National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

IPS Corporation	**Parameter(s) of Accreditation**
1878-1, Ono, Tatsuno-machi, Kamiina-gun, Nagano 399-0601 JAPAN Mr. Nobuyuki Kuwazawa Phone: +81-266-44-5200 Fax: +81-266-44-5300 E-mail: qa@ips-emc.co.jp URL: http://www.ips-emc.co.jp	Electromagnetics – DC/Low Frequency Time and Frequency Electromagnetics – RF/Microwave

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) Notes 3, 5	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY			
NVLAP Code: 20/E05 **DC RESISTANCE and CURRENT**			
ESD Simulators			IEC 61000-4-2, ISO 10605
Peak current at 2 kV to 30 kV	7.5 A to 113 A	2.9 %	Agilent 54845A, WavePro 725Zi
Discharge current at 30 ns to 800 ns	0.3 A to 60 A	3.5 %	
Surge Generator Field calibrations available Note 4			IEC 61000-4-5
Peak Current, Short-circuit current waveform (8/20 µs, 5/320 µs)	100 A to 2 kA	2.7 %	Agilent 54845A, WavePro 725Zi
NVLAP Code: 20/E06 **DC VOLTAGE**			
DC Voltage - Measure Field calibrations available Note 4	0.01 V to 1000 V	0.11 %	Agilent 34401A
ESD Simulators			IEC 61000-4-2, ISO 10605
DC High Voltage	0.5 kV to 30 kV	1.2 %	DHM-40/10

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) Notes 3, 5	Remarks
EFT/Burst Field calibrations available Note 4 Peak Voltage	250 V to 4 kV	2.8 %	IEC 61000-4-4 Agilent 54845A, WavePro 725Zi
Burst Generator Field calibrations available Note 4 Peak Voltage	10 V to 400 V	4.2 %	ISO 7637-2, Annex C
Surge Generator Field calibrations available Note 4			IEC 61000-4-5
Peak Voltage, Open-circuit voltage waveform 1.2/50 µs, 10/700 µs	100 V to 4 kV	3.0 %	Agilent 54845A, WavePro 725Zi
Overshoot/Undershoot Field calibrations available Note 4 Voltage	1 V to 50 V	3.1 %	Agilent 54845A, WavePro 725Zi
NVLAP Code: 20/E09 **LF AC VOLTAGE** Field calibrations available Note 4 AC Voltage - Measure			
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 % 0.18 % 0.79 % 5.2 %	Agilent 34401A
10 mV to 5 V 5 V to 4 kV	DC to 100 MHz DC to 50 MHz	3.3 % 3.8 %	WavePro 725Zi

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) [Notes 3, 5]	Remarks
TIME and FREQUENCY			
NVLAP Code: 20/F01 **FREQUENCY DISSEMINATION** Field calibrations available [Note 4]			
EFT/Burst			IEC 61000-4-4 Agilent 54622A, WavePro 725 Zi
250 V to 4 kV			
Repetition frequency	2.5 kHz to 100 kHz	1.2 %	
Burst duration	0.75 ms to 18 ms	1.0 %	
Burst period	240 ms to 360 ms	1.0 %	
Frequency - Measure			
	1 Hz to 1 GHz	0.5 %	WavePro 725Zi
	50 Hz / 60 Hz	0.1 %	Agilent 34401A
Differential - Time Measure	1 ns to 5 s	0.6 %	WavePro 725Zi
Differential - Phase	1° to 360°	2.4 %	WavePro 725Zi Agilent 54845A
NVLAP Code: 20/F04 **PULSE WAVEFORM**			
ESD Simulators			IEC 61000-4-2, ISO 10605
2 kV to 30 kV			
Rise time	0.6 ns to 1 ns	4.9 %	Agilent 54845A, WavePro 725Zi
EFT/Burst Field calibrations available [Note 4]			IEC 61000-4-4
250 V to 4 kV			Agilent 54845A,
Rise time	3.5 ns to 6.5 ns	1.1 %	WavePro 725Zi
Impulse duration	35 ns to 65 ns	1.0 %	

