



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

DLS Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

(and satellite sites 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.

A handwritten signature in black ink, appearing to read 'R.D.L.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 23 April 2022

Certificate Number: AT-1859



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).



ANSI National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

DLS Electronic Systems, Inc.

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TESTING

Valid to: **April 23, 2022**

Certificate Number: **AT-1859**

Electromagnetic Compatibility

Test Method	Test Specification(s)	Range	Comments
Industrial, scientific and medical equipment. Radio-frequency disturbance characteristics. Limits and methods of measurement	EN 55011(2016) + A1 (2017) AS CISPR 11:2017 IEC/CISPR11 ed. 6 - 2015	1 GHz	
Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	CISPR 14-1:2016 + COR1:2016, EN 55014-1:2017 AS CISPR 14.1:2018 NMX-I-171-NYCE-2016	1 GHz	
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	EN 55015 (2006) + A1 (2007)		
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	BS EN 55015 (2006) + A2 (2009)		

Electromagnetic Compatibility

Test Method	Test Specification(s)	Range	Comments
EN 55022 (2010) Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement	EN 55022 (2010)	1 GHz	
Electromagnetic compatibility of multimedia equipment. Emission requirements	IEC/CISPR 32:2015 IEC/CISPR 32 Ed. 2.1 b:2019 EN 55032:2015 AS/NZS CISPR 32:2015	1 GHz	
Radio Equipment and Systems - Short Range Devices - Limits and Methods of Measurement	AS-NZS 4268-2017 KS C 9832:2019	40 GHz	
Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part I: Emission	EN 55103-1(2009)		
Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions (equipment input current = 16 A per phase)	EN 61000-3-2 (2014)		
Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase	IEC 61000-4-34:2005/AMD1:2009		
Electromagnetic compatibility (EMC) Part 3.2: Limits - Limits for harmonic current emissions (equipment input current less than or equal to 16 A per phase)	AS/NZS 61000.3.2 (2013)		
EMC - Part 3: Limits - Section 3. Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current up to 16 amps	AS/NZS 2279.3 (2012)		

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Test Method	Test Specification(s)	Range	Comments
EMC - Part 3: Limits - Section 3: Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection	IEC 61000-3-3 Ed. 2.0 (2008) IEC 61000-3-3 Ed. 3.0 (2013-05)		
EMC - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection	EN 61000-3-11, 1st Ed (2000-08)		
Electromagnetic Compatibility (EMC)- PART 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current greater than 16 A and less than or equal to 75 A	IEC 61000-3-12 (2014)		
Electromagnetic compatibility (EMC) - Part 6-3: Generic standard - Emission standard for residential, commercial and light industrial environments	EN 61000-6-3 (2007), A1(2011) EN IEC 61000-6-3:2019 KS C 9610-6-3:2019		
Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments	IEC 61000-6-4:2018 EN IEC 61000-6-4 2019 KS C 9610-6-4 2019	1 GHz	
Electrical equipment for measurement, control, and laboratory use - EMC requirements - Part I: General requirements	IEC 61326-1 Ed. 2.0 (2012) EN 61326-1:2013	1 GHz	

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Test Method	Test Specification(s)	Range	Comments
Electrical equipment for measurement, control and laboratory use. EMC requirements. Requirements. In vitro diagnostic (IVD) medical equipment	EN 61326-2-6:2013 IEC 61326-2-6:2012		
Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods	EN 61800-3 (2004)	1 GHz	
Information Technology Equipment-Radio disturbance characteristics - Limits and methods of measurement	QCVN 118:2018/BTTTT	1 GHz	
Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only	ISO 7637-2 (2011)		
Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment	CNS 13438 (2010) (up to 6GHz)	6 GHz	
Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment	EN 55011 (2009) A1(2010) AS CISPR 11 (2017)	1 GHz	
Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	IEC/CISPR 11 Ed 6 (2015) CNS 13803:2018	1 GHz	

