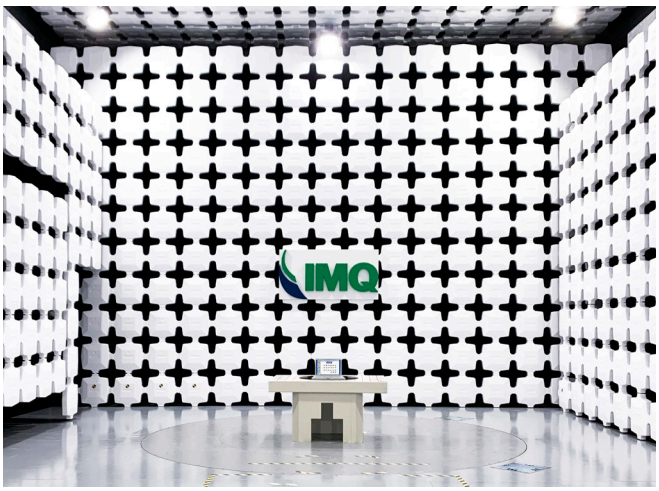
CASE STUDY IMQ S.p.A. – BOLLATE, ITALY



When IMQ S.p.A. (a European leader in Testing, Conformity Assessment, and Certification) decided to expand their EMC test capabilities at their division located in Bollate, Italy, their goal was to have a versatile test chamber in order to meet the growing demands of their diverse customer base. IMQ's customers include well-known companies in the commercial, industrial, residential, and automotive industries. The priority with a new EMC test facility was to provide high-quality test services for a wide range of products, from small consumer electronics to large full vehicles, with an equipment under test (EUT) size up to 5 m (16 ft).

Since ETS-Lindgren had designed and installed EMC test chambers for IMQ at other locations within Italy, IMQ management knew they could count on ETS-Lindgren to meet their long range goals. ETS-Lindgren once again utilized advance chamber modeling capabilities to meet and exceed the specific space and performance requirements of the Bollate, Italy facility. In addition, ETS-Lindgren offered extremely flexible and instrument-agnostic EMC testing software, including VisionTRX™ and TILE!™. As both the chamber manufacturer and system integrator, ETS-Lindgren provided a turnkey solution including an RF shielded semi-anechoic chamber, control and amplifier rooms, as well as an instrumentation system, software, accessories, qualification, and onsite training. The completion of the 10-meter EMC test chamber added to the list of successful projects resulting from the partnership of ETS-Lindgren and IMQ.

Chamber Overview

ETS-Lindgren designed and manufactured a FACT™ (Free-space Anechoic Chamber Test-site) 10 Test Chamber with auxiliary combined amplifier and control rooms. Asea Sistemi, ETS-Lindgren's valued partner in Italy, installed the chambers. FACT 10 Chambers offer the semi-anechoic radiated emissions (RE) and fully anechoic radiated immunity (RI) compliance test capability required by many international EMC compliance regulations.

Key Features:

- FACT 10 Chamber with nominal internal shield-to-shield dimensions of 20.5 m L x 10.6 m W x 8.4 m H (67 ft L x 36 ft W x 29 ft H) – prior to absorber installation.
- Control Room with external shield-to-shield dimensions of 6 m L x 3.5 m W x 2.9 m H (20 ft L x 12 ft W x 10 ft H).
- Amplifier Room with external shield-to-shield dimensions of 2 m L x 3.5 m W x 2.9 m H (7 ft L x 12 ft W x 10 ft H).
- Constructed of Series S101 RF shielded enclosure "pan" type panels with a single layer of 2 mm (.07 in) galvanized steel. Panels are bolted together with superior gasket to ensure high RF conductivity – no welding is required. Series S101 offers the highest shielding attenuation available on the market when combined with the RFD-100 series doors provided.
- The FACT 10 RF shielding system contains no wood components that could be adversely affected by variations in temperature or moisture in an uncontrolled environment. The panels maintain electrical continuity and are resistant to corrosion.

