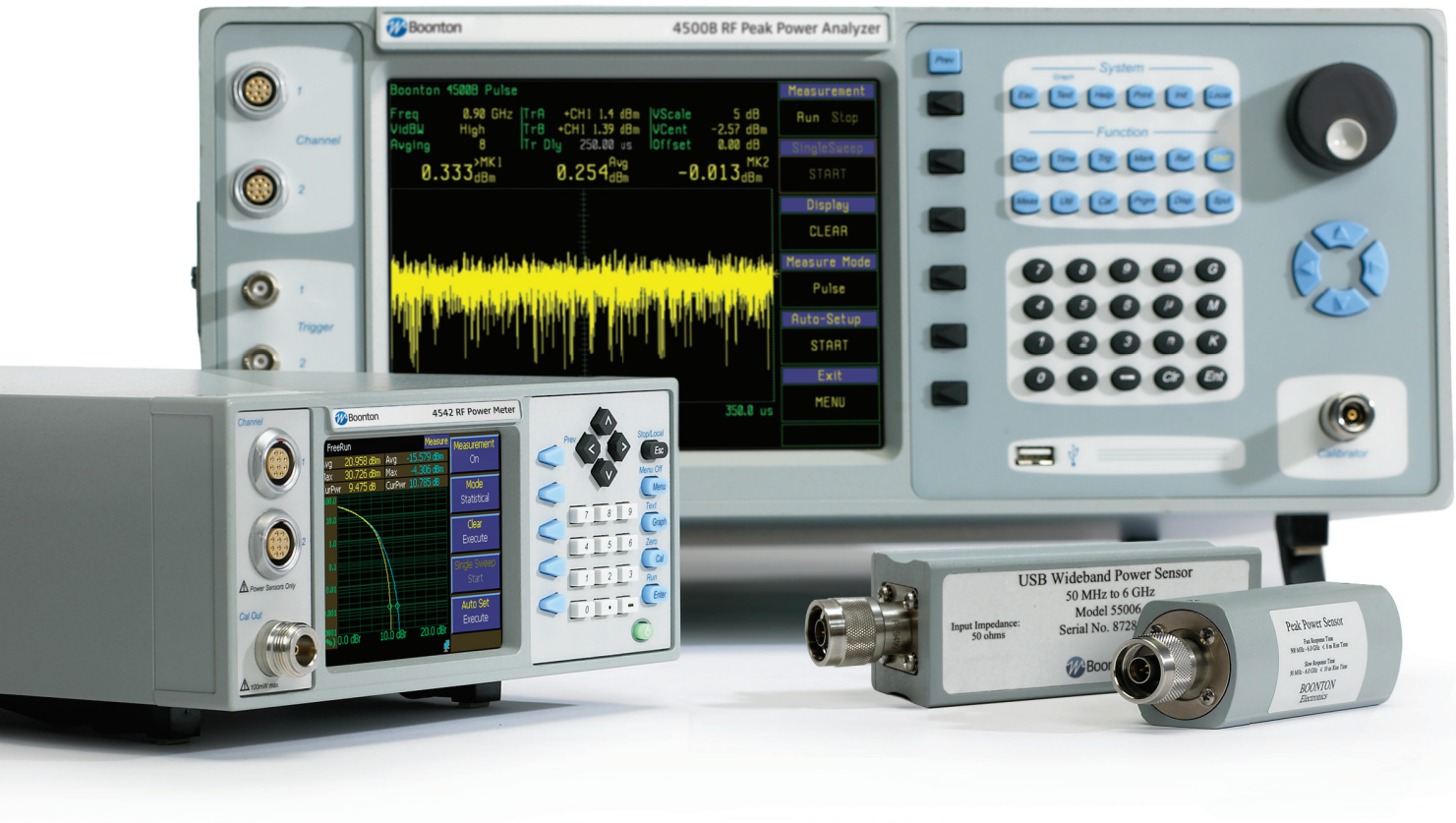
Boonton



Product Catalog

Boonton Products

Founded in 1947, Boonton has built on over 60 years of experience in RF technology. From the beginning, products have gained a reputation for high-performance combined with high reliability. This has not changed and Boonton customers recognize the products for their dependability, accuracy, and state-of-the art measurement capabilities. All products are backed by our exemplary customer service and support. Boonton's portfolio includes Peak and Average power meters, RF voltmeters, Modulation & Audio meters, and PIM (passive inter-modulation) testers. Boonton's diverse and innovative products are used in terrestrial and satellite communication, radar, telemetry, avionics, military, and an expanding number of wireless communication applications.

USB Power Sensor

Real-Time Power Processing™ technology delivers unsurpassed speed and accuracy.

- Boonton 55 Series

Peak and Average (CW) RF Power Meters

The right RF analyzer for any need, from basic average RF power meter to high-performance systems suited for most complex measurement applications.

- Boonton 4500B
- Boonton 4540
- Boonton 4530
- Boonton 4240
- Boonton 52000
- Boonton RF power sensors

RF Voltmeters

Reliable voltage measurement from 10Hz to 1.2GHz

- Boonton 9240

Audio Analyzers

Most accurate signal analysis from 10Hz to 200kHz

- Boonton 1121A

Modulation Analyzers

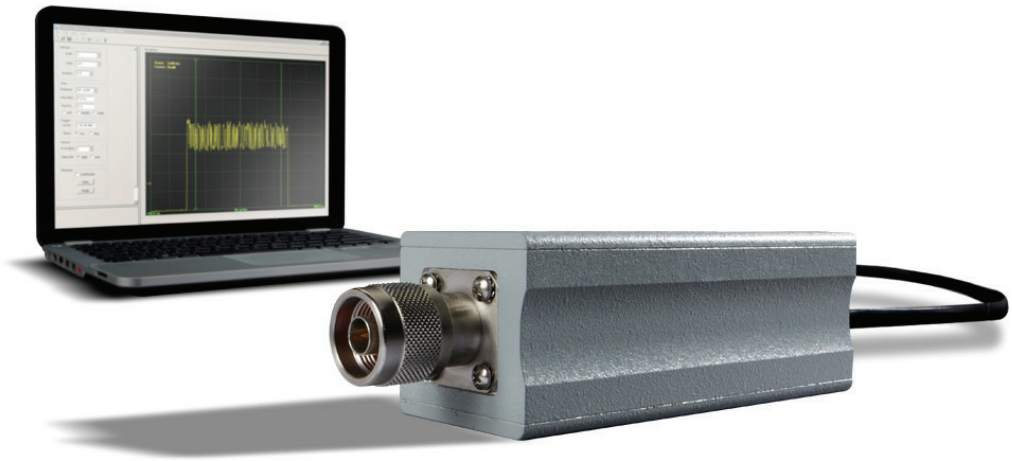
Analyzing AM and FM signals from 100kHz to 2.5 GHz

