



#### Features

- \* EMI/EMC, Antenna & RCS Measurements
- \* Low cost solution to anechoic chamber.
- Reflected signal (reaching test zone) down by min -30dB with respect to direct signal.
- \* Low RCS stand (FRP Rod and holding devices) to hold transmitting/ receiving antenna
- \* Antenna under test / RCS measurement target stand on a stepper motor monopod with 3D plotting.
- \* Five-side PU Foam absorber covered Aluminum Clad Frame.
- \* Special corner block absorbers used.
- \* PU Absorbers are high performance Pyramidal Microwave absorbers constructed using low density, flexible foam impregnated with carbon formulation.
- \* Suitable type optimum performing absorbers at near normal/grazing incidences of extraneous signals used.
- \* Specially shaped absorbers for transmitting and receiving (Pyramids for Transmitting and Wedges for receiving).
- \* Custom tailored solution, other size boxes, anechoic rooms can be provided.
- \* The pyramidal structure gives it the geometrical matching and carbon dispersed gives high attenuation.
- \* Suitable for 800 MHz to 20GHz and higher frequencies. Performance (Reflection Loss) at lower frequencies shall be deteriorated, like at 500MHz it will be -20dB only)
- \* Fire retardant and Zero halogen.
- \* Comprehensive Testing Validation report available.

#### Areas of Application

- \* Suitable for Microwave and Antenna labs.
- \* Measurement of radio noise emission.
- \* Making screens for hiding area of maximum reflections.
- \* For obtaining Quiet zones in very wide frequency range.
- \* Wedge shaped absorbers have maximum performance at grazing incidence angles.
- \* Designed in view of requirements of educational institutes.
- \* Necessary attachment for Antenna/Microwave Trainers.
- \* Accurate antenna pattern/RCS Measurements.

#### Intended Measurements:

Azimuth antenna Pattern: 360 degree.  
Relative/Absolute Gain Measurements of Antenna whose gain range from 0 dBi to +20 dBi or more.  
RCS Measurements (both monostatic and bistatic) to be carried out from 1GHz to 40 GHz.  
Bistatic Measurements are from +/- 20 degree from monostatic Chamber may be used for circular polarization and rotating linear polarization.  
Bore sight measurements can be carried out.  
Radome error measurements can be carried out.  
Radiated emission (RE) and radiated susceptibility (RS) test of equipment under test per MIL- STD461 E/F.  
Suitable for MIMO (Multiple Input Multiple Output), OTA (Over The Air), LTE (Long Term Evolution) lab of mobile and systems testing per ETSI (European Telecommunication Standard Institute).  
Chamber Size: 7.8m X 5.4m X 3.6m (Typical Room Dimension) (LengthX WidthX Height)  
Shielding Effectiveness (SE): Min. -100 dB from 500 MHz to 1.0 GHz and min. -80 dB from 2.0- 18.0 GHz.  
Shielded Structure: Modular PAN type maintenance free with 2mm GI sheet structure.

**Hardware Technical Specifications AMS20:**

Design, Supply, Installation and Validation of EMI/EMC, Antenna Near Field/Far Field RCS Test Range and Mobile test lab.

Frequency Region: 80MHz to 40.0 GHz

Purpose: EMI/EMC, Antenna and RCS Measurements and MIMO/OTA/LTE lab per ETSI for mobile & system testing.

**RF Shielded Structure:**

Modular PAN Type structure maintenance free structure made of 2mm thick GI sheet joined with wire mesh gaskets of size 7.8m x 5.4m x 3.6m. Drawing details attached as Annexure-1.

**RF Shielded Door:**

Shielded door of size 2100mm x 900mm size with 3 rows of Cu- Be finger stocks around be provided.

**Power Line Filter:**

1 Nos. Power line filter of 1 Phase, 50Hz, 250 Volt and 30A.

Threaded brass ground stud - 1/2" (M12) by 5" long (1.3cm x 12.7cm)

**Lighting: 4 Nos.**

Single source fiber optic LED light fixtures.

**CCTV:**

A CCTV camera is supplied/installed to monitor the movement inside the chamber.

It consists LCD High resolution monitor of Reputed make having 24" size.

