



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Retlif Testing Laboratories

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TESTING

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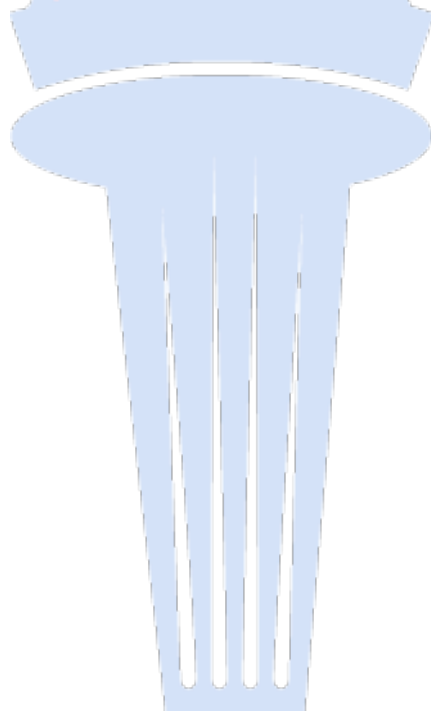
Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Acceleration	MIL-STD 202F (212A); MIL-STD 202G (212A); MIL-STD 750D (2006); MIL-STD 750E (2006); MIL-STD 810B (513); MIL-STD 810C (513.2); MIL-STD 810D (513.3); MIL-STD 810E (513.4); MIL-STD 810F (513.5); MIL-STD 810G (513.6); MIL-STD 883E (2001.2); MIL-STD 883F (2001.2); RTCA-DO 160C (7); RTCA-DO 160D (7); RTCA-DO 160E (7); RTCA-DO 160F (7); RTCA-DO 160G (7)	(0 to 400) g	Centrifuge



Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
<p>Altitude / Barometric Pressure (Including Explosive Decompression)</p>	<p>MIL-STD 202F (105C); MIL-STD 202G (105C); MIL-STD 750D (1001.1); MIL-STD 750E (1001.2); MIL-STD 810B (500); MIL-STD 810C (500.1); MIL-STD 810D (500.2); MIL-STD 810E (500.3); MIL-STD 810F (500.4); MIL-STD 810G (500.5); MIL-STD 883E (1001); MIL-STD 883F (1001); RTCA-DO 160C (4); RTCA-DO 160D (4); RTCA-DO 160E (4); RTCA-DO 160F (4); RTCA-DO 160G (4); GR-63-CORE (4.1.3) SAE J1211 (4.6.3)</p>	<p>(up to 150,000) ft (up to 400 000) ft (5 X 10E⁻⁶)</p>	<p>Altitude Chamber Thermal Vacuum Chamber</p>



Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
High / Low Temperature	MIL-STD 202F (108A); MIL-STD 202G (108A); MIL-STD 810B (501); MIL-STD 810B (502); MIL-STD 810C (501.1); MIL-STD 810C (502.1); MIL-STD 810D (501.2); MIL-STD 810D (502.2); MIL-STD 810E (501.3); MIL-STD 810E (502.3); MIL-STD 810F (501.4); MIL-STD 810F (502.4); MIL-STD 810G (501.5); MIL-STD 810G (502.5); MIL-STD 883E (1010.7); MIL-STD 883F (1010.8); RTCA-DO 160C (4); RTCA-DO 160C (5); RTCA-DO 160D (4); RTCA-DO 160D (5); RTCA-DO 160E (4); RTCA-DO 160E (5); RTCA-DO 160F (4); RTCA-DO 160F (5); RTCA-DO 160G (4); RTCA-DO 160G (5); EN 60068-2-1; EN 60068-2-2; GR-63-CORE (5.1.1.1); GR-63-CORE (5.1.1.2); IEC 60945 (8.2); IEC 60945 (8.4); IEC 68-2-14; IEC 60068-2-14; Lloyds Register 1996 (17); Lloyds Register 1996 (18); SAE J1455 (4.1) SAE J1211 (4.1.3.1) ISO 16750-4:2006 (5.2)	Chamber Volumes: (up to 1 000) ft ³ (10' X 10' X 10') Temperature Range: (-200 to 1 200) °C Transition Rate: (up to 20) °C/Min	Temperature Chambers



Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Humidity / Moisture Resistance	MIL-STD 202F (103B); MIL-STD 202F (106F); MIL-STD 202G (103B); MIL-STD 202G (106G); MIL-STD 750D (1021.2); MIL-STD 750E (1021.3); MIL-STD 810B (507); MIL-STD 810C (507.1); MIL-STD 810D (507.2); MIL-STD 810E (507.3); MIL-STD 810F (507.4); MIL-STD 810G (507.5); MIL-STD 883E (1004.7); MIL-STD 883F (1004.7); RTCA-DO 160C (6); RTCA-DO 160D (6); RTCA-DO 160E (6); RTCA-DO 160F (6); RTCA-DO 160G (6); EN 60068-2-30; GR-63-CORE (5.1.1.3); GR-63-CORE (5.1.2); IEC 60945 (8.3); Lloyds Register 1996 (14); Lloyds Register 1996 (15); SAE J1455 (4.2) SAE J1211 (4.2) IEC 60068-2-78	(2 to 98) %RH	Humidity Chambers



Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Shock – Mechanical	MIL-STD 202F (207A); MIL-STD 202F (213B); MIL-STD 202G (207B); MIL-STD 202G (213B); MIL-STD 750D (2016.2); MIL-STD 750E (2016.2); MIL-STD 810B (516); MIL-STD 810C (516.2); MIL-STD 810D (516.3); MIL-STD 810E (516.4); MIL-STD 810F (516.5); MIL-STD 810G (516.6); MIL-S-901C; MIL-S-901D; MIL-STD 883E (2002.3); MIL-STD 883E (2007.2); MIL-STD 883E (2026); MIL-STD 883F (2002.4); MIL-STD 883F (2007.3); MIL-STD 883F (2026); RTCA-DO 160C (7); RTCA-DO 160D (7); RTCA-DO 160E (7); RTCA-DO 160F (7); RTCA-DO 160G (7); EN 60068-2-27; IEC 60945 (8.6); SAE J1455 (4.10) SAE J1211 (4.8.2)	Force: Up to 40 000 lbf Waveforms: Half Sine, Sawtooth (Terminal Peak), Trapezoidal, Square Wave, Haversine, Triangle, SRS Maximum Level: (1 to 5 000) g's	Drop Shock Machine Electrodynamic Shaker MIL-DTL-901E Light Weight Hammer
Shock – Thermal	MIL-STD 202F (107G); MIL-STD 202G (107G); MIL-STD 750D (1051.5); MIL-STD 750E (1051.6); MIL-STD 810B (503); MIL-STD 810C (503.1); MIL-STD 810D (503.2); MIL-STD 810E (503.3); MIL-STD 810F (503.4); MIL-STD 810G (503.5); MIL-STD 883E (1011.9); MIL-STD 883F (1011.9); SAE J1445 (4.1.3.2)	High Temperature: Up to 180 °C Low Temperature: Down to -80 °C	Thermal Shock Chamber

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Fungus	MIL-STD 810B (508); MIL-STD 810C (508.1); MIL-STD 810D (508.3); MIL-STD 810E (508.4); MIL-STD 810F (508.5); MIL-STD 810G (508.6); RTCA-DO 160C (13); RTCA-DO 160D (13); RTCA-DO 160E (13); RTCA-DO 160F (13); RTCA-DO 160G (13)	Test Area: (up to 27) ft ³ (3' X 3' X 3')	Fungus Sources: USDA QM 380, QM 432, QM 474, QM 459, QM 386 ATCC 9642, 9643, 11730, 11797, 6205 Humidity Chamber
Rain / Waterproofness	MIL-STD 810B (506); MIL-STD 810C (506.1); MIL-STD 810D (506.2); MIL-STD 810E (506.3); MIL-STD 810F (506.4); MIL-STD 810G (506.5); RTCA-DO 160C (10); RTCA-DO 160D (10); RTCA-DO 160E (10); RTCA-DO 160F (10); RTCA-DO 160G (10); IEC 60529 (14.2.4a); IEC 60945 (8.8); NEMA 250 (5.3); NEMA 250 (5.4); UL 50 (30)	(0 to 100) mph (0.2 to 10) in/hour	Drip Fixture Wind Source Spray Nozzles and Jets Immersion Tank
Ballistic Shock	MIL-STD 810F (522); MIL-STD 810G (522.1);	-	-
901 Shock	MIL-S 901C; MIL-S 901D MIL-DTL-901E	(1 to 5) foot drops	MIL-S/DTL-901 Light Weight Shock Hammer

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Salt Spray / Fog	MIL-STD 202F (101D); MIL-STD 202G (101E); MIL-STD 750D (1041.3); MIL-STD 750D (1046.2); MIL-STD 750E (1041.3); MIL-STD 750E (1046.3); MIL-STD 810B (509); MIL-STD 810C (509.1); MIL-STD 810D (509.2); MIL-STD 810E (509.3); MIL-STD 810F (509.4); MIL-STD 810G (509.5); MIL-STD 883E (1009.8); MIL-STD 883F (1009.8); RTCA-DO160C (14); RTCA-DO 160D (14); RTCA-DO 160E (14); RTCA-DO 160F (14); RTCA-DO 160G (14); ASTM B117; ASTM G85-02; IEC 60945 (8.12); Lloyds Register 1996 (16); NEMA 250 (5.8); NEMA 250 (5.9); SAE J1455 (4.3); UL 50 (38); UL 50 (39)	Chamber Size: (up to 256) ft ³ (8' X 4' X 8') Salt Environment (0 to 20) % SO2 Environment (0 to 5) %	Salt Fog/Corrosion Chambers

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Icing / Freezing Rain	MIL-STD 810D (521); MIL-STD 810E (521.1); MIL-STD 810F (521.2); MIL-STD 810G (521.3); RTCA-DO 160C - (24); RTCA-DO 160C - (A, B, C); RTCA-DO 160D - (24); RTCA-DO 160D - (A, B, C) RTCA-DO 160E - (24); RTCA-DO 160E - (A, B, C); RTCA-DO 160F - (24); RTCA-DO 160F - (A, B, C); RTCA-DO 160G - (24); RTCA-DO 160G - (A, B, C); GR-63-CORE (34); NEMA 250 (5.6)	(0 to 100) mph (0.2 to 10) in/hour	Temperature Chambers Humidity Chambers Pressure Vessels
Immersion	MIL-STD 202F (104A); MIL-STD 202G (104A); MIL-STD 750D (1011); MIL-STD 750E (1011.1); MIL-STD 810B (512); MIL-STD 810C (512.1); MIL-STD 810D (512.2); MIL-STD 810E (512.3); MIL-STD 810F (512.4); MIL-STD 810G (512.5); MIL-STD 883E (1002); MIL-STD 883F (1002); IEC 60945 (8.9)	(0 to 10) ft (0 to 500) ft	Open Immersion Tanks Sealed Pressure Vessel
Explosive Atmosphere	MIL-STD 202F (109B); MIL-STD 202G (109C); MIL-STD 810B (511); MIL-STD 810C (511.1); MIL-STD 810D (511.2); MIL-STD 810E (511.3); MIL-STD 810F (511.4); MIL-STD 810G (511.5); RTCA-DO 160C (9); RTCA-DO 160D (9); RTCA-DO 160E (9); RTCA-DO 160F (9); RTCA-DO 160G (9);	Chamber Volume: 77 ft ³ Altitude: Up to 60 000 ft	Explosive Atmosphere Chamber



