

CALIBRATORS

RF Calibrator

Model 2520

- 30 MHz level reference, traceable to NIST
- Programmable output from -70 to +20 dBm
- Resolution of 0.1 dB
- Accuracy to 0.055 dB
- 50Ω output with SWR <1.05
- Automatic compensation for 75Ω output



Description

The Boonton Model 2520 brings a whole new dimension to the RF calibration of attenuators, amplifiers, detectors, RF and microwave components, and power meters...a dimension that includes a 90 dB range of programmable 30 MHz output levels that are directly traceable to the National Institute of Standards and Technology.

High Accuracy, Stability And Repeatability

For a source to qualify as a reference standard it must not only be accurate but must also possess stability and repeatability. The 2520 is excellent on all counts. The 30 MHz source is crystal-controlled to an accuracy of $\pm 0.1\%$ to avoid errors when calibrating frequency sensitive devices. Because the frequency is 30 MHz, there is direct traceability to a NIST 30 MHz piston attenuator standard; output levels are software calibrated and referenced to this standard. Temperature compensation allows operation over a range from 0 to 55°C.

Applications

The characterization of amplifiers for gain and signal compression is a typical example of the versatility of the 2520. Another important application for the 2520 is in characterizing diodes for RF detection. Such diodes exhibit a square-law response for low level RF signals, making them useful as RMS detectors when their high detection efficiency and freedom from overload damage allows them to replace fragile thermocouples. For such use, it is necessary to determine their detection efficiency, the effect of temperature on the recovered DC, and the point at which detection ceases to be square-law as the RF signal is increased. The 2520 is ideal for this application. The 2520 is also extremely useful for quickly standardizing attenuators for insertion loss.

Output Impedance

Normal output impedance is 50 ohms. A straight-through 50 to 75 ohm adapter is available and, when in use, the output is automatically compensated for its nominal mismatch loss.

The output impedance features a low SWR of less than 1.05 at 50 ohms. This is particularly important when the output of the 2520 must be connected to the device under test by a coaxial cable of appreciable electrical length at 30 MHz. If that device is not perfectly matched to the cable characteristic

impedance, a reflection will occur that travels back to the 2520. Because the 2520 is so well matched, the reflected wave is almost totally absorbed and no multiple reflections will occur to alter the level seen by the device under test.

Easy-to-Use

Front panel control is simple and straightforward, and all front panel functions are available on the bus for easy programmability. Output level in dBm is displayed on the front panel alphanumeric readout. Resolution is selectable in 0.1, 1, or 10 dB steps. An output level on/off key provides an RF interrupt, useful for measuring single-to-noise ratios. Also displayed is the bus address when the LOCAL mode is activated. In remote operation, the bus status (REM, ATN, TLK and LSN) is displayed.

Specifications

Output:

Frequency: 30 MHz $\pm 0.1\%$

Level: +20 to -70 dBm into 50 or 75 Ω

Resolution: 0.1, 1, or 10 dB increments

Impedance: 50Ω; a 75Ω straight-through adapter (P/N 95006) is available with automatic compensation for the nominal 0.1773 dB loss

SWR: <1.05 max. at 50Ω

Accuracy, 1 year after 5 min. warmup, NIST traceable;

50Ω System	23°C $\pm 5^\circ\text{C}$	0 to 55°C*
At 0 dBm	0.055 dB (1.27%)	0.07 dB (1.61%)
+20 to -39.9 dBm	0.075 dB (1.73%)	0.09 dB (2.07%)
-40 to -59.9 dBm	0.105 dB (2.42%)	0.12 dB (2.77%)
-60 to -64.9 dBm	0.165 dB (3.80%)	0.18 dB (4.15%)
-65 to -70 dBm	0.305 dB (7.03%)	0.32 dB (7.38%)
75Ω System	23°C $\pm 5^\circ\text{C}$	0 to 55°C
At 0 dBm	0.075 dB (1.73%)	0.09 dB (2.07%)
-20 to -39.9 dBm	0.095 dB (2.19%)	0.11 dB (2.54%)
-40 to -59.9 dBm	0.125 dB (2.88%)	0.14 dB (3.23%)
-60 to -64.9 dBm	0.185 dB (4.26%)	0.20 dB (4.61%)
-65 to -70 dBm	0.325 dB (7.49%)	0.34 dB (7.84%)

Aging: 0.002 dB/year max, typically 0.0003 dB/year

Settling Time: 150 ms to specified accuracy

Display: 40 characters x 2 lines backlit Alphanumeric LCD, power level in dBm, output impedance, output condition, and bus address

Controls: 4 cursors, left and right for cursor control and up and down for digit control, plus output on/off and LOCAL keys

Interface: IEEE-488-1978. Implements SH1, AH1, T6, L4, SR1, RL1, DC1 and DT1

Input Power: 100, 120, 220, 240 V $\pm 10\%$, 50 to 400 Hz, 20 VA

Environmental:

*Operating temperature: 0 to 55°C

Storage temperature: -40 to 90°C

Physical:

Dimensions: 3.5 H x 8.24 W x 12.375 D (8.9 cm x 20.0 x 31.4)

Weight: 7.0 lbs (3.2 kg)

Accessories Available: 50 to 75 ohm adapter, type N, P/N 950006
Rack mounting kit, P/N 954015

CE Mark: Declares Conformity to European Community (EC) Council Directives: 89/336/EEC/93/68/EEC, 73/23/EEC/93/68/EEC & Standards: EN55011, EN50082-1, EN61010-1.