



CALIBRATION LABORATORIES

NVLAP LAB CODE 200679-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY			
NVLAP Code: 20/E06 DC VOLTAGE DC Voltage Measure	0.01 V to 1000 V	0.11 %	34401A
NVLAP Code: 20/E09 LF AC VOLTAGE AC Voltage Measure 0.1 V to 750 V (True RMS)	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 % 0.18 % 0.79 % 5.2 %	34401A
VNA Source Level & Flatness (10 Hz to 20 kHz)	-47 dBm to 33 dBm	1.2 %	34401A and 11048C
VNA Amplitude Accuracy (10 Hz to 20 kHz)	-40 dBm to 20 dBm	4.2 %	34401A, 11048C, and 11667A
SA Amplitude and Response (10 Hz to 20 kHz)	-40 dBm to 20 dBm	0.18 dB	34401A
SA Reference Level Accuracy	10 dB step up to 110 dB	0.23 dB	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
NVLAP Code: 20/E13 MAGNETICS Magnetic Field Meter 50 Hz or 60 Hz Response to H-field	1.26 μ T to 62.8 μ T	2.1 %	IEC 61786
TIME and FREQUENCY			
NVLAP Code: 20/F01 FREQUENCY DISSEMINATION			
Sine-Wave Frequency Measure	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
Pulse Rise and Fall Time Pulse Period and Width	1 ns to 20 ns 10 s to 0.5 ms	4.7 % 0.84 %	Differential Time Measurements
Response to Pulse – Variation with Repetition Frequency Pulse Generator IGUU2916 Output Level from 10 dB to 60 dB	9 kHz to 1 GHz	0.31 dB	
Overall Selectivity	9 kHz to 150 kHz 150 kHz to 30 MHz 30 MHz to 1 GHz	0.85 % 1.8 % 3.5 %	CISPR B and A CISPR B and B CISPR Band C/D
Random Noise	9 kHz to 1 GHz	0.19 dB	(for 10 dB level variation)
IF Bandwidth Accuracy and Selectivity	Bandwidth: 0 dB to -6 dB Bandwidth: -6 dB to -60 dB	2.1 % 3.0 %	
Phase Angle	0° to 360°	2.7°	(measured by differential time)

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Noise Level	9 kHz to 40 GHz	0.63 dB	CISPR Band E
Impulse Bandwidth	1 MHz IF Filter	8.9 %	
Frequency Readout Accuracy	9 kHz to 40 GHz	0.92 %	
Frequency Span Accuracy	9 kHz to 40 GHz	0.60 %	
Magnitude Frequency Response	100 Hz to 18 GHz	0.09 dB	11667A
Phase Frequency Response	100 Hz to 18 GHz	0.97°	
IF BW Switching Accuracy	9 kHz to 40 GHz	0.12 dB	Relative Measurement
NVLAP Code: 20/F03 OSCILLATOR CHARACTERISTICS			
Modulation at Carrier	at Rate		
Amplitude (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 %	
Frequency (< 40 kHz peak)			Modulation Analyzer
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 %	
Phase (< 40 kHz peak)			Measured value in Radians. Range is dependent on rate, carrier, and peak deviation
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			
9 kHz to 3 GHz	0 dBc to 90 dBc	0.35 dB	Spectrum Analyzer

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
3 GHz to 6.5 GHz		0.63 dB	
NVLAP Code: 20/F04 PULSE WAVEFORM CISPR Pulse Generator Pulse Area (integral function) Pulse Width (horizontal scale) Amplitude Variation Flatness of Spectrum Amplitude Response to Pulse – Amplitude Relationship 9 kHz to 30 MHz 100 MHz 30 MHz to 100 MHz 100 MHz to 1 GHz	9 kHz to 1 GHz 10 dB to 60 dB	6.0 % 2.6 % 0.27 dB 0.25 dB 0.83 dB 0.94 dB 1.1 dB 1.5 dB	CISPR 16-1-1 CISPR Band A, B, and C/D CISPR Band A/B CISPR Band C CISPR Band C CISPR Band C/D
ELECTROMAGNETICS – RF/MICROWAVE			
NVLAP Code: 20/R02 REFLECTION PARAMETERS VSWR (Reflection Coefficient, Impedance, or Return Loss measurements are available)	10 Hz to 500 MHz 30 kHz to 1.3 GHz 1.3 GHz to 3 GHz 3 GHz to 6 GHz 9 kHz to 10 MHz 10 MHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 8.5 GHz 45 MHz to 2GHz 2 GHz to 8 GHz	2.0 % 1.1 % 1.8 % 3.6 % 1.2 % 1.5 % 2.3 % 2.9 % 1.2 % 2.0 %	4395A + 87512A + 85032B/F 8753ES + 85032B/F 8753ES + 85032B/F E5071C + 85032F E8563B + 85054B (Type-N)

