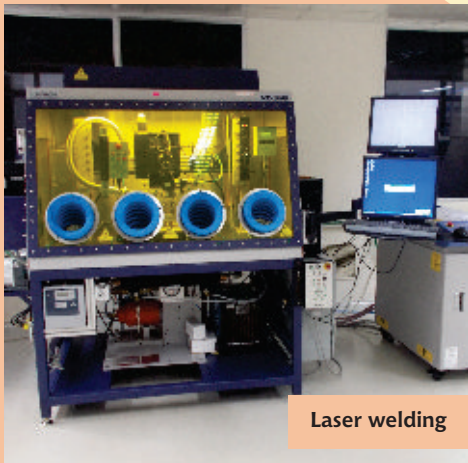


# Astra Microwave Products Ltd.

Environmental, EMI/EMC Test Facilities  
& Laser Welding



Laser welding



HALT/HASS Temperature and  
Multi Axis Vibration Chamber

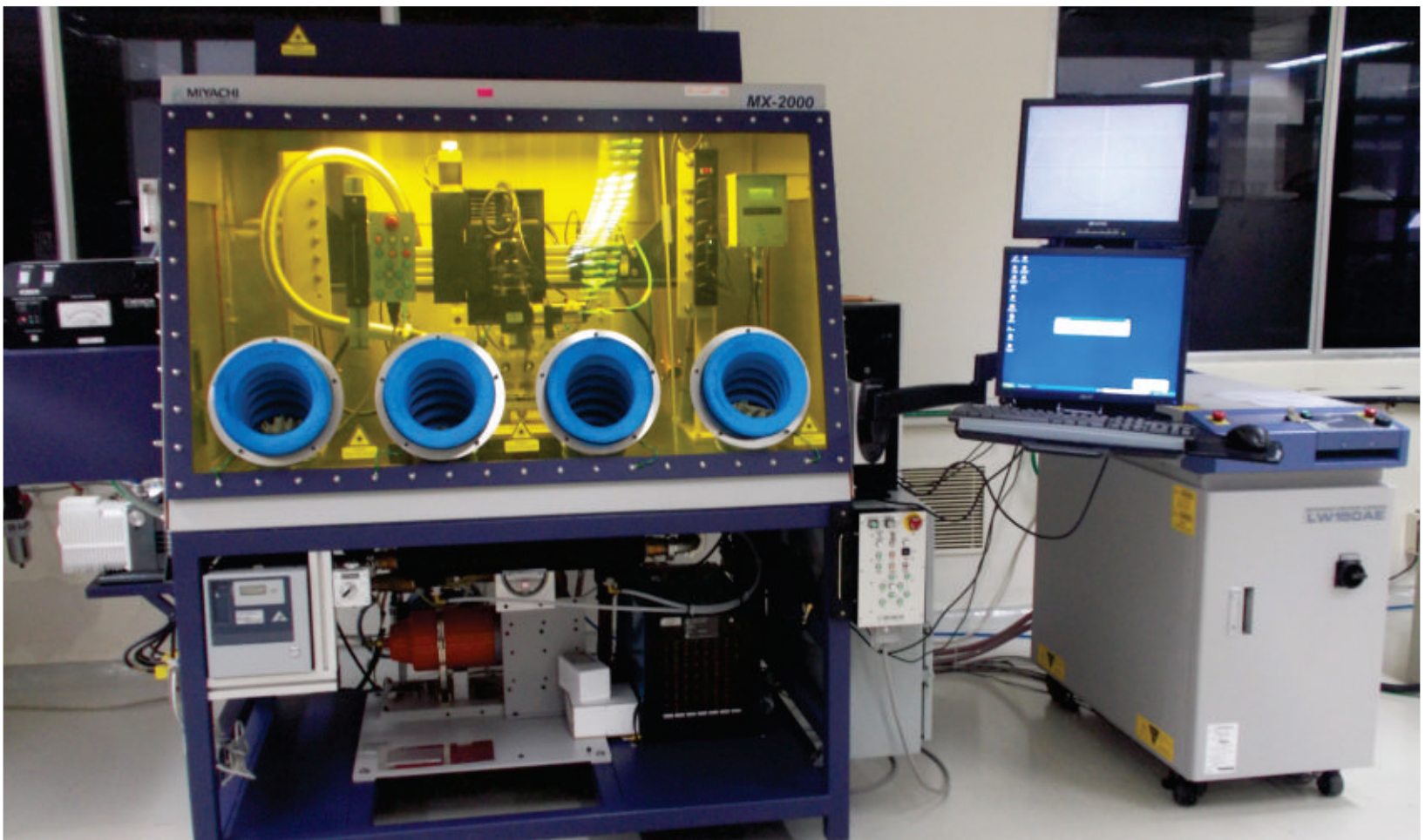


Vibration System



EMC Testing

[www.astramp.com](http://www.astramp.com)



## Laser welding

Laser welding is performed in an inert gas atmosphere using Argon and can provide spot, stitch and continuous hermetic (vacuum tight) weld in pulsed operation mode in a glove box.

Any weld compatible metals can be laser welded and we commonly laser weld parts made from Aluminum, i.e. Al Alloy 6061 T6 for Package & Al Alloy 4047 for lid.

