

True RMS

USB Smart Power Sensor

PWR-4RMS

50Ω -35 dBm to +20 dBm, 50 to 4000 MHz

The Big Deal

- True RMS power sensor
(Measure CW and modulated signals)
- USB HID device compatible with
32/64 Bit operating systems
- Includes “Measurement Application” GUI
(Graphical User Interface) software with an
API-DLL com object
- High speed measurement capability



CASE STYLE: JL1504



Product Overview

The Mini-Circuits PWR-4RMS true RMS Smart Power Sensor is a pocket-sized, 4.89” x 1.74” x 0.95”, precision test USB HID device (no driver installation required) that turns a Windows® or Linux® PC into a true RMS power meter. The power sensor provides highly accurate measurements of CW, modulated and multi tone signals providing plug-and-play measurement capability for a wide variety of applications including testing 3G and 4G products, cell phones and general RF components. Each power sensor is shipped with our N-to-SMA adapter and a quick-locking USB cable for reliable connectivity. Native software and detailed user guides are provided on the included CD, or can be downloaded from minicircuits.com anywhere an internet connection is available, providing a full range of data analysis options.

Key Features

Feature	Advantages
True RMS	Allows measurement of CW, modulated and multi tone signals
USB HID (Human Interface Device)	Plug-and-Play (no need to install driver for the device).
GUI Measurement Application Software built-in	Enables the user to perform measurements on RF components such as Couplers, Filters, Amplifiers etc. and displays numerical data and graphs .
32/64 Bit operating systems	Compatible with Windows® and Linux® operating systems.
No calibration required before taking measurement	The PWR-4RMS does not require any reference signal for calibration.
Low current consumption (105mA)	Preserves Laptop battery when operating in the field and allows operating multiple units with no need for an active USB hub.



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50Ω 50 to 4000 MHz

Product Features

- True RMS detection enables measuring CW, modulated and multi-tone signals.
- 55 dB Dynamic Range, -35 to +20 dBm
- Good VSWR, 1.05:1 typ.
- Fast measurement speed, 30 msec typ.
- Automatic frequency calibration & temperature compensation
- Multi-sensor capability (up to 24)
- Built in Application Measurement Software
- Remote operation via internet
- Effective, easy-to-use Windows® GUI
- Compatible with 32/64-bit Windows® or Linux® operating systems
- ActiveX com object and .Net class library for use with other software: C++, C#, CVI®, Delphi®, LabVIEW® 8 or newer, MATLAB® 7 or newer, Python, Agilent VEE®, Visual Basic®, Visual Studio® 6 or newer, and more¹



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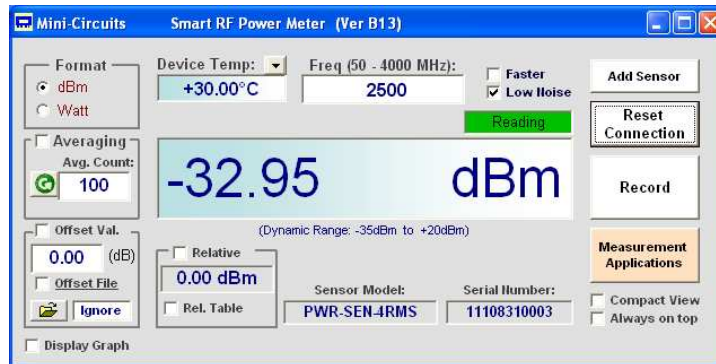
Model No.	Description	Price	Qty.
PWR-4RMS	USB smart Power Sensor	\$1169.00 ea.	(1-4)
Included Accessories			
PWR-SEN-4RMS	Power Sensor Head		
USB-CBL+	6 ft data cable (USB TYPe-A Plug)		1
NF-SM50+	N-Type (F) to SMA(M) Adapter		1
PWR-SEN-CD	Installation CD		1