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks	
BAN Field calibrations available <small>Note 4</small> Impedance CDN Field calibrations available <small>Note 4</small> Impedance Artificial Hand Field calibrations available <small>Note 4</small> Impedance	8 GHz to 18 GHz	2.8 %	E8563B + 85052B (3.5mm) E8563B + 85052B (3.5mm)	
	45 MHz to 2 GHz	1.2 %		
	2 GHz to 8 GHz	2.2 %		
	8 GHz to 20 GHz	2.7 %		
		20 GHz to 26.5 GHz	2.8 %	E8563B + 85056A (2.4mm)
		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 %	ISO 11452-7
		250 kHz to 500 MHz	3.5 %	CISPR 16-1-2
	100 kHz to 230 MHz	1.4 %		
	100 kHz to 30 MHz	2.0 %		
NVLAP Code: 20/R05 HF CAPACITANCE Capacitance 40 Hz to 50 kHz 50 kHz to 200 kHz Capacitive Coupling Clamp Coupling Capacitance	1.000 pF to 199.99 mF 100 kHz to 30 MHz	11 % 16 % 17 %	ZM2353 with 2325AL IEC 61000-4-4	
NVLAP Code: 20/R06 HF INDUCTANCE Inductance 40 Hz to 50 kHz 50 kHz to 200 kHz	1.00 nH to 19.999 kH	11 % 16 %	ZM2353 with 2325AL	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
NVLAP Code: 20/R07 HIGH FREQUENCY RESISTORS Resistance, Reactance, and Impedance 40 Hz to 50 kHz 50 kHz to 200 kHz LISN Field calibrations available ^{Note 4} Impedance	100.0 mΩ to 19.999 MΩ	11 % 16 %	ZM2353 + 2325AL
	9 kHz to 108 MHz	2.0 %	
NVLAP Code: 20/R08 MICROWAVE ANTENNA PARAMETERS Monopole Antenna Antenna Factor, Gain Isotropic Electric Field Probes Correction Factor Rotational Response	30 Hz to 50 MHz	0.39 dB	IEEE 291 & ARP958
	10 kHz to 1 GHz	1.4 dB	HI- 4422 / FP2000
	100 kHz to 1 GHz 1 GHz to 3.5 GHz 4 GHz	1.0 dB 2.0 dB 1.7 dB/-1.3 dB	HI-6005 / FP 6001
	100 kHz to 1 GHz 1 GHz to 3.5 GHz 4 GHz	1.0 dB 2.0 dB 1.7 dB/-1.3 dB	HI4433 / FP2080 / EMC-20
	100 kHz to 1 GHz 1 GHz to 3 GHz 10 kHz to 1 GHz	1.0 dB 2.0 dB 0.2 dB	OEFS-H-NS, OEFS-H-S1 HI-4422 / FP2000
	100 kHz to 1 GHz 1 GHz to 3.5 GHz 100 kHz to 3.5 GHz	0.2 dB 0.4 dB 0.2 dB	HI-6005 / FP6001 HI4433 / FP2080/ EMC-20

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
NVLAP Code: 20/R13 TRANSMISSION PARAMETERS			
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	
Switching Accuracy of RF Output, 10 dB Step	9 kHz to 12.4 GHz	0.31 dB	8496B
	12.4 GHz to 18 GHz	0.41 dB	
1dB to 2 dB Step	9 kHz to 12.4 GHz	0.29 dB	8494B
	12.4 GHz to 18 GHz	0.42 dB	
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	
Magnitude Dynamic Accuracy	0 dBm to -100 dBm by 10 dB step	0.13 dB	11667A + 8496B
LISN			
Field calibrations available ^{Note 4}			
Insertion Loss	9 kHz to 108 MHz	0.2 dB	
Isolation		1.4 dB	
EM Clamp			
Field calibrations available ^{Note 4}			
Insertion Loss	100 kHz to 230 MHz	0.4 dB	
150 Ohm to 50 Ohm Adapter			
Field calibrations available ^{Note 4}			
Insertion Loss	100 kHz to 230 MHz	0.3 dB	
BAN			
Field calibrations available ^{Note 4}			
Insertion Loss	250 kHz to 500 MHz	2.1 dB	ISO 11452-7

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
CDN Field calibrations available ^{Note 4} Insertion Loss	100 kHz to 230 MHz	0.2 dB	
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	1.1 dB 0.5 dB 0.8 dB	
Transfer Impedance	10 Hz to 10 kHz 10 kHz to 500 MHz 500 MHz to 2.1 GHz	1.1 dBΩ 0.5 dBΩ 0.8 dBΩ	
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
Input Cross Talk	10 Hz to 40 GHz	3.2 dB	
Hi-Impedance Probe Field calibrations available ^{Note 4} Voltage Division Factor	9 kHz to 30 MHz	0.3 dB	
RF Insertion Loss / Gain Measure			
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
30 kHz to 1.3 GHz	0 dB to 60 dB 60 dB to 70 dB 70 dB to 80 dB	0.09 dB 0.20 dB 0.54 dB	8753ES
1.3 GHz to 3 GHz	0 dB to 60 dB 60 dB to 70 dB	0.10 dB 0.23 dB	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
3 GHz to 6 GHz	70 dB to 80 dB	0.60 dB	E5071C
	0 dB to 60 dB	0.15 dB	
	60 dB to 70 dB	0.33 dB	
	70 dB to 80 dB	0.93 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
	50 dB to 60 dB	0.63 dB	
	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	E8363B, 3.5mm
	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	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
8 GHz to 20 GHz	0 dB to 80 dB	0.32 dB	E8363B, 2.4mm
	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	
	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	
	80 dB to 90 dB	0.73 dB	
	90 dB to 100 dB	1.9 dB	
20 GHz to 40.0 GHz	0 dB to 80 dB	0.50 dB	
	80 dB to 90 dB	1.2 dB	
	90 dB to 100 dB	3.1 dB	
RF Attenuation			
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	
1 dB Step			
9 kHz to 2 GHz	0 dB to 11 dB	0.09 dB	8494B-001
2 GHz to 12.4 GHz		0.11 dB	
12.4 GHz to 18 GHz		0.21 dB	
RF Power Amplifier			
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	

