

PM Series Microwave Power Calibration System



- Supports Sensors from most major manufactures up to 50 GHz
- Faster than direct compare method
- Lowest total uncertainty
- National Metrology Institute class thermistor reference standard
- Complete Automation by SureCAL

The PM Series calibrator simplifies the tedious and complex process of RF power sensor calibration. The goal is to realize consistent, cost effective and traceable calibrations. However, the manual approach is very demanding of even the most experienced technician.

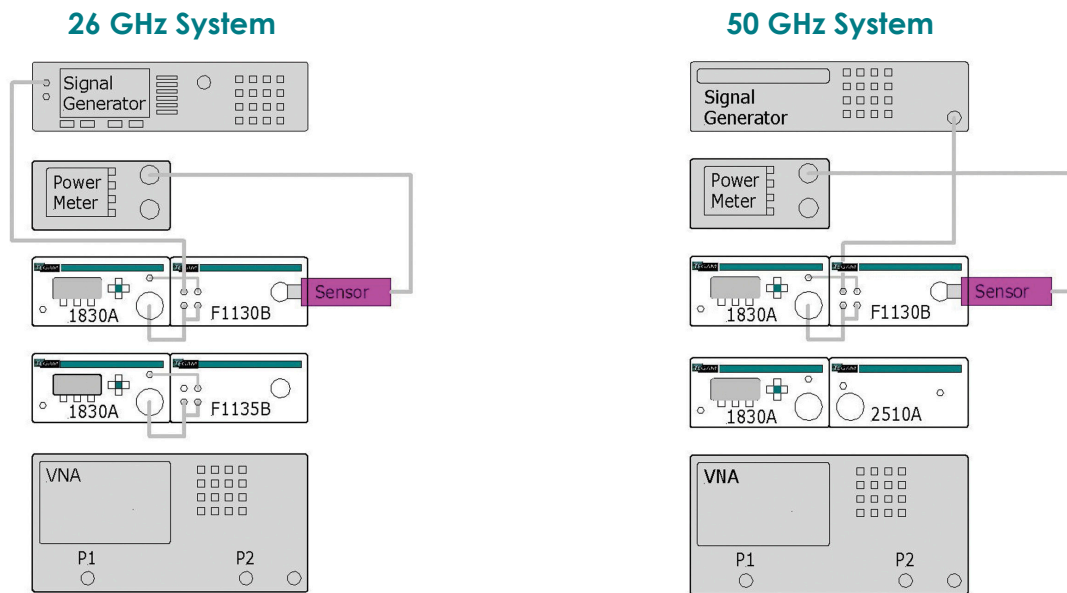
A successful calibration involves:

- Setting instruments
- Keeping track of standards
- Computing mismatch (Γ)
- Computing calibration factors (k)
- Computing total uncertainties
- Programming EPROM sensors
- Generating reports and labels

The PM Series automates and standardizes this process while providing compatibility with a wide variety of instruments and power sensors.

The PM Series is built upon the 1830A metrology grade RF Power Meter. This is the only RF Power Meter on the market that is compatible with all known types of thermistor sensors including TEGAM, Agilent, Weinschel, Hughes and Millitech.

A new line of compatible RF power thermistor transfer and reference standards have also been developed that provide flexibility and expandability as your RF calibration needs grow. These standards are based on the same time proven method used by NIST, PTB, NIM and other national metrology organizations around the world.



Complete System Integration PMX-100 Series

TEGAM has condensed their experience with microwave calibration into one convenient and accurate automated system that operates from 100 KHz to 18, 26.5 or 50 GHz. One turnkey package includes the VNA, signal generator, microwave power standards, workstation, software and accessories required for immediate productivity. The system is configured with instruments from different manufacturers that have been tested and verified by TEGAM to produce an accurate and repeatable calibration. Onsite installation and training are included with each complete system for a fast and trouble free start up. Due to the wide range of options, the PMX-100 system is quoted on an as requested basis.

Major System Components

	Signal Generators	Network Analyzers ⁱ	Microwave Standards
100 KHz to 18 GHz	Anritsu MG3692C Gigatronics 2520B Keysight N5173B-520	Anritsu MS4642B Keysight N5232A HP 8510C ⁱⁱ	1830A & F1130B
100 KHz to 26.5 GHz	Anritsu MG3693C Gigatronics 2526B Keysight N5173B-532	Anritsu MS4644B Keysight E5063A Keysight N5242A ⁱⁱ HP 8510C ⁱⁱ	1830A & F1130B 1830A & F1135B
100 KHz to 50 GHz	Anritsu MG3695C Gigatronics 2550B Keysight E8257D-550	Anritsu MS4645B Keysight E5063A Keysight N5245A ⁱⁱ HP 8510C ⁱⁱ	1830A & F1130B 1830A & 2510A

ⁱ VNA calibration kit consist of Open, Short, Low Band Load, and Sliding Load.

