

## SOFTWARE EMQUEST EMQ-100



### EMQUEST EMQ-100

- **Expandable Test Package**
- **Testing Capabilities**
  - Wireless Performance Testing
  - OTA Evaluation
  - TRP/TIS Testing
- **Site Validation and Calibration**
- **Parameter Entry and Data Acquisition**

**ETS-Lindgren's EMQuest™ EMQ-100** is a cutting-edge software platform designed to revolutionize antenna pattern measurement and wireless device performance testing. With its intuitive interface and robust functionality, the EMQ-100 provides a comprehensive solution for capturing, analyzing, and visualizing complex electromagnetic data. Whether you're testing for compliance, optimizing designs, or developing next-generation wireless technologies, the EMQ-100 empowers engineers and researchers to achieve accurate and repeatable results with ease.

Built with versatility in mind, the EMQuest™ EMQ-100 supports various test configurations, including far-field, near-field, and spherical scanning systems. Its advanced algorithms and real-time data processing ensure precise measurements, making it an invaluable tool for industries ranging from telecommunications and automotive to aerospace and defense.

Unlock new possibilities in RF and antenna testing with the EMQuest™ EMQ-100—delivering performance, precision, and unparalleled reliability in one powerful package.

### **Product Features** **EMQuest Support Portal**

The EMQuest Portal has additional resources and access to the software support team for those in maintenance.

### **Expandable Test Package**

The baseline test suite includes fully automated 2D (polar) and 3D (spherical) pattern measurement capabilities as well as various frequency response measurements for both passive antennas and active wireless devices in either transmit or receive mode. Vector versions of the tests allow detailed evaluation of antenna parameters, including left/right-hand circular polarization, elliptical polarization, and antenna correlation, all from the same vector pattern data. Scalar and vector response tests can be used to perform cable and range loss (path loss) measurements that can then be automatically applied as corrections to any subsequent measurement.

General post-processing capabilities include calculation of antenna properties such as half power beam-width, directivity, gain, radiation efficiency, total radiated power, and total isotropic sensitivity, as well as various partial surface performance metrics required by the various OTA test requirements.

Optional add-on modules expand the core functionality, including measurement capabilities for wireless throughput measurements, pre-compliant radiated spurious emissions (RSE), Assisted GPS (A-GPS), and MIMO OTA testing. A Lite version of the software is also available for entry-level pattern measurement of passive devices.

### **OTA Evaluation**

Using appropriate wireless communication testers and power measurement devices from the list of optional test equipment drivers, OTA performance can be evaluated for a broad range of wireless technologies, including:

- 5G NSA/SA
- LTE
- GSM, GPRS EGPRS (EDGE)
- WCDMA, HSDPA HSUPA, HSPA+
- CDMA, 1xEV-DO
- TDMA
- TD-SCDMA
- Wi-Fi
- Bluetooth
- BLE

### TRP/TIS Testing

For Total Radiated Power (TRP) Testing, the device is configured to transmit full power while the effective isotropic radiated power (EIRP) is measured at each point on the surface of a sphere around the device, generating a radiated power pattern.

The suite of tests includes spherical pattern measurements for determining transmit and receive total power metrics, including:

- TRP
- TIS/TRS

For Total Isotropic/Radiated Sensitivity (TIS/TRS) Testing, the digital error rate is evaluated as a function of downlink signal level at each point around the device to determine effective isotropic sensitivity (EIS) and produce a sensitivity pattern.

The resulting EIRP/EIS patterns are then integrated to determine TRP/TIS as well as partial surface metrics such as:

- NHPRP/NHPIS/ NHTRP/NHTIS
- Upper/Lower Hemisphere Partial Power/Sensitivity
- Many additional calculations

A number of optimizations and industry firsts are provided to accelerate testing, including theta-dependent phi optimization, where the angular resolution is reduced near the "poles" of the pattern to reduce the required test time and maintain a more even surface resolution, and received signal strength (RSS) based sensitivity measurements that use RSSI reports from the mobile device to capture receive pattern information and greatly improve TIS test times. When used in conjunction with appropriate test systems, special test modes including high speed triggered acquisition and spiral data acquisition allow for extremely fast compliant and pre-compliant testing of TRP and transmit antenna patterns.

