



The American Association for Laboratory Accreditation

World Class Accreditation

# Accredited Laboratory

A2LA has accredited

## EMC KASHIMA CORPORATION

*Chiba-ken, Japan*

for technical competence in the field of

### Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 28th day of April 2009.



  
President & CEO

For the Accreditation Council

Certificate Number 1266.02

Valid to January 31, 2011

Revised June 25, 2010

*For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.*



“World Class Accreditation”

**The American Association for Laboratory Accreditation**

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005  
& ANSI/NCSL Z540-1-1994

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CALIBRATION

Valid To: January 31, 2011

Certificate Number: 1266.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations: <sup>1,5</sup>

I. Electrical-RF/Microwave

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
RF Power <sup>4</sup> – Absolute - Measure  (-60 to +20) dBm (-70 to +20) dBm	10 Hz to 10 kHz  9 kHz to 18 GHz 50 MHz to 26.5 GHz	0.78 dB  0.24 dB 0.59 dB	Spectrum Analyzer  Power Meter/Sensors
RF Power <sup>4</sup> – Relative - Measure (General RF Insertion Loss/Gain)  (-60 to +20) dB (-70 to +20) dB	10 Hz to 3 GHz 3 GHz to 6.7 GHz 6.7 GHz to 20 GHz  9 kHz to 8.5 GHz  9 kHz to 18 GHz 50 MHz to 20 GHz	0.14 dB 0.48 dB 0.48 dB  0.24 dB  0.16 dB 0.34 dB	Signal Generator Spectrum Analyzer  Network Analyzer  Signal Generators Power Meter/Sensors
RF Power <sup>4</sup> – Absolute - Generate  (-60 to +10) dBm (-60 to +10) dBm (-30 to +10) dBm	10 Hz to 20 MHz 10 kHz to 2.7 GHz (1 to 20) GHz	0.36 dB 0.58 dB 0.58 dB	Signal Generators with GPS Reference

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
Attenuation <sup>4</sup> - Generate  (0 to 70) dB 10 dB steps  (0 to 11) dB 1 dB steps  (0 to 70) dB 10 dB steps  (0 to 11) dB 1 dB steps	10 Hz to 12.4 GHz   (12.4 to 18) GHz	0.58 dB  0.35 dB  0.70 dB  0.81 dB	Step Attenuators
Impedance <sup>4</sup> - Measure	9 kHz to 8.5 GHz	0.42Ω	Network Analyzer with Calibration Kit
VSWR <sup>4</sup> - Measure	9 kHz to 8.5 GHz	0.72 dB	Network Analyzer with Calibration Kit
Current Probe <sup>4</sup> Transfer Impedance - Measure	9 kHz to 1 GHz	1.9 dB	CISPR16-1-2 Network Analyzer

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
<b>Signal Generator<sup>4</sup></b>			
Output Frequency	10 Hz to 10 MHz	$2.2 \times 10^{-5}$ % of rdg.	Frequency Counter with GPS Reference
	10 MHz to 1 GHz	$2.8 \times 10^{-6}$ % of rdg.	
	1 GHz to 20 GHz	$2.8 \times 10^{-6}$ % of rdg.	
Output Level	10 Hz to 10 kHz	0.78 dB	Spectrum Analyzer Power Meter/Sensors
	9 kHz to 1 GHz	0.24 dB	
	1 GHz to 18 GHz	0.40 dB	
	(18 to 26.5) GHz	0.59 dB	
Amplitude Modulation - Measure			Modulation Analyzer
Depth: (5 to 99) % Rate: 50 Hz to 10 kHz	150 kHz to 10 MHz	2.6 % of rdg.	
Depth: (5 to 99) % Rate: 50 Hz to 50 kHz	10 MHz to 1300 MHz	1.5 % of rdg.	
Frequency Modulation - Measure			Modulation Analyzer
Rate: 50 Hz to 10 kHz	150 kHz to 10 MHz	2.4 % of rdg.	
Rate: 30 Hz to 100 kHz	10 MHz to 1300 MHz	1.2 % of rdg.	
Phase Modulation - Measure			Modulation Analyzer
Rate: 200Hz to 20 kHz	10 MHz to 1300 MHz	3.5 % of rdg.	
Modulation Frequency - Measure	50 Hz to 10 kHz	0.05 Hz	Modulation Analyzer and Frequency Counter with GPS Reference

