



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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ELECTRICAL

Valid to: May 31, 2020

Certificate Number: 0214.39

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electrical tests:

**Test Technology/Description:**

**Test Methods<sup>1</sup>:**

**Emissions**

Radiated Emissions

47 CFR FCC Parts 15B (using ANSI C63.4:2014) and 18 (using MP-5:1986); VCCI V-3 (*up to 6 GHz*); ANSI C63.4:2009;  
EN 55011; CISPR 11; AS/NZS CISPR 11; KN 11;  
EN 55012; CISPR 12; AS/NZS CISPR 12; KN 12;  
EN 55014-1; CISPR 14-1; AS/NZS CISPR 14-1; KN 14-1;  
EN 55022; CISPR 22; AS/NZS CISPR 22; KN 22;  
EN 55032; CISPR 32; AS/NZS CISPR 32; KN 32;  
EN/IEC 61000-6-3; EN/IEC 61000-6-4;  
AS/NZS 4268 +A1/A2; AS/NZS 4251-1; AS/NZS 4251-2;  
MIL-STD-461E, F, G (RE101, RE102, RE103);  
MIL-STD-462D (RE101, RE102, RE103);  
MIL-STD-462 (RE01, RE02); CISPR 25; SAE J1113-41;  
RTCA/DO-160C, D, E, F, G, Sections 15 and 21

Conducted Emissions

47 CFR FCC Parts 15B (using ANSI C63.4:2014) and 18 (using MP-5:1986); VCCI V-3; ANSI C63.4:2009;  
EN 55011; CISPR 11; AS/NZS CISPR 11; KN 11;  
EN 55012; CISPR 12; AS/NZS CISPR 12; KN 12;  
EN 55014-1; CISPR 14-1; AS/NZS CISPR 14-1; KN 14-1;  
EN 55022; CISPR 22; AS/NZS CISPR 22; KN 22;  
EN 55032; CISPR 32; AS/NZS CISPR 32; KN 32;  
EN/IEC 61000-6-3; EN/IEC 61000-6-4;  
AS/NZS 4268 +A1/A2; AS/NZS 4251-1; AS/NZS 4251-2;  
AS/NZS 4250-1; AS/NZS 4250-2;  
MIL-STD-461E, F, G (CE101, CE102, CE106);  
MIL-STD-462D (CE101, CE102, CE106);  
MIL-STD-462 (CE01, CE03, CE07);  
RTCA/DO-160C, D, E, F, G, Sections 21;  
CISPR 25; SAE J1113-41; SAE J1113-42

(A2LA Cert. No. 0214.39) 10/08/2018

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**Test Technology/Description:****Test Methods<sup>1</sup>:****Emissions (cont'd)**

Harmonics

EN/IEC 61000-3-2; AS/NZS 61000.3.2

Flicker

EN/IEC 61000-3-3; AS/NZS 61000.3.3

**Immunity**

Electrostatic Discharge (ESD)

EN/IEC/KN 61000-4-2; AS/NZS 61000.4.2;  
RTCA/DO-160C, D, E, F, G (Section 25);  
MIL-STD-1686C;  
MIL-STD-461G (CS118);  
ISO 10605; SAE J1113-13

Electrical Fast Transient/Burst

EN/IEC/KN 61000-4-4; AS/NZS 61000.4.4;  
ISO 7637-3; SAE J1113-12

Surge

EN/IEC/KN 61000-4-5; AS/NZS 61000.4.5;  
IEEE C62.41; IEEE C62.41.1; IEEE C62.41.2;  
ISO 16750-2 (Load Dump)

Radiated Immunity

EN/IEC/KN 61000-4-3; AS/NZS 61000.4.3;  
MIL-STD-461E, F, G (RS101, RS103, RS105);  
MIL-STD-462D (RS101, RS103);  
MIL-STD-462 (RS01, RS02, RS03);  
RTCA/DO-160C, D, E, F, G (Section 20);  
ISO 11452-2; ISO 11452-3; ISO 11451-2; ISO 11451-3;  
SAE J1113-21; SAE J1113-23; SAE J1113-24

Conducted Immunity

EN/IEC/KN 61000-4-6; AS/NZS 61000.4.6;  
MIL-STD-461E, F, G (CS103, CS104, CS105, CS109,  
CS114, CS115, CS116);  
MIL-STD-462D (CS103, CS104, CS105, CS109, CS114,  
CS115, CS116);  
MIL-STD-462 (CS01, CS02, CS06);  
RTCA/DO-160C, D, E, F, G (Section 20);  
ISO 11452-4; ISO 11451-4; SAE J1113-4Power Frequency Magnetic/Electric  
FieldEN/IEC/KN 61000-4-8; AS/NZS 61000.4.8;  
RTCA/DO-160C, D, E, F, G (Section 15);  
MIL-STD-461D, E, F, G (RS101);  
MIL-STD-462 (RS01); ISO 11452-8;  
SAE J1113-22; SAE J1113-26

