

Model 4610

Royce Field Site Source

Operational Manual



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A–D	Initial Release, Updates / Edits	1988–1997
E	Updates / Edits	April, 1999

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Notes, Cautions, and Warnings


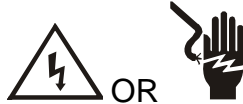


	<p>Note: Denotes helpful information intended to provide tips for better use of the product.</p>
<p>CAUTION</p>	<p>Caution: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.</p>
<p>WARNING</p>	<p>Warning: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.</p>


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Safety and Regulatory Information


Safety Symbol Definitions



This product and related documentation must be reviewed for familiarization with safety markings and instructions prior to operation.

Safety Symbol	Definition
	<p>Refer to Manual: When product is marked with this symbol, see the instruction manual for additional information. If the instruction manual has been misplaced, download from www.ets-lindgren.com, or contact ETS-Lindgren Customer Service.</p>
	<p>High Voltage: Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.</p>
	<p>Protective Earth Ground (Safety Ground): Indicates protective earth terminal. You should provide uninterruptible safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.</p>
	<p>Caution: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.</p>

Safety Symbol	Definition
	<p>Warning: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.</p>


General Safety Considerations

Safety Symbol	Definition
	<p>BEFORE POWER IS APPLIED TO THIS INSTRUMENT, GROUND IT PROPERLY through the protective conductor of the AC power cable to a power source provided with protective earth contact. Any interruption of the protective (grounding) conductor, inside or outside the instrument, or disconnection of the protective earth terminal could result in personal injury.</p>

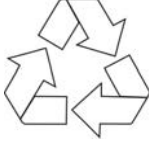
Safety Symbol	Definition
	<p>CONTACT ETS-LINDGREN PRIOR TO SERVICING. Servicing (or modifying) the unit by yourself may void your warranty. If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the instrument that could, if contacted, cause personal injury. Only trained service personnel should perform adjustments and/or service procedures upon this instrument. Capacitors inside this instrument may still be CHARGED even when instrument is disconnected from its power source.</p>
	<p>ONLY QUALIFIED PERSONNEL should operate or service this equipment.</p>

Waste Electrical and Electronic Equipment (WEEE)

Directive

	<p>(European Union) At end of useful life, this product should be deposited at an appropriate waste disposal facility for recycling and disposal. Do not dispose of with household waste.</p>
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Recyclable Products

	<p>This product includes rechargeable batteries. At end of useful life, please recycle the used batteries, or dispose of them safely and properly. Many cities collect used batteries for recycling or disposal. You may contact your local waste disposal agency for information on battery recycling and disposal.</p>
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1.0 Introduction

The **ETS-Lindgren Model 4610 Royce Field Site Source** is a self-contained battery-operated unit to be used as a radiated emission reference. When in operation, the unit radiates a comb of signals between 10 MHz and 600 MHz spaced in 10 MHz increments.

The Model 4610 initial design was performed by William G. Royce.

See *Specifications* on page 17 for electrical and mechanical specifications.

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2.0 Receiving Your Order

Unpacking and Acceptance

1. Upon delivery of your order, inspect the shipping container(s) for evidence of damage. Record any damage on the delivery receipt before signing it. In case of concealed damage or loss, retain the packing materials for inspection by the carrier.
2. Remove the product from its shipping container(s). Save the container(s) and any protective packing materials for future use.
3. Check all materials against the packing list to verify that the equipment you received matches what was ordered. If you find any discrepancies, note them and call ETS-Lindgren Customer Service for further instructions.

Make sure you are satisfied with the contents and condition of your order prior to placing the product into service.

Service Procedures

To return a system or system component for service:

1. Contact ETS-Lindgren Customer Service to obtain a Service Request Order (SRO).
2. Briefly describe the problem in writing. Give details regarding the observed symptom(s) or error codes, and whether the problem is constant or intermittent in nature. Please include the date(s), the service representative you spoke with, and the nature of the conversation. Include the serial number of the item being returned.

