Calibration Laboratory Cert: 5518.01

# ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994
# Accredited Calibration Certificate

| | |
|---|---|
| Customer Address: | Rental |
| Order: | |
| Certificate: | A24101403DR |
| Product: | Power Sensor |
| Manufacturer: | Agilent |
| Model: | E9327A |
| Serial: | 1498693 |
| Notes: | Frequency Range 50MHz to 18GHz<br>Tested Fully Functional to 20GHz |
| Date of Report: | 10/14/2024 |
| Date of Calibration: | 10/14/2024 |
| Next Calibration: | |

***The next calibration date is defined by the equipment user/owner. We recommend recalibration annually.***

The above instrument was tested and found to be within the manufacturer's specification. The results of the tests performed are held on file at The EMC Shop. The calibration was carried out in accordance with the general requirements of ISO/IEC 17025-2017, IEC 61000-4-6 using laboratory standards which are traceable to the SI International System of Quantities through the National Institute of Standards and Technology (NIST), and or other Accredited bodies except where none exist. Tests are carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. This certificate shall not be reproduced except in full without the written approval of the laboratory. The uncertainty results meet the requirements of the ISO/IEC 17025-2017 standard and ILAC Doc.P14.

| **Ambient Conditions of Laboratory** | |
|---|---|
| Temperature (°C): | **21** |
| Relative Humidity (%): | **37** |

Technician: **Dan Raines**

Technician Signature: _____

The EMC Shop

| Calibration Equipment | | | | |
|---|---|---|---|---|
| **Model** | **Description** | **Serial Number** | **Certificate #** | **Due Date** |
| E5071C | Network Analyzer | MY46214012 | A24041501DR | 4/15/2026 |
| 85052D | Cal Kit | MY43253324 | A24041502DR | 4/15/2026 |
| E4416B | Power Meter | MY56220009 | A23042001DR | 4/20/2025 |
| N5183A | Signal Generator | MY50140101 | 753924 | 3/22/2027 |

Calibration method used: IEC 61000-4-6

VSWR measurements made are not accredited

| | |
|---|---|
| **Condition as found:** | **IN tolerance** |
| **Condition as left:** | **IN tolerance** |

| Measuring Uncertainties | |
|---|---|
| Insertion Loss | **± 0.2 dB** |
| RF Power Level | **± 0.3 dB** |
| Power Amplifer Gain Linearity | **± 0.44 dB** |

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%

**1dB step Accuracy tested at 50MHz**

| Nominal (dBm) | Actual (dBm) | Difference (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|---|
| 0.00 | 0.20 | 0.20 | ±1.00 | PASS |
| -1.00 | -0.80 | 0.20 | ±1.00 | PASS |
| -2.00 | -1.80 | 0.20 | ±1.00 | PASS |
| -3.00 | -2.80 | 0.20 | ±1.00 | PASS |
| -4.00 | -3.80 | 0.20 | ±1.00 | PASS |
| -5.00 | -4.80 | 0.20 | ±1.00 | PASS |
| -6.00 | -5.80 | 0.20 | ±1.00 | PASS |
| -7.00 | -6.80 | 0.20 | ±1.00 | PASS |
| -8.00 | -7.80 | 0.20 | ±1.00 | PASS |
| -9.00 | -8.80 | 0.20 | ±1.00 | PASS |
| -10.00 | -9.80 | 0.20 | ±1.00 | PASS |

