

# R&S® ELEMI-E ESSENTIAL EMI TEST SOFTWARE

AN OPTION OF  
R&S® ELEKTRA

Easy-to-use software for measuring  
electromagnetic disturbance



Product Brochure  
Version 02.00

**ROHDE & SCHWARZ**  
Make ideas real



# AT A GLANCE

R&S®ELEMI-E essential EMI test software simplifies electrical product and component testing for EMI characteristics as early as the development phase. R&S®ELEMI-E supports the definition, performance, evaluation and archiving of EMI measurements in line with current standards.

Measurement configurations appropriate for the equipment under test (EUT) can be manually compiled or selected from the large library included with the software. R&S®ELEMI-E will automatically perform measurements in line with the configuration, including an evaluation of the measurement results based on the selected limit lines.

The EMI test software can directly generate reports in PDF or DOCX formats. Users can adjust the layout and level of detail in the reports. The results are quickly and conveniently archived using the integrated database.

Measurements can be made with all current Rohde&Schwarz EMI receivers and with many Rohde&Schwarz spectrum analyzers – from handheld to high end. The software supports both radiated and conducted measurements.

These features and the implemented tried-and-tested measurement procedures enable users to quickly generate correct and reproducible results. The clear and structured presentation of the measurement results make them easy to compare with test house results.

R&S®ELEMI-E is part of the R&S®ELEKTRA EMC test software and is essential for EMI applications. Rohde&Schwarz has more R&S®ELEKTRA options available for complex EMI and EMS measurements, which also include automation of EMI measurement accessories, such as antenna masts and turntables. R&S®ELEKTRA is the ideal test software for everything from development to acceptance. R&S®ELEMI-E can easily be extended by adding keycode based R&S®ELEKTRA options. Detailed information about further R&S®ELEKTRA options can be found in the R&S®ELEKTRA EMC test software brochure (PD 5216.3695.12).



# KEY FACTS

## FOR ALL TYPICAL MEASUREMENT TASKS

- ▶ Radiated emissions with antenna, field probe and GTEM waveguide
- ▶ Conducted voltage measurement with LISN or passive voltage probe
- ▶ Conducted current measurement with current probe
- ▶ Conducted power measurements with absorbing clamp

## WITH HELPFUL AUTOMATION FUNCTIONS

- ▶ Automated measurement sequence: spectrum overview, data reduction and final test
- ▶ Correction of measurement results according to selected transducer factors
- ▶ Automated switching of LISN lines via receiver control
- ▶ Automated calculation of field strength for three-axes GTEM measurements
- ▶ Customized actions or notification before/during/after test

## SIMPLE CONFIGURATION AND CONVENIENT OPERATION

- ▶ Test template and limit line library according to CISPR, EN, FCC, MIL-STD and RTCA
- ▶ Pre-defined transducer factors
- ▶ Dashboard for fast access to frequently used elements such as tests, test templates or instrument definitions

## AND POWERFUL DATA MANAGEMENT FUNCTIONS

- ▶ Management of all data via an integrated data base (test results, test templates, device configurations and tables)
- ▶ Import and export function
- ▶ Data backup and restore
- ▶ Migration wizard for R&S®ES-SCAN data file

# SIMPLE AND STRAIGHTFORWARD MEASUREMENT DEFINITION

Measurements with R&S®ELEMI-E use the definitions from a selected test template.

