CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Eurofins EAG Engineering Science LLC.

2710 Walsh Avenue
Santa Clara, CA 95051
(and satellite location as shown on the scope)

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

TESTING

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 01 May 2021
Certificate Number: AT-1111

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
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 April 2017).

ANAB
ANSI National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Eurofins EAG Engineering Science LLC.

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TESTING

Valid to: **May 1, 2021** Certificate Number: **AT-1111**

Electrical

<table>
<tr><th>Specific Tests and/or Properties Measured</th><th>Specification, Standard, Method, or Test Technique</th><th>Items, Materials or Product Tested</th><th>Key Equipment or Technology</th></tr>
<tr><td>Voltage Stress

Rise / Fall Time
2 ns to 10 ns
Rise / Decay Time
130 ns to 170 ns
Current
0.15 A to 5.86 A</td><td>JEDEC JS-001
JESD22-A114
Mil Std 883 TM 3015.8
AEC-Q100-002
Test – Human Body Model</td><td rowspan="4">Integrated Circuits</td><td>768 and 2304 Pin Capacity
100 V to 8 kV
ThermoKeyTek
MK2, MK4</td></tr>
<tr><td>Voltage Stress

Frequency -
11 MHz to 16 MHz
Current
1.5 A to 16.1 A</td><td>JEDEC JESD22-A115
AEC-Q100-003
Test – Machine Model</td><td>768 and 2304 Pin Capacity
50 V to 2 kV
ThermoKeyTek
MK2, MK4</td></tr>
<tr><td>Voltage Stress

I-Test
V_{supply}
Over-Voltage Test</td><td>JEDEC JESD78
AEC-Q100-004
Test –IC Latch-Up</td><td>768 and 2304 Pin Capacity
100 mA to 300 mA
Temp 25 °C to 125 °C
ThermoKeyTek
MK2, MK4</td></tr>
<tr><td>Voltage Stress

Rise / Fall Time
< 400 ps
Peak Current Magnitude
2.25 A to 18 A</td><td>JEDEC JESD22-C101
AEC-Q100-011
Test – Field Induced Charged Device Model</td><td>50 V to 2 kV
ThermoKeyTek
RCDM
Discharge Plate</td></tr>
</table>

Thermal

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
HTOL (High Temperature Operating Life)	Mil Std. 883TM 1005, 1006, 1015 JESD22-A108	Integrated Circuits	85 °C to 150 °C (1 to 20) V / (0 to 500) A
HTSL (High Temperature Storage Life)	JESD22-A103		(100 to 185) °C
THB (Temperature Humidity Bias)	JESD-A101		30 °C to 85 °C (60 to 95) %RH Non-Condensing
PPOT – Pressure Pot	JESD22-A102		(121 to 135) °C, 20 PSI, 100 % Saturation
HAST (Highly Accelerated Stress Test)	JESD22-A110		(110 to 145) °C, 35 PSI, 100 % Saturation @85 %RH (Max) Trio-tech HAST-6000X
TMCL – Temperature Cycling	JESD22-A104 Mil Std. 883 TM 1010 Mil Std. 750 TM 1051		Condition A-N (air to air) (-65 to 150) °C 10 min Dwell Instantaneous Ramp; 5 min Dwell 15 min Ramp
Preconditioning	JESD22-A113		Level 1 ~ 6

ANSI National Accreditation Board

SATELLITE SITE

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TESTING

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Electrical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Voltage Stress Rise / Fall Time (2 to 10) ns Rise / Delay Time (130 to 170) ns	JEDEC JS-001 JESD22-A114 Mil Std 883 TM 3015 AEC-Q100-002 AEC-Q101-001 Test – Human Body Model	Integrated Circuits	Thermo Fisher Scientific MK2, MK4, 768, 1024, and 2304 Pin Capacity 100 V to 8 kV Current (0.15 to 5.86) A
Voltage Stress Frequency (11 to 16) MHz	JEDEC JESD22-A115 AEC-Q100-003 AEC-Q101-002 Test – Machine Model	Integrated Circuits	Thermo Fisher Scientific MK2, MK4, 768, 1024, and 2304 Pin Capacity 50 V to 2 kV Current (1.5 to 16.1) A