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Test Method	Test Specification(s)	Range	Comments
Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers	CISPR 12 (2007) + AMD1 (2009) CSA CISPR 11-19	1 GHz	
Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers (Adopted IEC CISPR 12:2007 + A1:2009, edition 6.1, 2009-03, with Canadian deviations)	CAN/CSA CISPR 12-10 (R2014)	1 GHz	
Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 1: General EMC requirements under typical electromagnetic environmental conditions (ISO 13766-1:2018)	EN ISO 13766-1:2018		
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	IEC/CISPR 14-1 (2016) + A1 (2016), IEC/CISPR 14-1 (2016) + COR1 (2016), AS/NZS CISPR 14-1 (2010), AS/NZS CISPR 14.1 (2013)	1 GHz	
Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment	CISPR 15 (Ed 8.0 2013) KSC 9815:2019	1 GHz	
Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement	IEC/CISPR 22, Edition 5 (2005) + A1 (2005) + A2 (2006)	6 GHz	

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Test Method	Test Specification(s)	Range	Comments
Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment	IEC/CISPR 22, Edition 5.2 (2006-03), IEC/CISPR 22 Ed. 6.0 (2008-09)	6 GHz	
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	AS/NZS CISPR 22 (2009) +A1 (2010)	6 GHz	
Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers	EC/CISPR 25, Ed. 3.0 (2008-03) IEC/CISPR 25 (ed4.0)b 2016-10	6 GHz	
Electromagnetic compatibility of multimedia equipment - Emission requirements	AS/NZS CISPR 32 (2013), CAN/CSA-CISPR 32:17, CISPR 32:2015, CISPR 32(2015), CISPR 32, Ed. I (2012-01)	6 GHz	
Electromagnetic Compatibility Specification For Electrical/Electronic Components and Subsystems	FMC1278 (Oct 7, 2016)		
Industrial, Scientific and Medical (ISM) Radio Frequency Generators	ICES-001 Issue 4 (2006-Updated November 2014) ICES-001 Issue 5 (July 2020)	1 GHz	
Vehicles, Boats and Other Devices Propelled by an Internal Combustion Engine, Electrical Means or Both; Includes updates one-labelling (Nov 2014) and diesel engine transition period (Feb 2017)	ICES-002 Issue 6 (February 2017 update)	1 GHz	
Information Technology Equipment (ITE) - Limits and methods of measurement	ICES-003 Issue 6 (April 2019) ICES-003 Issue 7 (10-2020)	40 GHz	
Lighting Equipment	ICES-005 Issue 5 (Dec 2018)	1 GHz	



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Test Method	Test Specification(s)	Range	Comments
Measuring the Effectiveness of Electromagnetic Shielding Enclosures	IEEE Std 299 (2006)		
National technical regulation on Electromagnetic compatibility of multimedia equipment - Emission requirements	QCVN 118 (2018): BTTIT		
Test Method for Electromagnetic Interference Industrial, Scientific, and Medical (ISM) Devices	KS C 9811:2019		
Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Emission	KS C 9814-1:2020		
Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: Electromagnetic compatibility - Requirements and tests	KS C IEC 60601-1-2:2014	1 GHz	
Environmental Conditions and Test Procedures for Airborne Equipment - Section 21: Emission of Radio Frequency Energy	RTCA/DO- 160D (1997), RTCA/DO-160F (2007)		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 21.3: RF Emissions, Conducted	RTCA/DO-160E (2004)		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 21.4: RF Emissions, Radiated	RTCA/DO-160E (2004), RTCA/DO-160G (2010)		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 21.5: RF Emissions, Radiated	RTCA/DO- 1 60G (20 10)		



