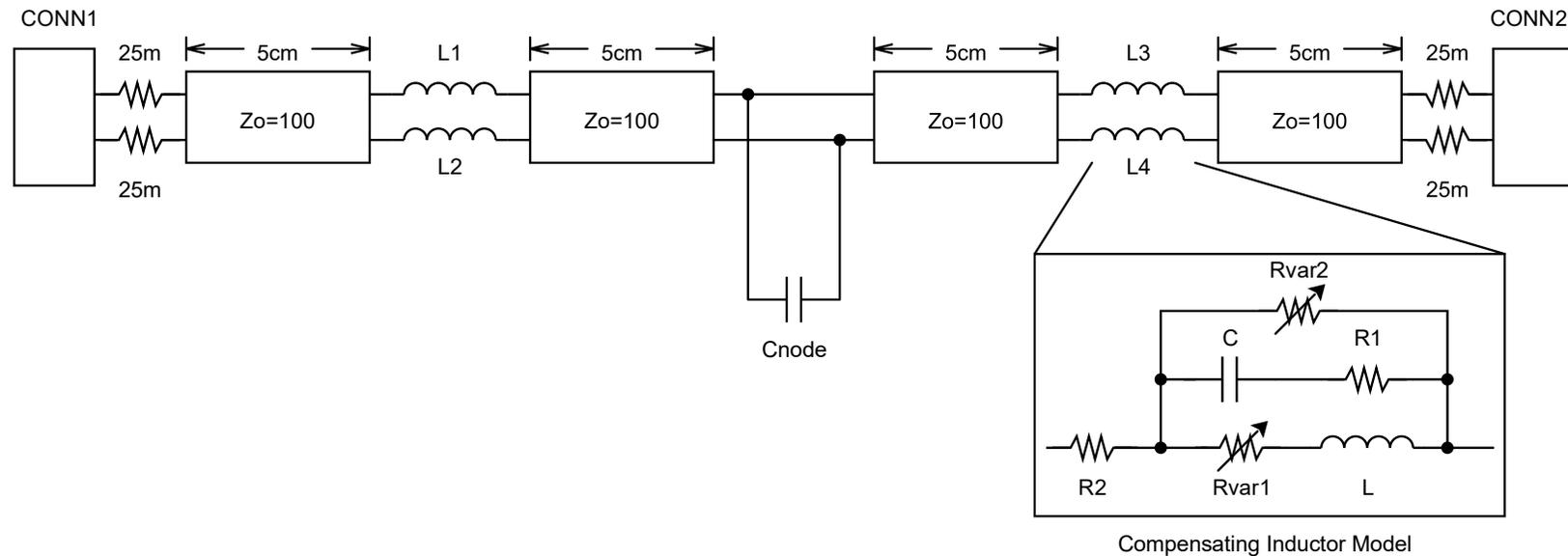
▶ Thanks to Andy Gardner (ADI) for assembling and measuring the T-connectors in the lab