



## Boonton Products

Boonton Electronics is a leader in high performance RF and microwave test equipment for radar, avionics, electronic warfare, satellite and wireless communications, and EMI/EMC applications. Used across the semiconductor, military, aerospace, medical and communications industries for more than 70 years, Boonton products enable a wide range of RF power measurements and signal analysis for RF product design, production, maintenance and system integration.

### Real-Time Power Sensors

*Real-Time Power Processing™* (RTPP) technology delivers unsurpassed speed and accuracy.

- RTP5000 Real-Time USB Peak Power Sensors
- RTP4000 Real-Time USB Average Power Sensors

### Connected Power Sensors

True-average connected power sensors providing the most cost-effective power measurement with USB and LAN connectivity.

- CPS2000 True-Average Connected Power USB/LAN Power Sensors

### Power Meters

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

- 4500C Peak Power Analyzer with RTPP™
- 4540 Peak Power Meter Series
- 4530 Peak Power Meter Series
- 4240 RF Power Meter Series
- Wideband Peak Power Sensors
- Average RF Power Sensors

### RF Voltmeters

Reliable voltage measurement from 10 Hz to 1.2 GHz

- 9240 RF Voltmeter Series

### Audio Analyzers

Most accurate signal analysis from 10 Hz to 200 kHz

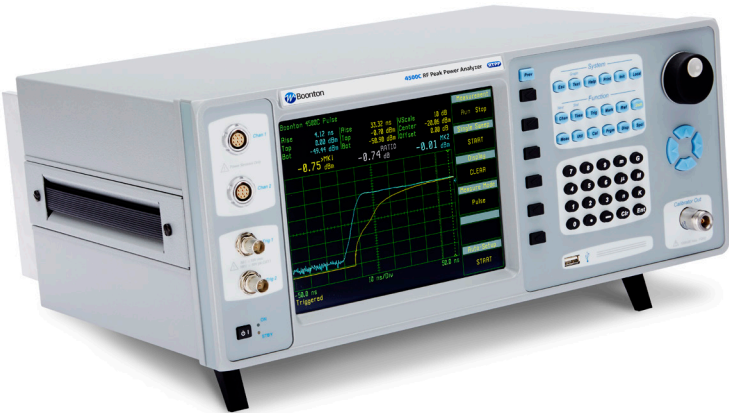
- 1121A Audio Analyzer

### Modulation Analyzers

Analyzing AM and FM signals from 100 kHz to 2.5 GHz

- 8201A Modulation Analyzer

# 4500C Peak Power Analyzer



The Boonton Model 4500C is the instrument of choice for capturing, displaying, analyzing and characterizing microwave and RF power in both the time and statistical domains. It is ideal for design, verification, and troubleshooting of pulsed and noise-like signals used in commercial and military radar, electronic warfare (EW), wireless communications (e.g., LTE, LTE-A, and 5G), and consumer electronics (WLAN), as well as education and research applications.

The 4500C features 100 ps time base resolution, video bandwidth up to 125 MHz, flexible triggering and greater than 80 dB dynamic range without any range switching to cover the most demanding peak power measurement applications. The 4500C also features continuous statistical analysis of power at acquisition rates up to 100 Mega-Samples per second (MS/s), a text display of up to 15 automatic measurements per channel, as well as envelope and persistence views to provide fast, in-depth signal analysis. The instrument incorporates convenient I/O, including USB ports for storing data such as instrument setups, trace waveforms and bitmap image files.

### Key Specifications

Frequency range	30 MHz to 40 GHz
Measurement range	-60 dBm to +20 dBm
RF channel video bandwidth	125 MHz
RF channel rise-time	< 5 ns
Overall accuracy	0.2 dB
Time Resolution	100 ps
Min Pulse Width / Max PRF	6 ns / 50 MHz
Channels	2 RF and 2 trigger

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

### Key Features

- Real-Time Power Processing™
- Ultrafast trace acquisition and refresh rate
- One button push for 15 automated power and time measurements
- Automatic peak-to-peak, delay-by-time and delay-by-events triggering
- Multi-level, multi-function calibrator
- Continuous statistical analysis (optional)
  - Includes gated PDF, CDF, and CCDF
- Displays up to 4 measurement, 2 memory, and 1 math channel simultaneously

Providing the highest video bandwidth and fastest rise times, RTP5000 peak power sensors with Boonton's Real-Time Power Processing™ deliver 100,000 measurements per second, no gaps in signal acquisition and zero measurement latency. Combining this performance with automatic pulse measurements, CCDF and crest factor statistical analysis, multi-channel capabilities and documentation tools make the RTP5000 peak power sensor the ideal instrument for fast, accurate and reliable RF power measurements.