ⁱⁱ Keysight PNA Series and HP8510C do not operate down to 100 kHz.

PM Series Package Summary

Part Number	Description	PMX18-001	PMX18-002	PMX26-001	PMX50-001	PMX50-002	PMX50-003	PMX50-004	PMC18-001	PMC26-001	PMC50-001
1830A	RF Power Meter	•	•	••	•	•	••	••	•	•	•
F1130B	18 GHz Transfer	•	•	•			•	•			
F1135B	26.5 GHz Transfer			•							
2510A	50 GHz Transfer				•	•	•	•			
M1130A	18 GHz Standard								•		
M1135A	26.5 GHz Standard									•	
1510A	50 GHz Standard										•
CA-7-48	Cable, F/M mounts								•	•	
CA-7-15	Cable, F/M mounts	•	•	••			•	•			
CA-10-48	Cable, large heater								•	•	
CA-11-48	Cable, small heater										
CA-11-15	Cable, small heater	•	•	••			•	•			
CA-21-48	Cable, 15XX/25XX										•
CA-21-15	Cable, 15XX/25XX				•	•	•	•			
CA-14-2M	Cable, USB A/A 2M	•	•	••	•	•	••	••			
PMX-SureCAL	Automation Software	•	•	•	•	•	•	•			
PMX-Training	System Training	•	•	•	•	•	•	•			

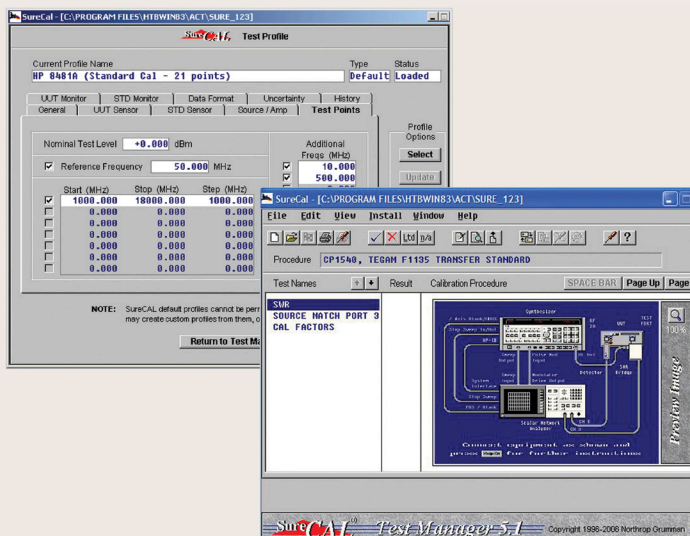
SureCAL calibration software delivers both automation and confidence to RF power sensor calibration.

Correctly calibrating an RF power sensor is an involved process that requires numerous complex calculations of calibration factor, mismatch correction and uncertainty. SureCAL is successfully deployed by many organizations who are ISO 17025:2005 accredited. Combined with the fastest calibration available across the greatest number of different sensors, it is the only real option for those who need automation with sensors from multiple manufacturers.

Calibration Software

MODEL SURECAL

- Fully automated RF power sensor calibration
- VNA support for automated SII parameter measurements
- User customizable calibration procedures
- Upload and download EPROM data of most Anritsu, Agilent (both E4400 and E9300 series), Boonton, and Giga-tronics power sensors
- Easy to understand graphical hook-up instructions
- Flexible standards allow the operator to use the instruments in their lab
- Data stored in ASCII text files for easy manipulation
- Selecting calibration procedures fast and easy
- Dynamic Uncertainty Calculations



RF Power Meter for Metrology

MODEL 1830A

- Frequency Range: 110 GHz (sensor dependent)
- Meter Uncertainty: $\pm 0.05\%$ of reading, $\pm 0.5 \mu\text{W}$ (0.1% at 1 mW)
- Calibrate 50 MHz reference outputs (with appropriate sensor)
- Compatible with most DC substitution thermistor sensors
- Directly reads calibrated RF power
- Replaces HP432



Microwave Calibration Standard

MODELS F1130B / F1135B

- Feedthrough design for calibrating microwave power sensors
- Provide lowest-uncertainty monitoring of RF power supplied to a Device Under Test
- Calibrate RF power sensors from 100 kHz to 18 GHz (F1130B) or from 10 MHz to 26.5 GHz (F1135B)
- Temperature controlled for minimal response to ambient environment
- Thermistor bolometer for lowest drift of absolute power reading
- 0.01 to 25 mW power range
- Rack mount option available