- Boonton 8201

PIM Testers

The right PIM test system for your field application

- Boonton PIM 21



55 Series Wideband USB Power Sensor

Boonton once again sets the standard for fast RF power measurements with the introduction of its 55 Series Wideband USB power sensors. Built with Boonton's Real-Time Power Processing™ technology (patent pending), this new product line offers speed and accuracy never before seen in a USB form factor. The 55 Series sensors are ideal for manufacturing, design, research, and service in commercial and military applications such as telecommunications, avionics, RADAR, and medical systems. They are the instrument of choice for fast, accurate and highly reliable RF power measurements, equally suitable for product development, compliance testing, and site monitoring applications.

Features and Benefits:

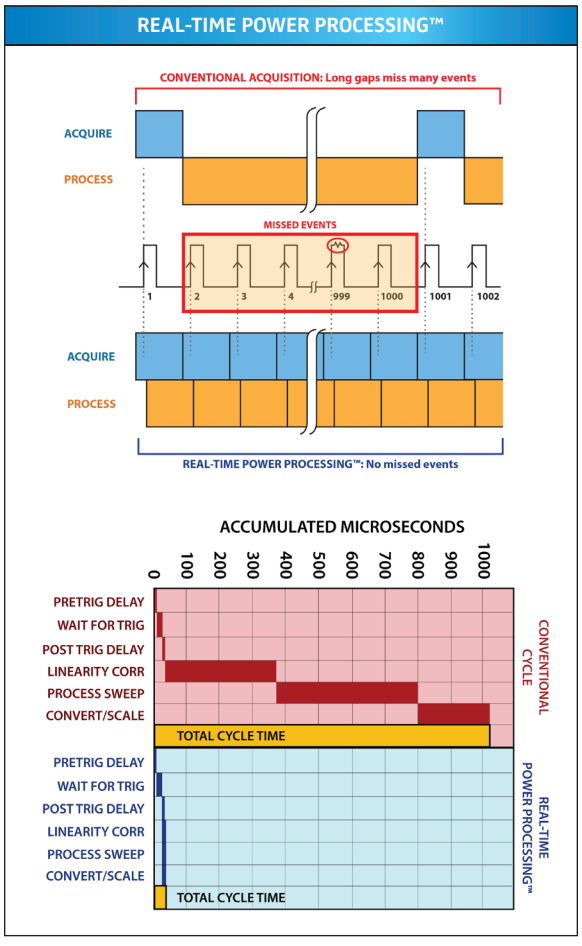
- Ultra-fast rise time: 5ns*
- Time resolution: 100 ps
- RF Frequency Range: Up to 40GHz
- Continuous Sample rate: 100 Msamples / sec
- Effective Sample Rate: 10 Gsamples / sec
- Class leading Video Bandwidth: 70 MHz*
- Statistical Measurements 100 Mpoints / sec
- Trace acquisition speed: 40 k sweeps / sec
- Real Time Power Processing™:
  No latency due to buffer processing by host PC
- Internal RF or External TTL trigger,
  Master/Slave in/out connector
- Synchronized multi-channel measurements
- Removable, locking USB cable

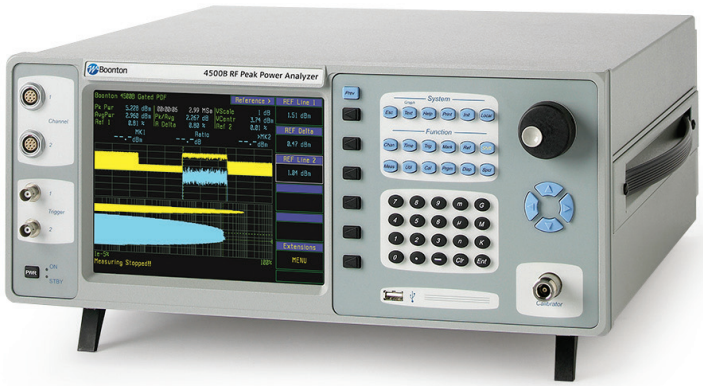
*55006

Related products

Boonton Wideband Peak Power Sensors
Boonton RF Power Meter 4540

For more information, please refer to the Boonton 55 Series data sheet.





Boonton 4500B RF Peak Power Analyzer

High-Performance Test Instrumentation for R&D, Production and Field Applications

The Boonton Model 4500B is the instrument of choice for capturing, displaying, analyzing fast and complex RF Signals. The 4500B Peak Power Analyzers provide most accurate measurements even for highly demanding RF measurement requirements. This power meter is taking performance to a new level and changes the way the industry views and analyzes RF signal powers. The 4500B features a rise time of less than 5ns, 100 picoseconds time base resolution, video bandwidth greater than 50 MHz, flexible triggering and greater than 80 dB dynamic range - that without the need of range switching. The 4500B also features an optional statistical power analysis package, offering continuous or gated CCDF, CDF or PDF presentations. When numeric information is required, users can choose an individual set of up to 15 different measurements parameters per channel – displayed simultaneously. Furthermore, envelope and persistence views provide fast in-depth signal analysis. 4500B's I/O capabilities include LAN, GPIB and USB ports for storing data such as instrument setups, trace waveforms and bitmap image files.