### Features (sensor dependent):

- 6 GHz, 18 GHz and 40 GHz RF power sensors
- Up to 195 MHz video bandwidth with 3 ns rise time
- Real-Time Power Processing™ technology with zero measurement dead time
- 100,000 measurements per second
- Power Analyzer Suite advanced measurement and analysis software
- Crest factor, CCDF and statistical measurements
- 10 GS/s effective sample rate
- 100 MS/s continuous sample rate
- Synchronized multi-channel measurements

*For more information, please refer to the Boonton RTP5000 data sheet.*

### Applications

- Crest factor and Peak to Average Power Ratio (PAPR) measurements for power amplifiers and RF components
- Telecommunication & satellite signals: W-CDMA, QAM, OFDM, LTE-FDD and LTE-TDD
- WiFi signals: 802.11ac and legacy 802.11 a/g/n/b
- RF and microwave pulse modulated power measurements: RADAR, MRI, particle accelerators
- General purpose scalar measurements, such as gain and return loss, using modulated and pulsed as well as CW signals
- Monitoring, recording, ALC loops, transient phenomena

### Real-Time Power Processing™

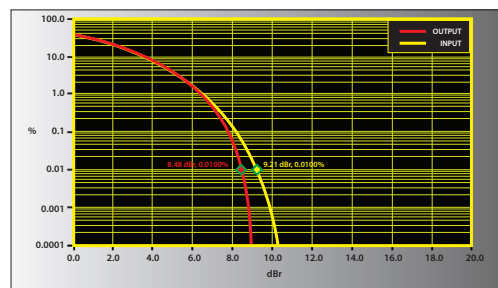
Real-Time Power Processing™ (RTPP) technology is a unique parallel processing methodology that performs the multi-step process of RF power measurement at incredible, unmatched speeds. While conventional power meters and USB sensors perform steps serially, resulting in long re-arm times and missed data, Boonton sensors with Real-Time Power Processing™ capture, display and measure every pulse, glitch and detail with no gaps in data and zero latency.

Specifications	RTP5006	RTP5318	RTP5340	RTP5518	RTP5540
RF Frequency					
Range	50 MHz to 6 GHz	50 MHz to 18 GHz	50 MHz to 40 GHz	50 MHz to 18 GHz	50 MHz to 40 GHz
Average					
Dynamic Range	-60 to +20 dBm	-34 to +20 dBm	-34 to +20 dBm	-50 to +20 dBm	-50 to +20 dBm
Pulse Dynamic					
Range	-50 to +20 dBm	-24 to +20 dBm	-24 to +20 dBm	-40 to +20 dBm	-40 to +20 dBm
Internal					
Trigger Range	-38 to +20 dBm	-10 to +20 dBm	-10 to +20 dBm	-27 to +20 dBm	-27 to +20 dBm
Rise time (fast/slow)	3 ns/<10 $\mu$ s	5 ns/<10 $\mu$ s	5 ns/<10 $\mu$ s	<100 ns/<10 $\mu$ s	<100 ns/<10 $\mu$ s
Video Bandwidth	195 MHz/350 kHz	70 MHz/350 kHz	70 MHz/350 kHz	6 MHz/350 kHz	6 MHz/350 kHz
Single-shot					
Bandwidth	35 MHz	35 MHz	35 MHz	6 MHz	6 MHz
RF Input	Type N, 50 $\Omega$	Type N, 50 $\Omega$	2.92 mm, 50 $\Omega$	Type N, 50 $\Omega$	2.92 mm, 50 $\Omega$
VSWR	1.25 (0.05 to 6 GHz)	1.15 (0.05 to 2.0 GHz) 1.28 (2.0 to 16 GHz)	1.25 (0.05 to 4.0 GHz) 1.65 (4 to 38 GHz)	1.15 (0.5 to 2.0 GHz) 1.20 (2.0 to 6.0 GHz)	1.25 (0.05 to 4.0 GHz) 1.65 (4.0 to 38 GHz)

## Series Specifications

Sampling Techniques	Real-time/Equivalent Time/ Statistical Sampling
Continuous sample rate	100 MS/s
Effective sample rate	10 GS/s
Time Resolution	100 ps
Statistical Analysis	Continuous or gated CCDF
Statistical Speed	100M points/s
Trigger Sources	Internal or External TTL
External Trigger in/out	TTL in (slave) or out (master)
Minimum Trigger Width	10 ns
Maximum Trigger Frequency	50 MHz
Trigger Jitter	0.1 ns rms
Trace Acquisition Speed	100K sweeps/s
Measurement Speed	100K meas/s (buffered mode)
over USB	800 meas/s (continuous)
Trigger Modes	Auto, Normal, Single, Free Run
Trigger Arming	Continuous, Trigger Holdoff, Frame (gap) Holdoff
Remote Connectivity	USB 2.0, Type B connector
Command Protocol	IVI-C and IVI-Com
Maximum Input Power	200 mW avg, 1 W for 1 $\mu$ s peak
Size (LxWxH)	145 x 43 x 43 (mm) 5.7 x 1.7 x 1.7 (inches)
Weight	363 grams/0.8 lbs.
Cable (with locking USB)	1.8 m / 6 ft
Power Consumption	2.5 W max (USB high power device)

