RF and Microwave Power Sensors/Meters

Tektronix PSM3000, PSM4000, and PSM5000 Series Data Sheet

Features & Benefits

Key Performance Specifications

- 8 GHz, 18 GHz, 20 GHz, and 26.5 GHz Models
- Models Available with N and 3.5 mm Connectors
- Dynamic Range as Low as –60 dBm and as High as +20 dBm
- Uncertainty as Low as 2.6%
- Reading Rates up to 2000 Readings/s

Features

- Meters are Calibrated over Full Temperature Range – No zero or cal needed before making measurements, saving time and avoiding poor-quality data
- Average Power, Duty Cycle Corrected Pulse Power, and Measurement Logging on All Models
- Included Applications run under Microsoft Windows
  - Power Meter Application
  - High-speed Logging Application
  - LabVIEW Drivers and Programming Examples for Most Common Windows Programming Environments are Available for Automated System Support
- Max Hold and Relative Measurement Modes
- Offset, Frequency Response, and 75 Ω Minimum Loss Pad Correction
- Flexible Averaging Modes for Quick, Stable Measurements
- TTL Trigger Input and Output allow Synchronization with External Instruments
- Pass/Fail Limit Mode
- Compact Size
- The PSM3000 Series offers True Average Power Measurements that Give Accurate Results Regardless of Signal Shape or Modulation
- The PSM4000 and PSM5000 Series offer:
  - Pulse Power, Duty Cycle, Peak Power, and Crest Factor Measurements
  - Measure Peak, Average and Minimum Power on Bursts with Adjustable Offset and Duration
- The PSM5000 Series includes a Pulse Profiling Application for Making Measurements on Repetitive, Pulsed Signals
  - Builds and Displays a Trace of the Pulse Envelope
  - Full-trace and Gated Measurements including Pulse, Peak and Average Power, Overshoot, Crest Factor, Rise and Fall Time, Pulse Width, Pulse Repetition Frequency, Duty Cycle
  - Statistical Measurements on the Trace Data, such as Complementary Cumulative Distribution Function (CCDF), and Probability Density Function (PDF)

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Applications

- General-purpose RF and Microwave Average Power Measurements
- Characterization of Repetitive Pulsed Signals, such as Navigation, Weather, and other Radar
- Peak and Average Power Measurements on Modulated Signals such as GSM, CDMA, WCDMA, HSPA, WiMAX up to 10 MHz
- Peak and Average Power Measurements of Modulated Pulsed Communications Signals
- Level Control Feedback for Signal Sources
- Validation and Characterization of Power Amplifiers, Switches, and Other RF and Microwave Components
- Service, Maintenance, and Installation of DTV, Cellular, Microwave Radio Link, and Radio Broadcast Transmitters
- Verification and Calibration of Test Equipment and Systems

3-year Warranty

Capable, Compact Power Sensors/Meters

The PSM3000, PSM4000, and PSM5000 Series are compact power sensors/meters that deliver fast, accurate RF and microwave power measurements. A broad range of CW and pulse modulation measurements are available, depending on the series you choose. Each meter comes with Windows Power Meter application software for controlling the meter, displaying readings, and recording data. The combination of the sensor/meter and PC provides a complete solution, eliminating the need for a separate, dedicated meter mainframe.

No Meter Mainframe Required

With the included power meter application software, familiar meter controls are available at the click of a mouse and readings are presented right on your PC screen. Familiar Windows pull-down menus provide additional controls. Data is immediately available on the PC for further analysis and documentation. The meters communicate with the PC using standard USB 2.0 protocols and cables for plug-and-play ease of use.

Integrate High-speed Power Measurements Into Your Testing

Tektronix PSM Series power sensors feature the industry's fastest measurement speed (2000 readings/s). This can significantly reduce test times and provide dynamic power measurement information that was previously unavailable. An included High-speed Logging Application provides a mechanism for getting this data into your PC for analysis.

