2438 Series
Microwave Power Meter
(9kHz～500GHz)

China Electronics Technology Instruments Co., Ltd.

Product Overview

2438 series microwave power meter consists of a main unit of microwave power meter and a series of microwave power sensors. In the design, broadband diode detector, digital signal processing technology and multidimensional calibration compensation technology are adopted to make the instrument have wide frequency band, wide dynamic range, high accuracy, fast measurement and analysis, sensor serialization, convenient use and so on. It is mainly used for measuring and calibrating the average power, peak power and pulse envelope power of microwave signals. It is an important measurement instrument for R&D, production, acceptance and maintenance in radar, electronic countermeasures, communications and other fields.

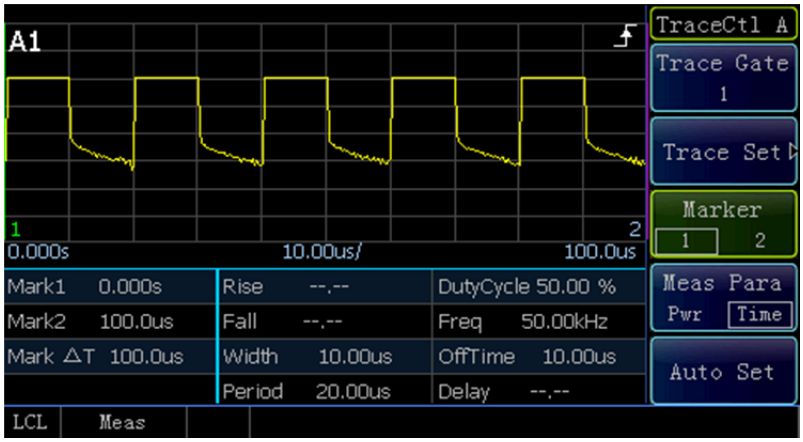
Main Characteristics

- Wide frequency range 9kHz to 500GHz
- Abundant power sensors, CW power sensor frequency up to 500GHz
  Max. dynamic range: 90dB
- Peak power sensor frequency up to 67GHz
  Max. dynamic range: 60dB
- More than 10 kinds of measurement and analysis functions of amplitude and time domain parameters for microwave / millimeter-wave pulse modulation signals
- Internal calibration technology
- Flexible frequency response offset list settings, with high-power attenuator or high-power directional coupler to achieve accurate measurement of signal power
- GPIB, LAN, USB, programmable control

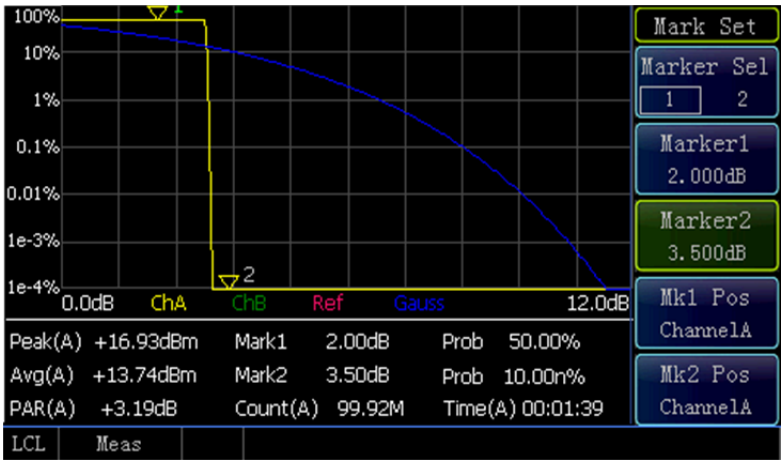
Multi- measurement mode

CW measurement, peak measurement, CCDF statistic measurement
CW power sensor frequency up to 500GHz
Max. dynamic range: 90dB

When the peak power sensor is connected, it becomes high-performance peak power meter. The amplitude and time domain parameters of pulse modulated signals in 50MHz ~ 67GHz band can be measured and analyzed.