## Crest Factor for Communication



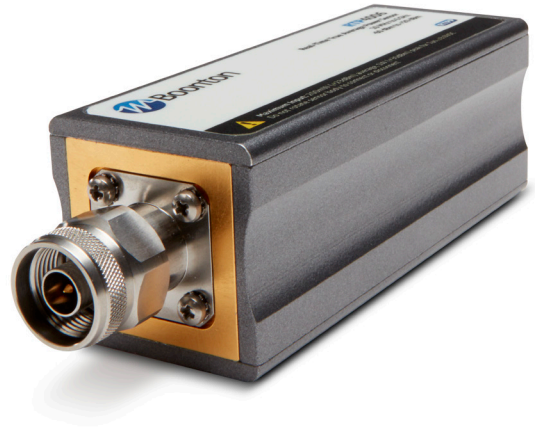
## Statistical Measurements

	Parameter	INPUT	OUTPUT
	10%	3.609 dB	3.569 dB
	1%	6.536 dB	6.412 dB
	0.1%	8.178 dB	6.412 dB
	0.01%	9.207 dB	8.478 dB
	0.01%	9.874 dB	8.780 dB
	0.0001%	10.293 dB	8.919 dB
	Cursor Pct	0.01 %	0.01%
	Cursor Pwr	9.210 dB	8.480 dB
	Average	-9.551 dBm	4.740 dBm
	Max	1.479 dBm	13.822 dBm
	Peak/Avg	11.030 dB	9.083 dB



## RTP4000 Real-Time True-Average Power Sensors

RTP4000 Real-Time True-Average Power Sensors provide 80 dB dynamic range and a frequency range down to 4 kHz. Built with Boonton's Real-Time Power Processing™ these sensors deliver 100,000 measurements per second, no gaps in signal acquisition and zero measurement latency. Combining this performance with pulse profiling, capture and measure of pulsed, CW and modulated signals, multi-channel capabilities and documentation tools make the RTP4000 Real-Time True-Average Power Sensor the ideal instrument for fast, accurate and reliable RF power measurements.



### Features (sensor dependent):

- 4 kHz to 6 GHz and 10 MHz to 6 GHz sensors
- -60 dBm to +20 dBm dynamic range
- 175 kHz video bandwidth for pulse profiling
- Real-Time Power Processing™ technology with zero measurement dead time
- 100,000 measurements per second
- True average with no modulation bandwidth limitations
- Pulse, Average, CW and Modulation modes
- Power Analyzer Suite advanced measurement and analysis software
- 1 GS/s effective, 25 MS/s continuous sample rate
- Synchronized multi-channel measurements

*For more information, please refer to the Boonton RTP4000 data sheet.*

### Applications

- EMI/EMC – Return loss measurements, conducted and radiated immunity, antenna efficiency
- Automotive & Transportation – Collision avoidance, WiFi/LTE communications, telemetry
- Scalar measurements, such as gain and return loss, on modulated and CW signals
- Gated average power measurements for modulated signals
- Communications – Amplifier efficiency, base station monitoring, compression point testing

Specifications	RTP4006	RTP4106
RF Frequency Range	10 MHz to 6 GHz	4 kHz to 6 GHz
Average Dynamic Range	-60 dBm to +20 dBm	-60 dBm to +20 dBm
Pulse Dynamic Range	-45 dBm to +20 dBm	-45 dBm to +20 dBm
Internal Trigger Range	-40 dBm to +20 dBm	-40 dBm to +20 dBm
Rise time	2 $\mu$ s	2 $\mu$ s
Video Bandwidth	175 kHz	175 kHz
RF Input	Type N, 50 $\Omega$	Type N, 50 $\Omega$
VSWR	1.15 (0.01 GHz to 2 GHz) 1.20 (2.0 GHz to 6 GHz)	1.15 (0.01 GHz to 2 GHz) 1.20 (2.0 GHz to 6 GHz)

### Series Specifications

Sampling Techniques	Real-time, Equivalent Time
Continuous sample rate	25 MS/s
Effective sample rate	1 GS/s
Time Resolution	1 ns
Trigger Sources	Internal or External TTL
External Trigger in/out	TTL in (slave) or out (master)
Minimum Trigger Width	4 $\mu$ s
Maximum Trigger Frequency	120 kHz
Trigger Jitter	1 ns rms 20 ns rms (external)
Trace Acquisition Speed	> 30k sweeps/second
Measurement Speed	100k meas/s (buffered mode)
over USB	1,000 meas/s (continuous)
Trigger Modes	Auto, Normal, Single, Free Run
Trigger Arming	Continuous, Trigger Holdoff, Frame (gap) Holdoff
Remote Connectivity	USB 2.0, Type B connector
Command Protocol	IVI-C and IVI-Com
Maximum Input Power	200 mW avg, 1W for 1 $\mu$ s peak
Size (LxWxH)	142 x 43 x 43 (mm) 5.6 x 1.7 x 1.7 (inches)
Weight	363 grams/0.8 lbs.
Cable (with locking USB)	1.8 m / 6 ft
Power Consumption	2.0 W max (USB high power device)
Operating Temperature	0 to 55° C
Storage Temperature	-40 to 70° C

