

## S2438 Series Microwave Power Meter

### Datasheet



Saluki Technology Inc.

### The document applies to following models:

- S2438PA (500GHz, 1CH, Pulse wave measurement)
- S2438PB (500GHz, 2CH, Pulse wave measurement)
- S2438CA (500GHz, 1CH, Continuous wave measurement)
- S2438CB (500GHz, 2CH, Continuous wave measurement)

### Standard Pack:

- 1x Main Machine
- 1x Power Cord
- 1x U Disk (for documents)
- 1x Connection Cable (1.5m)

### Ordering Information:

#### Main machine:

- S2438PA Power Meter
- S2438PB Power Meter
- S2438CA Power Meter
- S2438CB Power Meter

#### Hardware Options:

- S2438-001: S71710A Continuous Wave Power Sensor (9kHz - 12GHz)
- S2438-002: S71710D Continuous Wave Power Sensor (10MHz - 18GHz)
- S2438-003: S71710E Continuous Wave Power Sensor (50MHz - 26.5GHz)
- S2438-004: S71710F Continuous Wave Power Sensor (50MHz - 40GHz)
- S2438-005: S71710L Continuous Wave Power Sensor (50MHz - 67GHz)
- S2438-006: S81702D Peak Power Sensor (50MHz - 18GHz)
- S2438-007: S81702E Peak Power Sensor (500MHz - 26.5GHz)
- S2438-008: S81702F Peak Power Sensor (500MHz - 40GHz)
- S2438-009: S81702L Peak Power Sensor (500MHz - 67GHz)

- S2438-010: S81703D Peak Power Sensor (50MHz - 18GHz)
- S2438-011: S81703E Peak Power Sensor (500MHz - 26.5GHz)
- S2438-012: S81703F Peak Power Sensor (500MHz - 40GHz)
- S2438-013: S81703L Peak Power Sensor (500MHz - 67GHz)
- S2438-030: S71716 Millimeter Wave Power Sensor (50GHz - 75GHz)
- S2438-031: S71717 Millimeter Wave Power Sensor (75GHz - 110GHz)
- S2438-032: S71718 Millimeter Wave Power Sensor (110GHz - 170GHz)
- S2438-033: S87106A Millimeter Wave Power Sensor (170GHz - 220GHz)
- S2438-034: S87106B Millimeter Wave Power Sensor (220GHz - 325GHz)
- S2438-035: S87108B Millimeter Wave Power Sensor (325GHz - 500GHz)
- S2438-021: 2U-213 Racking Kit
- S2438-022: Rear Panel Output
- S2438-024: Probe Connection Cable (1.5m)

*Note: S2438CA/CB Power Meter only can choose continuous wave and millimeter wave power sensors. S2438PA/ PB can choose all of power sensors.*

## **Preface**

Thank you for choosing Saluki Technology Products.

We devote ourselves to meeting your demands, providing you high-quality measuring instrument and the best after-sales service. We persist with “superior quality and considerate service”, and are committed to offering satisfactory products and service for our clients.

## **Document No.**

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## **Version**

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## **Document Authorization**

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## **Product Quality Assurance**

The warranty period of the product is 36 months from the date of delivery. The instrument manufacturer will repair or replace damaged parts according to the actual situation within the warranty period.

## **Product Quality Certificate**

The product meets the indicator requirements of the document at the time of delivery. Calibration and measurement are completed by the measuring organization with qualifications specified by the state, and relevant data are provided for reference.

## **Quality/Settings Management**

Research, development, manufacturing and testing of the product comply with the requirements of the quality and environmental management system.

## Contacts

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## 1 Overview

The S2438 series microwave power meter is composed of a host of microwave power meter and a series of microwave power sensors. New technologies such as broadband diode detection technology, digital signal processing technology and multi-dimensional calibration compensation technology are used in the design, making the instrument have a wide frequency band, large dynamic power range, high precision, fast measurement and analysis, serialization of sensors, and ease of use are all used to measure and measure the average power, peak power and pulse envelope power of microwave signals. It is an important measurement instrument for the research, production, acceptance and maintenance of radar, electronic countermeasures, and communications.

S2438 series microwave power meter is a good substitute of Keysight N1911A / N1912A / N1913A / N1914A.