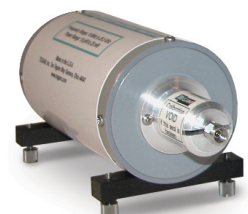
Microwave Calibration Standard

MODEL M1130A / M1135A

- Terminating Design
- Can be calibrated at NIST with the lowest uncertainty of any sensor type
- Transfer calibration from NIST (or other NMI) to feedthrough standards with the lowest possible uncertainty from 100 kHz to 18 GHz (M1130A) or from 10 MHz to 26.5 GHz (M1135A)
- Lowest uncertainty of any available CW absolute power sensor
- Temperature controlled for minimal response to ambient environment
- Thermistor bolometer for lowest drift of absolute power reading
- 0.01 to 25 mW power range
- Adjustable stand available



Model M1130A
(100 kHz to 18 GHz)



Model M1135A
(10 MHz to 26.5 GHz)

Microwave Calibration Standard

MODEL 2510A

- Feedthrough design for calibrating microwave power sensors
- Provide lowest-uncertainty monitoring of RF power supplied to a Device Under Test
- Calibrate RF power sensors from 10 MHz to 50 GHz
- Temperature controlled for minimal response to ambient environment
- Thermistor bolometer design
- 0.01 to 25 mW power range
- Rack mount option available



Microwave Calibration Standard

MODEL 1510A

- Terminating Design
- Transfer calibration from NIST (or other NMI) to feedthrough standards with the lowest possible uncertainty from 10 MHz to 50 GHz
- Lowest uncertainty of any available CW absolute power sensor
- Temperature controlled for minimal response to ambient environment
- Thermistor bolometer design
- 0.01 to 25 mW power range



Uncertainty Calculation for a Power Sensor Calibration

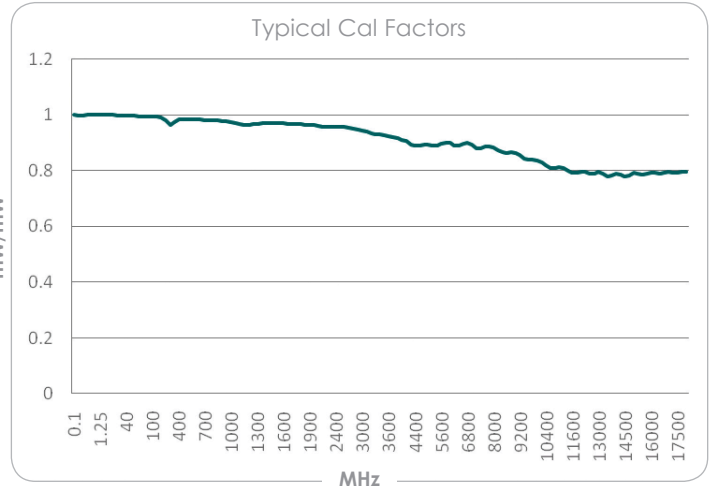
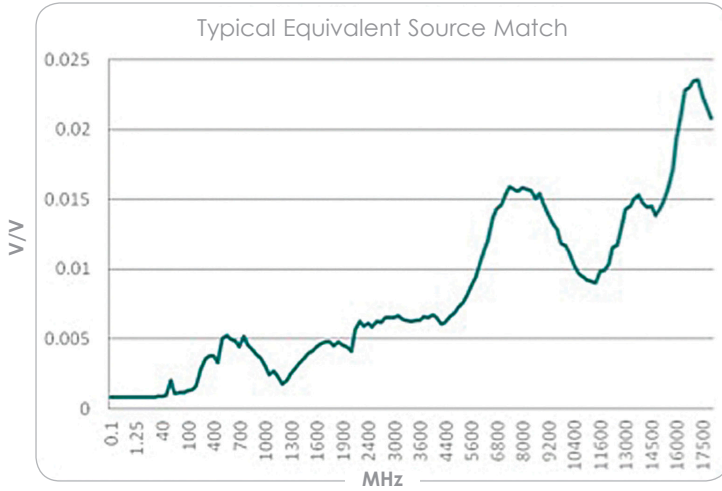
Example calibration: Frequency: 18 GHz
Power: 1 mW

