Ham 135 - Coax comparison

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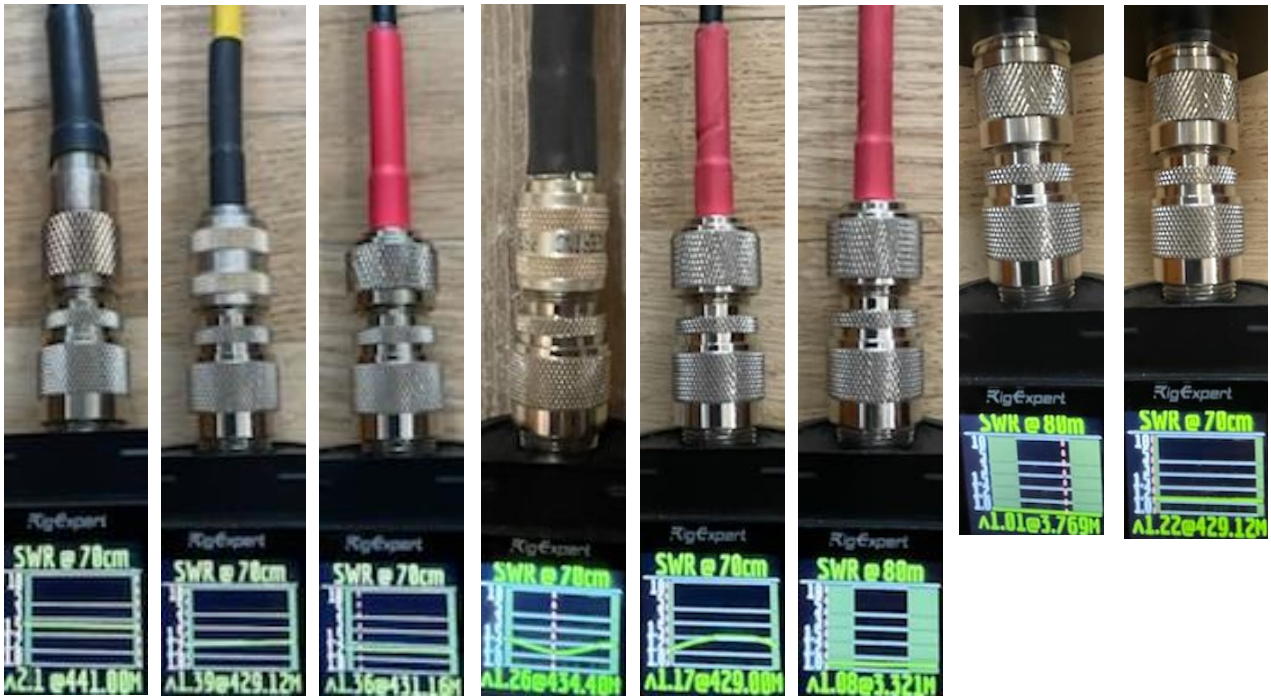
What is coax? It is the feedline between a radio and antenna, consisting of an electrical conductor in the middle surrounding by insulation, then a metallic shield or braid covered by a weather-resistant jacket. Most have characteristic impedance (Z_o) for use with a 50-Ω antenna and a 50-Ohm radio.

We conducted a series of tests using a Rig-Expert Stick Pro antenna analyzer with a 50-Watt dummy load of near pure resistance from DC to 1GHz. So, which coax should you use?

Coax choice depends on *frequency*, *length*, and amount of *loss* you can tolerate.



Item	1	2	3	4	5	6	7	8
Type	RG213u	RG8x	RG8x	RG213u	RG8x	RG8x	Dummy	Dummy
Length	3	3	3	25	25	25		
Freq	70 cm	70 cm	70 cm	70 cm	70 cm	80 M	80 M	70 cm
Vendor	ABR	DXE	Cable experts	DXE	Cable experts	Cable experts		
SWR	2.1	1.4	1.4	1.3	1.5	1.1	1	1.2

At HF, the size of coax matters little. Nevertheless, if budget allows, use 213 for over 50-feet. At VHF and above, use RG-8x up to 25-feet. Greater than 25-feet should be RG-213u.

Note even the shape of the curve changes at 70 cm (UHF) and 25-feet, regardless of size. The short 3-foot DXE jumper curve changed with flexing. That is not good, since you do not know present conditions.

As SWR increases, the amount of effective radiated power decreases because of heat loss. The radio is still putting out power, but it is not leaving (radiating), so it is just getting hotter. At SWR > 2.0 most transceivers begin cutting back power, to prevent overheating.

The receive scale is marked in S-units, where 1 S = 6 dB.
Recall, double power = 3 dB. So, 1 S-unit is four times the power.

A 9% loss on a 5-Watt radio impacts signal more than a 9% loss on a 50-Watt radio. It still has 45-Watt effective radiated power (ERP).

Two radios set up side by side, one operating at 50 Watts and the other at 100 Watts. A remote 'DX' receiver will not even see the trivial change in signal strength.

Do the best practical, but do not get overly concerned about power rating. Get on the air!

SWR	Loss %	ERP %
1.0:1	0.0	100.0
1.2:1	0.8	99.2
1.5:1	4.0	96.0
1.6:1	5.3	94.7
1.9:1	9.6	90.4
2.0:1	11.1	88.9
2.5:1	18.4	81.6
3.0:1	25.0	75.0
4.0:1	36.0	64.0
5.0:1	44.4	55.6
6.0:1	51.0	49.0
7.0:1	56.3	43.8
8.0:1	60.5	39.5
9.0:1	64.0	36.0
10.0:1	66.9	33.1

Life is good. Enjoy!

1 S unit = 6 dB

3 dB = ½ power

Loss W = Input * (SWR-1)2/ SWR+1)2