## CPS2008 True-Average Connected Power Sensors

CPS2000 True-Average Connected Power Sensors combine USB and PoE LAN connectivity to enable easy, true-average RF power measurement of CW and modulated signals from 50 MHz to 8 GHz. Compatible with Windows® and Linux systems, CPS2000 sensors include all the necessary drivers for programming through SCPI, IVI and LabVIEW. Flexible connectivity, combined with a 60 dB dynamic range and >100 measurements per second, make CPS2000 sensors the ideal solution for measurements in the lab, production, and the field in ATE, remote monitoring and embedded environments.

### Features (sensor dependent):

- 50 MHz to 8 GHz frequency range
- -40 dBm to +20 dBm dynamic range
- True average power measurements for CW and modulated signals
- USB and LAN with PoE connectivity
- SCPI, IVI and LabVIEW programming
- Windows® and Linux compatibility
- >100 measurements per second
- Multi-channel measurements
- Streamlined user interface for fast, easy, and accurate measurements

### Applications

- EMI/EMC – Return loss measurements, conducted and radiated immunity, antenna efficiency
- Automotive & Transportation – Collision avoidance, WiFi/LTE communications, telemetry
- Scalar measurements, such as gain and return loss, on modulated and CW signals
- Gated average power measurements for modulated signals
- Communications – Amplifier efficiency, base station monitoring, compression point testing

*For more information, please refer to the Boonton CPS2000 datasheet.*



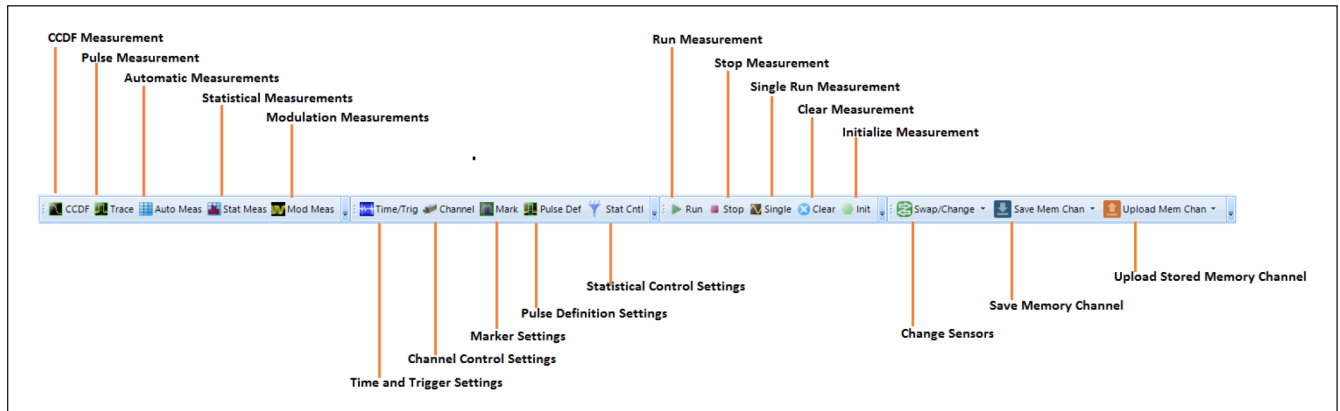


## Series Specifications

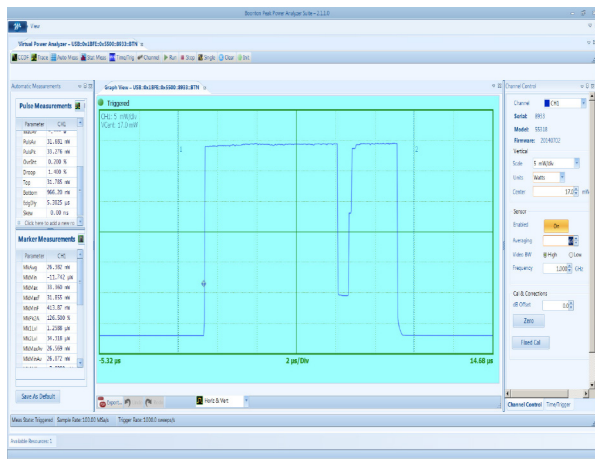
SRF Frequency Range	50 MHz to 8 GHz
Average Dynamic Range	-40 dBm to +20 dBm (50MHz to 6 GHz)
	-35 dBm to +20 dBm (6 GHz to 8 GHz)
RF Input	Type N, 50 $\Omega$
VSWR	1.15:1 (50 MHz to 2 GHz)
	1.25:1 (>2 GHz to 6 GHz)
	1.35:1 (>6 GHz to 8 GHz)
Trigger Mode	Single, Free run
Measurement Speed	>100 Meas/s
Measurement Aperture	1ms to 2 s
Remote Connectivity	USB Type B with SeaLATCH capability
	10/100 BaseT with Power-over Ethernet (PoE) Capability
Size (LxWxH)	132x43x33 (mm)
	5.2x1.7x1.3 (inches)
Operating Temperature	0° C to 50° C
Storage Temperature	0° C to 50° C
Weight	420 grams/0.9 lbs
Power Consumption	2.0 W max

