

The Effect of VSWR on Transmitted Power

VSWR	Return Loss (db)	Transmitted Power (%)
1	∞	100
1.1	26.4	99.8
1.2	20.8	99.2
1.3	17.7	98.3
1.5	14	96
2.0	9.5	88.9
3.0	6	75

Path Loss & Vertical Dipole Isolation

$$\text{path loss (dB)} = 10 \log \left[\left(\frac{\lambda}{4\pi r} \right)^2 \right]$$

$$\text{isolation (dB)} = 28 + 40 \log \left(\frac{h}{\lambda} \right)$$

λ = wavelength in metres
 R = distance between transmitting and receiving antennas in metres
 h = vertical antenna separation

Return Loss, VSWR & Reflection Coefficient (ρ)

$$\text{VSWR} = \frac{1 + \rho}{1 - \rho}$$

$$\rho = \frac{\text{VSWR} - 1}{\text{VSWR} + 1}$$

$$\text{R.L. (dB)} = -20 \log \rho$$

Stacking & Baying Distances for Yagi Antennas

number of elements	typical gain dBd	spacing for arraying, λ
3	4.5	0.7
4	7.5	1.0
6	8	1.25
8	10	1.63
12	12	1.8
15	13	1.9
18	14.5	2.0

Coaxial Cables

cable type part no.	outer diameter (mm)	dielectric	150MHz loss (db/100m) power (kW)	450MHz loss (db/100m) power (kW)	900MHz loss (db/100m) power (kW)	1800MHz loss (db/100m) power (kW)	2400MHz loss (db/100m) power (kW)
RG58 50901	5	PVC	18 0.35	32 0.2	50 0.13	80 0.08	95 0.03
RG213 50911	10.8	PVC	7 1.5	15 0.7	25 0.45	40 0.25	48 0.2
3/8" 62025	11.8	foam	3.84 1.81	6.79 1.02	9.76 0.71	14.25 0.49	16.69 0.42
1/2" 5128	16	foam	2.67 2.95	4.75 1.66	6.85 1.15	10.06 0.78	11.81 0.67
7/8" 5228	28	foam	1.43 6.57	2.56 3.68	3.72 2.53	5.50 1.71	6.48 1.45
1 1/4" 5328	39	foam	1.01 9.26	1.80 5.17	2.62 3.56	3.88 2.40	4.58 2.03