



Power Meters

From continuous wave measurements to complex pulse analysis

BUYING GUIDE

Keysight Power Meters

One family. 4 classes.



AVERAGE POWER METERS

PM4-class

- DC to 220 GHz
Frequency range
- -70 dBm to +44 dBm
Dynamic range



PEAK POWER METERS

PM2-class

- 9 kHz to 110 GHz
Frequency range
- -70 dBm to +44 dBm
Dynamic range



THERMISTOR POWER METERS

PM3-class

- 100 kHz to 18 GHz
Frequency range
- -30 dBm to +10 dBm
Dynamic range



HANDHELD POWER METERS

PM1-class

- 10 MHz to 6 GHz
Frequency range
- -63 dBm to +20 dBm
Dynamic range

Introduction

Choosing the right power meter depends on the frequency range, signal type, and measurement accuracy your application demands. This buying guide compares four types of meters — average, peak, thermistor, and handheld — and the key specifications. Each model balances channel count, frequency range, dynamic range, and video bandwidth to meet a wide range of needs, from basic power checks to precise pulse analysis. Whether you're performing wireless system validation, satellite communication testing, or field troubleshooting, use this guide to compare key features and choose the power meter that aligns with your requirements.

Average

Keysight PM4-class average power meters include the N1910B Series power meters. They deliver wide dynamic range, exceptional repeatability, and enhanced signal stability, making them ideal for continuous wave (CW) signal testing in labs, production, and field environments.



Peak

Keysight PM2-class peak power meters include the E4410A Series, N8262A, and N1910A Series power meters. They capture fast transients and complex modulation signals, offering high sampling rates, sophisticated triggering, and time-gated measurements for dynamic RF testing.



Thermistor

Keysight PM3-class thermistor power meter includes the N432A thermistor, which provides the highest accuracy and stability for calibration and metrology applications, with temperature compensation and self-balancing measurement techniques.



Handheld

Keysight PM1-class handheld power meter includes the V3500A handheld power meter, which combines portability and lab-grade accuracy in a rugged, compact form factor, making them perfect for fast, reliable field measurements without bulky setups.



Step 1. Check the General Specifications

Keysight offers a full spectrum of power meters to meet your testing needs, whether you're making simple average power measurements or analyzing high-speed pulsed signals. All Keysight power meters are designed for exceptional accuracy, signal stability, and fast measurement speeds. Coupled with powerful power meter and sensor software, you can control instruments, log and analyze power measurements, and automate complex testing sequences with minimal programming

effort. The first part of your power meter selection process is to know which measurements you require, such as average power, peak power, thermistor-based power, or portable field measurement. Next, review the channel count, frequency range, and dynamic range to ensure they fit your application requirements. The table below summarizes the key specifications by product type — average, peak, thermistor, and handheld — to help you select the power meter that is right for your application.

RF power meter comparison of specifications

Specifications	Average	Peak	Thermistor	Handheld
Class	PM4	PM2	PM3	PM1
Maximum number of channels	1 to 4	1 to 2	1	1
Frequency range	DC to 220 GHz	9 kHz to 110 GHz	100 kHz to 18 GHz	10 MHz to 6 GHz
Dynamic range	-70 dBm to +44 dBm	-70 dBm to +44 dBm	-30 dBm to +20 dBm	-60 dBm to +20 dBm
Video bandwidth	No	5 MHz, 30 MHz	No	No
	EXPLORE AVERAGE	EXPLORE PEAK	EXPLORE THERMISTOR	EXPLORE HANDHELD

Average

Core Features

- wide dynamic range from -70 dBm to +44 dBm
- frequency coverage from DC to 220 GHz
- low noise circuitry for stable, reliable performance
- real-time calibration with auto-zeroing

Key Capabilities

Keysight average power meters provide reliable, repeatable continuous wave measurements with enhanced signal stability, high repeatability, and consistent results. Our average power meters offer a broad frequency range and fast reading speeds, making them ideal for production, field testing, and RF system characterization.

Peak

Core Features

- fast transient capture with video bandwidth up to 30 MHz
- predefined wireless formats for TDMA, Bluetooth®, LTE, and 5G
- peak, average, and peak-to-average ratio measurements
- flexible triggering options for dynamic signals

Key Capabilities

Keysight peak power meters offer precise pulsed RF analysis, making them critical for TDMA, W-CDMA, radar, and complex wireless signal testing. Our peak power meters offer time-gated measurements, high-speed capture, and synchronized triggering capabilities to enable accurate characterization of even the fastest transients.