## Boonton Power Analyzer Software

Boonton Power Analyzer software is a Windows based software package that provides control and readout of the sensors. It is an easy to use program that provides both time and statistical domain views of power waveforms with variable peak hold and persistence views. Power measurements are supported using automated pulse and statistical measurements, power level and timing markers. The GUI application is easily configured with dockable or floating windows and measurement tables that can be edited to show only the measurements of interest.

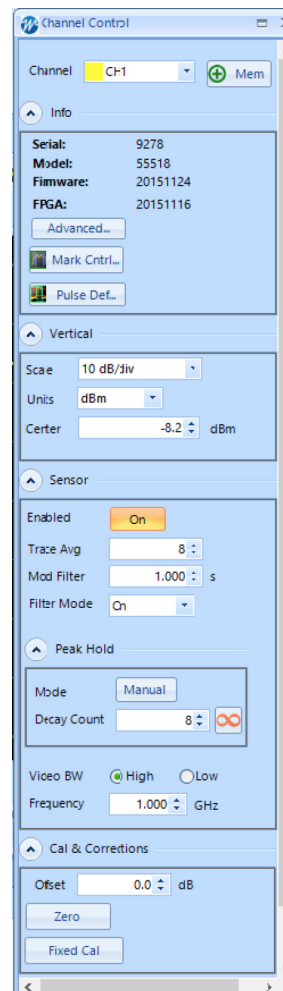


Main toolbar controls, shown grouped.

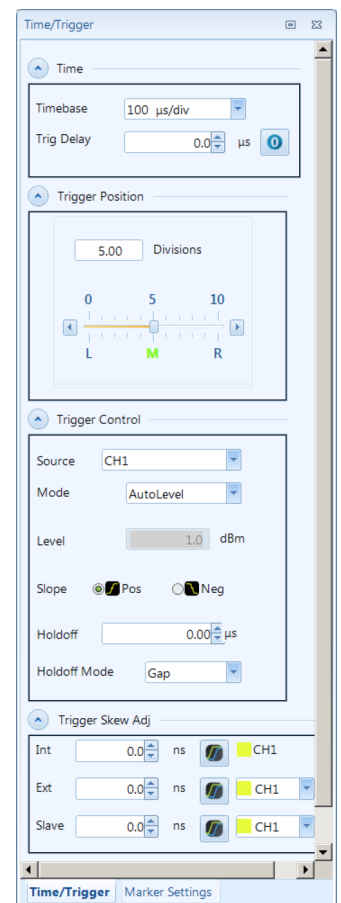


Main application window.

- Up to 15 automatic pulse measurements
- Statistical mode, includes complimentary cumulative distribution function (CCDF)
- Gated measurements, includes marker, burst (auto), external, external trigger, and periodic gates
- Multi-channel control for up to 8 sensors



Channel control window.



Time/Trigger control window.

