

The image shows the interior of an anechoic chamber. The walls, floor, and ceiling are covered with white, cross-shaped electromagnetic absorbers designed to eliminate reflections. In the center of the chamber, a vehicle test system is visible, consisting of two parallel tracks with glass covers and a central platform. The lighting is bright and even. The image is overlaid with a large blue diagonal shape in the top right corner and a grey diagonal shape in the bottom left corner.

TEST SYSTEM AND PRODUCT SOLUTIONS FOR FULL VEHICLES AND ESAS

BEYOND MEASURE.™

 **ETS·LINDGREN**®
An ESCO Technologies Company

ETS-LINDGREN IS AN EXPERIENCED PARTNER YOU CAN TRUST

THE LEADER IN AUTOMOTIVE TEST AND MEASUREMENT INTRODUCES ITS NEW SERIES OF E-MOTOR AND E-VEHICLE TESTING SOLUTIONS

ETS-Lindgren has the solutions to test to a wide variety of E-Vehicle Standards.

- CISPR 25
- CISPR 25, Edition 4
- CISPR 12
- ISO 11451-2, -3, -4
- ISO 7637-2, -3
- SAE J551/5, /16
- SAE J1113/27
- ECE REG 10.5

ETS-Lindgren's new Vehicle Test Solutions are designed to meet the emerging requirements of E-Motor and E-Vehicle performance validation and compliance testing. With full system designs to support both full vehicle and Electric/Electronic Sub-Assembly (ESA) testing, these solutions provide for cost effective, efficient, repeatable testing and offer whole vehicle configurations that include 4-wheel drive and multi-axle chassis dynamometers, fully-automatic remote antenna positioning, and charging mode test setups.

Component test setups cover the full range of available E-Motor torque and speed ranges for commercial and passenger vehicles, with 4-quadrant operation, battery emulation, inverter emulation and cooling options available.

ETS-Lindgren's TILE!™ Lab Environment Software works seamlessly with dyno control and other third party device monitoring software, and allows for easy integration into your lab environment.

Standard Immunity test systems are available for test levels up to 200 V/m /600 V/m for both full vehicle and component tests, with experienced guidance and support available for regulatory compliance.





ETS-LINDGREN
An ESCO Technologies Company

SAL-9000

ETS-LINDGREN



EMCenter™



ETS-LINDGREN



EMCenter™



8100-001M Power Amplifier



8100-001 RF Power Amplifier

PRODUCT SOLUTIONS

SEMI-ANECHOIC CHAMBERS

FACT™ (Free-space Anechoic Chamber Test-site) 3 and 10 meter chambers provide the test environment you need for meeting most international emissions and immunity standards for E-Vehicle and E-Motor testing.

ANTENNA AND FIELD PROBES

ETS-Lindgren has a broad line of antennas and probes. Specifically our horn, biconical and log periodic antennas and our E-Field probes provide the repeatability and performance critical for efficient immunity and emission measurements.

POSITIONING SYSTEMS

ETS-Lindgren manufactures tripods, antenna towers, turntables and test tables ideal for E-Vehicle test applications. Designed with the test standards in mind, these positioning systems are durable, easy-to-operate, and low maintenance.

EMCenter™ RF TEST SYSTEM PLATFORM

EMCenter is a flexible RF test platform that includes an integrated microcontroller, touch screen, and space for up to seven mix-or-match plug-in card modules. Each card module is an instrument that has been optimized for RF measurement. Vehicle charging station hardware and support can also be included for charging mode testing.

INSTRUMENTATION AND AMPLIFIERS

Your RF test system can be ordered with the carefully selected EMC instrumentation and amplifiers we provide or integrated with equipment you may already have in your lab. Adding or combining equipment is made easier with our large library of equipment drivers that support most popular brands of instrumentation, both new and existing.





