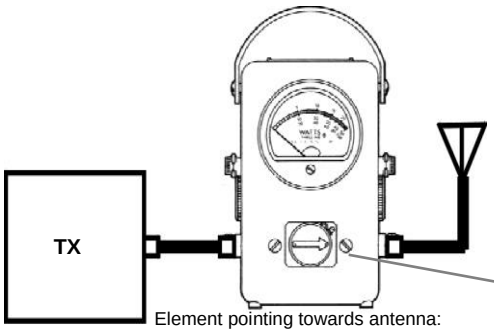
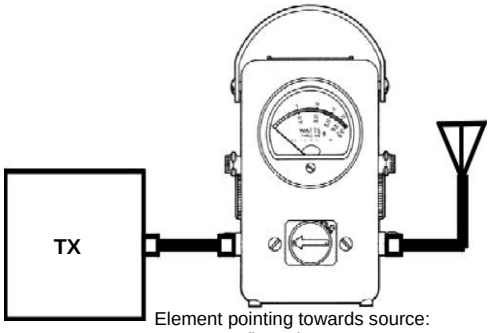
RF COM Information

Standing Wave Ratio

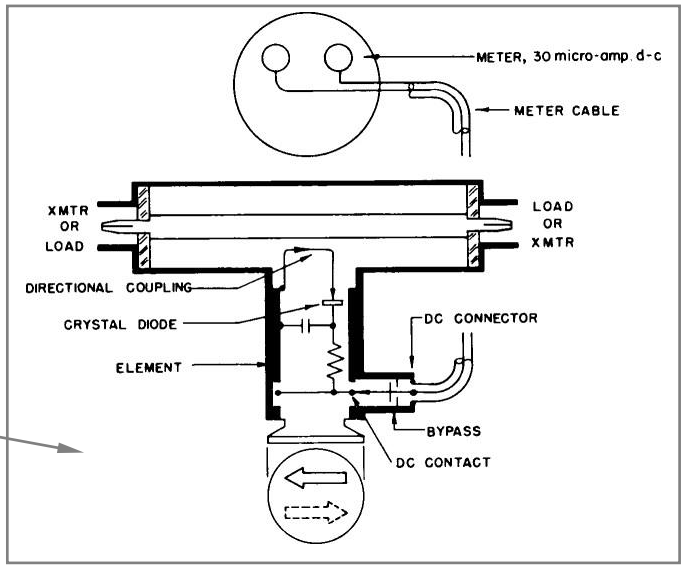
Bird Technologies®



Element pointing towards antenna:
Direct Power Pd



Element pointing towards source:
Reflected Power Pr



SWR: **S**tanding **W**ave **R**atio

$$COE = \frac{1+\sqrt{\frac{Pr}{Pd}}}{1-\sqrt{\frac{Pr}{Pd}}}$$

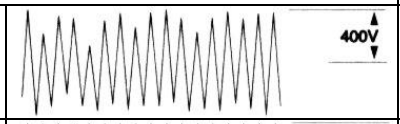
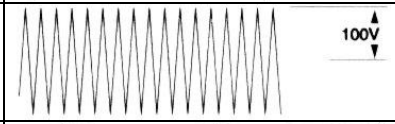
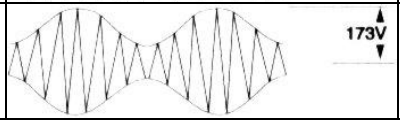
Pr = Reflected power
Pd = Direct power

SWR	Pr/Pd	Return Loss (dB)
1.00:1	0.00%	-∞
1.01:1	0.00%	-46.06
1.02:1	0.01%	-40.09
1.03:1	0.02%	-36.61
1.04:1	0.04%	-34.15
1.05:1	0.06%	-32.26
1.06:1	0.08%	-30.71
1.07:1	0.11%	-29.42
1.08:1	0.15%	-28.30
1.09:1	0.19%	-27.32
1.10:1	0.23%	-26.44
1.15:1	0.49%	-23.13
1.20:1	0.83%	-20.83
1.25:1	1.23%	-19.08
1.30:1	1.70%	-17.69
1.35:1	2.22%	-16.54
1.40:1	2.78%	-15.56
1.45:1	3.37%	-14.72

SWR	Pr/Pd	Return Loss (dB)
1.50:1	4.00%	-13.98
1.60:1	5.33%	-12.74
1.70:1	6.72%	-11.73
1.80:1	8.16%	-10.88
1.90:1	9.63%	-10.16
2.00:1	11.11%	-9.54
2.50:1	18.37%	-7.36
3.00:1	25.00%	-6.02
3.50:1	30.86%	-5.11
4.00:1	36.00%	-4.44
4.50:1	40.50%	-3.93
5.00:1	44.44%	-3.52
6.00:1	51.02%	-2.92
7.00:1	56.25%	-2.50
8.00:1	60.49%	-2.18
9.00:1	64.00%	-1.94
10.00:1	66.94%	-1.74

Modulated Signal Measurement

Always make sure that your power meter is capable of measuring the type of signal you are testing. The Bird 43 and 4410A can measure single-carrier CW of FM signals (AMPS). For multicarrier signals and/or other modulations, use the APM16

Measurement Examples:		Real Average Power	Bird 43 / 4410A	Bird APM16
Multi-carrier		400W	-	400W
CW		100W	100W	100W
AM 75%		127W	100W	127W

Units Conversion

$$P(dBm) = 10 \times \log\left(\frac{P(W)}{1mW}\right)$$

P(dBm) = Power in dBm
P(W) = Power in Watts

dBm	mW	dBm	mW	dBm	W	dBm	W
-20	0.010	0	1.00	20	0.10	40	10.0
-19	0.013	1	1.26	21	0.13	41	12.6
-18	0.016	2	1.58	22	0.16	42	15.8
-17	0.020	3	2.00	23	0.20	43	20.0
-16	0.025	4	2.51	24	0.25	44	25.1
-15	0.032	5	3.16	25	0.32	45	31.6
-14	0.040	6	3.98	26	0.40	46	39.8
-13	0.050	7	5.01	27	0.50	47	50.1
-12	0.063	8	6.31	28	0.63	48	63.1
-11	0.079	9	7.94	29	0.79	49	79.4
-10	0.100	10	10.00	30	1.00	50	100.0
-9	0.126	11	12.59	31	1.26	51	125.9
-8	0.158	12	15.85	32	1.58	52	158.5
-7	0.200	13	19.95	33	2.00	53	199.5
-6	0.251	14	25.12	34	2.51	54	251.2
-5	0.316	15	31.62	35	3.16	55	316.2
-4	0.398	16	39.81	36	3.98	56	398.1
-3	0.501	17	50.12	37	5.01	57	501.2
-2	0.631	18	63.10	38	6.31	58	631.0
-1	0.794	19	79.43	39	7.94	59	794.3
0	1.000	20	100.00	40	10.00	60	1000.0