AVS Measurement

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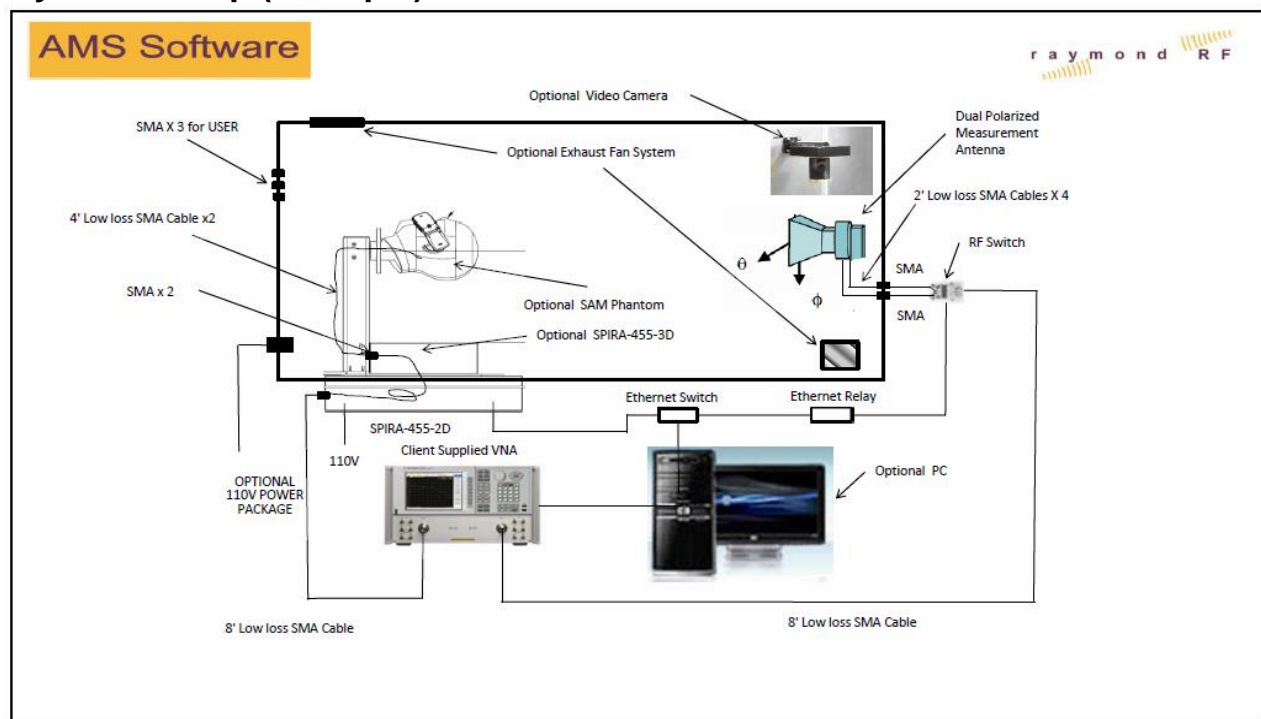## Far Field Antenna Measurements

Far field antenna measurements are performed in a reflection free and electromagnetically quiet environment. When there is no concern for radiated interference between the ambient and the measurement system, pre-compliance measurements can be made out doors or in a lab (some strategically placed absorber may be required). Otherwise, an Engineered RF Shielded Anechoic Chamber is required to provide a controlled environment for making accurate measurements.

An automated antenna measurement system includes:

- Measurement Antenna and Mount
- DUT Antenna Positioner, controller and Mount
- Reference Antenna for calibrating
- Signal Source (VNA or Signal Generator)
- Receiver (VNA, Spectrum Analyzer or Receiver)
- RF Switch(s) for dual polarised measurements
- Interconnection RF Cables
- Interconnection Control and Signaling Cables
- Computer
- GPIB and/or Ethernet Interface
- Measurement Software & Equipment Drivers

System Set-up (Example)

Set-up for 3D Dual Polarized Measurements with a 2 Port VNA

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Antenna Measurement Systems by Raymond RF

Theta 2D Measurement System

With the addition of a Vector Network Analyzer, or Spectrum Analyzer and Signal Generator, antenna measurements can be performed with this entry level system.   The basic system includes, positioner, calibrated measurement antenna, dielectric stands, cabling and our AMS 3D measurement software.