3. Package the system or component carefully. If possible, use the original packing materials or carrying case to return a system or system component to ETS-Lindgren at the following address:

ETS-Lindgren

Attn: Service Department

1301 Arrow Point Drive

Cedar Park, TX, USA 78613

Phone: +1.512.531.6400

Customer Service: +1.512.531.6498

www.ets-lindgren.com

3.0 Maintenance

CAUTION

Before performing any maintenance, see *Safety and Regulatory Information* on page vii.



Maintenance of the Model 4610 is limited to external components such as cables or connectors.

To prevent electrical shock, do not remove cover.

Warranty may be void if the housing is opened.

If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.

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4.0 Specifications

Electrical Specifications

Frequency Range:	10 MHz–600 MHz
Total Output Power Level:	1 uWatt (-30 dBm)
Frequency Spacing:	10 MHz increments
Field Strength Level:	See <i>Radiated Emissions from Open Area Test (OAT) Site</i> on page 25 for typical data.
Power Level:	Total output power of Watts.
Operating Temperature:	+10°C – +55°C
Frequency Stability:	Less than 400 Hz per hour noncumulative.
Amplitude Stability:	Less than ±1.0 dB at each frequency during the normal charge life of the battery.
Verification Data:	The unit is supplied with actual data which shows the comb of signals between 10 MHz and 600 MHz. This data can be verified at any time by removing the transmitting rod and connecting the output of the unit to a spectrum analyzer.
Batteries:	The unit is supplied with two 6-volt sealed lead-acid batteries. The batteries will operate for approximately 20 hours between charges.
Battery Low Indicator:	The battery low indicator light illuminates when the battery requires recharging.

Battery Charger:	4610/1–110 VAC/60 Hz 4610/2–220 VAC/50 Hz The charger port is located on the front of the unit.
Power On Indicator:	When the power switch is pushed, the power on indicator light will illuminate, indicating that power has been applied to the unit.
Fuses:	The unit has two 1/2 Amp Bus Fuses, regular blow.

Mechanical Specifications

Size:	7.4 in x 4.6 in x 3.5 in 18.8 cm x 11.8 cm x 8.9 cm
Weight:	Approximately 3.5 lb (1.59 kg)
Tripod Mounting:	A 1/4–20 hole is provided on the base for tripod mounting. The unit also has four pads for placing the unit on top of a flat surface.
Antenna Element Length:	7 in (180 mm)

5.0 Application

CAUTION

Before placing into operation, see *Safety and Regulatory Information* on page vii.

The Model 4610 Royce Field Site Source is a portable self-contained comb generator. This device can be used as an aid for maintaining the integrity of a test site and the accuracy of test results. By comparing daily test site measurements with the original reference measurement, sources of unexplained variances due to the test site and test equipment can be more easily identified. Using the Model 4610 does not take the place of periodically performing site calibration per the FCC, VDE, or MIL-STD requirements. To establish a reference for an individual test site (indoor or outdoor), the Model 4610 is placed on the test site in the area normally occupied by the Equipment Under Test (EUT). Power is applied to the unit by depressing the power switch. The power switch will show a green color, indicating the power switch is in the **On** position. Also, the power on indicator light will be illuminated. The Model 4610 is now radiating a comb of signals between 10 MHz and 600 MHz, spaced at 10 MHz increments. Using an antenna and a spectrum analyzer or receiver, the frequency and amplitude of each signal point is recorded. This initial measurement becomes the reference point for all future site measurements. The accuracy of the Model 4610 can be verified by removing the transmitting rod and connecting the output connector to a spectrum analyzer.

The Model 4610 is not a licensed transmitter; therefore, the output power level is extremely low. A preamplifier is required on the output of the receiving antenna to amplify the output signals from the Model 4610. A 26-dB preamp is recommended for this purpose. *Radiated Emissions from Open Area Test (OAT) Site* on page 25 shows a typical spectrum analyzer output plot of the signal pattern from the Model 4610 using a 26-dB preamp. This is the type of signal pattern found on an Open Area Test (OAT) site.

See *References* on page 21.

Application Note: Voltage-Selectable Battery Charger

Part Number:	102615, Rev A
Date:	May 25, 1993

BATTERY CHARGER OPERATION

The ETS-Lindgren voltage-selectable battery charger is solely intended for charging the sealed lead-acid batteries found in ETS-Lindgren products. The battery charger is a means of providing the necessary charge voltage and current from either a 115 VAC 50/60 Hz or 230 VAC 50/60 Hz source.