SOFTWARE SOLUTIONS

TILE! SOFTWARE WITH CAN/LIN INTERFACE

DUT (Device Under Test) monitoring is a critical part of any Immunity measurement. To support this, ETS-Lindgren's TILE! Software provides a number of user-friendly interface options. From visual monitoring with manual failure alert triggering to the very sophisticated interfacing with dedicated third party stand-alone monitoring and control software, TILE! Software is an integral part of any test lab.

A majority of modern vehicles use a combination of Controller Area Network (CAN) and/or Local Interconnect Network (LIN) buses for communication between different microcontrollers and sensors. TILE! Software allows for monitoring of both the standardized diagnostic information within these controllers plus offers the ability to conveniently monitor various nodes on the bus by using interfaces available from several sources.

During component and full vehicle immunity testing, monitoring the communication on these networks provides a useful means of detecting anomalies in DUT operation. TILE! Software can manage the immunity test while also monitoring up to 100 nodes on the CAN and/or LIN bus directly through an interface.¹ For added flexibility, a stand-alone program such as the VECTOR CANoe[®] can be integrated into your test lab. This will provide an unlimited number of nodes for more extensive monitoring as well as control of the DUT.²

TILE! Software comes standard with ready-to-use profiles, however, should your testing require a customized solution, ETS-Lindgren has the engineering and software expertise to make your project successful.



¹ When the pass/fail criteria is predefined within TILE!.

² VECTOR CANoe is a copyright and the property of VECTOR Infomatik GmbH (http://vector.com/vi_can_solutions_en.html).

SYSTEM SOLUTIONS

TYPICAL CONFIGURATION

ETS-Lindgren offers a standard solution as described below for E-Vehicle and E-Motor testing, however, if a custom solution is required, ETS-Lindgren has the experts to design and manufacture the ideal system for your project. For additional information, please visit our website at ets-lindgren.com or contact your local ETS-Lindgren representative.

Physical Specifications

Item	Model Number	QTY	Description
RF Shielding	Series 81	1 Lot	Modular RF Shielded Enclosure – Inside Shield Dimensions: 5.49 m x 5.49 m x 3.2 m (17.92 ft x 17.92 ft x 10.42 ft) – Estimated Overall Dimensions: 5.64 m x 5.64 m x 3.4 m (18.5 ft x 18.5 ft x 11.17 ft)
RF Shielded Door	Series 201	1	Single-leaf, Manually Operated RF Shielded Door Including Limit Switch ¹ – Door Dimensions: 1.21 m x 2.13 m (4.0 ft x 7.0 ft)
Waveguide Air Vents		2	Waveguide Air Vents Located in Chamber Ceiling – Vent Dimensions: 30.5 cm x 30.5 cm (1.0 ft x 1.0 ft)
Power Line Filter	LRW-2030	2	Dual Line UL Listed 2 x 30A 50/60 Hz Power Line Filters ² – One Power Line Filter for Lighting – One Power Line Filter for Convenience Outlets/EUT Power
Power Line Filter	LMF-4355	1	2 x 800A 1200 VDC Custom Power Line Filter for the Inverter Emulator and Battery Emulation ³ – Threaded Brass Ground Stud: 1.3 cm x 12.7 cm (.5 in (M12) x 5.0 in)
Lighting		4	Corner Light Fixtures with 2 x 100 W Halogen Floodlights ⁴
Connector Panels and Penetrations		1	Motor Shaft Feedthrough with Steel Shaft Extending 1 m Beyond the Inner Absorber Surface – Includes Bearing Supports and Housings for Shaft Stability and Safety for Speeds of up to 12,000 RPM ⁵
		1 Lot	RF Feedthroughs for the Flow of Coolant Between the MUT and the Heat Exchanger Unit Mounted External to the Chamber
		2	Connector Panels: 15.3 cm x 61.0 cm (.5 ft x 2.0 ft), includes – N-type Connector – WGF-6 Waveguide Feedthrough Accepting up to Six (6) Customer-supplied Pre-terminated Fiber Optic Cables
		1	Pipe Penetration with Cap, Located in a Non-critical Area: 3.8 cm (1.5 in)
Test Bench and Grounding	Copper Test Bench	1	Copper Test Bench: 4.27 m x 1.22 m x 0.91 m (14.0 ft x 4.0 ft x 2.92 ft) Ground studs are provided along the test bench wall, spaced every 30.5 cm (1.0 ft) on center. Solid grounding straps measuring 22.86 cm wide x .99 mm thick (9.0 in x 0.039 in) are provided for connecting the test bench to the grounding studs.
Floor and Ground Plane		1 Lot	Raised Ground Plane with Three Access Hatches – Ground Plane: 16.5 cm (6.5 in) – Access Hatches: 30.5 cm x 30.5 cm (12.0 in x 12.0 in) Dielectric Floor Underlay with Polyethylene Vapor Barrier – Dielectric Floor Underlay: 0.32 cm (0.13 in) – Polyethylene Vapor Barrier: 6 mil Vinyl Floor Tile: 0.32 cm (.13 in)