## 2 Key Feature

- Wide frequency range, frequency range from 9kHz to 500GHz
- A variety of sensor options, series of continuous wave power sensor frequency to 500GHz, single sensor maximum power dynamic range 90dB. Series peak power sensor frequency to 67GHz, single sensor maximum power dynamic range 60dB;
- Has more than ten kinds of microwave millimeter wave pulse modulation signal amplitude and time domain parameter measurement analysis function;
- The series of peak power sensors uses internal calibration technology that allows calibration without leaving the DUT and zero calibration without disconnecting the signal input.
- Flexible and open frequency offset list setting, matched with high power attenuator or high power directional coupler to achieve accurate testing of signal power;
- 4.3 color LCD display, Chinese/English graphical user interface, user-friendly;
- With GPIB, LAN, USB program control function, easy to build test system.

### 3 Main Functions

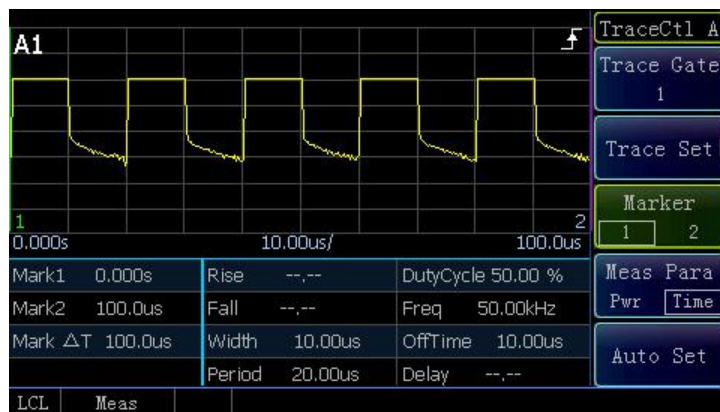
#### 3.1 Multi-measurement mode to fit different measurement requirements

S2438 series microwave power meter has **continuous wave measurement, peak measurement, CCDF statistical measurement** three measurement modes.

When S2438 is connected to a continuous wave power sensor, then it is a traditional continuous wave power meter capable of 9 kHz to 500 GHz accurate power measurement. The single sensor's power measurement dynamic range is up to 90dB.

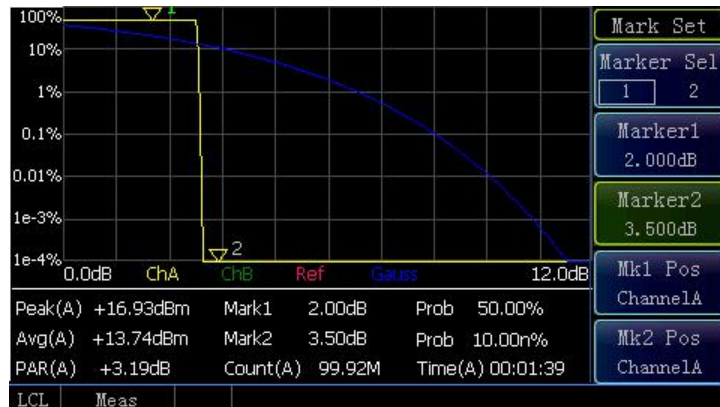


When the peak power sensor is connected, it is a high performance peak power meter. It can measure and analyze amplitude and time domain parameters of pulse modulated signals in the frequency range from 50MHz to 67GHz.



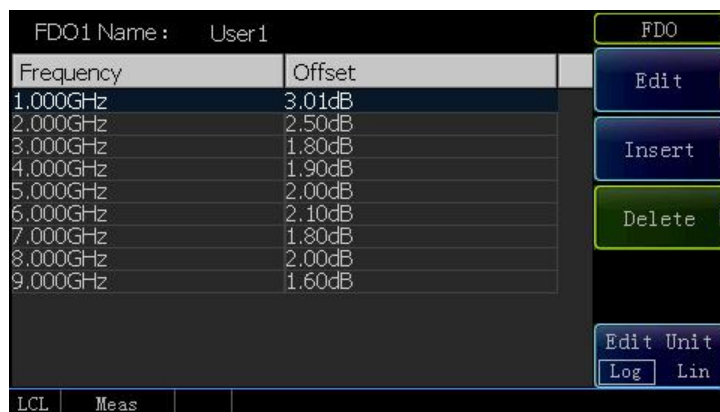
In the statistical measurement mode, the instrument does not need to trigger an event to measure, but instead continuously samples the signal. The CCDF indicates the percentage of the sample in a specific sample whose power level is greater than or equal to a specific value, and it can also be expressed as 1-CDF (1 minus CDF).