Typical Applications

- Turn almost any Windows or Linux PC into a Power Meter
- Pocket-sized portability for benchtop testing anywhere
- Remote location monitoring
- Automatic, scheduled data collection
- Evaluate high-power, multi-port devices with built-in virtual couplers/attenuators & other software tools
- Wide variety of applications including testing 3G and 4G products

RoHS Compliant
See our web site for RoHS Compliance methodologies and qualifications

Mini-Circuits Power Meter Program for Smart USB Power Sensor



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Electrical Specifications, -35 dBm to +20 dBm, 50 to 4000 MHz

Parameter		Freq. Range (MHz)	Min.	Typ.	Max.	Units
Dynamic Range		50 - 4000	-35	-	+20	dBm
VSWR		50 - 4000	-	1.05	1.35	:1
Uncertainty of Power Measurement ² @ 25°C	@ -35 to +5 dBm	50 - 1500	-	± 0.05	± 0.30	dB
		1500 - 4000	-	± 0.05	± 0.35	dB
	@ +5 to +12 dBm	50 - 1500	-	± 0.05	± 0.30	dB
		1500 - 4000	-	± 0.05	± 0.35	dB
	@ +12 to +20 dBm	50 - 1500	-	± 0.05	± 0.30	dB
		1500 - 4000	-	± 0.10	± 0.35	dB
Uncertainty of Power Measurement ² @ 0°C to 50°C	@ -35 to +5 dBm	50 - 1500	-	± 0.10	-	dB
		1500 - 4000	-	± 0.10	-	dB
	@ +5 to +12 dBm	50 - 1500	-	± 0.10	-	dB
		1500 - 4000	-	± 0.10	-	dB
	@ +12 to +20 dBm	50 - 1500	-	± 0.10	-	dB
		1500 - 4000	-	± 0.15	-	dB
Linearity @ 25°C		50 - 4000	-	± 1.5	-	%
Measurement Resolution		50 - 4000	0.01	-	-	dB
Averaging Range		50 - 4000	1	-	999	-
Measurement Speed	@ Low Noise Mode	50 - 4000	-	100	-	mSec
	@ Faster Mode		-	30	-	
Current (via host USB)		50 - 4000	-	105	140	mA

Note 2: Tested with CW signal

Electrical Specifications(Continued), -35 dBm to +20 dBm, 50 to 4000 MHz

Parameter		Freq. Range (MHz)	Min.	Typ.	Max.	Units	
Uncertainty of Power Measurement (digital modulation) ⁴ @ 25°C	QPSK in LTE Downlink setup ³	@ -30dBm	-	±0.10	±0.35	dB	
		@ 0dBm	-	±0.10	±0.35		
		@ +10dBm	-	±0.10	±0.35		
	QPSK in LTE Uplink setup ³	@ -30dBm	50 - 4000	-	±0.10	±0.25	dB
		@ 0dBm	-	±0.05	±0.25		
		@ +10dBm	-	±0.05	±0.30		
	MSK in GSM setup (Gaussian filter @270,833 sps)	@ -30dBm	50 - 4000	-	±0.10	±0.25	dB
		@ 0dBm	-	±0.05	±0.25		
		@ +10dBm	-	±0.05	±0.30		
	DQPSK in NADC setup (RNYQ filter@24.3 ksps)	@ -30dBm	50 - 4000	-	±0.10	±0.30	dB
		@ 0dBm	-	±0.05	±0.25		
		@ +10dBm	-	±0.05	±0.25		
	DQPSK in PWT setup (RNYQ filter@576 ksps)	@ -30dBm	50 - 4000	-	±0.10	±0.30	dB
		@ 0dBm	-	±0.05	±0.25		
		@ +10dBm	-	±0.05	±0.30		
	256QAM in DECT setup (Gaussian filter@1.152Msps)	@ -30dBm	50 - 4000	-	±0.10	±0.35	dB
		@ 0dBm	-	±0.05	±0.25		
		@ +10dBm	-	±0.05	±0.30		
	4QAM in PHS setup (RNYQ filter@192ksps)	@ -30dBm	50 - 4000	-	±0.10	±0.30	dB
		@ 0dBm	-	±0.05	±0.25		
		@ +10dBm	-	±0.05	±0.25		
Effect of multi-tone signals (within span of 15 MHz) ^{5,6}		50 - 100	-	±0.3	-	dB	
Effect of multi-tone signals (within span of 50 MHz) ^{5,6}		100 - 4000	-	-	±0.1	dB	