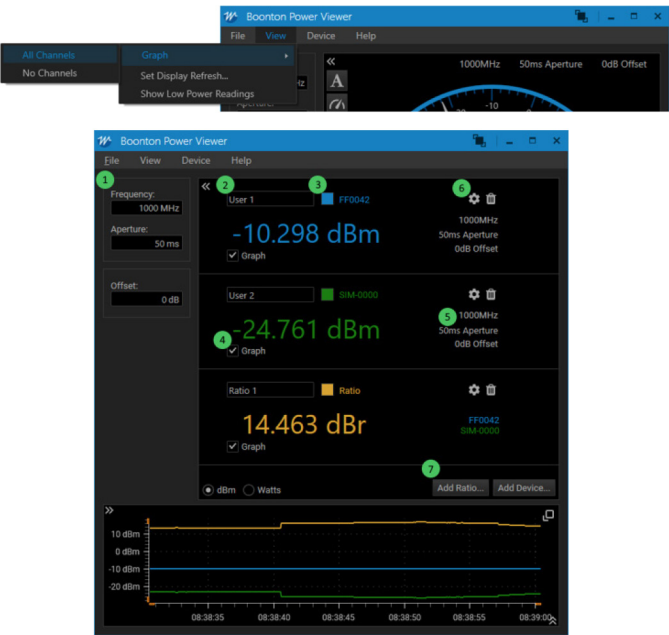
# Boonton Power Viewer Software

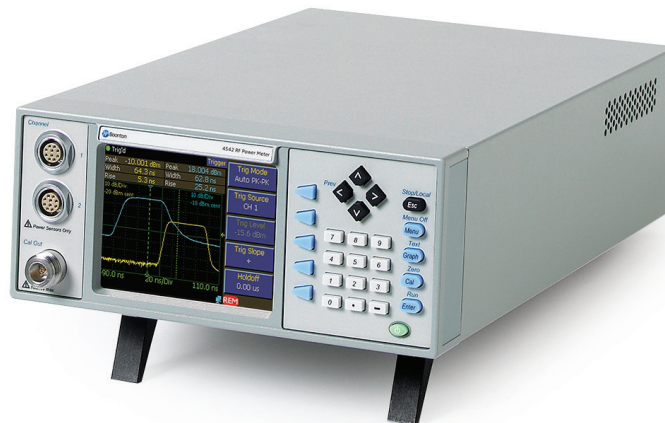
Boonton Power Viewer provides a simple, virtual power meter on Windows® systems. Power measurements are displayed in a numerical readout as well as analog-style meter. A data logging strip chart function allows for easy tracking of variations in measurements over time. Multiple sensors can be used and monitored virtually simultaneously.

1	Settings panel, including Frequency, Aperture, and Offset settings
Aperture 1 ms – 2 s	The aperture time is the total time the sensor observes the input signal to create one power measurement
Offset +/- 200 dB	This feature provides the ability to apply corrections to measurements when RF devices are between the sensor and DUT
2	Live Power vs. Time graph (units are dBm only)
3	Units Selection
4	Visualization selected Options include Text-Only, Gauge-Only, and Text + Gauge
5	Power Measurement
6	Add Device ... button for adding additional devices
7	Applied settings



1	Global settings panel, affects all devices are linked to the global settings
2	Device label – A user configurable label for a Power Sensor or Ratio
3	Color selector
4	Graph toggle checkbox
5	Applied device settings for each device





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

Boonton's 4540 peak 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 measurements on pulsed RF signals, such as RADAR, repetitive pulsed signals such as MRI, and pseudorandom or noise-like signals such as CDMA, WLAN, WiMAX, WCDMA/ UMTS and LTE.

The 4540 series is suitable for all kinds of RF signals. Boonton offers a large variety of high-dynamic peak and average power sensors, as well as voltage probes for the 4540. This advanced instrument measures on average, modulated and pulsed signals and performs statistical analysis making it well suited for R&D, manufacturing, control and maintenance operations. The meter is available in a single channel version (4541) and a dual channel version (4542).

This meter offers a very detailed representation of measured signals, allowing thorough RF signal analysis. When combined with optimized sensor characteristics, the best-in-class time resolution of 200 picoseconds and utilization of a sophisticated Random Interleaved Sampling (RIS), the 4540 series offers unprecedented performance. RIS delivers an effective sampling rate of up to 5 GSamples/second. The 4540 series' state-of-the-art hardware and unique algorithms also provide an ultra-fast screen update rate.

#### Features and Benefits (sensor dependent):

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

*For more information, please refer to the Boonton 4540 data sheet.*

#### Related Products

Peak Power Sensors  
Average Sensors  
Voltage Probes



### Affordable Peak Power Analysis

The 4530 peak power meters offer high dynamic average and peak power measurements at frequencies from 9.9 kHz to 40 GHz.

These meters combine the 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, the single-channel (4531) and dual-channel (4532) models provide a wealth of powerful features.

Beside peak power, average power, and voltage, the 4530 series performs statistical power analysis (e.g., cumulative distribution function [CDF] and probability distribution function [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 (sensor dependent):

