2438CA/CB/PA/PB Microwave Power Meter

9kHz～500GHz

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

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1000/24, P.B. Tower, 8 floor, Sukhumvit 71 Rd., North Klongtan, Wattana, Bangkok 10110
TEL: 02-064-4050 or 02-064-4051 I FAX: 02-010-4262 I Email: info@fesupply.com
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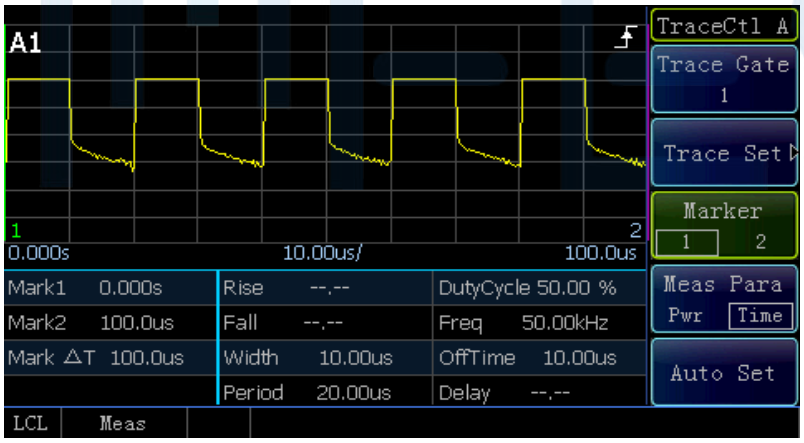
Multi- measurement mode

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.

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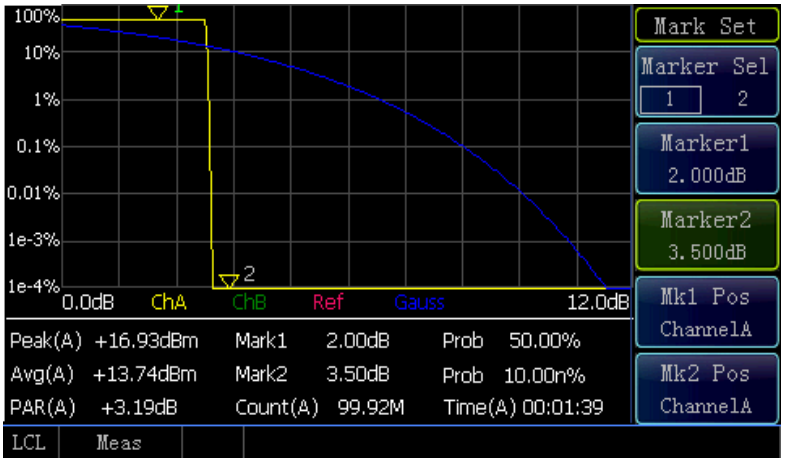
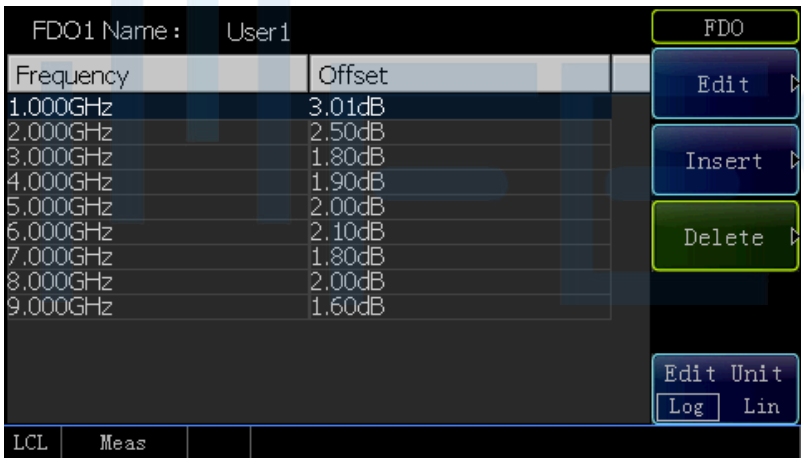


Frequency response offset for high power measurement

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.