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
LISN <sup>4</sup>			CISPR16-1-2
Insertion Loss (VDF)	9 kHz to 200 MHz	0.53 dB	Network Analyzer
Impedance (Magnitude)	9 kHz to 200 MHz	0.71 % of rdg.	Network Analyzer with Calibration Kit
(Phase)	9 kHz to 200 MHz	0.39 °	
Isolation	9 kHz to 200 MHz	0.66 dB	Network Analyzer
Antenna Factor – Measure			SAE ARP958 (excluding Appendix C)
Biconical	25 MHz to 300 MHz	0.7 dB	Network Analyzer and Standard Open Site
Log-Periodic	150 MHz to 1 GHz	0.8 dB	
Horn	1 GHz to 3 GHz	0.7 dB	
Rod Antenna	9 kHz to 50 MHz	0.6 dB	CISPR 25, Annex E ANSI C63.5 CISPR16-1-4, Annex D SAE ARP958  Network Analyzer

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> ( $\pm$ )	Comments <sup>5</sup>
Electric Field Probe –			IEEE Std 1309
Correction Factor (Frequency Response)	10 kHz to 1 MHz	0.83 dB	TEM using substitution by transfer standard
	1 MHz to 200 MHz	1.2 dB	
	10 kHz to 1 MHz (1 to 1000) MHz	0.83 dB 1.2 dB	GTEM using substitution by transfer standard
	(1 to 4) GHz	0.99 dB	
	(1 to 4) GHz	0.86 dB	Anechoic Chamber using substitution by transfer standard
Linearity	100 MHz	1.2 dB	TEM using
Rotational Response (Isotropic Deviation)	400 MHz	0.58 dB	GTEM using

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
EMI Receiver <sup>4</sup>			CISPR 16-1-1
Input Impedance	Band A	2.5 % of rdg.	Network Analyzer with Calibration Kit
	Band B	2.9 % of rdg.	
	Band C	2.4 % of rdg.	
	Band D	2.3 % of rdg.	
	Band E (up to 8.5GHz)	5.6 % of rdg.	
Pulse Response	Band A	0.96 dB	Pulse Generator
	Band B	0.96 dB	
	Band C	1.2 dB	Signal Generator with Function Generator
	Band D	1.2 dB	
	Band E	0.66 dB	
Relative Pulse Response	Band A	0.57 dB	Pulse Generator
	Band B	0.62 dB	
	Band C	0.60 dB	
	Band D	0.67 dB	
Sine-wave Accuracy	Band A	0.76 dB	Signal Generators with Power Meter/Sensor
	Band B	0.78 dB	
	Band C	0.77 dB	
	Band D	0.80 dB	
	Band E	0.91 dB	
Selectivity, 6dB Bandwidth	Band A	0.58 dB	Signal Generator
	Band B	0.57 dB	
	Band C	0.57 dB	
	Band D	0.57 dB	
	Band E	0.81 dB	

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
(Cont.)			
EMI Receiver <sup>4</sup>	Band A	0.72 dB	Signal Generator
Intermediate Frequency	Band B	0.59 dB	
Rejection Ratio	Band C	0.63 dB	
	Band D	0.65 dB	
Image Frequency	Band A	0.68 dB	Signal Generator
Rejection Ratio	Band B	0.58 dB	
	Band C	0.61 dB	
	Band D	0.59 dB	
Peak Detector	Band A	0.58 dB	Pulse Generator
Verification	Band B	0.58 dB	
	Band C	0.58 dB	
	Band D	0.59 dB	
Average Detector	Band A	0.60 dB	Pulse Generator
Verification	Band B	0.59 dB	
	Band C	0.60 dB	
	Band D	0.58 dB	
CISPR Average Detector	Band A	0.61 dB	Signal Generator with
Verification	Band B	0.60 dB	Function Generator
	Band C	0.59 dB	
	Band D	0.60 dB	

