

Certificate of Calibration



Standards Laboratory Calibration
Certificate Number 1-10951267114-1



AC-1498

Model Number	8481A	Customer	Keysight Technologies Inc
Manufacturer	Agilent Technologies Inc		700 Lairport St
Description	Power Sensor, 10 MHz to 18 GHz, -30 to +20 dBm		EL SEGUNDO CA 90245-5006
Serial Number	US37299315		United States
Customer Asset No.	PSI0981		
Date of Calibration	1 Mar 2019	Location of Calibration	Keysight Technologies Inc.
Procedure	8481A/H_TP, 30 JUN 2000		10090 Foothills Blvd.
Temperature	(23 ± 1) °C		Roseville CA 95747-7102
Humidity	(45 ± 10) %RH		UNITED STATES

This certifies that the equipment has been calibrated using applicable Keysight Technologies procedures and accredited to ISO/IEC 17025:2017 and ANSI/NCSL Z540.3-2006. The quality management system is registered to ISO 9001:2015.

As Received Conditions

The measured values of the equipment was for the purpose of characterization. No compliance statement is made relating to specification.

Action Taken

- Calibration Factors were updated.

As Completed Conditions

The measured values of the equipment was for the purpose of characterization. No compliance statement is made relating to specification.

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95%. This probability corresponds to a coverage factor of k=2 for a normal distribution.

Remarks or Special Requirements

This calibration certificate may refer to instruments manufactured by HP, Agilent and Keysight as being manufactured by Keysight Technologies, Inc.

The test limits stated in the report correspond to the published specifications of the equipment, at the points tested.

Based on the customer's request, the next calibration is due on 1 Mar 2020.

Keysight Technologies Inc
10090 Foothills Blvd.
Roseville CA 95747-7102
UNITED STATES

Wes Fischbach Roseville Serv. Cntr. Mgr.

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Traceability Information

Technician ID Number 00330937

Measurements are traceable to the International System of Units (SI) via national metrology institutes (www.keysight.com/find/NMI) that are signatories to the CIPM Mutual Recognition Arrangement.

This certificate shall not be reproduced, except in full, without prior written approval of the laboratory.

Calibration Equipment Used

<u>Model Number</u>	<u>Model Description</u>	<u>Equipment ID</u>	<u>Cal Due Date</u>	<u>Certificate Number</u>
11667A	DC-18 GHz power splitter, type N, 50 ohm	11667A19832	11 Jul 2020	1-10181236286-1
3577A	Network Analyzer	3577A14136	26 Jun 2019	1-10680046946-1
432A	Power Meter, Thermistor	432A26217	20 Mar 2020	1-10401474545-1
437B	Power Meter	437B27169	26 Apr 2019	1-8821520551-1
478A	Coaxial Thermistor Mount, 10 MHz to 10 GHz	SP1517	29 Aug 2020	1-10193639039-1
8478B	Coaxial thermistor mount, 10 MHz to 18 GHz	SP4313	28 Aug 2020	1-10193639470-1
85054B	Standard mechanical calibration kit, DC to 18 GHz, type-N	SP7165	11 Dec 2019	1-10663941270-1
8510C	Vector network analyzer	SP11591	17 Mar 2020	1-10401388268-1

* KEYSIGHT TECHNOLOGIES *
* ROSEVILLE STANDARDS LAB *
* MEASUREMENT REPORT *

DATE: 1 Mar 2019
CAL NO: SP17721
SO NO: 1-10951267114-1
ITEM: Power Sensor, Model 8481A H84
IDENTIFICATION: US37299315
TEMPERATURE: 23 +/- 1 Deg. C
REL. HUMIDITY: 45 +/-10%
TECHNICIAN: 00330937

This Power Sensor was calibrated using standards traceable to a National Metrology Institute (NMI). The uncertainty of the frequency output of the source used was +/- 0.01%. The calibration was performed at a nominal incident power level of one milliwatt.

The calibration factor is referenced to 100 % at 50 MHz.

Note: When using this Sensor to measure absolute power, the user must include the uncertainty of the 50 MHz Power Reference and the uncertainty of setting the 50 MHz CAL or CAL ADJ along with the calibration factor uncertainty at the frequency of interest.

Standards Used	Reference No.	Last Calibrated
SP1517	2017090440-1	08-18
SP4313	2018050060-1	08-18

Test Procedure Number: 8481A/H_TP, 30 Jun 2000

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*           KEYSIGHT TECHNOLOGIES           *
*           ROSEVILLE STANDARDS LAB       *
*           MEASUREMENT REPORT             *
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MODEL: 8481A H84
IDENTIFICATION: US37299315
CAL. NO: SP17721
DATE: 1 Mar 2019

Measurement uncertainty for reflection coefficient is +/- 0.009.
The uncertainty analysis for this calibration was done in accordance with
the ISO/TAG4 Guide. The uncertainty reported is the expanded uncertainty
with a 95% confidence level and a coverage factor of 2.

NOTE: The uncertainties may differ from those previously reported. In
most cases this results from the change in the method of expressing the
uncertainty and does not necessarily imply new uncertainties in the
measurement results.

FREQUENCY	CALIBRATION	UNCERTAINTY	REFLECTION COEFFICIENT	
-MHz-	FACTOR-%	%	Magnitude	Degrees
10.00	99.57	+/- 0.60	0.061	-91.2
30.00	100.02	+/- 0.45	0.022	-111.9
50.00	100.00	(Reference)	0.015	-129.5
100.00	99.90	+/- 0.41	0.011	-160.0
300.00	99.71	+/- 0.52	0.010	136.4
500.00	99.24	+/- 0.52	0.010	93.5
800.00	99.23	+/- 0.52	0.013	50.2
1000.00	98.55	+/- 0.52	0.012	13.9
1200.00	98.55	+/- 0.52	0.011	1.2
1500.00	98.78	+/- 0.52	0.013	-31.1
2000.00	98.50	+/- 0.52	0.014	-98.0
3000.00	98.09	+/- 0.56	0.017	117.6
4000.00	97.68	+/- 0.56	0.027	9.4
5000.00	97.25	+/- 0.64	0.028	-93.0
6000.00	96.92	+/- 0.66	0.024	152.8
7000.00	96.49	+/- 0.67	0.022	41.4
8000.00	96.08	+/- 0.70	0.011	-42.5
9000.00	95.54	+/- 0.80	0.013	8.5
10000.00	95.11	+/- 0.78	0.032	-67.9
11000.00	94.59	+/- 0.74	0.036	-163.0
12000.00	94.37	+/- 0.76	0.041	93.3
12400.00	94.20	+/- 0.80	0.044	48.5
13000.00	93.81	+/- 0.75	0.047	-8.9
14000.00	93.53	+/- 0.73	0.043	-91.6
15000.00	92.87	+/- 0.74	0.024	157.7
16000.00	93.65	+/- 0.82	0.012	-57.3
17000.00	93.45	+/- 0.87	0.025	-163.1
18000.00	92.82	+/- 0.80	0.041	43.8