DEIABLO MOUNTAIN RESEARCH 741 BUENA VISTA PLACE Walnut Creek, California 94597 TEL: 925- 788-4807

Coaxial Cable Transfer Impedance and Shielding Effectiveness

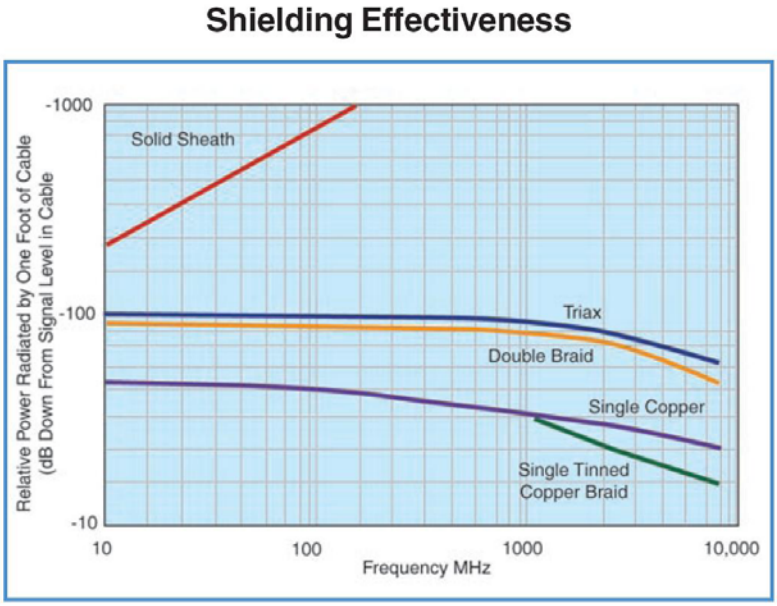
Transfer impedance relates the induced voltage on the center conductor of a coaxial cable in response to a current flowing on the outside of its shield:

$$Vr = Z_t \bullet I_s \bullet L$$ where Zt is in ohms per meter, Is is the outer surface shield current, and L is the length of the cable in meters

Transfer impedance is related to shielding effectiveness by:

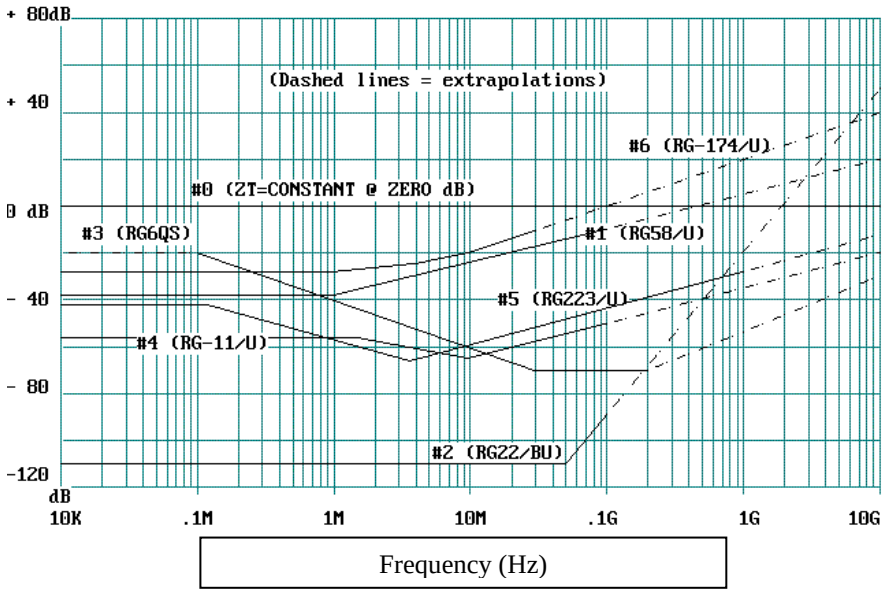
$$Z_t = \frac{2 \bullet Z_o}{10^{\frac{SE}{20}}}$$ where Zo is the characteristic impedance of the cable (terminated both ends), and SE is the shielding effectiveness in dB

For example, shielding effectiveness for a selection of shield types [1]:
(note, SE in the chart below is dB per foot)



Thus, typical values at 100MHz:
RG174 or RG58: 300 milliohms per foot
RG223 (double shielded): 2 milliohms per foot.
RG405 (semi rigid): 0 milliohms per foot

Approximate transfer impedance (dB ohms per meter) for some common coaxial cable types [2]:



References:

1. Times Microwave Systems, "Complete Coaxial Cable Catalog and Handbook", 2005.

2. Glazar, Arthur J. "A Software Implementation of TL Field-to-Cable Coupling Equations", IEEE EMC Society Newsletter, 2000.

3. Morriello, A., et al, "Surface Transfer Impedance Measurement: A Comparison Between Current Probe and Pull-On Braid Methods for Coaxial Cables," *IEEE Transactions on Electromagnetic Compatibility*, Vol 40 Number 1, pp. 69-76.