

Antenna Current Measurement

Is it useful to measure Ae current?

Ae and earth currents gives indication of radiated power.

For a resistive load

$$W = I^2 R$$

Max I gives max W

In the 'old days' when ships transmitted on the MF band (410 to 525 Khz).

500 KHz being the world wide maritime safety frequency monitored 24 hours a day, 365 days a year.

There was also a three minute window at 15 and 45 minutes past the hour when there were none but emergency transmissions allowed.

On the annual equipment tests you had to provide a defined current into the Ae.

This was measured and RECORDED in meter amps.

The Vertical height thus being significant.

This was to cause much trouble after my time at sea (1963 - 1966), when points to hang aerials became difficult....Masts were removed, central accommodation and bridge moved aft, thus mounting points for L and T wire aerials became almost impossible.

Aerial efficiency was not considered, only the measured meter amps.

The ship owners were not interested in how well the aerial performed, just the additional COST of providing the mounting points!

Providing good aerials was not considered.

The solution was a tenfold or more increase in the transmitter power! This caused problems in the “radio shack” where every bit of metal seemed to become hot with rf at some frequencies!

Limitations

Consider

10 W	50 Ω	0.45A
50 W	50 Ω	1A
100W	50 Ω	1.414A

VI Phase	0	30	45	60	90deg
Cos	1	0.866	0.707	0.5	0
Power = V ² I	1	0.75	0.5	0.25	0

VSWR	1:1	2:1	3:1
Reflected Power	0%	11%	25%

What does this do to your transmitted signal at the receiving end?

Methods of measuring Ae current.

RF ammeter

Not readily available these days.



Toroidal coil + detector

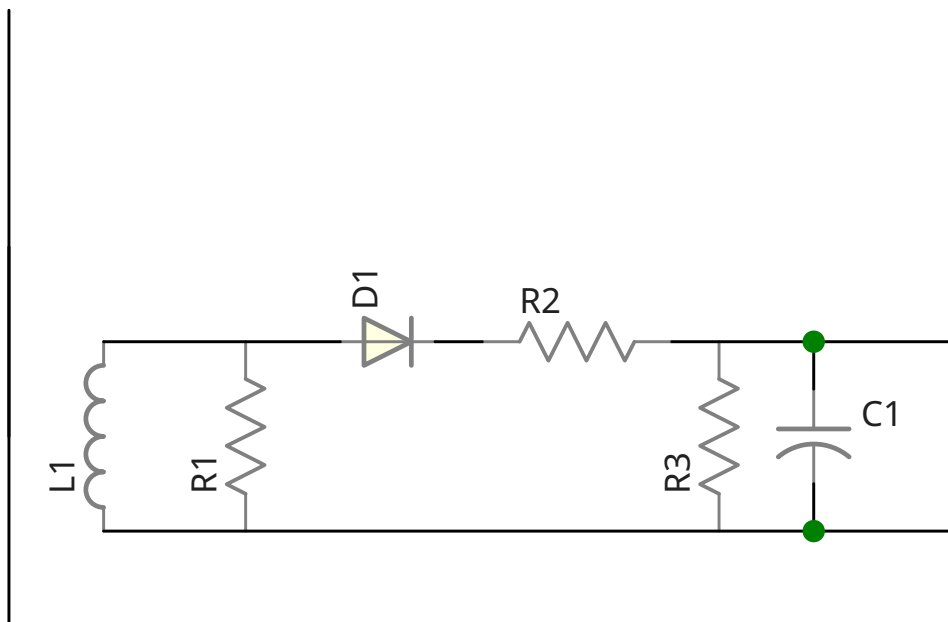
A good solution

Suitable ferrite cores readily available for permanent measurement

Split core available for a test unit.