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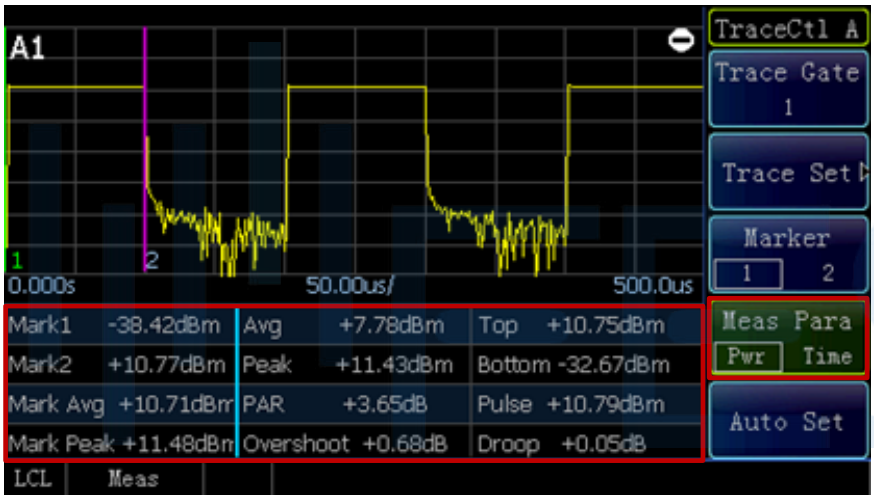
Programmable control

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.



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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		

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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)	
71710LB	Frequency range	50MHz～67GHz	

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CW Power Sensor	Power range	-70dBm～+20dBm	
	Maximum SWR	50MHz～18 GHz 18GHz～26.5GHz 26.5GHz～50GHz 50GHz～67GHz	1.13 1.25 1.36 1.30
	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)	
87115NA Millimeter-wave power sensor	Frequency range	50GHz～75GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.35	
	Connector type	Standard square wave-guide-WR 15.0	
87115N Millimeter-wave power sensor	Frequency range	60 GHz～90 GHz	
	Power range	-50dBm～+20dBm	
	Maximum SWR	1.30	
	Connector type	Standard square wave-guide-WR 12.0	
87115P Millimeter-wave power sensor	Frequency range	75GHz～110GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.35	
	Connector type	Standard square wave-guide-WR 10.0	
87115QA Millimeter-wave power sensor	Frequency range	90 GHz～140 GHz	
	Power range	-40dBm～+20dBm	
	Maximum SWR	1.45	
	Connector type	Standard square wave-guide-WR 8.0	
87115Q Millimeter-wave power sensor	Frequency range	110GHz～170GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.45	
	Connector type	Standard square wave-guide-WR 6.5	
87115R Millimeter-wave power sensor	Frequency range	170 GHz～220 GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.5	
	Connector type	Standard square wave-guide-WR 5.1	
87115SA Millimeter-wave power sensor	Frequency range	170 GHz～260 GHz	
	Power range	-30dBm～+20dBm	
	Maximum SWR	1.5	

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	Connector type	Standard square wave-guide-WR 4.3
87115S Millimeter-wave power sensor	Frequency range	220GHz～325GHz
	Power range	-30dBm～+20dBm
	Maximum SWR	1.5
	Connector type	Standard square wave-guide-WR 3.4
87115TA Millimeter-wave power sensor	Frequency range	260 GHz～400 GHz
	Power range	-30dBm～+20dBm
	Maximum SWR	1.7
	Connector type	Standard square wave-guide-WR 2.8
87115T Millimeter-wave power sensor	Frequency range	325GHz-500GHz
	Power range	-30dBm～+20dBm
	Maximum SWR	1.7
	Connector type	Standard square wave-guide -WR 2.2
87115U Millimeter-wave power sensor	Frequency range	500 GHz-750 GHz
	Power range	-30dBm～+20dBm
	Maximum SWR	2.0
	Connector type	Standard square wave-guide-WR 1.5

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	Frequency range	500MHz～40GHz	

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Peak power sensor	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	Frequency range	500MHz～40GHz	

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Peak power sensor	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)	
87103NA Peak-Millimeter-wave power sensor	Frequency range	50 GHz-75 GHz	
	Peak Power Measurement range	-20dBm～+20dBm	
	Rise TIME	≤100ns	
	Maximum SWR	1.50	
	Connector type	Standard square wave-guide-WR 15.0	
87103N Peak-Millimeter-wave power sensor	Frequency range	60 GHz-90 GHz	
	Peak Power Measurement range	-20dBm～+20dBm	
	Rise TIME	≤100ns	
	Maximum SWR	1.50	
	Connector type	Standard square wave-guide-WR 12.0	
87103P	Frequency range	75 GHz-110 GHz	

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Peak-Millimeter-wave power sensor	Peak Power Measurement range	-20dBm～+20dBm
	Rise TIME	≤100ns
	Maximum SWR	1.50
	Connector type	Standard square wave-guide-WR 10.0

Fixed Attenuator Specification

Model	Name	Attenuation (dB)	Attenuation Accuracy (dB)	Frequency Range (GHz)	SWR (Max.)	Maximum Input Power (W)	Interface
71523B	Fixed Attenuator	30	±1.7	DC to 18GHz	1.35	50	N
71524C	Fixed Attenuator	40	±2.0	DC to 18GHz	1.5	100	N