$$k_{DUT} = \frac{P_{DUT}}{P_{FT_{20}}} (|1 - \Gamma_{FT} \Gamma_{DUT}|^2)$$

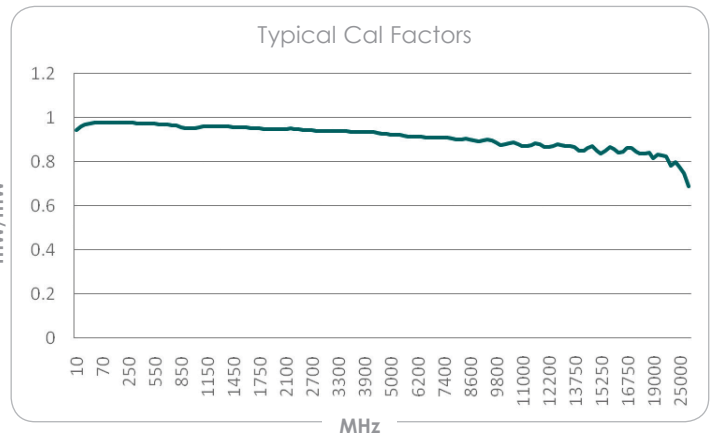
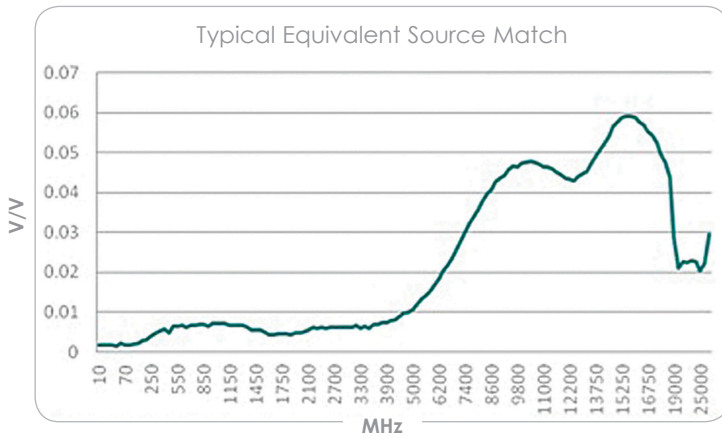
Input Component	Value of Input	Uncertainty of Input Value	Uncertainty Contribution to <i>k</i> of Input
F1130B calibration factor	.8851 mW/mW	.01 mW/mW	.01 mW/mW
F1130B Rho	.042 V/V	.03 V/V	.00114 mW/mW
F1130B Phi	-41.8 degrees	8 degrees	.00111 mW/mW
1830A Power Reading	1.0000 mW	.07% of rdg	.00059 mW/mW
DUT Rho	.111 V/V	.03 V/V	.00014 mW/mW
DUT Phi	120 degrees	4 degrees	.00055 mW/mW
DUT Power Reading	1.0050 mW	.5% of rdg	.00431 mW/mW
Repeatability	.002 mW/mW		.002 mW/mW
RSS Uncertainty			.0113 mW/mW

Performance Graphs

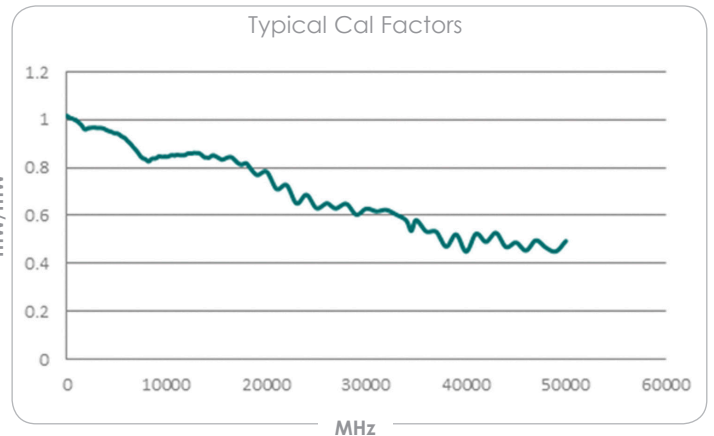
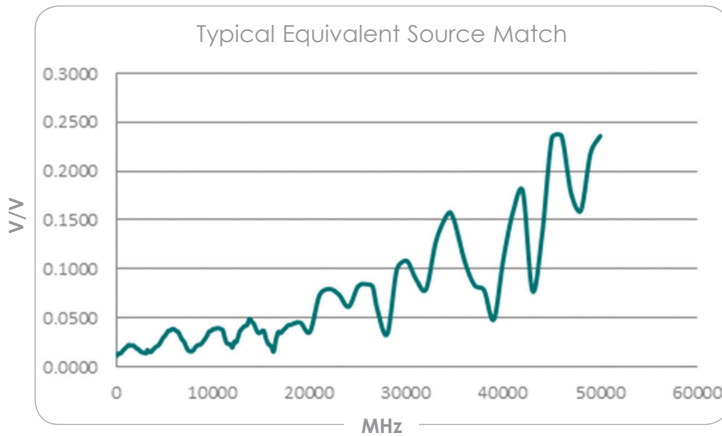
F1130B



