



Diamond Engineering
Automated Measurement Systems



DAMS Full Spherical Mount Option

Overview of Full Spherical Mount

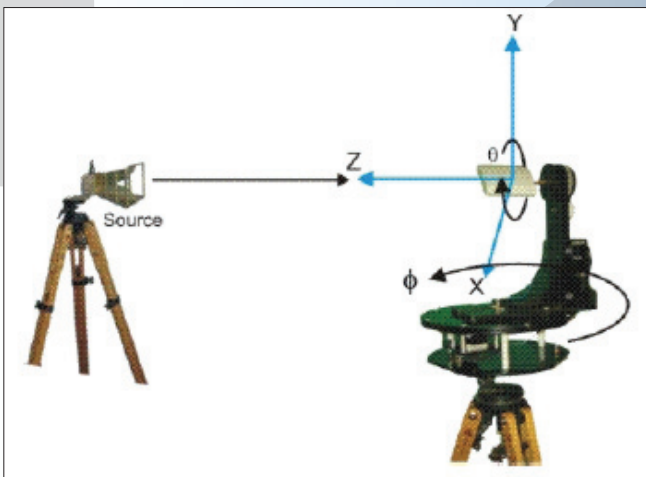
DAMS PLATFORM OPTION

The new Diamond Engineering Full Spherical Mount is now a DAMS platform option that may be added to any DAMS platform. The mount utilizes Delrin ball bearings and structure, as well as enabling full spherical measurements to resolutions of 0.1 degrees. The mount is ideal for unobstructed gain data and efficiency with a low radar cross section less than -20dBsm. The belt driven system is a plug-and-play substitution to the DAMS elevations motor.

FEATURES

- Low reflection - 90% Delrin construction
- DC-18 GHz
- 6" horizontal adjustment for centering
- 12" vertical height
- 0.1 degree movement resolution
- 5 or 10 lb. load (options 5 or 10)
- CTIA and general efficiency software
- Runs from existing platform azimuth plug

FSM Efficiency Test Setup Example



Same patch antenna measured *with* FSM

Freq = 5 GHz Az = -10 EL = 25



Path antenna measured *without* FSM

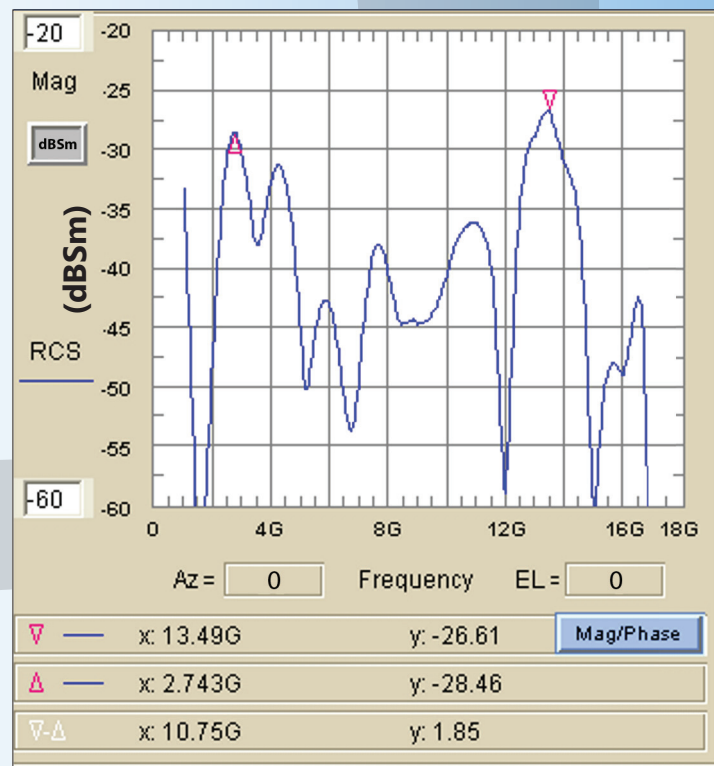
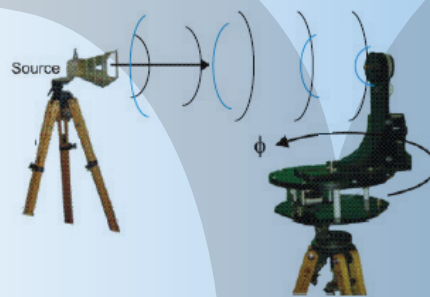
Freq = 5 GHz Az = -10 EL = 25