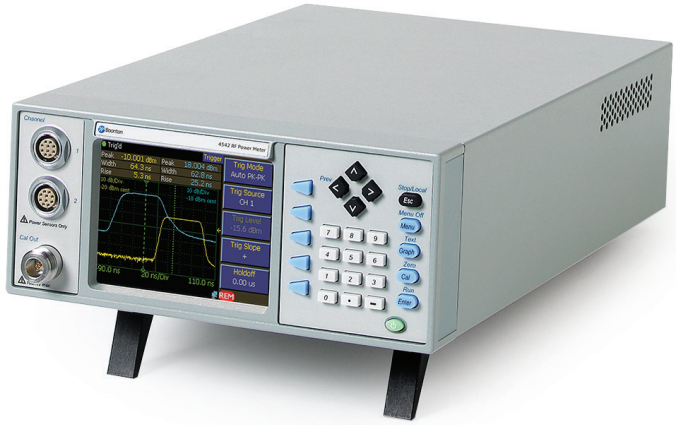
Features and Benefits:

- RF frequency range: 1MHz to 40 GHz
- Measurement Range (Pulsed / Modulated): -50 to + 20 dBm / -60 to +20 dBm
- Time base resolution: 100 ps (0.01% accuracy)
- Rise time: <5ns
- Automatic peak-to-peak, delay-by-time and delay-by-events triggering
- Envelope, persistence and roll mode displays
- Includes one or two general-purpose oscilloscope channels
- Large 8.4'' TFT color LCD display
- GPIB, USB and LAN
- Compatible with industry leading 57006, 59318 and 59340 peak power sensors

Related products

Boonton Wideband Peak Power Sensors
Boonton RF Power Meter 4540
Amplifier Test Bench ™ Software

For more information, please refer to the Boonton 4500B data sheet.



Boonton 4540 RF Power & Voltage Meter Series

Fast and High-Precision RF Power Analyzer for the Lab, Field and Production Floor

Boonton's 4540 Series RF Power Meters are the leading instruments for capturing, displaying and analyzing RF power in both time and statistical domains. They perform RF peak power measurements, RF average power measurements of signals up to 40 GHz and RF Voltage measurements. Applications include pulsed RF signals such as RADAR, repetitive pulsed signals such are MRI, and pseudorandom or noise-like signals such as CDMA, WLAN, WiMAX, WCDMA/ UMTS and LTE.

The 4540 Series RF power and voltage meters are suitable for virtually all kind of RF signals. Boonton offers a large variety of high-dynamic peak and average power sensors, as well as voltage probes for the 4540 Series. This advanced instrument provides average, modulated signal, pulsed signal and statistical operating modes making it well suited for R&D, manufacturing, control and maintenance operations. The Power meter is available as single channel version (4541) and dual channel version (4542).

Boonton's 4540 Series RF Power Meter offers a very detailed representation of measured signals, allowing thorough RF signal analysis. A time resolution of 200 picoseconds, unprecedented in a power meter of this class, and sophisticated Random Interleaved Sampling (RIS) technique, together with optimized sensor characteristics allows for this very high signal definition. RIS delivers an effective sampling rate of up to 5 GSamples/second. Furthermore, 4540's state-of-the-art hardware and special algorithm provide an ultra-fast screen repetition rate.

Features and Benefits:

- Frequency range: 9.9kHz to 40 GHz
- Time resolution: 200 ps
- Video bandwidth: 70MHz
- Rise time: <7ns
- Effective sampling rate (RIS): 5GSamples/second
- Statistical analysis including CCDF
- GPIB, USB (device) and LAN standard

Related Products

Boonton Peak Power Sensors
Boonton Average Sensors
Boonton Voltage Probes
Boonton Amplifier Test Bench ™ Software

For more information, please see the Boonton 4540 data sheet.

Boonton 4530 RF Power Meter Series

Affordable Peak Power Analysis

The 4530 series RF Power and Voltage Meters offer high dynamic average and peak power measurements at frequencies from 9.9 kHz to 40 GHz.

Boonton's advanced 4530 Series RF power meters combine accuracy of a laboratory-grade instrument with capabilities required for production test. For measuring average power or peak power of EvDo, WCDMA, WIMAX, LTE or HDTV signals, Boonton's single-channel (4531) and dual-channel (4532) models provide a wealth of powerful features.

Besides peak power, average power, and voltage, the 4530 series perform statistical power analysis (CDF and PDF). It is compatible with a wide variety of Boonton RF power sensors and voltage probes. Sensor setup is easy and accurate: the instrument recognizes sensors and downloads calibration and setup data from the sensor automatically, as soon as they are connected to the instrument.

Features and Benefits:

- Frequency range: 9.9 kHz to 40 GHz (sensor dependent)
- Dynamic range: >60 dB (peak), 90 dB (CW) (sensor dependent)
- Bandwidth: 20 MHz
- Dual-channel statistical measurements (CDF/PDF)
- SCPI commands for remote control through GPIB and RS-232

Related Products

Boonton Peak Power Sensors
Boonton Average Power Sensors
Boonton Voltage Probes
Boonton 4540 Series RF Power Meters

For more information, please see the Boonton 4530 data sheet.

Boonton 4240 Average RF Power Meter

RF Power Meter with 90 dB Dynamic Range

Boonton's Model 4240 Series RF Power Meters are available as single (4241A) or dual-channel (4242A) instrument, capable of measuring power levels from –70 dBm to +44 dBm (sensor dependent) within a 90 dB dynamic range. Boonton 4240 RF power meters are compatible to a vast variety of Boonton average power sensors. These instruments are very accurate and provide measurement speeds up to 200 readings per second, equally fulfilling production and lab requirements. The 4240 series displays measurement data with up to 5-digit resolution in logarithmic (dB) or linear (W) units. Numeric or bar graph display can be selected. Showing both channels (4242) allows simultaneous indication of two signals, making comparisons simple. Log or linear readouts can be selected along with +/- difference and ratios.

Features and Benefits:

- Dynamic range: 90 dB
- Frequency range: 10 kHz to 40GHz
- Over 200 readings per second in single channel mode
- GPIB interface standard
- HP 437B and HP 438B emulation

Related Products

Boonton Average Sensors
Boonton 4530 Series Power Meter
Boonton 52000 USB Power Meter

For more information, please see the Boonton 4240 data sheet.