With their well defined beams, lasers are excellent tools for welding thin materials with localized heating, without effecting the heat-sensitive components.

## Laser welding Advantages:

- Very high precision welding
- Excellent repeatability
- Material versatility
- Contact-free, very localized energy means low thermal and mechanical strain on parts
- Low heat input/minimal heat affect
- Fine grain structure/excellent weld quality
- No filler material
- Non-contact processing eliminates unwanted stress on materials

## Laser welding Equipment Specifications

- Avg. Power :150W
- Pulse Energy :70 J
- Peak Power :7kW
- 32 Programmable weld schedules





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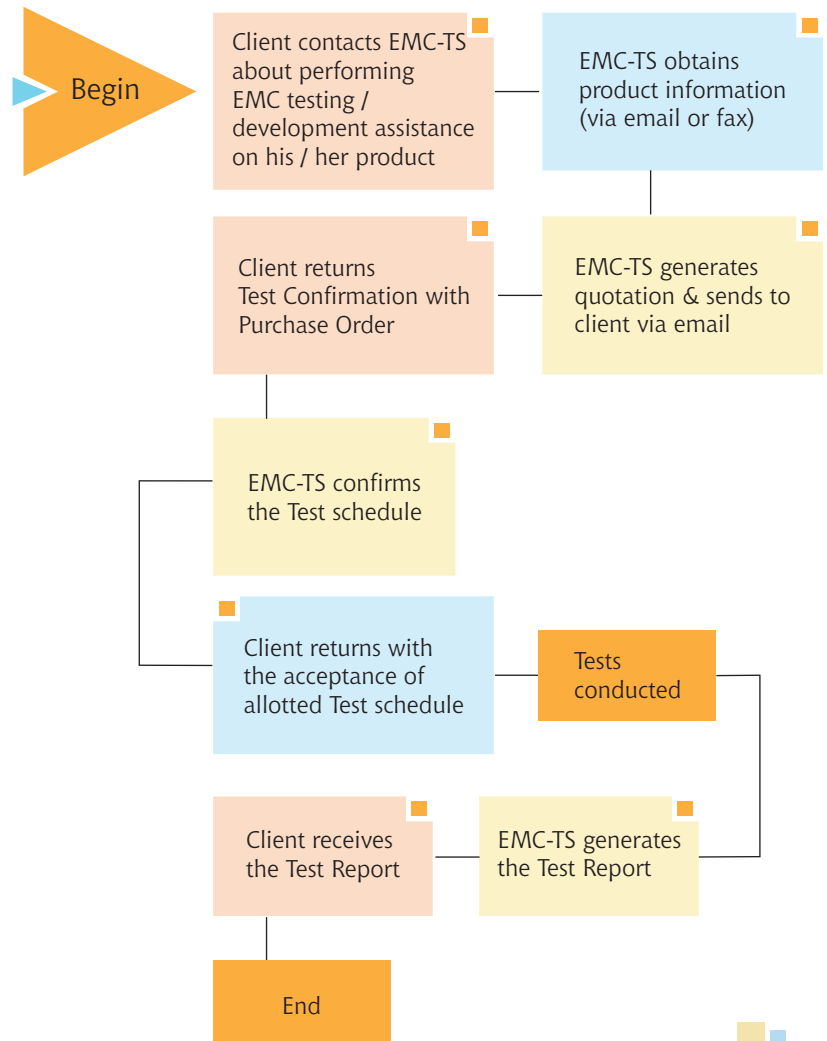
ELECTROMAGNETIC COMPATABILITY TEST SERVICES EMC-TS



