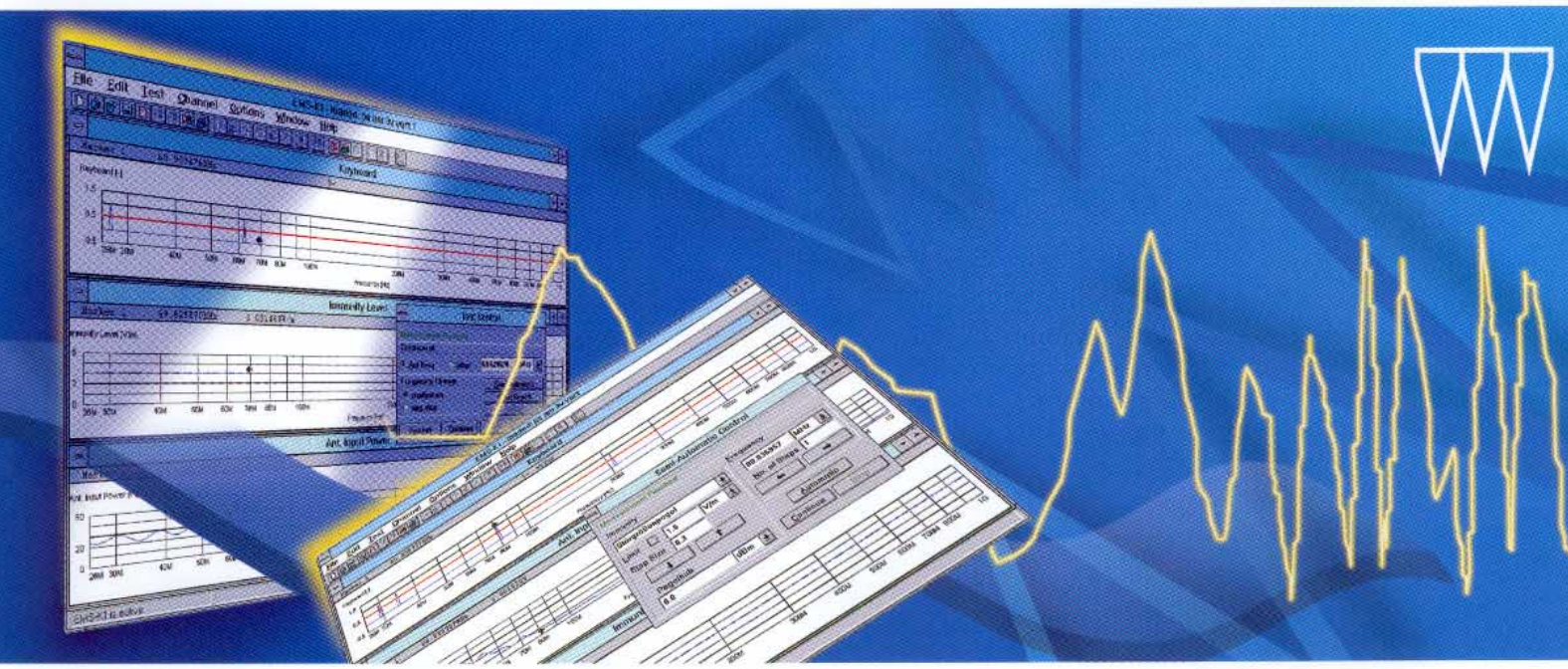

EMS Software EMS-K1

Automatic measurement of electromagnetic susceptibility

- Running under Windows™ 3.1 and 95
  - Interface to other Windows™ programs
- Open and modular system concept
  - easy to extend
  - great variety of drivers
  - generic drivers
- Fully automatic measurements
  - fast go/nogo test
  - comprehensive determination of EUT immunity threshold
- Interactive measurements
  - test at critical frequencies
- Monitoring of relevant system parameters
  - permanent system overview
- Integrated programming interface
  - for specific test procedures
- Comprehensive EUT monitoring
  - EUT stimulation
  - manual and automatic detection of nogo status
  - individual reaction on nogo
- Modular calibration concept
  - reduced time required for recalibration
- Flexible report generation
  - brief report
  - configurable comprehensive report
  - customized report (DDE link to text programs)
- Password protection
  - three user levels
  - administration of user groups
- Support of all large and small EMS test systems from Rohde & Schwarz
- Measurements in line with all common civil and military standards such as
  - IEC 1000-4-3, -6
  - ENV 50140, 50141
  - ISO 11451, 11452, 10600
  - VDE 0843
  - DIN 40839
  - VG 95373 Part 10, 13
  - RTCA/DO-160C
  - MIL 462D: CS 101, 114, 116; RS 101, 103

