



**National Voluntary
Laboratory Accreditation Program**



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION LABORATORIES

NVLAP LAB CODE 200012-0

Scope Revised: 2009-08-24

ELECTROMAGNETICS - RF MICROWAVE, DC/LF, FREQUENCY

(Capabilities listed by instrument type and/or method)

NVLAP Code: 20/R08

Microwave Antenna Parameters

<i>Range</i>	<i>Best Uncertainty (\pm)^{note 1}</i>	<i>Remarks</i>
Dipole Antenna (such as the VHA9103/UHA9105)		
Reference Antenna Method (substitution method)		
30 MHz to 80 MHz (Tuned 80 MHz)	0.6 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) EMI Receiver used
30 MHz to 300 MHz	0.6 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) EMI Receiver used
300 MHz to 1000 MHz	0.8 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) EMI Receiver used

Biconical Antenna (such as the BBA9106)

Reference Antenna Method (substitution method)

2009-01-01 through 2009-12-31

Effective dates

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30 MHz to 300 MHz	0.8 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) EMI Receiver used
30 MHz to 300 MHz	0.7 dB	Horizontal Antenna Factor (D = 3 m, H = 2 m) EMI Receiver used
30 MHz to 300 MHz	0.8 dB	Horizontal Antenna Factor (D = 3 m, H = 1 m) EMI Receiver used
30 MHz to 300 MHz	0.8 dB	Vertical Antenna Factor (D = 3 m, H = 1.5 m) EMI Receiver used
30 MHz to 300 MHz	1.0 dB	Vertical Antenna Factor (D = 3 m, H = 1 m) EMI Receiver used
30 MHz to 300 MHz	0.7 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) Network Analyzer used
30 MHz to 300 MHz	0.6 dB	Horizontal Antenna Factor (D = 3 m, H = 2 m) Network Analyzer used
30 MHz to 300 MHz	0.7 dB	Horizontal Antenna Factor (D = 3 m, H = 1 m) Network Analyzer used
30 MHz to 300 MHz	0.8 dB	Vertical Antenna Factor (D = 3 m, H = 1.5 m) Network Analyzer used
30 MHz to 300 MHz	0.9 dB	Vertical Antenna Factor (D = 3 m, H = 1 m) Network Analyzer used
Log-Periodic Antenna (such as the USLP9143/UHALP9108A)		
Reference Antenna Method (substitution method)		
300 MHz to 1000 MHz	1.2 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) EMI Receiver used

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300 MHz to 1000 MHz	1.1 dB	Horizontal Antenna Factor (D = 3 m, H = 2 m) EMI Receiver used
300 MHz to 1000 MHz	1.1 dB	Horizontal Antenna Factor (D = 3 m, H = 1 m) EMI Receiver used
300 MHz to 1000 MHz	1.1 dB	Vertical Antenna Factor (D = 3 m, H = 1.5 m) EMI Receiver used
300 MHz to 1000 MHz	1.2 dB	Vertical Antenna Factor (D = 3 m, H = 1 m) EMI Receiver used
300 MHz to 1000 MHz	1.1 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) Network Analyzer used
300 MHz to 1000 MHz	1.1 dB	Horizontal Antenna Factor (D = 3 m, H = 2 m) Network Analyzer used
300 MHz to 1000 MHz	1.1 dB	Horizontal Antenna Factor (D = 3 m, H = 1 m) Network Analyzer used
300 MHz to 1000 MHz	1.1 dB	Vertical Antenna Factor (D = 3 m, H = 1.5 m) Network Analyzer used
300 MHz to 1000 MHz	1.2 dB	Vertical Antenna Factor (D = 3 m, H = 1 m) Network Analyzer used
Bi-log Antenna (such as the CBL6112B)		
Reference Antenna Method (substitution method)		
30 MHz to 1000 MHz	1.3 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) EMI Receiver used
30 MHz to 1000 MHz	1.3 dB	Horizontal Antenna Factor (D = 10 m, H = 2 m) Network Analyzer used

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30 MHz to 1000 MHz	1.3 dB	(D = 3 m, H = 2 m) Network Analyzer used
Biconical Antenna SAE ARP958 25 to 300 MHz	0.8 dB	Horizontal Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
25 to 300 MHz	0.6 db	Vertical Antenna Factor (D = 1 m, H = 3 m)
Log-Periodic Antenna SAE ARP958		
150 to 300 MHz	1.1 dB	Horizontal Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
300 to 1000 MHz	0.4 dB	Horizontal Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
1000 to 1800 MHz	0.7 dB	Horizontal Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
150 to 300 MHz	0.6 dB	Vertical Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
300 to 1000 MHz	0.2 dB	Vertical Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
1000 to 1800 MHz	0.5 dB	Vertical Antenna Factor (D = 1 m, H = 3 m) Network Analyzer Used
NVLAP Codes: 20/E06, 20/E09, 20/R13		
LISN ^{note 2}		
9 kHz to 108 MHz	2.0 %	Impedance
9 kHz to 108 MHz	0.2 dB	Insertion Loss
AC 100 V to 240 V with 50 Hz	0.17 %	Series Voltage Drop

