The ETS-Lindgren AMS-8000 Antenna Measurement System (AMS) packages are a series of turnkey solutions for making antenna measurements of portable wireless telecommunication devices. The systems are fully configured to perform both research and development and type approval according to the recently published Cellular and Telecommunications and Internet Association (CTIA) test methods for portable transceivers. The system can also be used to perform antenna measurements in both near- and far-field test distances for more generic antenna properties.

Our system packages offer you a choice of components to fit your custom needs. For a detailed description of each component, please see the individual data sheets.

Components of AMS-8000 Series Chambers

ETS-Lindgren has manufactured and installed thousands RF shielded anechoic chambers worldwide. This series of anechoic chambers is designed to have excellent Quiet Zone (QZ) reflectivity. This attribute will allow the user to perform antenna measurements in the QZ with minimal measurement uncertainty. Although standard sized anechoic chambers are listed in this package, other chambers of different dimensions can be designed to fit your specific requirements. The AMS-8000 series system packages offer two types of standard shielded anechoic chambers:

**Tapered Anechoic Chamber**

Tapered chambers are available in two sizes, compact (9.14 m tapered section) or full size (15.24 m tapered section). The chambers are constructed with ETS-Lindgren RF shielding, and are lined with ETS-Lindgren’s Rantec brand of microwave absorber. The system is designed to operate over the frequency range of 400 MHz to 6 GHz, but can be extended to higher frequencies if desired.

**Rectangular**

The rectangular chamber is available in a 7.32 m length, and is constructed with ETS-Lindgren’s RF shielding, and lined with ETS-Lindgren’s Rantec brand of microwave absorber. This full size chamber is designed to operate over the frequency range of 700 MHz to 6 GHz and can be extended to higher frequencies if desired.

Multi-Axis Positioner

ETS-Lindgren’s Multi-Axis Positioners (MAPS) are designed with adjustment rails to position the Device Under Test (DUT) at the center of rotation axes (both azimuth and ortho axes) for more accurate antenna measurement of a large DUT. To minimize measurement error, the vertical support structures are constructed from low-density dielectric material to provide RF transparency during the measurement. The optional DUT signal lines are RF suppressed and routed through the center of each axis shaft for minimal coupling and interference. The MAPS uses fiber optic control lines between the motor drive and controller. Two models are offered: Model 2010 Light Duty Multi-Axis Positioner and Model 2015 Medium Duty Multi-Axis Positioner.
Model 2010 Light Duty Positioner
The light duty multi-axis Model 2010 offers independent 360° rotation in both azimuth and elevation. Wireless devices of up to 1 lb (.45 kg) can be accommodated. The positioner is modular, consisting of a rotating turntable base and mounting post.

Model 2015 Medium Duty Positioner
The medium duty Model 2015 offers independent 360° rotation in both azimuth and elevation. The positioner is modular, consisting of a rotating turntable base and interchangeable mounting posts. The medium duty mounting post is designed for testing wireless devices with a phantom head (optional accessory). Maximum load capacity is 9.07 kg (20 lb). Also available as an accessory, the optional light duty mounting post is designed for testing wireless devices up to .45 kg (1 lb).

Positioning Controller
The ETS-Lindgren Model 2090 Multi-Device Positioning Controller is capable of operating two MAPS axes simultaneously. The Model 2090 can be operated manually from the front panel, or under software control via the built-in GPIB port (IEEE 488 compatible).

Antenna
ETS-Lindgren’s EMCO brand Diagonal Dual Polarized Horn antenna series has been designed for wireless test applications. These antennas cover all currently used wireless service frequencies. Model 3164-03 frequency range is 400 MHz to 6 GHz, while the more compact Model 3164-04 frequency range is 700 MHz to 6 GHz. Two orthogonal input feeds allow them to be used as a linear or elliptically polarized antenna (with hybrid coupler), as well as making simultaneous measurements in two polarizations at a single angular position. While intended for use as a receive antenna, the Model 3164 series antennas can also be used as transmit antennas with proper re-configuration. Model 3164-03 rated power handling capability is 200 W maximum CW input power while the Model 3164-04 rated power handling capability is 10 W maximum.

The ETS-Lindgren Model 3126-836 and 3126-1880 precision sleeve dipoles and Model 3127-836 and 3127-1880 loops, for ripple test and range calibration are designed specifically for CTIA recommended procedures.

Instrumentation
The ETS-Lindgren AMS-8000 system packages can be incorporated with a variety of RF instrumentation for your measurement requirements. The system can be configured to perform generic antenna measurement by using a multi-channel vector network analyzer (VNA). A spectrum analyzer or power meter can be used as the receiver instrument for active antenna measurements. For transceiver measurements, antennas and a digital package Communication Analyzer can be added to provide transceiver communication link measurements for sensitivity and bit error rate tests.

Software
ETS-Lindgren’s EMQuest EMQ-100 Antenna Measurement Software is designed for azimuth antenna pattern measurement and/or full spherical antenna pattern measurements for Instruments Under Test (IUTs) in either transmit or receive mode. Post-processing calculations include derivation of antenna half-power beam-width, directivity, gain, radiation efficiency, total radiated power, and total isotropic sensitivity. EMQ-100 also provides derivation of CTIA specific near-horizon partial radiated power and near-horizon sensitivity. Advanced graphic capabilities allow acquired data to be displayed in a variety of 2D and 3D formats. Tabular data can be exported to Microsoft Excel™ spreadsheets. Reports can be exported to PDF files, or saved in RTF format for import to Microsoft Word™.

Integration
ETS-Lindgren provides custom field installation of the chamber, positioner, antenna, lab RF cable circuitry, and the EMQuest antenna measurement software. After installation of the system, the chamber can be certified by means of two different approaches. The first approach is Free Space VSWR and the second is Quiet Zone Ripple Test. Free Space VSWR chamber performance testing is to

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be performed at four (4) customer-selected frequencies from 400 MHz to 6 GHz. Quiet Zone Ripple Test is to be performed at two (2) frequencies 236.52 MHz and 1879.95 MHz as specified in the CTIA radiated test plan. As another optional feature, ETS-Lindgren will provide the antenna range calibration at any number of test frequencies specified by the customer using the standard antenna method to provide range insertion loss to be incorporate into the software for post-processing. This will allow the user to have a hassle-free turnkey solution for the antenna measurement requirements.

**Training**

ETS-Lindgren will train the customer’s technical personnel in operation of the positioner device, controller, and the test and measurement software. The training package will also provide a generic theoretical review of antenna measurement principles. Software support and upgrades will be provided for one year after chamber commissioning. Extended software support and upgrade can be provided at an annual fee.
AMS-8000 System including Model 3164-04 horn antenna and Medium Duty MAPS with optional SAM Phantom Head

Model 3126 Precision Sleeve Dipole

Model 3127 Loop for ripple testing and range calibration