

RF Probe Calibration and Accuprobe

The use of a 4.7 Meg scaling resistor in the classic ARRL Handbook RF Probe** never quite worked out in my mind. The probe was first used in the days of 11 Meg VTVMs and has never changed.

A little calculation showed that for modern 10 Meg DMMs the scaling resistor value should be 4.14 Megohms (4.55 Megohms for 11 Meg DMMs).

So I measured a bunch of resistors from my stash and found a 3.9M and a 220k resistor that combined measured 4.12 Megohms. Also a 3.3 M and 1.5 M that measured 4.77 Meg.

Using my Accuprobe with a 9.53V battery as the *gold standard* and FT-817 as a signal generator on the two lowest levels, I made some measurements shown in the table below. The Accuprobe output is an accurate RMS equivalent.

The RF probe values are RMS equivalent for each band and power level at the OUT terminal of the NorCal SM dummy load. $P_o = V_{rms}^2 / R_{load}$

Band	80	40	20	10
Accuprobe	4.38	4.36	4.45	4.60
Lo/Out Term	6.52	6.48	6.48	6.62
4.1M RF Probe	4.39	4.35	4.45	4.52
	6.56	6.49	6.44	6.55
4.7M RF Probe	4.19	4.15	4.23	4.31
	6.28	6.19	6.13	6.25

Not a whole lot of difference but the 4.1Meg probe is closer than the 4.7Meg probe.



** The ARRL probe uses a series .01 cap, 1n34a shunt diode and 4.7Meg scaling resistor. The handbook description also includes considerable rounding. The only change I made is the 4.1Meg scaling resistor.

I used the scaling value of :

$R_s = .414R_{dmm}$; $R_s = .414 \times 10M$ or 4.14Meg scaling resistor. For a 1Meg meter, like those from Harbor Freight, the scaling resistor would be 414k Ohms.