United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200012-0

IPS Corporation Nagano Calibration Center

Nagano-ken
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).

2016-12-12 through 2017-12-31

Effective Dates

For the National Voluntary Laboratory Accreditation Program

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

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

IPS Corporation Nagano Calibration Center	Fields of Calibration
1878-1, Ono, Tatsuno-machi, Kamiina-gun, Nagano-ken 399-0601 JAPAN Mr. Shuichi Aruga 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	Expanded Uncertainty Notes 3, 5	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY			
DC RESISTANCE and CURRENT (20/E05)			
ESD Simulators			IEC 61000-4-2, ISO 10605
Peak current (2 kV to 30 kV)	7.5 A to 113 A	3.9 %	Oscilloscope
Discharge current (30 ns to 800 ns)	0.3 A to 60 A	4.9 %	
Surge Generator			IEC 61000-4-5
Field calibrations available Note 4			
Peak Current, Short circuit current waveform (8/20 µs, 5/320 µs)	100 A to 2 kA	2.6 %	Oscilloscope
DC VOLTAGE (20/E06)			
DC Voltage - Measure	0.01 V to 1000 V	0.11 %	DMM
Field calibrations available Note 4			
ESD Simulators			IEC 61000-4-2, ISO 10605
DC High Voltage	0.5 kV to 1 kV	2.3 %	DHM-40/10
	1 kV to 3 kV	1.2 %	
	3 kV to 40 kV	1.1 %	
EFT/Burst			IEC 61000-4-4
Field calibrations available Note 4			
Peak Voltage	100 V to 6 kV	3.0 %	Oscilloscope

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
Peak Voltage with capacitive clamp		2.8 %	
Transient Generator			ISO 7637-2, Annex C
Field calibrations available Note 4			
Peak Voltage	10 V to 600 V	4.1 %	
Surge Generator			IEC 61000-4-5
Field calibrations available Note 4			
Peak Voltage, Open-circuit voltage waveform (1.2/50 µs, 10/700 µs)	100 V to 4 kV	2.8 %	Oscilloscope
Overshoot/Undershoot			Oscilloscope
Field calibrations available Note 4			
Voltage	1 V to 50 V	3.2 %	
LF AC VOLTAGE (20/E09)			
AC Voltage - Measure			
Field calibrations available Note 4			
0.1 V to 750 V	3 Hz to 5 Hz	3.1 %	DMM
	5 Hz to 10 Hz	0.46 %	
	10 Hz to 20 kHz	0.12 %	
	20 kHz to 50 kHz	0.18 %	
	50 kHz to 100 kHz	0.79 %	
	100 kHz to 300 kHz	5.2 %	
10 mV to 5 V	DC to 100 MHz	3.3 %	Oscilloscope
5 V to 4 kV	DC to 50 MHz	3.8 %	Oscilloscope w/ HV Probe
Voltage Dip Simulator			
Field calibrations available Note 4			
AC Voltage	10 V to 500 V	0.4 %	DMM

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
TIME and FREQUENCY			
FREQUENCY DISSEMINATION (20/F01)			
EFT/Burst (100 V to 6 kV) Field calibrations available Note 4			IEC 61000-4-4 Oscilloscope
Repetition frequency	1 kHz to 500 kHz	0.6 %	
Burst duration	0.5 ms to 20 ms	0.6 %	
Burst period	100 ms to 500 ms	0.4 %	
Voltage Dip Simulator Field calibrations available Note 4			
Duration Time	10 ms to 5 s	2.4 %	Oscilloscope
Frequency - Measure Field calibrations available Note 4	1 Hz to 1 GHz 50 Hz / 60 Hz	0.5 % 0.1 %	Oscilloscope DMM
Differential - Time Measure Field calibrations available Note 4	1 ns to 5 s	0.6 %	Oscilloscope
Differential - Phase Field calibrations available Note 4	0° to 360°	2.5°	Oscilloscope
PULSE WAVEFORM (20/F04)			
ESD Simulators (2 kV to 30 kV)			IEC 61000-4-2, ISO 10605 (Excluding RC time constant)
Rise time	0.6 ns to 1 ns	6.9 %	Oscilloscope
EFT/Burst (100 V to 6 kV) Field calibrations available Note 4			IEC 61000-4-4
Without Capacitive Clamp			Oscilloscope
Rise time	1 ns to 10 ns	1.5 %	
Impulse duration	10 ns to 500 ns	1.0 %	
With Capacitive Clamp			
Rise time	1 ns to 10 ns	1.4 %	
Impulse duration	10 ns to 500 ns	0.6 %	