F1135B



2510A



AGILENT						
SENSOR	FREQUENCY RANGE	POWER RANGE	EEPROM Read	EEPROM Write	SureCAL Procedure	Required PM Series
478A	10 MHz to 10 GHz	-30 dBm to 10 dBm	NA	NA	CP0198	PMX18-001
8478B	10 MHz to 18 GHz	-30 dBm to 10 dBm	NA	NA	CP0197	PMX18-001
8481A	10 MHz to 18 GHz	-30 dBm to 20 dBm	NA	NA	CP0196	PMX18-001
8481B	10 MHz to 18 GHz	0 dBm to 44 dBm	NA	NA	CP0768	PMX18-001
8481D	10 MHz to 18 GHz	-70 dBm to -20 dBm	NA	NA	CP0244	PMX18-001
8481H	10 MHz to 18 GHz	-10 dBm to 35 dBm	NA	NA	CP0295	PMX18-001
8482A	100 kHz to 4.2 GHz	-30 dBm to 20 dBm	NA	NA	CP0254	PMX18-001
8482B	100 kHz to 4.2 GHz	0 dBm to 44 dBm	NA	NA	CP0795	PMX18-001
8482H	100 kHz to 4.2 GHz	-10 dBm to 35 dBm	NA	NA	CP0765	PMX18-001
8483A	100 kHz to 2 GHz	-30 dBm to 20 dBm	NA	NA	Derived from CP0254 with 75 Ohm adapter	PMX18-001
8484A	10 MHz to 18 GHz	-70 dBm to -20 dBm	NA	NA	Derived from CP0244	PMX18-001
8485A	50 MHz to 26.5 GHz	-30 dBm to 20 dBm	NA	NA	CP0212	PMX26-001
8485D	50 MHz to 26.5 GHz	-70 dBm to -20 dBm	NA	NA	CP1117	PMX26-001
8487A	50 MHz to 50 GHz	-30 dBm to 20 dBm	NA	NA	Derived from CP0212	PMX50-001
8487D	50 MHz to 50 GHz	-70 dBm to -20 dBm	NA	NA	Derived from CP1117	PMX50-001
11722A	100 kHz to 2.6 GHz	-30 dBm to 20 dBm	NA	NA	CP0520	PMX18-001
11792A	50 MHz to 26.5 GHz	-30 dBm to 20 dBm	NA	NA	CP0526	PMX26-001
84812A	500 MHz to 18 GHz	-34 dBm to 10 dBm	Yes	Yes	CP0844	PMX18-001
84813A	500 MHz to 26.5 GHz	-34 dBm to 10 dBm	Yes	Yes	Derived from CP0844	PMX26-001
84815A	20 MHz to 18 GHz	-40 dBm to 20 dBm	Yes	Yes	CP0856	PMX18-001
E4412A	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	CP1052	PMX18-001
E4413A	50 MHz to 26.5 GHz	-70 dBm to 20 dBm	Yes	Yes	CP1118	PMX26-001
E9300A	10 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1510	PMX18-001
E9300H	10 MHz to 18 GHz	-50 dBm to 30 dBm	Yes	Yes	CP1512	PMX18-001
E9301A	10 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1511	PMX18-001
E9301B	10 MHz to 6 GHz	0 dBm to 44 dBm	Yes	Yes	Derived from CP0768 and CP1512	PMX18-001
E9301H	10 MHz to 6 GHz	-50 dBm to 30 dBm	Yes	Yes	CP1513	PMX18-001
E9304A	9 kHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1511	PMX18-001 (100 kHz limited)
E9321A	50 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1596	PMX18-001
E9322A	50 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1596	PMX18-001