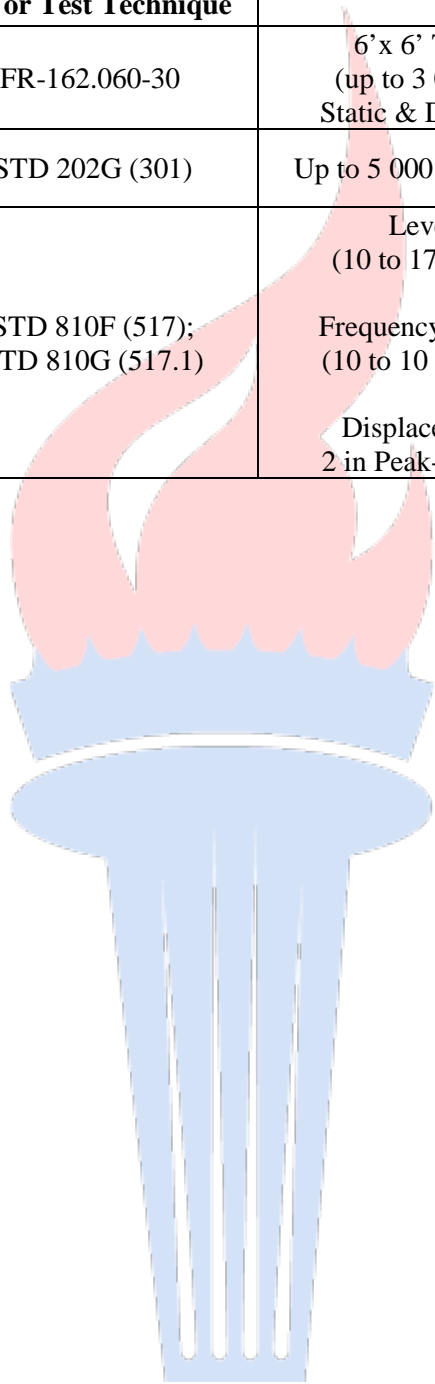
Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Sand & Dust	MIL-STD 810B (510); MIL-STD 810C (510.1); MIL-STD 810D (510.2); MIL-STD 810E (510.3); MIL-STD 810F (510.4); MIL-STD 810G (510.5); MIL-STD 202F (110A); MIL-STD 202G (110A); RTCA-DO 160C (12); RTCA-DO 160D (12); RTCA-DO 160E (12); RTCA-DO 160F (12); RTCA-DO 160G (12); IEC 60529; 2001 Para 13 IPX6; NEMA 250 (5.5.1.3) SAE J1211 (4.5) ISO 16750-4:2006 (5.1) ISO 20653	Sand Chamber: Test Area - Up to 5 X 5 ft ² Velocities: Up to 5 700 ft / min Dust Chamber: Test Area – Up to 4 X 4 ft ²	Sand Chamber Metal Dust Chamber Dust Chamber IEC Dust Chamber SAE Agitated Dust Chamber
Terminal Strength	MIL-STD 202F (211A); MIL-STD 202G (211A); MIL-STD 750D (2036.4); MIL-STD 750E (2036.4)	(0 to 100) lbf	Force Gauge
Resistance to Solvents	MIL-STD 202F (215J); MIL-STD 202G (215K); MIL-STD 750D (1022.5); MIL-STD 750E (1022.5); MIL-STD 810G (504.1)	Solvents Identified by Customer	Temperature Chamber
Fluid Susceptibility	RTCA-DO 160C (11); RTCA-DO 160D (11); RTCA-DO 160E (11); RTCA-DO 160F (11); RTCA-DO 160G (12); IEC 60945 (8.11) ISO16750-5:2003 ISO 20653	Fluids Identified by Customer	Hot Plate Fume Hood Friction Aire Oven
Insulation Resistance	MIL-STD 202F (302); MIL-STD 202G (302); MIL-STD 750D (1016); MIL-STD 750E (1016);	(0 to 600) V 0.01 M Ohm to 10 G Ohm	IR Tester
Solderability	MIL-STD 202F (208H); MIL-STD 750D (2026.10); MIL-STD 750E (2026.11)	N/A	Solderability Tester



Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
Inclination	46-CFR-162.060-30	6' x 6' Table (up to 3 000) lb Static & Dynamic	2 Axis Dynamic Inclination Table
Hi Potential Testing	MIL-STD 202G (301)	Up to 5 000 V AC/DC	Hi-Pot Tester
Pyrotechnic Shock	MIL-STD 810F (517); MIL-STD 810G (517.1)	Level: (10 to 17 000) g Frequency Range: (10 to 10 000) Hz Displacement: 2 in Peak-to-Peak	Electrodynamic Shaker Drop Shock Machine MIL-S-901 Shock Machine





