

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200679-0

IPS Corporation Tokyo Calibration Center
Chiba Prefecture
Japan

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Calibration Laboratories

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2018-11-30 through 2019-12-31

Effective Dates



A handwritten signature in blue ink, reading 'Dana S. Haman'. The signature is written in a cursive style and is positioned above a horizontal line.

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

<p>IPS Corporation Tokyo Calibration Center 935, Fusa Abiko-City, Chiba Prefecture 270-1101 JAPAN Mr. Toshio Shiba Phone: 81-4-7187-7311 Fax: 81-4-7187-7312 E-mail: tcc@ips-emc.co.jp URL: http://www.ips-emc.co.jp</p>	<p>Fields of Calibration Electromagnetics – DC/Low Frequency Time and Frequency Electromagnetics – RF/Microwave</p>
--	---

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY			
AC CURRENT and RESISTANCE (20/E02)			
Resistance, Reactance, and Impedance Field calibrations available ^{Note 4} 40 Hz to 50 kHz 50 kHz to 200 kHz	100.0 mΩ to 19.999 MΩ	11 % 16 %	ZM2353 + 2325AL
DC VOLTAGE (20/E06)			
DC Voltage Measure Field calibrations available ^{Note 4}	0.01 V to 1 V 1 V to 1000 V	0.24 % 0.15 %	34401A
LF AC VOLTAGE (20/E09)			
AC Voltage Measure Field calibrations available ^{Note 4} 0.1 V to 750 V	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	3.1 % 0.46 % 0.12 % 0.19 % 0.79 % 5.2 %	34401A
0.1 V to 4 V	10 kHz to 30 MHz	8.3 %	E4418B + E9304A

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
Spectrum Analyzer-- Amplitude and Response Field calibrations available ^{Note 4} 5 Hz to 100 kHz 100 kHz to 200 kHz 10 Hz to 20 kHz Reference Level Accuracy Field calibrations available ^{Note 4} 9 kHz to 18 GHz	10 mVp-p to 1 Vp-p -40 dBm to 20 dBm 10 dB step up to 110 dB	0.14 dB 0.27 dB 0.18 dB 0.23 dB	33220A, 33120A 34401A
CAPACITANCE (20/E10)			
Capacitance Field calibrations available ^{Note 4} 40 Hz to 50 kHz 50 kHz to 200 kHz	1.000 pF to 199.99 mF	11 % 16 %	ZM2353 with 2325AL
INDUCTANCE (20/E11)			
Inductance Field calibrations available ^{Note 4} 40 Hz to 50 kHz 50 kHz to 200 kHz	1.00 nH to 19.999 kH	11 % 16 %	ZM2353 with 2325AL
MAGNETICS (20/E13)			
Magnetic Field Meter 50 Hz or 60 Hz Response to H-field	1.26 μT to 62.8 μT	2.1 %	IEC 61786
TIME and FREQUENCY			
FREQUENCY DISSEMINATION (20/F01)			
Sine-Wave Frequency Measure Field calibrations available ^{Note 4}	(Aging rate daily) 0.1 Hz to 225 MHz 10 Hz to 40 GHz	 1.2 x 10 ⁻¹² 1.2 x 10 ⁻¹²	Rubidium Standard and Counter

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
Signal Generator -- Pulse Rise and Fall Time Field calibrations available ^{Note 4}	1 ns to 20 ns	4.7 %	Differential Time
Pulse Period and Width Field calibrations available ^{Note 4}	10 s to 0.5 ms	0.84 %	Measurements
Receiver-- Overall Selectivity Field calibrations available ^{Note 4}	9 kHz to 18 GHz	6.6 %	CISPR Band A/B/C/D/E
Random Noise Field calibrations available ^{Note 4}	9 kHz to 1 GHz	0.19 dB	(for 10 dB level variation)
Impulse Bandwidth Field calibrations available ^{Note 4}	1 MHz IF Filter	8.9 %	CISPR B and E
Spectrum Analyzer-- Field calibrations available ^{Note 4}			
IF Bandwidth Accuracy and Selectivity	Bandwidth: 0 dB to -6 dB	2.1 %	
	Bandwidth: -6 dB to -60 dB	3.0 %	
Noise Level	9 kHz to 40 GHz	0.63 dB	
Frequency Readout Accuracy	9 kHz to 40 GHz	0.92 %	
Frequency Span Accuracy	9 kHz to 40 GHz	0.75 %	
IF BW Switching Accuracy	9 kHz to 40 GHz	0.12 dB	Relative Measurement