Note 3: Advanced LTE (2010-06) Freq. domain QPSK with 25 Resource Blocks (BW 5MHz)

Note 4: Digital modulation transmission rates are measured in 'symbols per second' (sps) and use a bandpass filter on the output to limit spectral spreading.

Note 5: Relative to an equivalent CW signal @+25°C

Note 6: Tested at -30 to 0 dBm @+25°C



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Minimum System Requirements

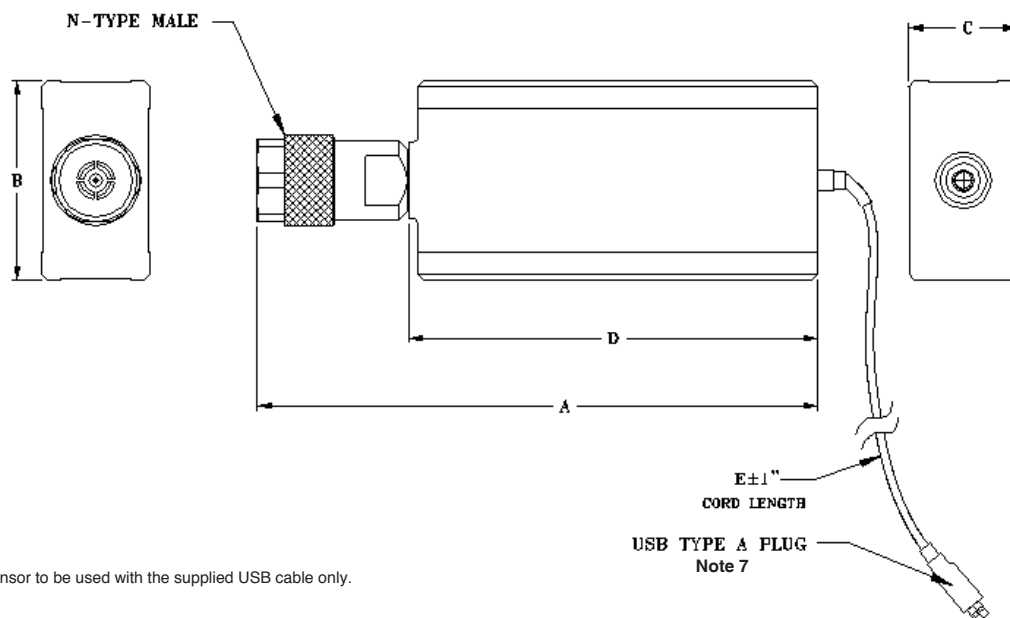
Parameter	Requirements
Interface	USB HID
Host operating system	32 Bit operating system: Windows 98®, Windows XP®, Windows Vista®, Windows 7® 64 Bit operating system: Windows Vista®, Windows 7® Linux® support: 32/64 Bit operating system
Hardware	Pentium® II or higher, RAM 256 Mb, USB port
USB cable (supplied)	Power sensor to be used with the supplied USB cable only

Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature	0°C to 50°C
Storage Temperature	-30°C to 70°C
DC Voltage at RF port	4 V
CW Power	+25 dBm

Permanent damage may occur if any of these limits are exceeded.

