

## PORTABLE RADIATED EMISSIONS MEASUREMENT SYSTEM (PREMS II)



### PROJECT HIGHLIGHTS

- Innovative tool for finding interference sources (inverter based DER connection issues, arcing issues, etc.)
- Repeatable, rapid detection, measurement, and mapping of radiated emissions over large areas to enable quick resolution
- Identify emissions problem, source, and verify subsequent mitigation
- Easily deployable via common utility vehicles
- Classroom and field training

### Background, Objectives, and New Learnings

Finding the source of anomalous radiated emissions has always been a challenging task for electric utilities. Emissions can be generated from random occurrences on the grid system or created by interconnected devices. With increasing DER and inverter-based electromagnetic interference (EMI) contributions, this task is even more difficult today due to the increasing complexity of the power grid and other infrastructure that are in proximity to (or even share) grid rights-of-way such as internet, telephone, and radio communications. While handheld meters, AM radios, and ultrasonic equipment are useful for spot checking individual locations, they are inefficient for investigating indeterminate issues over wider regions.

Building on over 20 years of Research and Development, EPRI has built a second iteration of a Portable Radiated Emissions Measurement System (PREMS II). This design builds on the previous design, updated with modern equipment, and works from the BAMMP robotic measurement platform. PREMS II is a new measurement platform capable of efficient, accurate, and repeatable electric field measurements over broad geographical areas to quickly and efficiently pinpoint sources of radiated emissions. Operators interface with PREMS II using a web browser-based connection through smart phones, tablets, or laptop via an on-board Wi-Fi access point. PREMS II connects to a set group of sensors for measurement collection and an interconnected GPS for positional and data correlation. The system helps the user to “see” the invisible electric field and frequency spectrum through heat maps overlaid on satellite imagery. PREMS II enables the location of RFI/EMI from a broad to a narrow spectrum of frequencies, thereby allowing for quick correction in most cases.

PREMS II was developed through EPRI’s Power Quality research program and represents the transfer of research and technology to the public. Utilities can use PREMS II in the field to help them better analyze and/or find sources of radiated emissions. Sharing their use cases and learnings back to EPRI’s research program can also enable further knowledge generation and technology refinement.

Specifically, new learnings from this project may include:

- Refined methodologies for quickly locating interference sources.
- Broader identification of equipment conditions that produce interference issues.

- Identification of best practices involving locating interference geographically.
- Better understanding of DER and grid-related interface issues. Both the discovery and resolution steps taken by the user are expected to develop new knowledge that will be documented as use cases.

## Benefits

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This technology transfer can enable utilities to accelerate the measurement and detection of the sources of radiated emissions issues, thereby expediting mitigation and promoting compatibility between the electrical grid, end-use customers, and a myriad of related systems. The application of PREMS II can enable significantly improved efficiency of investigations. The PREMS II system can be deployed in the utilities via a service truck, a side-by-side (UTV), SUV, or even a hand cart (for measurements closer to buildings).

## Project Approach and Summary

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- Accept an order for a PREMS II system and sensor(s)
- Equipment ordered and assembled
- Install operating software with measurement sensor configuration
- Verify operation of the system and data collection of the sensor device
- Schedule a time for delivery of the completed system to customer
- After delivery, conduct a training class on the operation and features of the system
- Conduct one field survey with the customer using the system and help with any issues or questions about the process

## Deliverables

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Participants will receive their own PREMS II system with sensors, classroom training on the system, and a use-case field training session on the features and operation of the system.

## Price of Project

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The cost of participation in this project is \$90,000.

## Project Status and Schedule

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The estimated delivery time, after a system is ordered, is estimated to be no later than six months for delivery of a working system. Use and training on the unit is estimated to be up to two days on-site at the purchaser's location.

## EPRI Material/Other Documentation:

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An operator's manual will be provided with each unit. The manual will include detailed instructions on the operation of the system. Included with the manual will be any related documentation from the component vendors, as reference.

## Who Should Join

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Electric utilities who want to develop more robust capabilities to identify radiated sources of emission so that they can quickly resolve and mitigate issues.

## Contact Information

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For more information, contact the EPRI Customer Assistance Center at 800.313.3774 ([askepri@epri.com](mailto:askepri@epri.com)).

### Technical Contact

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