**1dB step Accuracy tested at 20 GHz**

| Nominal (dBm) | Actual (dBm) | Difference (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|---|
| 0.00 | -0.20 | -0.20 | ±1.00 | PASS |
| -1.00 | -1.20 | -0.20 | ±1.00 | PASS |
| -2.00 | -2.20 | -0.20 | ±1.00 | PASS |
| -3.00 | -3.20 | -0.20 | ±1.00 | PASS |
| -4.00 | -4.20 | -0.20 | ±1.00 | PASS |
| -5.00 | -5.20 | -0.20 | ±1.00 | PASS |
| -6.00 | -6.20 | -0.20 | ±1.00 | PASS |
| -7.00 | -7.20 | -0.20 | ±1.00 | PASS |
| -8.00 | -8.20 | -0.20 | ±1.00 | PASS |
| -9.00 | -9.20 | -0.20 | ±1.00 | PASS |
| -10.00 | -10.30 | -0.30 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at 14dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | 14.00 | ±1.00 | PASS |
| 100 MHz | 14.00 | ±1.00 | PASS |
| 300 MHz | 13.90 | ±1.00 | PASS |
| 1 GHz | 14.00 | ±1.00 | PASS |
| 3 GHz | 14.00 | ±1.00 | PASS |
| 6 GHz | 14.00 | ±1.00 | PASS |
| 10 GHz | 14.00 | ±1.00 | PASS |
| 15 GHz | 13.90 | ±1.00 | PASS |
| 18 GHz | 13.80 | ±1.00 | PASS |
| 20 GHz | 13.70 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at 10dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | 10.10 | ±1.00 | PASS |
| 100 MHz | 10.10 | ±1.00 | PASS |
| 300 MHz | 10.10 | ±1.00 | PASS |
| 1 GHz | 10.20 | ±1.00 | PASS |
| 3 GHz | 10.10 | ±1.00 | PASS |
| 6 GHz | 10.00 | ±1.00 | PASS |
| 10 GHz | 10.00 | ±1.00 | PASS |
| 15 GHz | 9.90 | ±1.00 | PASS |
| 18 GHz | 9.80 | ±1.00 | PASS |
| 20 GHz | 9.80 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at 0dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | 0.20 | ±1.00 | PASS |
| 100 MHz | 0.20 | ±1.00 | PASS |
| 300 MHz | 0.10 | ±1.00 | PASS |
| 1 GHz | 0.20 | ±1.00 | PASS |
| 3 GHz | 0.00 | ±1.00 | PASS |
| 6 GHz | 0.00 | ±1.00 | PASS |
| 10 GHz | -0.10 | ±1.00 | PASS |
| 15 GHz | -0.20 | ±1.00 | PASS |
| 18 GHz | -0.30 | ±1.00 | PASS |
| 20 GHz | -0.20 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at -10dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | -9.80 | ±1.00 | PASS |
| 100 MHz | -9.80 | ±1.00 | PASS |
| 300 MHz | -9.90 | ±1.00 | PASS |
| 1 GHz | -9.90 | ±1.00 | PASS |
| 3 GHz | -10.00 | ±1.00 | PASS |
| 6 GHz | -10.10 | ±1.00 | PASS |
| 10 GHz | -10.20 | ±1.00 | PASS |
| 15 GHz | -10.30 | ±1.00 | PASS |
| 18 GHz | -10.40 | ±1.00 | PASS |
| 20 GHz | -10.30 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at -20dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | -19.80 | ±1.00 | PASS |
| 100 MHz | -19.80 | ±1.00 | PASS |
| 300 MHz | -19.80 | ±1.00 | PASS |
| 1 GHz | -19.80 | ±1.00 | PASS |
| 3 GHz | -20.00 | ±1.00 | PASS |
| 6 GHz | -20.10 | ±1.00 | PASS |
| 10 GHz | -20.10 | ±1.00 | PASS |
| 15 GHz | -20.30 | ±1.00 | PASS |
| 18 GHz | -20.30 | ±1.00 | PASS |
| 20 GHz | -20.30 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at -30dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | -29.70 | ±1.00 | PASS |
| 100 MHz | -29.70 | ±1.00 | PASS |
| 300 MHz | -29.70 | ±1.00 | PASS |
| 1 GHz | -29.80 | ±1.00 | PASS |
| 3 GHz | -29.90 | ±1.00 | PASS |
| 6 GHz | -30.00 | ±1.00 | PASS |
| 10 GHz | -30.00 | ±1.00 | PASS |
| 15 GHz | -30.20 | ±1.00 | PASS |
| 18 GHz | -30.20 | ±1.00 | PASS |
| 20 GHz | -30.20 | ±1.00 | PASS |