Outline Drawing (JL1504)

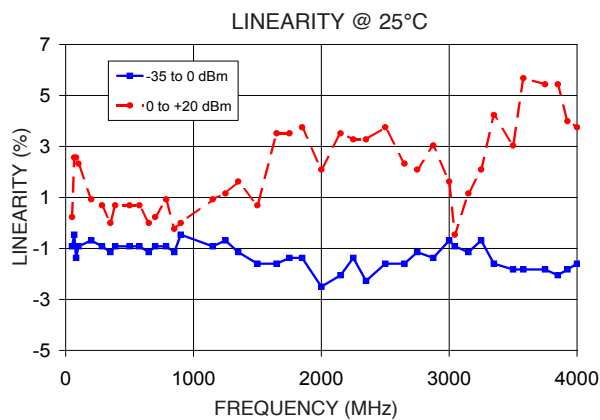
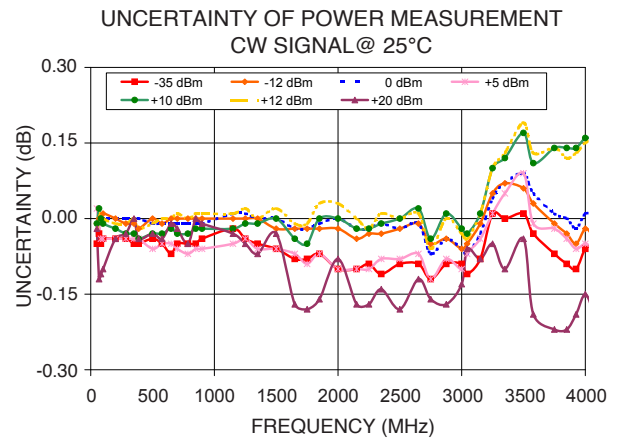
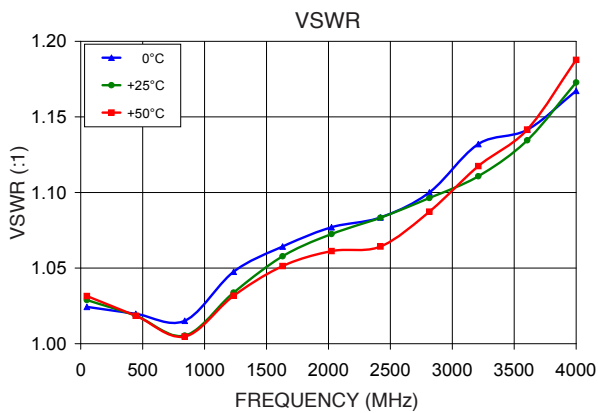


Note 7: Power sensor to be used with the supplied USB cable only.

Outline Dimensions (inch mm)

