

Another HF RF Sampler

Recently I came across a Youtube video by RF Man about a simple HF RF sampler. What caught my attention was he provided test data with it and it looked good. It had a 30 dB (down) calibrated output at the sample port. Here is the link. https://www.youtube.com/watch?v=v_eBQ4Qp1_E I built one shown below. The box was used before by several other projects and had several unused holes that I plugged.



The construction was the same as his except I used RG58 coax for the inner conductor and used a T50-2 core because that is what I had.

I wanted to verify the performance. For the loss measurement (isolation) I used an HP8640B signal generator and a Boonton 92B RF millivoltmeter. Care was taken to produce the most accurate reading that included compensating for cable losses etc. For the return loss and vswr measurements I used my NanoVNA-H4.

Frequency	Sample Port dB Down	Return Loss dB	VSWR
54 MHz	-30.5	16.5	1.35
30 MHz	-30.1	21.5	1.18
21 MHz	-30	24.5	1.13
14 MHz	-30	27.8	1.08
7 MHz	-30.2	33.5	1.04
3.5 MHz	-30.9	38.5	1.02
1.8 MHz	-32.5	43	1.01

As can be seen the results are not bad.

I did a higher power isolation test with it on 20 meters using my IC7300, a Ballantine 323 RF voltmeter and a good 50 OHM dummy load for the transmitter and 50 OHM termination for the sample port. I wanted to check it as it would be normally used. The idea was to measure the voltage across the 50

OHM dummy load and do the calculations for power and measure the voltage across the 50 OHM termination for the loss (isolation) at the sample port.

20 Meters	Measured Voltage Across Load	Power in Watts	Power in dBW
High Power	66 Volts	87.1	19.4
At sample port across 50 OHMs	2.1 Volts	0.088	-10.545
Measured Isolation			29.945 dB

The measured isolation is very good at 14 MHz. I did not test it on other bands. With a calibrated output from the sampler you can do power measurement if you had a good RF voltmeter by measuring the voltage at the sample port and doing the calculations. Most of the time when you are using an RF sampler you don't need a calibrated output but it's nice to have. I measured the voltage across the sample port unterminated with the set-up above and an oscilloscope. You might use this set-up if you are looking at the waveform of a transmitted signal. The CW signal I used was approximately 8.5 volts P to P. The voltage seen will likely vary with frequency.

I don't know how much power this sampler can handle but in this configuration it should be fine for the typical 100 Watt HF transceiver. It looks like he got better return loss results than I did. My isolation results may be better. Overall I am impressed with this sampler.

Original August 1, 2021

Revised September 4, 2021

Home Page www.ve6kq.com