CASE STUDY AT4 WIRELESS BOASTS WORLD'S FIRST WIMAX FORUM – CEDAR PARK, TEXAS

AT4 wireless, Inc. is a global provider of testing solutions for wireless technologies. The company holds the unique distinction of being the world's first WiMAX Forum® Designated Certification Laboratory. To conduct testing in accordance with the WiMAX Forum Radiated Performance Tests (RPT) for Subscriber and Mobile Stations test plan, it was imperative that AT4 wireless add an operational wireless test system to its laboratory. ETS-Lindgren, with its considerable experience in Over-The-Air (OTA) testing of wireless devices, provided a turnkey test and measurement system to meet the requirements of AT4 wireless. The system installation resulted in a fully operational, WiMAX Forum Designated Certification Laboratory to perform Radiated Performance Tests of wireless mobile devices. "When we placed our contract with ETS-Lindgren in late 2007, a WiMAX Forum qualified system had not been supplied or installed anywhere in the world," said Jose Aurelio Rodrigo, chief operating officer for AT4 wireless. He added, "It was critical that we place our contract with a supplier we could trust to deliver a fully functional system. A key advantage for ETS-Lindgren was its membership in the WiMAX Forum and its technical contribution to the WiMAX Forum RPT test plan. The company's considerable expertise in this area gave us confidence we'd receive a successful solution to our wireless test needs." ETS-Lindgren offered a test solution that fully addressed the test requirements with its suite of five AMS series test chambers. A modified Model AMS-8500 was installed to conduct Radiated Performance Tests (RPT). In addition, two shielded enclosures for Radio Conformance Testing (RCT) and two shielded enclosures for Interoperability Testing (IOT) were provided.

AMS-8500 Technical Specifications

Antenna Measurement System, Model AMS 8500, is a convenient turnkey system that includes the chamber, software and supporting test instrumentation.

Notable features of the system include:

- A high-performance RF shielded rectangular anechoic chamber with nominal interior dimensions of 24 ft long x 12 ft wide x 12 ft high (7 m x 4 m x 4 m)
- A Recessed Contact Mechanism (RCM) shielded door, 4 ft x 7 ft (1.2 m x 2.1 m)
- High-performance, combustion limiting polyurethane microwave absorber with power handling capability of 200 V/m installed on all interior surfaces. The absorber was provided in an optimal combination of 12 in and 24 in (30 cm x 60 cm) pyramidal and wedge shapes
- An open boundary quad-ridge horn antenna with a 700 MHz to 10 GHz performance range as well as a conical log spiral antenna with a 1 GHz to 10 GHz performance range
- A Multi-Axis Positioning System (MAPS) which includes a turntable, removable mast, motor drives, rotary joint and fiber-optic interface to the controller

Antenna Measurement Software

The AMS-8500 system includes EMQuest™ EMQ-100 software which offers fully automated 2-D (polar) and 3-D (spherical) pattern measurement capabilities as well as frequency response measurements for both passive and active wireless mobile stations (cell phones). The software conveniently acquires data and provides full post processing capabilities. With the AMS-8500 system, the software enables:

- Radiated Performance Tests of 2G, 3G and 4G wireless equipment and mobile handsets
- Measurement of active mobile radios at a far-field and/or a radiating near-field test distance when testing low directivity equipment and antennas
- Far-field measurements at a separation distance of approximately 5 m
- A far-field test distance measurement for an EUT with a maximum dimension of 50 cm for bands I, II and III. For bands IV and V, the system provides radiating near-field test conditions with a minimum measurement uncertainty penalty in the frequency range of 3.4 to 3.8

GHz for the same 50 cm maximum EUT dimension. For 3G WiMAX testing, the operational frequency range for the five bands is between 2.4 to 3.8 GHz

Support Chambers

Support chambers were provided to complement the suite of five AMS-8500 series test chambers. This addition further expanded the wireless test capabilities offered by AT4 wireless. The support chambers include:

- Two shielded enclosures for Radio Conformance Testing (RCT), each with nominal interior dimensions of 16 ft long x 10 ft wide x 8 ft 6 in high (5 m x 3 m x 3 m)
- Two shielded enclosures for Interoperability Testing (IOT), each with nominal interior dimensions of 16 ft long x 10 ft wide x 8 ft 6 in high (5 m x 3 m x 3 m)

Customer Guarantee and Training

Since the RPT standard was still in development when AT4 wireless placed its contract, ETS-Lindgren provided a contractual guarantee that the modified AMS-8500 test system and related equipment would comply with the final RPT test plan. To ensure a trained and prepared staff that was ready to start testing immediately upon project completion, ETS-Lindgren partnered directly with AT4 wireless to fine tune the associated system software and thoroughly review the wireless testing process. This improved the company's ability to provide accurate and reliable certification testing as well as expedited reporting to conveniently accommodate the wireless testing needs of its customers.

Experts in Wireless Testing

ETS-Lindgren has long been at the forefront of wireless testing with key "industry firsts" to its credit, including:

- Design and installation of the world's first WiMAX Forum Designated Certification Laboratory for performing WiMAX Radiated Performance Tests
- Design and installation of the world's first CTIA – The Wireless Association® Authorized Test Lab (CATL) approved for performing CTIA Over-The-Air (OTA) performance testing

ETS-Lindgren's goal is to maintain its leadership expertise in the test and measurement of wireless devices. To meet this goal, the company will continue its collaboration with and technical contributions to the leading industry organizations for wireless test plan development including CTIA, the WiMAX Forum, and the Wi-Fi Alliance®.

About AT4 wireless

AT4 wireless is a global supplier of Testing Solutions for wireless technologies recognized as the most complete Wireless Certification & Testing Laboratory in the world and a leading manufacturer of cutting-edge test & measurement equipment for telecommunication technologies. With the largest coverage in different technologies (GSM/GPRS/EDGE, WCDMA, HSPA, LTE, WiMAX™, Bluetooth®, Wi-Fi®, RFID, NFC, EPC, etc.) and a portfolio that ranges from conformance, regulatory and interoperability testing to worldwide compliance services AT4 wireless' Test Laboratory offers a one-stop-shop approach for the certification of telecommunication devices.

With our world-class self-developed Test Systems MINT, BITE and RIDER, AT4 wireless meets all certification aspects like R&TTE, FCC, GCF, PTCRB, WiMAX Forum®, Wi-Fi Alliance, NFC Forum and Bluetooth SIG. AT4 wireless was founded in 1991, has more than 370 employees and operates from its headquarters in Malaga/Spain and its US-based branch in Herndon/VA. For additional information, visit www.at4wireless.com

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About ETS-Lindgren

ETS-Lindgren is an international manufacturer of components and systems that measure, shield, and control electromagnetic and acoustic energy. The company's products are used for electromagnetic compatibility (EMC), microwave and wireless testing, electromagnetic field (EMF) measurement, radio frequency (RF) personal safety monitoring, magnetic resonance imaging (MRI), and control of acoustic environments. Headquartered in Cedar Park, Texas, ETS-Lindgren has manufacturing facilities in North America, Europe, and Asia. Additional information about ETS-Lindgren is available at www.ets-lindgren.com. Additional information about ETS-Lindgren's parent company ESCO and its subsidiaries is available at www.escotechnologies.com.