

# POWER SENSORS

## Statistical Power Sensor

±3% ACCURACY

# 7022 SERIES



## Statistical Sampling for Precise RF Measurement

The Bird line of Statistical Power Sensors take measurement beyond signal average power for complex wireless systems. Because this measurement is no longer a sufficient control variable, the 7022 Series power sensors measure the percentage of time the signal exists at a specific peak-to-average ratio. In the time domain mode, the sensor adds a variety of functions similar to an oscilloscope to our standard suite of measurements.

The statistical power sensor is flexible enough to be used in all known communication formats and is able to accurately provide a wide range of RF measurements for non-periodic signals such as EVDO, UMTS, LTE, and HDTV. Calibration is traceable to NIST standards and no field calibration is required.

### PRODUCT FEATURES

- Provides Forward and Reflected Power, Peak/ Pulse Power, Time Domain and Statistical Measurements
- Three operating modes: Conventional, Time Domain and Statistical
- Analytical results of Signal of Interest using CCDF parameters
- Detailed breakdown of a single or multiple pulses
- Isolate and identify specific breakpoints with the use of markers
- Includes a wide range of IEEE pulse parameters

### APPLICATIONS

- Analog Cellular, Digital Cellular, 3G, 4G, Tetra, APCO/ P25 Phase 1 & 2, DMR, MOTOTRBO, Tunking, CDMA, TDMA, WCDMA, GSM, Transportation, Tactical Military, Radar, Avionics, Marine, LMR, Analog Broadcast, Digital Broadcast, GSM, GPRS, EDGE, UMTS, HSDPA, Bluetooth, Fire, GPS, NPSPAC, Paging, Public Safety, Telematics, Utilities, WIMAX, WLAN, EVDO, UMTS, LTE, and HDT

## MEASUREMENT

<b>Measurement Type</b>	ThruLine Power
<b>Frequency Range</b>	350 MHz to 6 GHz
<b>Frequency Measurement Accuracy</b>	±3% of reading with CW signals
<b>Power Measurement Range*</b>	0.025 W to 500 W average Average Power Rating limited, see chart
<b>Dynamic Range</b>	33 dB
<b>Peak to Average Ratio</b>	12 dB, absolute peak power limited to 1500 W
<b>Impedance</b>	50 Ohms nominal
<b>Insertion Loss</b>	0.05 dB max
<b>Insertion VSWR</b>	1.065, 350 to 2500 MHz max 1.12, 2500 to 6000 MHz max
<b>Directivity, Min</b>	<-30 dB, 350 to 1000 MHz, <-28 dB, 1000 to 4000 MHz**, <-24 dB, 4000 to 6000 MHz**

\* Derate maximum average power rating from 500 W at 300 MHz to 100 W at 6 GHz using a straight line on a log-log scale.

## CONNECTORS

<b>RF Connectors</b>	N Female
<b>Display Interface</b>	USB 2.0 Type B (USBTMC)
<b>Trigger Input</b>	BNC female (1MΩ Impedance; 3 V High, 1.2 V Low)

## SYSTEM

<b>Factory Calibration</b>	NIST traceable
<b>Field Calibration</b>	No field calibration required
<b>Data Logging</b>	Yes, with the VPM3 software
<b>Power Supply</b>	USB Port
<b>Sample Rate</b>	44 M samples/s max
<b>Time Resolution</b>	50 nSec to 10 Sec
<b>Time Base Accuracy</b>	.01%
<b>Display Refresh Rate</b>	10 times/sec (Limited by communication)
<b>Video Bandwidth</b>	Settable: 20 MHz (none), 5 MHz, 400 kHz, 4.5 kHz
<b>Points per screen</b>	1001

## ENVIRONMENTAL

<b>Operating Temperature</b>	-10 °C to 50 °C (14 °F to 122 °F)
<b>Storage Temperature</b>	-40 °C to 80 °C (-40 °F to 176 °F)
<b>Humidity</b>	95% max (non-condensing)
<b>Altitude</b>	Up to 15,000 ft (4,572 m)