E9323A	50 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1596	PMX18-001
E9325A	50 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1595	PMX18-001
E9326A	50 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1595	PMX18-001
E9327A	50 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1595	PMX18-001
ECP-18A	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	CP1052	PMX18-001
ECP-E18A	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	CP1052	PMX18-001
ECP-E26A	50 MHz to 26.5 GHz	-70 dBm to 20 dBm	Yes	Yes	CP1118	PMX26-001
K486A	18 GHz to 26.5 GHz	-30 dBm to 10 dBm	NA	NA	Derived from CP0198 with K band adapter	PMX26-001
N5532A-504	100 kHz to 4.2 GHz	-20 dBm to 30 dBm	Yes	Yes	CP1777	PMX18-001
N5532A-518	10MHz to 18 GHz	-20 dBm to 30 dBm	Yes	Yes	CP1778	PMX18-001
N5532A-526	30 MHz to 26.5 GHz	-20 dBm to 30 dBm	Yes	Yes	CP1779	PMX26-001
N5532A-550	30 MHz to 50 GHz	-20 dBm to 30 dBm	Yes	Yes	CP1779	PMX50-001
N8481A	10 MHz to 18 GHz	-35 dBm to 20 dBm	Yes	Yes	CP1948	PMX18-001
N8482A	100 kHz to 6 GHz	-35 dBm to 20 dBm	Yes	Yes	CP1949	PMX18-001
N8485A	10 MHz to 26.5 GHz	-35 dBm to 20 dBm	Yes	Yes	CP1950	PMX26-001
N8487A	50 MHz to 50 GHz	-35 dBm to 20 dBm	Yes	Yes	CP1951	PMX50-001
P486A	12.4 GHz to 18 GHz	-30 dBm to 10 dBm	NA	NA	Derived from CP0198 with P band adapter	PMX18-001
Q8486A	33 GHz to 50 GHz	-30 dBm to 20 dBm	NA	NA	Derived from CP0198 with Q band adapter	PMX50-001
R486A	26.5 GHz to 40 GHz	-30 dBm to 10 dBm	NA	NA	Derived from CP0198 with R band adapter	PMX26-001 with 1107-8
R8486A	26.5 GHz to 40 GHz	-30 dBm to 20 dBm	NA	NA	Derived from CP0198 with R band adapter	PMX26-001 with 1107-8
R8486D	26.5 GHz to 40 GHz	-70 dBm to -20 dBm	NA	NA	CP1117	PMX26-001 with 1107-8
R8686A	26.5 GHz to 40 GHz	-30 dBm to 20 dBm	NA	NA	CP0212	PMX26-001 with 1107-8
U2000A	10 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1986	PMX18-001
U2001A	Modified 10 MHz to 6 GHz	-60 dBm to 25 dBm	Yes	Yes	CP1986	PMX18-001
U2000H	10 MHz to 18 GHz	-50 dBm to 30 dBm	Yes	Yes	CP1987	PMX18-001
U2001H	Modified 10 MHz to 6 GHz	-50 dBm to 30 dBm	Yes	Yes	CP1987	PMX18-001
U2002A	50 MHz to 24 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1988	PMX26-001
U2002H	50 MHz to 24 GHz	-50 dBm to 30 dBm	Yes	Yes	CP1989	PMX26-001