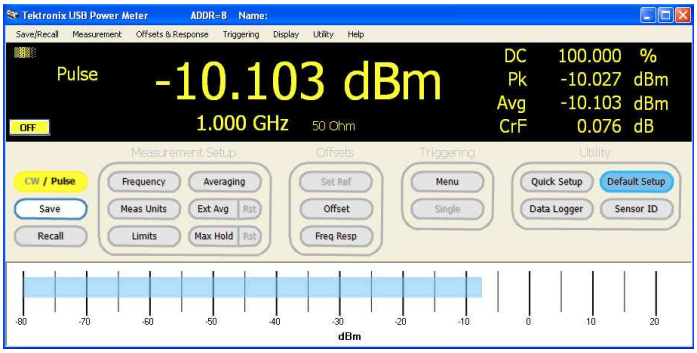

Figure 1 – Software presents familiar controls and measurement presentation.

For custom test applications, you can communicate with the sensors using LabVIEW, or using a fully documented API. Example programs are provided for the most commonly used development environments. The communications library allows your program to communicate with up to 12 sensors, eliminating the need for costly switches.

Tektronix real-time signal analyzers, arbitrary waveform generators, and oscilloscopes that use the Windows operating system can also be used to control the PSM Series sensor/meter and give you quick access to accurate power measurements.

To allow synchronization with other measurement equipment all models include Trigger In and Trigger Out TTL signals.

High-speed measurements, extensive programming tools, and synchronization features make these sensors versatile additions to your test setup.

Industry-leading Performance for Demanding Designs

Tektronix power sensors/meters come fully calibrated over their entire operating temperature range. Sensor zeroing and meter reference calibration have been eliminated, reducing setup time and helping to avoid inaccurate results. These meters provide accuracy you can count on for general-purpose CW, peak, pulse, and other modulated power measurements. Whether doing installation or maintenance on a wireless base station, production testing, or R&D for wireless components, the PSM Series products serve these needs with a wide dynamic range (–60 dBM to +20 dBm) and frequencies ranging from 10 MHz up to 26.5 GHz.

Select the Performance/Features to Meet Your Needs

PSM3000 Series power sensors/meters provide true average power measurements, giving accurate power measurements independent of signal modulation and bandwidth. The PSM4000 Series delivers average power (CW) measurements, and adds pulse and peak power measurements for gathering basic data on pulsed RF and microwave signals. PSM5000 Series power sensors/meters provide the same measurements as the PSM4000, and add pulse profiling capability for signal viewing and characterization in pulsed RF and microwave systems.

Feature	PSM3000 Series	PSM4000 Series	PSM5000 Series
Frequency Range	10 MHz to 26.5 GHz	10 MHz to 20 GHz	50 MHz to 20 GHz
Dynamic Range	–55 dBM to +20 dBm	–60 dBm to +20 dBM	–60 dBm to +20 dBm
Measurement Speed	2000 readings/s	2000 readings/s	2000 readings/s
Measurements			
True Average Power	X		
Average (CW) Power		X	X
Duty Cycle Corrected Pulse Power	X	X	X
Peak Power, Pulse Power, Duty Cycle		X	X
Peak and Average Burst Power		X	X
Measurement Logging	X	X	X
Pulse Width, Rise/Fall, Overshoot, Droop			X
Time Gated Measurements			X
Pulse Waveform Display with Markers			X

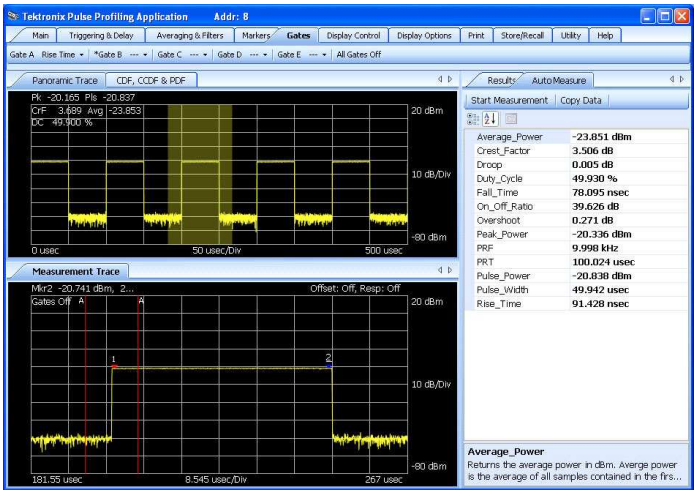

Figure 2 – Pulse profiling software enables a thorough analysis of pulse characteristics.