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Test Method	Test Specification(s)	Range	Comments
Agreement of VCCI Council - Technical Requirements: VCCI-CISPR 32:2016 (including radiated disturbance above 1 GHz)	VCCI-CISPR 32 (Nov 2016)	6 GHz	
Agreement of VCCI Council - Technical Requirements: V-3/2015.04 (including radiated disturbance above 1 GHz)	Agreement of VCCI V-3 (2015.04)	6 GHz	
Immunity Standards			
Road vehicles - Test methods for electrical disturbances from electrostatic discharge	ISO 10605 (2008) ISO 10605:2008(R2013)		
Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 2: Absorber-lined shielded enclosure	ISO 11452-2 (2004) ISO 1452-2 (2019)		
Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 4: Harness excitation methods	ISO 11452-4 (2011)		Current
Uninterruptible power systems (UPS) - Part 2: EMC Requirements	EN IEC 62040-2 (2018) AS IEC 62040.2 (2019)		
Alarm systems· Part 4 Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder and social alarm systems	EN 50130-4:2011 AMD1:2014		
Information technology equipment, Immunity characteristics, Limits and methods of measurement	EN 55024 (2010) AMD 1 (2015)		
Electromagnetic compatibility of multimedia equipment - Immunity requirements	EN 55035:2017/AC:2019-11		

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Test Method	Test Specification(s)	Range	Comments
Electromagnetic compatibility of multimedia equipment - Immunity requirements	CISPR 35 1 ED 2016 KS C 9835:2019		
Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use Part 2: Immunity	EN 55103-2:2009/IS1:2012		
ESD Immunity Test	KS C 9610-4-2:2017		
Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	IEC 61000-4-2, Ed. 2.0 (2008-12)		
Conformity Assessment Procedure for EMS (Electrostatic Discharge Immunity Test)	KN 61000-4-2 (Annex 1)		
Electromagnetic compatibility (EMC) - Part 4-3: Testing measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	IEC 61000-4-3 Ed. 3.2 (2010) KS C 9610-4-3:2017 EN 61000-4-3:2-006+A2 2010 AS/NZS IEC 61000.4.3:2013		
Conformity Assessment Procedure for EMS (Radiated, radio-frequency, electromagnetic field immunity test)	KN 61000-4-3 (Annex 2)		
Electromagnetic compatibility (EMC) - Part 4-3: Testing measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	AS/NZS IEC 61000.4.3:2013		
Conformity Assessment Procedure for EMS (Radiated, radio-frequency, electromagnetic field immunity test)	KN 61000-4-3 (Annex 2)		

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Test Method	Test Specification(s)	Range	Comments
Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test	IEC 61000-4-4 (2012-04)		
Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test	KS C 61000-4-4:2020		
Conformity Assessment Procedure for EMS (Electrical Fast Transient/Burst test)	KN 61000-4-4 (Annex 3)		
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	IEC 61000-4-5:2017-08		
Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	IEC 61000-4-5, Ed. 1.1 (2001-04), EN 61000-4-5, IEC 61000-4-5(1995), A1 (2001), EN 61000-4-5 (1995), A1(2001)		
EMC - Part 4-5: Testing and measurement techniques - Surge immunity test	IEC 61000-4-5, Ed 1.1 (2005-11)		
Electromagnetic Compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5:2017-08 Ed. 1.1 (2001-04), EN 61000-4-5, IEC 61000-4-5(1995), A1 (2001), EN 61000-4-5 (1995), A1(2001)		
Conformity Assessment Procedure for EMS (Surge Immunity Test)	KN C 61000-4-5:2020		

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Test Method	Test Specification(s)	Range	Comments
Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	IEC 61000-4-6 Ed. 4.0 (2013)		
Conformity Assessment Procedure for EMS (Conducted disturbances, induced by radio-frequency fields test)	KS C 9610-4-6:2020		
Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	IEC 61000-4-8:2.0 (2009)		
Conformity Assessment Procedure for EMS (Power Frequency Magnetic Field Immunity Test)	KS C 9610-4-8:2017		
Electromagnetic compatibility (EMC). Testing and measurement techniques. Pulse magnetic field immunity test. Basic EMC publication	EN 61000-4-9 (1994), IEC 61000-4-9 (1993)		
EMC - Part 4-9: Testing and Measurement Techniques - Pulse Magnetic Field Immunity Test	IEC 61000-4-9, Ed 1.1 (2001) IEC 61000-4-9:2.0 (2016) KS C 9610-4-9:2019		
EMC - Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test	IEC 61000-4-10, Ed 1.1 (2001-03)		