> Theta Measurement Spec Sheet
> AMS Software Brochure
> AMS Software Manual
> 2D / 3D Positioner Spec Sheet
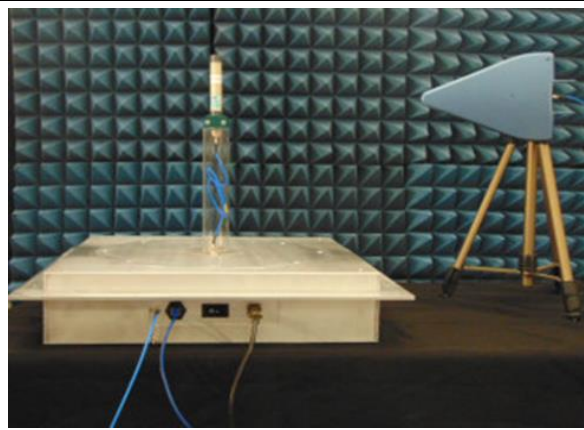
Phi Over Theta 3D Measurement System

Upgrade the Theta 2D Measurement System with a Phi Axis Positioner to make 3D measurements.

The Phi positioner includes a dielectric head which is virtually RF transparent. Replacement foam heads are available for custom set-ups.
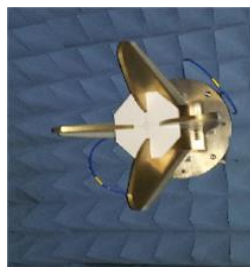
Dual Polarized Measurements

Upgrade the Theta 2D Measurement System with a Dual Polarized Open Boundary Quad Ridge Antenna to measure both Horizontal (theta) and Vertical (phi) polarizations.

This upgrade will require:
- Open Boundary Quad Ridge Antenna
- RF Switch (not required for 4 port VNA)
- Ethernet Relay (not required for 4 port VNA)
- Additional RF Cabling
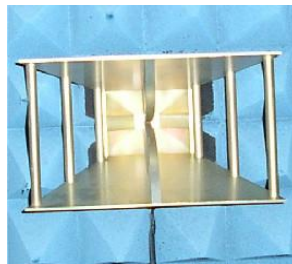
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Measurement Antenna

3 models of Measurement Antennas are available. The Open Boundary Quad Ridge Horn is dual polarized, allowing for measurements of both the Horizontal (theta) and the Vertical (phi) polarizations.

Antenna Style:	Logperiodic	Dual Ridge Horn	Open Boundary Quad
Frequency Range:	700 - 10000 MHz	1000 - 18000 MHz	700 - 10000 MHz
Polarization	Single	Single	Dual

DUT Antenna Positioner

Raymond RF offers 2 models of Antenna Positioners. The Spira-455 is an 18" turntable, Theta Axis, for making single cut measurements. The Spria-455 can be upgraded to a 3D positioner by adding the Phi Axis positioner.

Spira-455 2D/3D Spec Sheet
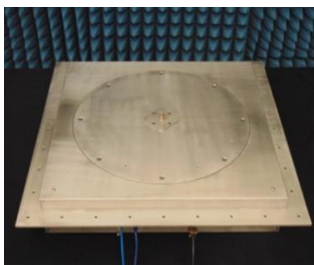
Spira-455, Theta Axis	Spira-455 3D, Phi over Theta

Reference Antennas

Calibrated Sleeve Dipole Antennas are utilized as a reference standard for verifying the systems accuracy . Calibrated Logperiodic antennas are utilized for calibrating the systems measured power.