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## PHYSICAL

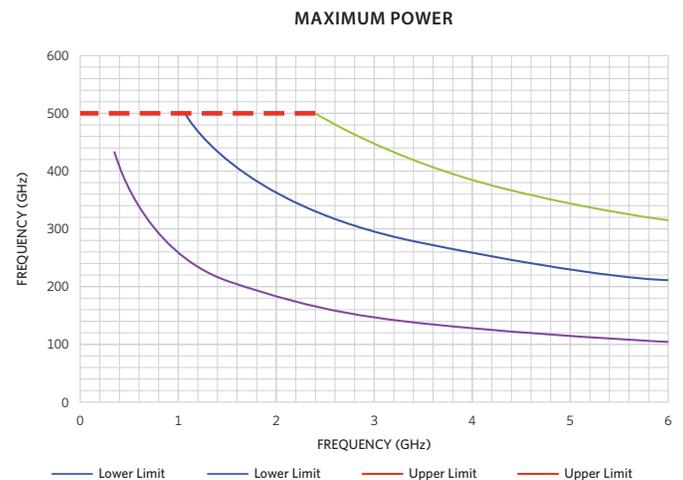
<b>Size</b>	5.8 in x 4.8 in x 1.3 in (147 mm x 122 mm x 33 mm)
<b>Weight</b>	1.5 lb (0.68 kg)

## CERTIFICATIONS

<b>CE</b>	EMC Directive (2004/108/EC) European Standard: EN 61326— Electrical Equipment for measurement, control and laboratory use; <b>EMC Requirements</b> ; Test Spec (for radiated immunity): EN 61000-4-3 - Testing and measurement techniques - 10V/meter
<b>Shock</b>	Mil-PRF-28800F Class 3
<b>Vibration</b>	Mil-PRF-28800F Class 3
<b>RoHS</b>	Compliant

## STANDARD ACCESSORIES

<b>5A2653-6L2</b>	USB SeaLatch™ Cable
<b>VPM3</b>	Virtual Power Meter
<b>920-7022</b>	Manual for Statistical Power Sensor
<b>920/VPM3</b>	920-VPM3 Manual for Virtual Power Meter
<b>5A2918-11-6</b>	BNC / BNC Trigger Cable



## STATISTICAL MODE

<b>Peak-to-Average Ratio (Horizontal Axis)</b>	0 to 16 dB
<b>Percent Time Above Average Power (Vertical Axis)</b>	.0001 to 100% (log display)
<b>Number of Samples**</b>	268 M samples max
<b>Elapsed Time*</b>	6.5 s max
<b>Confidence Band*</b>	85 to 99.99 adjustable
<b>Modes on Full Buffer</b>	Restart Stop

\*\*Number of Samples, Elapsed Time and Confidence Band are all related, if one is set the other two parameters are calculated.

## AVERAGE MODE

<b>Average Forward Power Range</b>	0.25 W to 500 W
<b>Average Forward Power Accuracy</b>	4% of reading $\pm$ 16 mW +3% outside 15-35°C
<b>Average Reflected Power Range</b>	0.025 W to 50 W
<b>Average Reflected Power Accuracy</b>	4% of reading $\pm$ 1.6 mW +3% outside 15-35°C
<b>Return Loss</b>	0 to 23 dB
<b>VSWR</b>	1.15 to 99.9
<b>Rho</b>	0.07 to 1.0

## TIME DOMAIN MEASUREMENT MODE

<b>Peak Envelope Power Accuracy (up to 500 W)</b>	$\pm$ 5% +3.75% outside 15-35°C
<b>Peak Envelope Power</b>	up to 500 W
<b>Peak Envelope Power Accuracy (500 W to 1500 W)</b>	$\pm$ 11% +3.75% outside 15-35°C
<b>Burst Average Power Accuracy (0.25 W to 2 W)</b>	$\pm$ 7% +3.75% outside 15-35°C
<b>Burst Average Power Accuracy (2 W to 500 W)</b>	$\pm$ 5% +3.75% outside 15-35°C
<b>Burst Average Power Accuracy (500 W to 1500 W)</b>	$\pm$ 11% +3.75% outside 15-35°C
<b>Pulse Measurements</b>	All IEEE Std 194 Pulse Parameters Pulse off time Pulse width Pulse fall-time Pulse repetition frequency Pulse rise time Pulse period Pulse duty cycle Peak power Pulse overshoot
<b>Triggers</b>	Auto Free run Marker based (video trigger) External Trigger hold off



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