μ-Lab

A compact millimeter-wave measurement system for microchips and antennas

µ-Lab is suited for the collection of far-field and near-field electromagnetic data of chips and miniature antenna assemblies in the millimeter waveband. It is the ideal measurement system for testing M2M devices using WiGig technology. The extra-wide door on this compact anechoic chamber enables easy access and mounting of the DUT. µ-Lab is a portable turn-key system that can be moved to any preferred location. MVG's 959 Spectrum software complements the µ-Lab for complete data acquisition and analysis.

- **Millimeter wave measurement capabilities**
- **Wide range of antenna configurations**
- **Compact and portable**

SOLUTION FOR

- **Chip measurements**
- **Miniature connectorized antenna measurements**
- **Measurements of laptop and other devices**

Main features

Technology

- Near-field / Spherical
- Far-field / Spherical

Measurement capabilities

- Gain
- Directivity
- Sidelobe levels - user-defined criteria
- Null depth- search for user-defined null level (e.g, -3, -10, etc.)
- Time domain response capacity
- Dynamic density control - real time speed adjustments
- Beam width - user-defined beamwidth analysis (1 dB, 3 dB, etc.)
- Pass/fail criteria - user defined specification levels (e.g., minimum gain spec over angular region)
- Capabilities up to 2 millimeter wave bands (V and W), others upon request

Frequency bands

- 50-110 GHz
- 18-50 GHz optional
- Other bands possible upon request

Max. size of DUT

- On centered support column: as large as a standard laptop
- On offset column for chip measurements: 5 cm x 5 cm (chipset)

Dynamic range

- > 60 dB at 50-110 GHz

System configurations

Software

Measurement control, data acquisition and post-processing (case specific)

- ■ 959 Spectrum
- ■ MiDAS

Equipment

- ■ Elevation axis positioner: rotary, lightweight gantry-arm assembly
- ■ Azimuth axis: standard bearing and motor assembly
- ■ Stationary DUT platform
- ■ DUT support: various configurations possible
- ■ Manual polarization positioner
- ■ Standard Digital Servo Controller and Amplifier, Model AL-4164-1
- ■ Source and receiver: Agilent PNA standard, other options available
- ■ RF amplifiers and cables
- ■ Vibration isolation

Add-ons

- ○ Millimeter wave VNA extension heads (e.g., VDI or equivalent) frequency banded
- □ Standard gain horns
- □ Centered column for connectorized device measurements
- □ Micro-probing for chip device measurements (offset mount)
- □ Microscope camera w/ visualization screens for on-chip testing
- □ Equipment rack
- □ 67 to 75 GHz coverage (hardware changes to meet these frequencies)

Accessories

- ■ Folding/retractable PC work desk
- ■ Extra space in cart for material and tool storage
- ■ Leveling feet