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

*For more information, please refer to the Boonton 4530 data sheet.*

### Related Products

Peak Power Sensors  
Average Power Sensors  
Voltage Probes

## Ultra-Fast, High-Dynamic Peak Power Sensors

### Features (sensor dependent):

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



Model	Frequency Range	Dynamic Range	Overload Rating	Sensor Response	Applicability				
RF Connector	High Bandwidth (Standard Bandwidth)	Peak Power Range** CW Power Range Int. Trigger Range	Pulse/Continuous	Fast Risetime (Bandwidth)	Standard Risetime (Bandwidth)	4400 4400A 4500 4500A	4500B	4530	4540
<b>57006</b> 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 1 $\mu$ s 200 mW	<7 ns (70 MHz typical)	<10 $\mu$ s (350 kHz)	-	X	X*	X
<b>59318</b> 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 1 $\mu$ s 200 mW	<10 ns (50 MHz typical)	<10 $\mu$ s (350 kHz)	-	X	X*	X
<b>59340</b> 2.92 mm (M)	0.5 - 40 GHz (0.05 - 40 GHz)	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1 $\mu$ s 200 mW	<10 ns (50 MHz typical)	<10 $\mu$ s (350 kHz)	-	X	X*	X
<b>56318</b> N (M)	0.5 - 18 GHz	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1 $\mu$ s 200 mW	<15 ns (35 MHz)	<200ns (1.75 MHz)	X	X	X***	-
<b>56326</b> 2.92 mm (M)	0.5 - 26.5 GHz	-24 to +20 dBm -34 to +20 dBm -10 to +20 dBm	1 W for 1 $\mu$ s 200 mW	<15 ns (35 MHz)	<200 ns (1.75 MHz)	X	X	X***	-
<b>56518</b> N (M)	0.5 - 18 GHz	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1 $\mu$ s 200 mW	<100 ns (6 MHz)	<300 ns (1.16 MHz)	X	X	X***	-
<b>57518</b> 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 1 $\mu$ s 200 mW	<100 ns (6 MHz)	<10 $\mu$ s (350 kHz)	X	X	X	X
<b>57540</b> 2.92 mm (M)	0.1 - 40 GHz (0.05 - 40 GHz)	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1 $\mu$ s 200 mW	<100 ns (6 MHz)	<10 $\mu$ s (350 kHz)	X	X	X	X
<b>56526</b> 2.92 mm (M)	.05 to 26.5 GHz	-40 to +20 dBm -50 to +20 dBm -27 to +20 dBm	1 W for 1 $\mu$ s 200 mW	<100 ns (6 MHz)	<300 ns (1.16 MHz)	X	X	X***	-

\* Model 4530 with software version 20070215 or later, \*\* For pulsed signals only, \*\*\* Model 4530 with 1 GHz calibrator



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

Model	Frequency Range	Dynamic Range	Overload Rating	Applicability		
RF Connector			Pulse/Continuous	4240	4530	4540
Wide Dynamic Range Dual Diode Sensors						
<b>51075A</b> N (M)	500 kHz to 18 GHz	-70 to +20 dBm	1 W for 1 $\mu$ s 300 mW	X	X	X
<b>51077A</b> N (M)	500 kHz to 18 GHz	-60 to +30 dBm	10 W for 1 $\mu$ s 3 W	X	X	X
<b>51079A</b> N (M)	500 kHz to 18 GHz	-50 to +40 dBm	100 W for 1 $\mu$ s 25 W	X	X	X
<b>51071A</b> 2.92 mm (M)	10 MHz to 26.5 GHz	-70 to +20 dBm	1 W for 1 $\mu$ s 300 mW	X	X	X
<b>51072A</b> 2.92 mm (M)	30 MHz to 40 GHz	-70 to +20 dBm	1 W for 1 $\mu$ s 300 mW	X	X	X
Thermocouple Sensors						
<b>51100(9E)</b> N (M)	10 MHz to 18 GHz	-20 to +20 dBm	15 W for 1 $\mu$ s 300 mW	X	X	X
<b>51200</b> N (M)	10 MHz to 18 GHz	0 to +37 dBm	150 W for 1 $\mu$ s 10 W	X	X	X
Special Purpose Dual Diode Sensors						
<b>51011A(EMC)</b> N (M)	10 kHz to 8 GHz	-60 to +20 dBm	1 W for 1 $\mu$ s 200 mW	X	X	X
<b>51011A</b> N (M)	100 kHz to 12.4 GHz	-60 to +20 dBm	1 W for 1 $\mu$ s 300 mW	X	X	X
<b>51013A</b> N (M)	100 kHz to 18 GHz	-60 to +20 dBm	1 W for 1 $\mu$ s 300 mW	X	X	X
<b>51015A</b> N (M)	100 kHz to 18 GHz	-50 to +30 dBm	10 W for 1 $\mu$ s 2 W	X	X	X
<b>51085</b> N (M)	500 kHz to 18 GHz	-30 to +20 dBm	1 W for 1 $\mu$ s 5W (*)	-	-	X



### RF Power Meter with 90 dB Dynamic Range

The 4240 RF power meters are available as single (4241A) or dual-channel (4242A) instrument, capable of measuring power levels from  $-70$  dBm to  $+44$  dBm within a 90 dB dynamic range - sensor dependent. These RF power meters are compatible with a wide variety of Boonton average power sensors. The 4240 series is very accurate and provides measurement speeds up to 200 readings per second, equally fulfilling production and lab requirements. It displays measurement data with up to 5-digit resolution in logarithmic (dB) or linear (W) units and a numeric or bar graph display can be selected. Utilizing both channels (4242A) allows simultaneous display of two measurements, making comparisons simple. Log or linear readouts can be selected along with  $\pm$  differences and ratios.