(Sensors continue on next page)

ANRITSU						
SENSOR	FREQUENCY RANGE	POWER RANGE	EEPROM Read	EEPROM Write	SureCAL Procedure	Required PM Series
MA2468A	10 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2468B	10 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2469A	10 MHz to 14 GHz	-60 dBm to 20 dBm	Yes	Yes	CP1175	PMX18-001
MA2472A	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2472B	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2472D	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2473A	10 MHz to 32 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX50-001
MA2473D	10 MHz to 32 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX50-001
MA2474A	10 MHz to 40 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX50-001
MA2474D	10 MHz to 40 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX50-001
MA2475A	10 MHz to 50 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX50-001
MA2475D	10 MHz to 50 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX50-001
MA2481B	10 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2481D	10 MHz to 6 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2482D	10 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2490A	50 MHz to 8 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
MA2491A	50 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1175	PMX18-001
BOONTON						
4200-4E	100 kHz to 18 GHz	-60 dBm to 10 dBm	NA	NA	CP0200	PMX18-001
4200-5E	100 kHz to 18 GHz	-50 dBm to 20 dBm	NA	NA	Derived from CP0200	PMX18-001
4200-6E	100 kHz to 18 GHz	-40 dBm to 30 dBm	NA	NA	Derived from CP0200	PMX18-001
4200-7E	100 kHz to 18 GHz	-30 dBm to 10 dBm	NA	NA	Derived from CP0200	PMX18-001
51075	500 kHz to 18 GHz	-70 dBm to 20 dBm	No	No	CP1990	PMX18-001
56318	500 MHz to 18 GHz	-34 dBm to 20dBm	Yes	Yes	Derived from CP1342	PMX18-001
56326	500 MHz to 18 GHz	-34 dBm to 20dBm	Yes	Yes	Derived from CP1343	PMX26-001
56340	500 MHz to 18 GHz	-50 dBm to 20 dBm	Yes	Yes	Derived from CP1342	PMX18-001
57318	50 MHz to 18 GHz	-34 dBm to 20dBm	Yes	Yes	CP1342	PMX18-001
57340	50 MHz to 40 GHz	-40 dBm to 20 dBm	Yes	Yes	Derived from CP1343	PMX50-001
57518	50 MHz to 18 GHz	-50 dBm to 20dBm	Yes	Yes	CP1343	PMX18-001
GIGA-TRONICS						
16936	500 MHz to 18 GHz	-40 dBm to 20 dBm	Yes	No	CP0812	PMX18-001
17266	500 MHz to 26.5 GHz	-40 dBm to 20 dBm	Yes	No	CP1157	PMX26-001
80301A	10 MHz to 18 GHz	-70 dBm to 20 dBm	Yes	Yes	CP1119	PMX18-001
80303A	10 MHz to 26.5 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1119	PMX26-001
80304A	10 MHz to 40 GHz	-70 dBm to 20 dBm	Yes	Yes	Derived from CP1119	PMX50-001
80310A	10 MHz to 18 GHz	-64 dBm to 26 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80313A	10 MHz to 26.5 GHz	-64 dBm to 26 dBm	Yes	Yes	Derived from CP1119	PMX26-001
80314A	10 MHz to 40 GHz	-64 dBm to 26 dBm	Yes	Yes	Derived from CP1119	PMX40-001
80320A	10 MHz to 18 GHz	-60 dBm to 30 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80321A	10 MHz to 18 GHz	-50 dBm to 37 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80325A	10 MHz to 18 GHz	-40 dBm to 47 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80350A	45 MHz to 18 GHz	-67 dBm to 20 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80401A	10 MHz to 18 GHz	-67 dBm to 20 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80601A	10 MHz to 18 GHz	-67 dBm to 20 dBm	Yes	Yes	Derived from CP1119	PMX18-001
80701A	50 MHz to 18 GHz	-60 dBm to 20 dBm	Yes	Yes	Derived from CP1119	PMX18-001
TEGAM						
1807A	10 MHz to 18 GHz	-20 dBm to 13 dBm	NA	NA	CP0216	PMX18-001
13869	10 MHz to 18 GHz	-50 dBm to 10 dBm	NA	NA	CP0199	PMX18-001
F1109	10 MHz to 18 GHz	-20 dBm to 13 dBm	NA	NA	CP1122	PMX18-001
F1116	100 kHz to 100 MHz	-20 dBm to 13 dBm	NA	NA	CP1123	PMX18-001
F1117A	50 MHz to 26.5 GHz	-20 dBm to 13 dBm	NA	NA	CP1124	PMX26-001
F1119	100 kHz to 4.2 GHz	-20 dBm to 13 dBm	NA	NA	CP1125	PMX18-001
F1125	100 kHz to 4.2 GHz	-20 dBm to 13 dBm	NA	NA	CP1539	PMX18-001
F1130	100 kHz to 18 GHz	-20 dBm to 13 dBm	NA	NA	CP1542	PMX18-001
F1135	10 MHz to 26.5 GHz	-20 dBm to 13 dBm	NA	NA	CP1540	PMX26-001
M1110	10 MHz to 18 GHz	-20 dBm to 13 dBm	NA	NA	Derived from CP1122	PMX18-001
M1130	12.4 GHz to 18 GHz	-20 dBm to 13 dBm	NA	NA	Derived from CP1542	PMX18-001
M1135	10 MHz to 26.5 GHz	-20 dBm to 13 dBm	NA	NA	Derived from CP 1540	PMX26-001

PM Series Accessories

Attenuators

138-645-1

Coaxial fixed attenuator; 30 dB

- Frequency DC to 18 GHz
- Maximum Input Power: 2 W (average), 100 W (peak)
- Maximum SWR: 1.2 to 8 GHz, 1.3 to 12.4 GHz, 1.5 to 18 GHz
- Connector: Type-N male to female
- Includes S-parameter test data



138-645-2

Coaxial fixed attenuator; 30 dB

- Frequency DC to 26.5 GHz
- Maximum Input Power: 2 W (average), 5 μ sec pulse width; 0.05% duty cycle (peak)
- Maximum SWR: 1.1 to 8 GHz, 1.15 to 12.4 GHz, 1.25 to 26.5 GHz
- Connector: 3.5 mm male to female
- Includes S-parameter test data



2510-913-01

Coaxial fixed attenuator; 30 dB

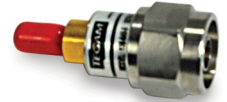
- Frequency DC to 50 GHz
- Maximum Input Power: 2 W (average)
- Maximum SWR: 1.3 to 26.5 GHz, 1.5 from 26.5 GHz to 50 GHz
- Connector: 2.4 mm male to female
- Includes S-parameter test data