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
Surge Generator			IEC 61000-4-5
Field calibrations available Note 4			
Open-circuit voltage waveform			
(100 V to 4 kV)			
(1.2/50 µs, 10/700 µs)			
Rise Time	0.5 µs to 20 µs	3.5 %	Oscilloscope
Half value duration	10 µs to 1000 µs	3.7 %	
Short-circuit current waveform			
(50 A to 2 kA)			
(8/20 µs, 5/320 µs)			
Rise Time	1 µs to 20 µs	3.4 %	
Half value duration	10 µs to 500 µs	2.3 %	
Transient Generator			
(10 V to 600 V)			ISO 7637-2, Annex C
Field calibrations available Note 4			
Rise Time	1 ns to 50 ms	5.8 %	Oscilloscope
Pulse Width	50 ns to 3 s	5.9 %	
Voltage Dip Simulator			
(10 V to 500 V)			IEC 61000-4-11
Field calibrations available Note 4			
Rise/Fall Time	1 µs to 5 µs	2.7 %	Oscilloscope
ELECTROMAGNETICS – RF/MICROWAVE			
MICROWAVE ANTENNA PARAMETERS (20/R08)			
Dipole Antenna			
(such as the VHA9103/UHA9105)			Substitution method
Horizontal Antenna Factor	30 MHz to 80 MHz	0.6 dB	EMI Receiver
(D = 10 m, H = 2 m)	(Tuned at 80 MHz)		Network Analyzer
	30 MHz to 300 MHz	0.6 dB	
	300 MHz to 1 GHz	0.8 dB	

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
Biconical Antenna (such as the BBA9106)			Substitution method
Antenna Factor			
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	
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)			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	
Antenna Factor			
Horizontal (D = 10 m, H = 2 m)	300 MHz to 1GHz	1.1 dB	Network Analyzer
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 = 1 m)		1.2 dB	

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
Bi-log Antenna (such as the CBL6112B)			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	0.5 dB	Network Analyzer
Vertical (D = 1 m, H = 3 m)		0.4 dB	
Log-Periodic Antenna			SAE ARP958
Antenna Factor			
Horizontal (D = 1 m, H = 3 m)	150 MHz to 300 MHz	0.7 dB	Network Analyzer
Horizontal (D = 1 m, H = 3 m)	300 MHz to 1 GHz	0.3 dB	
Horizontal (D = 1 m, H = 3 m)	1 GHz to 1.8 GHz	0.5 dB	
Vertical (D = 1 m, H = 3 m)	150 MHz to 300 MHz	0.4 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	0.4 dB	
NSA Measurement			CISPR 16-1-4, and ANSI C63.4
Field calibrations available Note 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	
SVSWR Measurement			CISPR 16-1-4, and ANSI C63.4
Field calibrations available Note 4			Network Analyzer
Horizontal	1 GHz to 3 GHz	2.2 dB	Spectrum Analyzer
Vertical		2.1 dB	
Horizontal	3 GHz to 6 GHz	2.4 dB	
Vertical		2.7 dB	
Horizontal	6 GHz to 12 GHz	2.7 dB	
Vertical		2.1 dB	

