



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELITE ELECTRONIC ENGINEERING, INC.¹

1516 Centre Circle

Downers Grove, IL 60515

Robert Bugielski (QA Manager) Phone: 630 495 9770 ext. 168

Email: rbugielski@elitetest.com

Kevin Halpin (Deputy QA Manager) Phone: 630 495 9770 ext. 111

Email: khalpin@elitetest.com

John Lindberg (ENV Lab Manager) Phone: 630 495 9770 ext. 157

Email: jlindberg@elitetest.com

Website: www.elitetest.com

MECHANICAL

Valid To: June 30, 2023

Certificate Number: 1786.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above, *as well as the two satellite laboratory locations listed below*, for the following mechanical tests:

Test Technology

Test Method(s)²

Humidity
(5 to 95) %

MIL-STD-810 (C/E/F/G/H), Methods 507 and 520;
MIL-STD-202 (F/G/H), Methods 103 and 106;
SAE J1455, Sec. 4.2, 4.12; SAE J575, Section 4.4;
RTCA/DO-160 (D/E/F/G), Section 6.0;
EIA-364-31;
GMW 3172, Section 9.4;
IACS-E10, Test 6;
IEC 60068-3-4; IEC 60068-2-30; IEC 60068-2-38; IEC 60068-2-78;
ISTA 2A 2008;
US CAR-2, Section 5.6.2;
ISO 16750-4;
FAA AC 150/5345-3G, -5B, -10H, -43J, -49D, -51B, -52A, 54B;
USCAR21-3, Section 4.5.4

Temperature Cycling,
Temperature Steady State,
Temperature Life
(-100 to 343) °C
Thermal Shock
(-100 to 200) °C
(Ramps up to 60°C/min)
(<15sec transitions)

MIL-STD-810 (E/F/G/H), Methods 501, 502, 503, 520, and 524;
MIL-STD-202 (F/G/H), Methods 107 and 108;
IEC 60068-2-1; IEC 60068-2-2; IEC 60068-2-28; IEC 60068-2-14;
SAE J1455, Sections 4.1 and 4.12;
EIA-364-32;
RTCA/DO-160 (D/E/F/G), Sections 4 and 5;
US CAR-2, Sections 5.6.1 and 5.6.3;
GMW 3172, Section 9.4;

Test Technology

Test Method(s)²

Temperature Cycling,
Temperature Steady State,
Temperature Life
Thermal Shock
(Cont'd)

IACS-E10, Tests 5 and 11;
ISTA 2A 2008;
ISO 16750-4;
FAA AC 150/5345-5B, -10H, -12F, -28G, -39D, -42J, -43J, -44K, -46E,
-49D, -50B, -51B, -52A, -54B, -55A;
FAA EB-67D;
US CAR-21, Section 4.5.5

Immersion

MIL-STD-810 (E/F/G/H), Method 512;
MIL-STD-202 (F/G/H), Method 104;
SAE J1455, Section 4.3; SAE J575, Section 4.3;
US CAR-2, Section 5.6.5;
IEC 529; IEC 60529; ISO 16750-4;
GMW 3127, Section 5.8;
ISO 20653;
FAA AC 150/5345-26D, -39D, -44K, -46E, -47C

Rain, Drip, and Water Spray

MIL-STD-810 (E/F/G/H), Method 506;
SAE J1455, Section 4.5; SAE J575, Section 4.3;
RTCA/DO-160 (D/E/F/G), Section 10;
IEC 60529; IEC 60068-2-17; ISO 16750-4; ISO 20653;
DIN 40 050;
NEMA 250;
GMW 3127, Section 9.5;
FAA AC 150/5345-12F, -28G, -43J, -44K, -46E, -50B, -51B, -54B

Dust Blowing and Settling

MIL-STD-810 (E/F/G/H), Method 510, Procedure I;
MIL-STD-202 (F/G/H), Method 110;
IEC 60529; ISO 20653; ISO 16750-4;
SAE J1455, Section 4.7, Alternate Method;
RTCA/DO-160(D/E/F/G), Section 12, Procedure D;
DIN 40 050;
NEMA 250;
GMW 3127, Section 9.5

Salt Spray (Corrosion)

ASTM B117; ASTM G85;
MIL-STD-810 (E/F/G/H), Method 509;
MIL-STD-202 (F/G/H), Method 101;
SAE J1455, Section 4.3; SAE J575, Sections 4.6, 4.7;
RTCA/DO-160 (D/E/F/G), Section 14;
US CAR-2, Section 6.6.4;
GMW 3172, Section 9.4.7;
IACS-E10, Test 12;
IEC 60068-2-11; IEC 60068-2-52; ISO 16750-4;
FAA AC 150/5345-28G, -39D, -43J, -45C, -46E, 50B, 51B, 52A