Adapters

138-645-5

Connector/Adapter

- Frequency DC to 18 GHz
- Maximum SWR: 1.065 to 4 GHz, 1.13 to 18 GHz
- Connector: Type-N male to 3.5 mm female
- Includes S-parameter test data



138-645-6

Connector/Adapter

- Frequency DC to 18 GHz
- Maximum SWR: 1.065 to 4 GHz, 1.13 to 18 GHz
- Connector: Type-N female to 3.5 mm male
- Includes S-parameter test data



2510-912-01

Connector/Adapter

- Frequency DC to 26.5 GHz
- Maximum SWR: 1.05 DC to 18 GHz, 1.08 18 GHz to 26.5 GHz
- Connector: 2.4 mm male to 3.5 mm female
- Includes S-parameter test data

2510-911-01

Connector/Adapter

- Frequency DC to 40 GHz
- Maximum SWR: 1.05 DC to 4 GHz, 1.08 4 GHz to 20 GHz, 1.12 20 GHz to 40 GHz
- Connector: 2.4 mm male to 2.92 mm female
- Includes S-parameter test data

1510-912-01

Connector/Adapter

- Frequency DC to 26.5 GHz
- Maximum SWR: 1.05 DC to 18 GHz, 1.08 18 GHz to 26.5 GHz
- Connector: 2.4 mm female to 3.5 mm male
- Includes S-parameter test data

1510-911-01

Connector/Adapter

- Frequency DC to 40 GHz
- Maximum SWR: 1.05 DC to 4 GHz, 1.08 4 GHz to 20 GHz, 1.12 20 GHz to 40 GHz
- Connector: 2.4 mm female to 2.92 mm male
- Includes S-parameter test data

Cables

CA-11-15 and CA-11-48 (15" or 48" length)

Heater cable (4-pin mini to 4-pin mini)

For use with the following combinations:

- 1806A connected to F1130A/B and F1135A/B
- 1830A connected to F1130A/B and F1135A/B

CA-10-48 (48" length)

Heater cable (4-pin mini to 4-pin large)

For use with the following combinations:

- 1806A connected to M1130A and M1135A
- 1830A connected to M1130A and M1135A

CA-7-15 and CA-7-48 (15" or 48" length)

Sensor cable for use with the following combinations:

- 1830A connected to F1130A/B, F1135A/B, M1130A or M1135A

CA-27-48

Heater cable for 1805, 1806 to F1109, F1117, M1110, M1118, M1130 and M1135

CA-21-15 and CA-21-48 (15" or 48" length)

Heater and sensor cable for use with the following combinations:

- 1830A connected to 1510A and 2510A

CA-6-48 (48" length)

Sensor cable for use with the following combinations:

- 1830A connected to 478A and 8478B

CA-9-48 (48" length)

Sensor cable; un-terminated cable for customers that wish to make their own cables to interface with the 1830A

CA-20-48 (48" length)

Sensor cable; lug-terminated cable for calibration of the 1830A

CA-23-12 (12" length)

Low loss RF cable, 50 GHz, 2.4 mm male connectors

- Insertion loss max 1.8 dB

CA-23-36 (36" length)

Low loss RF cable, 50 GHz, 2.4 mm male connectors

- Insertion loss max 4.0 dB

CA-14-2M (2-meter length)

USB cable, USB A to USB A; communication cable for the 1830A

1585-1000 (36" length)

Test cable with SMA straight plug connectors, DC to 18 GHz

- Insertion loss max 1.9 dB

1585-1008 (36" length)

Low loss RF cable, 26.5 GHz, 3.5 mm male connectors

- Insertion loss max 3.0 dB

1585-1009 (36" length)

Low loss RF cable, 40.0 GHz, 2.92mm male connectors

- Insertion loss max 3.6 dB

Torque Wrenches

1130-910-01

Torque wrench, 8mm, 5 in-lbs

1130-911-01

Torque wrench, 3/4", 12 in-lbs

1130-912-01

Torque wrench, 13/16", 14 in-lbs

2510-910-01

Torque wrench, 8mm, 8 in-lbs

Rack Mount Kits

1830-910

Single unit rack mount, 1830A, F113XB and 2510A

1830-911

Dual rack mount kit, 1830A, F113XB and 2510A

F1120-RMK

Rack mount kit, F11XX Series (before "B" suffix only)

Transport Cases

1500-910

Transport case for 1510A power standard

2500-910

Transport case for 1830A, F113X, 2510A, M1130 and M1135

8000

RF mount transport case for F1109, F1117, M1110, M1118, M1130 and M1135

1800

Transport case, 1806A