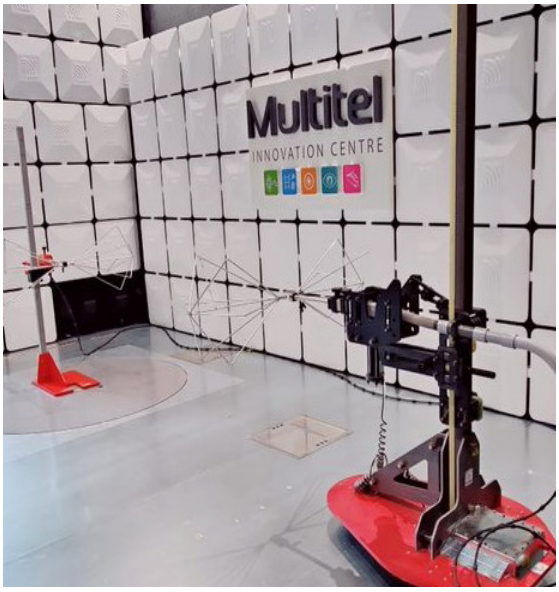
CASE STUDY MULTITEL – MONS, BELGIUM



When in need of a new 3m EMC chamber, Multitel, a commercial EMC test lab, sought a solution partner to help develop their testing infrastructure. They desired a turnkey measurement system, including instrumentation, software, building preparation (concrete, HVAC, electrical), and long-term calibration support. The project was particularly challenging due to the limited space available in the parent building.

ETS-Lindgren's advanced building information modeling (BIM) and simulation tools enabled Multitel to optimize space, performance, and budget parameters to maximize the return on their chamber investment. ETS-Lindgren's software BIM expertise provided better insight and predictability during the design phase, helping determine the optimal chamber size to fit within the existing building. Additionally, as an accredited lab, ETS-Lindgren offered the necessary guidance and support to ensure the space met accreditation standards.

ETS-Lindgren's experience as a turnkey EMC solution provider helped Multitel minimize risk and successfully navigate the project challenges. The collaboration resulted in an EMC test system that met or exceeded Multitel's needs. With over 40 years of experience in EMC facility design and project management, ETS-Lindgren delivers cost-effective, technically sound solutions on time and to the highest quality standards, earning trust as an industry leader.

Chamber Overview

ETS-Lindgren's Series 101 RF shielded construction system meets and substantially exceeds all RF shielding requirements. The modular design is uniquely configured to be dismantled and reinstalled, enlarged or modified due to the panel system.

The FACT™ 3 Anechoic Chamber achieves:

- NSA (30 MHz – 1 GHz) ≤ +/-4dB
- SVSWR ≤6.0 dB Between 1 GHz and 18 GHz
- Chamber has also been Validated from 18 GHz to 40 GHz using the Specific Transmission Loss Test Method

Key Features:

- External Dimensions of the Anechoic Chamber are 8480 mm L x 5120 mm W x 5840 mm H 28 ft L x 17 ft W x 19 ft H)
- Best-In-Class S101 Shielding – Upgraded for Testing to 87 GHz
- RF Shielding Swinging Door, Model RFD-F/A-100, with clear opening of 1800 mm W x 2100 mm H (6 ft W x 7 ft H).
  - Includes Four Rows of Contact Fingers for Optimal RF Performance.
  - Double-Articulated Hinges Engineered to Provide Smoother and More Controlled Operation When Opening or Closing the Door, Ensuring a Seamless User Experience
  - Semi-Automated System Designed to Enhance Ease of Use and Streamline Workflow
- 2188EU 2.0 m 1000 kg (2,000 lb) Turntable
- 2171B Boresight Tower
- DSH-400H Absorbers with Optimized Lining
- RF Control Room and Measurement Room Dimensions 4000 mm L x 2560 mm W x 2480 mm H (13 ft L x 8.3 ft W x 8 ft H)
- All Performances NSA/SVSWR/FU Tested by Independent Accredited Third Party Lab

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EMC Absorber

ETS-Lindgren lined the FACT 3 Anechoic 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. Model DSH-400H absorber 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 better than -15 dB from 80 MHz to 300 MHz, and better than -20 dB at above 300 MHz.

- 30 MHz to 40 GHz Frequency Range Performance
- Power Handling of 200 V/m CW
- Durable Construction with Precision Installation Design
- Non-Hygroscopic and Fire Resistant
- Includes Ferrite Tile Base

EMC Test System

Turnkey instrumentation system, using state-of-the-art equipment, including ETS-Lindgren's EMCenter™ to cover a wide variety of applications including:

- Emmissions Testing per:
  - Commercial/Industrial Standards: EN 61000-6-3, EN 61000-6-4, CISPR 11, CISPR 14-1, CISPR 16
  - Automotive Standards: CISPR 25
  - Avionics Standards: DO-160 G Section 21
  - Satellite/Aerospace Standards: ECSS ECSS-E-ST-20-07C
  - Military Standards: MIL-STD-461G RE102
- Immunity Testing per:
  - Commercial/Industrial Standards: EN 61000-6-1, EN 61000-6-2, IEC 61000-4-3, CISPR 14-2
  - Avionics standards: DO-160 G Section 20
  - Satellite/Aerospace Standards: ECSS ECSS-E-ST-20-07C
  - Military Standards: MIL-STD-461G RS103
- Radio Testing per Various ETSI Standards (RED Directive), including:
  - ETSI EN 300 328
  - ETSI EN 301 489-1, -3, -17, -52
  - ETSI EN 301908-1, -2, -4, -6, -8, -13, -16, -19, -21

Automated EMC Test Software

For automated testing, ETS-Lindgren's EMCenter, which forms the heart of any EMC test solution, is controlled using TILE!™ (Total Integrated Laboratory Environment Software). The software can control external receivers, amplifiers, antennas, and other equipment in the test loop. The software can be configured for testing for full compliance, conducted, and radiated emissions in addition to immunity testing according to all industry standards noted above.

Components and Services

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 absorber, shielding, doors, waveguide air vents, power filters, connector panels, and positioning systems – nearly eliminating reliance on third parties. ETS-Lindgren also supervised the electrical and HVAC installation to ensure the RF shielding performance of the chambers was maintained during construction.

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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