Voltage Dips/Interrupts and Variations

EN/IEC/KN 61000-4-11; AS/NZS 61000.4.11

Voltage Spike

RTCA/DO-160C, D, E, F, G (Section 17);  
MIL-STD-461F (CS106);  
ISO 7637-2; SAE J1113-11

**Test Technology/Description:**

**Test Methods<sup>1</sup>:**

**Immunity (cont'd)**

Power Input

RTCA/DO-160C, D, E, F, G (Section 16);  
MIL-STD-704A, B, C, D, E, F (with Notice 1);  
ISO 16750-2

Audio Frequency Conducted  
Susceptibility

RTCA/DO-160C, D, E, F, G (Section 18);  
MIL-STD-461D, E, F, G (CS101);  
MIL-STD-462 (CS01);  
ISO 11452-10; SAE J1113-2

Induced Signal Susceptibility

RTCA/DO-160C, D, E, F, G (Section 19)

Lightning Induced Transient

RTCA/DO-160C, D, E, F, G (Section 22);  
MIL-STD-461G (CS117)

**Generic and Product Family Standards**

EN/IEC 61000-6-1; AS/NZS 61000.6.1;  
EN/IEC 61000-6-2; AS/NZS 61000.6.2;  
CISPR 14-2; EN 55014-2; AS/NZS CISPR 14-2;  
CISPR 24; EN 55024; AS/NZS CISPR 24;  
KN 24; KN 35; BS EN/IEC 60601-1-2;  
BS EN/IEC 60947-1; BS EN/IEC 60439-1;  
BS EN/IEC 61326-1; BS EN/IEC 61326-2;  
BS EN 50130-4; BS EN 50131-1; EN 61800-3;  
IEC 61800-3 (up to 75A, 1000V); BS EN 14982;  
ISO 14982 (using component methods except ISO 7637 and  
ISO 11452-3);  
ISO 13766:2006 Ed 2.0; BS EN 12895:2015

**Current Measure**

*(500 A DC, 1000A AC)*

USCAR 2, Sections 5.3.3 & 5.3.4;  
GMW3431, Section 4.2.3

**Insulation Resistance**

*(1 Kilo-ohms to 10 Tera-ohms)*

MIL-STD-202, Method 302;  
IPC-TM-650, Sections 2.5.11, 2.5.16, & 2.5.26A;  
USCAR-2 Section 5.5.1; GMW 3431, Section 4.1.3;  
ASTM D257

**High Voltage/Dielectric Withstanding  
Voltage**

*(Up to 50 kVAC & 60 KV DC)*

ASTM D149 (2009) Types 1, 3, & 4;  
MIL-STD-202, Method 301;  
IPC-TM-650 Sections 2.5.6B, 2.5.6.1A, 2.5.6.2A, 2.5.6.3,  
2.5.7D, 2.5.7.1, & 2.5.25A

**Continuity Monitoring**

*(50 Nanosecond Event Detection or  
more or Resistance Change)*

IPC-9701A, Section 4.3.3 (2006);  
MIL-STD-202, Method 310; USCAR-2, Section 5.1.9

**Contact Resistance, Low Level Contact  
Resistance**

*(LLCR) (100 micro-ohms to 200 kilo-  
ohms)*

MIL-STD-202, Method 307;  
MIL-DTL 83513G, Method 3.5.6;  
ASTM B539 (2002); ASTM B193;  
IPC-TM-650, Sections 2.5.12, 2.5.13A, 2.5.14A, 2.5.24, &  
2.5.32

**Test Technology/Description:**

**Test Methods<sup>1</sup>:**

**Dry Circuit Resistance/Resistance**

USCAR-2, Section 5.3.1;  
MIL-STD-202, Methods 303 & 304

**Voltage/Voltage Drop**

10  $\mu$ V – 80 KV

GMW 3431, Section 4.1.1; USCAR-2, 5.3.2

**Battery Testing**

External Short Circuit Overcharge

UN/ST/SG/AC.10/11 Section 38.3.4.5

UN/ST/SG/AC.10/11 Section 38.3.4.7

On the following types of equipment:

Industrial Drives, Tractor Components, Automotive System and Subsystems, Consumer Electronics, Electrical Power/Distribution Equipment

<sup>1</sup> When the date, revision or edition of a test method standard is not identified on the scope of accreditation, the laboratory is expected to be using the current version within one year of the date of publication, per part C., Section 1 of A2LA R101 - *General Requirements- Accreditation of ISO-IEC 17025 Laboratories.*

Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1<sup>2</sup>

**Rule Subpart/Technology**

**Test Method**

**Maximum  
Frequency  
(MHz)**

Unintentional Radiators

Part 15B

ANSI C63.4:2014

18000

Industrial, Scientific, and Medical Equipment

Part 18

FCC MP-5:1986

18000

<sup>2</sup>Accreditation does not imply acceptance to the FCC equipment authorization program. Please see the FCC website (<https://apps.fcc.gov/oetcf/eas/>) for a listing of FCC approved laboratories.



## *Accredited Laboratory*

A2LA has accredited

# **NATIONAL TECHNICAL SYSTEMS (NTS) CHICAGO**

*Mount Prospect, IL*

for technical competence in the field of

## **Electrical Testing**

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 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).



Presented this 8<sup>th</sup> day of October 2018.

A handwritten signature in black ink, written over a horizontal line.

President and CEO  
For the Accreditation Council  
Certificate Number 0214.39  
Valid to May 31, 2020

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