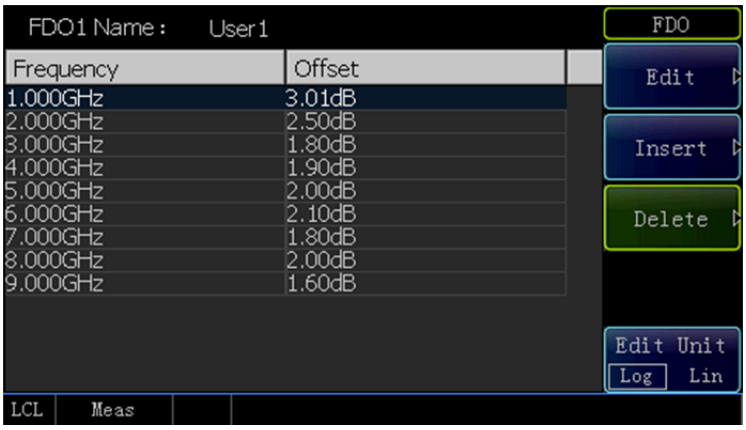


In the statistic measurement mode, the instrument does not need to trigger events to measure, but continuously sampling and measuring the signals. CCDF represents the percentage of a sample point in a specific sample that is greater than or equal to a specific value in the sample. It can also be represented as 1 - CDF.



Frequency response offset for high power measurement

This function is very useful when storing high-power directional coupler or high-power attenuator for high frequency signal measurement. After starting the frequency response offset function, the power meter automatically sets the calibration factor according to the calibration form of the sensor and the frequency response offset form in the process of automatic calibration and power measurement, and corrects the measurement results to ensure the measurement accuracy.



Internal zero, fast calibration

The peak power sensor adopts internal zero calibration technology, which makes the peak power sensor automatic calibration speed very fast. In addition, it can be calibrated without leaving the measured parts, and the signal can be zeroed without interruption of the signal input.

Save and recall configuration information

In order to reduce the duplication process, the user can save up to 10 configuration information of the power meter host. These configuration parameters are stored in the system, and the user can make a convenient call when conducting similar measurements.

Programmable control

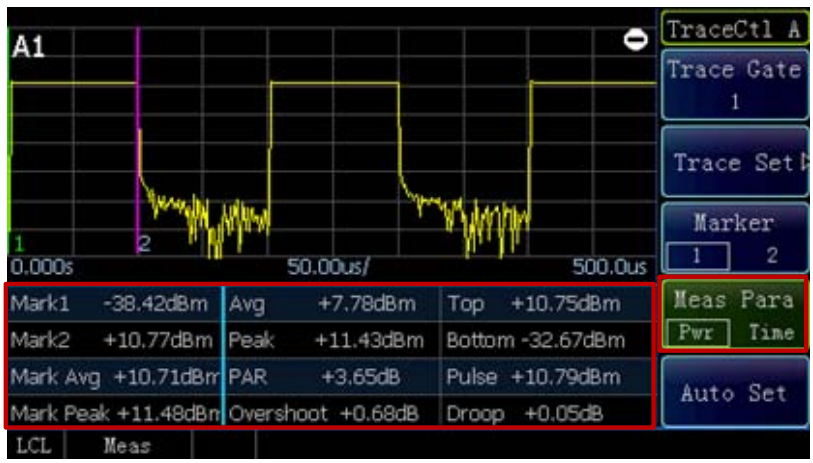
GPIB, LAN, USB control, for system construction.

Typical Applications

It is mainly used for calibrating and measuring the average power, peak power and pulse envelope power of microwave signals.

In CW mode, it is a universal microwave power meter.

In peak measurement mode, through setting time base, the instrument can automatically measure and analyze more than 10 kinds of microwave / millimeter-wave pulse modulation signal pulse envelope parameters, such as 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 etc.



Technical Specifications

Main unit

Model	2438PA/PB	2438CA/CB
Channels	Single/Double	Single/Double
Frequency range	9kHz～500GHz	9kHz～500GHz
Pulse power range	-40dBm～+20dBm	——
CW power range	-70dBm～+50dBm	-70dBm～+50dBm
Max. display resolution	Log：0.001dB Line：0.0001	Log：0.001dB Line：0.0001
Relative offset range	±100.00dB	±100.00dB
Rise time	≤13ns	——
Video bandwidth	≥30MHz	——
Maximum pulse repetition rate	10MHz	——
Minimum pulse width	50ns	——
Time base range	2ns/div～3600s/div	——
Internal trigger level range	-20dBm～+20dBm	——
Calibration source frequency	50MHz±1MHz	50MHz±1MHz
Calibration source power	1.000mW（1±1.0%）	1.000mW（1±1.0%）
Connector type	Type-N（f）	Type-N（f）
Meter uncertainty	±1.0%	±1.0%
Display	4.3 inch colorful LCD	4.3 inch colorful LCD
Power requirement	90～240VAC，50/60Hz，50Watts Max.	90 ～ 240VAC， 50/60Hz， 50Watts Max.
Dimensions (W×H×D)	220 mm * 89 mm * 340 mm	220 mm * 89 mm * 340 mm
Weight	≤5kg	≤5kg
Operating/storage temperature	0℃～50℃/-40℃～+70℃	0℃～50℃/-40℃～+70℃
* Depending on power sensors		

