

3500

- **Broad 10MHz to 6GHz frequency range enables use in a wide variety of applications, including test of mobile phones and infrastructures, WLAN devices, RFID readers, and WiMax devices.**
- **Large dynamic range of +20dBm to -63dBm measures a wide variety of signals, either directly from the device-under-test or through layers of cabling and fixtures.**
- **Integrated power sensor eliminates the need to carry a separate sensor and makes it the most compact and truly portable RF power measurement instrument.**
- **Internal power reference enables self-calibration and eliminates the need for the user to perform an independent calibration before the instrument can be used.**
- **Absolute accuracy as good as $\pm 0.21\text{dB}$ enables more precise characterization of devices, tighter test limits, and more accurate fixture calibration.**

Ordering Information

3500 Portable RF Power Meter

Accessories Supplied

USB-MINI-1 USB Cable—Type A to Mini Type B, 1m (3.3 ft.)

CD-ROM 3500 Portable RF Power Meter User's Manual

ACCESSORIES AVAILABLE

3500-PWR	Universal Switching Power Supply: 85VAC to 276VAC, 47Hz to 63Hz, 51mm × 102mm × 29mm (2 in. × 4 in. × 1 1/8 in.), uses 1.3mm DC connector
3500-SHL	Holster Carrying Case with Shoulder Strap
USB-B-1	USB Cable Type A to B, 1m (3.3 ft.)
USB-B-3	USB Cable Type A to B, 3m (10 ft.)
USB-MINI-1	USB Cable Type A to Mini, 1m (3.3 ft.)
USB-MINI-3	USB Cable Type A to Mini, 3m (10 ft.)

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Portable RF Power Meter



The Model 3500 Portable RF Power Meter is a compact, handheld instrument that makes lab quality RF power measurements in both field and R&D laboratory environments. With an absolute accuracy as good as $\pm 0.21\text{dB}$, a wide frequency range of 10MHz to 6GHz, and a measurement range of -63dBm to $+20\text{dBm}$, the Model 3500 is suitable for a wide variety of RF measurement applications. Its built-in power sensor eliminates the need for users to carry both an instrument and a separate sensor module, and the same sensor is used when duplicating tests or measurements for better repeatability. Truly portable, the Model 3500 fits easily into your hand or a toolkit; an optional belt loop holster or carrying case with shoulder strap is also available. To optimize flexibility, it's capable of drawing operating power from batteries, an AC-DC converter module, or a computer via the USB interface. With its features and very attractive price, the Model 3500 truly redefines superior value.

High Accuracy in the Lab or the Field

Whether it's used in the field or on the factory floor, the Model 3500 makes lab quality RF measurements quickly and easily. Its absolute accuracy, as good as $\pm 0.21\text{dB}$, enables more precise characterization of devices, tighter test limits, and more accurate fixture calibration. In the laboratory, the Model 3500 can be used as an RF power datalogger. Using normal or high speed mode, it easily captures and transfers data to your personal computer through its built-in USB interface (cable supplied), allowing for trend or drift analysis. Despite its small package, the Model 3500 provides outstanding accuracy on the bench, replacing much larger and more expensive instrumentation.

Convenient Utilities

The Model 3500 incorporates several handy and practical utilities that make it easier than ever to attain high quality RF measurements with this handheld instrument. A number of averaging values can be used when the signal you want to measure varies significantly with time. A hold command saves a measurement that is made in a hard to reach area until the instrument can be retrieved. A backlight can be illuminated when making measurements in poorly lit areas. To maximize battery life, the Model 3500 can be setup to turn off the backlight or the instrument entirely after a specific period of time. Once the instrument utilities are setup in the manner you prefer, the instrument state can be saved for the next use.

TYPICAL APPLICATIONS

Ideal for use in:

- **Production test, research and development, design verification, installation, and maintenance**

Associated with:

- **Mobile phones and infrastructure, wireless sensors and transceivers, and WiMax, WLAN, RFID, mobile radio, Zigbee, and Bluetooth devices.**

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

Portable, handheld RF power meter for field and lab use

RF/MICROWAVE

3500

Portable RF Power Meter

SPECIFICATIONS

FREQUENCY RANGE: 10MHz to 6GHz.

POWER RANGE: +20dBm to -63dBm.

Max. Power: +23dBm, 5VDC.

