Coaxial Power Standards
(Thermistor Mounts)

0.1 MHz to 26.5 GHz

FIGURE 1: MODEL F1109
(FEED-THROUGH MOUNT)

FIGURE 2: MODEL M1110
(TERMINATING MOUNT)

FIGURE 3: MODEL 1807A
(FEED-THROUGH MOUNT WITH CASE)

TEGAM Temperature Stabilized Coaxial Power Standards enable precise measurement of microwave power in the 0.1 MHz to 26.5 GHz frequency range. All units are extremely rugged, highly accurate, stable with time and temperature, and ideal for use as standards for the transfer of calibration factors to other standards and power meters. Units are supplied with calibration data traceable to NIST with Z540 data standard.

All models are designed for use with dc self balancing bridges or controllers such as the TEGAM Model 1806 Dual Type IV Power Meter and the Model 1805B RF Power Level Control Unit. System configurations employing instruments of this extreme accuracy typically achieve results in the transfer of calibration factors normally found only in primary standards laboratories (refer to System IIA data sheet).

Models F1116, F1119, F1109 and F1117A are Thermistor Mount/Power Splitter combinations used as feed-through standards for the calibration of terminating power sensors such as bolometer mounts and power meters.

Models 1807A, F1119C and F1117AC are feed-through mounts provided with a case (figure 3) simplifying setup configurations requiring a precision power standard and a highly stable RF signal level all in one package. This package protects the individual components mounted within the unit from damage due to mishandling as can happen with other RF transfer standards. A pull-out shelf located in the bottom of the unit is provided for use as a work platform when calibrating power sensors and power meter mounts or for the transfer of calibration factors.

Models F1119H and F1109H are Thermistor Mount/Attenuator/Power Splitter combinations used as feed-through standards for the calibration of higher power terminating sensors. The use of the attenuator/splitter combination provides a broader band, lower SWR device. Use of either Model, along with the Model 1805B and a suitable source of power enables calibration of 1W to 5W terminating sensors directly at a power level within their normal operating range.

Models M1111, M1120, M1110 and M1118 are terminating power standards capable of calibration directly by NIST, and are used for the calibration of feed-through devices such as RF power meters, bolometer mount-coupler and bolometer mount-splitter assemblies, and in other configurations requiring direct measurement of RF power.

CONNECTORS: Mounts feature either Type N or 3.5 mm connectors which mate nondestructively with SMA, 2.92 mm and other 3.5 mm connectors. Mount Bias connectors are Binding Posts, standard 0.75" spacing for Banana plugs.

Model Number	Mount Connector Option
F1116	Type N (female)
M1111	Type N (male)
F1119	Type N (female)
F1119H	Type N (female)
M1120	Type N (male)
F1109	Type N (female)
F1109H	Type N (female)
M1110	Type N (male)
F1117A	3.5 mm (female)
M1118	3.5 mm (male)

CALIBRATION: Individual calibrations traceable to NIST are supplied at following frequencies. Data is supplied on floppy diskette with hard copy backup.

0.1 to 100 MHz
0.1, 0.2, 0.455, 1.0, 1.25, 3.0, 5.0, 10-100 MHz in 10 MHz increments

100 kHz to 4.2 GHz
0.0001 to 0.10 GHz in 10 MHz increments
0.15 to 2.00 GHz in 50 MHz increments
2.10 to 4.00 GHz in 100 MHz increments
4.2 GHz

0.01 to 18.0 GHz
0.01 to 1.10 GHz in 10 MHz increments
0.10 to 2.00 GHz in 100 MHz increments
2.10 to 4.00 GHz in 100 MHz increments
4.20 to 12.40 GHz in 200 MHz increments
12.40 to 18.00 GHz in 250 MHz increments

0.05 to 26.5 GHz
0.05 to 0.10 GHz in 10 MHz increments
0.10 to 2.00 GHz in 50 MHz increments
2.10 to 4.00 GHz in 100 MHz increments
4.00 to 12.40 GHz in 200 MHz increments
12.40 to 18.00 GHz in 250 MHz increments
18.00 to 26.00 GHz in 1 GHz increments
26.5 GHz