- RF Shielded Doors provided for personnel and equipment access provide the highest shielding effectiveness performance available on the market at 100 dB from 100 kHz to 40 GHz.
- The fully automatic sliding door, Model RFSD-F/A-100, with a nominal clear opening 3.0 m x 3.5 m (10 ft x 11 ft) can be opened from outside or from inside the chamber.
- A lift-type automatic platform door ramp system rated for 6,000 kg (13,000 lb) load enables a smooth, flush access transition of the EUT from the lab to the chamber.
- The manual opening swinging door, Model RFD-F/A-100, provides personnel access with a clear opening of 0.9 m x 2.1 m (3 ft x 7 ft).

RF Shielding System

ETS-Lindgren is the most vertically-integrated test solution supplier in the industry with six factories worldwide that design and manufacture over 90% of the key chamber components including absorbers, shielding, doors, waveguide air vents, power filters, connector panels, and positioning systems - nearly eliminating reliance on third parties. Control over manufacturing allows ETS-Lindgren to tailor product performance to specific test applications and efficiently support IMQ's current and future operational requirements. ETS-Lindgren also supervised the electrical and HVAC installation to ensure the RF shielding performance of the chambers was maintained during construction.

Key Features:

- Model 2171B Boresight Antenna Tower, compliant with the latest requirements of ANSI C63.4.
- Model 2089EU built-in turntable, flush with ground plane, 5.0 m (16 ft) diameter, 6000 kg (13,000 lb) max permissible load.
- Versatile EMCenter™ RF measurement platform that offers flexibility for future upgrade of the EMC systems.
- CISPR 16 and 25 test bench.
- Galvanized steel ground plane.
- Complete state-of-the-art EMC hardened (200V/m) audio/video system.
- All electrical, including LED lighting, and HVAC services for a turnkey installation.

EMC Absorber

ETS-Lindgren lined the FACT 10 EMC Test Chamber with DuraSorb™ hybrid broadband absorber materials. 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, which are loaded volumetrically and uniformly throughout each absorber. Each piece of absorber is serialized and factory tested before shipment. DSH-1250H provides a smooth transition from free space impedance to the lossy ferrite tile base. As a result of its optimized design, high performance is guaranteed not only at the lower frequency band, but also at above 1 GHz. It has a reflectivity greater than 17 dB from 60 MHz to 3 GHz, and better than 20 dB at above 4 GHz. At frequencies above 8 GHz, the reflectivity exceeds 35 dB. In addition, DSH-1250H absorber is made of expanded polystyrene, which is a close cell structure; there is no possibility for particles to leak out from inside.

Key Features:

- Full coverage on four side walls and ceiling with ferrite tiles (individually screwed to under-construction, so these may be dismounted for future chamber transfer).
- Optimized coverage with 1250 mm (4 ft) DuraSorb volumetrically loaded polystyrene absorbers, including white end caps.
- Model DSH-1250H provided on walls and ceiling.
- Absorber provided on movable floor carts for convenience during test set up included Model EHP-12PCL-FX for testing per CISPR 16-1-4 SVSWR (RE above 1 GHz) placed in front of the quiet zone. For testing per IEC 61000-4-3 (RI from 80 MHz to 6 GHz) Model DSH-600H is placed between the field generating antenna tip and the uniform field area.

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Automated Test Software

In order to automate and expedite testing for IMQ's commercial as well as automotive test applications, ETS-Lindgren provided VisionTRX™ Visual Monitoring System software. The software redefines automated movement based analysis of 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.
- EUT may include speedometer needles, dash lights, LEDs, radios, heads up displays, etc.
- Flexible software enables testing for IMQ's varied commercial and automotive test requirements..

Performance

IMQ's EMC Test Chamber provides NSA and sVSWR performance exceeding basic expectations at ±3.0 dB NSA from 30 MHz to 1 GHz and sVSWR ≤ 4.5 dB from 1 GHz to 18 GHz.

Testing is offered in accordance with the requirements specified in Automotive, Commercial, Industrial, Military, and Aerospace Standards such as MIL-STD-461F, MIL-STD-464C, RTCA-DO-160G, CISPR 16, CISPR 25, ANSI C63.4 and IEC 61000-4-3.

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.