## Test templates

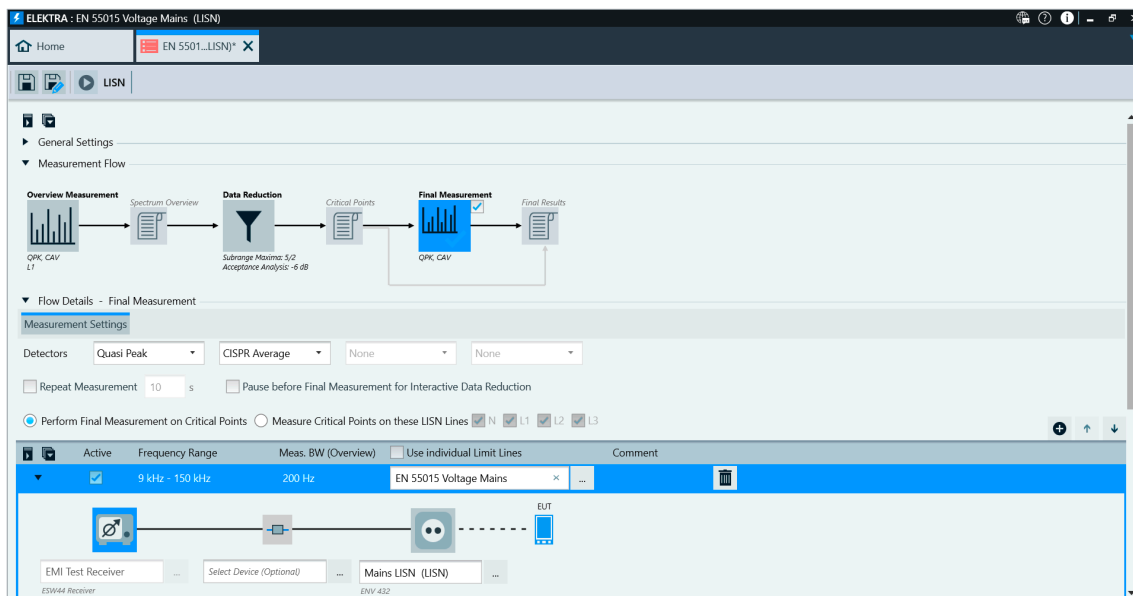
Users can compile their own test templates or select one from the software's library. The software includes several test templates for key commercial, automotive and military standards greatly reducing configuration work. The test template defines the frequency range, detectors and parameters for data reduction ("Which frequencies need to be remeasured?"). The test templates also reference the devices used, the relevant transducer tables and limit lines. The devices may include Rohde&Schwarz EMI receivers and Rohde&Schwarz spectrum analyzers along with antennas and line impedance stabilization networks (LISN).

## Transducer tables and limit lines

R&S®ELEMI-E includes transducer tables for standard Rohde&Schwarz EMI equipment, such as antennas, LISNs and other test sensors. Device specific transducer sets typically provided with a device can easily be integrated and used alternatively. R&S®ELEMI-E offers an expansive library of limit lines, which are defined in current EMI standards. Users no longer need to compile these themselves. If necessary, the compilation of limit lines, transducer tables and other tables can still be done directly in the EMI test software.

## Standards for which R&S®ELEMI-E provides test templates and limit lines

| Standard    | Application          |
|-------------|----------------------|
| EN55011     | ISM equipment        |
| EN55012     | Vehicle and boats    |
| EN55014-1   | Household appliances |
| EN55015     | Lighting equipment   |
| EN55025     | Automotive equipment |
| EN55032     | Multimedia equipment |
| FCC Part 15 | RF devices           |
| RTCA DO-160 | Avionic equipment    |
| MIL-STD-461 | Military equipment   |



Test template for a conducted measurement with a LISN to measure a lamp (based on EN 55015 lighting equipment).

# MEASUREMENT AUTOMATION

Time savings and greater comfort with automated, multi-phase test sequences and automated LISN and GTEM usage.

## Time savings with automated three-phase test sequence

EMI measurements of commercial products are usually made with CISPR detectors, which require long settling times. To save time during measurements of larger frequency ranges, R&S®ELEMI-E breaks the measurements down into three phases: overview measurement, data reduction and final measurement.

In the overview measurement, the entire measured frequency range is evaluated by a detector with short settling times (usually a peak detector). Data reduction involves identifying critical frequencies and including these in the list of frequencies to be further evaluated during the final measurement. The automatic identification of critical frequencies can be extensively configured and identify peaks that approach or exceed limits. Users can adjust the list of measured frequencies and add frequencies. Final measurement involves evaluating all the listed frequencies using the detector specified in the standards. Users can also make manual measurements at defined frequencies and add the results to the final table. This procedure means detectors with longer settling times are only used for the selected frequencies, saving a lot of time. The multi-phase test procedure is helpful for instruments without time domain scan functions, reducing scan times even for detectors with longer settling times.