¹A chamber access ramp is currently excluded from baseline configuration.

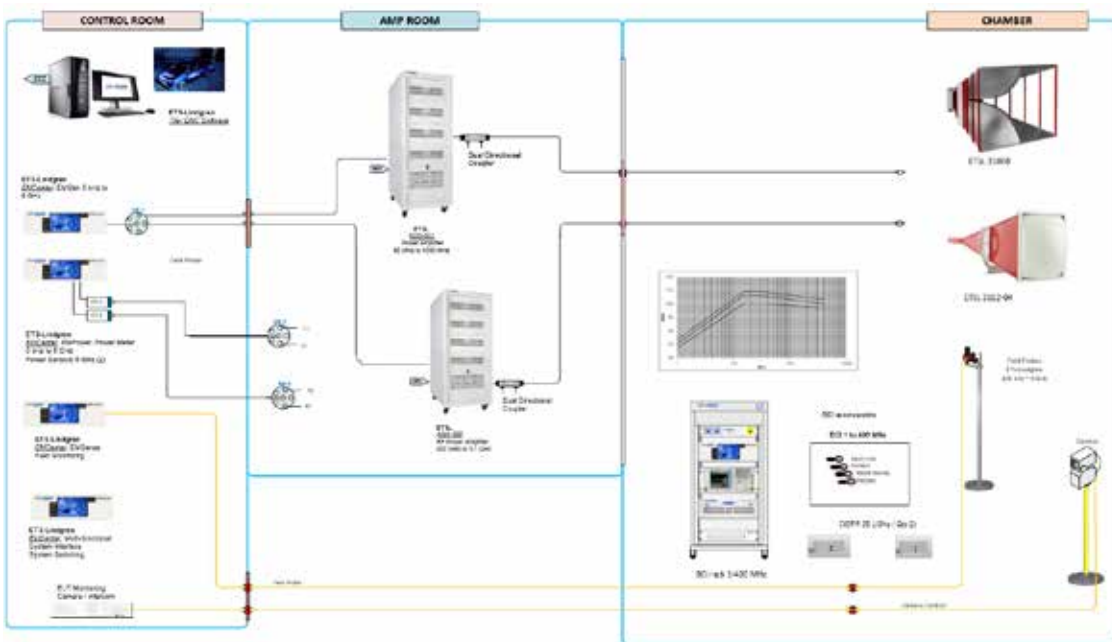
²Electrical distribution is currently excluded from baseline configuration. If additional (or 50 Hz) EUT power is necessary, more filters are required.

³This is a non-UL listed power line filter, however, it is built to the same exacting quality control standards as ETS-Lindgren's UL-listed filters. The insertion loss performance of this filter will be a best effort.