Wideband Peak Power Sensors

Average RF Power Sensors

Boonton Wideband Peak Power Sensors

Ultra-Fast, High-Dynamic Peak Power Sensors

Features (sensor dependent):

- Rise time: <7ns
- Bandwidth: up to 65 MHz
- Frequency range: 50MHz to 40GHz
- Dynamic range: -50dBm to +20dBm (peak)
  -60dBm to +20dBm (CW)

Model	Frequency Range	Dynamic Range	Overload Rating	Sensor Response		Applicability		
RF Connector	(Low Bandwidth)	Peak Power Range** CW Power Range Int. Trigger Range	Pulse/Continuous	Fast Risetime (Bandwidth)	Slow Risetime (Bandwidth)	4500B	4540	4530 (WITH 2530*)
57006 N (M)	0.5 - 6 GHz (0.05 - 6 GHz)	-50 to +20 dBm -60 to +20 dBm -40 to +20 dBm	1 W for 1µs 200 mW	<7 ns (70 MHz typical)	<10 µs (350 kHz)	X	X	X
59318 N (M)	0.5 - 18 GHz (0.05 - 18 GHz)	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1µs 200 mW	<10 ns (50 MHz typical)	<10 µs (350 kHz)	X	X	- (X)
59340 K (M)	0.5 - 40 GHz (0.05 - 40 GHz	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1µs 200 mW	<10 ns (50 MHz typical)	<10 µs (350 kHz)	X	X	X (X)
56318 N (M)	0.5 - 18 GHz	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1µs 200 mW	<15 ns (35 MHz)	<200ns (1.75 MHz)	-	-	- (X)
56326 K (M)	0.5 - 26.5 GHz	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1µs 200 mW	<15 ns (35 MHz)	<200 ns (1.75 MHz)	-	-	- (X)
56518 N (M)	0.5 - 18 GHz	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1µs 200 mW	<100 ns (6 MHz)	<300 ns (1.16 MHz)	-	-	- (X)
57518 N (M)	0.1 - 18 GHz (0.05 - 18 GHz)	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1µs 200 mW	<100 ns (6 MHz)	<10 µs (350 kHz)	-	X	X
57540 K (M)	0.1 - 40 GHz (0.05 - 40 GHz)	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1µs 200 mW	<100 ns (6 MHz)	<10 µs (350 kHz)	-	X	X
56526 K (M)	500 MHz to 26.5 GHz	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1µs 200 mW	<100 ns (6 MHz)	<300 ns (1.16 MHz)	-	-	- (X)

** Boonton 2530 Model is the external 1GHz RF Calibrator, ** For pulse signal only*

For more information, please see the Boonton Wideband Peak Power Sensors data sheet.

Boonton Average RF Power Sensors

Versatile, High-Dynamic Range RF Power Sensors

Average sensors from Boonton provide accurate RF power measurements over a wide dynamic range and allow average power measurements of modulated and pulsed signals.

Features (sensor dependent)**:**

- Frequency range: 9.9kHz to 40GHz
- Dynamic range: up to 90dB
- Max power: up to +40dBm

Model RF Connector	Frequency Range	Dynamic Range	Overload Rating Pulse/Continuous
Wide Dynamic Range Dual Diode Sensors			
51075A N (M)	500 kHz to 18 GHz	-70 to +20 dBm	1 W for 1µs 300 mW
51077A N (M)	500 kHz to 18 GHz	-60 to +30 dBm	10 W for 1µs 3 W
51079A N (M)	500 kHz to 18 GHz	-50 to +40 dBm	100 W for 1µs 25 W
51071A K (M)	10 MHz to 26.5 GHz	-70 to +20 dBm	1 W for 1µs 300 mW
51072A K (M)	30 MHz to 40 GHz	-70 to +20 dBm	1 W for 1µs 300 mW
Thermocouple Sensors			
51100(9E) N (M)	10 MHz to 18 GHz	-20 to +20 dBm	15 W for 1µs 300 mW
51200 N (M)	10 MHz to 18 GHz	0 to +37 dBm	150 W for 1µs 10 W
Special Purpose Dual Diode Sensors			
51011(EMC) N (M)	10 kHz to 8 GHz	-60 to +20 dBm	1 W for 1µs 200 mW
51011(4B) N (M)	100 kHz to 12.4 GHz	-60 to +20 dBm	1 W for 1µs 300 mW
51013(4E) N (M)	100 kHz to 18 GHz	-60 to +20 dBm	1 W for 1µs 300 mW
51015(5E) N (M)	100 kHz to 18 GHz	-50 to +30 dBm	10 W for 1µs 2 W
51033(6E) N (M)	100 kHz to 18 GHz	-40 to +33 dBm	10 W for 1µs 2 W
51078 N (M)	100 kHz to 18 GHz	-20 to +37 dBm	100 W for 1µs 7 W
Diode Average Sensor (For use with 4530, 5230, 4230, 4240, 4540)			
51085 N(M)	500 kHz to 18 GHz	-30 to +20 dBm	1 W for 1µs 5W (*)

For more information, please see the Boonton Average RF Power Sensors data sheet.

Boonton 52000 Series USB Power Meter

Versatile RF Power Measurement

The 52000 Series USB RF Power Meter allows cost-effective CW and average power measurements. They are equally suited for production and service environments that require accuracy and affordability. With their 70dB dynamic range, their capabilities cover many applications. The 52000 series comes with complete user interface (UI) software. Multiple 52000 Series USB Power meters can be controlled by a single PC via an USB network. In this case, the UI software will distinguish the individual meters by their serial number.

Combining sensor and meter in one compact USB instrument saves costs and rack space. The 52000 series are light-weight and portable, measuring only 1.3 x 1.7 x 4.9 inches (34 x 43 x 125 mm). Due to their low power consumption of (less than 50mA) they can be easily operated from any notebook with USB interface.

Features and Benefits:

- Measurement range from –50 dBm to +20 dBm
- Frequency ranges available from 10 MHz to 12.4, 18.5 or 26.5 GHz
- No reference calibrator required
- USB current: < 50mA
- Simple USB connection to PC, multiple sensors on one PC supported
- Convenient for lab, production test and field service

Related Products

Boonton 4530 Power Meter
Boonton 4240 Power Meter
Boonton Average Power Sensors
Boonton 55 Series USB Sensor

For more information, please see the Boonton 52000 data sheet.