CW power sensor

71710A CW Power Sensor	Frequency range	9kHz～12GHz	
	Power range	-60dBm～+20dBm	
	Maximum SWR	100kHz～12GHz	1.20
	Calibration factor uncertainty	9kHz～12GHz	±4.0%
	Connector type	Type-N（m）	
71710D CW Power Sensor	Frequency range	10MHz～18GHz	
	Power range	-70dBm～+20dBm	
	Maximum SWR	10MHz～50MHz 50MHz～2GHz 2GHz～12.4GHz 12.4GHz～18GHz	1.35 1.15 1.20 1.26
	Calibration factor uncertainty	10MHz～18GHz	±4.5%
	Connector type	Type-N（m）	
71710E CW Power Sensor	Frequency range	50MHz～26.5GHz	
	Power range	-70dBm～+20dBm	
	Maximum SWR	50MHz～2GHz 2GHz～12.4GHz 12.4GHz～18GHz 18GHz～26.5GHz	1.15 1.20 1.26 1.35
	Calibration factor uncertainty	50MHz～18GHz 18GHz～26.5GHz	±4.5% ±5.9%
	Connector type	3.5mm（m）	
71710F CW Power Sensor	Frequency range	50MHz～40GHz	
	Power range	-70dBm～+20dBm	
	Maximum SWR	50MHz～2GHz 2GHz～12.4GHz 12.4GHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz	1.15 1.20 1.26 1.35 1.50
	Calibration factor uncertainty	50MHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz	±4.5% ±5.9% ±6.9%
	Connector type	2.4mm（m）	
71710L	Frequency range	50MHz～67GHz	

CW Power Sensor	Power range	-70dBm～+20dBm	
	Maximum SWR	50MHz～2GHz 2GHz～12.4GHz 12.4GHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz 40GHz～67GHz	1.15 1.20 1.26 1.35 1.50 1.78
	Calibration factor uncertainty	50MHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz 40GHz～67GHz	±4.5% ±5.9% ±6.9% ±7.9%
	Connector type	1.85mm（m）	
71716 Milimeter -wave power sensor	Frequency range	50GHz～75GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.35	
	Connector type	Standard square wave-guide	
71717 Milimeter -wave power sensor	Frequency range	75GHz～110GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.35	
	Connector type	Standard square wave-guide	
71718 Milimeter -wave power sensor	Frequency range	110GHz～170GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.45	
	Connector type	Standard square wave-guide	
87106A Milimeter -wave power sensor	Frequency range	170GHz～220GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.5	
	Connector type	Standard square wave-guide	
87106B Milimeter -wave power sensor	Frequency range	220GHz～325GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.5	
	Connector type	Standard square wave-guide	
87108B Milimeter -wave power sensor	Frequency range	325GHz-500GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.8	
	Connector type	Standard square wave-guide	

Peak power sensor

81702D Peak power sensor	Frequency range	50MHz～18GHz	
	Pulse power range	-20dBm～+20dBm	
	Rise time	≤10ns（frequency carrier ＞500MHz）	
	Maximum SWR	50MHz～2GHz 2GHz～18GHz	1.15 1.26
	Calibration factor uncertainty	50MHz～18GHz	±5.0%
	Connector type	Type-N（m）	
81702E Peak power sensor	Frequency range	500MHz～26.5GHz	
	Pulse power range	-20dBm～+20dBm	
	Rise time	≤10ns	
	Maximum SWR	500MHz～2GHz 2GHz～18GHz 18GHz～26.5GHz	1.15 1.26 1.35
	Calibration factor uncertainty	500MHz～18GHz 18GHz～26.5GHz	±5.0% ±6.0%
	Connector type	3.5mm（m）	
81702F Peak power sensor	Frequency range	500MHz～40GHz	
	Pulse power range	-20dBm～+20dBm	
	Rise time	≤10ns	
	Maximum SWR	500MHz～2GHz 2GHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz	1.15 1.26 1.35 1.50
	Calibration factor uncertainty	500MHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz	±5.0% ±6.0% ±7.5%
	Connector type	2.4mm（m）	
81702L Peak power sensor	Frequency range	500MHz～67GHz	
	Pulse power range	-20dBm～+20dBm	
	Rise time	≤10ns	
	Maximum SWR	500MHz～2GHz 2GHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz 40GHz～67GHz	1.15 1.26 1.35 1.50 1.78

