CASE STUDY TÜV SÜD - VOLPIANO, ITALY

With demand growing for automotive EMC testing of full vehicles and components as well as for commercial, consumer, medical, and wireless products, TÜV SÜD Italy investigated options for expanding their test capabilities. After careful research, TÜV SÜD selected ETS-Lindgren's FACT™10 (Free-space Anechoic Chamber Test-site) 10-meter EMC Test Chamber. TÜV SÜD valued ETS-Lindgren's unrivaled expertise having installed more than one hundred 10-meter chambers worldwide. As both the chamber manufacturer and system integrator, ETS-Lindgren provided a convenient turnkey solution comprised of an RF Shielded Anechoic Chamber and Amplifier Room, as well as software, accessories, integration, qualification, and onsite training. In addition, with over 40 years of experience in building full vehicle automotive, aircraft, and satellite test chambers, TÜV SÜD knew they could count on ETS-Lindgren's veteran team of project managers. ETS-Lindgren provided TÜV SÜD with a single point of responsibility, thus minimizing risk and maximizing project success.

Chamber Overview

ETS-Lindgren designed and manufactured a FACT 10 EMC Test Chamber and Amplifier Room for a truly versatile test environment. FACT 10 EMC Test Chambers offer the semi-anechoic radiated emissions (30 MHz to 40 GHz) and fully anechoic radiated immunity (26 MHz to 40 GHz) test capability specified in most international EMC compliance regulations. Asea Sistemi, ETS-Lindgren's trusted partner in Italy, installed the chambers, components, and absorber. Approximate shield-to-shield dimensions:

- EMC Test Chamber: 18 m L x 9 m W x 7 m H (59 ft L x 29.5 ft W x 23 ft H).
- Amplifier Room: 5 m L x 2 m W x 3 m H (16 ft L x 6.5 ft W x 10 ft H).

RF Shielding System

The shielding used for both chambers is constructed of all metal modular elements including 2 mm (zinc layer: 275 g/m², thickness 20 µm) panels constructed of hot galvanized rigid steel. All interior surfaces of the shielding are smooth and ready to accept anechoic material. A copper clad, tin-coated steel wire mesh gasket is installed between all panels to maintain shielding attenuation. Panels are bolted together assuring high RF conductivity by means of the gaskets; no welding is required.

The shielding system contains no wood components that could be adversely affected by variations in temperature or moisture in an uncontrolled environment. The panels provide high shielding effectiveness, maintain electrical continuity, and are resistant to corrosion. This system provides RF attenuation of 120 dB up to 40 GHz and is 100% dismountable and transferable should TÜV SÜD decide to move from or reconfigure their facility in the future.

Chamber Components

- Automatic Sliding Door, Model RFSD-F/A-100, 3 m x 3 m (10 ft x 10 ft), with an automatic access ramp.
- Swinging Personnel Door, Model RFD-F/A-100, 0.9 m x 2.1 m (3 ft x 7 ft), for easy access of equipment and staff.
- Built-in turntable, flush with ground plane, 3 m (10 ft) diameter, with a weight load capability of 2,500 kg (5,500 lb), Model 2089EU.

- A boresight (tilt) antenna tower with a 1 m (3 ft) to 4 m (13 ft) scan range, Model 2171B.
- A CISPR 25 test table and radiated emissions test bench.
- Integration of a built-in, passive chassis dynamometer for motorcycle/passenger vehicle testing, which can be upgraded to active in the future. The maximum weight load is 3,000 kg (6,600 lb).
- Air vents, power line filters, and connector panels.
- Complete electrical package for lighting and test instrumentation.
- Polyurethane resin floor coating.
- Complete state-of-the-art EMC hardened (200 V/m) audio/video system.

Absorber Details

Use of ETS-Lindgren's advanced chamber modeling capabilities resulted in optimized hybrid absorber coverage, ensuring full compliance at a competitive price. ETS-Lindgren lined the FACT 10 EMC Test Chamber with DuraSorb™ hybrid broadband absorber material, Model DSH-1250H (approximately 1250 mm/4 ft in length), on all walls and ceiling. White end caps were provided on all absorber tips to brighten the test environment.

DuraSorb is manufactured in-house at ETS-Lindgren under a strict ISO 9001 Quality Management System. It is constructed using substrates with rigid closed cell foams loaded volumetrically and uniformly throughout each piece of absorber. DuraSorb meets the requirements specified in Automotive, Commercial, Industrial, Military, and Aerospace Standards such as MIL-STD-461F, MIL-STD-464C, RTCA/DO-160G, CISPR 16, ANSI C63.4, and IEC 61000-4-3. Each piece of absorber is serialized, providing traceability throughout the manufacturing process. In addition, ETS-Lindgren performs 100% quality assurance testing at the critical frequency bands from 30 MHz to 18 GHz using swept-frequency test methods per IEEE STD 1128. All absorber is tested in the factory before shipment, and full performance data is provided to the customer.

Automated Test Software

In order to automate and expedite testing for TÜV SÜD's commercial as well as automotive test applications, ETS-Lindgren provided VisionTRX™ Visual Monitoring System software. The software redefines automated movement-based analysis of Equipment Under Test (EUT) during EMC testing.

Key Features:

- In order to verify EUT behavior, the software allows automated visual monitoring of relevant parameters during exposure to the required electromagnetic field strengths.
- The EUT may include speedometer needles, dash lights, LEDs, radios, heads up displays, etc.
- Flexible software enables testing for TÜV SÜD's varied commercial and automotive test requirements.

Performance

TÜV SÜD now serves the EMC test requirements of their diverse customers with a versatile test chamber that supports full-compliance, conducted and radiated, emissions and immunity testing, from 9 kHz to 40 GHz. The FACT 10 EMC Test Chamber provides NSA and sVSWR performance exceeding basic expectations at ±4.0 dB NSA from 30 MHz to 1 GHz and sVSWR ≤6.0 dB from 1 GHz to 18 GHz.

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.

Information presented is subject to change as product enhancements are made. Contact ETS-Lindgren Sales Department for current specifications.

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