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
<b>Spectrum Analyzer<sup>4</sup></b>			
Calibration Output Frequency		$2.1 \times 10^{-5}$ % of rdg.	Frequency Counter with GPS Reference
Calibration Output Level		0.16 dB	Power Meter/Sensors
Frequency Readout Accuracy	10 Hz to 20 GHz	$1.2 \times 10^{-9}$ % of rdg	Signal Generator with GPS Reference
Level Accuracy		0.42 dB	Power Meter/Sensors Signal Generator
Resolution Bandwidth		2.0 % of rdg.	Signal Generator
Input Attenuator Switching		0.58 dB	Signal Generator
Scale Fidelity		1.6 dB	Signal Generator
VSWR		1.4 dB	Network Analyzer with Calibration Kit
Tracking Generator Absolute Output		0.29 dB	Power Meter/Sensors
Tracking Generator Output Level Flatness		0.03 dB	Power Meter/Sensors
<b>(150 to 50)<math>\Omega</math>adapters<sup>4</sup></b>			
Insertion Loss	150 kHz to 230 MHz	0.24 dB	Network Analyzer
<b>CDNs<sup>4</sup></b>			
Coupling Factor	150 kHz to 230 MHz	0.24 dB	Network Analyzer
Impedance	150 kHz to 230 MHz	1.1 % of rdg.	Network Analyzer with Calibration Kit

Parameter/Equipment	Frequency	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
Directional Couplers <sup>4</sup>			Network Analyzer
Insertion loss	9 kHz to 8.5 GHz	0.24 dB	
Coupling Factor	9 kHz to 8.5 GHz	0.24 dB	
Isolation	9 kHz to 8.5 GHz	0.30 dB	
Bulk Current Injection Probe and Fixture <sup>4</sup>			
Insertion Loss	9 kHz to 1 GHz (0.8 to 2.1) GHz	0.58 dB 0.52 dB	Network Analyzer
VSWR	9 kHz to 1000 MHz (0.8 to 2.1) GHz	0.48 dB 0.37 dB	Network Analyzer with Calibration Kit

Parameter/Equipment	Range	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
ESD Simulator – Contact discharge			IEC61000-4-2 ISO10605 Oscilloscope and ESD Target
Current	(0.15 to 73.125) A	5.9 % of rdg.	
Rise/Fall time	(0.7 to 1) ns	53 ps	
Air Discharge			
Rise/Fall time	(0.7 to 20) ns	53 ps	
RC time at ±15 kV	(230 to 730) ns	12 ns	
Charging Voltage (+ and -)	(0 to 20) kV (20 to 40) kV	0.2 % of rdg. 0.4 % of rdg.	High Voltage Meter

Parameter/Equipment	Range	Best Uncertainty <sup>2,3</sup> (±)	Comments <sup>5</sup>
EFT/Burst Generator <sup>4</sup> – (50 and 1000)Ω			IEC61000-4-4 Oscilloscope
Peak Voltage (+ and -)	225 V to 4.4 kV	3.4 % of rdg.	
Rise/Fall time	5 ns±30 %	0.65 ns	
Impulse 50%	50 ns±30 %	5.5 ns	
Burst Duration	15 ms±20 %	0.01 ms	
Burst Period	300 ms±20 %	0.01 ms	
Repetition Rate	(2.5, 5, 100) kHz	0.1 % of rdg.	
Surge Generator <sup>4</sup> –			IEC61000-4-5 Oscilloscope with HV Differential Probe
Front time (+ and -) Open Circuit Short Circuit	1.2 μs±30 % 8 μs±20 %	0.08 μs 0.10 μs	
Rise time (+ and -) Open Circuit Short Circuit	1 μs±30 % 6.4 μs±20 %	0.07 μs 0.20 μs	
Time to Half Value Open Circuit Short Circuit	(16 to 60) μs	2.5 μs 1.3 μs	
Duration time Open Circuit Short Circuit	(12.8 to 60) μs	2.1 μs 0.42 μs	
Voltage (+ and -) Open Circuit	(0.45 to 4.4) kV	4.3 % of rdg.	
Current (+ and -) Short Circuit	(0.225 to 2.2) kA	2.7 % of rdg.	
Over/Under Shoot	(0 to 30) %	2.5 % of rdg.	