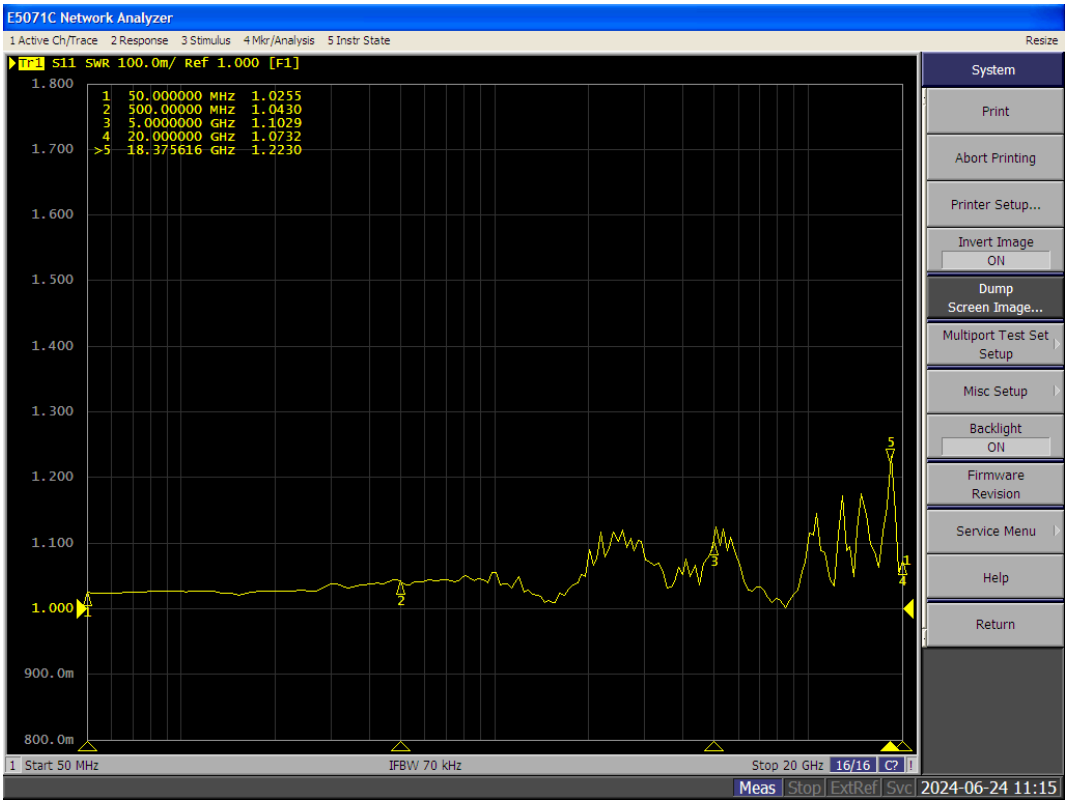
**Power Level Accuracy versus Frequency tested at -40dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | -39.30 | ±1.00 | PASS |
| 100 MHz | -39.40 | ±1.00 | PASS |
| 300 MHz | -39.40 | ±1.00 | PASS |
| 1 GHz | -39.50 | ±1.00 | PASS |
| 3 GHz | -39.60 | ±1.00 | PASS |
| 6 GHz | -39.60 | ±1.00 | PASS |
| 10 GHz | -39.60 | ±1.00 | PASS |
| 15 GHz | -39.50 | ±1.00 | PASS |
| 18 GHz | -39.50 | ±1.00 | PASS |
| 20 GHz | -39.40 | ±1.00 | PASS |

**Power Level Accuracy versus Frequency tested at -50dBm**

| Frequency | Actual (dBm) | Tol. Error (dBm) | Verdict |
|---|---|---|---|
| 50 MHz | -49.10 | ±1.00 | PASS |
| 100 MHz | -49.10 | ±1.00 | PASS |
| 300 MHz | -49.10 | ±1.00 | PASS |
| 1 GHz | -49.20 | ±1.00 | PASS |
| 3 GHz | -49.20 | ±1.00 | PASS |
| 6 GHz | -49.20 | ±1.00 | PASS |
| 10 GHz | -49.20 | ±1.00 | PASS |
| 15 GHz | -49.20 | ±1.00 | PASS |
| 18 GHz | -49.20 | ±1.00 | PASS |
| 20 GHz | -49.10 | ±1.00 | PASS |

## VSWR


E5071C Network Analyzer
1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Resize
Tr1 S11 SWR 100.0m/ Ref 1.000 [F1]
1 50.000000 MHz 1.0255
2 500.00000 MHz 1.0430
3 5.0000000 GHz 1.1029
4 20.000000 GHz 1.0732
>5 18.375616 GHz 1.2230
1.800
1.700
1.600
1.500
1.400
1.300
1.200
1.100
1.000
900.0m
800.0m
1 Start 50 MHz
IFBW 70 kHz
Stop 20 GHz
16/16
Meas
Stop
ExtRef
Svc
2024-06-24 11:15
System
Print
Abort Printing
Printer Setup...
Invert Image
ON
Dump
Screen Image...
Multiport Test Set
Setup
Misc Setup
Backlight
ON
Firmware
Revision
Service Menu
Help
Return