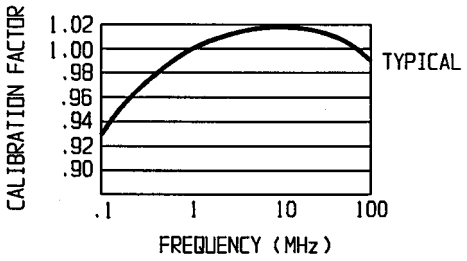
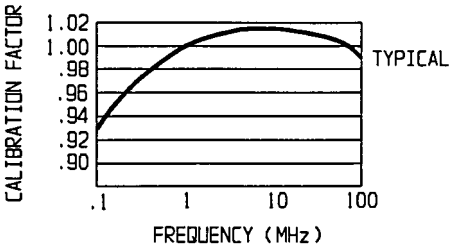
NIST CALIBRATION: Calibration Factors only for the Models M1110, M1111 and M1118 Terminating Mounts can be supplied directly by the National Institute of Standards and Technology.

RACK MOUNTING: Models 1807A, F1119C and F1117AC are half-rack instruments that can be mounted in any cabinet or rack designed according to EIA RS-310 and MIL-STD-189 using the Rack Adapter Kit (P/N 1919). This kit allows any of the models to be mounted with the model 1805B, or another coaxial power standard in the same rack-mount configuration.

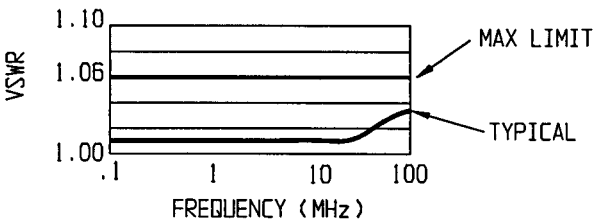
ORDERING INFORMATION

F1116	Feed-through Mount/Splitter	0.1 to 100 MHz
M1111	Terminating Mount	0.1 to 100 MHz
F1119	Feed-through Mount	100 kHz to 4.2 GHz
F1119C	Feed-through Mount with case	100 kHz to 4.2 GHz
F1119H	100m W Feed-through Mount	100 kHz to 4.2 GHz
M1120	Terminating Mount	100 kHz to 4.2 GHz
F1109	Feed-through Mount	0.01 to 18.0 GHz
1807A	Feed-through Mount with case	0.01 to 18.0 GHz
F1109H	100m W Feed-through Mount	0.01 to 18.0 GHz
M1110	Terminating Mount	0.01 to 18.0 GHz
F1117A	Feed-through Mount/Splitter	0.05 to 26.5 GHz
F1117AC	Feed-through Mount/Splitter with case	0.05 to 26.5 GHz
M1118	Terminating Mount	0.05 to 26.5 GHz

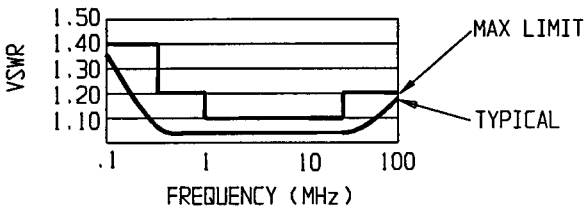
SPECIFICATIONS

SPECIFICATION	Model F1116	Model M1111
FREQUENCY RANGE	0.1 to 100 MHz	0.1 to 100 MHz
RF IMPEDANCE	50 Ω nominal	50 Ω nominal
THERMISTOR BIAS POWER	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control
CALIBRATION FACTOR STABILITY	< 0.5 % per year	< 0.5 % per year
CALIBRATION FACTOR ACCURACY (RSS %) 0.1 - 10 MHz 10 - 100 MHz	 ± 0.80 ± 0.90	 ± 0.80 ± 0.90
POWER DEPENDENCE OF CALIBRATION FACTOR	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit
POWER RANGE	10 µW to 25 mW	100 µW to 250 mW
RESISTANCE AT BIAS	200 Ω	200 Ω
RESISTANCE TEMP. COEFFICIENT	Negative	Negative
RESISTANCE POWER SENSITIVITY	~ 13 Ω /mW	~ 13 Ω /mW
TEMPERATURE RANGE Operating: Non-Operating:	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C
WEIGHT	1.5 kg (3 lbs, 4 oz)	1.3 kg (2 lbs, 4 oz)
CALIBRATION FACTOR (Typical)		