A Broad Range of Pulse Envelope Measurements

Tektronix PSM5000 Series products feature an easy-to-use, high performance, pulse profiling, pulse (modulation), and CW power meter and sensor in one. The PSM5000 Series product is specifically designed for applications requiring time domain analysis of constant-envelope, repetitive pulsed signals. It performs time domain pulse measurements such as rise/fall time, overshoot, and droop that have typically required costly signal analyzers. PSM5000 Series sensors use an equivalent time-sampling technique to reconstruct repetitive, pulsed input signals. Repetitive pulses with video bandwidths up to 10 MHz can be measured with an effective sample rate of up to 48 MS/s.

Performance You Can Count On

In addition to industry-leading service and support, every PSM Series power sensor/meter comes backed with a three-year standard warranty.

Specifications

Electrical Specifications

All specifications apply over the full instrument operating temperature range unless otherwise noted, after a 20 minute warm-up interval.

PSM3000 Series USB Power Meters (True Average)

Characteristic	PSM3110	PSM3120	PSM3310	PSM3320	PSM3510
Input Connector	3.5 mm, male	N-type, male	3.5 mm, male	N-type, male	3.5 mm, male
Frequency Range	10 MHz to 8 GHz		10 MHz to 18 GHz		10 MHz to 26.5 GHz
Dynamic Range	–55 dBm to +20 dBm				
Video Bandwidth	100 Hz, typical				
Total Accuracy*1	Total Uncertainty = $2 \times \sqrt{[(CF/2)^2 + (L/2)^2 + (N/2)^2 + (Z/\sqrt{2})^2 + (Mm/\sqrt{2})^2 + (T/\sqrt{2})^2]}$				
Calibration Factor Uncertainty (CF)	10 MHz to 1 GHz: 2.5% 1 GHz to 8 GHz: 2.4%	10 MHz to 1 GHz: 1.8% 1 GHz to 8 GHz: 1.7%	10 MHz to 1 GHz: 2.5% 1 GHz to 10 GHz: 2.4% 10 GHz to 18 GHz: 2.7%	10 MHz to 1 GHz: 1.8% 1 GHz to 10 GHz: 1.7% 10 GHz to 18 GHz: 1.9%	10 MHz to 1 GHz: 2.5% 1 GHz to 10 GHz: 2.4% 10 GHz to 18 GHz: 2.7% 18 GHz to 26.5 GHz: 3.7%
Linearity Uncertainty (L)	+15 dBm to +20 dBm: 3.0% –15 dBm to +15 dBm: 2.5% –55 dBm to –15 dBm: 2.0%				
Noise Uncertainty (N)	5 second integration +10 dBm to +20 dBm: 0.10% –15 dBm to +10 dBm: 0.25% –30 dBm to –15 dBm: 0.10% –40 dBm to –30 dBm: 0.25% –50 dBm to –40 dBm: 1.50% –55 dBm to –50 dBm: 4.50%				
Zero Offset Power*2 (Z)	[(3.0 nW at 25 °C) + |ΔT| × (0.15 nW / °C)] + 0.01 nW / month				
Match*3	1.20:1 VSWR (21 dB Return Loss)		10 MHz to 10 GHz: 1.20:1 VSWR (21 dB Return Loss) 10 GHz to 18 GHz: 1.29:1 VSWR (18 dB Return Loss)		10 MHz to 10 GHz: 1.20:1 VSWR (21 dB Return Loss) 10 GHz to 26.5 GHz: 1.29:1 VSWR (18 dB Return Loss)
Temperature Uncertainty (T)	40 °C < T ≤ 50 °C: 2.00% 30 °C < T ≤ 40 °C: 0.75% 20 °C < T ≤ 30 °C: 0.00% 10 °C < T ≤ 20 °C: 0.75% 0 °C < T ≤ 10 °C: 2.00%				