Boonton 9240 Series RF Voltmeter

Accurate Analog RF Voltmeter 10Hz to 1.2GHz

Boonton's 9240 RF Voltmeter provides precise voltage measurements from audio frequencies to the GHz region. The range extends from 200 µV to 10 volts; with accessory 100:1 divider up to 300 V. The 9240 RF Voltmeter is simple to use on the bench, and comprehensive enough to integrate into an ATE system.

Features and Benefits:

- Frequency range: 10 Hz to 1.2 GHz (Probe dependent)
- Voltage range: 200 µV to 10 V (to 300V @ 700MHz with optional 100:1 divider)
- RMS response to 30 mV (to 3 V @ 700 MHz with 100:1 divider)
- DC recorder output
- Dual channel and differential voltage measurements (9242)

Related Products

Boonton 4540 Series RF Power and Voltage Meter
Boonton 4530 Series RF Power and Voltage Meter
Boonton 4240 Series RF Power Meter

For more information, please see the Boonton 9240 data sheet.

Boonton 1121A Audio Analyzer

High-Precision Audio Analyzer, Built-In Test Signal Generator

Boonton Model 1121A audio analyzer provides fast and very accurate measurements including frequency, AC or DC level, distortion, SINAD and signal-to-noise ratio. It also includes an audio source providing low distortion signals over wide frequencies and level ranges.

The 1121A incorporates selectable output impedances of 50, 150 and 600 ohms, 16 volt RMS output, additional 0.3 mV full scale measurement range, and quasi-peak detection. The 1121A Audio Analyzer also tunes and manages auto-ranging automatically for maximum accuracy and resolution. Distortion, frequency response, AC and DC voltage measurements require only one single keystroke. The instrument is ideally suited for stimulus response applications because of an on-board low-distortion audio source. Internal control of the source and analyzer allows for swept measurements.

For the accurate measurement of complex waveforms and noise, the audio analyzer uses true RMS average or quasi-peak detection. Accurate distortion measurements can be made to –90 dB (0.003%) between 20 Hz and 20 kHz. Over the same frequency range, flatness measurements are possible to 0.05 dB (0.5%). The audio analyzer precision reciprocal counter gives fast and accurate characterization of audio frequencies.

Features and Benefits:

- Frequency range from 10 Hz to 200 kHz
- Measurement level from 300 µV to 300 V (full scale)
- Low-distortion audio source for testing systems, amplifiers, receivers and components
- Instant recall of up to 99 complete front panel setups

Related Products

Boonton 8201 Modulation analyzer
Boonton 4240 Average power meter
Boonton 4540 RF Power Meter

For more information, please see the Boonton 1121A data sheet.

Boonton 8201 AM/FM/PM Modulation Analyzer

High-Precision Analyzer for AM/FM Radio Technology

The Model 8201 AM/FM Modulation Meter offers a unique combination of measurements including AM, FM and PM, Carrier level and frequency, Signal, noise and distortion power (SINAD), thus eliminating the need for different discrete items of test equipment. With a carrier level resolution of 0.01dB, a frequency resolution of 10Hz and an accuracy of 1% AM and FM modulation measurements, the 8201 is well suited for the most demanding requirements.

Modulation is detected using peak, while residuals are measured using RMS and referenced to a specific level. These values are displayed in %, dB or quasi-peak, and the highest values are stored using the peak-hold function. Signal frequency and level can be acquired automatically or input via the keyboard or remote command. The 8201 is a cost-effective measurement tool for an ATE system, signal generator calibration or mobile radio production testing.

Features and Benefits:

- Carrier frequency range: 100 kHz to 2.5 GHz
- 0 to 500 kHz FM deviation to 1% accuracy
- 0 to 99% AM to 1% accuracy
- 0 to 500 radians to 3% accuracy
- Audio distortion range: 0.01% to 100% THD or 0 to 80 dB SINAD
- Remote control through GPIB

Related Products

Boonton 1121A Audio Analyzer
Boonton 4540 RF Power Meter
Boonton 4240 Average RF Power Meter
Boonton 52000 USB Power Meter

For more information, please see the Boonton 8201 data sheet.

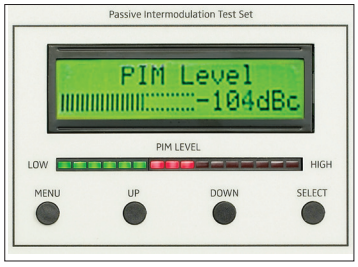
Boonton PIM 21

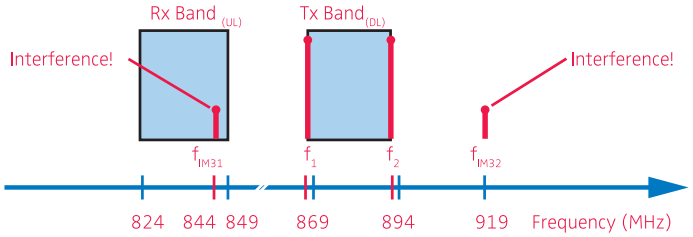
Improves Wireless Network Quality and Detects Unwanted PIM Sources

Passive intermodulation (PIM) in wireless networks distorts receiving bands, which results in significant loss of receiver sensitivity. This again causes poor call quality, low data rates and even dropped calls. Boonton's PIM 21 is a microprocessor-controlled, portable test set that measures passive intermodulation (PIM) of systems.

Low quality components or assemblies in radio base stations, in-building DAS installations or other systems transmitting radio frequencies can cause passive intermodulation. Poor manufacturing or assembly of components in coaxial feeder elements such as connectors, jumper cables, splitters, hybrids, filters, DC blocks and antennas can cause PIM.

By applying two carriers to a RF system, PIM21 detects and measures its intermodulation (IM3) behavior. With this, the PIM21 provides the user with a helpful and easy to use tool to pinpoint and repair or replace defective elements.





