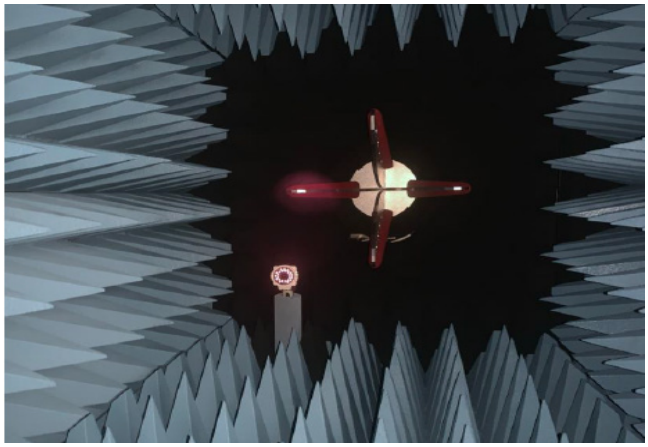
CASE STUDY SILICON LABS - AUSTIN, TEXAS



Silicon Labs, a global leader in silicon, software, and solutions for a smarter, more connected world, sought to enhance its in-house radiated performance measurement capabilities. With a growing demand for more comprehensive and reliable wireless device testing, they turned to ETS-Lindgren for a solution that would meet both current and future needs.

Having already partnered with ETS-Lindgren on a similar project at their Finland facility, Silicon Labs was looking to replicate and refine that success in a new U.S.-based chamber. The goal was to ensure consistency in test methodologies across global teams, while improving the efficiency and reliability of radiated spurious emission (RSE) testing.

ETS-Lindgren proposed the AMS-8050-RSE40, a compact, self-contained test chamber designed for pre-compliant RSE measurements up to 40 GHz. Developed in close collaboration with the Silicon Labs engineering team, the chamber was tailored to accommodate a wide range of wireless devices, including mobile handsets and IoT modules, tested in either free space or with simulated human head and hand phantoms.

The chamber features a 1.5-meter test range and frequency coverage from 750 MHz to 40 GHz. Hardware components include door-mounted amplification, 40 GHz rotary joints, high-frequency RF cables, and motorized polarization for automated testing. A custom high-pass filter matrix was integrated into the system, along with a high-gain amplifier and pre-amplifier to ensure accurate measurement of low-level spurious signals.

This filter setup includes three high-pass filters (1.032 GHz, 2.778 GHz, and 18GHz) designed to suppress the fundamental signal and isolate emissions of interest.

The system's performance is driven by ETS-Lindgren's EMQuest™ EMQ 100 software, which supports automated 2D and 3D pattern measurements, as well as various frequency response and antenna characterization metrics. EMQuest was configured specifically for RSE testing, with features including max hold dwell time control, adjustable resolution and video bandwidth, and EMC standard overrides (such as CISPR and MIL-STD 461A). The software also enables real-time loopback and path loss corrections, custom parameter file (.parm) configurations, and user-defined limit line overlays. Engineers at Silicon Labs can now generate consistent, fully formatted reports using the platform's built-in reporting tools.

Chamber Technical Specifications

- Chamber Dimensions: 2.52 m L x 1.42 m W x 1.88 m H (8.3 ft x 4.7 ft x 6.2 ft)
- Measurement Antennas: ETS-3115 (750 MHz–18 GHz), Eravant 23dBi WR42 (18 – 26.5 GHz), Eravant 23dBi WR28 (26.5–40 GHz)
- Reference Antennas: 3115 and 3116C
- Switching Paths: Configurable for each frequency range with bypass options
- Calibration Equipment: Vector Network Analyzer (VNA), low-loss cables, loopback correction process

Integration Service & Performance Validation

ETS-Lindgren provided full system integration and calibration support, including loopback correction, horizontal and vertical polarization range validation, and switch-path configuration for each frequency segment.

A vector network analyzer (VNA) was used for calibration, with temporary equipment provided when needed. On-site training sessions covered the use of EMQuest for RSE testing, loopback file management, and automated report generation. ETS-Lindgren's application engineers also walked the Silicon Labs team through step-by-step procedures to maintain system accuracy over time.

Key absorber features include:

- Range calibration using 3115 and 3116C antennas
- Loopback path calibration to correct for cable and path losses
- Dual-polarization range calibration for each frequency band (horizontal and vertical)
- Personnel training on EMQuest™ EMQ-100 for RSE testing
- Demonstration of automated report generation tools

Chamber Performance Specifications

Baseline systems can be equipped with this package to support pre-compliant Radiated Spurious Emission (RSE) testing above the fundamental carrier frequency utilizing the included filter matrix with three (3) high-pass filters detailed below.

The provided filter matrix also includes a high-gain amplifier and pre-amplifier to accurately measure the spurious signals that are typically at a lower power than the fundamental, intended signal.

- WHKX10-928.8-1032-18000-40SS (1.032 GHz HPF)
- WHKX10-2500.2-2778-18000-40SS (2.778 GHz HPF)
- WHKX8-6003-6900-18000-40SS (6.9 GHz HPF)
- High-gain amplifier and pre-amplifier for improved improved dynamic range and signal detection

The successful collaboration between ETS-Lindgren and Silicon Labs resulted in a reliable, high-performance RSE testing solution tailored to their exact needs. With seamless integration, advanced capabilities, and consistent results across global teams, the AMS-8050-RSE40 has become a cornerstone of Silicon Labs' wireless testing strategy. This project highlights ETS-Lindgren's ability to deliver customized, scalable systems backed by dedicated support and engineering expertise.

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.

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