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Test Method	Test Specification(s)	Range	Comments
Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests	IEC 61000-4-11:2020 IEC 61000-4-11:2.0 (2004) IEC 61000-4-11:2.1 (2017) IEC 61000-4-11, Ed.1.1 (2001-03), EN 61000-4-11, IEC 61000-4-11(1994), A I (2001) & EN 61000-4-11(1994), AI (2001), IEC 61000-4-11(1994), AI(2000) & EN 61000-4-11(1994), AI(2001), EN 61000-4-11 (1994), AI (2001), EN 61000-4-11 (2004), KS C 9610-4-11:2020		
EMC - Part 4-12: Testing and measurement techniques - Ring wave immunity test	IEC 61000-4-12:2.0 (2006-09) IEC 61000-4-12:3.0 (2017)		
EMC - Part 4-16: Testing and Measurement Techniques - Test for Immunity to Conducted, Common Mode Disturbances in the Frequency Range Up to 150 kHz	IEC 61000-4-16, Edition 1.1 (2002-07) IEC 61000-4-16:1.2 (2011) IEC 61000-4-16:2.0 (2015)		
Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Reverberation chamber test methods	IEC 61000-4-21:2.0 (2011)		
Electromagnetic compatibility (EMC) - Part 6 - 1: Generic standards - Immunity for residential, commercial and light-industrial environments	IEC 61000-6-1:3.0 (2016) EN IEC 61000-6-1:2019 EN 61000-6-1 (2007) KS C 9610-6-1:2019		
Test Method for Electromagnetic Susceptibility (RRA Announce 2012-22, June 28, 2012) only	KN 61000-6-1 (Annex 11); RRA Announce 2012-22 (Jun 28, 2012), KN 61000-6-2 (Annex 14), RRA Announce 2012-22 (June 28, 2012)		

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Test Method	Test Specification(s)	Range	Comments
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	IEC 61000-6-2:3.0 (2016) EN IEC 61000-6-2:2019 EN 61000-6-2 (2005) KS C 9610-6-2:2019		
Electrical equipment for measurement, control and laboratory use - EMC requirements	EN 61326-1(2006) IEC 61326-1:1.0 (2005)	1 GHz	
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements	EN 61326-1 (2013) IEC 61326-1:2.0 (2012)		
Medical Electrical Equipment & System Electromagnetic Immunity Test for RFID Readers	AIM 7351731 (2017)		
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2. Immunity - Product family standard	AS/NZS CISPR 14.2 (2015)		
Information technology equipment - Immunity characteristics - Limits and methods of measurement	IEC/CISPR 24 (1997) + A2 (2002) & EN 55024 (1998) + A2 (2003)		
Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus	IEEE Std C37.90.1 (2002) IEEE C37.90.1:2012		
Electromagnetic compatibility measurement procedures and limits for vehicle components (except aircraft) - Conducted immunity, 30 Hz to 250 kHz - all leads	SAE J1113-2 (01-01-2010)		
Direct Injection of Radio Frequency Power	SAE J1113-3 (2006-09)		

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Test Method	Test Specification(s)	Range	Comments
Immunity to Radiated Electromagnetic Fields - Bulk Current Injection (BCI) Method	SAE J1113-4 (2004-08)		
Immunity to Conducted Transients on Power Leads	SAE J1113-11 (2006-01)		
Electrical Interference by Conduction and Coupling	SAE J1113-12 (2006-08)		
Electromagnetic Compatibility Measurement Procedure for Vehicle Components – Part 13 - Immunity to Electrostatic Discharge	SAE J1113-13 (2004-11)		
Immunity to Electromagnetic Fields, Absorber Lined Chamber	SAE J1113-21 (2005-10)		
Immunity Radiated Magnetic Fields	SAE J1113-22 (2003-11)		
Immunity to AC Power Line Electric Fields	SAE J1113-26 (July 2001)		
Limits and methods of measurement of radio disturbance characteristics of components and modules for the protection of receivers used on board vehicles	SAE J1113-41 (2000-05)		
Radio Disturbance Characteristics for the Protection of Receivers Used on Board Vehicles	SAE J1113-41 (2006-09)		
Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Immunity	KS C 9814-2:2020		
Information Technology Equipment - immunity characteristics - limits and methods of measurements	KN 24 (2008-5)		