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DC 100 V to 28 V	0.15 %	Series Voltage Drop
CDN <i>note 2</i>		
100 kHz to 230 MHz	1.35 %	Impedance
100 kHz to 230 MHz	0.2 dB	Insertion Loss
NVLAP Codes: 20/E05, 20/E06, 20/E09, 20/F04		
ESD Simulators		
7.5 A to 60A (2 kV to 15 kV)	2.7 %	Peak current, 54845A
0.7 ns to 1 ns (2 V to 1.5 kV)	6.2 %	Rise time, 54845A
4 A to 30 A (2 kV to 15 kV)	3.3 %	Discharge current at 30 ns, 54845A
2 A to 15 A (2 kV to 15 kV)	5.2 %	Discharge current at 60 ns, 54845A
0.5 to 30 kV	1.2 %	DC High Voltage, DHM-40/10
EFT/Burst <i>note 2</i>		
0.25 kV to 4 kV	2.8 %	Peak voltage, 54845A
3.5 ns to 6.5 ns (0.25 kV to 4 kV)	1.1 %	Rise time, 54845A
35 ns to 65 ns (0.25 kV to 4 kV)	1.0 %	Impulse duration, 54845A
2.5 kHz to 5 kHz (0.25 kV to 4 kV)	1.2 %	Repetition frequency, 54622A
12 ms to 18 ms (0.25 kV to 4 kV)	1.0 %	Burst duration, 54622A
240 ms to 360 ms (0.25 kV to 4 kV)	1.0 %	Burst period, 54622A
Surge Generator <i>note 2</i>		
(IEC 61000-4-5)		
0.1 to 4 kV	3.0 %	Peak Voltage, Open circuit waveform 54845A
0.7 to 1.6 μs	3.3 %	Rise Time, open circuit waveform 54845A
15 to 60 μs	3.7 %	Half value duration time 54845A
0.1 to 2 kA	2.7 %	Peak Current, short circuit waveform 54845A

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1.4 to 9.6 μ s	3.2 %	Rise Time, short circuit waveform 54845A
12 to 33 μ s	2.3 %	Half value duration time 54845A

NVLAP Code: 20/R13
Directional Coupler ^{note 2}

9 kHz to 6 GHz, 0 dB to 60 dB	0.20 dB	Coupling Factor
9 kHz to 6 GHz, 0 dB to 70 dB	0.44 dB	Coupling Factor
9 kHz to 6 GHz, 0 dB to 80 dB	0.95 dB	Coupling Factor
9 kHz to 6 GHz	0.20 dB	Insertion Loss

EM Clamp ^{note 2}

0.1 MHz to 230 MHz	0.4 dB	Insertion Loss
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150 ohm to 50 ohm Adaptor ^{note 2}

0.1 MHz to 230 MHz	0.3 dB	Insertion Loss
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Current Probe/Current Injection Probe ^{note 2}

10 kHz to 500 MHz	0.5 dB	Insertion Loss
10 kHz to 500 MHz	0.5 dB ohm	Transfer Impedance

Hi-Impedance Probe ^{note 2}

9 kHz to 30 kHz	0.3 dB	Voltage Division Factor
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Impedance & VSWR Measure ^{note 2}

9 kHz to 500 MHz	2.0 %	4395A + 87512A
100 kHz to 1.8 GHz	2.0 %	4396B
300 kHz to 3 GHz	1.2 %	E5071B
3 GHz to 6 GHz	2.2 %	E5071B

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RF Insertion Loss/Gain Measure *note 2*

9 kHz to 500 MHz, 0 dB to 60 dB	0.20 dB	4395A + 87512A
100 kHz to 1.8 GHz, 0 dB to 60 dB	0.15 dB	4396B
300 kHz to 3 GHz, 0 dB to 60 dB	0.10 dB	E5071B
3 GHz to 6 GHz, 0 dB to 60 dB	0.13 dB	E5071B

NVLAP Code: 20/E09

AC Voltage Measure (0.1 V to 750 V) *note 2*

3 Hz to 5 Hz	3.1 %	34401A
5 Hz to 10 Hz	0.46 %	34401A
10 Hz to 20 kHz	0.12 %	34401A
20 kHz to 50 kHz	0.18 %	34401A
50 kHz to 100 kHz	0.79 %	34401A
100 kHz to 300 kHz	5.2 %	34401A

NVLAP Code: 20/E06

DC Voltage Measure *note 2*

0.01 V to 1000 V	0.11 %	34401A
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1. Represents an expanded uncertainty using a coverage factor, $k = 2$, at an approximate level of confidence of 95 %.
2. Items available for on-site service.

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