It is necessary to select the proper input voltage prior to connecting the battery charger to the power mains. The voltage select switch is located adjacent to the power input receptacle.

To maintain safety requirements, use the CSA-certified power cord provided. If it is necessary to provide other means of attaching the battery charger to the power mains, it is required that a Type HD 21 (PVC cord) or Type HD 22 (rubber cord) with a nominal cross-section of 0.75 mm² be used.

The battery charger provides both fast and trickle charge operation. Switching from one charge mode to the other is provided automatically by the charger. The front panel indicator marked **FAST CHARGE** illuminates when the battery charger is in the fast charge mode. When the **POWER ON** light is illuminated and the **FAST CHARGE** light is extinguished, the battery charger is in the trickle charge mode.



Always remove mains power before opening the housing.

The battery charger is protected against overcurrent by a 200 mA 250 VAC time-delay fuse. If it becomes necessary to replace the fuse, use a fuse of the same type and rating to maintain safe operation. The fuse is accessible by removing the two Phillips head screws on the underside of the unit. The output of the battery charger is protected against overcurrent conditions by use of fold-back circuitry.

BATTERY CHARGER SPECIFICATIONS

Input Voltage:	115/230 VAC selectable
Input Frequency:	50/60 Hz
Input Power:	20 VA max.
Protection Class:	Class II double insulated
Input Fuse Rating:	200 mA time-delay Type 5x20 mm
Input Power Connection:	IEC-320 power inlet
Output Voltage:	12 VDC (13.5–15 VDC)
Output Current:	350 mA
Safety Approvals:	TUV, CSA

REFERENCES

1. Berger, Steve, "Stabilizing EMI Measurements", EMC Technology, Vol. 7, No. 5 July–August 1988, pp. 58–60.
2. Bennett, W.S., "Radiated EMI Measurement Reproducibility", Atlanta, GA, August 25–27, pp. 90–93.
3. Roleson, Scott, "Monitoring Measuring Repeatability At Radiated Emissions Testing Facilities", 1987 IEEE International EMC Symposium Record, Atlanta, GA, August 25–27, pp. 231–235.

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6.0 Installation and Operation

CAUTION

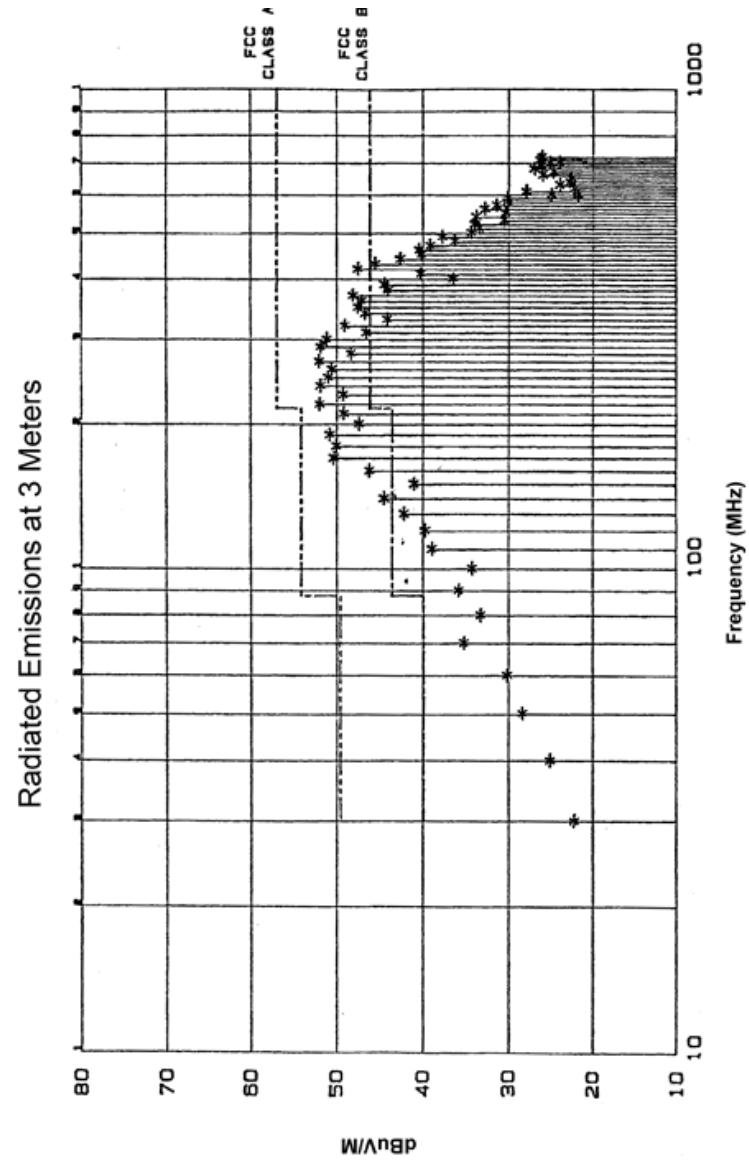
Before connecting any components, see *Safety and Regulatory Information* on page vii.