Suitable test lead 10 : 1 toroid + diode detector

Ae In



Ae Out

R1 = 100 Ω

R2 = 270 Ω

R3 = 100K Ω

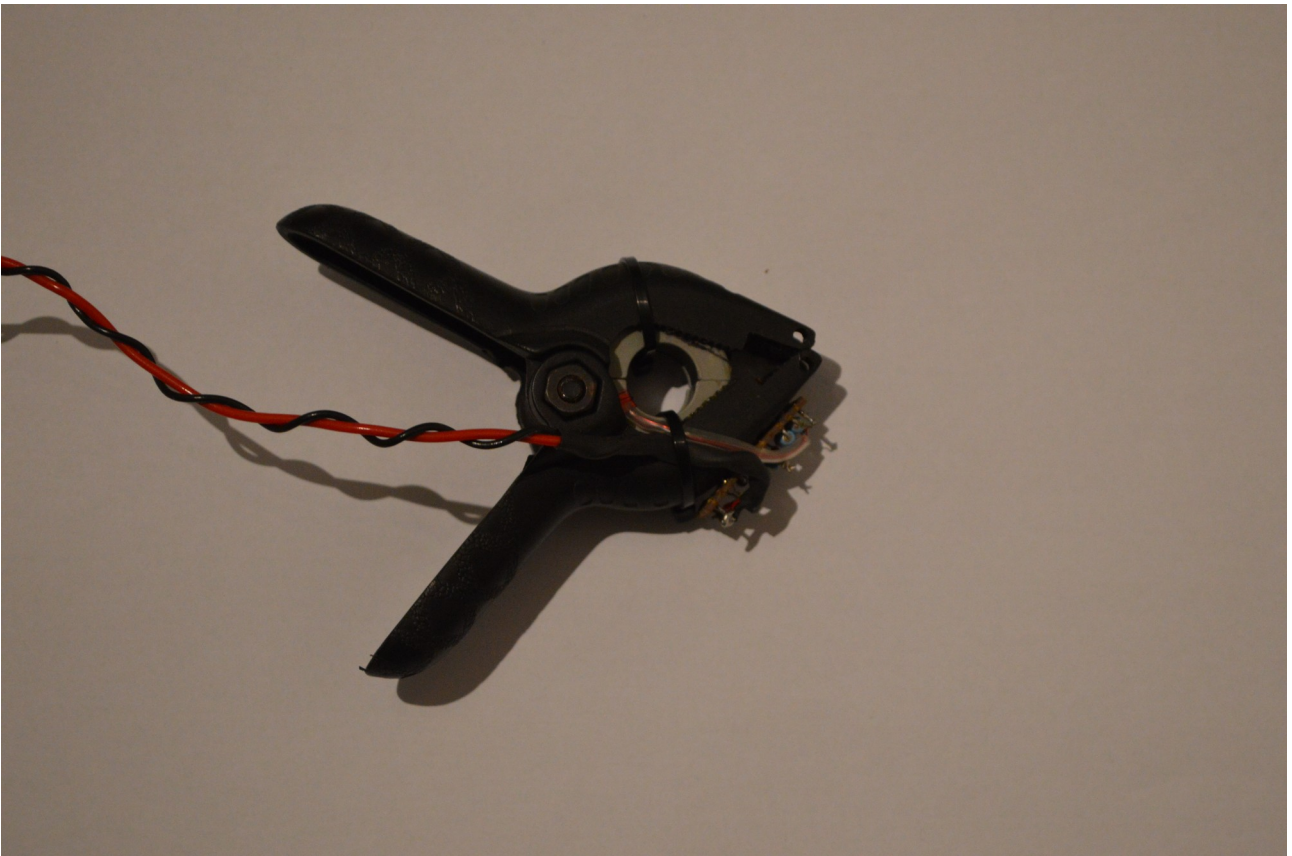
C1 = 47 nF

What to measure

Current in the active wire

Current in the earth lead

Built Project





Power	10	25	50	100
Amps	0.45	0.707	1.0	1.414
Measured Voltage	4.45	6.86	10.0	14.0

The output dropping off slightly above 18 MHz

Worth a Club project?