

## AMS-8700 MIMO ANTENNA MEASUREMENT SYSTEM

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ETS-Lindgren's AMS-8700 MIMO OTA Test System allows repeatable measurement of radiated performance of wireless devices in a simulated multi-path environment. The AMS-8700 Antenna Measurement System allows repeatable measurement of radiated performance of wireless devices in a simulated multi-path environment. The system supports generation of spatial field structures similar to those seen in a wide variety of real-world scenarios. Standard conducted channel models can be adapted to equivalent radiated spatial channel models for

evaluation of the entire device signal chain including antennas, device platform, and near-field phantom impact on device performance. The system can be equipped with any combination of optional Test Packages to evaluate downlink MIMO performance

### Key Features

- Suitable for LTE, WiMAX, and 802.11n MIMO Testing
- Supports Testing per CTIA Test Plan for 2x2 Downlink MIMO and Transmit Diversity Over-the-Air Performance
- Suitable for Evaluation of Receive Diversity
- Complete RF Environment Simulation
- Supports Single Cluster, Multiple Cluster, and Uniform Models
- Supports Variable Angles of Arrival, Doppler, and Delay Spread
- Patent Pending Technology
- Multiple Patents for Over-the-Air Testing and Environmental Simulation:
  - Patent Number 20080056340 "Systems and Methods for OTA Performance Testing of Wireless Devices with Multiple Antennas"
  - Patent Number 20080305754 "Systems and Methods for OTA

### Features

#### Chamber

The system acts as an RF environment simulator that can generate spatial field structures similar to those seen in a wide range of real-world scenarios. Standard conducted channel models can be adapted to equivalent radiated spatial channel models for evaluation of the entire device signal chain, including antennas, device platform, and near field phantom (head, hands, etc.) impact on device performance. The simulated environment is suitable for evaluation of downlink MIMO performance for emerging wireless technologies such as LTE, WiMAX, and 802.11n Wi-Fi as well as receive diversity performance of existing wireless technologies.

#### Antenna Array System

The multi-antenna array includes dual-polarized antennas mounted to the interior of the MIMO antenna structure via custom fixtures that allow for adjustments in angular position, creating more specific channel models within the chamber. The array is configured with RF-cables routed from the antennas back to the connector panel along with the necessary communication antenna and positioner cabling. RF-cables are also provided outside the chamber to connect each component within the chamber to technology-specific communication test equipment through a radio channel emulator(s).

Via the channel emulator the antenna array transmits downlink signals from a range of Angles of Arrival (AoA), simulating the scattered reflections seen by a wireless device in normal operation. The channel emulator(s) uses specially-modified spatial channel models to feed each antenna in the array with a statistical sampling of the source signal(s) with appropriate doppler and delay spreads to emulate the

## Performance Testing of Wireless Devices"

scattering effect of fixed and moving objects within the simulated environment. A positioning system allows the wireless Device Under Test (DUT) to be rotated through the generated field structure to determine its relative performance in different orientations within the simulated environment.

### Positioning System

A positioning system allows the DUT to be rotated through the generated field structure to determine its relative performance in different orientations within the simulated environment.

### EMQuest™ EMQ-108 Data Acquisition Software

EMQuest EMQ-108 MIMO OTA Test Option adds a suite of test capabilities to the EMQuest EMQ-100 Antenna Measurement Software. These include specialized tests for evaluating the throughput of a wireless device in the simulated environment, as well as R&D tests to allow evaluation of antenna correlation and system calibration and validation tests.

### Optional Configurations

The baseline system configuration provides a simulated environment suitable for testing typical wireless handsets. Optional configurations are available to increase the uncorrelated field volume. Optional system components add support for antenna pattern measurement and traditional SISO Total Radiated Power (TRP) and Total Isotropic Sensitivity (TIS) testing of wireless devices. An optional theta axis array and high speed switch matrix allows for high speed antenna pattern measurement and TRP/TIS testing.

## Specifications

### Electrical Specifications

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**Frequency Range:** 690 MHz to 6 GHz  
**Path Length:** 1.95 m (6.40 ft)  
**Voltage (Hz):** 50/60 Hz

### Physical Specifications

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**Shield Dimensions (L x W x H):** 4.88 m x 4.88 m x 3.05 m (16 ft x 16 ft x 10 ft)  
**Overall Dimensions:** 4.95 m x 4.95 m x 3.35 m (16.25 ft x 16.25 ft x 11 ft)  
**Shielded Door Dimensions:** 1.2 m x 2.1 m (3.93 ft x 6.89 ft)  
**Shield Material:** Aluminum

### Additional Specifications

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- Design and Fabricate RF-shielded Enclosure
- Installation of the Enclosure, Absorber, and System Components
- One Single-leaf, Manually Operated RF-shielded Personnel Door
- Waveguide Air Vents at Ceiling
- 50/60 Hz Power-line Filters for EUT, Convenience Outlet and Positioner
- Fiber Optic LED Light System
- Connector Panels with 4 Type N, 20 Type SMA and Four (4) ST to ST Fiber Optic Connectors for Positioner Control
- Microwave Absorber on all Chamber Surfaces
- MIMO Antenna Structure with 8 Dual-polarized Environment Simulation Antennas (16 Dual-polarized Antenna Array Upgrade)
- Two Log Spiral Communication Antennas
- 8-port Power Amplifier
- Medium-duty MAPS Positioner
- Laptop Mount for Medium-duty MAPS
- Light-duty Mast for Testing Handsets
- CTIA Ripple Calibration Antenna Mount Kit
- CTIA Ripple Calibration RF-cable Mount Kit
- EMQuest EMQ-100 Antenna Pattern Measurement Software
- EMQuest EMQ-108 MIMO OTA Test Package
- System Control PC with Windows® Software
- Shield Verification Test at 1 GHz per MIL-STD 285/IEEE-299
- Integration of the Test System Components and Training of Lab Personnel on the Use of System
- SISO Single Antenna Measurement Option
- DockOn Quarry Advance Analysis and Reporting Tool

### Product Options

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- LTE MIMO Test Package
- Wi-Fi MIMO Test Package
- 2G/3G Cellular SISO Test Package
- Wi-Fi SISO Test Package
- LTE-SISO Test Package

- LTE-A Carrier Aggregation (2DL/1UL) SISO Test Package
  - LTE-A Carrier Aggregation (3DL/1UL) SISO Test Package
  - A-GNSS (A-GPS for 2G/3G) Test Package
  - A-GNSS (A-GPS for 4G) Test Package
  - A-GNSS (A-GLONASS for 4G) Test Package
  - Bluetooth Test Package
  - Bluetooth Low Energy Test Package
  - TD-SCDMA Test Package
  - RSE Test Package
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