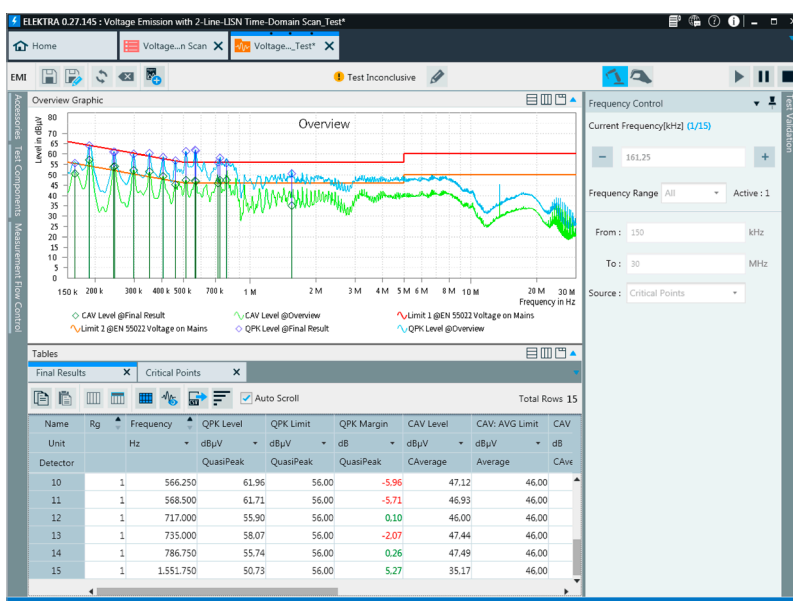
## Full GTEM support

Gigahertz transverse electromagnetic waveguides (GTEMs) enable fully shielded disturbance field strength measurements, while significantly reducing space requirements and investment costs relative to measurements in a chamber or an open air test site (OATS). In addition to pre-compliance applications, CISPR 14-1 states that GTEMs can also be used for standard conformant measurements of battery-powered electrical tools. R&S®ELEMI-E provides full GTEM support.

- ▶ Automatic field strength calculations based on measurements off all three EUT axes giving results as found in OATS environments enable direct comparisons with standardized limit lines.
- ▶ Integrated tools generate necessary factors for configuring automated field strength calculations and simplify configuration, even when the necessary factors are not available.

## Fully automated conducted measurements

When using remote-controlled LISNs, such as the R&S®ENV216, R&S®ENV432 or R&S®ENV4200, R&S®ELEMI-E automatically performs the sequential measurement of all defined lines and compiles the results in a single graphic.



Fully automatic final measurement with standard-compliant detector.