*1 Total uncertainty includes contributions from Calibration Factor Uncertainty (CF), Linearity Uncertainty (L), Noise Uncertainty (N), Zero Offset Uncertainty (Z), Mismatch Uncertainty, and Temperature Uncertainty (T). All error terms must be converted to percentages for Total Uncertainty (RSS) calculation. Mismatch Uncertainty (Mm) requires knowledge of source match and should be expressed as a percentage using the equation $Mm = 100 \times [(1 \pm \Gamma_{source} \times \Gamma_{sensor})^2 - 1]$.

*2 Use the following formula to determine Zero Offset Uncertainty as a percentage: Z = (Zero Offset Power / Nominal Power) × 100.

*3 Nominal impedance = 50 Ω.

PSM4000 Series USB Power Meters (Average/Peak/Pulse)

Characteristic	PSM4110	PSM4120	PSM4320	PSM4410
Input Connector	3.5 mm, male	N-type, male	N-type, male	3.5 mm, male
Frequency Range	10 MHz to 8 GHz	10 MHz to 8 GHz	50 MHz to 18.6 GHz	50 MHz to 20 GHz
Dynamic Range	10 MHz to 6 GHz: –60 dBm to +20 dBm 6 GHz to 8 GHz: –50 dBm to +20 dBm		–40 dBm to +20 dBm	
Maximum Peak-to-Average Ratio	10 MHz to 6 GHz: 80 dB 6 GHz to 8 GHz: 70 dB		55 dB	
Internal Video Bandwidth	10 MHz, typical			
Timebase	±50 ppm, typical			
Sample Rate	500 kS/s			
Average Power, Minimum Pulse Width	500 ns, typical			
Peak Power, Minimum Pulse Width	200 ns, typical			
Total Accuracy*[1]	Total Uncertainty = $2 \times \sqrt{[(CF/2)^2 + (L/2)^2 + (N/2)^2 + (Z/\sqrt{2})^2 + (Mm/\sqrt{2})^2 + (T/\sqrt{2})^2]}$			
Calibration Factor Uncertainty (CF)	10 MHz to 100 MHz: 7.0% 100 MHz to 500 MHz: 4.0% 500 MHz to 8 GHz: 2.5%	10 MHz to 100 MHz: 7.0% 100 MHz to 500 MHz: 4.0% 500 MHz to 8 GHz: 1.7%	50 MHz to 500 MHz: 4.0% 500 MHz to 10 GHz: 1.7% 10 GHz to 18.6 GHz: 1.9%	50 MHz to 500 MHz: 4.0% 500 MHz to 12.5 GHz: 2.6% 12.5 GHz to 18 GHz: 3.2% 18 GHz to 20 GHz: 3.5%
Linearity Uncertainty (L)	10 MHz to 100 MHz +15 dBm to +20 dBm: 7.0% +10 dBm to +15 dBm: 5.0% –60 dBm to +10 dBm: 4.0% 100 MHz to 2 GHz +15 dBm to +20 dBm: 7.0% +10 dBm to +15 dBm: 5.0% –60 dBm to +10 dBm: 3.0% 2 GHz to 8 GHz +15 dBm to +20 dBm: 5.0% +10 dBm to +15 dBm: 3.0% –60 dBm to +10 dBm: 2.0%		50 MHz to 100 MHz +15 dBm to +20 dBm: 7.0% –40 dBm to +15 dBm: 5.0% 100 MHz to 2 GHz +15 dBm to +20 dBm: 7.0% +5 dBm to +15 dBm: 5.0% –40 dBm to +5 dBm: 3.0% 2 GHz to 20 GHz +15 dBm to +20 dBm: 6.0% +5 dBm to +15 dBm: 4.0% –40 dBm to +5 dBm: 2.0%	
Noise Uncertainty (N)	1 second integration +10 dBm to +20 dBm: 0.22% (10 MHz to 100 MHz) 0.15% (100 MHz to 8 GHz) –30 dBm to +10 dBm: 0.22% (10 MHz to 100 MHz) 0.04% (100 MHz to 8 GHz) –50 dBm to –30 dBm: 0.22% (10 MHz to 100 MHz) 0.04% (100 MHz to 6 GHz) 0.15% (6 GHz to 8 GHz) –60 dBm to –50 dBm: 0.44% (10 MHz to 100 MHz) 0.15% (100 MHz to 6 GHz)		5 second integration +10 dBm to +20 dBm: 1.5% (50 MHz to 20 GHz) –20 dBm to +10 dBm: 1.0% (50 MHz to 20 GHz) –30 dBm to –20 dBm: 1.5% (50 MHz to 20 GHz) –40 dBm to –30 dBm: 7.0% (50 MHz to 18.6 GHz)	
Zero Offset Power*[2] (Z)	[(0.35 nW at 25 °C) + |ΔT| × (0.025 nW / °C)] + 0.005 nW / month		50 MHz to 500 MHz [(200 nW at 25 °C) + |ΔT| × (10 nW / °C)] + 10 nW / month 500 MHz to 20 GHz [(100 nW at 25 °C) + |ΔT| × (5 nW / °C)] + 5 nW / month	
Match*[3]	1.09:1 VSWR (27 dB Return Loss)	1.15:1 VSWR (23 dB Return Loss)	50 MHz to 10 GHz: 1.20:1 VSWR (21 dB Return Loss) 10 GHz to 18.6 GHz: 1.29:1 VSWR (18 dB Return Loss)	50 MHz to 10 GHz: 1.20:1 VSWR (21 dB Return Loss) 10 GHz to 20 GHz: 1.29:1 VSWR (18 dB Return Loss)