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
OSCILLATOR CHARACTERISTICS (20/F03)			
Signal Generator-- Modulation (at carrier shown) Field calibrations available ^{Note 4}	at Rate		
AM (5 % to 99 %)			
150 kHz to 10 MHz	50 Hz to 10 kHz	2.3 %	Modulation Analyzer
10 MHz to 1300 MHz	50 Hz to 50 kHz	1.2 %	
9 kHz to 3GHz	2 Hz to 100 kHz	0.82 %	Spectrum Analyzer
3 GHz to 6.5GHz	2 Hz to 100 kHz	2.4 %	
FM			Modulation Analyzer
< 40 kHz peak, 250 kHz to 10 MHz	20 Hz to 10 kHz	2.3 %	
< 400 kHz peak 10 MHz to 1300 MHz	50 Hz to 100 kHz	1.2 %	
PM ^{Note 7}			
< 40 kHz peak, 150 kHz to 10 MHz	200 Hz to 10 kHz	4.6 %	
< 400 kHz peak 10 MHz to 1300 MHz	200 Hz to 20 kHz	3.5 %	
Harmonics Field calibrations available ^{Note 4}			
9 kHz to 3 GHz	0 dBc to 80 dBc	0.35 dB	Spectrum Analyzer
3 GHz to 6.5 GHz	0 dBc to 80 dBc	0.63 dB	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty <small>Notes 3,5</small>	Remarks
PULSE WAVEFORM (20/F04)			
CISPR Pulse Generator			CISPR 16-1-1
Pulse Area (integral function)	9 kHz to 1 GHz	6.0 %	CISPR Band A, B, and C/D
Pulse Width (horizontal scale)		2.6 %	
Amplitude Variation		0.27 dB	
Flatness of Spectrum Amplitude			
Band A		0.37 dB	
Band B		0.30 dB	
Band C/D		0.57 dB	
CISPR Receiver			
Field calibrations available <small>Note 4</small>			
Response to Pulse – Amplitude Relationship			
9 kHz to 30 MHz	10 dB to 60 dB	0.83 dB	CISPR Band A/B
100 MHz		0.94 dB	CISPR Band C
30 MHz to 100 MHz		1.1 dB	CISPR Band C
100 MHz to 1 GHz		1.5 dB	CISPR Band C/D
1 GHz to 3 GHz		1.6 dB	CISPR Band E
3 GHz to 18 GHz		0.75 dB	CISPR Band E
Response to Pulse – Variation with Repetition Frequency			Pulse Generator IGUU2916 Output Level from 10 dB to 60 dB
	9 kHz to 30 MHz	0.69 dB	
	30 MHz to 1 GHz	0.90 dB	
	1 GHz to 3 GHz	0.22 dB	
	3 GHz to 18 GHz	0.52 dB	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
ELECTROMAGNETICS – RF/MICROWAVE			
MICROWAVE ANTENNA PARAMETERS (20/R08)			
Monopole Antenna Field calibrations available ^{Note 4} Antenna Factor, Gain	30 Hz to 50 MHz	0.39 dB	IEEE 291 & ARP958
Loop Antenna Field calibrations available ^{Note 4} Antenna Factor	5 Hz to 200 kHz	0.47 dB	ARP958 Standard Field Method
Isotropic Electric Field Probes Correction Factor	10 kHz to 1 GHz	1.4 dB	HI- 4422 / FP2000
	100 kHz to 1 GHz	1.0 dB	HI-6005 / FP 6001
	1 GHz to 2 GHz	2.0 dB	
	2 GHz to 4 GHz	0.72 dB	
	4 GHz to 6 GHz	0.95 dB	
Rotational Response	100 kHz to 1 GHz	1.0 dB	HI4433 / FP2080 / EMC-20
	1 GHz to 3.5 GHz	2.0 dB	
	4 GHz	1.7 dB/-1.3 dB	
Rotational Response	100 kHz to 1 GHz	1.0 dB	OEFS-H-NS, OEFS-H-S1
	1 GHz to 3 GHz	2.0 dB	
	10 kHz to 1 GHz	0.2 dB	HI-4422 / FP2000
Rotational Response	100 kHz to 1 GHz	0.2 dB	HI-6005 / FP6001
	1 GHz to 3.5 GHz	0.4 dB	
	100 kHz to 3.5 GHz	0.2 dB	HI4433 / FP2080/ EMC-20