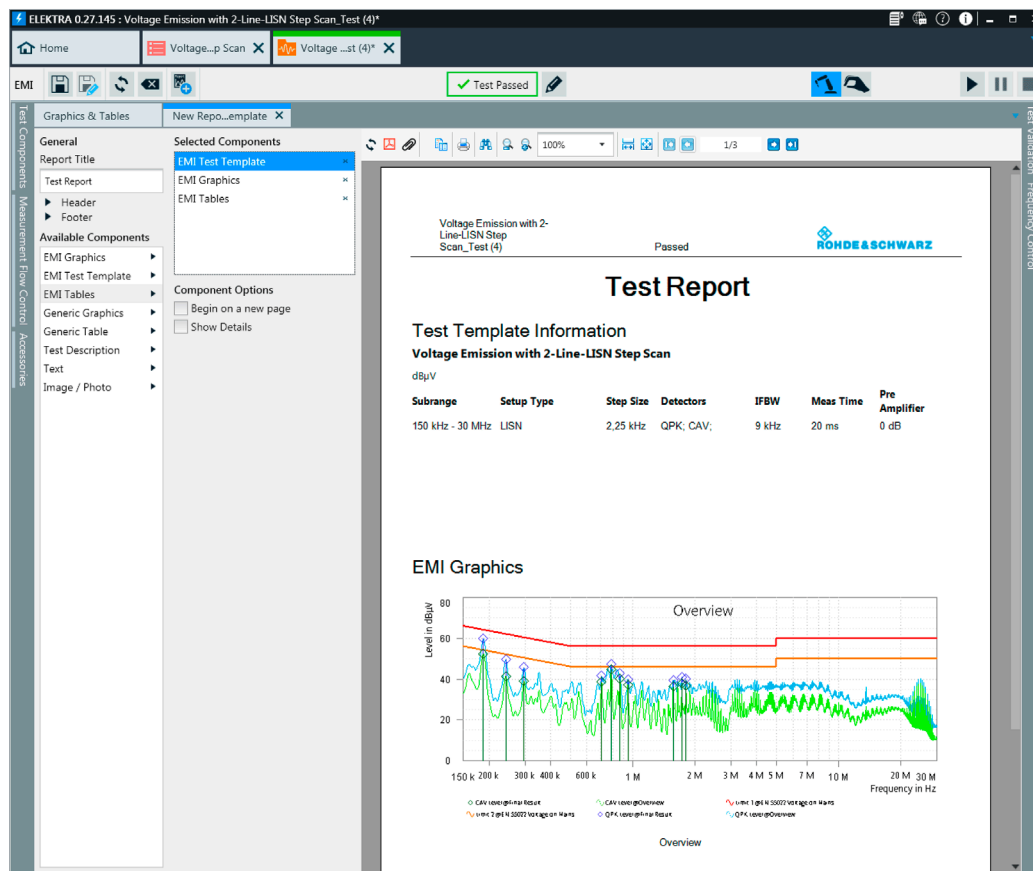
# DOCUMENTATION OF RESULTS

R&S®ELEMI-E offers detailed result documentation and user defined report layouts.

In addition to measurement results, the measurement documentation also includes instrument settings and test setup configurations. Users can add additional components such as texts or photos (e.g. of the test setup).

Users can also define layout and data elements for a report (pdf or docx format). Different report definitions can be stored as report templates for the flexible and quick generation of recipient or application specific reports.

Test report for a disturbance voltage measurement.

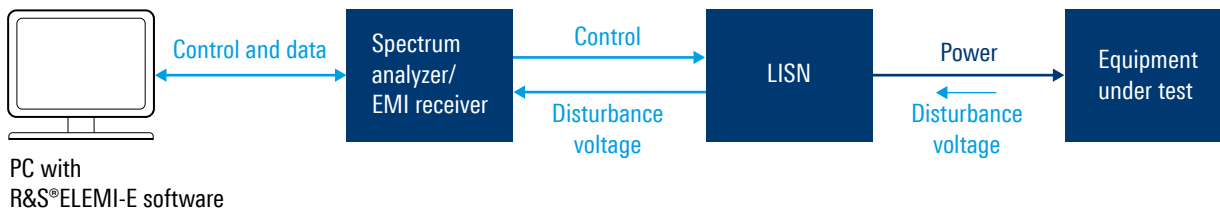




# TYPICAL USE CASES

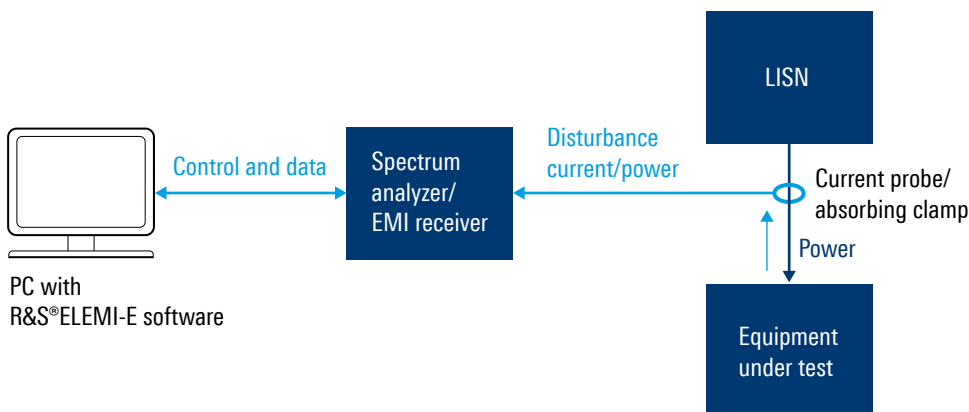
## CONDUCTED VOLTAGE MEASUREMENTS

A line impedance stabilization network (LISN) supplies the EUT (defined network impedance and isolation from the network) and decouples the disturbance voltage for measurement. R&S®ELEMI-E also supports other measurement setups, such as the those using voltage sensors or those measuring data transmission lines.