Characteristic	PSM4110	PSM4120	PSM4320	PSM4410
Temperature Uncertainty (T)	40 °C < T ≤ 50 °C: 1.00% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm) 30 °C < T ≤ 40 °C: 0.75% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm) 20 °C < T ≤ 30 °C: 0.00% 10 °C < T ≤ 20 °C: 0.75% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm) 0 °C < T ≤ 10 °C: 1.00% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm)		40 °C < T ≤ 50 °C: 6.00% 30 °C < T ≤ 40 °C: 3.00% 20 °C < T ≤ 30 °C: 0.00% 10 °C < T ≤ 20 °C: 3.00% 0 °C < T ≤ 10 °C: 6.00%	

*1 Total uncertainty includes contributions from Calibration Factor Uncertainty (CF), Linearity Uncertainty (L), Noise Uncertainty (N), Zero Offset Uncertainty (Z), Mismatch Uncertainty, and Temperature Uncertainty (T). All error terms must be converted to percentages for Total Uncertainty (RSS) calculation. Mismatch Uncertainty (Mm) requires knowledge of source match and should be expressed as a percentage using the equation $Mm = 100 \times [(1 \pm \Gamma_{source} \times \Gamma_{sensor})^2 - 1]$.

*2 Use the following formula to determine Zero Offset Uncertainty as a percentage: Z = (Zero Offset Power / Nominal Power) × 100.

*3 Nominal impedance = 50 Ω.

PSM5000 Series USB Power Meters (Average/Peak/Pulse + Profiling)

