

Quality Assurance Environmental Test Capabilities

To be assured that our products operate reliably in the most challenging environments, Comark maintains an in-house environmental testing laboratory that is supplemented by certified outside resources as required. All equipment used for testing has been calibrated according to methods and procedures defined by the National Institute of Standards and Technology (NIST).

Our internal capabilities include:

Environmental Testing



Our Thermotron SE-600-3-3 temperature and humidity environmental test chamber is able to provide rapid product temperature change rates and use varying levels of relative humidity to identify design problems prior to shipping our products, improving product quality and reliability.

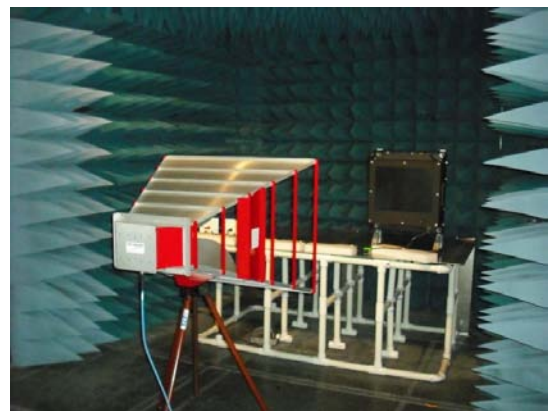
Our test chambers are able to provide a top end temperature of +80°C and a low temperature of -70°C. Temperature control software allows the chamber to achieve very rapid product temperature change rates.

Specifically, these tests help us verify that our products continue to perform within the specified operational and storage high/low temperature and humidity specifications.

EMC Product Compliance Testing

Our ETS Lindgren Series 81 Shielded Room is capable of confirming that our products meet the following global standards for EMC line conducted and radiated emissions:

- FCC Part 15b
- IEC 61000-6-2
- EN 55022
- MIL-STD-461E/F



We are capable of performing fully compliant testing to MIL-STD-461E/F to CE101, CE102, RE101 and RE102 tests. Our chamber is capable of performing pre-compliance EMI at 3 meters within the performance spectrum from 30Hz through 18GHz via our state of the art fully-compliant CISPR-16-1-1 PMM 9010, 9060 and 9180 EMI receiver. Additional related equipment includes:

- Line Impedance Stabilization Network (LISN), 9 kHz to 30 MHz;
- Model LI-400, Line Impedance Stabilization network (LISN), 10 kHz to 10 MHz
- Model 9207-1 RF Current Measuring Probe, 30 Hz – 150 MHz
- Active Loop Antenna with a capability of 2 Hz through 30 MHz
- Model 3301C Active Monopole Antenna, 30 Hz to 50 MHz
- Model 3110C Bi-conical Antenna, 30 MHz to 300 MHz
- Model 3106B Double Ridge Horn Antenna, 200 MHz to 2.5 GHz
- Model 3142B BiConiLog™ Antenna, which is a dual-purpose antenna that can be used for both emissions and immunity applications and operates in the 30 MHz to 1.5 GHz range;
- Model 3117 Double Ridge Horn Antenna, 1 GHz to 18 GHz

Shock/Vibration Testing



Comark vibration testing provides an intermediate force range of vibration test system consisting of a power amplifier, H560 electrodynamic shaker, DC field supply, and a remote cooling blower.

utilizing a Vibration Research VR-8500 controller which supports sine and random vibration modes up to 55 G's, shock in three axes up to 15 G's 11 ms. as well as recording and replicating vibration and shock events from the field.

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Our equipment is fully capable of supporting the requirements of:

- MIL-STD 810F Method 514.5 Vibration
- MIL-STD 810F Method 516.5 Shock
- IEC 60945
- MIL-STD-167-1A

All Comark products are tested to their application environment for Vibration and Shock to ensure product quality and reliability in challenging environments. Comark capabilities support a wide variety of vibration test applications including product development and design conformance, qualification and certification, and production screening.

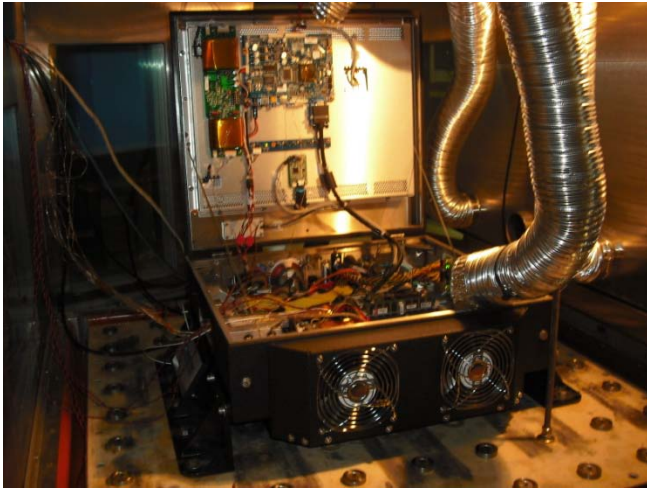
ElectroStatic Discharge Susceptibility

Each Comark product is tested to verify no susceptibility to electrostatic discharges using our ESD Simulator, Model Keytek MZ-15.

Our simulator meets the exact requirements of IEC 801-2, IEC 61000-4-2, or EN 61000-4-2

It operates in contact mode to ± 8 kV or Air Discharge to ± 15 kV





HALT/HASS Testing

HALT and HASS are accelerated stress product testing techniques focused on finding defects in products so they can be fixed before becoming expensive field issues. This type testing subjects a product to a series of overstresses, effectively forcing product weak links to emerge by accelerating fatigue.

The latest addition to the Comark Test Laboratory is the Hanse VTC9 HALT/HASS Chamber. Used in product development as well as production sampling, Comark products are exposed to simultaneous operational temperature extremes, thermal shock, humidity, and vibration to evaluate the robustness of our product designs.

Temperature range capability is from -100°C to +200°C with a change Rate of 70 °C/min, and tri-axial vibration up to 70G rms.

Package Testing

All Comark Drop Testing is used to determine our container's ability to retain and protect its contents after a free fall. It duplicates the rigors associated with manual or mechanical handling at loading and unloading points.

We perform repeatable tests on flat, corner, and edge drops. All drops are without rotation to the test package so it lands in the same orientation in which it was released.

Comark drop test methods are consistent with the requirements of:

- ASTM D5276 - 98(2009)
- ISO Standards 2206:1987 and 2248:1985.