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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

No.	Designation	Functions	Remarks
CW Power Sensor			
1	71710A CW Power Sensor	CW average power measurement	Coaxial connector
2	71710D CW Power Sensor	CW average power measurement	
3	71710E CW Power Sensor	CW average power measurement	
4	71710F CW Power Sensor	CW average power measurement	
5	71710LB CW Power Sensor	CW average power measurement	
6	87115NA Millimeter-wave Power Sensor	CW average power measurement	Wave-guide connector
7	87115P Millimeter-wave Power Sensor	CW average power measurement	
8	87115Q Millimeter-wave Power Sensor	CW average power measurement	
9	87115R Millimeter-wave Power Sensor	CW average power measurement	
10	87115S Millimeter-wave Power Sensor	CW average power measurement	
11	87115T Millimeter-wave Power Sensor	CW average power measurement	
12	87115N Millimeter-wave Power Sensor	CW average power measurement	

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13	87115QA Millimeter-wave Power Sensor	CW average power measurement	
14	87115SA Millimeter-wave Power Sensor	CW average power measurement	
15	87115TA Millimeter-wave Power Sensor	CW average power measurement	
16	87115U Millimeter-wave Power Sensor	CW average power measurement	
Peak Power Sensor			
17	81702D Peak Power Sensor	Peak/average power measurement	Coaxial connector
18	81702E Peak Power Sensor	Peak/average power measurement	
19	81702F Peak Power Sensor	Peak/average power measurement	
20	81702L Peak Power Sensor	Peak/average power measurement	
21	81703D Peak Power Sensor	Peak/average power measurement	
22	81703E Peak Power Sensor	Peak/average power measurement	
23	81703F Peak Power Sensor	Peak/average power measurement	
24	81703L Peak Power Sensor	Peak/average power measurement	
25	81703NA Peak-Milimeter-wave power sensor	Peak Millimeter-wave power measurement	Wave-guide connector
26	81703N Peak-Milimeter-wave power sensor	Peak Millimeter-wave power measurement	
27	81703P Peak-Milimeter-wave power sensor	Peak Millimeter-wave power measurement	
28	71523B	Fixed Attenuator	DC to 18 GHz, 30 dB Attenuation, Rated Power: 50W
29	71524C	Fixed Attenuator	DC to 18 GHz, 30 dB Attenuation, Rated Power: 100W
30	2438-021	2U-213 Rack mount kits	Rack mount kits
31	2438-022	Rear panel RF input	To put the RF signal input interface on the rear panel
32	2438-023	English options	2438 Power Meter English panels, keys, label
33	2438-024	Sensor connecting cable(1.5m)	--

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34	2438-H26	2438 Aluminum alloy box	High-strength aluminum alloy case with carry handle for transportation
35	71710A-H04	English Options	English Labels
36	71710D-H04	English Options	English Labels
37	71710E-H04	English Options	English Labels
38	71710F-H04	English Options	English Labels
39	71710LB-H04	English Options	English Labels
40	81702D-H04	English Options	English Labels
41	81702E-H04	English Options	English Labels
42	81702F-H04	English Options	English Labels
43	81702L-H04	English Options	English Labels
44	81703D-H04	English Options	English Labels
45	81703E-H04	English Options	English Labels
46	81703F-H04	English Options	English Labels
47	81703L-H04	English Options	English Labels
48	2438CA-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
49	2438CB-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
50	2438PA-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
51	2438PB-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
52	71710A-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
53	71710D-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
54	71710E-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
55	71710F-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
56	71710LB-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
57	81702D-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
58	81702E-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
59	81702F-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
60	81702L-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
61	81703D-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports

62	81703E-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
63	81703F-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
64	81703L-JL	Calibration Service	Provision of metrological calibration services and provision of metrological reports
65	2438CA-EWT1	Extended 1 Year warranty	1 Year extended warranty outside of warranty period, 2 optional items for 2 Year extended warranty, and so on. Service does not include calibration, only one-way shipping cost of goods
66	2438CB-EWT1	Extended 1 Year warranty	1 Year extended warranty outside of warranty period, 2 optional items for 2 Year extended warranty, and so on. Service does not include calibration, only one-way shipping cost of goods
67	2438PA-EWT1	Extended 1 Year warranty	1 Year extended warranty outside of warranty period, 2 optional items for 2 Year extended warranty, and so on. Service does not include calibration, only one-way shipping cost of goods
68	2438PB-EWT1	Extended 1 Year warranty	1 Year extended warranty outside of warranty period, 2 optional items for 2 Year extended warranty, and so on. Service does not include calibration, only one-way shipping cost of goods