Vibration

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Range	Key Equipment or Technology
<p>Vibration – Random and Sinusoidal</p>	<p>MIL-STD 202F (201A); MIL-STD 202F (204D); MIL-STD 202F (214A); MIL-STD 202G (201A); MIL-STD 202G (204D) MIL-STD 202G (214A); MIL-STD 750D (2046.1); MIL-STD 750D (2056); MIL-STD 750D (2057.1); MIL-STD 750E (2046.2); MIL-STD 750E (2056); MIL-STD 750E (2057.2); MIL-STD 810B (514); MIL-STD 810B (519); MIL-STD 810C (514.2); MIL-STD 810C (519.2); MIL-STD 810C (514.3); MIL-STD 810C (519.3); MIL-STD 810E (514.4); MIL-STD 810E (519.4); MIL-STD 810E (514.5); MIL-STD 810E (519.5); MIL-STD 810G (514.6); MIL-STD 810G (519.6); MIL-STD 883E (2005.2); MIL-STD 883F (2005.2); MIL-STD 167-1A; RTCA-DO 160C (8); RTCA-DO 160D (8); RTCA-DO 160E (8); RTCA-DO 160F (8); RTCA-DO 160G (8); EN 60068-2-6; GR-63-CORE (5.4.2); GR-63-CORE (5.4.3); IEC 60945 (8.7); Lloyds Register 1996 (12); Lloyds Register 1996 (13); SAE J1455 (4.9) SAE J1211 (4.7.3) IEC 60068-2-59 EN 60068-2-64</p>	<p>Force Rating: 20 000 lbf</p> <p>Displacement: 2 in Peak-to-Peak</p> <p>Frequency Range: <i>Random</i> (4 to 3 000) Hz <i>Sinusoidal</i> (4 to 10 000) Hz</p> <p>Maximum Level: <i>Random</i> 100 g rms <i>Sinusoidal</i> 160 g</p> <p>Sine Velocity: <i>Intermittent Duty</i> 100 in/sec <i>Continuous Duty</i> 80 in/sec</p>	<p>Electrodynamic Shakers</p> <p>Vibration Controllers</p>



Military EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
General	MIL-STD-464A, B, C MIL-STD-704A, B, C, D, E, F	-	-
Bonding and Grounding	MIL-STD-1310G, H	-	-
Conducted Emissions, Current	MIL-STD-462, CE01 MIL-STD-462, CE02 MIL-STD-462, CE03 MIL-STD-462, CE04 MIL-STD-462D, CE101 MIL-STD-461E, CE101 MIL-STD-461F, CE101 MIL-STD-461G, CE101	DC to 400 MHz	-
Conducted Emissions, RF Port	MIL-STD-462, CE06 MIL-STD-462D, CE106 MIL-STD-461E, CE106 MIL-STD-461F, CE106 MIL-STD-461G, CE106	10 kHz to 100 GHz	-
Conducted Emissions, Transient	MIL-STD-462, CE07	Time Domain	-
Conducted Emissions, Voltage	MIL-STD-462D, CE102 MIL-STD-461E, CE102 MIL-STD-461F, CE102 MIL-STD-461G, CE102	10 kHz to 1 GHz	-
Conducted Susceptibility, AF	MIL-STD-462, CS01 MIL-STD-462, CS09 MIL-STD-462D, CS101 MIL-STD-462D, CS109 MIL-STD-461E, CS101 MIL-STD-461E, CS109 MIL-STD-461F, CS101 MIL-STD-461F, CS109 MIL-STD-461G, CS101 MIL-STD-461G, CS109	DC to 250 kHz	-
Conducted Susceptibility, RF	MIL-STD-462, CS02 MIL-STD-462D, CS114 MIL-STD-461E, CS114 MIL-STD-461F, CS114 MIL-STD-461G, CS114	4 kHz to 400 MHz	-



Military EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Conducted Susceptibility, RF Port	MIL-STD-462, CS03 MIL-STD-462, CS04 MIL-STD-462, CS05 MIL-STD-462, CS07 MIL-STD-462D, CS103 MIL-STD-462D, CS104 MIL-STD-462D, CS105 MIL-STD-461E, CS103 MIL-STD-461E, CS104 MIL-STD-461E, CS105 MIL-STD-461F, CS103 MIL-STD-461F, CS104 MIL-STD-461F, CS105 MIL-STD-461G, CS103 MIL-STD-461G, CS104 MIL-STD-461G, CS105	30 Hz to 40 GHz	-
Conducted Susceptibility, Transient	MIL-STD-462, CS06 MIL-STD-462, CS10 MIL-STD-462, CS11 MIL-STD-462, CS12 MIL-STD-462, CS13 MIL-STD-462D, CS115 MIL-STD-462D, CS116 MIL-STD-461E, CS115 MIL-STD-461E, CS116 MIL-STD-461F, CS106 MIL-STD-461F, CS115 MIL-STD-461F, CS116 MIL-STD-461G, CS115 MIL-STD-461G, CS116	CS115: 5 Amperes CS116: 10 Amperes	-
EMP	MIL-STD-462, RS05 MIL-STD-462D, RS105 MIL-STD-461E, RS105 MIL-STD-461F, RS105 MIL-STD-461G, RS105	50 000 V/M	-
ESD	MIL-STD-1686C MIL-STD-461G, CS118	25 kV	-
Lightning	MIL-STD-461G, CS117	Single Stroke, Multiple Stroke and Multiple Burst Waveforms 1, 2, 3, 4, 5A, 6	-