Specialized tests for measuring intermediate channel sensitivity, interference, or degradation are included to determine the potential self-interference on all wireless channels where total surface testing would be impractical and time consuming. In addition, wireless desensitization testing is provided to evaluate the impact of one interfering embedded radio on the performance of another. Using appropriate optional test equipment, this test meets the requirements of the CTIA/Wi-Fi Alliance Converged Devices Test Plan.

### Site Validation and Calibration

EMQuest provides a complete system software solution including test capabilities for calibration and validation of the test system. Compliant test methods are provided for performing the CTIA ripple test. Range calibration can be performed using basic site path loss measurements or more advanced efficiency (pattern) and ripple-based calibrations. Specialized calibration and validation methods are supported for MIMO OTA testing and other specialized tests.

### Application Interface

The EMQ-100 package is based on our EMQuest Data Acquisition and Analysis Software. The EMQuest core provides all of the functionality required for parameter entry, data acquisition, data analysis and report generation. This Windows™ based platform provides a powerful, easy to navigate environment. A modular data acquisition system makes this system continually expandable. Test and equipment modules provide the required data acquisition capability. New modules can be added to enhance the data acquisition functionality as needed.

### Parameter Entry and Data Acquisition

A convenient tree-view structure organizes input parameters in an easily navigated hierarchy, allowing modification of any parameter with only a few mouse clicks. Parameters, graphs, and tables are displayed on separate tabs to allow a maximized viewing area while still providing quick access to any piece of information. Running a test is as simple as loading a pre-saved parameter file and pressing the "Run" button. All acquired data is automatically stored in a raw format data file, insuring that preprocessed data can always be recovered. Data can be located quickly by model, serial number, test date, etc. Output to JSON files is included at no cost.

### Graphing and Report Generation

Advanced graphing capabilities allow acquired data to be displayed in both 2D and 3D formats. Built-in 3D visualization icons provide a reference for the orientation of the DUT relative to the pattern information. Tabular data can be exported to Microsoft Excel™ spreadsheets and reports can be saved in RTF format for import to Microsoft Word™ or export to PDF files. The report generator uses a powerful document style template scheme to allow automatic generation of output without the limitations of "banding" type report generators. A template editor links to existing data sets for editing in a "What You See Is What You Get" (WYSIWYG) environment. Multiple data sets, test parameters, and templates can be manipulated in memory at once with the Multiple Document Interface (MDI).

### Test Packages

The EMQ-100 Software provides test functionality for single and dual axis (2D and 3D) antenna pattern measurements and the associated post-processing, for vector, scalar (relative or absolute power), and receiver sensitivity measurements. It also contains a response calibration package for capturing frequency response and VSWR curves from supported test equipment. Optional expansion packages are available to increase the testing capability, adding features like wireless throughput testing, A-GPS testing, MIMO performance testing, and pre-compliant RSE testing.

### Equipment Drivers

Equipment drivers are included to control all ETS-Lindgren positioning equipment using the EMCenter™ Modular RF Platform with optional EMControl™ and EMSwitch™ modules. The base configuration include a choice of three optional equipment drivers from the standard list of available drivers, with additional drivers available at a nominal fee. Standard drivers are available for most frequently used vector or scalar network analyzers, spectrum analyzers, power meters, and communication analyzers for single and/or dual channel data acquisitions. Hybrid drivers allow combining two or more dissimilar devices to function as another more complex device. For example, two power meters, or a power meter and a spectrum analyzer could be used in place of a dual channel receiver.

### Recommended System Requirements

- Microsoft Windows 11
- Intel Core i7 or greater processor
- 8 GB RAM or more
- 320 GB Free HDD or more
- 2 free Ethernet ports
- 2 free USB ports
- National Instruments GPIB Card or USB
- 20-in or Greater Monitor
- Speakers, Keyboard, Mouse