Explosive Atmosphere

MIL-STD-810 (E/F/G/H), Method 511;
MIL-STD-202 (F/G/H), Method 109;
RTCA/DO-160 (D/E/F/G), Section 9



Test Technology

Test Method(s)²

Fluids Susceptibility

MIL-STD-810 (E/F/G/H), Methods 504 and 518;
MIL-STD-202 (F/G/H), Method 215;
SAE J1211, Section 4.4; SAE J1455, Section 4.4;
SAE J575, Sections 4.15 and 4.16;
RTCA/DO-160 (D/E/F/G), Section 11;
US CAR-2 Sec. 6.4; ISO 16750-5;
FAA AC 150/5345-42J, -46E

Flammability

MIL-STD-202 (F/G/H), Method 111;
FMVSS 302;
RTCA/DO-160 (D/E/F/G), Section 26, Category C

Vibration
Random and Sine
25k force pound
3” stroke
2 Hz to 3 kHz

MIL-STD-810 (E/F/G/H), Method 520;
MIL-STD-202 (F/G/H), Methods 201, 204, and 214;
IEC 60068-2-6; IEC 60068-2-64; IEC 61373:2010; ISO 16750-3;
CEI IEC 255-21-1;
SAE J1455, Sections 4.10 and 4.12; SAE J575, Section 4.2;
RTCA/DO-160 (D/E/F/G), Section 8;
US CAR-2, Sections 5.4.6 and 5.8;
EIA-364-28;
GMW 3172, Section 9.3;
IACS-E10, Test 7;
ISTA 2A 2008;
FAA AC 150/5345-46E

Mechanical Shock

MIL-STD-810 (E/F/G/H), Methods 516 and 519;
MIL-STD-202 (F/G/H), Methods 203 and 213;
RTCA/DO-160 (D/E/F/G), Section 7;
EIA-364-27;
GMW 3172, Section 9.3;
IEC 60068-2-27; IEC-60068-2-29; IEC 60068-2-3; ISO 16750-3;
CEI IEC 255-21-2;
SAE J1455, Section 4.11;
ISTA 2A 2008;
US CAR-2, Sections 5.4.6 and 5.8;
FAA AC 150/5345-46E, -47C;
IEC 61373:2010

Transportation Vibration

ISTA 1D 2014 (*except for sequence # 3*), 2A 2011;
MIL-STD-810 (E, F, G/H), Method 514, Procedure II

UN Manual of Tests and
Criteria

Tests T1 (Altitude Simulation), T2 (Thermal Test), T3 (Vibration),
T4 (Shock), T5 (External Short Circuit), and T7 (Overcharge)

Gravel Bombardment

SAE J400; SAE J1455, Section 4.8;
ISO 16750-3; ISO 20567-1

Transformer Tests

FAA AC 150/5345-47C (Section 4.2.4)



<u>Test Technology</u>	<u>Test Method(s)²</u>
Dielectric Withstand Voltage	MIL-STD-202, Method 301; EIA-364-20D
Insulation Resistance	MIL-STD-202, Method 302; SAE/USCAR-2, Revision 6, Section 5.5.1; EIA-364-21D
Contact Resistance	MIL-STD-202, Method 307; SAE/USCAR-2, Revision 6, Section 5.3.1; EIA-364-23C; USCAR21-3 Section 4.5.3
DC Resistance	MIL-STD-202, Method 303
Contact Chatter	MIL-STD-202, Method 310; SAE/USCAR-2, Revision 6, Section 5.1.9
Voltage Drop	SAE/USCAR-2, Revision 6, Section 5.3.2; USCAR21-3 Section 4.5.6

¹ This accreditation covers the testing performed at the main laboratory listed above, and the satellite laboratories listed below.

² When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA R101 - *General Requirements- Accreditation of ISO-IEC 17025 Laboratories*.