VSWR



Model 1116

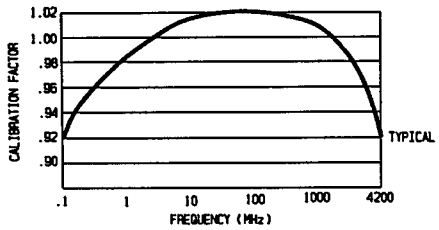


Model 1111

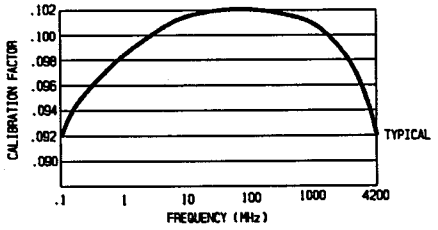
SPECIFICATIONS

SPECIFICATION	Model F1119	Model F1119H	Model M1120
FREQUENCY RANGE	100 kHz to 4.2 GHz	100 kHz to 4.2 GHz	100 kHz to 4.2 GHz
RF IMPEDANCE	50 Ω nominal	50 Ω nominal	50 Ω nominal
THERMISTOR BIAS POWER	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control
CALIBRATION FACTOR STABILITY	< 0.5 % per year	< 0.5 % per year	< 0.5 % per year
CALIBRATION FACTOR ACCURACY (RSS %) 0.01 - 10 MHz 10 - 4200 MHz	 ± 0.80 ± 0.90	 ± 0.80 ± 0.90	 ± 0.80 ± 0.90
POWER DEPENDENCE OF CALIBRATION FACTOR	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit	< 0.1 % from 10 to 100 mW, negligible to maximum useful limit	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit
POWER RANGE	10 µW to 25 mW	100 µW to 250 mW	10 µW to 25 mW
RESISTANCE AT BIAS	200 Ω	200 Ω	200 Ω
RESISTANCE TEMP. COEFFICIENT	Negative	Negative	Negative
RESISTANCE POWER SENSITIVITY	~ 13 Ω /mW	~ 13 Ω /mW	~ 13 Ω /mW
TEMPERATURE RANGE Operating: Non-Operating:	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C
WEIGHT	1.5 kg (3 lbs, 4 oz)	1.57 kg (3 lbs, 7 oz)	1.3 kg (2 lbs, 14 oz)

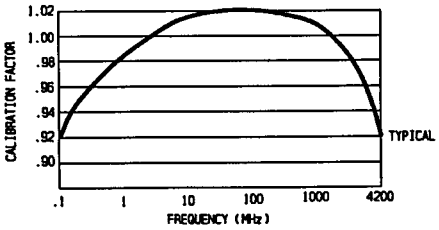
CALIBRATION FACTOR (Typical)