System supplied is not EMI/EMC hardened which is required by test lab working at low frequency (~10 KHz) Magnetic field (low impedance) testing.

**Ventilation: 2 Nos.**

Wave guide air vents of size 300mm x 600mm.

**Access Panel with connectors:**

Access panel of size 300mm x 300mm to be provided with following connectors.

1. N-type (f-f) 4 nos. 2. SMA (f-f) 4 nos.

**Absorbers:**

PU foam based Pyramidal FU-SE-24 and corner absorber.

FF- 150 to be used as required. Pyramidal absorbers will be Fire retardant per NRL-8093 Meeting Tests 1, 2 & 3 With Zero Halogen Means. Data sheet of Pyramidal Absorber is attached for your perusal. FU-SE-24 absorbers also meets MIL-STD- 461 E requirements. Absorber layout is attached herewith as Annexure-2.

**Design and Installation:**

Chamber design.

Installation of shielded chamber and absorbers.

**Amitec Dual Ridge Horn Antenna DRH20 -2Nos.**

Frequency Range: 1-18GHz

Gain(Typ.): 8.5dBi

Polarization: Linear

VSWR (Typ.): <2:1

3dB Beam width: 52-24 degree

Net Weight: 1.1Kgs

Connector: N type Female

Mounting Bracket: Aluminum right angled plates.

**Advantages of Total Steel Structure TSS**

(TSS/ PAN type structure) over Wood Core Structure (WCS) for Shielded Enclosure.

Different thermal expansion or contraction of wood w.r.t GI threatens the Shielding

Effectiveness of WCS rooms due to differential stresses thus loosening the joints and need to be maintained regularly which is very cumbersome process.

TSS is not affected by water and moisture, which play havoc with WCS system.

WCS room has many leak points (screws both surfaces of hat and flats and any joints areas of inter section). TSS has only one point of possible leakage (missing bolt) and still there is an RF gasket.

TSS is lighter in weight with fewer parts than wood core designs and very easy to assemble.

TSS offers years of maintenance free, high RF attenuation.

TSS is very desirable in geographic regions with seismic problems. A WCS room can break apart.

TSS has higher fire-retardancy.

TSS can be easily disassembled and reassembled without deteriorations of Shielding Effectiveness. In WCS the disassembled panels will not seal properly after reassembling because the wood is compressed where it was clamped.

Performance of the Anechoic Chamber:

Shielding Effectiveness (SE): Min. -100 dB from 500MHz to 1.0 GHz and min. -80 dB from 2.0 to 18.0 GHz. Modular PAN type maintenance free total 2mm steel sheet structure.

Quiet zone size/ Location/ Quietness / Equivalent RCS of Chamber.

Frequency	Quiet Zone (Q Z) Cylindrical (Length Equals diameter)	Locations from Transmitting Antenna	Quietness	Residual (Equivalent) RCS of Chamber	
				Location	RCS dBm
0.1 GHz	1m	4.5 to 5.5m	-20dB	-	-
1 GHz	0.8m	4.2 to 5.0m	-35dB	4.6m	-
2 GHz	0.6m	4.4 to 5.0m	-40dB	4.8m	-
3 GHz	0.5m	4.5 to 5.0m	-40dB	4.9m	-30
10-40 GHz	0.3m	4.7 to 5.0m	-40dB	5.1m	-30

**Performance Testing:**

Performance testing shall be per IEEE-299 FOR SHIELDING EFFECTIVENESS and per free space VSWR method for quietness level. Advanced VSWR, RCS Method be used per the article entitled "Recent Microwave Absorber wall- Reflectivity Measurement Methods" appeared in "IEEE Antenna & propagation Magazine" Vol.50, no:2, pp 140-147, 2008.

**Area of Experimentation:**

- \* 3D& Cartesian Polar Plots- E & H Plane
- \* Vertical Plane Plots – Ground Plane effect
- \* Directive gain, Front to back ratio of Antenna.
- \* Side lobe Level and its Angular Position
- \* Beam width – Half Power (3dB) & 10 dB
- \* Frequency Bandwidth of an Antenna
- \* Study RF reflection loss and absorption loss properties of some sample absorbers.