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
RF/MICROWAVE POWER (20/R17)			
CISPR Receiver Internal Calibration Source – Level Accuracy Field calibrations available ^{Note 4}	120 MHz, -40 dBm	0.17 dB	ESIB series only
High Power Sensor/Meters Field calibrations available ^{Note 4} Amplitude and Linearity (9 kHz to 1 GHz) (1 GHz to 4.2 GHz)	0.1 W to 100 W 0.1 W to 20 W	13 % 19 %	
Power Meter & Power Sensor Termination Type Field calibrations available ^{Note 4} Calibration Factor at 0 dBm	9 kHz to 6 GHz	1.7 %	E9304A & 11667A (type N)
	10 MHz to 2 GHz	1.9 %	E4412A & 11667A (type N)
	2 GHz to 10 GHz	2.8 %	
	10 GHz to 18 GHz	3.4 %	
	50 MHz to 2 GHz	3.1 %	E4413A & 11667B (type 3.5 mm)
	2 GHz to 10 GHz	3.2 %	
	10 GHz to 18 GHz	3.4 %	
	18 GHz to 26.5 GHz	4.2 %	
	50 MHz to 18 GHz	5.6 %	8487A & 11667C (type 2.4 mm)
	18 GHz to 26 GHz	7.0 %	
	26 GHz to 34 GHz	8.2 %	
	34 GHz to 40 GHz	8.9 %	
	50 MHz to 18 GHz	7.3 %	8487D, 11708A, and 11667C (type 2.4 mm)
	18 GHz to 26 GHz	8.9 %	
	26 GHz to 34 GHz	13 %	
	34 GHz to 40 GHz	13 %	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
Power Linearity 9 kHz to 6 GHz	-40 dBm to 20 dBm	3.7 %	E9304A
10 MHz to 18 GHz	-50 dBm to 20 dBm	6.6 %	E4412A
10 MHz to 26.5 GHz	-50 dBm to 20 dBm	6.2 %	E4413A
50 MHz to 40 GHz	-30 dBm to 20 dBm	8.5 %	8487A
50 MHz to 40 GHz	-70 dBm to -20 dBm	12 %	8487D
RF Absolute Power Measure (Unmodulated Sine-wave) Field calibrations available ^{Note 4}			
100 kHz to 4.2 GHz	-30 dBm to 20 dBm	3.7 %	8482A (type N)
9 kHz to 6 GHz	-40 dBm to 20 dBm	3.7 %	E9304A (type N)
10 MHz to 18 GHz	-50 dBm to 20 dBm	6.6 %	E4412A (type N)
50 MHz to 26.5 GHz	-50 dBm to 20 dBm	6.2 %	E4413A (type 3.5 mm)
50 MHz to 18 GHz	-30 dBm to 20 dBm	7.1 %	8487A (type 2.4 mm)
18 GHz to 40 GHz		8.5 %	
40 GHz to 50 GHz		11 %	
50 MHz to 18 GHz	-70 dBm to -20 dBm	8.0 %	8487D (type 2.4mm)
18 GHz to 40 GHz		12 %	
40 GHz to 50 GHz		15 %	
100 kHz to 1 GHz	20 dBm to 50 dBm	4.1 %	E9304, LA250
CISPR Receiver Field calibrations available ^{Note 4}			CISPR 16-1-1
Frequency Response to Sine Wave Voltage -10 dBm to +10 dBm	9kHz to 6GHz	0.26 dB	E9304 and 8496B

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
-47 dBm to +10 dBm	9kHz to 6GHz	0.23 dB	E9304 (Type N)
-50 dBm to +10 dBm	10 MHz to 6 GHz	0.28 dB	E4412A (Type N)
	6 GHz to 18 GHz	0.30 dB	
0 dBm to +10 dBm	6 GHz to 18 GHz	0.41 dB	E4412A and 8496B
-50 dBm to +10 dBm	50 MHz to 2 GHz	0.25 dB	E4413A (Type 3.5 mm)
	2 GHz to 10 GHz	0.26 dB	
	10 GHz to 18 GHz	0.27 dB	
	18 GHz to 26.5 GHz	0.29 dB	
-30 dBm to +10 dBm	50 MHz to 2 GHz	0.35 dB	8487A (Type 2.4 mm)
	2 GHz to 12.4 GHz	0.36 dB	
	12.4 GHz to 18 GHz	0.37 dB	
	18 GHz to 26.5 GHz	0.40 dB	
	26.5 GHz to 40 GHz	0.43 dB	
CISPR Average Response to Unsteady Narrowband Disturbances			
9 kHz to 30 MHz	60 dB μ V Reference	0.60 dB	CISPR Band A/B
30 MHz to 999.999 MHz	60 dB μ V Reference	0.66 dB	CISPR Band C/D
1 GHz to 18 GHz	60 dB μ V Reference	0.90 dB	CISPR Band E
CW Simulator (RF Generator) Unmodulated Sine Wave Field calibrations available ^{Note 4}			
Absolute Power			
100 kHz to 1 GHz	0.1 W to 100 W	4.1 %	
SCATTERING PARAMETERS (20/R18)			
VSWR ^{Note 8} Field calibrations available ^{Note 4}	10 Hz to 500 MHz	2.0 %	4395A + 87512A + 85032B/F
	5 Hz to 100 Hz	2.0 %	E5061B + 85032B/85032F
	100 Hz to 150 MHz	1.0 %	
	150 MHz to 3 GHz	1.4 %	
	9 kHz to 10 MHz	1.2 %	E5071C + 85032F