POWER ACCURACY (at 23°C ±5°C):¹

+20dBm to +6dBm:

±0.24dB, 10MHz to 3GHz (characteristic).²

±0.16dB, 3GHz to 5GHz (characteristic).²

±0.22dB, 5GHz to 6GHz (characteristic).²

+6dBm to -9dBm:

±0.26dB, 10MHz to 3.75GHz; ±0.07dB typical.³

±0.40dB, 3.75GHz to 6GHz; ±0.07dB typical.³

-10dBm to -29dBm:

±0.26dB, 10MHz to 3.75GHz; ±0.05dB typical.³

±0.37dB, 3.75GHz to 6GHz; ±0.05dB typical.³

-30dBm to -40dBm:

±0.21dB, 10MHz to 3.75GHz; ±0.12dB typical.³

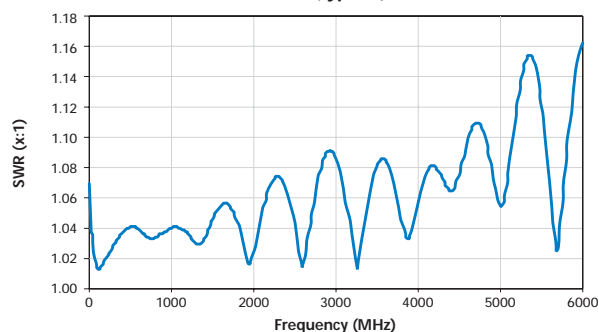
±0.27dB, 3.75GHz to 6GHz; ±0.13dB typical.³

LINEARITY (at 23°C ±5°C): ±0.10dB, +6dBm to -40dBm.

NOISE FLOOR: -63dBm.

SWR: 1.12:1, 10MHz to 3.75GHz. 1.20:1, 3.75GHz to 6GHz.

SWR (typical)³



DISPLAY: 4 digits, backlight, auto-shutoff, hold—the most recent reading is shown on the display and is no longer updated.

UNITS: dBm, milliwatts.

POWER (equipped with auto-shutoff): Unit can be powered from any of these methods:

Two 1.5V alkaline AA batteries (not included). Typical battery life: 17.5 hours⁴; low battery indicator.

USB port⁵.

Optional DC power supply⁶ (3500-PWR).

SPEED:

Normal: ~2 readings per second (> approx. -30dBm).

~1 readings per second (≤ approx. -30dBm).

High-speed: ~34 readings per second (> approx. -30dBm).

~11 readings per second (≤ approx. -30dBm).

HOST INTERFACE: USB 2.0 interface with a miniature "B" USB connector⁷.

AVERAGING: 1, 2, 4, 8, 16, and 32 averages.

CONNECTORS:

RF: Type N male RF connector (50Ω characteristic impedance).

USB: Miniature "B" USB connector.

External Power: Power receptacle (connect optional External Power Supply: 3500-PWR).

OPERATING CONDITIONS:

Operating Temperature: 0° to 50°C (32° to 122°F).

Operating Humidity: <80% RH at 35°C (95°F), non-condensing.

Air Quality: Compatible for use in a Class 10 cleanroom.

GENERAL

STORAGE CONDITIONS: 0° to 70°C (32° to 158°F), 5% to 70% RH, non-condensing.

DIMENSIONS: 79mm × 134mm × 49mm (3.125 in. × 5.260 in. × 1.925 in.), not including N connector.

WEIGHT: 0.5kg (1.1 lb.).

WARRANTY: 1 year; 1 year suggested calibration cycle.

EMC: Conforms to European Union Directive 89/336/EEC, EN 61326-1.

SAFETY: Conforms to European Union Directive 73/23/EEC, EN 61010-1.

NOTES

Explanation of how we derived our specs:

1. Customer Spec $X = (x, f) + K(=2) \cdot \delta(x, f) + \Delta_{\epsilon}(x, f, [18^{\circ}-28^{\circ}\text{C}]) + \mu$ where:

\bar{X} = Mean of the data taken in the frequency range stated (x, f).

δ = Standard deviation of the data taken in the frequency range stated (x, f).

x = Measured value at test frequencies.

f = Frequency range over which data was taken for specification.

μ = Measurement uncertainty.

Δ_{ϵ} = Change associated temperature variation.

18°-28°C = Statistics generated separately at these temperatures and larger statistical value used in setting spec.

2. Characteristic (or Expected Value): *Characteristic* indicates performance that a unit would be expected to exhibit under the following conditions:

• Ambient operating temperature of 18° to 28°C, unless otherwise noted

• After specified warm up time of 30 minutes.

• Does not include measurement uncertainty.

This performance is not warranted.

3. Typical (mean + 3 standard deviations): *Typical* indicates performance that all units will meet under the following conditions:

• Ambient operating temperature of 23°C, unless otherwise noted

• After specified warm up time of 30 minutes.

• Does not include measurement uncertainty.

This performance is not warranted.

4. Typical battery life was measured in the default conditions from the factory at 500MHz with backlight off and no USB communications. With backlight on, typical battery life is 2.5 hours.

5. With the USB connected and providing power, and the optional external power disconnected, the Model 3500 will be powered from USB regardless of whether batteries are present.

6. If the external power supply is connected, the Model 3500 will be powered by the external supply, regardless of whether USB power or batteries are present.

7. The interface is USB 2.0 compliant but with an interface speed of 12Mbps.

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