## CONDUCTED CURRENT/POWER MEASUREMENTS

A line impedance stabilization network (LISN) supplies the EUT (defined network impedance and isolation from the network). The disturbance current/disturbance power measurement uses a current probe/absorbing clamp, which can be positioned at various points on a cable. The unused measuring output of the LISN is terminated with 50 Ω. R&S®ELEMI-E also supports other measurement setups, such as those for data transmission cables.



## RADIATED MEASUREMENTS

In general, radiated emission measurements are performed "over the air". Typical transducers are EMI antennas, field probes or TEM waveguides. For TEM waveguides R&S®ELEMI-E converts the measurement results from the x, y and z axis to results equivalent to those obtained from an open area test site. For other transducers R&S®ELEMI-E applies the related correction values ("transducer factor").



# SPECIFICATIONS IN BRIEF

| Specifications in brief                 |                           |   |
|---|---------------------------|---|
| Supported devices                       | test receivers            | R&S®ESCI, R&S®ESL, R&S®ESPI, R&S®ESR, R&S®ESRP, R&S®ESU, R&S®ESW                                |
|   | spectrum analyzers        | R&S®FPC, R&S®FPL1000, R&S®FPH, R&S®FSL, R&S®FSV, R&S®FSV3000, R&S®FSVA3000, R&S®FSW             |
|   | LISNs                     | R&S®ENV216, R&S®ENV432, R&S®ENV4200, R&S®ESH2-Z5, R&S®ESH3-Z5, R&S®HM6050-2<br>GTEM waveguide   |
| Instrument link                         | VISA I/O library          | included in software package  |
|   | link types                | VXI-11 (not available for the R&S®ESPI with Windows NT),<br>GPIB (requires additional hardware) |
| Measurement result display              | diagram                   | trace of preview measurement with limit lines and final measurement results                     |
|   | result lists              | overview measurement,<br>critical frequencies,<br>final measurement results                     |
| Documentation of measurement results    | test report               | pdf, docx   |
|   | measurement results table | ASCII (csv)   |
| Minimum requirements for the controller | computer                  | PC with Intel® Core™ i5 processor or laptop/tablet with Intel® Core™ i7 processor               |
|   | RAM                       | 8 Gbyte   |
|   | mass storage              | 250 Gbyte hard disk,<br>solid-state disk (SSD) recommended                                      |
|   | USB                       | USB 2.0   |
|   | LAN                       | 100 Mbit LAN interface, Gbit LAN recommended  |
|   | resolution                | 1280 × 720 pixel  |
|   | operating system          | Windows 10, 64 bit  |

# ORDERING INFORMATION

| Designation                 | Type        | Order No.    |
|-----------------------------|-------------|--------------|
| Essential EMI test software | R&S®ELEMI-E | 5601.0030.02 |
| License dongle              | R&S®EMCPC   | 5601.0018.02 |

For further information, see R&S®ELEKTRA EMC Test Software (PD 5216.3695.12) product brochure.

Your local Rohde&Schwarz expert will help you find the best solution for your requirements.  
To find your nearest Rohde&Schwarz representative, visit [www.sales.rohde-schwarz.com](http://www.sales.rohde-schwarz.com)