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
	10 MHz to 3 GHz	1.5 %	E8363B + 85054B (Type-N)
	3 GHz to 6 GHz	2.3 %	
	6 GHz to 8.5 GHz	2.9 %	
	45 MHz to 2GHz	1.2 %	
	2 GHz to 8 GHz	2.0 %	
	8 GHz to 18 GHz	2.8 %	
	45 MHz to 2 GHz	1.2 %	E8363B + 85052B (3.5mm)
	2 GHz to 8 GHz	2.2 %	
	8 GHz to 20 GHz	2.7 %	E8363B + 85056A (2.4mm)
	20 GHz to 26.5 GHz	2.8 %	
	45 MHz to 2 GHz	1.5 %	
	2 GHz to 8 GHz	1.9 %	
	8 GHz to 20 GHz	1.9 %	
	20 GHz to 40 GHz	3.0 %	
	10 MHz to 2 GHz	1.0 %	N5234B + 85054B (Type-N)
	2 GHz to 8 GHz	1.8 %	
	8 GHz to 18 GHz	2.6 %	
	10 MHz to 2 GHz	1.1 %	N5234B + 85052B (3.5mm)
	2 GHz to 8 GHz	2.1%	
	8 GHz to 20 GHz	2.6 %	
	20 GHz to 26.5 GHz	2.7 %	
	10 MHz to 2 GHz	1.3 %	N5234B + 85056A (2.4mm)
	2 GHz to 8 GHz	1.7 %	
	8 GHz to 20 GHz	1.7 %	
	20 GHz to 40 GHz	2.8%	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
BAN Field calibrations available ^{Note 4}			ISO 11452-7
Impedance	250 kHz to 500 MHz	3.5 %	
Insertion Loss	250 kHz to 500 MHz	2.1 dB	
CDN Field calibrations available ^{Note 4}			
Impedance	100 kHz to 80 MHz 80 MHz to 230 MHz	1.4 % 2.1 %	
Insertion Loss	100 kHz to 230 MHz	0.2 dB	
Artificial Hand Field calibrations available ^{Note 4}			CISPR 16-1-2
Impedance	100 kHz to 30 MHz	2.0 %	
LISN Field calibrations available ^{Note 4}			
Impedance	9 kHz to 30 MHz 30 MHz to 108 MHz 108 MHz to 150 MHz	2.1 % 3.3 % 3.6 %	
Insertion Loss	9 kHz to 108 MHz 108 MHz to 150MHz	0.2 dB 0.39 dB	
Isolation	9 kHz to 108 MHz	1.4 dB	
Phase Angle	9 kHz to 30 MHz 30 MHz to 108 MHz	5.4° 6.6°	
Spectrum Analyzer Field calibrations available ^{Note 4}			
Scale Fidelity – Log scale	0 dB to 80 dB scale range	0.23 dB	
Scale Fidelity – Linear scale	0 dB to 20 dB scale range	0.18 dB	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
Switching Accuracy of RF Output 10 dB Step	9 kHz to 12.4 GHz 12.4 GHz to 18 GHz	0.31 dB 0.41 dB	8496B
1dB to 2 dB Step	9 kHz to 12.4 GHz 12.4 GHz to 18 GHz	0.29 dB 0.42 dB	8494B
Input Attenuator Switching Accuracy	9 kHz to 18 GHz	0.18 dB	
Response to Sine Wave Voltage – Linearity 0 dB to -110 dB step change	9 kHz to 18 GHz	0.32 dB	
EM Clamp / Decoupling Clamp Field calibrations available ^{Note 4}			
Insertion Loss	100 kHz to 230 MHz	0.4 dB	IEC 61000-4-6
Impedance	100 kHz to 100MHz	5.8 %	
Decoupling Factor	100 kHz to 100MHz	0.3 dB	
Coupling Factor	100 kHz to 100MHz	0.6 dB	
150 Ohm to 50 Ohm Adapter Field calibrations available ^{Note 4}			
Insertion Loss	100 kHz to 230 MHz	0.3 dB	Vector network analyzer and calibration kit
Current Probe / Current Injection Probe Field calibrations available ^{Note 4}			
Insertion Loss	10 Hz to 10 kHz 10 kHz to 500 MHz 500 MHz to 2.1 GHz 2.1 GHz to 2.7GHz	1.1 dB 0.5 dB 0.8 dB 0.9 dB	Vector network analyzer and calibration kit