#### Features and Benefits (sensor dependent):

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

*For more information, please refer to the Boonton 4240 data sheet.*

#### Related Products

Average Sensors



### Accurate Analog RF Voltmeter 10 Hz to 1.2 GHz

Boonton's 9240 RF voltmeter provides precise voltage measurements from audio frequencies to the GHz region. The measurement range extends from 200  $\mu$ V to 10 V; up to 300 V with accessory 100:1 divider. The 9240 RF Voltmeter is simple to use on the bench, and comprehensive enough to integrate into an automated test equipment (ATE) system.

#### Features and Benefits (probe dependent):

- Frequency range: 10 Hz to 1.2 GHz
- Voltage range: 200  $\mu$ V to 10 V (to 300 V @ 700 MHz 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)

*For more information, please refer to the Boonton 9240 data sheet.*

#### Related Products

4540 Peak Power Voltage  
4530 Peak Power Voltage  
4240 RF Power Meter



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

The Boonton 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 frequency and level ranges.

The 1121A incorporates selectable output impedances of 50, 150 and 600 ohms, 16 V<sub>RMS</sub> 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 keystroke. The instrument is ideally suited for stimulus-response applications with the utilization 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  $\mu$ V 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

*For more information, please refer to the Boonton 1121A data sheet.*

### Related Products

4240 RF Power Meter  
4540 Peak Power Meter

## 8201A Modulation Analyzer



### High-Precision Analyzer for AM/FM Radio Technology

The 8201A Modulation Analyzer 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 multiple test instruments. With a carrier level resolution of 0.01 dB, a frequency resolution of 10 Hz, and an accuracy of 1% AM and FM modulation measurements, the 8201 is well suited for the most demanding requirements.

Modulation is measured using peak detectors, while residuals are measured using an RMS detector 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 8201A is a most-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

*For more information, please refer to the Boonton 8201A data sheet.*

### Related Products

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

## Who We Are

**Wireless Telecom Group** comprised of Boonton Electronics, CommAgility, Microlab and Noisecom, is a global designer and manufacturer of advanced RF and microwave components, modules, systems and instruments. Serving the wireless, telecommunication, satellite, military, aerospace, semiconductor and medical industries, Wireless Telecom Group products enable innovation across a wide range of traditional and emerging wireless technologies. With a unique set of high-performance products including peak power meters, signal analyzers, signal processing modules, LTE PHY and stack software, power splitters and combiners, GPS repeaters, public safety monitors, noise sources, and programmable noise generators, Wireless Telecom Group enables the development, testing, and deployment of wireless technologies around the globe.



**Boonton Electronics** is a leader in high performance RF and microwave test equipment for radar, avionics, electronic warfare, satellite and wireless communications, and EMI/EMC applications. Used across the semiconductor, military, aerospace, medical and communications industries for more than 70 years, Boonton products enable a wide range of RF power measurements and signal analysis for RF product design, production, maintenance and system integration. The Boonton product portfolio is designed and manufactured in the USA and includes peak and average RF power meters, Real-Time USB Power sensors, RF voltmeters, modulation analyzers, and audio analyzers.



**CommAgility** is a developer of embedded signal processing and RF modules, and LTE PHY/stack software, for 4G and 5G mobile network and related applications. Combining the latest DSP, FPGA and RF technologies with advanced, industry-leading software, CommAgility provides compact, powerful, and reliable products for integration into high performance test equipment, specialized radio and intelligence systems, and R&D demonstrators. CommAgility engineers work closely with customers to provide hardware and software solutions for the most demanding real-time signal processing, test and control challenges in wireless baseband, semiconductor processing, medical imaging, radar and sonar applications.



**Microlab** is a leader in low PIM (passive intermod) RF and microwave products enabling signal distribution and deployment of in-building DAS (distributed antenna systems), wireless base stations and small cell networks. High performance passive components such as power combiners, directional couplers, attenuators, terminators and filters are developed for broadband applications to support public safety networks, GPS reference signaling, television transmitters and aircraft landing systems. Active solutions from Microlab include GPS signal repeaters for cellular timing synchronization and passive safety monitors for real-time in-building DAS system diagnostics.



**Noisecom** is a leader of RF and microwave noise sources for signal jamming and impairment, reference level comparison and calibration, receiver robustness testing, and jitter injection. Electronic noise generation devices from Noisecom come in a variety of product types including, noise diodes, built-in-test modules (BITE), calibrated noise sources, jitter sources, cryogenic noise standards and programmable instruments. Calibrated noise sources are available from audio to millimeter wavelengths in coaxial or waveguide modules. Programmable instruments are highly configurable and able to generate precise Carrier-to-Noise, Signal-to-Noise and broad band white noise. Noisecom products are customizable to meet the unique needs of challenging applications and can be designed for high power, high crest factor, specific filter responses with a wide selection of input and output options.