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
Horizontal	12 GHz to 18 GHz	2.3 dB	
Vertical		2.2 dB	
Absorbing Clamp			CISPR 16-1-3:2004
Clamp Factor	30 MHz to 300 MHz	0.8 dB	Original Method
	300 MHz to 1 GHz	1.1 dB	Network Analyzer
Biconical, Log-peridioc, Hybrid Antenna			Standard Site Method
Horizontal Antenna Factor	20 MHz to 30 MHz	1.1 dB	ANSI C63.5: 2006
(D = 10 m, H = 2 m)	30 MHz to 300 MHz	1.0 dB	(OATS Calibration)
	300 MHz to 1 GHz	0.9 dB	(excluding GSCF)
	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	
Loop Antenna – Antenna Factor	9 kHz to 30 MHz	1.2 dB	Standard Field Strength Method
Large Loop Antenna – Validation Factor	9 kHz to 30 MHz	0.9 dB	CISPR 16-1-4 Annex C
Field calibrations available Note 4			
SCATTERING PARAMETERS (20/R18)			
Impedance & VSWR - Measure	9 kHz to 300 kHz	2.0 %	Network Analyzer
Field calibrations available Note 4	300 kHz to 3 GHz	1.2 %	
	3 GHz to 6 GHz	2.2 %	
Directional Coupler (9 kHz to 6 GHz)			
Field calibrations available Note 4			
Insertion Loss	0 dB to 60 dB	0.20 dB	Network Analyzer
Coupling Factor	0 dB to 60 dB	0.20 dB	
	60 dB to 70 dB	0.44 dB	
	70 dB to 80 dB	0.95 dB	

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
EM Clamp / Decoupling Clamp 0.1 MHz to 230 MHz Field calibrations available Note 4			IEC 61000-4-6
Insertion Loss	100 kHz to 230 MHz	0.4 dB	
Impedance	100 kHz to 100MHz 100MHz to 230MHz	6.0 % 8.8 %	
Decoupling Factor	100 kHz to 100MHz 100MHz to 230MHz	0.6 dB 0.7 dB	
Coupling Factor	100 kHz to 100MHz 100MHz to 230MHz	0.7 dB 0.6 dB	
50 ohm to 150 ohm Adaptor 0.1 MHz to 230 MHz Field calibrations available Note 4			Network Analyzer
Insertion Loss	0 dB to 60 dB	0.3 dB	
Current Probe/Current Injection Probe 10 kHz to 500 MHz Field calibrations available Note 4			
Insertion Loss	0 dB to 60 dB	0.5 dB	
Transfer Impedance	0 dB to 60 dB	0.5 dB ohm	
Calibration Jig of Current Injection Probe Field calibrations available Note 4			
Transmission Loss	150 kHz to 230MHz	0.6 dB	IEC 61000-4-6
Hi-Impedance Probe 9 kHz to 30 MHz Field calibrations available Note 4			
Voltage Division Factor	0 dB to 60 dB	0.3 dB	

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3, 5	Remarks
RF Insertion Loss/Gain Measure Field calibrations available Note 4			
9 kHz to 300 kHz	0 dB to 60 dB	0.20 dB	
300 kHz to 3 GHz		0.10 dB	
3 GHz to 6 GHz		0.13 dB	
LISN Field calibrations available Note 4			
Insertion Loss	9 kHz to 108 MHz	0.2 dB	
Impedance	9 kHz to 30 MHz 30 MHz to 108 MHz	2.1 % 3.3 %	
Phase	9 kHz to 30 MHz 30 MHz to 108 MHz	4.9° 6.6°	
Isolation	9 kHz to 108 MHz	2.9 dB	
CDN Field calibrations available Note 4			
Insertion Loss	100 kHz to 230 MHz	0.2 dB	
Impedance	100 kHz to 80 MHz 80 MHz to 230 MHz	1.4 % 2.1 %	
END			

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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 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.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.

2016-12-12 through 2017-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program