Military EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Power Input	<p>MIL-STD-1275A, B, C, D, E MIL-STD-1399, Section 300A MIL-STD-1399, Section 300B</p> <p>MIL-STD-704A-F Utilizing:</p> <p>MIL-HDBK-704-2, SAC101, SAC102, SAC103, SAC104, SAC105, SAC106, SAC107, SAC108, SAC109, SAC110, SAC201, SAC301, SAC302, SAC303, SAC401, SAC601, SAC603</p> <p>MIL-HDBK-704-3, TAC101, TAC102, TAC103, TAC104, TAC105, TAC106, TAC107, TAC108, TAC109, TAC110, TAC201, TAC301, TAC302, TAC303, TAC401, TAC601, TAC602, TAC603</p> <p>MIL-HDBK-704-4, SVF101, SVF102, SVF104, SVF105, SVF106, SVF107, SVF108, SVF109, SVF110, SVF201, SVF301, SVF302, SVF303, SVF401, SVF601, SVF603</p>		-



Military EMC Methods

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Power Input (cont.)	<p>MIL-HDBK-704-5, TVF101, TVF102, TVF103, TVF104, TVF105, TVF106, TVF107, TVF108, TVF109, TVF110, TVF201, TVF301, TVF302, TVF303, TVF401, TVF601, TVF602, TVF603</p> <p>MIL-HDBK-704-6, SXF101, SXF102, SXF104, SXF105, SXF106, SXF107, SXF108, SXF109, SXF110, SXF201, SXF301, SXF302, SXF303, SXF401, SXF601, SXF603</p> <p>MIL-HDBK-704-7, HDC101, HDC102, HDC103, HDC104, HDC105, HDC201, HDC301, HDC302, HDC303, HDC401, HDC501, HDC601, HDC602</p> <p>MIL-HDBK-704-8, LDC101, LDC102, LDC103, LDC104, LDC105, LDC201, LDC301, LDC302, LDC401, LDC501, LDC601, LDC602</p>		-
Radiated Emissions, E-Field	<p>MIL-STD-462, RE02 MIL-STD-462, RE04 MIL-STD-462D, RE102 MIL-STD-461E, RE102 MIL-STD-461F, RE102 MIL-STD-461G, RE102</p>	10 kHz to 40 GHz	-
Radiated Emissions, H-Field	<p>MIL-STD-462, RE01 MIL-STD-462D, RE101 MIL-STD-461E, RE101 MIL-STD-461F, RE101 MIL-STD-461G, RE101</p>	30 Hz to 150 kHz	-
Radiated Emissions, RF Spurious	<p>MIL-STD-462, RE03 MIL-STD-461E, RE103 MIL-STD-461F, RE103 MIL-STD-461G, RE103</p>	10 kHz to 40 GHz	-



Military EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Radiated Susceptibility, E-Field	MIL-STD-462, RS03 MIL-STD-462D, RS103 MIL-STD-461E, RS103 MIL-STD-461F, RS103 MIL-STD-461G, RS103	10 kHz to 40 GHz	-
Radiated Susceptibility, H-Field	DOD-STD-1399, (NAVY) - Section 070 MIL-STD-1399, Section 070 MIL-STD-461E, RS101 MIL-STD-461F, RS101 MIL-STD-461G, RS101 MIL-STD-462, RS01 MIL-STD-462, RS02 MIL-STD-462, RS06 MIL-STD-462D, RS101	DC to 250 kHz	-

Commercial Aviation EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Magnetic Effects	RTCA/DO-160A, B, C, D, E, F, G, Section 15 ABD01001.2 Rev E, F, G Section 3.4.1	DC	-
Power Input	RTCA/DO-160A, B, C, D, E, F, G, Section 16 D6-16050-4 Rev C, D, F Section 7.5.3	-	-
Conducted Susceptibility, Transient	RTCA/DO-160A, B, C, D, E, F, G, Section 17 D6-16050-4 Rev C, D, F Section 7.5.1 ABD01001.2 Rev E, F, G Section 3.4.2	600 Volts	-
Conducted Susceptibility, AF	RTCA/DO-160A, B, C, D, E, F, G, Section 18 D6-16050-4 Rev C, D, F Section 7.2 ABD01001.2 Rev E, F, G Section 3.4.3	DC to 250 kHz	-

Commercial Aviation EMC Methods

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Radiated Susceptibility, H-Field	RTCA/DO-160A, B, C, D, E, F, G, Section 19 D6-16050-4 Rev C, D, F D6-16050-5 Rev A, B, C Section 7.2, 7.5 ABD01001.2 Rev E, F, G Section 3.4.4	DC to 250 kHz	-
Conducted Susceptibility, RF	RTCA/DO-160A, B, C, D, E, F, G, Section 20 D6-16050-4 Rev C, D, F D6-16050-5 Rev A, B, C Section 7.3 ABD01001.2 Rev E, F, G Section 3.3.2	10 kHz to 400 MHz	-
Radiated Susceptibility, E-Field	RTCA/DO-160A, B, C, D, E, F, G, Section 20 D6-16050-4 Rev C, D, F D6-16050-5 Rev A, B, C Section 7.3 ABD01001.2 Rev E, F, G Section 3.3.3, 3.3.4	150 kHz to 40 GHz	-
Conducted Emissions, Current	RTCA/DO-160A, B, C, D, E, F, G, Section 21 D6-16050-4 Rev C, D, F Section 8.3.2, 8.4 D6-16050-5 Rev A, B, C Section 8.1,8.2.1 ABD01001.2 Rev E, F, G Section 3.4.5	DC to 400 MHz	-
Conducted Emissions, Transient	D6-16050-4 Rev D, F Section 8.1,8.3.1 D6-16050-5 Rev A, B, C Section 8.1	Time Domain	-
Radiated Emissions	RTCA/DO-160A, B, C, D, E, F, G, Section 21 D6-16050-4 Rev C, D, F Section 8.4 D6-16050-5 Rev A, B, C Section 8.2.2 ABD01001.2 Rev E, F, G Section 3.4.5	150 kHz to 40 GHz	-