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Test Method	Test Specification(s)	Range	Comments
Conformity Assessment Procedure for EMS (Information technology equipment - Immunity characteristics - Limits and methods of measurement)	KN 24 (Annex 11) RRA Announce 2008-12 (Dec. 16, 2008)		
Testing method of electromagnetic wave endurance of multimedia device	KS C 9835:2016	6 GHz	
RTCA/DO-160 Aviation Testing			
Environmental Conditions and Test Procedures for Airborne Equipment- Section 15: Magnetic Effects	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 16: Power Input	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 17: Voltage Spike	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment- Section 18: Audio Frequency Conducted Susceptibility - Power Inputs	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment- Section 19: Induced Signal Susceptibility	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 20: Radio Frequency Susceptibility (Radiated and Conducted)	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		

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Test Method	Test Specification(s)	Range	Comments
Environmental Conditions and Test Procedures for Airborne Equipment - Section 20.4: RF Susceptibility, Conducted	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment- Section 20.5: RF Susceptibility, Radiated	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 20.6: RF Susceptibility (Mode-Stirred)	RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment - Section 22: Lightning Induced Transient Susceptibility	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Environmental Conditions and Test Procedures for Airborne Equipment- Section 25: Electrostatic Discharge (ESD)	RTCA/DO-160D RTCA/DO-160E RTCA/DO-160F RTCA/DO-160G		
Aircraft Lightning Test Methods	SAE ARP 5416 (2005-03)		
Product Safety			
Medical electrical equipment- Part 1-2: General requirements for basic safety and essential performance- Collateral Standard: Electromagnetic disturbances - Requirements and tests	IEC 6060 1-1-2, Ed. 4, (2014-02), EN 60601-1-2 (2015)		
Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: Electromagnetic compatibility - Requirements and tests	IEC 60601-1-2, Ed. 3.0 (2007), RRL Notice No. 2008-4 (May 20, 2008)	6 GHz	

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Test Method	Test Specification(s)	Range	Comments
Medical electrical equipment Part 2-24: Requirements for the safety of infusion pumps and controllers	EN 60601-2-24 (1994)		
ERM; Electro-Magnetic Compatibility (EMC); Standard for Radio Equipment and Services; Part 1: Common Technical Requirements Harmonized Standard for Electromagnetic Compatibility	ETSI EN 301 489-1 V2.2.3 (2019-11)	6 GHz	
(ERM); (EMC) standard for radio equipment and services; Part 1	KS X 3124	6 GHz	
Electromagnetic compatibility and Radio spectrum Matters; Electro-Magnetic Compatibility standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRO) operating on frequencies between 9 kHz and 40 GHz	ETSI EN 301 489-3 V2.1.1 (2019-03)	6 GHz	
Electromagnetic compatibility and Radio spectrum Matters (ERM); EMC standard for radio equipment and services; Part 17: Specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment	ETSI EN 301 489-17 V3.1.1 (2017-02) KS X 3126		