Radar Cross-Section Profile

The Full Spherical Mount (FSM) satisfies the demanding requirements to quickly and efficiently obtain Radar Cross-Section (RCS) profile measurements of your antenna. The FSM allows you to determine the overall reflectivity characteristics of the AUT. An objects RCS profile is a principle concern when designing for low reflection and stealth. The extremely low-reflection design, combined with wide frequency range capabilities (from DC to 40 GHz), make the FSM ideal for this type of application. Below is actual FSM typical measured RCS data in dBsm which DAMS platform compiles when equipped with our FSM package.

Equivalent Radar Cross-section at 1m (typical)

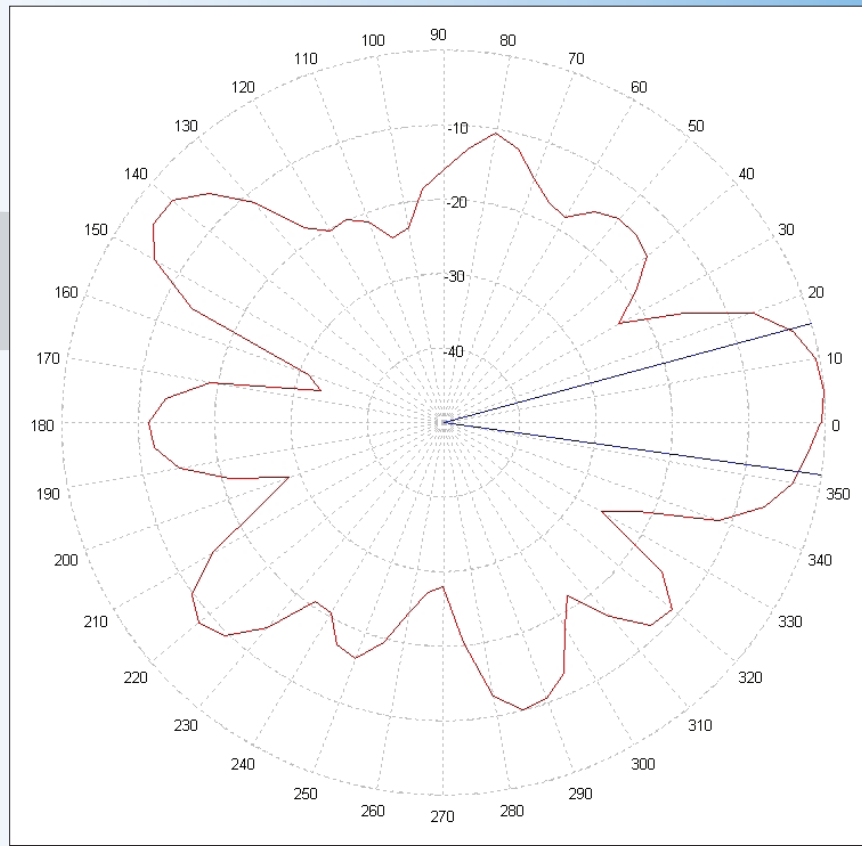


Our amplitude frequency feature illustrates which frequencies the amplitude of your RCS profile are highest and lowest from measurement data.