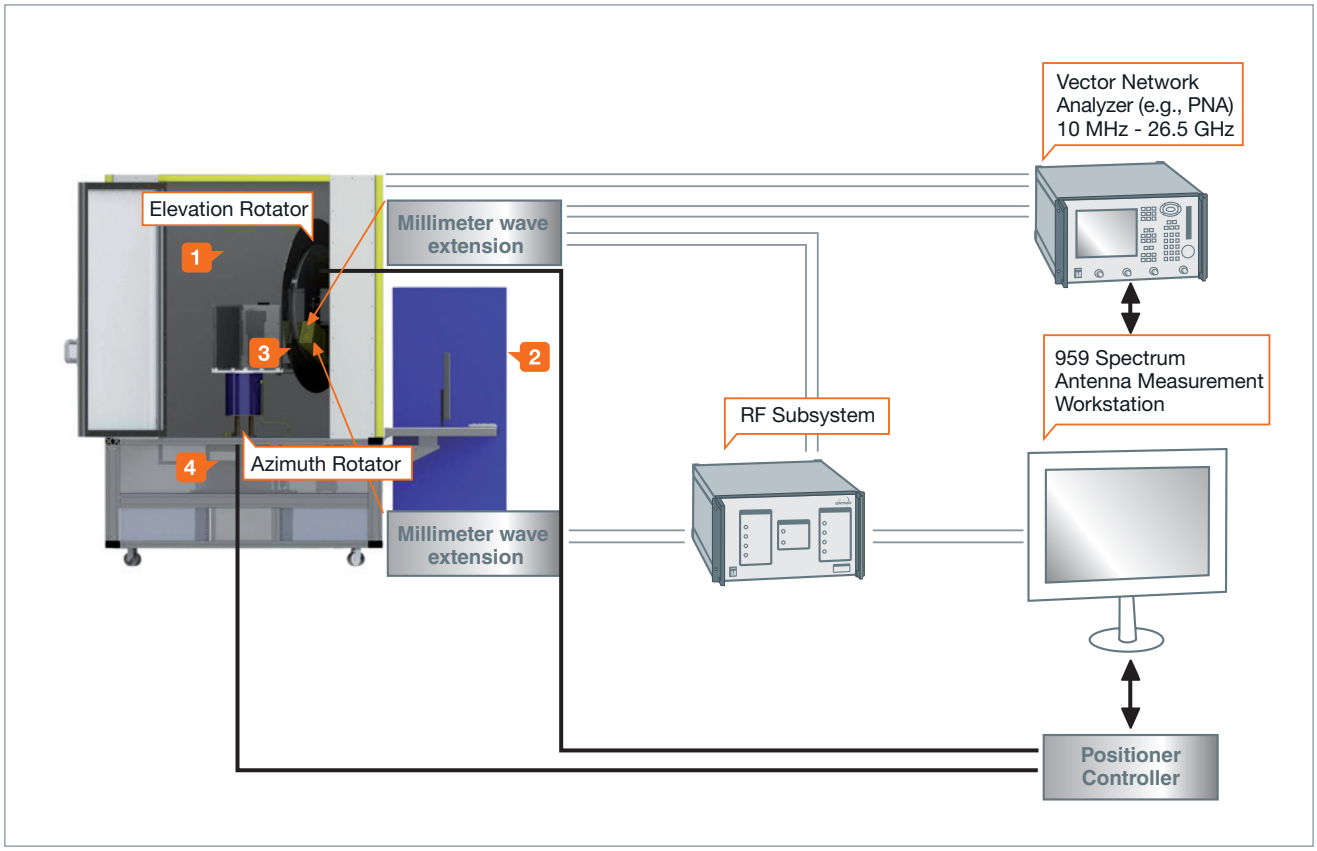
Services

- ■ Training
- ■ Calibration and maintenance
- ■ Warranty
- □ Post warranty service plans*

* Refer to ORBIT/FR service brochure for more information

■ Included □ Optional ○ Required

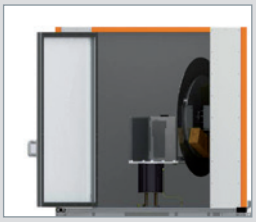
System overview



The positioning subsystem consists of a lightweight precision gantry arm assembly mounted on an azimuth positioner. The near-field probe, mounted on the gantry arm, can be rotated to change polarization. The gantry arm assembly rotates in azimuth to cover all the longitudinal cuts on the measurement sphere. The DUT remains fixed on a stationary disk while the probe rotates in elevation and azimuth around the DUT to cover the measurement sphere.

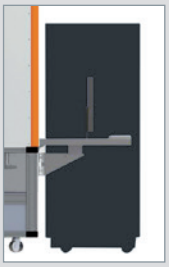
Measurement bands are reconfigurable to allow wide bandwidth operation of the system. The system is designed for convenient manual changeover. Measurements can be set up in a single test or batch configuration. Analysis and plotting can also be included in the batch test. Overall, µ-Lab provides a unique, small, portable measurement test capability for a wide variety of antennas.

Standard system components



1 Anechoic chamber

- The chamber is approximately 7 feet high and 5 feet long x 5 feet wide (not including side tabletop). It is mounted on casters for full portability. A folding tabletop is attached to the chamber for peripheral computer equipment.



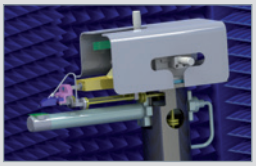
2 Equipment rack

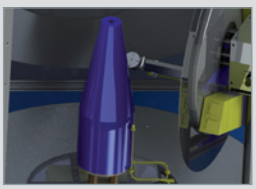
Including:

- VNA
- AL-4164 Positioner Control Unit
- Power conditioning
- Measurement computer
- LAN switch assembly

3 Positioning subsystem

Near-field probe positioning is provided for by the elevation gantry arm. The elevation axis is comprised of a standard rotary positioner, probe arm assembly, and necessary electronic and RF equipment.





4 DUT platform

The center mounted support foam column accommodates small connectorized antennas and items up to the size of a standard laptop. The offset support column supports antenna chips up to 5 cm x 5 cm. The DUT support columns are easily swappable between connectorized and non-connectorized testing, with a storage cart available for the support that is not in use.

The microscope camera (optional) folds conveniently onto the top of the chamber when not in use.

Measurement specifications*

Frequency Range	50 - 110 GHz* (V and W bands)
Measurement Radius	15 in (38.1 cm) nominal
Positioner Speeds	Up to 9 deg/sec typ.
Typical Data Acquisition Speed	10-120 minutes depending on the test scenario
Sidelobe Level Accuracy	+/- 1 dB peak error at - 20 dB typ.
Gain Accuracy	+/- 0.5 dB typ
System Dynamic Range	> 60 dB 50-110

* V band measurements over 50-67 GHz unless full coverage to 75 GHz is required

Mechanical Characteristics

Dimensions	7 ft H x 5ft W x 5 ft L (2.13 m x 1.52 m x 1.52 m) nominal
Max size DUT	• On centered support column: as large as a standard laptop • On offset column: 5 cm x 5 cm (chipset)

mvg Microwave Vision Group

Contact your local sales representative for more information

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