

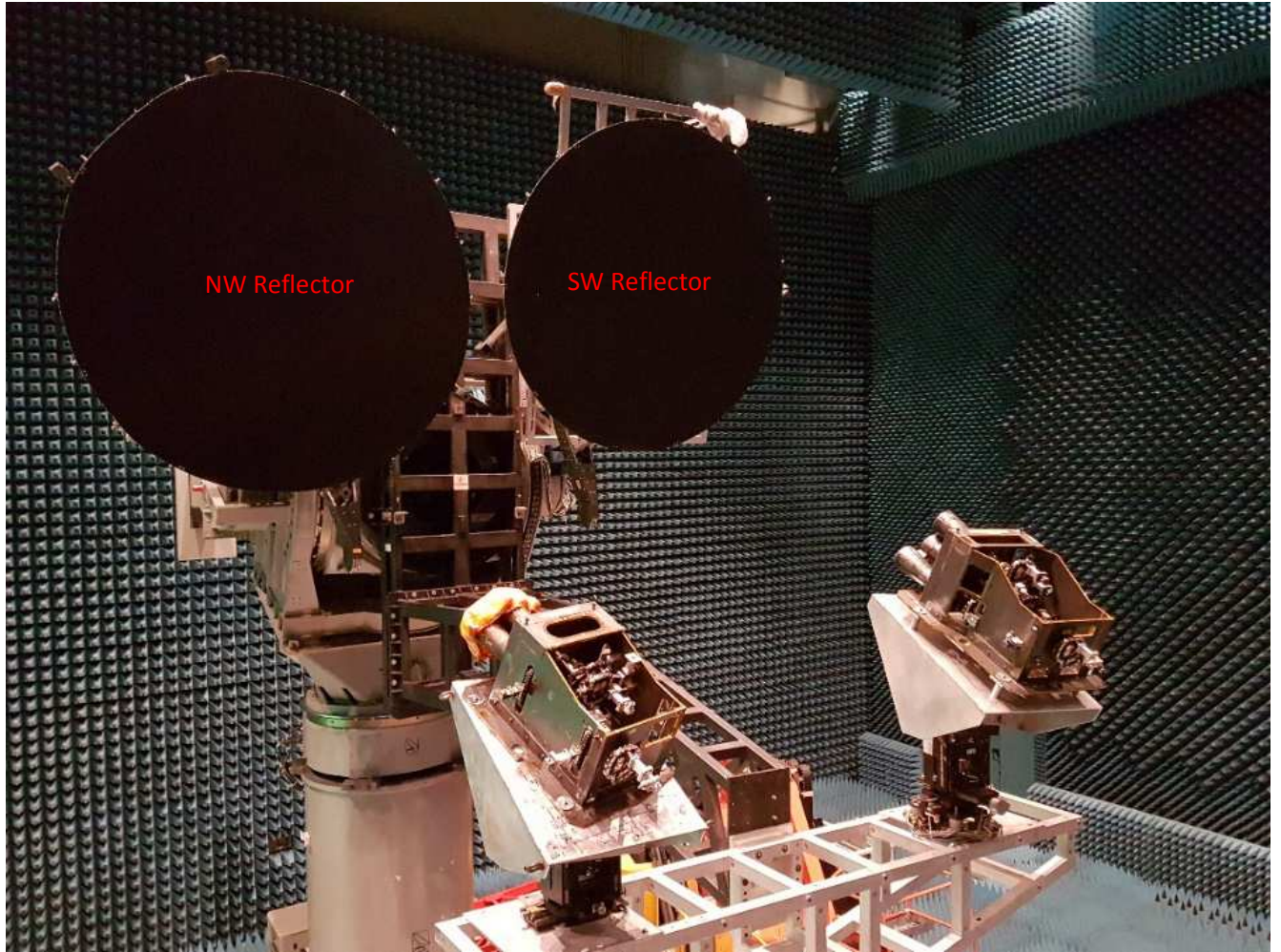
Test of GSAT-11 Dual Reflector multiple beam antennas Configuration Conducted Successfully in Compact Antenna Test Facility (CATF) at SAC.

ISRO is building a Ku x Ka high through put multibeam satellite GSAT-11. The activities of its development are at advanced stage. In its pursuit, recently Space Applications Centre (SAC) has conducted successful RF test of dual reflector configuration multiple beam antennas in Compact Antenna Test Facility (CATF).

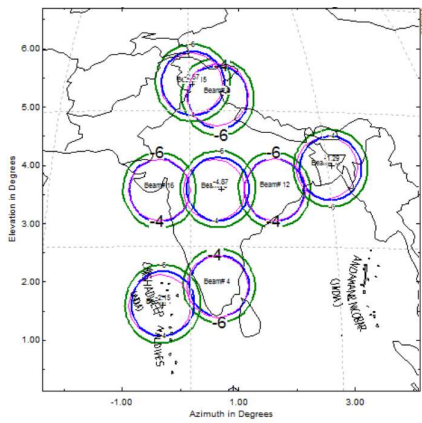
GSAT-11 has four large size reflectors with two reflectors mounted on each side of east and west panels of the spacecraft. SAC has designed these multiple beam antennas generating total of 32 spot beams yielding a spectrum utilization factor of 8. The feed chain of these antenna consists of a high efficiency horn, compact ortho mode transducer (OMT) and multimode tracking coupler. The feeds are realized using special technology of CFRP reducing the mass of the feed cluster significantly.

In order to assure the RF performance of an antenna, its characterization in CATF is essential which simulates the far field environment in a short distance. Conventionally, one antenna is tested at a time. However due to presence of adjacent reflector in the deployed configuration, it is required to be characterized the antenna performance in the presence of other reflector to ensure the scattering from adjacent reflector does not perturb the RF performance. A special test fixture was designed to mount two reflectors in such a way that it comes in the center of quiet zone of CATF. The quiet zone is the region wherein the amplitude and phase ripples are within the specified limits of 0.5 dB and 5 deg respectively. The alignment of reflectors is carried out using laser tracker to achieve required reflector optics.

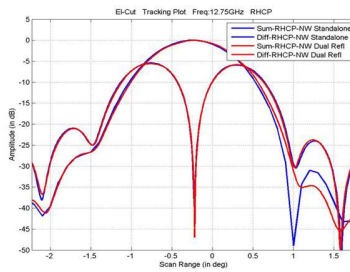
This test of two reflectors cannot be carried out at spacecraft level as in the mounted condition, much of the area of the reflector falls outside the quiet zone. Hence in order to ensure the in orbit performance, this test was conducted at subsystem level. The measured results are shown below giving its co-polar gain contours of 8 beams of one polarization generated from them. The measured tracking pattern indicate standalone antenna measurement and dual reflector antenna measurement results are in close agreement.



Measured Transmit Gain Contours



Tracking Performance Comparison



Measured Receive Gain Contours