Characteristic	PSM5110	PSM5120	PSM5320	PSM5410
Input Connector	3.5 mm, male	N-type, male	N-type, male	3.5 mm, male
Frequency Range	100 MHz to 8 GHz		50 MHz to 18.6 GHz	50 MHz to 20 GHz
Dynamic Range	100 MHz to 6 GHz: –60 dBm to +20 dBm 6 GHz to 8 GHz: –50 dBm to +20 dBm		–40 dBm to +20 dBm	
Maximum Peak-to-Average Ratio	100 MHz to 6 GHz: 80 dB 6 GHz to 8 GHz: 70 dB		55 dB	
Internal Video Bandwidth	10 MHz, typical			
Timebase	±50 ppm, typical			
Real-time Sample Rate	500 kS/s			
Average Power, Minimum Pulse Width	500 ns, typical			
Peak Power, Minimum Pulse Width	200 ns, typical			
Pulse Profiling, Maximum Equivalent-time Sample Rate*4	48 MS/s			
Pulse Profiling, Minimum Rise Time, 10% to 90%	54 ns (–70 dBm to –20 dBm pulse, 4 GHz)			
Pulse Profiling, Minimum Fall Time, 90% to 10%	44 ns (–70 dBm to –20 dBm pulse, 4 GHz)			
Pulse Profiling, Manual Trigger Level Accuracy	±1 dBm			
Pulse Profiling, Minimum Number of Cycles	2 cycles			
Pulse Profiling, Video Filters	100 kHz, 200 kHz, 300 kHz, 500 kHz, 1 MHz, 2 MHz, 3 MHz, 5 MHz, 10 MHz			
Total Accuracy*1	Total Uncertainty = $2 \times \sqrt{[\ (CF/2)^2 + (L/2)^2 + (N/2)^2 + (Z/\sqrt{2})^2 + (Mm/\sqrt{2})^2 + (T/\sqrt{2})^2\ ]}$			
Calibration Factor Uncertainty (CF)	100 MHz to 500 MHz: 4.0% 500 MHz to 8 GHz: 2.5%	100 MHz to 500 MHz: 4.0% 500 MHz to 8 GHz: 1.7%	50 MHz to 500 MHz: 4.0% 500 MHz to 10 GHz: 1.7% 10 GHz to 18.6 GHz: 1.9%	50 MHz to 500 MHz: 4.0% 500 MHz to 12.5 GHz: 2.6% 12.5 GHz to 18 GHz: 3.2% 18 GHz to 20 GHz: 3.5%
Linearity Uncertainty (L)	100 MHz to 2 GHz +15 dBm to +20 dBm: 7.0% +5 dBm to +15 dBm: 5.0% –60 dBm to +5 dBm: 3.0% 2 GHz to 8 GHz +15 dBm to +20 dBm: 5.0% +5 dBm to +15 dBm: 3.0% –60 dBm to +5 dBm: 2.0%		50 MHz to 100 MHz +15 dBm to +20 dBm: 7.0% –40 dBm to +15 dBm: 5.0% 100 MHz to 2 GHz +15 dBm to +20 dBm: 7.0% +5 dBm to +15 dBm: 5.0% –40 dBm to +5 dBm: 3.0% 2 GHz to 20 GHz +15 dBm to +20 dBm: 6.0% +5 dBm to +15 dBm: 4.0% –40 dBm to +5 dBm: 2.0%	