Commercial Aviation EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Lightning	RTCA/DO-160A, B, C, D, E, F, G, Section 22 D6-16050-4 Rev C, D, F D6-16050-5 Rev A, B, C Section 7.4 ABD01001.2 Rev E, F, G Section 3.2	Single Stroke, Multiple Stroke and Multiple Burst Waveforms: 1,2 ,3 ,4 ,5A ,5B, 6 Levels: 1 through 5	-
ESD	RTCA/DO-160A, B, C, D, E, F, G, Section 25 D6-16050-4 Rev C, D, F D6-16050-5 Rev A, B, C Section 7.1 ABD01001.2 Rev E, F, G Section 3.5	25 kV	-

Product Family EMC Standards			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Electromagnetic Compatibility Emissions & Immunity	ETSI EN 301 489-1 V1.9.2: 2011	Radio Equipment	-
	CISPR 11 ED 4.0: 2003 IEC/CISPR 11 ED 5.0: 2009 + A1: 2010 IEC/CISPR 11 ED 5.1: 2010 IEC/CISPR 11 ED 6.0: 2015 IEC/CISPR 11 ED 6.1: 2016 IEC/CISPR 12 ED 6.1: 2009 EN 55011: 2009 +A1: 2010 ICES-001 Issue 4: 2006- Updated Nov 2014	Industrial, Scientific and Medical Equipment	-
	EN 55014-2:1997 + A1:2001 + A2:2008 EN 55014-1:2006 + A1:2009 + A2:2011 EN 55014-2: 2015 IEC/CISPR 14-1 ED 5.0: 2005 IEC/CISPR 14-1 ED 6.0: 2016 + ISH1: 2017 IEC/CISPR 14-2 ED 2.0: 2015	Household Appliances, Electric Tools and Similar Apparatus	-
	EN 55015: 2013 ICES-005 Issue 4: 2015	Lightning Equipment	-

Product Family EMC Standards			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Electromagnetic Compatibility Emissions & Immunity	IEC/CISPR 22, Edition 5:2005-04 EN 55022:2006 + A1:2007 EN 55022: 2010 + AC: 2011 EN 55024: 2010 ICES-003 Issue 6: 2016 Updated Apr 2017 Agreement of VCCI V-3: 2015.04	Information Technology Equipment	-
	IEC/CISPR 25: 2002 IEC/CISPR 25: 2008 IEC/CISPR 25: 2016	Automotive Components	
	EN 55032: 2012 + AC: 2013 IEC/CISPR 32 ED 2.0: 2015 VCCI-CISPR 32: 2016	Multimedia Equipment	-
	EN 50083-2: 2012 +A1:2015	Cable Networks for Television Signals, Sound Signals and Interactive Services	-
	EN 50121-1: 2006 + AC:2008 EN 510121-1: 2017 IEC 62236-1: 2018	Railway Applications	-
	EN 50121-2:2006 + AC:2008 EN 50121-2: 2017 IEC 62236-2: 2018	Railway Applications – Whole Railway System	-
	EN 50121-3-1:2006 + AC:2008 EN 50121-3-1: 2017 IEC 62236-3-1: 2018	Railway Applications – Rolling Stock – Train and Complete Vehicle	-
	EN 50121-3-2:2006 + AC:2008 EN 50121-3-2: 2016 IEC 62236-3-2: 2018	Railway Applications – Rolling Stock - Apparatus	-
	EN 50121-4:2006 + AC:2008 EN 50121-4: 2016 IEC 62236-4: 2018	Railway Applications – Signaling and Telecommunications Apparatus	-
	EN 50121-5:2006 + AC:2008 EN 50121-5: 2017 IEC 62236-5: 2018	Railway Applications – Fixed Power Supply Installations and Apparatus	-
	EN 50130-4: 2011	Fire, Intruder Hold Up, CCTV, Access Control and Social Alarm Systems	-
	EN 50498:2010	Aftermarket Electronic Equipment in Vehicles	-



Product Family EMC Standards			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Electromagnetic Compatibility Emissions & Immunity	EN 55103-1: 2009 + A1: 2012 EN 55103-2: 2009	Audio, video, audio-visual and entertainment lighting control apparatus for professional use	-
	EN 60034-1: 2010/AC: 2010	Rotating Machines	-
	EN 60255-26: 2013 + AC:2013 IEC 60255-26: 2013-05	Measuring Relays and Protection Equipment	-
	IEC 60601-1-2: ED 3.0: 2007 IEC 60601-1-2: ED 4.0: 2014 EN 60601-1-2: ED 3.0: 2007 EN 60601-1-2: ED 4.0: 2014	Medical Electrical Equipment	-
	EN 60945: 2002	Maritime Navigation and Radio communication Equipment and Systems	-
	EN 60974-10: 2014	Arc Welding Equipment	-
	EN 61000-6-1: 2007 EN 61000-6-3: 2007+ A1: 2011+AC: 2012	Generic Standard for Residential, Commercial and Light Industrial Environments	-
	EN 61000-6-2: 2005 + AC: 2005 EN 61000-6-4: 2007 + A1: 2011	Generic Standard for Industrial Environments	-
	IEC 61326-1:2005-12 IEC 61326-1, Ed. 2.0:2012 EN 61326-1:2013	Electrical Equipment for Measurement, Control and Laboratory Use	-
	EN 62040-2: 2006 +AC: 2006	Uninterruptible Power Systems (UPS)	-
	MTA-NYCT EMC Standard for non-third rail powered work cars, Rev. 1.0	Railway Applications	-
	MTA-NYCT AC Train EMC Standards, Rev. 2.0	Railway Applications	-
	MTA-NYCT AC Train EMC Standards, Rev. 2.0	Railway Applications	-
	NYCT Specification Section 16ES	Railway Applications	-
NYCT Specification Section 1N	Railway Applications	-	