Sleeve Dipole	Logperiodic

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Signal Source and Receiver

The signal source and receiver is supplied by the client. Although a Signal Generator and Spectrum Analyzer or Receiver can be used for scalar measurements, A Vector Network Analyzer is the preferred measurement instrument as it can perform both scalar and complex (phase) measurements. In addition to better measurement speed and accuracy, a VNA also serves as both signal source and receiver.

| Signal Generator | Spectrum Analyzer | Receiver | VNA (2 port) |

RF Switch

An RF switch is required to interconnect a dual polarized measurement antenna to a 2 Port VNA, Spectrum Analyzer or Receiver. Systems which include a 4 Port VNA, do not require an RF Switch. An Ethernet relay is required to drive the RF Switch.

SPDT RF Switch   Ethernet Relay

Interconnection RF Cables

Raymond RF recommends the following cables, as may be required:

From:	Length (in)
Signal Port	96
Receiver Port	96
Positioner (to the DUT)	24
RF Switch (Port 1)	24
RF Switch (Port 2)	24
VNA (if Port 3 is used)	96

Low Loss SMA Coax Cable

SMA Feedthrough Connectors and additional cables or also required for passing RF Cables through chamber surfac

Interconnection Control and Signaling Cables

Raymond RF recommends the following cables, as may be required:

From:	
VNA / Receiver / SA	GPIB
Signal Generator (if utilized)	GPIB
Ethernet Switch	CAT5
Spira-455 Positioner	CAT5
Ethernet Relay (If used)	CAT5
RF Switch	2 X 18AWG

GPIB   CAT5

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Computer

A PC running windows, with Microsoft Office, is required to run the Antenna Measurement Software

Recommended Minimum System Requirements

- 2 GHz quad core processor
- Microsoft XP / Vista / 7 / 8
- 4 GB RAM
- 50 GB free hard drive space
- CD-ROM Drive
- 10 BaseT Ethernet Card, set on primary bindings (first priority)
- Microsoft Office with Word and Excel

PC with Windows & Office

GPIB and Ethernet

Most instruments such as Signal Generators, Spectrum Analyzers, Receivers and VNAs will require a GPIB Controller.

A 10/100 4 Port Ethernet Switch will be required for systems which utilize a Raymond RF Antenna Positioner and Ethernet Relay.

GPIB-USB-HS   ETHERNET SWITCH

Measurement Software & Equipment Drivers

Raymond RF's Antenna Measurement Software performs 2-D (polar/rectangular) and 3-D (spherical) antenna pattern measurements for passive antennas and active wireless mobile stations (cell phones). Insertion loss of passive devices is included as part of the calibration component. Data management and reporting of antenna properties such as half power beam-width, directivity, gain, radiation efficiency, total radiated power, and total isotropic sensitivity. AMS performs and reports all measurements required by the CTIA Over-the-Air Performance Test Plan.

   AMS Software Brochure
   AMS Software Manual
   Web Site
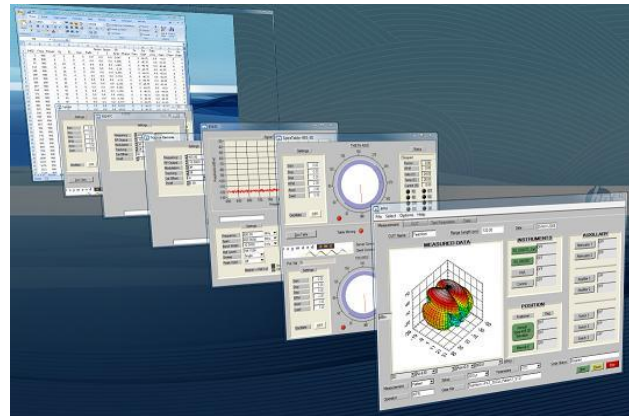
Raymond RF Measurements can provide a complete Engineered system or individual components.

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