## EMC-TS Salient Features

- Shielded Semi Anechoic Chamber of size 6.7m L x 6.1m W x 3.75m H, feasible to wide range of frequencies from 10kHz to 40GHz.
- Shielding Effectiveness of
  - >80dB in the Magnetic Field
  - >120dB in the Electric Field
  - >100dB in the Plane Wave
- All Electrical and Electronic Products with 1 $\Phi$ /3 $\Phi$ : 25A max and DC: 250V, 70A max
- 60 V/m field strength throughout the frequency range of 14kHz to 18GHz.
- Fully automated Test system Software.
- The facility is accredited as per ISO/IEC 17025:2005 by NABL, India

## Overview of EMC-TS's System Process



## Scope of EMC-TS

| Test Title                                               | Specification/Standard against which tests are performed                | Range of Testing                                       |
|----------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------|
| Conducted Emission, Power leads                          | CE01, MIL-STD-461 C<br>CE03, MIL-STD-461 C<br>CE101, MIL-STD-461 D/E/F  | 30 Hz to 15 kHz<br>15 kHz to 50 MHz<br>30 Hz to 10 kHz |
| Conducted Emission, Power leads                          | CE102, MIL-STD-461 D/E/F                                                | 10 kHz to 10 MHz                                       |
| Conducted Emission, Antenna Terminal                     | CE06, MIL-STD-461 C<br>CE106, MIL-STD-461 D/E/F                         | 10 kHz to 40 GHz                                       |
| Radiated Emission, Magnetic Field                        | RE01, MIL-STD-461 C<br>RE101, MIL-STD-461 D/E/F                         | 30 Hz to 50 kHz<br>30 Hz to 100 kHz                    |
| Radiated Emission, Electric Field                        | RE02, MIL-STD-461 C<br>RE102, MIL-STD-461 D/E/F                         | 10 kHz to 10 GHz<br>10 kHz to 18 GHz                   |
| Radiated Emission, Antenna Spurious and Harmonic Outputs | RE03, MIL-STD-461 C<br>RE103, MIL-STD-461 D/E/F                         | 10 kHz to 40 GHz                                       |
| Conducted Susceptibility, Power Leads                    | CS01, MIL-STD-461 C<br>CS101, MIL-STD-461 D/E/F                         | 30 Hz to 50 kHz<br>30 Hz to 150 kHz                    |
| Conducted Susceptibility, Intermodulation                | CS03, MIL-STD-461 C<br>CS103, MIL-STD-461 D/E/F                         | 15 kHz to 10 GHz                                       |
| Conducted Susceptibility, Rejection of Undesired Signal  | CS04, MIL-STD-461 C<br>CS104, MIL-STD-461 D/E/F                         | 30 Hz to 20 GHz                                        |
| Conducted Susceptibility, Antenna Port, Cross-Modulation | CS05, MIL-STD-461 C<br>CS105, MIL-STD-461 D/E/F                         | 30 Hz to 20 GHz                                        |
| Conducted Susceptibility, Transients Power Leads         | CS06, MIL-STD-461 C<br>CS106, MIL-STD-461 F                             | 400V Peak,<br>5 $\mu$ s Pulse Width                    |
| Conducted Susceptibility, Structure Current              | CS09, MIL-STD-461 C<br>CS109, MIL-STD-461 D/E/F                         | 60 Hz to 100 kHz                                       |
| Conducted Susceptibility, Bulk cable injection           | CS114, MIL-STD-461 D/E/F                                                | 10 kHz to 400 MHz                                      |
| Conducted Susceptibility, Impulse Excitation             | CS115, MIL-STD-461 D/E/F                                                | 5 Amperes                                              |
| Conducted Susceptibility, Damped Sinusoidal Transients   | CS116, MIL-STD-461 D/E/F                                                | 10 kHz to 100 MHz<br>10 Amperes                        |
| Radiated Susceptibility, Magnetic Field                  | RS01, MIL-STD-461 C<br>RS101, MIL-STD-461 D/E/F                         | 30 Hz to 50 kHz<br>30 Hz to 100 kHz                    |
| Radiated Susceptibility, Electric Field                  | RS03, MIL-STD-461 C<br>RS103, MIL-STD-461 D/E/F                         | 14 kHz to 18 GHz<br>60 V/m                             |
| Electrostatic Discharge Susceptibility                   | IEC 61000-4-2<br>DO160E<br>MIL-STD-883<br>MIL-STD-750-1<br>MIL-STD-1686 | +/- 30 kV                                              |
| Power Quality Test                                       | MIL-STD-704 A TO F                                                      | 0 to 600V DC<br>0-415V 50 Hz, 60 Hz,<br>400 Hz AC      |

