CASE STUDY BALAI BESAR PENGUJIAN PERANGKAT TELEKOMUNIKASI (BBPPT) – BEKASI BARAT, INDONESIA

This comprehensive turnkey EIRP (Effective Isotropic Radiated Power) Measurement Chamber is meticulously engineered around several high-performance components, including ETS-Lindgren's Fully Lined Anechoic Chamber, the advanced EMQuest™ Software, the versatile EMCenter™ Modular RF Platform, and a wide range of specialized antennas and positioning systems. The chamber is specifically designed to accommodate EIRP measurements across a broad frequency range, from 370 MHz to 40 GHz, adhering to international standards and tailored to meet the unique specifications of each customer.

The EMQuest Software plays a crucial role in this system, providing robust capabilities for precise EIRP measurements. It facilitates the collection and analysis of data, ensuring that the measurements are accurate and reliable. The combination of these sophisticated tools and technologies ensures that the measurement process is efficient and adaptable to various testing scenarios. Whether for regulatory compliance or research and development purposes, this turnkey solution offers a comprehensive and customizable approach to EIRP measurements.

RF Shielded Anechoic Chamber

The BBPPT system is housed in an ETS-Lindgren Series 81 RF shielded enclosure, a proven design with over 50,000 worldwide installations. The enclosure features shielded modular panel sections assembled with a clamping system, utilizing 28-gauge galvanized steel sheets laminated to a high-density particle and/or plywood board core. Panels are joined together using precision-machined clamping sections to ensure uniform pressure contact and corrosion resistance. Secure fasteners spaced 10 cm (4 in) apart and trihedral end cap sections further enhance the enclosure's structural integrity.

- Overall chamber dimensions: 12.8 m L x 8.2 m W x 5.7 m H (42 ft L x 27 ft W x 19 ft H) including structure.
- Seismic design, bracing, and engineering support required for the installation located in a high seismic zone area.
- Series 81 RF shielding provides excellent RFI and EMI shielding effectiveness and is the most commonly specified shielding for NSA 65-6/NSA 94-106 testing requirements. Series 81 delivers high-performance attenuation over a broad frequency range.

RF Shielded Doors

- Single leaf semi-automatic latch (electric) 1.2 m W x 2 m H (4 ft W x 7 ft H) RF shielded door with limit switch and HASP lock accommodations.
- Dual leaf semi-automatic latch 3 m W x 2 m H (10 ft W x 7 ft H) RF shielded double leaf door with limit switch and HASP lock accommodations (two sets of these doors were provided for the front and back walls of the chamber).
- Two-piece aluminum ramp supporting 226 kg (500 lb) wheeled loads for the double leaf door.

RF/Microwave Absorber

The RF shielded enclosure at BBPPT is lined with ETS-Lindgren absorber materials to minimize reflections in the test environment. ETS-Lindgren employs a unique two-step impregnation process to enhance the polyurethane absorber material's performance and fire resistance. Initially, the urethane foam block is compressed and submerged in a mixture of conductive carbon and neoprene latex, ensuring complete distribution throughout the foam cells. The second step involves incorporating a solution of

fire retardant ingredients. This meticulous two-step process results in uniformly impregnated absorbers that deliver consistent RF performance across a wide frequency range.

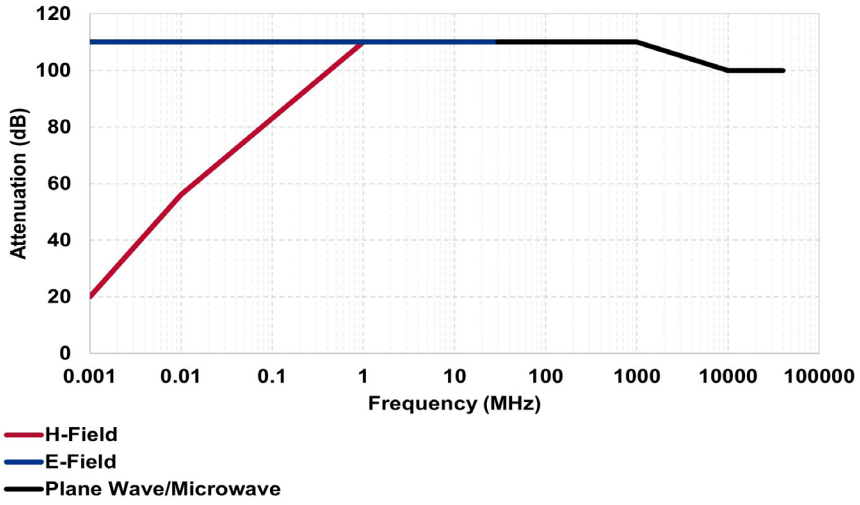
- ETS-Lindgren Model EHP-24PCL, 60 cm (24 in) pyramidal absorber lined all six sides of the chamber.
- Power Handling: 775W per m^2 (0.5W per in^2).
- Extra High Performance (EHP) microwave absorber reduces reflections from 30 MHz through 100 GHz.
- Fire Retardant Performance meets:
  - NRL Report 8093 (Tests 1, 2, and 3)
  - MIT Lincoln Laboratory Specification MS-8-21 (1, 2, and 3)
  - Raytheon Drawing No. 2693066 (latest revision)
  - UL 94-5VA and UL 94-5VB
  - UL 94 HBF
  - DIN 4102 Class B-2

Additionally, ETS-Lindgren's FlexSorb™ coating creates durable absorber tips that resist breakage, which is especially important for high-traffic areas. This innovative coating is dust resistant, easy to handle, and capable of bending without breaking, ensuring longevity and reliability in demanding environments. As a baseline, all absorbers are coated with FlexSorb. To further guarantee product quality, ETS-Lindgren stands out as the only absorber manufacturer that tests 100% of its products for key quality indicators, such as RF reflectivity. Our absorbers undergo rigorous testing from 1 to 18 GHz per IEEE Std. 1128-1998 using a Naval Research Lab (NRL) broadband swept frequency test arch, with data available to customers upon request. Additionally, for an extra fee, we can conduct reflectivity testing from 18 to 40 GHz in a separate NRL test area, ensuring that our products meet the highest standards in performance and durability.

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.

Series 81 Shielding Effectiveness



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