Characteristic	PSM5110	PSM5120	PSM5320	PSM5410
Noise Uncertainty (N)	1 second integration +10 dBm to +20 dBm: 0.15% (100 MHz to 8 GHz) –30 dBm to +10 dBm: 0.04% (100 MHz to 8 GHz) –50 dBm to –30 dBm: 0.04% (100 MHz to 6 GHz) 0.15% (6 GHz to 8 GHz) –60 dBm to –50 dBm: 0.15% (100 MHz to 6 GHz)		5 second integration +10 dBm to +20 dBm: 1.5% (50 MHz to 20 GHz) –20 dBm to +10 dBm: 1.0% (50 MHz to 20 GHz) –30 dBm to –20 dBm: 1.5% (50 MHz to 20 GHz) –40 dBm to –30 dBm: 7.0% (50 MHz to 18.6 GHz)	
Zero Offset Power*2 (Z)	[(0.35 nW at 25 °C) + |ΔT| × (0.025 nW / °C)] + 0.005 nW / month		50 MHz to 500 MHz [(200 nW at 25 °C) + |ΔT| × (10 nW / °C)] + 10 nW / month 500 MHz to 20 GHz [(100 nW at 25 °C) + |ΔT| × (5 nW / °C)] + 5 nW / month	
Match*3	100 MHz to 250 MHz: 1.18:1 VSWR (21.7 dB Return Loss) 250 MHz to 8 GHz: 1.09:1 VSWR (23 dB Return Loss)	100 MHz to 250 MHz: 1.18:1 VSWR (21.7 dB Return Loss) 250 MHz to 8 GHz: 1.15:1 VSWR (27 dB Return Loss)	50 MHz to 10 GHz: 1.20:1 VSWR (21 dB Return Loss) 10 GHz to 18.6 GHz: 1.29:1 VSWR (18 dB Return Loss)	50 MHz to 10 GHz: 1.20:1 VSWR (21 dB Return Loss) 10 GHz to 20 GHz: 1.29:1 VSWR (18 dB Return Loss)
Temperature Uncertainty (T)	40 °C < T ≤ 50 °C: 1.00% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm) 30 °C < T ≤ 40 °C: 0.75% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm) 20 °C < T ≤ 30 °C: 0.00% 10 °C < T ≤ 20 °C: 0.75% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm) 0 °C < T ≤ 10 °C: 1.00% (plus 1%, 0 dBm to 10 dBm; plus 3%, 10 dBm to 20 dBm)		40 °C < T ≤ 50 °C: 6.00% 30 °C < T ≤ 40 °C: 3.00% 20 °C < T ≤ 30 °C: 0.00% 10 °C < T ≤ 20 °C: 3.00% 0 °C < T ≤ 10 °C: 6.00%	

*1 Total uncertainty includes contributions from Calibration Factor Uncertainty (CF), Linearity Uncertainty (L), Noise Uncertainty (N), Zero Offset Uncertainty (Z), Mismatch Uncertainty, and Temperature Uncertainty (T). All error terms must be converted to percentages for Total Uncertainty (RSS) calculation. Mismatch Uncertainty (Mm) requires knowledge of source match and should be expressed as a percentage using the equation $Mm = 100 \times [(1 \pm \Gamma_{source} \times \Gamma_{sensor})^2 - 1]$.

*2 Use the following formula to determine Zero Offset Uncertainty as a percentage: Z = (Zero Offset Power / Nominal Power) × 100.

*3 Nominal impedance = 50 Ω.

*4 Equivalent-time Sampling requires repetitive pulses for accurate results.

General Specifications

Characteristic	Description
Maximum Average Power	+20 dBm (100 mW) Damage Level: +23 dBm (200 mW)
Maximum Pulse Power	+20 dBm (100 mW) Damage Level: +23 dBm (200 mW)
Measurement Rate	2000/s (100 settled measurements per second typical)
Trigger In / Trigger Out	TTL compatible Damage Level: 5.5 V max, –0.5 V min Rate: 1 Hz to 750 kHz, typical
USB Interface	USB Version: 2.0 Full speed (11 Mb/s)

System Requirements for Meter and High Speed Logger Software

Characteristic	Description
Typical Host Specifications	- 2 GB RAM - USB 2.0 Port
Operating System	- Windows XP, Service Pack 3 - Windows Vista - Windows 7 (32-bit, 64-bit, or XP mode)

Environmental

Characteristic	Description
Temperature	
Operating	0 °C to +55 °C
Nonoperating	–25 °C to +85 °C
Humidity	
Operating	15% to 95% RH (Relative Humidity) at up to +30 °C 15% to 45% RH above +30 °C up to +55 °C; noncondensing
Nonoperating	15% to 95% RH at up to +30 °C 15% to 45% RH above +30 °C up to +85 °C; noncondensing
Altitude	
Operating	3,000 m (10,000 ft.)
Nonoperating	15,000 m (50,000 ft.)
Electromagnetic Compatibility	EMC Directive 2004/108/EC, EN 61326-2-1: 2006, CE

Physical Characteristics

Dimension	Description
PSM3110, PSM3120, PSM3310, PSM3320, PSM3510, PSM4320, PSM4410, PSM5320, PSM5410	
Diameter	48 mm (1.9 in.)
Length	74 mm (2.9 in.), plus connector
PSM4110, PSM4120, PSM5110, PSM5120	
Diameter	48 mm (1.9 in.)
Length	62 mm (2.4 in.), plus connector
Weight	
PSM3110 PSM3310 PSM3510	164 g (5.78 oz.)
PSM3120 PSM3320	203 g (7.16 oz.)
PSM4110 PSM5110	110 g (3.88 oz.)
PSM4120 PSM5120	149 g (5.26 oz.)
PSM4320 PSM5320	163 g (5.75 oz.)
PSM4410 PSM5410	124 g (4.37 oz.)