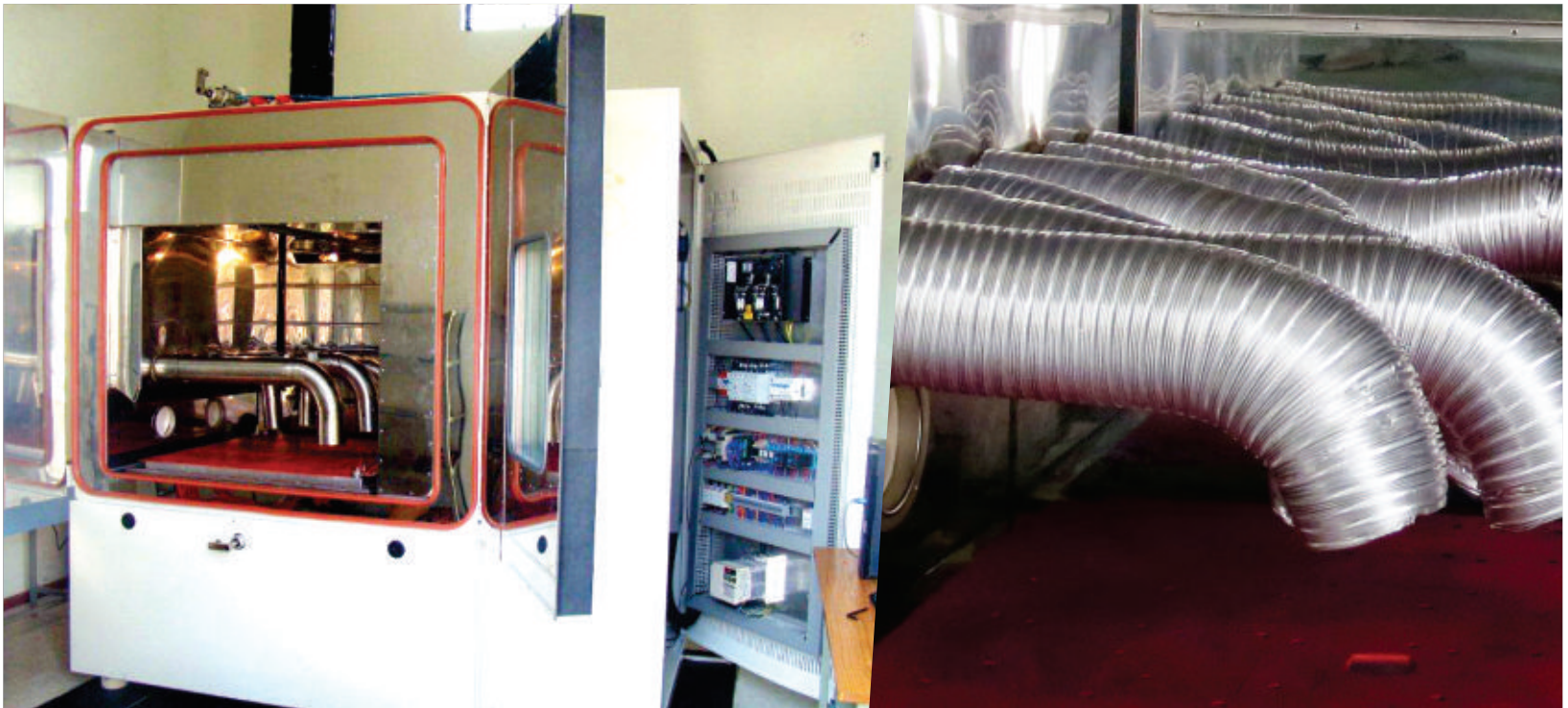
### Astra Microwave Products Ltd

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## Floor Standing HALT/HASS Temperature and Multi Axis Vibration Chamber - Model Sigma 1000-36