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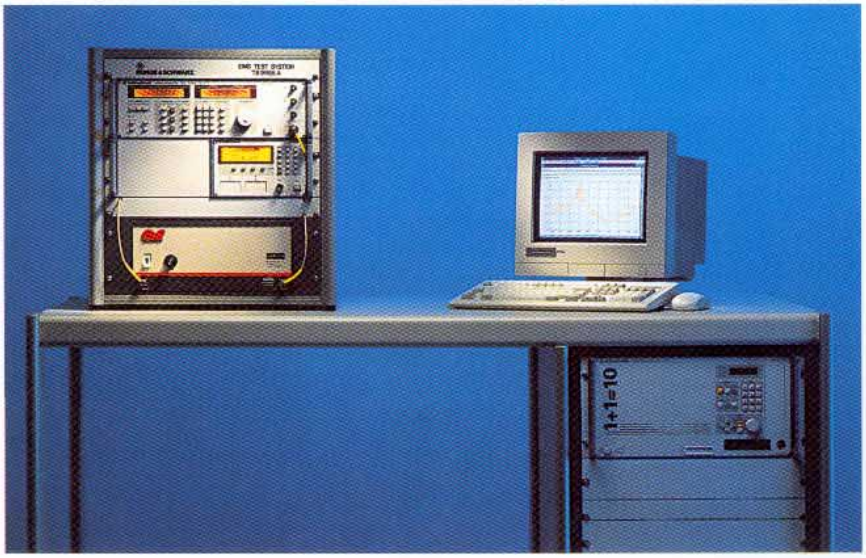


The software package EMS-K1 supports a wide range of system requirements from the EMS application package (see above) to large EMS systems (left).

Overview

The powerful Software Package EMS-K1 forms the basis for automatic control and monitoring of EMS test systems and for the acquisition and analysis of measurement data.

The software is extremely user-friendly and has been optimized both for development and acceptance tests. Integrated test sequences allow fully automatic test procedures as well as interactive re-measurements at critical frequencies to be carried out. The software is continually extended so that all EMC regulation and test procedure requirements can be met.

The basic functions of EMS-K1 are:

- automatic generation of stress signal (field strength, current, voltage)
- automatic monitoring of EUT response

Access to EMS-K1 is protected by the user name and a password (dialog 1). In addition to this general protection against unauthorized access, the users are organized in classes and groups with different rights of access. A distinction is made between the classes system manager, extended user and normal user. The organization into user groups provides additional protection of measurement data against unauthorized access by other user groups.

The complete software package can be run on a PC or PC-compatible industrial controller. The measurement devices are controlled via IEC/IEEE bus or RS-232 interface.

Defining a test

To reproduce a complete measurement, results and all the settings required for obtaining the results must be stored (dialog 2). Software EMS-K1 meets this requirement. All settings for a specific measurement are laid down in a test specification which comprises the following information:

- selection of test procedure (script)
- control of selected script by additional script parameters
- specification of stress signal
- selection of system parameters to be monitored (system monitoring)
- definition of EUT monitoring
- selected layout for result tables
- definition of report configuration

Test procedure

The actual measurement is performed on the basis of this test specification. Results are stored together with the respective specification in form of a test (dialog 2). A test includes all measurement results as well as the associated settings.

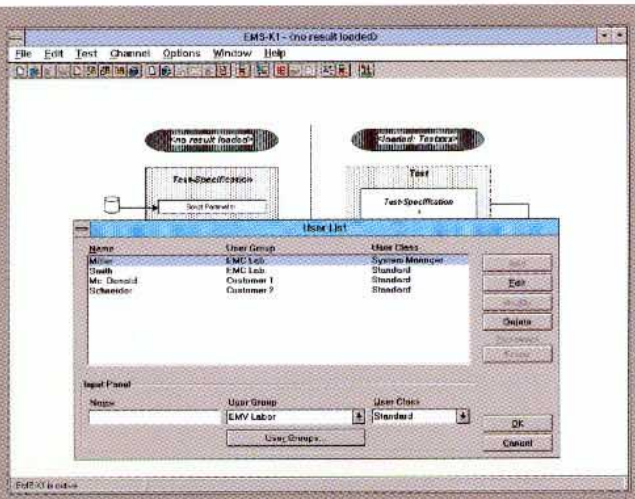
The measurement may be completely user-controlled. Two different control modes are available for this purpose:

- fully automatic operation
- semi-automatic (interactive) operation

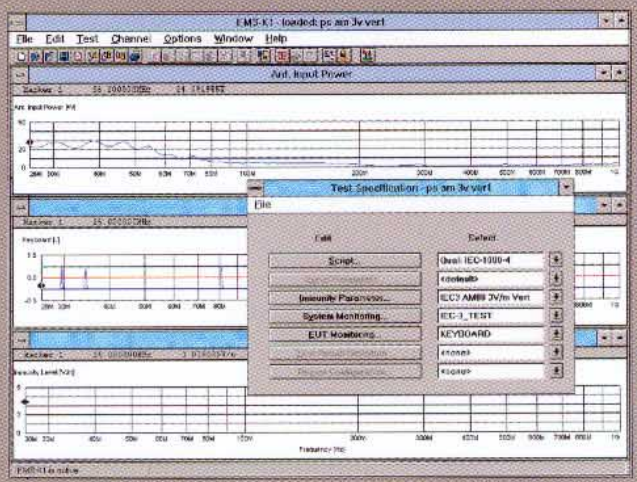
In fully automatic operation (dialog 3) measurements are carried out with the predefined settings in the test specification. This mode is mainly used for comprehensive overview measurements. Critical frequencies can then be further analyzed in the semi-automatic mode (dialog 4). In this mode signal amplitude and frequency can be varied so that the immunity characteristics of the EUT can be determined in greater detail.

To avert system controller capacity being used up by pre- and post-processing, virtual operation of EMS-K1 is also possible. In this case all test system charcteristics are simulated. Virtual results are obtained instead of physical measurement result. This allows, for instance, test specifications to be prepared and tested prior to the actual measurements which can be started any time on the controller. The same applies to the subsequent generation of reports.

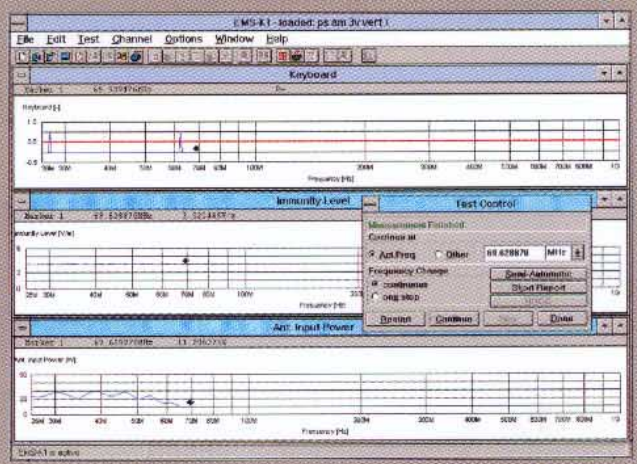
Dialog 1:
Software EMS-K1 allows administration of different kinds of users. Each user may be allocated to a user group and is given a specific right of access.



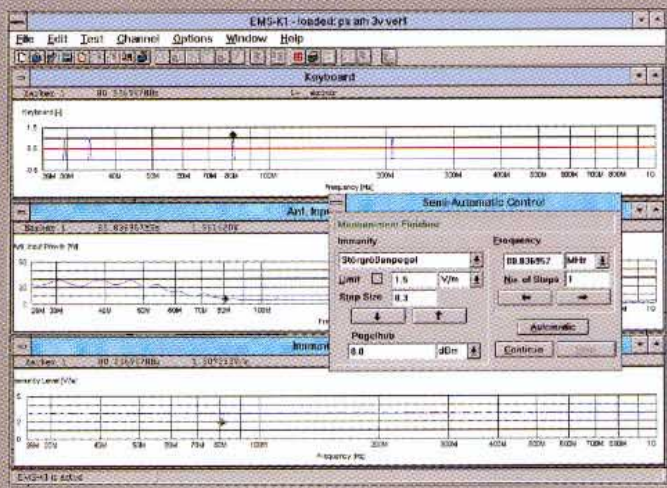
Dialog 2:
For reasons of reproducibility, all settings in the EMS-K1 required for a measurement are stored in the form of a test specification. This specification is the basis for any measurement and stored as a test together with the measurement results.