Model F1119

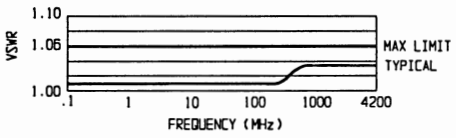


Model F1119H

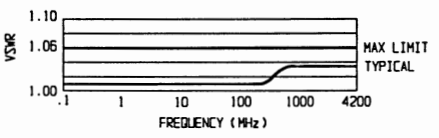


Model M1120

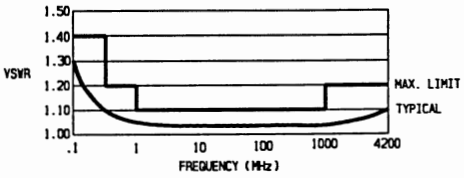
VSWR



Model F1119



Model F1119H

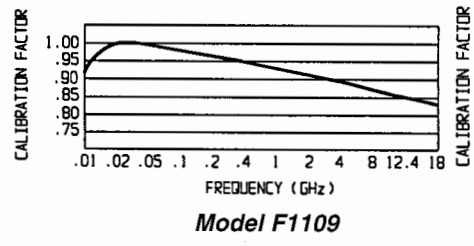


Model M1120

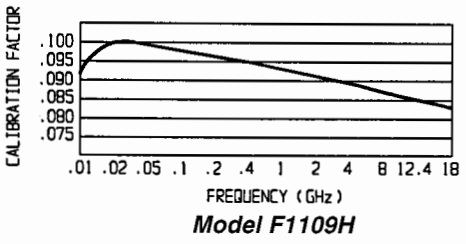
SPECIFICATIONS

SPECIFICATION	Model F1109	Model F1109H	Model M1110
FREQUENCY RANGE	0.01 to 18.0 GHz	0.01 to 18.0 GHz	0.01 to 18.0 GHz
RF IMPEDANCE	50 Ω nominal	50 Ω nominal	50 Ω nominal
THERMISTOR BIAS POWER	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control
CALIBRATION FACTOR STABILITY	< 0.5 % per year	< 0.5 % per year	< 0.5 % per year
CALIBRATION FACTOR ACCURACY (RSS %) 0.01 - 10 GHz 10 - 18 GHz	 ± 1.00 ± 1.10	 ± 1.00 ± 1.10	 ± 1.20 ± 1.30
POWER DEPENDENCE OF CALIBRATION FACTOR	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit	< 0.1 % from 1 to 100 mW, negligible to maximum useful limit	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit
POWER RANGE	10 µW to 25 mW	100 µW to 250 mW	10 µW to 25 mW
RESISTANCE AT BIAS	200 Ω	200 Ω	200 Ω
RESISTANCE TEMP. COEFFICIENT	Negative	Negative	Negative
RESISTANCE POWER SENSITIVITY	~ 13 Ω /mW	~ 13 Ω /mW	~ 13 Ω /mW
TEMPERATURE RANGE Operating: Non-Operating:	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C
WEIGHT	1.5 kg (3 lbs, 4 oz)	1.57 kg (3 lbs, 7 oz)	1.3 kg (2 lbs, 14 oz)

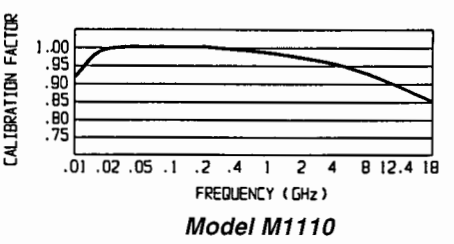
CALIBRATION FACTOR (Typical)



Model F1109

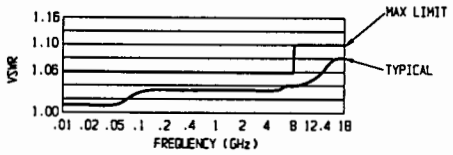


Model F1109H

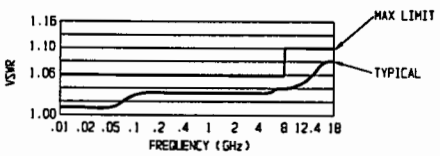


Model M1110

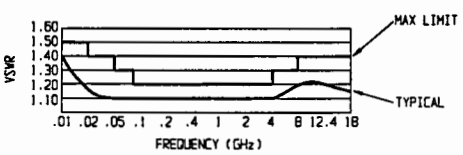
VSWR



Model F1109

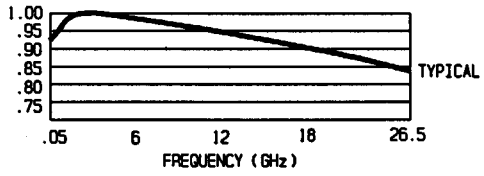
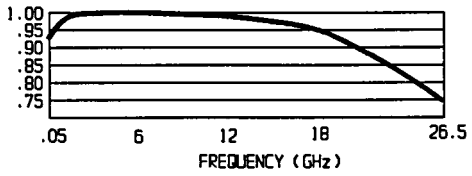