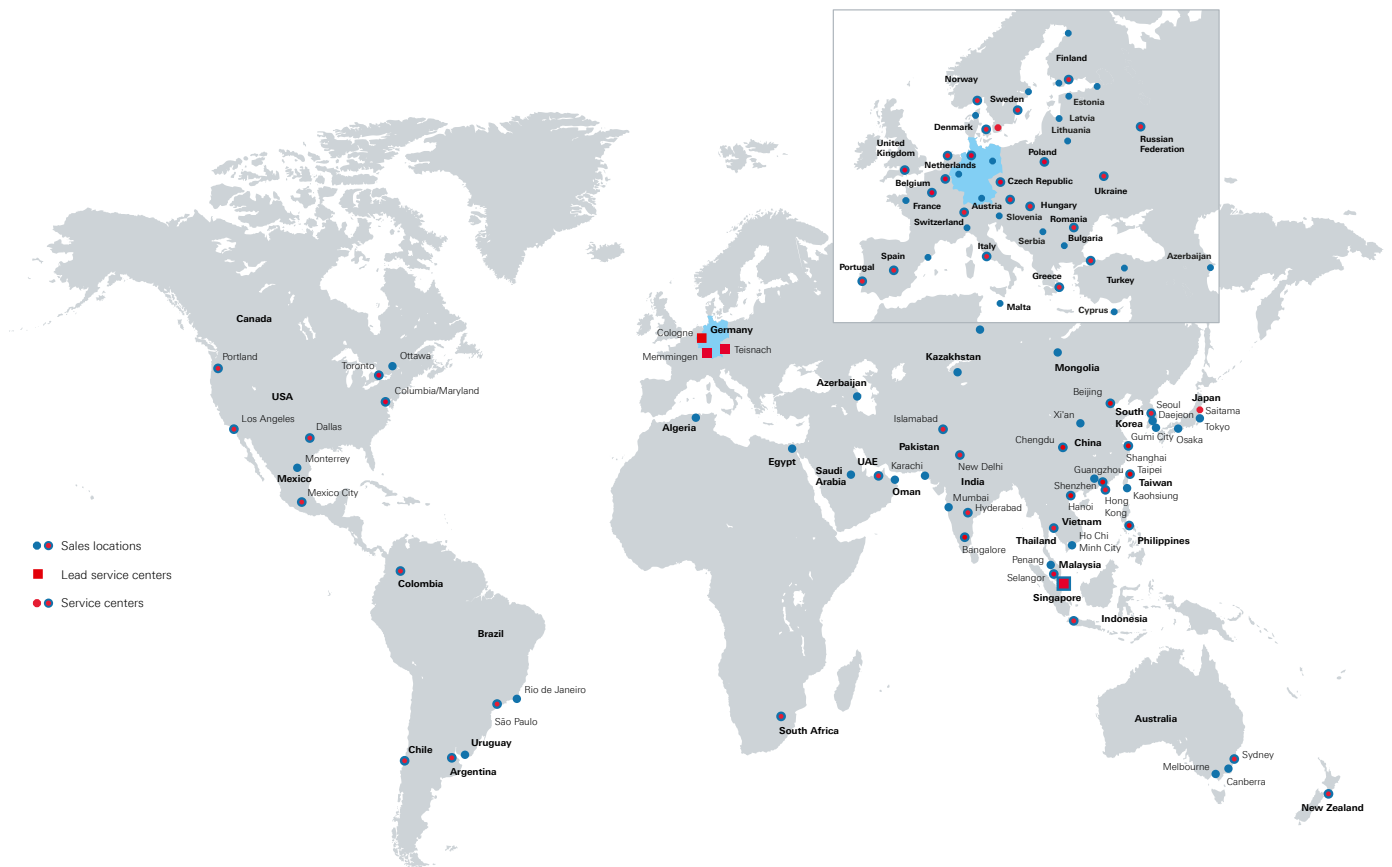


# FROM PRESALES TO SERVICE. AT YOUR DOORSTEP.

The Rohde & Schwarz network in over 70 countries ensures optimum on-site support by highly qualified experts.

User risks are reduced to a minimum at all project stages:

- ▶ Solution finding/purchase
- ▶ Technical startup/application development/integration
- ▶ Training
- ▶ Operation/calibration/repair



## Service that adds value

- ▶ Worldwide
- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

## Rohde & Schwarz

The Rohde&Schwarz technology group is among the trail-blazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems, and networks & cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

## Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

## Rohde & Schwarz training

[www.training.rohde-schwarz.com](http://www.training.rohde-schwarz.com)

## Rohde & Schwarz customer support

[www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support)