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NVLAP Code: 20/R14 RF/MICROWAVE PHASE Phase Dynamic Accuracy	0° to 360°	0.42°	
NVLAP Code: 20/R17 RF/MICROWAVE POWER METERS Signal Generator RF Absolute Power Measure (Unmodulated Sine-wave)			
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)
9kHz to 6 GHz	-30 dBm to 30 dBm	4.9 %	E9304 H19 (type N)
6 GHz to 18 GHz	-30 dBm to 30 dBm	7.4 %	
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	-30 dBm to 20 dBm	8.5 %	
40 GHz to 50 GHz	-30 dBm to 20 dBm	10 %	
50 MHz to 18 GHz	-70 dBm to -20 dBm	7.5 %	8487D (type 2.4mm)
18 GHz to 40 GHz	-70 dBm to -20 dBm	12 %	
40 GHz to 50 GHz	-70 dBm to -20 dBm	15 %	
Internal Calibration Source – Level Accuracy	120 MHz, -40 dBm	0.17 dB	ESIB series only
High Power Sensor/Meters Amplitude and Linearity			
(9 kHz to 1 GHz)	0.1 W to 100 W	13 %	
(1 GHz to 4.2 GHz)	0.1 W to 20 W	19 %	

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**National Voluntary
Laboratory Accreditation Program**



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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks	
Power Meter & Power Sensor Termination Type Calibration Factor at 0 dBm	9 kHz to 6 GHz	1.7 %	E9304A & 11667A (type N)	
	9 kHz to 8 GHz	1.8 %	E9304A/H19 & 11667A (type N)	
	8 GHz to 18 GHz	2.4 %	E9304A+H19 & 11667A (type N)	
	10 MHz to 2 GHz	1.9 %	E4412A & 11667A (type N)	
	2 GHz to 10 GHz	2.5 %		
	10 GHz to 18 GHz	3.1 %		
	50 MHz to 2 GHz	2 GHz to 10 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	4.1 %	
50 MHz to 18 GHz	18 GHz to 26 GHz	4.6 %	8487A & 11667C (type 2.4 mm)	
	18 GHz to 26 GHz	5.8 %		
	26 GHz to 34 GHz	6.9 %		
	34 GHz to 40 GHz	7.7 %		
Calibration Factor at -20 dBm	50 MHz to 18 GHz	5.8 %	8487D & 11667C (type 2.4 mm)	
	18 GHz to 26 GHz	7.1 %		
	26 GHz to 34 GHz	9.7 %		
	34 GHz to 40 GHz	10 %		
Power Linearity 9 kHz to 6 GHz	-40 dBm to 20 dBm	3.7 %	E9304A	

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
9 kHz to 6 GHz	-30 dBm to 30 dBm	4.9 %	E9304A-H19
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)			
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)
9kHz to 6 GHz	-30 dBm to 30 dBm	4.9 %	E9304A H19 (type N)
6 GHz to 18 GHz	-30 dBm to 30 dBm	7.4 %	
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	-30 dBm to 20 dBm	8.5 %	
40 GHz to 50 GHz	-30 dBm to 20 dBm	11 %	
50 MHz to 18 GHz	-70 dBm to -20 dBm	7.5 %	8487D (type 2.4mm)
18 GHz to 26.5 GHz	-70 dBm to -20 dBm	9.4 %	
26.5 GHz to 50 GHz	-70 dBm to -20 dBm	12 %	
100 kHz to 1 GHz	20 dBm to 50 dBm	4.1 %	Absolute power measure
CISPR Receiver Frequency Response to Sine Wave Voltage			CISPR 16-1-1

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-47 dBm to +10 dBm	9 kHz to 6 GHz	0.23 dB	E9304A (Type N)
-30 dBm to +10 dBm	9 kHz to 6 GHz	0.28 dB	E9304A H19 (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	
-30 dBm to +10 dBm	6 GHz to 18 GHz	0.41 dB	E9304A H19 (Type N)
-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 Absolute Power			
100 kHz to 1 GHz	0.1 W to 100 W	4.1 %	

END

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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 using a coverage factor, k = 2, with a level of confidence of approximately 95 %. 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.1.h. 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: See NIST Handbook 150 for further explanation of these notes.

2013-01-01 through 2013-12-31

Effective dates

For the National Institute of Standards and Technology