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
Transfer Impedance	10 Hz to 10 kHz 10 kHz to 500 MHz 500 MHz to 2.1 GHz 2.1 GHz to 2.7GHz	1.1 dBΩ 0.5 dBΩ 0.8 dBΩ 0.9 dBΩ	
Insertion Impedance	9 kHz to 200 MHz	2.1 %	CISPR 16-1-2
Calibration Jig of Current Injection Probe Field calibrations available ^{Note 4} Transmission Loss	150 kHz to 80MHz	0.5 dB	IEC 61000-4-6
CISPR Current Probe Field calibrations available ^{Note 4} Transducer Factor	20 Hz to 1 kHz 1 kHz to 100 MHz	0.27 dB 0.25 dB	e.g. EZ-17 type 33120A + 4395A SA function 4395A + 87512 VNA function
Hi-Impedance Probe Field calibrations available ^{Note 4} Voltage Division Factor	9 kHz to 30 MHz	0.3 dB	
RF Insertion Loss / Gain Measure Field calibrations available ^{Note 4} 10 Hz to 500 MHz	0 dB to 60 dB 60 dB to 70 dB 70 dB to 80 dB	0.20 dB 0.44 dB 0.95 dB	4395A + 87512A
5 Hz to 100 Hz	0 dB to 60 dB 60 dB to 70 dB 70 dB to 80 dB 80 dB to 90 dB	0.15 dB 0.19 dB 0.29 dB 0.60 dB	E5061B

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
100 Hz to 9 kHz	0 dB to 60 dB	0.17 dB	E5071C
	60 dB to 70 dB	0.36 dB	
	70 dB to 80 dB	1.0 dB	
	80 dB to 90 dB	2.7 dB	
9 kHz to 150 MHz	0 dB to 60 dB	0.20 dB	
	60 dB to 70 dB	0.47 dB	
	70 dB to 80 dB	1.3 dB	
	80 dB to 90 dB	3.3 dB	
150 kHz to 3 GHz	0 dB to 60 dB	0.13 dB	
	60 dB to 70 dB	0.19 dB	
	70 dB to 80 dB	0.34 dB	
	80 dB to 90 dB	0.82 dB	
9 kHz to 300 kHz	0 dB to 60 dB	0.27 dB	
	60 dB to 70 dB	0.80 dB	
	70 dB to 80 dB	2.1 dB	
300 kHz to 10 MHz	0 dB to 60 dB	0.15 dB	
	60 dB to 70 dB	0.31 dB	
	70 dB to 80 dB	0.87 dB	
10 MHz to 3 GHz	0 dB to 60 dB	0.11 dB	
	60 dB to 70 dB	0.16 dB	
	70 dB to 80 dB	0.28 dB	
3 GHz to 6 GHz	0 dB to 60 dB	0.15 dB	
	60 dB to 70 dB	0.20 dB	
	70 dB to 80 dB	0.35 dB	
6 GHz to 8.5 GHz	0 dB to 60 dB	0.18 dB	
	60 dB to 70 dB	0.26 dB	
	70 dB to 80 dB	0.48 dB	
45 MHz to 2 GHz	0 dB to 50 dB	0.23 dB	E8363B, Type N