Sigma is a range of Liquid Nitrogen cooled, HALT/HASS chambers specifically designed to interface with a multi axis pneumatic vibration table.

### Chamber Dimensions

|               | Wide (mm) | High (mm) | Deep (mm) |
|---------------|-----------|-----------|-----------|
| Internal Size | 1100      | 900       | 1100      |
| External Size | 2200      | 2200      | 1485      |

### Capacity (Litres)

1089

### Ambient Conditions

+10°C to +30°C, 10%RH to 80%RH

### Temperature Specifications

- a) Temperature Range : - 100°C to + 200°C  $\pm 2^\circ\text{C}$  after stabilisation.
- b) Heating Range : - 100°C to + 200°C, Approx 2°C to 80°C/Min ROC (Rate of change).
- c) Rate of Heating (Air Temp) : Up to 80°C/min average empty chamber measured in the air as it enters the Chamber in accordance with IEC600068.
- d) Cooling Range : + 200°C to - 100°C Approx 2°C to 80°C/Min ROC (Rate of change).
- e) Rate of Cooling : Up to 80°C/min average empty chamber measured in the air as it enters the Chamber in accordance with IEC600068.

### Vibration Specifications

- a) Vibration Table Size : 914mm (36") x 914mm (36").
- b) Maximum Payload : The vibration table is supported on four spring isolation mounts can accommodate a maximum 317kg test load.
- c) Vibration : Six degree of freedom (6DoF) vibration non coherent broadband by 9X Multi Directional Lubemist lubricated repetitive shock pneumatic Vibrators.
- d) Frequency Range : 5-10,000 Hz, with 90% of vibration energy in the 5-4,000Hz band width of maximum low energy in low frequency range.
- e) Acceleration : Up to 100 Grms in Z axis empty table at +25°C to +30°C.
- f) Acceleration Tolerance :  $\pm 1$  Grms within one minute of setting.





## Vibration System

**Vibration:** A body is said to be vibrating when it executes an oscillatory motion about a reference position of equilibrium.

Vibration testing is accomplished by introducing a forcing function into a structure, usually with some type of shaker. Alternately, a DUT (device under test) is attached to the "table" of a shaker. Vibration testing is performed to examine the response of a device under test (DUT) to a defined vibration specification.

Two typical types of vibration tests performed are random and Sine test. Sine (one-frequency-at-a-time) tests are performed to survey the structural response of the DUT. A random (all frequencies at once) test is generally considered to more closely replicate a real world environment, such as road inputs to a moving automobile.

### 5.89 Ton Vibration Machine Specifications

|                     |                                    |
|---------------------|------------------------------------|
| Make                | : Unholtz Dickie                   |
| Model               | : SAI60F-R24C/ST                   |
| Table Size          | : Slip Table (36"X36")Vertical 24" |
| Displacement        | : 2"[51mm]                         |
| Max Accl            | : Sine: 89g Random: 85g            |
| Max Velocity        | : Sine: 70 in/sec Shock: 95 in/s   |
| Sine & Random Force | : 13000lbf&12500lbf                |

### 2.0 Ton Vibration Machine Specifications

|                     |                             |
|---------------------|-----------------------------|
| Make                | : Unholtz Dickie            |
| Model               | : S 452-LB                  |
| Table Size          | : Vertical 13.3"            |
| Displacement        | : 2"[51mm]                  |
| Max Accl            | : Sine: 89.0g Random: 89.0g |
| Max Velocity        | : Sine: 70 in/sec           |
| Sine & Random Force | : 4500lbf                   |

### Astra Microwave Products Ltd

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