Plot Examples

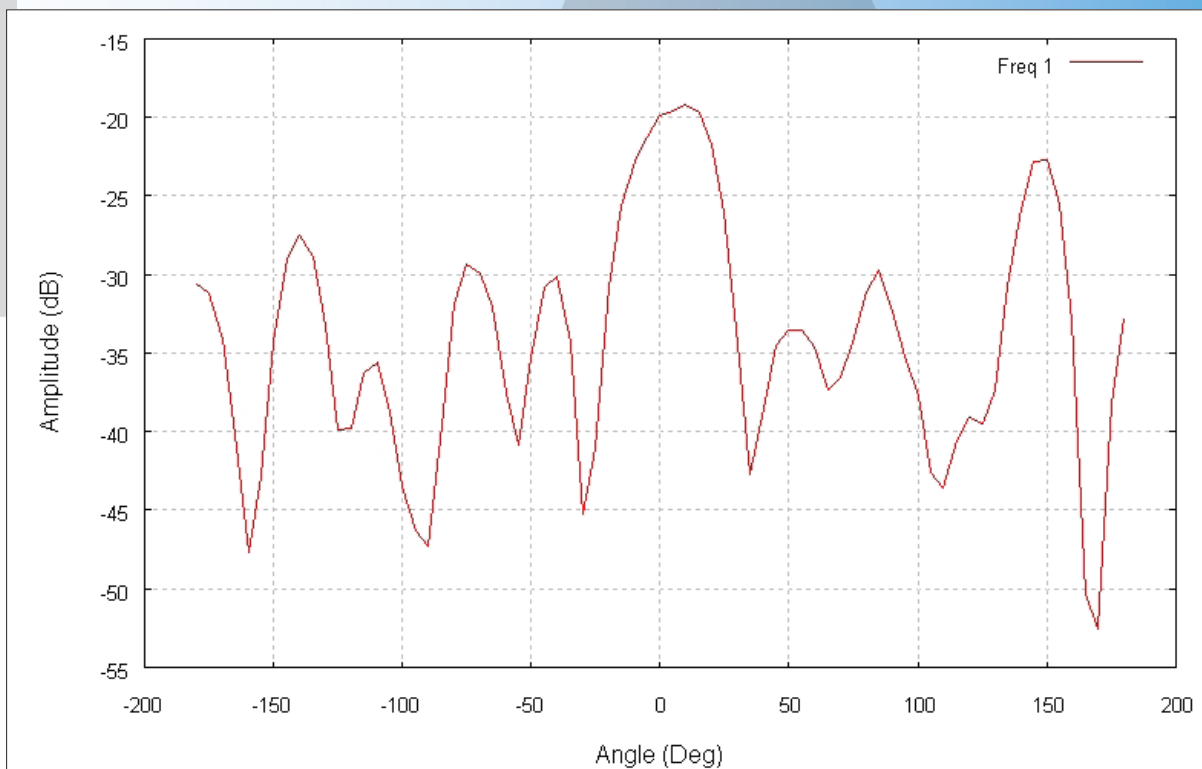
Polar Plot Example

DAMS FSM typical RCS profile measured



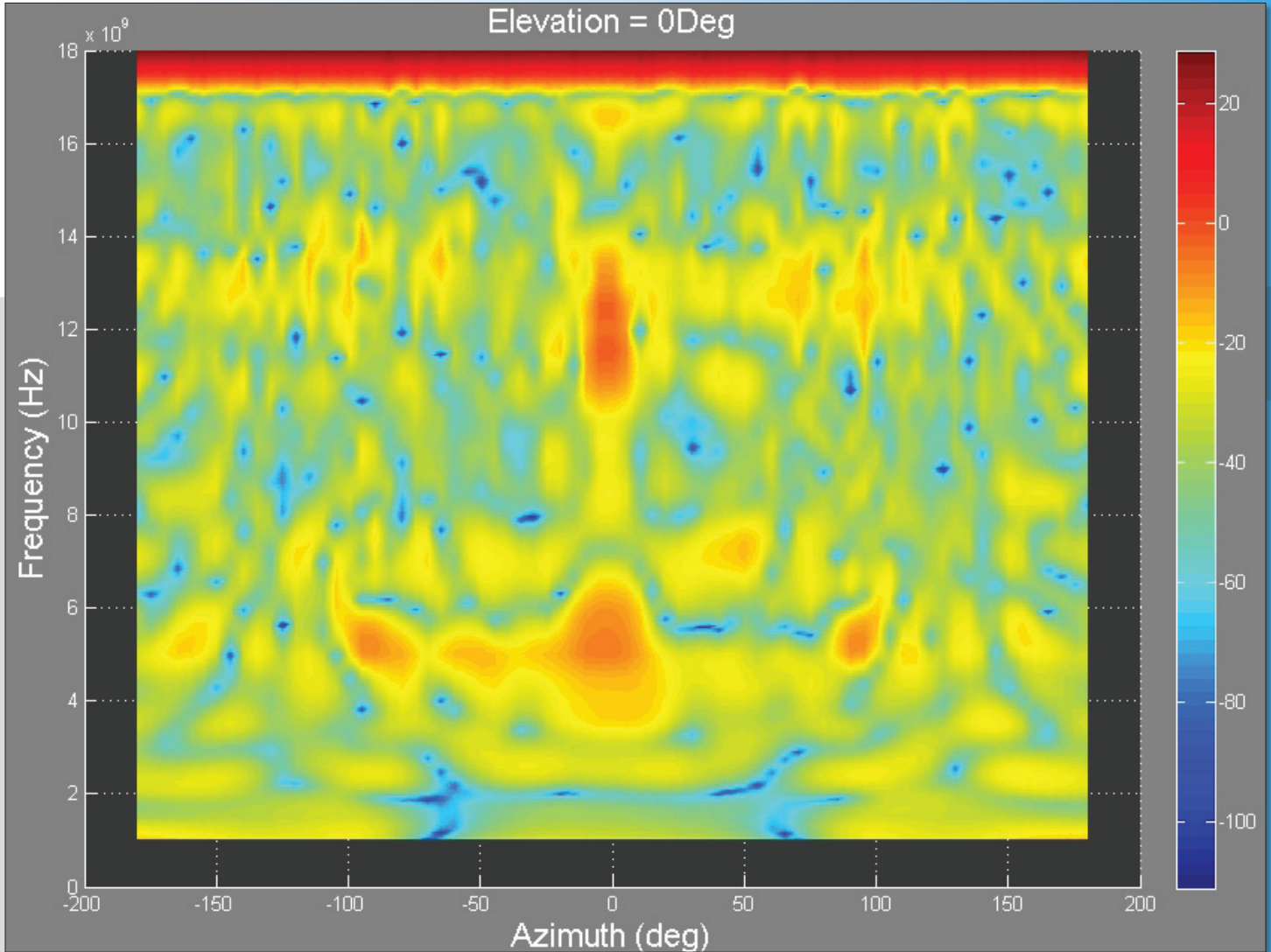
Amplitude vs. Angle

DAMS FSM typical RCS profile measured

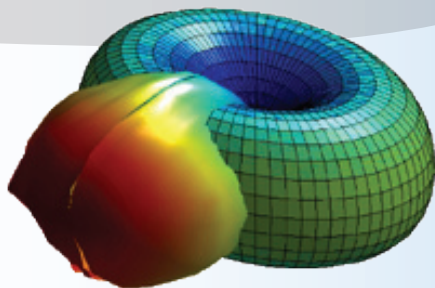


Color Chart

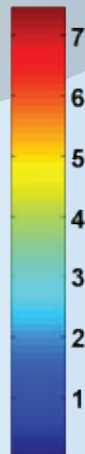
Measured DAMS RCS profile processed with simulator and advance plotting