Step 2. Look at Key Features



Thermistor

Core Features

- self-balancing operation for enhanced stability
- temperature-compensated measurement
- RF-to-DC conversion measurements
- GPIB, USB, and LAN interfaces

Key Capabilities

Keysight thermistor power meters deliver exceptional accuracy for calibration and metrology applications. Our thermistor power meters compensate for environmental drift and precisely converts RF power to DC measurements, such as voltage and resistance, ensuring trusted results in demanding environments.

Handheld

Core Features

- fully integrated power sensor
- battery, AC-to-DC, or USB-powered operation
- software for remote operation and data logging
- compact, rugged design for portable use

Key Capabilities

Keysight handheld power meters combine lab-quality performance with true portability, offering quick RF power measurements with minimal setup. Our handheld power meters offer self-calibration features and multiple power options, ensuring fast and reliable results wherever your testing takes you.

Step 3. Consider Your Use Cases

While specifications are important, considering the various ways you will use a power meter will determine which power meter is best for your needs. Keysight power meters support a wide variety of use cases, from basic RF signal verification to complex pulse and modulation analysis. Here are a few typical use cases for each type of meter.

Average: Reliable CW signal verification

Keysight average power meters provide consistent, stable readings for CW signals across a broad range of frequencies. Their wide dynamic range and dual-channel capability make them ideal for general RF power measurements and system-level testing.

Common use cases for average power meters include:

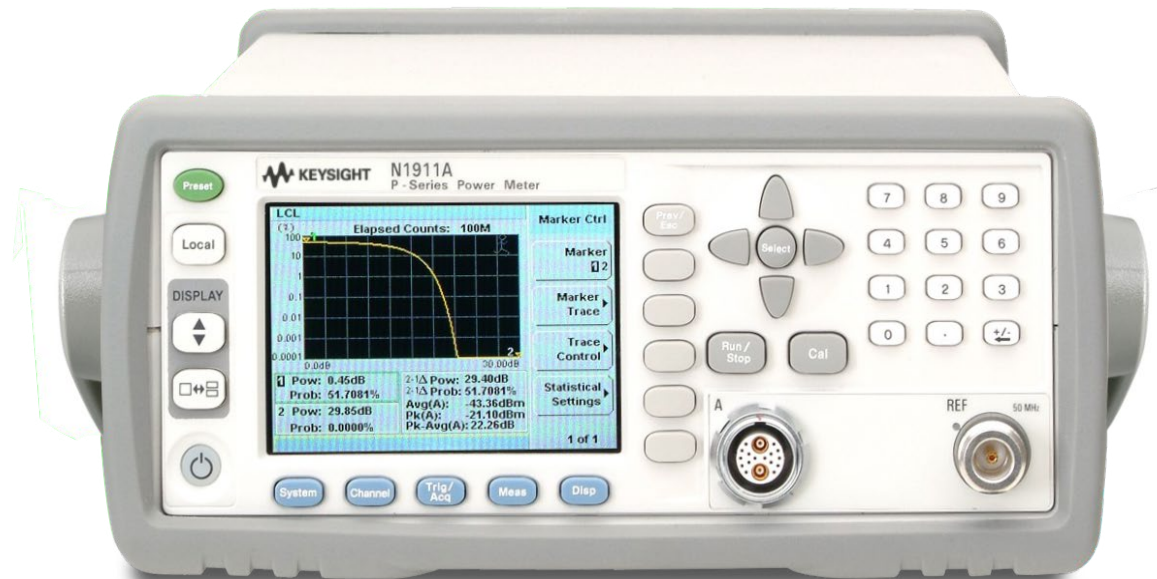
- > How to Verify Continuous-Wave Signals
- > How to Minimize Mismatch Loss Uncertainty

Peak: Dynamic pulse and modulation analysis

Keysight peak power meters measure peak, average, and peak-to-average ratio power. They enable precision measurements of pulsed RF signals, transients, and complex modulated formats. High-speed sampling, intelligent triggering, and time-gated analysis deliver comprehensive visibility into rapidly changing RF signals.

Common use cases for peak power meters include:

- > How to Capture Short-Duration and Complex Radar Pulses
- > How to Perform an LTE Signal Burst Power Measurement
- > How to Monitor the Output Power of Transmitters During Satellite Testing
- > How to Measure RF Power From E-band mmWave Devices



Consider Your Use Cases (cont.)

Thermistor: High-accuracy calibration and metrology

Keysight thermistor power meters provide the precision and stability needed for reference-grade measurements, often used when calibrating power meters, sensors, and RF instruments. Their self-balancing operation and temperature compensation ensure the highest accuracy available for metrology and calibration labs.