RF Exposure			
Test Method	Test Specification(s)	Range	Comments
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	EN 62233 (2008) IEC 62233 (2005)		
Assessment of lighting equipment related to human exposure to electromagnetic fields	IEC 62493:2015 BS EN 62493:2015		
MIL-STD			
Characteristics of 28 Volt DC Electrical Systems in Military Vehicles (Sections 5.3.2.2, 5.3.2.3, 5.3.2.4, 5.3.2.5)	MIL-STD-1275D MIL-STD-1275E		
Interface standard for Shipboard Systems: Electric Power, Alternating Current	MIL-STD 1399 Section 300A MIL-STD 1399 Section 300B		
Aircraft Electrical Power Characteristics	MIL-STD-704, Revision D (September 30, 1980), MIL-STD-704 Revision E (May 1, 1991) MIL-STD-704, Revision F (March 12, 2004)		
MIL-STD Conducted Emissions			
Conducted Emissions, Power Leads, 30 Hz to 10 kHz	MIL-STD-461E, CE101 MIL-STD-461F, CE101 MIL-STD-461G, CE101		
Conducted Emissions, Power Leads, 10 kHz to 10 MHz	MIL-STD-461E, CE102 MIL-STD-461E, CE102 MIL-STD-461G, CE102		
Conducted Emissions, Antenna Terminal, 10 kHz to 40 GHz	MIL-STD-461E, CE106 MIL-STD-461F, CE106 MIL-STD-461G, CE106		
Conducted Emissions, Power and Interconnecting Leads, Low Frequency (up to 15 kHz)	MIL-STD-462, CE01		
Conducted Emission, 30 Hz to 20 kHz, Control and Signal Leads	MIL-STD-462, CE02		

Test Method	Test Specification(s)	Range	Comments
Conducted Emissions, Power and Interconnecting Leads, 0.015 to 50 MHz	MIL-STD-462, CE03		
Conducted Emissions, Control and Signal Leads, 30 Hz to 20 kHz	MIL-STD-462, CE04		
Conducted Emissions, Antenna Terminals 10 kHz to 26 GHz	MIL-STD-462, CE06		
Conducted Emissions, Power Leads, Spikes, Time Domain	MIL-STD-462, CE07		
Conducted Emissions, Power Leads, 30 Hz to 10 kHz	MIL-STD-462D, CE101		
Conducted Emissions, Power Leads, 10 kHz to 10 MHz	MIL-STD-462D, CE102		
MIL-STD Conducted Susceptibility			
Conducted Susceptibility, Power Leads, 30 Hz to 150 kHz	MIL-STD-461E, CS101 MIL-STD-461F, CS101 MIL-STD-461G, CS101		
Conducted Susceptibility, Antenna Port, Intermodulation, 15 kHz to 20 GHz	MIL-STD-461E, CS103 MIL-STD-461F, CS103 MIL-STD-461G, CS103		
Conducted Susceptibility, Antenna Port, Rejection of Undesired Signals, 30 Hz to 20 GHz	MIL-STD-461E, CS104 MIL-STD-461F, CS104 MIL-STD-461G, CS104		
Conducted Susceptibility, Antenna Port, Cross-Modulation, 30 Hz to 20 GHz	MIL-STD-461E, CS105 MIL-STD-461F, CS105 MIL-STD-461G, CS105		
Conducted Susceptibility, Transients, Power Leads	MIL-STD-461F, CS106		
Conducted Susceptibility, Structure Current, 60 Hz to 100 kHz	MIL-STD-461E, CS109 MIL-STD-461F, CS109 MIL-STD-461G, CS109		
Conducted Susceptibility, Bulk Cable Injection, 10 kHz to 200 MHz	MIL-STD-461E, CS114 MIL-STD-461F, CS114 MIL-STD-461G, CS114		
Conducted Susceptibility, Bulk Cable Injection, Impulse Excitation	MIL-STD-461E, CS115 MIL-STD-461F, CS115 MIL-STD-461G, CS115		
Conducted Susceptibility, Damped Sinusoidal Transients, Cables and Power Leads, 10 kHz to 100 MHz	MIL-STD-461E, CS116 MIL-STD-461F, CS116 MIL-STD-461G, CS116		