The Model 4610 Royce Field Site Source generates a 10 MHz fundamental frequency and harmonics at 10 MHz increments up to 600 MHz. A rod antenna is provided which should be connected to the Type N connector located on the top of the unit. This Type N output can also be connected to a spectrum analyzer to verify performance of the unit.

Power to the Model 4610 is provided by rechargeable sealed lead-acid batteries (two are provided at six volts DC each). In the detented position of the power switch, power is provided to the unit and a power on indicator should be illuminated. When battery voltage discharges to a predetermined minimum level, a low battery indicator will illuminate (should the batteries experience a deep discharge, neither light will be illuminated). At this point, the power switch should be placed in the **Off/Charge** position and batteries charged using the charger port located adjacent to the power switch. Charging can be made with either the 100 VAC/60 Hz charger or the optional 220 VAC/50 Hz charger.

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7.0 Radiated Emissions from Open Area Test (OAT) Site



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Appendix A: Warranty

SCOPE AND DURATION OF WARRANTIES

Seller warrants to Buyer that the Products to be delivered hereunder will be (1) free from defects in material, manufacturing workmanship, and title, and (2) conform to the Seller's applicable product descriptions and specifications, if any, contained in or attached to Seller's quotation. If no product descriptions or specifications are contained in or attached to the quotation, Seller's applicable product descriptions and specifications in effect on the date of shipment shall apply. The criteria for all testing shall be Seller's applicable product specifications utilizing factory-specified calibration and test procedures and instruments.

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to one year unless otherwise specified in the product manual and/or Seller's quotation.

Duration of Warranties for Model 4610

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to two years.

Product Warranted	Duration of Warranty Period
Model 4610 Royce Field Site Source	2 Years

Any product or part furnished to Buyer during the warranty period to correct a warranty failure shall be warranted to the extent of the un-expired term of the warranty applicable to the repaired or replaced product.

The warranty period shall commence on the date the product is delivered to Buyer; however, if Seller assembles the product, or provides technical direction of such assembly, the warranty period for such product shall commence on the date the assembly of the product is complete. Notwithstanding the foregoing, in the event that the assembly is delayed for a total of thirty (30) days or more from the date of delivery for any reason or reasons for which Seller is not responsible, the warranty period for such product may, at Seller's options, commence on the thirtieth (30th) day from the date such product is delivered to Buyer. Buyer shall promptly inspect all products upon delivery. No claims for shortages will be allowed unless shortages are reported to Seller in writing within ten (10) days after delivery. No other claims against Seller will be allowed unless asserted in writing within thirty (30) days after delivery (or assembly if the products are to be assembled by Seller) or, in the case of alleged breach of warranty, within the applicable warranty period.