### 3.2 Set frequency response offset for accurate measurement of high power

This function stores the frequency response of high power directional couplers or high power attenuators for high power signal measurements offset is very useful. After the frequency response bias function is activated, the power meter automatically roots the system during automatic calibration and power measurement. According to the sensor calibration table and frequency offset table, calibration factors are set to correct the measurement results to ensure the measurement accuracy.



Frequency	Offset
1.000GHz	3.01dB
2.000GHz	2.50dB
3.000GHz	1.80dB
4.000GHz	1.90dB
5.000GHz	2.00dB
6.000GHz	2.10dB
7.000GHz	1.80dB
8.000GHz	2.00dB
9.000GHz	1.60dB

### 3.3 Quick calibration peak power sensor

The peak power sensor uses an internal zero calibration technique that makes the peak power sensor's auto-calibration extremely fast. In addition, calibration can be performed without leaving the device under test, and zero calibration can be performed without disconnecting the signal input.

### 3.4 User statuses save/load

In order to reduce the repetitive setting process, the user can store configuration information for up to 10 statuses. These configuration parameters are saved in the system and can be easily invoked when the user makes similar measurements.

### 3.5 Remote control mode

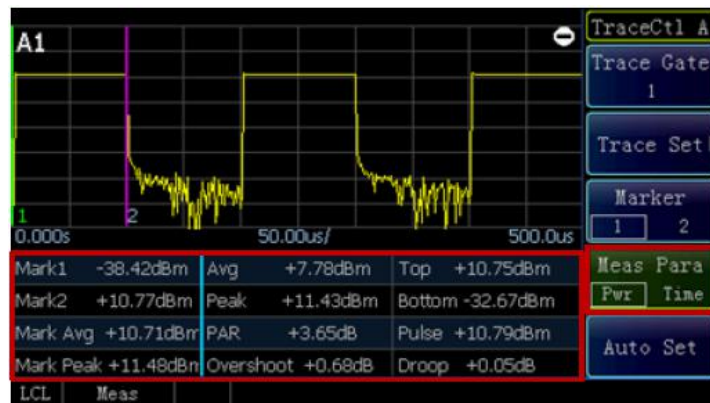
S2438 series microwave power meter supports remote control via GPIB, LAN and USB. Very convenient for user to build the measurement system.

## 4 Typical Applications

S2438 series Microwave Power Meter is a high-performance, general-purpose average/peak microwave power measurement instrument designed to measure average power, peak power, and pulse envelope power of microwave signals.

In the continuous wave mode, it is a universal conventional microwave power meter. In the peak measurement mode, the instrument can automatically measure microwave millimeter wave pulse modulation through different time base settings.

Peak power, pulse power, average power, overshoot, rise time, fall time, top amplitude, bottom amplitude, pulse width, pulse period, duty cycle, off-time, pulse repetition frequency and more than ten kinds of pulse envelope parameters.



## 5 Specifications

### Main Machine

	<b>S2438PA/PB</b>	<b>S2438CA/CB</b>
<b>Channel</b>	Single/Dual	Single/Dual
<b>Frequency Range</b>	9kHz - 500GHz	9kHz - 500GHz
<b>Pulse Power Range</b>	-40dBm to +20dBm	-
<b>CW Power Range</b>	-70dBm to +50dBm	-70dBm to +50dBm
<b>Resolution</b>	Logarithmic: 0.001dB Linear: 10 <sup>-4</sup>	Logarithmic: 0.001dB Linear: 10 <sup>-4</sup>
<b>Offset Range</b>	±100.00dB	±100.00dB
<b>Pulse Rise Time</b>	≤13ns	-
<b>Video Bandwidth</b>	≥30MHz	-
<b>Max Pulse Repetition Frequency</b>	10MHz	-
<b>Min Pulse Width</b>	50ns	-
<b>Time Base</b>	2ns/div to 3600s/div	-
<b>Internal Trigger Level Range</b>	-20dBm to +20dBm	-
<b>Calibration Source Frequency</b>	50MHz±1MHz	50MHz±1MHz
<b>Calibration Source Power</b>	1.000mW(1±1.0%)	1.000mW(1±1.0%)
<b>Output Port</b>	N (f)	N(f)
<b>Uncertainty</b>	±0.04dB	±0.04dB
<b>Display</b>	4.3" color LCD	4.3" color LCD
<b>Power</b>	100-240VAC, 50-60Hz	100-240VAC, 50-60Hz
<b>Consumption</b>	50W	50W
<b>Type</b>	Bench top	Bench top
<b>Dimension</b>	220 mm x 100 mm x 350 mm	220 mm x 100 mm x 350 mm