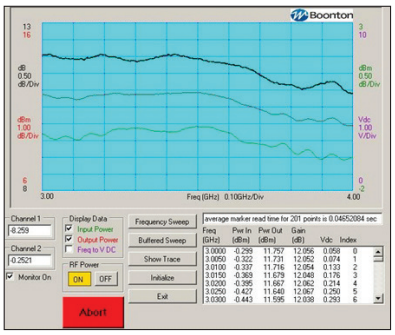
Features and Benefits:

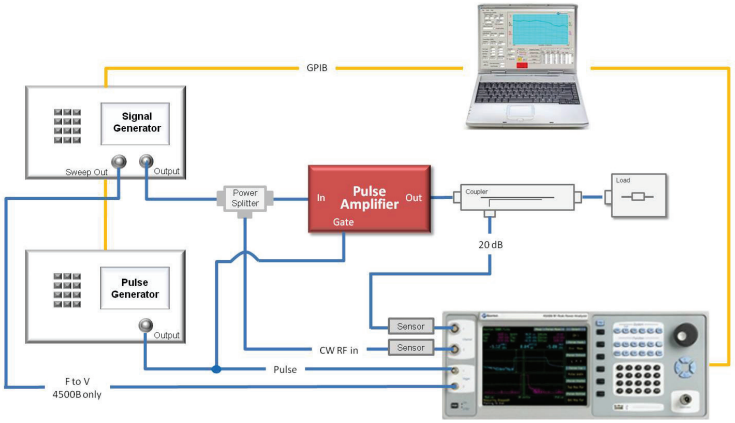
- PIM sensitivity of -80 to –153 dBc @ 850 MHz (typical –155 dBc @ 850 MHz)
- Measurement carrier power: 2x 33dBm
- Multiple frequency bands available
- Battery-operated
- Rugged, weather-proof (IP55)
- Numeric and bar graph interface
- Audio PIM level indicator

Related Products

Boonton 52000 Series USB Power Meter

For more information, please see the Boonton PIM 21 data sheet.



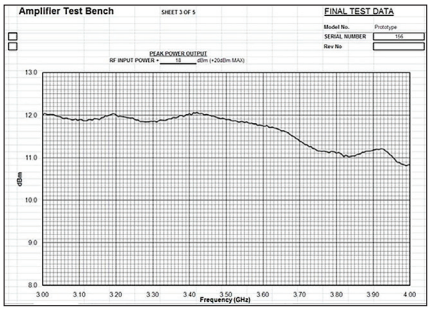


Boonton Amplifier Test Bench™ System Software

Why Average Power Measurements are Not Sufficient with Pulsed Amplifiers

Measuring pulsed amplifiers with conventional average RF power measurement equipment like RF detectors or average power sensors is common but the measurement results are often inaccurate. Such measurements require calculating pulse power based on the duty cycle and the average pulse power. Depending on the duty cycle ratio, the measured average power may be close to the sensor's noise floor, causing significant measurement error. Duty cycles of 0.1% (1:1000) or 0.01% (1:10,000) are common in radar technology and other applications. A duty cycle of 0.1% reduces the usable dynamic range of an average sensor by 30dB and a duty cycle of 0.01% by even 40dB. The remaining dynamic range of the measurement setup might not be sufficient for proper measurements.

Unfortunately, RF pulses are not perfectly rectangular. The solution for accurate pulse measurements is high dynamic range, fast peak power measurement equipment like the Boonton 4500B and 4540 Series Power Analyzers with peak power sensors which are fast enough and provide sufficient dynamics to measure the actual signal and offer accurate information about the real signal trace.



Amplifier Test Bench ™ measures linear and pulsed amplifiers and does not require any programming expertise: Sophisticated measurements and documentation are possible with just a few mouse clicks.

Applications

- Telecommunication amplifiers
- Pulsed RF amplifiers
- RF Filter characterization
- Radar, MRI amplifier
- Amplifier for noise-like signals (LTE, OFDM, UMTS)

Measurements

- Gain over frequency
- Power over frequency

Related Products

Boonton 4500B Series RF Peak Power Analyzer
Boonton 4540 Series RF Power Meter

For more information, please see the Boonton Amplifier Test Bench ™ Software data sheet.

Boonton Calibration Service

Factory Certified Calibration Sustains Accuracy and Value of T&M Investments

Boonton, a Wireless Telecom Group brand, offers a top calibration service that verifies compliance with national standards. If incoming instruments should fail verification limits, full alignments are performed. The calibration performance provides full sets of initial and final data, with a certificate listing the as-received condition. Boonton provides calibration certificates and traceability sheets. As production calibration data, annual calibration is also traceable to NIST Standards. Before-and -after comparisons can also be shown. Finally, any software updates or engineering changes that effect the units operation are performed as part of our normal service.

Why Calibrate?

Test equipment in the wireless world uses analog components such as capacitors, coils, RF amplifiers, mixers and many others. These component types may develop age related deviation from their manufacturer's specifications. Boonton products are well known for high reliability, however even the most reliable components may deviate over time. Additional stress caused by temperature changes, switching, humidity and even simple oxidation will cause deviation. Deviations may cause malfunctions or result in failed measurements. Because of this every test instrument requires periodic calibrations.

What is Boonton Calibration Service?

Boonton Calibration Service goes beyond the mere verification of specification values. It covers inspection, maintenance, verification alignment and documentation, ensuring the return of a unit that is as precise as a new unit.

Inspection

Each unit is inspected for damage, wear and tear. Key functions are tested and the display is checked (if applicable). Small damaged parts that are detected during the inspection will be replaced immediately. If the unit shows more extensive damage, customers will be contacted with an estimate for the required repair.

Maintenance

Units sent for calibration undergo a standard maintenance procedure. Displays are cleaned of dust and marks. Fans are cleaned to enhance cooling and the lifespan of the instrument.

Verification

An essential part of Boonton's Calibration Service is verification. All specified measurement and performance parameters are checked. The verification limits are tighter than the unit's specifications ensuring that results remain accurate until the next calibration.