Spherical plot of AUT (Patch) gain with ideal 3dBd dipole

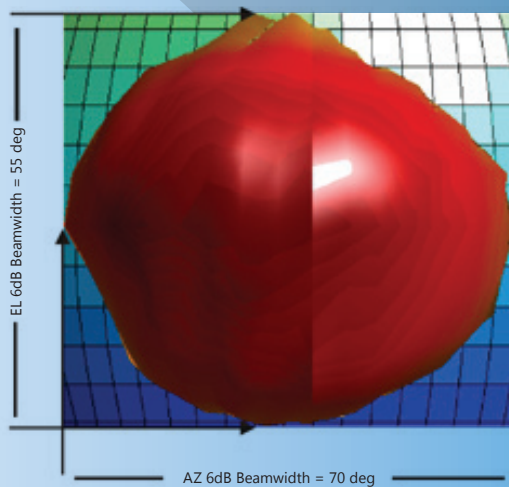


Gain(dB)

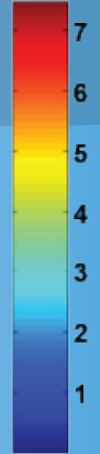


Spherical plot of AUT (Patch) 6dB beamwidth using 6dB gain Iso-sphere

Freq = 5GHz AZ = 0 EL = 0

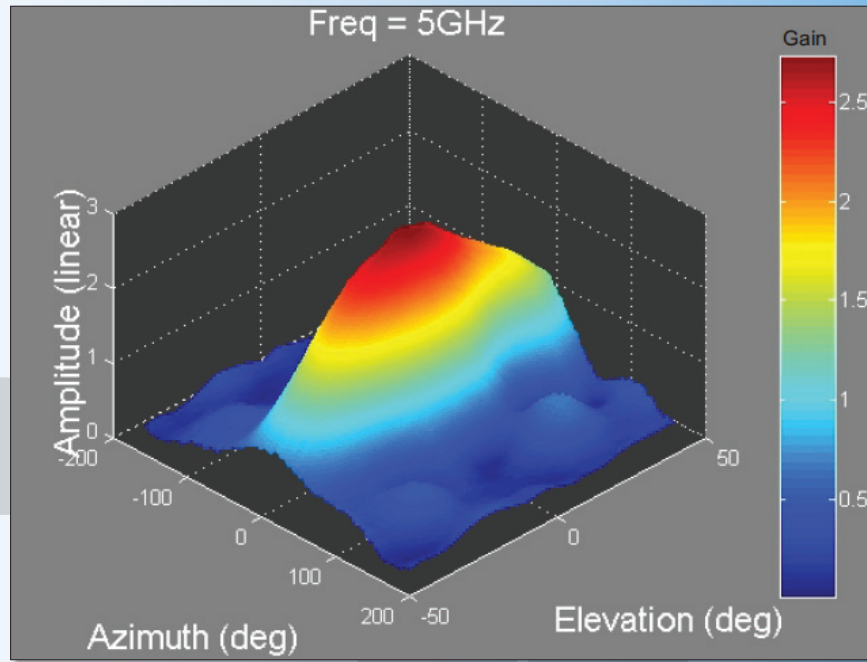


Gain(dB)



Iso-Sphere grid set to 5 deg/div AZ and EL

Linear AZ-EL Plot of AUT



Polar Plot of Patch AUT showing all AZ EL contours relative to Max Gain



Efficiency Measurement Functions

Efficiency with AUT S22 removed

Efficiency

$$\epsilon = \frac{\pi}{2NM} \sum_N \sum_M \frac{S_{21}^2(\theta_M, \phi_N)}{P_L G_T} \cos(\phi_N)$$

N = number of EL cuts
M = number of Az cuts
 $S_{21}^2(\theta_M, \phi_N)$ = Measured Link data
PL = Path loss
GT = Ref antenna gain

Efficiency is calculated using AUT gain data in REG0

REG0 = Gain Data

AUT S22 may be removed. Measured S22 data must be present in REG4. S22 data may be of any size or shape as long as the frequency extents are identical to REG0 gain data. Integration is performed over the measurement extents enabling faster beam measurements.

