

Measuring Your SSB RF Output Power

Your ICOM single sideband (SSB) radio was designed to deliver the RF power out stated in your owner's manual.

Peak Envelope Power (PEP) is defined by the ARRL and RSGB as "The average power supply to a load by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions."

With SSB, no power is transmitted when the PTT is pressed until you start talking into the microphone. The output envelope is non-sinusoidal in appearance. To measure peak RF power, you must measure the peak-to-peak values of this envelope using an oscilloscope or special peak-reading watt meter. Testing RF power output for AM, FM, and CW is considerably different.

Test Considerations

Measuring SSB peak envelope power accurately requires high-quality test equipment and care in setting up the test. The following briefly describes a few items that should be considered when performing these tests and interpreting the results.

- Most high-quality, peak power-reading watt meters are only 8% accurate.
- Most high-quality oscilloscopes are only 10% accurate.
- Most high-quality dummy loads are only 5% accurate.
- To maintain accuracy requires that you add all accuracy percentages together, subtract from 100%, and multiply this remaining percentage times the result measured.
- Keep the leads as short as possible and be sure they are the correct impedance.
- The radio being tested must be operated under the specified DC power and load conditions in order for the output results to meet specifications.
- Power measurements for the VHF/UHF equipment require high-quality equipment; losses in cables and connectors must be considered.
- Be sure all test equipment has the correct sensitivity and frequency response.

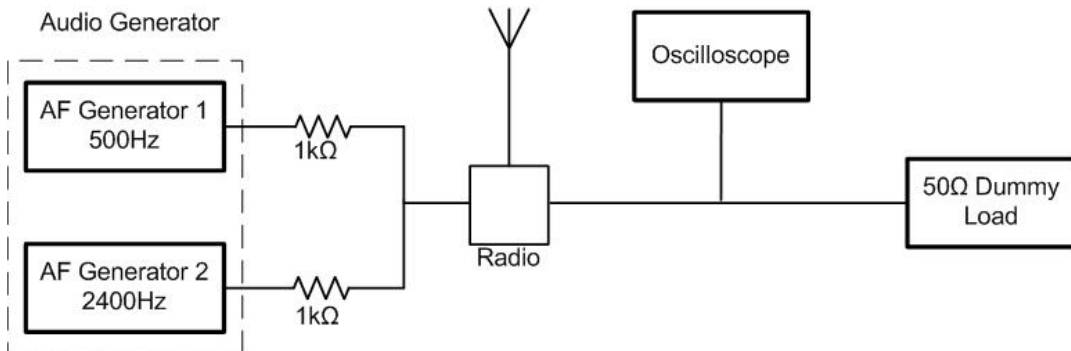
You can test for peak envelope power using either an oscilloscope or a PEP wattmeter, as described in the following tests.

Test Method using Oscilloscope

What you will need:

- two-tone audio generator with 2 tone output of 500Hz and 2400Hz of equal amplitude and low distortion
- 50Ω dummy load
- Oscilloscope

1. Connect all equipment as shown below, and turn power on.



2. Set the radio controls for maximum RF power.
3. Apply a two-tone audio signal and adjust the amplitude of both signals, making sure they are of equal amplitude. The ALC should be off (check the oscilloscope to be sure that you are not over-driving the radio).
4. With the radio set maximum power (no "flat-topping"), read the peak-to-peak voltage on the oscilloscope.
5. To find the PEP, use the following formula:

$$P_{out} = V^2/8R \text{ where } R \text{ is the } 50\Omega \text{ dummy load}$$

Test Method using PEP Wattmeter

1. Connect all equipment as shown in the following diagram, and turn power on.
2. Set the radio controls for maximum RF power
3. Apply a two-tone audio signal and adjust the amplitude of both signals, making sure they are of equal amplitude and are not overdriving the radio.
4. With the radio set maximum power (no "flat-topping"), read the peak-to-peak voltage on the wattmeter.

If good-quality test equipment is used, and care is taken in setting up the testing procedures, the results will indicate the true PEP value to within test equipment tolerances.