	<b>S2438PA/PB</b>	<b>S2438CA/CB</b>
<b>Weight</b>	5kg	5kg
<b>Working/Storage Temperature</b>	0°C to 50°C/ -40°C to +70°C	0°C to 50°C/ -40°C to +70°C

### Continuous Wave Power Sensors

<b>S71710A Continuous Wave Power Sensor</b>	<b>Frequency Range</b>	9kHz - 12GHz	
	<b>Power Range</b>	-60dBm to +20dBm	
	<b>SWR</b>	100kHz - 12GHz	1.2
	<b>Calibration Fact Uncertainty</b>	9kHz - 12GHz	±4.0%
	<b>Test Port</b>	N (m)	
<b>S71710D Continuous Wave Power Sensor</b>	<b>Frequency Range</b>	10MHz - 18GHz	
	<b>Power Range</b>	-70dBm to +20dBm	
	<b>SWR</b>	10MHz - 50MHz	1.35
		50MHz - 2GHz	1.15
		2GHz - 12.4GHz	1.2
		12.4GHz - 18GHz	1.26
	<b>Calibration Fact Uncertainty</b>	10MHz - 18GHz	±4.5%
<b>Test Port</b>	N (m)		
<b>S71710E Continuous Wave Power Sensor</b>	<b>Frequency Range</b>	50MHz - 26.5GHz	
	<b>Power Range</b>	-70dBm to +20dBm	
	<b>SWR</b>	50MHz- 2GHz	1.15
		2GHz - 12.4GHz	1.2
		12.4GHz - 18GHz	1.26
18GHz - 26.5GHz		1.35	

	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±4.5%
		18GHz - 26.5GHz	±5.9%
	<b>Test Port</b>	3.5mm (m)	
<b>S71710F Continuous Wave Power Sensor</b>	<b>Frequency Range</b>	50MHz - 40GHz	
	<b>Power Range</b>	-70dBm to +20dBm	
	<b>SWR</b>	50MHz- 2GHz	1.15
		2GHz - 12.4GHz	1.2
		12.4GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
		26.5GHz - 40GHz	1.5
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±4.5%
		18GHz - 26.5GHz	±5.9%
		26.5GHz - 40GHz	±6.9%
<b>Test Port</b>	2.4mm (m)		
<b>S71710L Continuous Wave Power Sensor</b>	<b>Frequency Range</b>	50MHz - 67GHz	
	<b>Power Range</b>	-70dBm to +20dBm	
	<b>SWR</b>	50MHz- 2GHz	1.15
		2GHz - 12.4GHz	1.2
		12.4GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
		26.5GHz - 40GHz	1.5
		40GHz - 67GHz	1.78
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±4.5%
		18GHz - 26.5GHz	±5.9%
26.5GHz - 40GHz		±6.9%	
40GHz - 67GHz		±7.9%	

	<b>Test Port</b>	1.85mm (m)
<b>S71716 Millimeter Wave Power Sensor</b>	<b>Frequency Range</b>	50GHz - 75GHz
	<b>Power Range</b>	-30dBm to +20dBm
	<b>SWR</b>	1.35
	<b>Test Port</b>	Standard Rectangular Waveguide Port
<b>S71717 Millimeter Wave Power Sensor</b>	<b>Frequency Range</b>	75GHz - 110GHz
	<b>Power Range</b>	-30dBm to +20dBm
	<b>SWR</b>	1.35
	<b>Test Port</b>	Standard Rectangular Waveguide Port
<b>S71718 Millimeter Wave Power Sensor</b>	<b>Frequency Range</b>	110GHz - 170GHz
	<b>Power Range</b>	-30dBm to +20dBm
	<b>SWR</b>	1.45
	<b>Test Port</b>	Standard Rectangular Waveguide Port
<b>S87106A Millimeter Wave Power Sensor</b>	<b>Frequency Range</b>	170GHz - 220GHz
	<b>Power Range</b>	-30dBm to +20dBm
	<b>SWR</b>	1.5
	<b>Test Port</b>	Standard Rectangular Waveguide Port
<b>S87106B Millimeter Wave Power Sensor</b>	<b>Frequency Range</b>	220GHz - 325GHz
	<b>Power Range</b>	-30dBm to +20dBm
	<b>SWR</b>	1.5
	<b>Test Port</b>	Standard Rectangular Waveguide Port
<b>S87108B Millimeter Wave Power Sensor</b>	<b>Frequency Range</b>	325GHz - 500GHz
	<b>Power Range</b>	-30dBm to +20dBm
	<b>SWR</b>	1.8
	<b>Test Port</b>	Standard Rectangular Waveguide Port