Common use cases for thermistor power meters include:

- > How to Test Base Station Components for Long-Duration Performance
- > How to Ensure Precise Power Readings in Radar Applications

Handheld: Portable power measurement

Keysight handheld power meters combine mobility and ease of use with reliable RF power measurement performance. Their integrated sensor design and flexible power options make them the ideal choice for field engineers and on-site troubleshooting.

Common use cases for handheld power meters include:

- > How to Measure Power in Point-to-Point Radio Communication Systems
- > How to Measure Power Transfer Between Generators and Loads



Explore more **power meter use cases** to help you measure with greater precision and confidence.

Step 4. Final Key Considerations

As you look across basic features, enhanced functionality, and your typical use cases, it is good to revisit how use cases might drive each of your instrument's features. Factors to consider when choosing a power meter:

Channel count

Channel count affects how many signals you can measure simultaneously.

Select an average power meter (up to 4 channels) for multisignal CW testing, a peak power meter (up to 2 channels) for dynamic or pulsed analysis, and a thermistor or handheld power meter for stable, single-source measurements.

Frequency range

Specifies the span of RF signal rates your power meter can measure.

Select an average power meter (up to 220 GHz) for broad CW coverage or a peak power meter (up to 110 GHz) for pulsed and modulated signal analysis. Choose a thermistor power meter (up to 18 GHz) for calibration-grade precision at lower frequencies, or a handheld unit (up to 6 GHz) for field measurements.



Final Key Considerations (cont.)

Dynamic range

Dynamic range is the span of power levels a meter can measure accurately.

Choose an average power meter (-70 dBm to +44 dBm) for CW signal testing or a peak power meter (-70 dBm to +44 dBm) for capturing fast transients. Choose a thermistor power meter (-30 dBm to +20 dBm) for stable, high-accuracy measurements in calibration and metrology applications or a handheld model (-60 dBm to +20 dBm) for field use.

Video bandwidth

Measures how quickly the power meter captures rapid changes in signal power.

Select a peak power meter (up to 30 MHz) for pulsed or modulated signals needing transient capture. Choose an average, thermistor, or handheld model for steady CW, calibration tasks, or field measurements where time resolution is not required.

Common mistakes to avoid when selecting a power meter

- Choosing an insufficient frequency range that limits your ability to measure future signal types.
- Ignoring sampling rate requirements, especially for fast-changing or modulated signals.
- Selecting based only on form factors without considering the need for accuracy and stability.
- Overlooking video bandwidth can result in missed pulse or transient signal details.
- Neglecting calibration needs can lead to inaccurate or unstable measurements.
- Underestimating dynamic range, resulting in missed low-level signals or clipping on high-power bursts.



How to Choose a Power Sensor

When choosing a power meter, selecting the right power sensor is just as critical as the meter itself. The sensor determines the accuracy, frequency range, dynamic range, and response time of your measurements. Different applications, such as average versus peak power measurements or low-level signals versus high-power transmissions, require different sensors. To ensure optimal performance for your specific application, consider factors such as measurement type, sensor technology, form factor, and signal handling capabilities. Here's a detailed breakdown to guide your selection process:

Measurement types

Average versus peak power sensors: Choose average power sensors for stable measurements of continuous-wave signals, and peak power sensors for capturing peak-power profiles and time-gated measurements.

Sensor technologies

Diode sensors versus thermocouple power sensors: Choose diode sensors for high sensitivity and fast response, and thermocouple sensors for stability and resilience to temperature and environmental changes.

Form factor

Benchtop versus USB / LAN power sensors: Choose benchtop sensors for laboratory environments with seamless integration to power meters, and USB / LAN sensors for compact, portable use with handheld analyzers, signal generators, or instrument control and data logging software.

Signal handling capabilities

Wide dynamic range, wideband, and waveguide power sensors: For signal handling, select extended dynamic range sensors for varied signal strengths, wideband sensors for complex modulation and high-speed data, and waveguide sensors for accurate high-frequency measurements.



Average Power Sensors

Accurate, repeatable measurements for all modulation formats



Peak and Average Power Sensors

Precision and versatility for pulsed and complex signals



Diode Power Sensors

Precision and sensitivity for low-level RF measurements



Thermocouple Power Sensors

Robust and accurate power measurements for high power applications



USB / LAN Power Sensors

Compact and efficient power measurements



Wide Dynamic Range Power Sensors

Precision and speed across a wide dynamic range



Wideband Power Sensors

Wideband power analysis for high-speed applications



Waveguide Power Sensors

Precision and reliability for millimeter-wave measurements

Power Meter and Sensor Compatibility

There is a wide range of power meter and sensor compatability tailored to different measurement needs. For example, average power meters pair best with diode sensors, which offer fast response and high accuracy across a wide dynamic range, while peak power meters often require wideband sensors capable of capturing fast signal transitions, pulse characteristics, and time-gated measurements. Our thermistor power meters, known for their high accuracy and stability at lower frequencies, are compatible only with thermistor mount sensors for precision power measurements in calibration or metrology applications. Our handheld power meters have a built-in sensor and do not require an external sensor. Explore compatible power meters and sensors.