201 Eisenhower Lane South, Unit 219
Lombard, IL 60418

<u>Test Technology</u>	<u>Test Method(s)²</u>
Connector and Cable Testing (5,000 to 20,000) lbs 20"/min	GMW 3172, Sections 9.3.6 through 9.3.10; EIA-364, 38; US CAR-2, Sections 5.2 through 5.4; US CAR-21-3 Section 4.4; FAA AC 150/5345-26D, Sections 4.2.2.2, 4.2.3, and 4.2.4, -47C
Transportation Vibration	ISTA 1A 2014, 1B 2014, 1D 2014 (<i>except for sequence #3</i>), 2A 2011
UN Manual of Tests and Criteria	Tests T1 (Altitude Simulation), T2 (Thermal Test), T3 (Vibration), T4 (Shock), T5 (External Short Circuit), & T7 (Overcharge)
Seal/Leakage	FAA AC 150/5345-10H, -42J, -46E
Yield Device	FAA AC 150/5345-27D, -28G, -39D, -44K, -46E, -50B, -51B, -52A, -55A



Test Technology**Test Method(s)²**

Load	FAA AC 150/5345-27D, -28G, -39D, -42J, -43J, -46E, -50B, -52A, -55A
Surface Temperature	FAA AC 150/5345-46E
Impact	ASTM E23; ASTM D6110; FAA AC 150/5345-42J
Accelerated Life Test	FAA AC 150/5345-46E; FAA EB-67D
Humidity (5 to 95) %	MIL-STD-810 (C/E/F/G/H), Methods 507 and 520; MIL-STD-202 (F/G/H), Methods 103 and 106; SAE J1455, Sections 4.2 and 4.12; SAE J575, Section 4.4; RTCA/DO-160 (D/E/F/G), Section 6.0; EIA-364-31; GMW 3172, Section 9.4; IACS-E10, Test 6; IEC 60068-3-4; IEC 60068-2-30; IEC 60068-2-38; IEC 60068-2-78; ISTA 2A 2008; US CAR-2, Section 5.6.2; US CAR21-3, Section 4.5.4; ISO 16750-4; FAA AC 150/5345-3G, -5B, -10H, -43J, -49D, -51B, -52A, -54B
Temperature Cycling, Temperature Steady State, Temperature Life (-100 to 343) °C Thermal Shock (-100 to 200) °C	MIL-STD-810 (E/F/G/H) Methods 501, 502, 503, 520, and 524; MIL-STD-202 (F/G/H) Methods 107, 108; IEC 60068-2-1; IEC 60068-2-2; IEC 60068-2-28; IEC 60068-2-14; SAE J1455, Sections 4.1 and 4.12; EIA-364-32; RTCA/DO-160 (D/E/F/G), Sections 4 and 5; US CAR-2, Sections 5.6.1 and 5.6.3; US CAR-21-3, Section 4.5.5; GMW 3172, Section 9.4; IACS-E10, Tests 5 and 11; ISTA 2A 2008; ISO 16750-4; FAA AC 150/5345-5B, -10H, -12F, -26D, -28G, -39D, -42J, -43H, -44K, -46E, -49D, -50B, -51B, -52A, -54B, -55A; FAA EB-67D
Altitude (-1.5 to 90) k ft	MIL-STD-810 (E/F/G/H), Methods 500 and 520; MIL-STD-202 (F/G/H), Method 105C, Test Conditions A, B, and C; SAE J1455, Section 4.9; RTCA/DO-160 (D/E/F/G), Section 4.0; EIA-364-20; US CAR-2 5.6.6; IEC 60068-20-13; FAA AC 150/5345-5B, -10H, -51B
Ice & Freezing Rain	MIL-STD-810 (E/F/G/H), Method 521; RTCA/DO-160 (D/E/F/G), Section 24; NEMA 250; FAA AC 150/5345-12F

<u>Test Technology</u>	<u>Test Method(s)²</u>
Dielectric Withstand Voltage	MIL-STD-202, Method 301; EIA-364-20D
Insulation Resistance	MIL-STD-202, Method 302; SAE/USCAR-2, Revision 6, Section 5.5.1; EIA-364-21D
Contact Resistance	MIL-STD-202, Method 307; SAE/USCAR-2, Revision 6, Section 5.3.1; EIA-364-23C; USCAR21-3 Section 4.5.3
DC Resistance	MIL-STD-202, Method 303
Contact Chatter	MIL-STD-202, Method 310; SAE/USCAR-2, Revision 6, Section 5.1.9
Voltage Drop	SAE/USCAR-2, Revision 6, Section 5.3.2; USCAR21-3 Section 4.5.6
Photometry, Luminous Flux ³ 2-meter Integrating Sphere with spectroradiometer; 4pi and 2pi geometries; (6 to 159,000) lumens	IES LM-79-08, Section 9.1; LM-79-19, Section 7.0; LM-45-2015; 49 CFR 571.108 (FMVSS 108), 49 CFR 564 (Part 564); CMVSS 108; SAE J573, J2560; UNECE Reg 37, Reg 99; CIE 84, CIE S025; ANSI/PLATO FL 1 2019
Photometry, Luminous Intensity ³ 64' (19.5 m) Type A Goniophotometer; (Steady, Flashing); (0.01 to 1,000,000) cd	FAA AC 150/5345-12F, -28G, -43J, -46E, -50B, -51B, -52A, -55A; FAA EB-67D; ICAO Annex 14, Volume 1 (8 th Edition); CASA MOS139; TP312 (5 th Edition); SAE J222, J575, J581, J582, J583, J585, J586, J588, J591, J592, J593, J595, J845, J852, J914, J1319, J1373, J1383, J1395, J1398, J1424, J1432, J1735, J1889, J1957, J2009, J2039, J2040, J2042, J2087, J2139, J2261, J2595, J2650, AS8037, AS 8017; 49 CFR 571.108 (FMVSS 108); CMVSS 108; UNECE Reg 38; NFPA 1901 Chapter 13; GSA/KKK-A-1822F Section 3.8; GMW 14906 Section 4.5.5; CIE 70; ANSI/PLATO FL 1 2019