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) [Notes 3, 5]	Remarks
Surge Generator Field calibrations available [Note 4]			IEC 61000-4-5
Open-circuit voltage waveform 100 V to 4 kV 1.2/50 µs, 10/700 µs			Agilent 54845A, WavePro 725Zi
Rise Time	0.7 µs to 10 µs	3.3 %	
Half value duration	15 µs to 700 µs	3.7 %	
Short-circuit current waveform 50 A to 2 kA 8/20 µs, 5/320 µs			
Rise Time	1.4 µs to 10 µs	3.2 %	
Half value duration	12 µs to 320 µs	2.3 %	
Burst Generator Field calibrations available [Note 4]			ISO 7637-2, Annex C Agilent 54845A,
10 V to 400 V Rise Time	5 ns to 100 ms	5.3 %	WavePro 725Zi
Pulse Width	10 ns to 500 ms	5.9 %	
Voltage Dip Simulator Field calibrations available [Note 4]			IEC 61000-4-11
10 V to 230 V Rise/Fall Time	1 µs to 5 µs	2.7 %	Agilent 54845A, WavePro 725Zi
ELECTROMAGNETICS – RF/MICROWAVE			
NVLAP Code: 20/R02 **COAXIAL/WAVEGUIDE TERMINATIONS** Field calibrations available [Note 4]			
Impedance & VSWR - Measure	9 kHz to 500 MHz	2.0 %	Agilent 4395A w/87512A
	100 kHz to 1.8 GHz	2.0 %	Agilent 4396B
	300 kHz to 3 GHz	1.2 %	Agilent E5071B
	3 GHz to 6 GHz	2.2 %	Agilent E5071B

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) [Notes 3, 5]	Remarks
NVLAP Code: 20/R08 **MICROWAVE ANTENNA PARAMETERS**			
Dipole Antenna (such as the VHA9103/UHA9105)			Reference Antenna Method (substitution method)
Horizontal Antenna Factor (D = 10 m, H = 2 m)	30 MHz to 80 MHz (Tuned at 80 MHz) 30 MHz to 300 MHz 300 MHz to 1 GHz	0.6 dB 0.6 dB 0.8 dB	EMI Receiver
Biconical Antenna (such as the BBA9106) Antenna Factor			Reference Antenna Method (substitution method)
Horizontal (D = 10 m, H = 2 m)	30 MHz to 300 MHz	0.8 dB	EMI Receiver
Horizontal (D = 3 m, H = 2 m)		0.7 dB	
Horizontal (D = 3 m, H = 1 m)		0.8 dB	
Vertical (D = 3 m, H = 1.5 m)		0.8 dB	
Vertical (D = 3 m, H = 1m)		1.0 dB	
Biconical Antenna Factor			
Horizontal (D = 10 m, H = 2 m)	30 MHz to 300 MHz	0.7 dB	Network Analyzer
Horizontal (D = 3 m, H = 2 m)		0.6 dB	
Horizontal (D = 3 m, H = 1 m)		0.7 dB	
Vertical (D = 3 m, H = 1.5 m)		0.8 dB	
Vertical (D = 3 m, H = 1 m)		0.9 dB	
Log-Periodic Antenna (such as the USLP9143/UHALP9108A)			Reference Antenna Method (substitution method)
Antenna Factor			
Horizontal (D = 10 m, H = 2 m)	300 MHz to 1GHz	1.2 dB	EMI Receiver
Horizontal (D = 3 m, H = 2 m)		1.1 dB	
Horizontal (D = 3 m, H = 1 m)		1.1 dB	
Vertical (D = 3 m, H = 1.5 m)		1.1 dB	
Vertical (D = 3 m, H = 1m)		1.2 dB	