Product Family EMC Standards			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Electromagnetic Compatibility Emissions & Immunity	OIML R-76-1: 2006	Non-Automatic Weighing Systems	-
	ABS Rules for Building and Classing Steel Vessels: 2018	Maritime Equipment	-
	Lloyd's Register LR Type Approval Test Specification #1: 2015	Maritime Equipment	-
	ISO 7176-21: 2009 ANSI/RESNA WC-2: 2009	Electrically Powered Wheelchairs, Scooters and Battery Chargers	-
	ISO 7637-1: 2015 ISO 7637-2: 2011 ISO 7637-3: 2016 ISO 11451-1:2015 ISO 11452-1:2015 ISO 16750-1:2006 ISO 16750-2:2012 SAE J1113-1: 2006 SAE J1113-1: 2013	Road Vehicles	-
	ISO 13766: 2006 ISO 13766-1: 2018 ISO 13766-2:2108	Earth-Moving and Building and Construction Machinery	-

Commercial EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Conducted Emissions, Transient	IEC/CISPR 16-2-1: 2014 IEC/CISPR 25:2016 IEC/CISPR 25, Ed. 1:1995-09 IEC/CISPR 25, 2 nd Ed.:2002-08 IEC/CISPR 25, Ed. 3.0:2008-03 IEC/CISPR 22, Edition 5:2005-04 SAE J1113-42: 2010	Time Domain	-

Commercial EMC Methods

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Conducted Emissions, Current	IEC/CISPR 16-2-1: 2014 IEC/CISPR 25:2016 IEC/CISPR 25, Ed. 1:1995-09 IEC/CISPR 25, 2 nd Ed.:2002-08 IEC/CISPR 25, Ed. 3.0:2008-03 IEC/CISPR 22, Edition 5:2005-04 EN 55022:2006 IEC/CISPR 22, Ed. 6.0:2008-09, EN 61000-3-2: 2014 IEC 61000-3-2, Ed. 4.0:2014-05 IEC 61000-3-2, Ed. 3.0:2005-11 IEC 61000-3-2, Ed. 3.0:2005 +A1:2008 + A2:2009 IEC 61000-3-2, Ed. 3.2:2009 EN 61000-3-3: 2013 IEC 61000-3-3:2013 +A1:2017 IEC 61000-3-11: 2017 IEC 61000-3-11: 2000-08 EN 61000-3-11: 2000 IEC 61000-3-12: 2004 EN 61000-3-12: 2011 IEC 61000-3-12: 2011-05 UMTA-MA-06-0153-87-2 UMTA-MA-06-0153-85-8	9 kHz to 30 MHz	-
Conducted Emissions, Voltage	IEC/CISPR 16-2-1: 2014 EN 55011:2009 + A1:2010 EN 55014-1:2006 + A1:2009 + A2:2011 EN 55022:2006 + A1:2007 EN 55022:2010 + AC:2011 EN 55032:2012 + AC:2013 EN 55032:2012-05 ANSI C63.4:2014 ANSI C63.4:2003 IEC/CISPR 25:2016 IEC 61000-3-3 Ed.2.0:2008 IEC 61000-3-3 Ed.3.0:2013-05 UMTA-MA-06-0153-87-2 UMTA-MA-06-0153-85-8	9 kHz to 30 MHz	-



Commercial EMC Methods

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Conducted Immunity, AF	ISO 11452-10:2009 SAE J1113-2: 1996 SAE J1113-2: 2004 SAE J1113-2: 2010	DC to 250 kHz	-
Conducted Immunity, RF	IEC 61000-4-6, Ed. 2.0:2003-05 IEC 61000-4-6, Ed. 2.1:2004 IEC 61000-4-6, Ed. 2.2:2006 IEC 61000-4-6, Ed. 3.0:2008 IEC 61000-4-6, Ed. 4.0:2013 IEC 61000-4-6:1996 EN 61000-4-6:2009 IEC 61000-4-16: Ed. 2.0: 2015 IEC 61000-4-17 Ed. 1.2: 2009 ISO 11452-4: 2011 ISO 11452-7:2003 + A1:2013 SAE J1113-3: 2006 SAE J1113-3: 2010 SAE J1113-4: 2004 SAE J1113-4: 2014	9 kHz to 230 MHz	-
EFT/Chattering Relay	IEC 61000-4-4, Ed. 2.0:2004-07 EN 61000-4-4:2004 + A1:2010 IEC 61000-4-4:1995 IEC 61000-4-4, Ed. 2.1:2011 IEC 61000-4-4:2012-04 SAE J1113-12: 2006 SAE J1113-12: 2017	4 kV	-
ESD	IEC 61000-4-2, Ed. 2.0:2008-12 EN 61000-4-2:2009-05 ISO 10605:2008 + A1:2014 SAE J1113-13: 2004 SAE J1113-13: 2015	25 kV	-
Power Input	IEC 61000-4-11:2004 + A1:2017 EN 61000-4-11:2004 IEC 61000-4-11:2004 IEC 61000-4-11:1994 IEC 61000-4-29: 2000 IEC 61000-4-34: 2005 + A1: 2009	-	-