Alignment

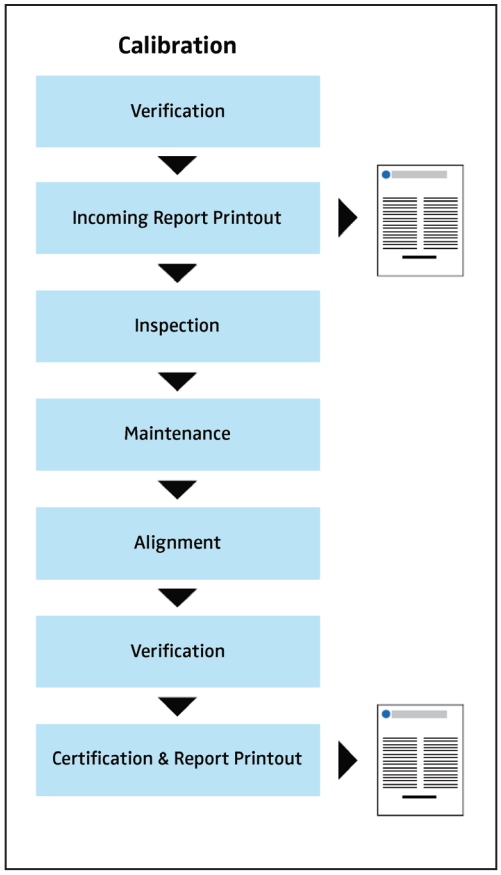
If equipment has drifted out of verification limits, the instrument will be aligned. Alignment tunes the calibration into the range center of the verification limits, resulting in maximum measurement precision. Only Boonton and authorized Boonton Service Centers have the competence necessary to provide such alignments.

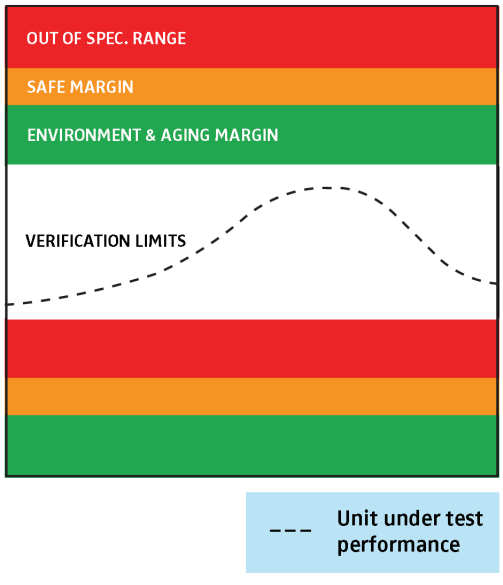
Documentation

Customers receive certificates that precisely describe the instrument's status. The Calibration Certification declares conformity of the unit with the published specifications. Any information found during examination is noted in this document.

A Calibration Service You Can Trust

Boonton Service Centers and authorized WTG Service partners perform service that is traceable to national standard institutes.





Features and Benefits:

- Full Functional Check
- Verification of RF parts
- Alignment to highest precision
- Detailed reporting with NIST traceable results

Related Products

All Boonton products

For more information, please see the Boonton Calibration Service data sheet.

Detailed RF Pulse Analysis

Highly Detailed Waveform Traces Allow Accurate Measurements, Efficient Alignment and Detailed Analysis of Linear and Pulsed RF Components and Systems

Wide dynamic range pulsed RF applications like radar and MRI are challenging for test engineers. These signals transmit high power signals but return weak signals facing significant ambient noise. Power measurements are vital for any kind of RF transmission system: too much power, and signals distort, too little power, and signals submerge in the noise. Power meters are the most accurate way to perform RF power measurements. Determining sensitivity, measuring maximum output power, or analyzing linearity of RF components are just a few of many parameters power meters are tasked to perform with great precision.

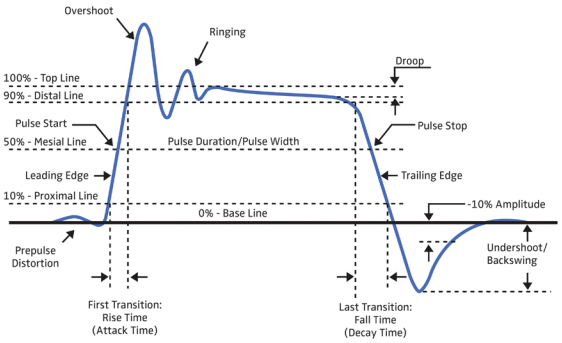


Figure 1

For pulsed RF signals, critical specifications are peak power, average power, rise time, fall time, overshoot, and undershoot (see Figure 1). To achieve highest detail and accuracy, power sensors must be fast, provide a wide bandwidth and must offer a high dynamic range. Power meters with high sampling rate capture signal points in small increments, which are then used to reconstruct the signal waveform on the screen for further analysis. Boonton power meters not only utilize fast sampling, but they offer an additional powerful feature: sampling performed at random intervals. Why is this important? This sampling technique operates independent of the instrument's time base and has huge advantages whenever repeating signals are measured. Repeating signals constitute the vast majority of all signals measured in RF applications. This asynchronous sampling technique is also known as Random Interleaved Sampling or RIS for short. RIS sampling provides a detail depth that reveals much more waveform information than conventional sampling.

Screenshots in Figure 2 show three consecutive measurements of a fast signal transition using two power meters. The upper row illustrates a power meter with conventional sampling technique; the lower row illustrates a Boonton 4540 power meter with RIS technology. Both power meters measure the same signal. As one would expect, both power meters are able to measure the fast signal transitions, but using RIS technology Boonton's power meters have an effective time resolution in the 100 ps range. With this it generates significantly more detail of the displayed waveform, allowing the user to analyze the signal thoroughly. The undersampled waveform measurement varies by 30mW, while the Boonton only varies by 8mW.

Related Products

Boonton Peak Power Analyzer 4540 Series
Boonton Peak Power Analyzer 4500B
Boonton 55 Series Wideband USB Sensors

For more information, please see the Boonton Peak Power Meter data sheet.