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty <small>Notes 3,5</small>	Remarks
2 GHz to 8 GHz	50 dB to 60 dB	0.63 dB	E8363B, 3.5mm
	60 dB to 70 dB	1.80 dB	
2 GHz to 8 GHz	0 dB to 80 dB	0.33 dB	
	80 dB to 90 dB	0.87 dB	
	90 dB to 100 dB	2.2 dB	
8 GHz to 18 GHz	0 dB to 80 dB	0.32 dB	
	80 dB to 90 dB	0.74 dB	
	90 dB to 100 dB	1.9 dB	
45 MHz to 2 GHz	0 dB to 50 dB	0.21 dB	
	50 dB to 60 dB	0.63 dB	
	60 dB to 70 dB	1.8 dB	
2 GHz to 8 GHz	0 dB to 80 dB	0.33 dB	
	80 dB to 90 dB	0.87 dB	
	90 dB to 100 dB	2.2 dB	
8 GHz to 20 GHz	0 dB to 80 dB	0.32 dB	
	80 dB to 90 dB	0.73 dB	
	90 dB to 100 dB	1.9 dB	
20 GHz to 26.5 GHz	0 dB to 80 dB	0.49 dB	
	80 dB to 90 dB	1.2 dB	
	90 dB to 100 dB	3.1 dB	
45 MHz to 2 GHz	0 dB to 50 dB	0.22 dB	E8363B, 2.4mm
	50 dB to 60 dB	0.61 dB	
	60 dB to 70 dB	1.8 dB	
2 GHz to 8 GHz	0 dB to 80 dB	0.32 dB	
	80 dB to 90 dB	0.87 dB	
	90 dB to 100 dB	2.2 dB	
8 GHz to 20 GHz	0 dB to 80 dB	0.29 dB	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
20 GHz to 26.5 GHz	0 dB to 60 dB 60 dB to 70 dB 70 dB to 80 dB 80 dB to 90 dB	0.21 dB 0.59 dB 1.7 dB 4.1 dB	N5234B, 2.4mm
10 MHz to 2 GHz	0 dB to 70 dB 70 dB to 80 dB 80 dB to 90 dB 90 dB to 100 dB	0.19 dB 0.59 dB 1.7 dB 4.1 dB	
2 GHz to 8 GHz	0 dB to 70 dB 70 dB to 80 dB 80 dB to 90 dB 90 dB to 100 dB	0.20 dB 0.59 dB 1.7 dB 4.1 dB	
8 GHz to 20 GHz	0 dB to 60 dB 60 dB to 70 dB 70 dB to 80 dB 80 dB to 90 dB	0.20 dB 0.59 dB 1.7 dB 4.1 dB	
20 GHz to 40 GHz	0 dB to 60 dB 60 dB to 70 dB 70 dB to 80 dB 80 dB to 90 dB	0.22 dB 0.59 dB 1.7 dB 4.1 dB	
RF Attenuation Field calibrations available ^{Note 4}			
10 dB Step			
9 kHz to 2 GHz	0 dB to 110 dB	0.08 dB	8496B-001
2 GHz to 8 GHz		0.10 dB	
8 GHz to 18 GHz		0.17 dB	

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty ^{Notes 3,5}	Remarks
1 dB Step 9 kHz to 2 GHz 2 GHz to 12.4 GHz 12.4 GHz to 18 GHz	0 dB to 11 dB	0.09 dB 0.11 dB 0.21 dB	8494B-001
Digital Oscilloscope Field calibrations available ^{Note 4}			
Vertical scale accuracy	10 mV to 25 V	0.46 %	
Horizontal scale accuracy	0.1 Hz to 6GHz	0.35 %	
Bandwidth (-3 dB)	9kHz to 6 GHz	14 %	
Input resistance	0.1 Ω to 9.999 MΩ	0.012 %	
	10 MΩ to 99.99 MΩ	0.046 %	
	100 MΩ to 999.9 MΩ	0.092 %	
RF Power Amplifier Field calibrations available ^{Note 4}			
Gain	9 kHz to 8.5 GHz	0.38 dB	
Power linearity	9 kHz to 10 MHz	12 %	
	10 MHz to 1 GHz	9.7 %	
	1 GHz to 4 GHz	11 %	
Harmonic Distortion	9 kHz to 6.5 GHz	1.6 dB	
END			

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program



Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory’s customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory’s scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of $k = 2$. However, laboratories may report a coverage factor different than $k = 2$ to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer’s device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory’s customers under *normal conditions*. However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory’s scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory’s scope of accreditation apply. These requirements are set out in Annex A.5. of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: Measured value in Radians. Range is dependent on rate, carrier, and peak deviation.

Note 8: Reflection Coefficient, Impedance or Return Loss measurements are available.

2018-11-30 through 2019-12-31

Effective dates

For the National Voluntary Laboratory Accreditation Program