WARRANTY EXCLUSIONS

Except as set forth in any applicable patent indemnity, the foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, express, implied, or statutory. EXCEPT AS EXPRESSLY STATED ABOVE, SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, BY STATUTE OR OTHERWISE, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE OR OTHERWISE ON THE PRODUCTS, OR ON ANY PARTS OR LABOR FURNISHED DURING THE SALE, DELIVERY OR SERVICING OF THE PRODUCTS. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

Warranty coverage does not include any defect or performance deficiency (including failure to conform to product descriptions or specifications) which results, in whole or in part, from (1) negligent storage or handling of the product by Buyer, its employees, agents, or contractors, (2) failure of Buyer to prepare the site or provide an operating environmental condition in compliance with any applicable instructions or recommendations of Seller, (3) absence of any product, component, or accessory recommended by Seller but omitted at Buyer's direction, (4) any design, specification, or instruction furnished by Buyer, its employees, agents or contractors, (5) any alteration of the product by persons other than Seller, (6) combining Seller's product with any product furnished by others, (7) combining incompatible products of Seller, (8) interference with the radio frequency fields due to conditions or causes outside the product as furnished by Seller, (9) improper or extraordinary use of the product, or failure to comply with any applicable instructions or recommendations of Seller including maintenance, calibration and cleaning procedures and intervals, or (10) acts of God, acts of civil or military authority, fires, floods, strikes or other labor disturbances, war, riot, or any other causes beyond the reasonable control of Seller.

This warranty does not include (1) batteries, (2) cables, (3) gasket, (4) fingerstock, or any item that is designed to be consumable. Seller does not warranty products of others which are not included in Seller's published price lists.

BUYER'S REMEDIES

If Seller determines that any product fails to meet any warranty during the applicable warranty period, Seller shall correct any such failure by either, at its option, repairing, adjusting, or replacing without charge to Buyer any defective or nonconforming product, or part or parts of the product. Seller shall have the option to furnish either new or exchange replacement parts or assemblies.

Warranty service shall be performed at the Seller's factory, or the Buyer's site at the sole discretion of the Seller. Within the warranty period, the Buyer shall be responsible for all transportation to the Seller's factory, and the Seller shall be responsible for transportation of goods to the Buyer's site.

Within the contiguous 48 United States, warranty service performed during the applicable warranty period will be performed without charge to Buyer during Seller's normal business hours. After the warranty period, service will be performed at Seller's prevailing service rates. Subject to the availability of personnel, after-hours service is available upon request at an additional charge.

Outside the contiguous 48 United States, travel and per diem expenses, when required, shall be the responsibility of the Buyer, or End User, whichever is applicable regardless of the warranty period.

The remedies set forth herein are conditioned upon Buyer promptly notifying Seller within the applicable warranty period of any defect or non-conformance and making the product available for correction.

Appendix B: EC Declaration of Conformity

EUROPEAN COMMUNITY DECLARATION OF CONFORMITY

The EC Declaration of Conformity is the method by which EMC Test Systems, L.P. declares that the equipment listed on this document complies with the Low-voltage and EMC Directives.

Factory: EMC Test Systems, L.P. P.O. Box 80589 Austin, Texas USA 78708-0589	Issued by: EMC Test Systems, L.P. P.O. Box 80589 Austin, Texas USA 78708-0589
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The products manufactured under the EMCO product name and listed below are eligible to bear the EC Mark:

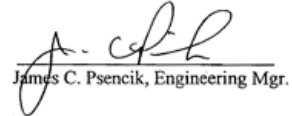
Model 4610 Field Site Source (Intentional radiator)
Part Number 102615 Battery Charger

Applicable Requirements:

Standard	Criteria
EN61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
EN60742/1989	Isolating transformers and safety isolating transformers
EN55022	Class B
IEC 801-2	Level 2 4/8kV
IEC 801-3	Level 2 3V/m
IEC 801-4	Level 2 .5 I/O, 1kV AC

Authorized Signatories


Bruce Butler, General Manager


James C. Psencik, Engineering Mgr.


Charles Garrison, Quality Assurance

Date of Declaration: December 10, 1996

The authorizing signature on the EC Declaration of Conformity document authorizes EMC Test Systems, L.P. to affix the CE mark to the indicated product. CE marks placed on these products will be distinct and visible. Other marks or inscriptions liable to be confused with the CE mark will not be affixed to these products. EMC Test Systems, L.P. has ensured that appropriate documentation shall remain available on premises for inspection and validation purposes for a period of no less than 10 years.