Test Method	Test Specification(s)	Range	Comments
Conducted Susceptibility, Lightning Induced Transients, Cables and Power Leads	MIL-STD-461G, CS117		
Personnel Borne Electrostatic Discharge (ESD)	MIL-STD-461G, CS118		
Conducted Susceptibility, Power Leads, 30 Hz to 50 kHz	MIL-STD-462D, CS101		
Conducted Susceptibility, Power Leads, 30 Hz to 50 kHz	MIL-STD-462, CS01		
Conducted Susceptibility, Power Leads, 0.05 to 400 MHz	MIL-STD-462, CS02		
Conducted Susceptibility, Spikes, Power Leads	MIL-STD-462, CS06		
Conducted Susceptibility, Squelch Circuits	MIL-STD-462, CS07		
Conducted Susceptibility, Structure (Common Mode) Current, 60 Hz to 100 kHz	MIL-STD-462, CS09		
Conducted Susceptibility, Antenna Port, Intermodulation, 15 kHz to 10 GHz	MIL-STD-462D, CS103		
MIL-STD: Radiated Emissions			
Radiated Emissions, Magnetic Field, 30 Hz to 100 kHz	MIL-STD-461E, RE101 MIL-STD-461F, RE101 MIL-STD-461G, RE101		
Radiated Emissions, Electric Field, 10 kHz to 18 GHz	MIL-STD-461E, RE102 MIL-STD-461F, RE102 MIL-STD-461G, RE102		
Radiated Emissions, Antenna Spurious and Harmonic Outputs, 10 kHz to 40 GHz	MIL-STD-461E, RE103 MIL-STD-461F, RE103 MIL-STD-461G, RE103		
Radiated Emissions, Magnetic Field, 30 Hz to 100 kHz	MIL-STD-462D, RE101		
Radiated Emissions, Electric Field, 10 kHz to 18 GHz	MIL-STD-462D, RE102		
Radiated Emissions, Antenna Spurious and Harmonic Outputs, 10 kHz to 40 GHz	MIL-STD-462D, RE103		

MIL-STD: Radiated Susceptibility			
Test Method	Test Specification(s)	Range	Comments
Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz	MIL-STD-461E, RS101 MIL-STD-461F, RS101 MIL-STD-461G, RS101		
Radiated Susceptibility, Electric Field, 2 MHz to 40 GHz	MIL-STD-461E, RS103 MIL-STD-461F, RS103 MIL-STD-461G, RS103		
Radiated Susceptibility, Transient Electromagnetic Field	MIL-STD-461E, RS105 MIL-STD-461F, RS105 MIL-STD-461G, RS105		
Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz	MIL-STD-462D, RS101		
Radiated Susceptibility, Electric Field, 10 kHz to 40 GHz	MIL-STD-462D, RS103		

Radio

Test Method	Test Specification(s)	Range	Comments
License-Exempt Radio Apparatus: Category I Equipment	RSS-210 Issue10, December 2019 RSS-210 Issue10 (December 2019)		Up to 40 GHz
Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices	RSS-247 (without DFS) Issue 2, February 2017		Up to 40 GHz
General Requirements for Compliance of Radio Apparatus	RSS-Gen Issue 5, March 2019 Amendment 1		Up to 40 GHz
License-Exempt Radio Apparatus: Category II Equipment	RSS-310 Issue 5, January 2020		Up to 40 GHz

Testing performed in support of FCC approval procedures for certification

Type of Device Examples	Scope of Accreditation	Supporting FCC Guidance	Comments/Maximum Frequency Tested
Unintentional Radiators (FCC Part 15, Subpart B)	ANSI C63.4-2014	-	Up to 40 GHz



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Testing performed in support of FCC approval procedures for certification

Type of Device Examples	Scope of Accreditation	Supporting FCC Guidance	Comments/Maximum Frequency Tested
Industrial, Scientific, and Medical Equipment (FCC Part 18) Consumer ISM equipment	FCC MP-5, (February 1986)	-	Up to 40 GHz
Intentional Radiators (FCC Part 15, Subpart C)	ANSI C63.10-2013	-	Up to 40 GHz