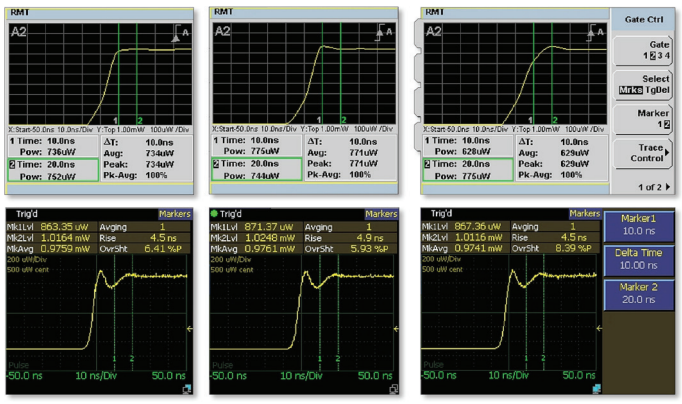


Figure 2

Using Statistical Methods to Measure Noise-like Carrier Signals

Boonton 4540 and 4500B Peak Power Analyzers with High Dynamic Range, Allow Aligning Modern Telecommunication Amplifiers with Greatest Precision

Unlike simple, average power measurements using CW tones, statistical analysis is beneficial when comparing peak to average ratios of signals. Results are shown in percent with respect to the total signal time. This method is particularly useful for noise-like signals like LTE, WiMAX, or UMTS. The peak power values are sorted, or binned, according to their magnitude, normalized by the average power, and displayed in log-log plot in dBr as crest factor. An important display is the CCDF, or complementary cumulative distribution function. The CCDF in figure 1 shows how frequently a particular power level is present as a percentage of the total signal time. A value of 0 dBr is equal to the average power and 0% time is equal to maximum instantaneous crest factor. Figure 1 shows a crest factor probability of 0.0001% occurs at 15 dBr with respect to the average.

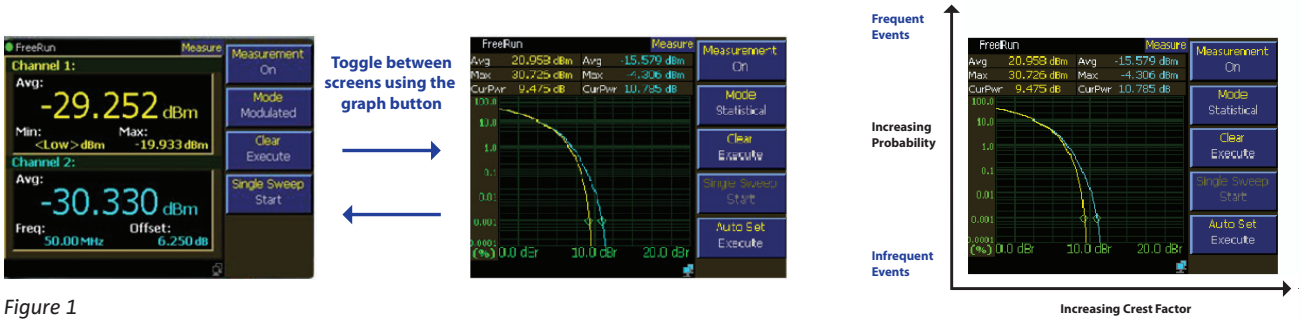


Figure 1

Using CCDF Distributions to Compare Amplifier Input and Output.

The right-hand side of figure 1 shows two CCDF distributions comparing the input and output of the amplifier under test. The blue signal serves as a reference input, while the yellow signal is the output of the DUT. Wide dynamic range peak power sensors allow direct comparison of input and output peak to average ratio using the CCDF display. The amplifier can be tested over its entire dynamic range using the signal of interest.

The graph button on a Boonton 4540 series power meter allows the user to toggle between the average power measurement and the dual CCDF statistical display. The peak to average ratio deviation of the DUT input to output using the CCDF display illustrates the difference between an average 1 dB compression point figure of merit and the statistical display. In this example amplifier compression begins well before the 1 dB compression point is reached (see Figure 2). The 1dB compression, or third order-intercept point figures of merit do not include information above the physical layer, but a CCDF statistical graph can infer BER qualities about the amplifier from previously measured receivers. The advanced statistical measurement capability in Boonton power meters provide flexibility, high accuracy, and a reduction in amplifier test measurement time.

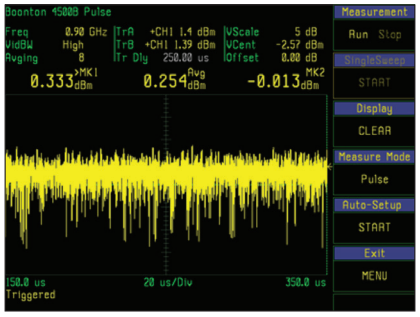


Figure 2

Related Products

Boonton Peak Power Analyzer 4540 Series
Boonton Peak Power Analyzer 4500B
Boonton 55 Series Wideband USB Sensors

For more information, please see the Boonton Peak Power Meter data sheet.

Who We Are

Wireless Telecom Group is a global designer and manufacturer of radio frequency (“RF”) and microwave-based products for wireless and advanced communications industries. We market our products and services worldwide under the Boonton Electronics (“Boonton”), Microlab/FXR (“Microlab”) and Noisecom brands. Our Brands and products have maintained a reputation for their accuracy and performance as they support our customers’ technological advancements within communications. We offer our customers a complementary suite of high performance. instruments and components meeting a variety of standards including peak power meters, signal analyzers, noise sources, power splitters, combiners, diplexers, noise modules and precision noise generators. We serve commercial and government markets within the satellite, cable, radar, avionics, medical, and computing applications.We are headquartered in Parsippany, New Jersey, in the New York City metropolitan area and we maintain a global network of Sales offices dedicated to providing excellent product support.

Wireless Telecom Group, Inc. continuously targets opportunities that allow us to capitalize on our synergies and our talents. Our technological capabilities along with our customer service strategies remain essential competencies for our success.

Noisecom

Noisecom is a global provider of electronic noise generation equipment and noise sources in the commercial and military telecommunications fields. Utilized for accurate, reliable measurements, users look to Noisecom for specialized assistance with their equipment design.

Boonton

Boonton Electronics, a wholly owned subsidiary, is a leader in the manufacture of test equipment dedicated to measuring the power of RF and Microwave systems used in multiple telecommunication markets. A pioneer in the industry, Boonton continues to provide high quality and high value instruments for users backed with outstanding customer support.

Microlab

Microlab, a wholly owned subsidiary, is a global provider of passive microwave components including power splitters, directional couplers and filters. These products are employed as system components in commercial applications such as wireless base stations for cellular, paging and private communications, in-building wireless signal distribution, television transmitters and aircraft navigation landing systems. Microlab products are also used in military systems such as electronic countermeasures and missile guidance.

Wireless Telecom Group Inc.
25 Eastmans Rd
Parsippany, NJ
United States
Tel: +1 973 386 9696
Fax: +1 973 386 9191
www.boonton.com

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