Power sensors	Average power meters	Peak power meters	Thermistor power meters
Average	X	X	
Peak and average		Model-dependent	
Diode	X	X	
Thermocouple	X	X	
Wide dynamic range	X	X	
Wideband		Model-dependent	
Waveguide	X	X	
Thermistor mount			X
USB / LAN	Standalone power measurement without separate power meter		

> [Learn more about our power sensors](#)



Power Meter Software Functionality

Keysight power meter software expands your measurement capabilities, making it easier to control instruments, automate tests, log results, and analyze RF signal performance. Whether you need simple data logging or complex sequence automation, our power meter software ensures fast setup, easy operation, and comprehensive measurement insight. **Explore the software tools** that enhance Keysight power meters, from basic control to in-depth analysis for complex RF signals.

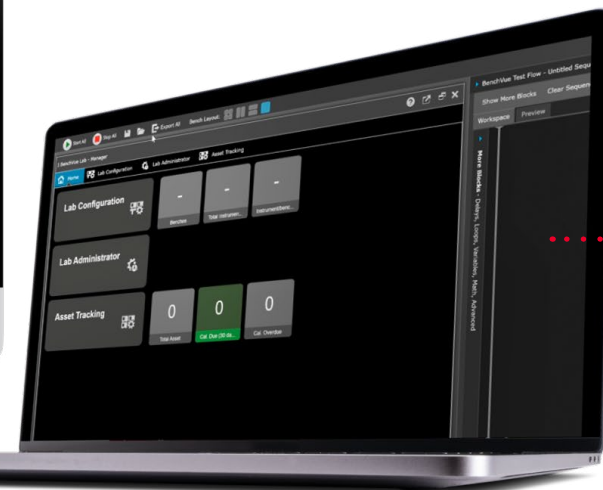
Measurement software for Average, Peak and Thermistor Power Meters



AVERAGE AND PEAK
Data logging and
visualization



**AVERAGE, PEAK AND
THERMISTOR**
Lab management
and configuration



Why Choose Keysight?

Keysight power meters deliver the precision, performance, and flexibility engineers need, whether in the lab, field, or within complex systems. Here's why engineers choose Keysight:

Measurement precision

- Exceptional accuracy and stability for repeatable results that ensure reliable power verification.
- Precision that supports compliance, calibration, and performance verification.

Application versatility

- Supports CW, pulse, and modulated signal types for broad test coverage.
- Built for lab, field, and production use, ensuring consistent results wherever you test.

Signal visibility

- High-speed sampling and time-gating to capture short or complex signals.
- Captures fast bursts, key for accurate radar, 5G, and SATCOM testing.

Connected ecosystem

- Integrated software with automated workflows enabling faster and easier testing.
- Consistent connectivity across instruments, sensors, and platforms for end-to-end validation.

Feature

Specification

Number of channels

Up to 4 channels

Dynamic range

Up to -70 to +44 dBm for wide amplitude signal coverage

Frequency coverage

DC to 220 GHz

Video bandwidth

Up to 30 MHz for accurate transient and modulated signal capture

Calibration and accuracy

Real-time auto-zeroing, thermistor-based precision, and temperature compensation



Calibration

Ensure your test system performs to specification and meets local and global standards.



Repair

Restore equipment to original functionality and specifications with trained technicians.



KeysightCare

Innovate at speed with curated support plans and prioritized response and turnaround times.



Education

Make measurements quickly with eLearning and in-house, instructor-led training.



Keysight Support

Get 24x7 access to service requests, case management help, and technical articles.

Select the Power Meter That Is Right for You

Should you need more information on Keysight power meter offerings, visit our extensive **library of resources** to help you select the right solution for your application.

Here are some of the resources that can guide you in determining the best power meter for your needs:

- > **How to Choose the Right Power Meter and Power Sensor**
- > **Seven Practices to Prevent Damaging Power Meters and Power Sensors**
- > **4 Steps for Making Better Power Measurements**

Once you are ready, visit **Keysight power meters** to select one of our popular configurations or build one to meet your specific application.



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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