Warranty and Calibration

Characteristic	Description
Warranty	3 years
Recommended Calibration Interval	1 year

Ordering Information

Models

Model	Description
PSM3110	USB Power Sensor/Meter, 10 MHz to 8 GHz, True Average, 3.5 mm male
PSM3120	USB Power Sensor/Meter, 10 MHz to 8 GHz, True Average, N-male
PSM3310	USB Power Sensor/Meter, 10 MHz to 18 GHz, True Average, 3.5 mm male
PSM3320	USB Power Sensor/Meter, 10 MHz to 18 GHz, True Average, N-male
PSM3510	USB Power Sensor/Meter, 10 MHz to 26.5 GHz, True Average, 3.5 mm male
PSM4110	USB Power Sensor/Meter, 10 MHz to 8 GHz, Peak and Pulse, 3.5 mm male
PSM4120	USB Power Sensor/Meter, 10 MHz to 8 GHz, Peak and Pulse, N-male
PSM4320	USB Power Sensor/Meter, 50 MHz to 18 GHz, Peak and Pulse, N-male
PSM4410	USB Power Sensor/Meter, 50 MHz to 20 GHz, Peak and Pulse, 3.5 mm male
PSM5110	USB Power Sensor/Meter, 100 MHz to 8 GHz, Pulse Profiling, 3.5 mm male
PSM5120	USB Power Sensor/Meter, 100 MHz to 8 GHz, Pulse Profiling, N-male
PSM5320	USB Power Sensor/Meter, 50 MHz to 18 GHz, Pulse Profiling, N-male
PSM5410	USB Power Sensor/Meter, 50 MHz to 20 GHz, Pulse Profiling, 3.5 mm male

Includes: USB Power Sensor/Meter, certificate of traceable calibration, calibration data report, 2-meter USB cable, Installation and Safety Manual, USB flash drive. (The flash drive includes user manuals in English, French, German, Italian, Japanese, Korean, Portuguese, Russian, Simplified Chinese, Spanish, Traditional Chinese, and a Technical Reference Manual and Programmer Manual in English.)

Service Options

Option	Description
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R5	Repair Service 5 Years

Recommended Accessories

Accessory	Description
174-6150-00	USB Cable, 2 m, 20 AWG
174-6164-00	SMB Female to BNC Male, 1 m Trigger Cable
348-2013-00	Replacement rubber boot

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900

Austria 00800 2255 4835*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777

Belgium 00800 2255 4835*

Brazil +55 (11) 3759 7627

Canada 1 800 833 9200

Central East Europe and the Baltics +41 52 675 3777

Central Europe & Greece +41 52 675 3777

Denmark +45 80 88 1401

Finland +41 52 675 3777

France 00800 2255 4835*

Germany 00800 2255 4835*

Hong Kong 400 820 5835

India 000 800 650 1835

Italy 00800 2255 4835*

Japan 81 (3) 6714 3010

Luxembourg +41 52 675 3777

Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90

Middle East, Asia, and North Africa +41 52 675 3777

The Netherlands 00800 2255 4835*

Norway 800 16098

People's Republic of China 400 820 5835

Poland +41 52 675 3777

Portugal 80 08 12370

Republic of Korea 001 800 8255 2835

Russia & CIS +7 (495) 7484900

South Africa +41 52 675 3777

Spain 00800 2255 4835*

Sweden 00800 2255 4835*

Switzerland 00800 2255 4835*

Taiwan 886 (2) 2722 9622

United Kingdom & Ireland 00800 2255 4835*

USA 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

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