Cabling channel resistance unbalance

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Summary of resistivity and resistance unbalance specifications in TIA cabling standards

- Resistivity of cable and “cordage” from cabling standards
  - Cable DC resistance is 9.38 Ohms / 100 meters, ANSI/TIA-568-C.2, 6.4.1, page 58. Cat 5e, 6, and 6A are all the same.
  - Cordage DC resistance is 14 Ohms / 100 meters, ‘568-C.2, 6.6.1, page 74. Cat 5e, 6, and 6A are all the same.
  - Cable and cordage resistance unbalance with a pair is 2.5 % per IEC 61156-1, ‘568-C.2-1 6.4.2 page 58. All categories are the same.
  - Cable and cordage resistance unbalance between pairs is not specified, but has been studied and found to be less than 5 %.
  - Connectors are allowed 200 mOhms resistance and 50 mOhms resistance unbalance between any conductor. They actually have much less. The values of 60 mOhms and 30 mOhms are okay to use.

Suggested topologies to study

- There is no specified minimum length, only a max of 100 meters.
- There is no specified minimum number of connectors, only a max of 4.
- Suggested topologies:
  A. 6 inch (0.15 m) of cordage, no connectors.
  B. 4 m channel with 1 m of cordage, 3 m of cable, 2 connectors
  C. 23 m channel with 8 m of cordage, 15 m cable, 4 connectors
  D. 100 m channel with 10 m of cordage, 90 m of cable, 4 connectors

Calculated Channel resistance and unbalance for the selected topologies (Ohms) (1 conductor, one direction)

	max channel resistance	min channel resistance	channel unbalance, Ohms	channel unbalance %
A	0.021	0.019	0.002	5.00%
B	0.587	0.482	0.104	9.77%
C	2.767	2.406	0.361	6.97%
D	10.082	9.025	1.057	5.53%

(The max channel resistance implies a loop resistance of 20.164. The 300 mOhm Connector resistance for cat 3 would result in a loop resistance of 22.1 Ohms. The Max channel DC loop resistance from ‘568-C.2 is 25 Ohms.)