A	B	C	D	E	WT. GRAMS
4.89	1.74	.95	3.50	72.0	250
124.2	44.2	24.1	88.9	1829	

Typical Performance Curves

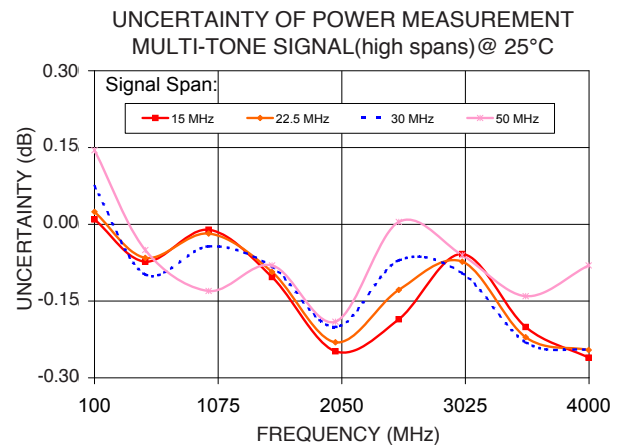
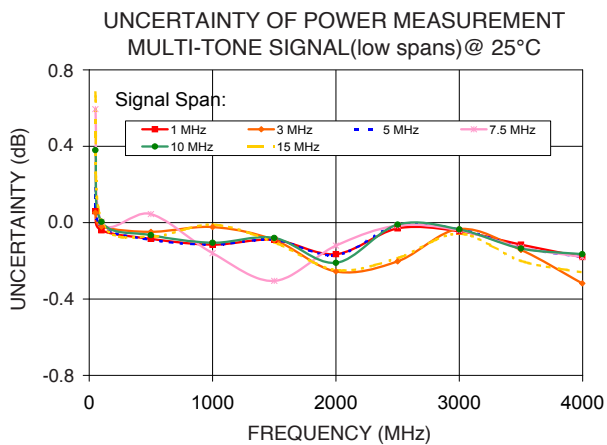
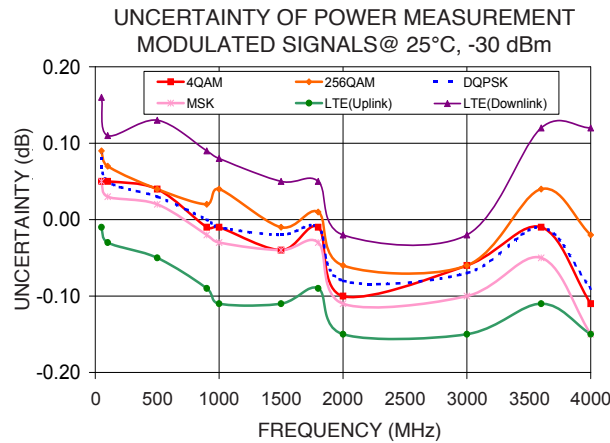
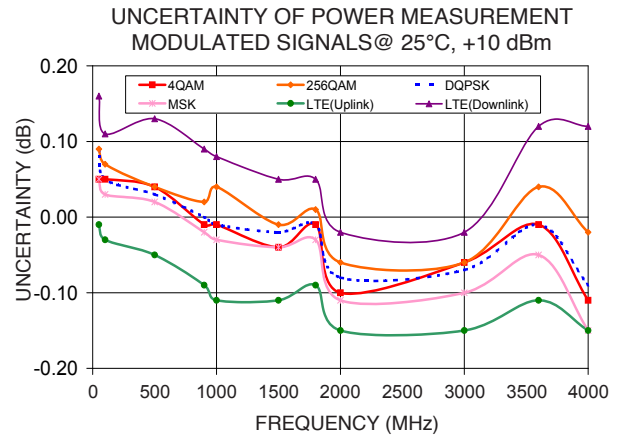
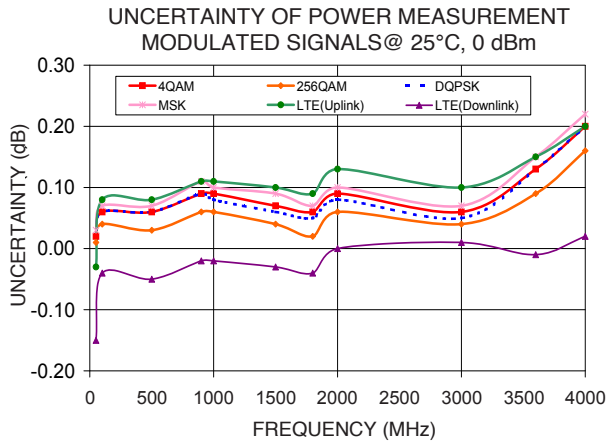


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Typical Performance Curves (Continued)



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Ordering, Pricing & Availability Information see our web site

Model	Description
PWR-4RMS	USB <i>Smart</i> Power Sensor

Included Accessories	Description
PWR-SEN-4RMS	Power Sensor Head
USB-CBL+ ⁸	6 ft data cable with USB Type-A plug connector
NF-SM50+	N-Type Female to SMA Male Adapter.
PWR-SEN-CD	Installation CD

Note 8: Power sensor to be used with the supplied USB cable only.

Calibration

Model	Description
CALSEN-4RMS	Calibration Service



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