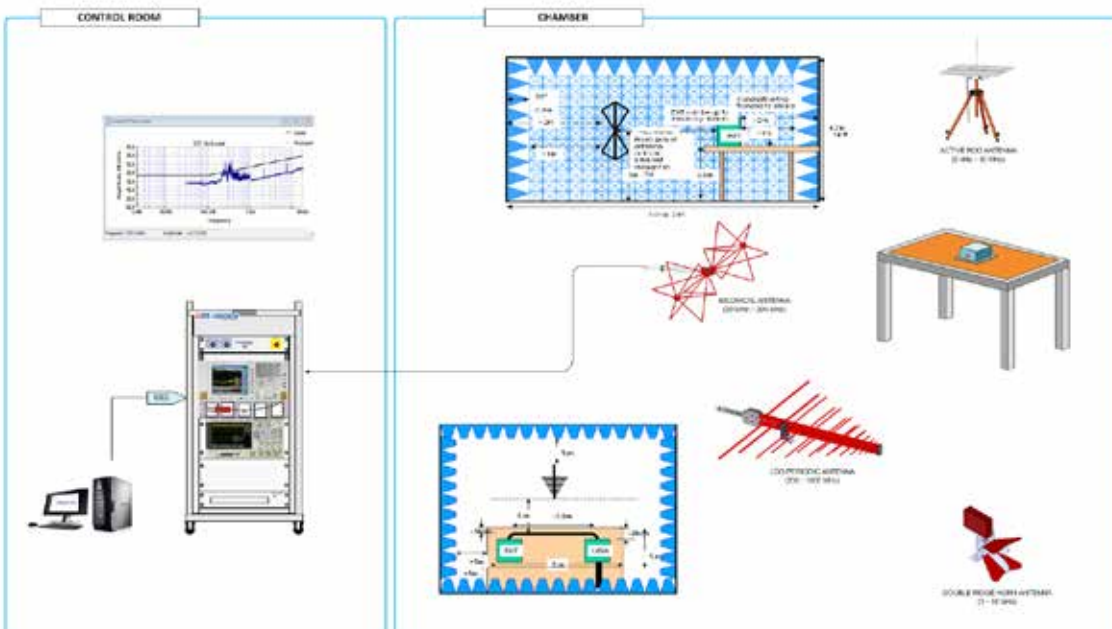
⁴Electrical distribution is excluded from baseline configuration.

⁵Details are defined during the preliminary design phase, after receipt of order.

TYPICAL RADIATED IMMUNITY TEST SETUP



TYPICAL RADIATED EMISSIONS TEST SETUP



Sales and Support Offices

UNITED STATES – TEXAS

Cedar Park, TX

+1.512.531.6400 Phone

+1.512.531.6500 Fax

info@ets-lindgren.com

UNITED STATES – ILLINOIS

Wood Dale, IL

+1.630.307.7200 Phone

+1.630.307.7571 Fax

info@ets-lindgren.com

UNITED STATES – WISCONSIN

Minocqua, WI

+1.715.356.2022 Phone

+1.715.356.2023 Fax

info@ets-lindgren.com

FINLAND

Eura

+358.2.8383.300 Phone

+358.2.8651.233 Fax

euinfo@ets-lindgren.com

UNITED ARAB EMIRATES

Dubai

+971.55.610.4055 Phone

uae@ets-lindgren.com

CHINA

Beijing

+86(10)8273.0877 Phone

+86(10)8273.0880 Fax

china@ets-lindgren.com

JAPAN

Tokyo

+81.3.3813.7100 Phone

+81.3.3813.8068 Fax

japan@ets-lindgren.com

INDIA

Bangalore

+91.80.4341.8600 Phone

+91.80.4341.8611 Fax

indiainfo@ets-lindgren.com

SINGAPORE

Singapore

+65.6391.0912 Phone

+65.6298.9509 Fax

singapore@ets-lindgren.com

TAIWAN

Taipei

+886.2.27023389 Phone

+886.2.27023055 Fax

taiwan@ets-lindgren.com

BEYOND MEASURE.



An ESCO Technologies Company

ets-lindgren.com