Electrical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Voltage Stress Pin Capacity 100 mA to 300 mA Temp (70 to 125) °C I-Test V_{supply} Over-Voltage Test	JEDEC JESD78 AEC-Q100-004 Test –IC Latch-Up	Integrated Circuits	Thermo Fisher Scientific MK2, MK4, 768, 1024, and 2304
Voltage Stress 50 V to 2 kV Rise / Fall Time < 400 ps Peak Current (2.25 to 18) A	JEDEC JESD22-C101 AEC-Q100-011 AEC-Q101-005 Test – Field Induced Charged Device Model	Integrated Circuits	Thermo Fisher Scientific, Orion, Orion2

Environmental – Thermal Stress

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
HTOL (High Temperature Operating Life)	JESD22-A108	Integrated Circuits	(85 ~ 150) °C ± 3 °C (1 to 4) V, (0 to 52) A, ADEC 7056/92 AEHR Max2
HTSL (High Temperature Storage Life)	JESD22-A103	Integrated Circuits	150 °C (- 0 °C, +10 °C) Thelco
THB (Temperature Humidity Bias)	JESD22-A101	Integrated Circuits	85 °C ± 2 °C 85 % ± 5 %RH Non-Condensing, Thermotron SM-32C
PPOT – Pressure Pot (Autoclave)	JESD22-A102	Integrated Circuits	121 °C ± 2 °C 29.7 psia, 100 %RH Hirayama HA300MIV
HAST (Highly Accelerated Stress Test)	JESD22-A110	Integrated Circuits	110 °C ± 2°C, 17.7 psia 130 ± 2°C, 33.3 psia 85 % ± 5 %RH Trio-tech 1000X Hirayama R7/8

Environmental – Thermal Stress

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
TMCL – Temperature Cycling	JESD22-A104 Mil Std. 883 TM 1010	Integrated Circuits	Condition A-N (air to air) (-65 to 150) °C (10 to 15) min Dwell <10 s transfer ESPEC TSE-11 TSA70/100
Thermal Shock	JESD22-A106 Mil Std. 883 TM 1011	Integrated Circuits	(-65 to 150) °C (Liquid to Liquid) 5 min dwell <10 s transfer Blue M LTB-ATS-B
Moisture Reflow Sensitivity	JEDEC J-STD-020	Integrated Circuits	Level 1 ~ 6 HAFO 1675 Bake 125 + (-0 to 5) °C ESPEC PRA-2AP (30 to 85) °C ± 2 °C (60 to 85) % ±3% RH HELLER 1500. 1809 260 °C peak reflow ESPEC TH HELLER reflow
Preconditioning	JESD22-A113	Integrated Circuits	Level 1 ~ 6 HAFO 1675 Bake 125 + (-0 to 5) °C ESPEC PRA-2AP (30 to 85) °C ± 2 °C (60 to 85) ±3 %RH HELLER 1500. 1809 260 °C peak reflow ESPEC TH HELLER reflow

Optical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
EDX - Energy Dispersive X-ray Spectroscopy	Customer and Sample Dependent	Integrated Circuits and Electronic Components	FEI Nova Nanolab Dual-Beam FIB using Oxford Detector; Elements C to U; (5- 30) keV; Line scan; Dot map

Optical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Bond Shear Test	JEDEC – JESD22-B117; JEDEC – JESD22-B116; AEC-Q100; Customer and Sample Dependent	Integrated Circuits and Electronic Components	Royce Instruments 620; SMS-250 g: Accuracy: ± 0.1% gf Capacity: 250 gf Max SMS-5K: Accuracy ± 0.1% kgf Capacity: 5 kgf Max
Wire Pull Test	MIL-STD-883 Method 2011; AEC-Q100; Customer and Sample Dependent	Integrated Circuits and Electronic Components	Royce Instruments 620; SMW-100g: Accuracy ± 0.1% gf Capacity: 100 gf Max
SEM- Scanning Electron Microscope (Defects Imaging)	Customer and Sample Dependent	Integrated Circuits and Electronic Components	FEI Nova Nanolab Dual-Beam FIB; Knights CAD Navigation; Cross-sectioning sub-micron features by “slice and view”; 6” wafer/sample capacity; Ion Channeling Imaging

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1111.

R. Douglas Leonard Jr., VP, PILR SBU