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TESTING

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Vibration, Shock, Op-Shock	RTCA/DO-160; MIL810; UL991; MIL STD 202; IEC 60068	Aviation, Automotive, Consumer Electronics	ETS Solutions LDS Dytran Accelerometers
Crash Safety Acceleration	RTCA/DO-160; MIL810; UL991 MIL STD 202; IEC 60068	Aviation, Automotive, Consumer Electronics	VST CSAT Centrifugal Static Acceleration Tester Dytran Accelerometers
Thermal Exposure, Humidity Exposure	RTCA/DO-160; MIL810; UL991 MIL STD 202; IEC 60068	Aviation, Automotive, Consumer Electronics	Thermotron, Ransco, Espec, Cincinnati Sub Zero
Solar Radiation	MIL STD 810; or Per Customer Requirement	Aviation, Automotive, Consumer Electronics	Q-Lab, Q-Sun Xenon Arc Chamber
Dust/Sand Exposure	RTCA/DO-160 Rev B-G MIL810 Rev B-G	Aviation, Automotive, Consumer Electronics	Custom Vaisala Temp/Humidity Probe Goyen Particle Sensor



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Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Salt Fog Exposure	RTCA/DO-160; MIL810; UL991 MIL STD 202; ASTM B117	Aviation, Automotive, Consumer Electronics	Singleton Corp.
Altitude Testing	RTCA/DO-160; MIL810 MIL STD 202	Aviation	Tenney
Ingress Protection against water	IEC 60529	Consumer & Industrial Products	Water fixtures/nozzles, Cole Parmer
Ingress Protection against dust	IEC 60529	Consumer & Industrial Products	Dust Chamber/Vacuum pump/gages, Cole Parmer
Waterproofness	RTCA/DO-160 MIL810; IEC 60529	Aviation, Automotive, Consumer Electronics	Water Drip Fixture
Immersion	RTCA/DO-160 MIL STD 810	Aviation, Automotive, Consumer Electronics	Water Immersion Tank
Fluids Susceptibility/Also Electrical	RTCA/DO-160 MIL STD 810; MIL STD 202	Aviation, Automotive, Consumer Electronics	Thermotron, Ransco, Espec, Cincinnati Sub Zero
Icing	RTCA/DO-160 MIL STD 810	Consumer & Industrial Products	Thermotron, Ransco, Espec, Cincinnati Sub Zero
Fire/Flammability	RTCA/DO-160 MIL STD 810; UL94 IEC 60695	Consumer & Industrial Products	Fire Hood/ Burners/Fixtures
Explosive Atmosphere	MIL-STD-810G, Method 511.5, RTCA/DO-160G, Section 9	Aviation, Automotive, Consumer Electronics	Explosive Atmosphere Chamber Gas Analyzer Temp Monitoring
Hail Impact Resistance	ASTM F370	Aviation Transparent Enclosures	Hail Test Rig

Electrical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Input current	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1 EN 60335	Consumer & Industrial Products	Voltech / APT



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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
Temperature Rise / Heating	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1 EN 60335	Consumer & Industrial Products	Agilent / Omega
Grounding / Bonding Test	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1 EN 60335	Consumer & Industrial Products	Associated Research
Insulation Resistance Test	IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 60730-1; IEC 60664, EN 60335	Consumer & Industrial Products	Associated Research
Dielectric / Electric Strength Test	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1, EN 60335	Consumer & Industrial Products	Associated Research
Lock Rotor Fault Test, Component Fault Test-Overload, Component Fault Test-Short Circuit / Output	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1, EN 60335	Consumer & Industrial Products	Agilent / Omega
Leakage Test, Residual Voltage Test	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1, EN 60335	Consumer & Industrial Products	Bapco



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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
Battery Reverse Polarity	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1, EN 60335	Consumer & Industrial Products	Fluke / Voltech / Agilent
Power Supply Interruption Test	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC/EN/UL 62368-1, EN 60335	Consumer & Industrial Products	Inspection per IEC 60601-1 – Clause 16.8
Limited Current / Power Test, Hazardous Voltage Measurement	IEC/EN/UL/CSA 60950-1; IEC/EN/UL/CSA 60065; IEC/EN/UL/CSA 61010-1; IEC/EN/UL/AAMI ES/CSA 60601-1; IEC/EN/UL/CSA 60730-1; IEC 60060; IEC 60092; IEC/EN/UL 62368-1, EN 60335	Consumer & Industrial Products	Agilent / Fluke

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1859.

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