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) [Notes 3, 5]	Remarks
Horizontal (D = 10 m, H = 2 m)		1.1 dB	Network Analyzer
Log Periodic Antenna Factor			Reference Antenna Method
Horizontal (D = 3 m, H = 2 m)		1.1 dB	Network Analyzer
Horizontal (D = 3 m, H = 1 m)		1.1 dB	
Vertical (D = 3 m, H = 1.5 m)		1.1 dB	
Vertical (D = 3 m, H = 1 m)		1.2 dB	
Bi-log Antenna (such as the CBL6112B)			Reference Antenna Method (substitution method)
Horizontal Antenna Factor			
(D = 10 m, H = 2 m)	30 MHz to 1 GHz	1.3 dB	EMI Receiver
(D = 10 m, H = 2 m)		1.3 dB	Network Analyzer
(D = 3 m, H = 2 m)		1.3 dB	
Biconical Antenna			SAE ARP958
Antenna Factor			
Horizontal (D = 1 m, H = 3 m)	25 MHz to 300 MHz	0.8 dB	Network Analyzer
Vertical (D = 1 m, H = 3 m)		0.6 dB	
Log-Periodic Antenna			SAE ARP958
Antenna Factor			
Horizontal (D = 1 m, H = 3 m)	150 MHz to 300 MHz	1.1 dB	Network Analyzer
Horizontal (D = 1 m, H = 3 m)	300 MHz to 1 GHz	0.4 dB	
Horizontal (D = 1 m, H = 3 m)	1 GHz to 1.8 GHz	0.7 dB	
Vertical (D = 1 m, H = 3 m)	150 MHz to 300 MHz	0.6 dB	
Vertical (D = 1 m, H = 3 m)	300 MHz to 1 GHz	0.2 dB	
Vertical (D = 1 m, H = 3 m)	1 GHz to 1.8 GHz	0.5 dB	
NSA Measurement			CISPR 16-1-4, and
Field calibrations available [Note 4]			ANSI C63.4
Horizontal	30 MHz to 200 MHz	1.4 dB	Network Analyzer
Vertical		1.7 dB	
Horizontal	200 MHz to 1 GHz	1.4 dB	
Vertical		1.5 dB	

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) [Notes 3, 5]	Remarks
SVSWR Measurement Field calibrations available [Note 4]			CISPR 16-1-4, and ANSI C63.4
Horizontal	1 GHz to 3 GHz	2.2 dB	Network Analyzer
Vertical		2.1 dB	
Horizontal	3 GHz to 6 GHz	2.4 dB	
Vertical		2.7 dB	
Absorbing Clamp Clamp Factor			CISPR 16-1-3:2004 Original Method Network Analyzer
	30 MHz to 300 MHz	0.8 dB	
	300 MHz to 1 GHz	1.1 dB	
Biconical, Log-peridioc, Hybrid Antenna			Standard Site Method ANSI C63.5: 2006 (OATS Calibration)
Horizontal Antenna Factor	20 MHz to 30 MHz	1.1 dB	
(D = 10 m, H = 2 m)	30 MHz to 300 MHz	1.0 dB	
	300 MHz to 1 GHz	0.9 dB	
	1 GHz to 1.8 GHz	1.2 dB	
Biconical, Log-periodic, Hybrid Antenna			ANSI C63.5: 2006 Clause 4.4.1 (OATS Calibration)
Antenna Symmetry	20 MHz to 300 MHz	0.6 dB	
	300 MHz to 1 GHz	0.6 dB	
	1 GHz to 1.8 GHz	0.5 dB	
NVLAP Code: 20/R13 **RF/MICROWAVE ATTENUATORS** Field calibrations available [Note 4]			Various Network Analyzers (Dependent on Frequency)
Directional Coupler 9 kHz to 6 GHz			
Insertion Loss	0 dB to 60 dB	0.20 dB	
Coupling Factor	0 dB to 60 dB	0.20 dB	
	60 dB to 70 dB	0.44 dB	

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) [Notes 3, 5]	Remarks
	70 dB to 80 dB	0.95 dB	
EM Clamp 0.1 MHz to 230 MHz Insertion Loss	0 dB to 60 dB	0.4 dB	
50 ohm to 150 ohm Adaptor 0.1 MHz to 230 MHz Insertion Loss	0 dB to 60 dB	0.3 dB	
Current Probe/Current Injection Probe 10 kHz to 500 MHz Insertion Loss Transfer Impedance	 0 dB to 60 dB 0 dB to 60 dB	 0.5 dB 0.5 dB ohm	
Hi-Impedance Probe 9 kHz to 30 MHz Voltage Division Factor	0 dB to 60 dB	0.3 dB	
RF Insertion Loss/Gain Measure 9 kHz to 500 MHz 100 kHz to 1.8 GHz 300 kHz to 3 GHz 3 GHz to 6 GHz	 0 dB to 60 dB	 0.20 dB 0.15 dB 0.10 dB 0.13 dB	
LISN Insertion Loss	9 kHz to 108 MHz	0.2 dB	
CDN Insertion Loss	100 kHz to 230 MHz	0.2 dB	
END			

2013-01-01 through 2013-12-31
Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 200012-0**

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