Circular Efficiency
For circular efficiency add LHC+RHC in the

Efficiency %

Frequency

Auto Scale | Hold Plot | Print

▼	x: 2.52G	Marker Trace	y: 0
▲	x: 2.52G		y: 0
	x: 0		y: 0

Efficiency Model

Calculate

Exit

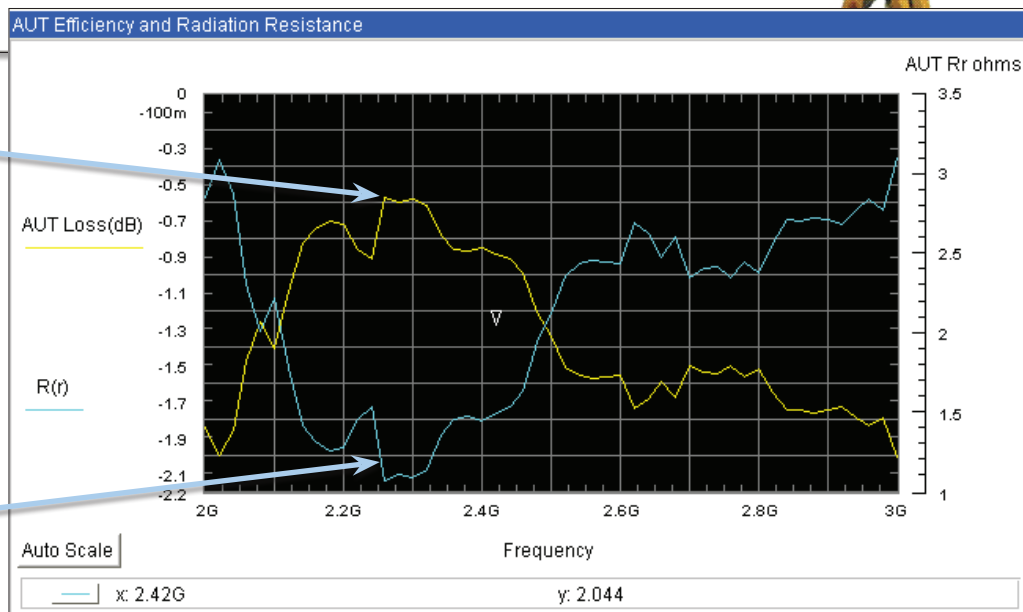
S22 Required

Overlay AUT loss & Rr

Remove S22 (REG4)

AUT Rad R

AUT Loss



Product List

Standard x000 Series - Up to 20 lb. capacity (9 kg.)



Product Code	Frequency
D5000	DC-6 GHz
D6000	DC-18 GHz
D7000	DC-40 GHz

Heavy Duty x100 Series - Up to 150 lb. capacity (90 kg.)



Product Code	Frequency
D5100	DC-6 GHz
D6100	DC-18 GHz
D7100	DC-40 GHz

Heavy Duty x250 Series - Up to 250 lb. capacity (113 kg.)



Product Code	Frequency
D5250	DC-6 GHz
D6250	DC-18 GHz
D7250	DC-40 GHz

Full Spherical Mount - Up to 10 lb. capacity (4.5 kg.)



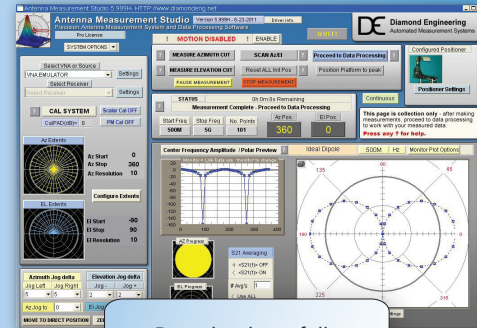
Product Code	Frequency
DFSM-5-18	DC-18 GHz
DFSM-5-40	DC-40 GHz
DFSM-10-18	DC-18 GHz
DFSM-10-40	DC-40 GHz

Optional Accessories

Advanced Processing Module (incl. with 6x00/7x00)
 Pre-Configured Desktop or Laptop PC w/ GPIB
NEW! Antenna Network and Measurement Simulator

Product Code

DPA-APM
 DPA-PC-DSK or DPA-PC-LAP
 DANMS



Download our fully functional demo software at www.DiamondEng.net



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