Commercial EMC Methods

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Radiated Emissions, E-Field	IEC/CISPR 16-2-3: 2016 EN 55011 EN 55012:2007 + A1:2009 EN 55014-1:2006 + A1:2009 + A2:2011 EN 55022:2006 + A1:2007 EN 55022:2010 + AC:2011 EN 55032:2012 + AC:2013 EN 55032:2012-05 ANSI C63.4: 2014 SAE J1113-41: 2006 UMTA-MA-06-0153-85-11	10 kHz to 40 GHz	-
Radiated Immunity, E-Field	IEC 61000-4-3:1995 IEC 61000-4-3, Ed. 3.0:2006-02 EN 61000-4-3:2006 + A1:2008 + A2:2010 IEC 61000-4-3, Ed. 3.1:2008-04 IEC 61000-4-3, Ed. 3.2:2010 ISO 11451-2: 2015 ISO 11451-3: 2015 ISO 11452-2: 2004 ISO 11452-3: 2016 ISO 11452-5:2002 ISO 11452-9:2012 SAE J1113-21: 2005 SAE J1113-21: 2013 SAE J1113-23: 2002 SAE J1113-24: 2010 SAE J1113-26: 2006 SAE J1113-26: 2014	10 kHz to 18 GHz	-
Radiated Immunity, H-Field	IEC 61000-4-8:1993 IEC 61000-4-8:2009 IEC 61000-4-9: 2016 IEC 61000-4-10: 2016 ISO 11452-8:2015 SAE J1113-22: 2003 SAE J1113-22: 2010	DC to 250 kHz	-



Commercial EMC Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Surge/Transients	IEC 61000-4-5, Ed. 3.0: 2014 + A1:2017 IEC 61000-4-5, Ed. 2.0:2005-11 IEC 61000-4-5, Ed. 1.1:2005-11 EN 61000-4-5: 2006 IEC 61000-4-5:1995 IEC 61000-4-12: 2017 SAE J1113-11: 2006 SAE J1113-11: 2011 SAE J1113-11: 2012 SAE J1113-11: 2017	6 kV	-

Product Family Radio Standards			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Radio Parameters	RSS-210 Issue 9, August 2016, Amendment November 2017	License Exempt Radio Apparatus – Category I	-
	RSS-247, Issue 2, Feb 2017, Updated March 2017 (without DFS)	Digital Transmissions Systems, Frequency Hopping Systems and LE-LAN	-
	RSS-310, Issue 4, July 2015	License Exempt Radio Apparatus – Category II	-
	RSS-GEN, Issue 5, Amendment 1, March 2019	General Requirements for Compliance of Radio Apparatus	-

Radio Test Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Conducted Emissions, Voltage	ANSI C63.10, 6.2:2013 AC Line Conducted TIA-603-D, 2.1.3 Power Line Conducted	9 kHz to 30 MHz	-
Transmitter, Adjacent Channel Power	ANSI C63.10, 6.10:2013 Band Edge	10 kHz to 40 GHz	-
Transmitter, DSS, Spectral Density	ANSI C63.10, 11.10 PSD	10 kHz to 40 GHz	-



Radio Test Methods			
Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Frequency / Range of Test	Key Equipment or Technology
Transmitter, Duty Cycle	ANSI C63.10, 11.6:2013 DTS Duty Cycle	-	-
Transmitter, Frequency Stability, Temperature	ANSI C63.10, 6.8:2013 Frequency Stability, Tempe	10 kHz to 40 GHz	-
Transmitter, Frequency Stability, Voltage	ANSI C63.10, 6.9:2013 Frequency Stability, Voltage	10 kHz to 40 GHz	-
Transmitter, Modulation Bandwidth	ANSI C63.10, 11.8:2013 DTS Bandwidth ANSI C63.10, 11.13:2013 Band Edge	-	-
Transmitter, RF Power Output, Conducted	ANSI C63.10, 11.9:2013 Fundamental Output Power	10 kHz to 40 GHz	-
Transmitter, Unwanted Emissions	ANSI C63.10, 6.4:2013, < 30 MHz ANSI C63.10, 6.5:2013 Radiated Emissions, (30 to 1 000) MHz ANSI C63.10, 6.6:2013 Radiated Emissions, > 1 GHz ANSI C63.10, 6.7:2013 Antenna Conducted ANSI C63.10, 11.11:2013 Non- Restricted Bands ANSI C63.10, 11.12:2013 Restricted Bands	10 kHz to 40 GHz	-

Testing performed in support of FCC approval procedures for certification and Supplier's Declaration of Conformity (SDoC)

Type of Device Examples	Scope of Accreditation	Supporting FCC Guidance	Comments
Unintentional Radiators (FCC Part 15, Subpart B)	ANSI C63.4-2014	-	40 GHz
Industrial, Scientific, and Medical Equipment (FCC Part 18) Consumer ISM equipment	FCC MP-5, (February 1986)	-	120 GHz
Intentional Radiators (FCC Part 15, Subpart C)	ANSI C63.10-2013	-	120 GHz

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. L2320.



 Vice President