Model F1109H

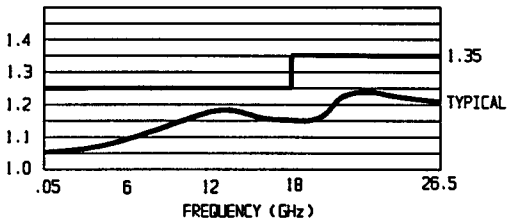


Model M1110

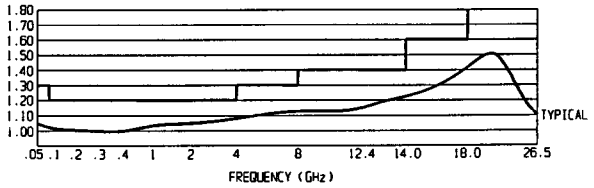
SPECIFICATIONS

SPECIFICATION	Model 1117A	Model 1118
FREQUENCY RANGE	0.05 to 26.5 GHz	0.05 to 26.5 GHz
RF IMPEDANCE	50 Ω nominal	50 Ω nominal
THERMISTOR BIAS POWER	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control
CALIBRATION FACTOR STABILITY	< 0.5 % per year	< 0.5 % per year
CALIBRATION FACTOR ACCURACY (RSS %) 0.05 - 10 GHz 10 - 18 GHz 18 - 26.5 GHz	 ± 1.00 ± 1.10 ± 2.20	 ± 1.20 ± 1.30 ± 2.30
POWER DEPENDENCE OF CALIBRATION FACTOR	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit
POWER RANGE	10 µW to 25 mW	10 µW to 25 mW
RESISTANCE AT BIAS	200 Ω	200 Ω
RESISTANCE TEMP. COEFFICIENT	Negative	Negative
RESISTANCE POWER SENSITIVITY	~ 13 Ω /mW	~ 13 Ω /mW
TEMPERATURE RANGE Operating: Non-Operating:	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C
WEIGHT	1.5 kg (3 lbs, 4 oz)	1.3 kg (2 lbs, 4 oz)
CALIBRATION FACTOR (Typical)		

VSWR



Model 1117A

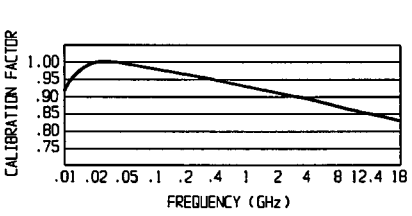


Model 1118

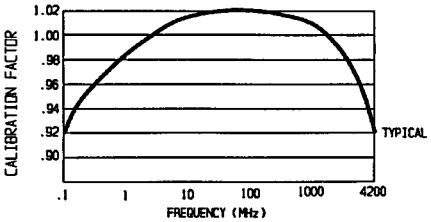
SPECIFICATIONS

SPECIFICATION	Model 1807A	Model F1119C	Model 1117AC
FREQUENCY RANGE	0.01 to 18.0 GHz	100 kHz to 4.2 GHz	0.05 to 26.5 GHz
RF IMPEDANCE	50 W nominal	50 W nominal	50 Ω nominal
THERMISTOR BIAS POWER	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control	30 ± 0.7 milliwatt with temperature control
CALIBRATION FACTOR STABILITY	< 0.5 % per year	< 0.5 % per year	< 0.5 % per year
CALIBRATION FACTOR ACCURACY (RSS %) 0.1 - 10 MHz 10 MHz - 10 GHz 10 - 18 GHz	 — ± 1.00 ± 1.10	 ± 0.80 ± 0.90 —	 ± 1.00 ± 1.10 ± 2.20
POWER DEPENDENCE OF CALIBRATION FACTOR	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit	< 0.1 % from 1 to 10 mW, negligible to maximum useful limit
POWER RANGE	10 mW to 25 mW	100 mW to 25 mW	10 µW to 25 mW
RESISTANCE AT BIAS	200 W	200 W	200 Ω
RESISTANCE TEMP. COEFFICIENT	Negative	Negative	Negative
RESISTANCE POWER SENSITIVITY	~ 13 Ω /mW	~ 13 Ω /mW	~ 13 Ω /mW
TEMPERATURE RANGE Operating: Non-Operating:	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C	 +12°C to +40°C -55°C to +75°C
WEIGHT	5.69 kg (12 lbs, 8.5 oz)	5.69 kg (12 lbs, 8.5 oz)	5.69 kg (12 lbs, 8.5 oz)

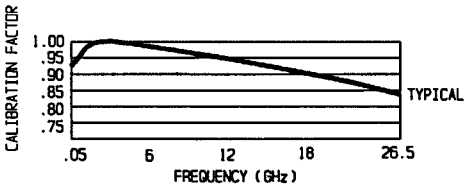
CALIBRATION FACTOR (Typical)



Model 1807A

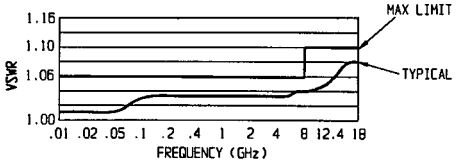


Model F1119C

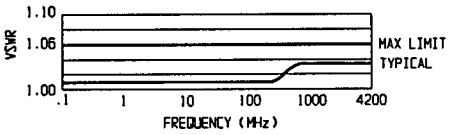


Model 1117AC

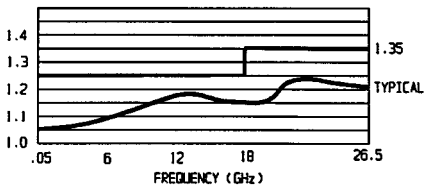
VSWR



Model 1807A



Model F1119C



Model 1117AC