Test Technology**Test Method(s)²**

Colorimetry, Chromaticity ³ Spectrometer (350 to 1050) nm	FAA AC 150/5345-12F, -28G, -43J, -46E, -50B, -51B, -52A, -55A; FAA EB-67D; SAE J576, SAE J578, AS25050; IES LM-79-08, Section 12.1; LM-79-19, Section 7.0; LM-58-20, TM-30-20; CIE 13.3; CIE15; ANSI C78-09.377; ICAO Annex 14, Volume 1 (8 th Edition); CASA MOS139; TP312 (5 th Edition)
--	--

³ Also using customer specified methods directly related to the technologies and parameters listed above.

1524 Centre Circle
Downers Grove, IL 60515

Test Technology**Test Method(s)²**

Acceleration	MIL-STD-810 (E/F/G/H), Method 513; MIL-STD-202 (F/G/H), Method 212, Conditions A and C
Solar Radiation	MIL-STD-810 (E/F/G/H), Method 505; FAA AC 150/5345-12F, -39D, -43J, -44K, -45C, -46E, -50B, -51B, -52A, -54B
Temperature Cycling, Temperature Steady State, Temperature Life (-100 to 343) °C	MIL-STD-810 (E/F/G/H) Methods 501, 502, 503, 520, and 524; MIL-STD-202 (F/G/H) Methods 107, 108; IEC 60068-2-1; IEC 60068-2-2; IEC 60068-2-28; IEC 60068-2-14; SAE J1455, Sections 4.1 and 4.12; EIA-364-32; RTCA/DO-160 (D/E/F/G), Sections 4 and 5; US CAR-2, Sections 5.6.1 and 5.6.3; US CAR-21-3, Section 4.5.5; GMW 3172, Section 9.4; IACS-E10, Tests 5 and 11; ISTA 2A 2008; ISO 16750-4; FAA AC 150/5345-5B, -10H, -12F, -26D, -28G, -39D, -42J, -43H, -44K, -46E, -49D, -50B, -51B, -52A, -54B, -55A; FAA EB-67D
Dielectric Withstand Voltage	MIL-STD-202, Method 301; EIA-364-20D
Insulation Resistance	MIL-STD-202, Method 302; SAE/USCAR-2, Revision 6, Section 5.5.1; EIA-364-21D
Contact Resistance	MIL-STD-202, Method 307; SAE/USCAR-2, Revision 6, Section 5.3.1; EIA-364-23C; USCAR21-3 Section 4.5.3

Test Technology

Test Method(s)²

DC Resistance

MIL-STD-202, Method 303

Contact Chatter

MIL-STD-202, Method 310;
SAE/USCAR-2, Revision 6, Section 5.1.9

Voltage Drop

SAE/USCAR-2, Revision 6, Section 5.3.2;
USCAR21-3 Section 4.5.6

On the following products and materials:

Telecommunications Terminal Equipment (TTE), Radio Equipment, Network Equipment, Information Technology Equipment (ITE), Automotive Electronic Equipment, Automotive Hybrid Electronic Devices, Maritime Navigation and Radio Communication Equipment and Systems, Vehicles, Boats and Internal Combustion Engine Driven Devices, Automotive, Aviation, and General Lighting Products, Medical Electrical Equipment, Motors, Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment, Household Appliances, Electric Tools, Low-voltage Switchgear and Control gear, Programmable Controllers, Electrical Equipment for Measurement, Control and Laboratory Use, Base Materials, Power and Data Transmission Cables and Connectors



Accredited Laboratory

A2LA has accredited

ELITE ELECTRONIC ENGINEERING INC.

Downers Grove, IL

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *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 19th day of May 2021.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.02
Valid to June 30, 2023

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