	Calibration factor uncertainty	500MHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz 40GHz～67GHz	±5.0% ±6.0% ±7.5% ±8.5%
	Connector type	1.85mm（m）	
81703D Peak power sensor	Frequency range	50MHz～18GHz	
	Pulse power range	-40dBm～+20dBm	
	Rise time	≤100ns	
	Maximum SWR	50MHz～2GHz 2GHz～18GHz	1.15 1.26
	Calibration factor uncertainty	50MHz～18GHz	±5.0%
	Connector type	Type-N（m）	
81703E Peak power sensor	Frequency range	500MHz～26.5GHz	
	Pulse power range	-40dBm～+20dBm	
	Rise time	≤100ns	
	Maximum SWR	500MHz～2GHz 2GHz～18GHz 18GHz～26.5GHz	1.15 1.26 1.35
	Calibration factor uncertainty	500MHz～18GHz 18GHz～26.5GHz	±5.0% ±6.0%
	Connector type	3.5mm（m）	
81703F Peak power sensor	Frequency range	500MHz～40GHz	
	Pulse power range	-40dBm～+20dBm	
	Rise time	≤100ns	
	Maximum SWR	500MHz～2GHz 2GHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz	1.15 1.26 1.35 1.50
	Calibration factor uncertainty	500MHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz	±5.0% ±6.0% ±7.5%
	Connector type	2.4mm（m）	
81703L Peak power sensor	Frequency range	500MHz～67GHz	
	Pulse power range	-40dBm～+20dBm	
	Rise time	≤100ns	
	Maximum SWR	500MHz～2GHz 2GHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz 40GHz～67GHz	1.15 1.26 1.35 1.50 1.78

	Calibration factor uncertainty	500MHz～18GHz 18GHz～26.5GHz 26.5GHz～40GHz 40GHz～67GHz	±5.0% ±6.0% ±7.5% ±8.5%
	Connector type	1.85mm（m）	

Ordering Information

- Main unit

2438CA Microwave power meter Single channel CW power measurement
2438CB Microwave power meter Dual channel CW power measurement
2438PA Microwave power meter Single channel CW/Peak power measurement
2438PB Microwave power meter Dual channel CW/Peak power measurement

- Standard accessories

No.	Designation	Remarks
1	Power cord	Standard 3-core power cord
2	User manual	--
3	Programming manual	--
4	Sensor connecting cable（1.5m）	--
5	Certificate of conformity	--

- Options

Options	Designation	Functions	
2438-001	71710A CW Power Sensor	CW average power measurement	Coaxial connector
2438-002	71710D CW Power Sensor	CW average power measurement	
2438-003	71710E CW Power Sensor	CW average power measurement	
2438-004	71710F CW Power Sensor	CW average power measurement	
2438-005	71710L CW Power Sensor	CW average power measurement	
2438-006	81702D Peak Power Sensor	Peak/average power measurement	Coaxial connector
2438-007	81702E Peak Power Sensor	Peak/average power measurement	
2438-008	81702F Peak Power Sensor	Peak/average power	

		measurement	
2438-009	81702L Peak Power Sensor	Peak/average power measurement	
2438-010	81703D Peak Power Sensor	Peak/average power measurement	
2438-011	81703E Peak Power Sensor	Peak/average power measurement	
2438-012	81703F Peak Power Sensor	Peak/average power measurement	
2438-013	81703L Peak Power Sensor	Peak/average power measurement	
2438-030	71716 Millimeter-wave Power Sensor	CW average power measurement	Wave-guide connector
2438-031	71717 Millimeter-wave Power Sensor	CW average power measurement	
2438-032	71718 Millimeter-wave Power Sensor	CW average power measurement	
2438-033	87106A Millimeter-wave Power Sensor	CW average power measurement	
2438-034	87106B Millimeter-wave Power Sensor	CW average power measurement	
2438-035	87108B Millimeter-wave Power Sensor	CW average power measurement	
2438-021	2U-213 Rack mount kits	Rack mount kits	--
2438-022	Rear panel RF input	To put the RF signal input interface on the rear panel	--
2438-023	English options	English panels, keys, label	--
2438-024	Sensor connecting cable（1.5m）	--	Optional