## Peak Power Sensors

<b>81702D Peak Power Sensor</b>	<b>Frequency Range</b>	50MHz - 18GHz	
	<b>Pulse Power Range</b>	-20dBm to +20dBm	
	<b>Pulse Rise Time</b>	<10ns	
	<b>SWR</b>	50MHz - 2GHz	1.15
		2GHz - 18GHz	1.26
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%
<b>Test Port</b>	N (m)		
<b>81702E Peak Power Sensor</b>	<b>Frequency Range</b>	500MHz - 26.5GHz	
	<b>Pulse Power Range</b>	-20dBm to +20dBm	
	<b>Pulse Rise Time</b>	<10ns	
	<b>SWR</b>	500MHz - 2GHz	1.15
		2GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%
		18GHz - 26.5GHz	±6%
<b>Test Port</b>	3.5mm (m)		
<b>81702F Peak Power Sensor</b>	<b>Frequency Range</b>	500MHz - 40GHz	
	<b>Pulse Power Range</b>	-20dBm to +20dBm	
	<b>Pulse Rise Time</b>	<10ns	
	<b>SWR</b>	500MHz - 2GHz	1.15
		2GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
26.5GHz - 40GHz		1.5	
<b>Calibration Fact</b>	50MHz - 18GHz	±5%	

	<b>Uncertainty</b>	18GHz - 26.5GHz	±6%	
		26.5GHz - 40GHz	±7.5%	
	<b>Test Port</b>	2.4mm (m)		
<b>81702L Peak Power Sensor</b>	<b>Frequency Range</b>	500MHz - 67GHz		
	<b>Pulse Power Range</b>	-20dBm to +20dBm		
	<b>Pulse Rise Time</b>	<10ns		
	<b>SWR</b>	500MHz - 2GHz	1.15	
		2GHz - 18GHz	1.26	
		18GHz - 26.5GHz	1.35	
		26.5GHz - 40GHz	1.5	
		40GHz - 67GHz	1.78	
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%	
		18GHz - 26.5GHz	±6%	
		26.5GHz - 40GHz	±7.5%	
40GHz - 67GHz		±8.5%		
<b>Test Port</b>	1.85mm (m)			
<b>81703D Peak Power Sensor</b>	<b>Frequency Range</b>	50MHz - 18GHz		
	<b>Pulse Power Range</b>	-40dBm to +20dBm		
	<b>Pulse Rise Time</b>	<100ns		
	<b>SWR</b>	50MHz - 2GHz	1.15	
		2GHz - 18GHz	1.26	
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%	
	<b>Test Port</b>	N (m)		
<b>81703E Peak Power Sensor</b>	<b>Frequency Range</b>	500MHz - 26.5GHz		
	<b>Pulse Power Range</b>	-40dBm to +20dBm		



	<b>Pulse Rise Time</b>	<100ns	
	<b>SWR</b>	500MHz - 2GHz	1.15
		2GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%
		18GHz - 26.5GHz	±6%
<b>Test Port</b>	3.5mm (m)		
<b>81703F Peak Power Sensor</b>	<b>Frequency Range</b>	500MHz - 40GHz	
	<b>Pulse Power Range</b>	-40dBm to +20dBm	
	<b>Pulse Rise Time</b>	<100ns	
	<b>SWR</b>	500MHz - 2GHz	1.15
		2GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
		26.5GHz - 40GHz	1.5
	<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%
		18GHz - 26.5GHz	±6%
26.5GHz - 40GHz		±7.5%	
<b>Test Port</b>	2.4mm (m)		
<b>81703L Peak Power Sensor</b>	<b>Frequency Range</b>	500MHz - 67GHz	
	<b>Pulse Power Range</b>	-40dBm to +20dBm	
	<b>Pulse Rise Time</b>	<100ns	
	<b>SWR</b>	500MHz - 2GHz	1.15
		2GHz - 18GHz	1.26
		18GHz - 26.5GHz	1.35
26.5GHz - 40GHz		1.5	
40GHz - 67GHz		1.78	

<b>Calibration Fact Uncertainty</b>	50MHz - 18GHz	±5%
	18GHz - 26.5GHz	±6%
	26.5GHz - 40GHz	±7.5%
	40GHz - 67GHz	±8.5%
<b>Test Port</b>	1.85mm (m)	

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