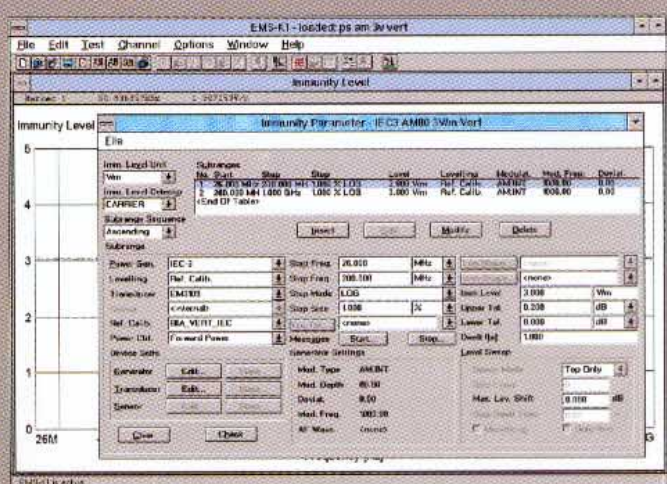
Dialog 3:
EMS-K1 supports fully automatic and semi-automatic measurements (dialog 4). The two modes are controlled via a user panel.



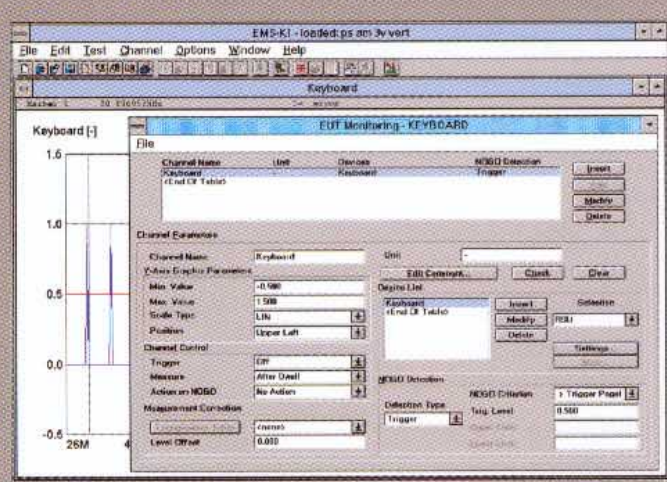
Dialog 4:
Semi-automatic measurements are mainly used for a more detailed analysis at critical points.



Dialog 5:
The test signal editor comprises all settings required for generating the desired stress signal.



Dialog 6:
The EUT monitoring editor comprises all settings required for monitoring the EUT. When several monitoring channels are defined, several EUT parameters can be monitored simultaneously.



Automatic generation of stress signals

EMS-K1 is a universal software package that can be used for just about any measurement method.

- Measurement of immunity to radiated electromagnetic fields using
  - antennas,
  - S-LINE cells (see data sheet PD 757.2338, S-LINE),
  - TEM or GTEM cells,
  - striplines,
  - etc
- Measurement of immunity to conducted interference using
  - coupling networks,
  - coupling clamps,
  - current clamps,
  - etc
- Measurement of immunity to magnetic fields

Three operating modes can be selected for setting the stress signal level (dialog 5). Setting is based on the criteria

- Transducer:
  The stress signal level is set by means of a specified transducer correction factor (constant or frequency-dependent). With the aid of this factor the required amplifier and generator output power can be determined and set.
- Reference calibration:
  The parameters required for generating the desired stress signal level are obtained in a reference calibration. Calibration results are used for determining and setting the required amplifier and generator output power (substitution method).
- Sensor:
  In this case the test level is set to the desired value using the actual level measured with a sensor. This method is also referred to as closed-loop method.

EMS test strategies

Depending on the parameters to be measured, the EMS test procedure has to meet different requirements. When acceptance tests are carried out a go/nogo decision will be sufficient in most cases. Only if the EUT fails will it be necessary to carry out further measurements, eg to determine the immunity level. This particularly applies in the case of development-accompanying measurements. For this reason EMS-K1 offers two different test modes, the qualification mode and the susceptibility mode:

- In the qualification mode a measurement is automatically carried out at each frequency of the desired susceptibility profile (limits as a function of frequency) and the responses of the EUT are monitored, stored and displayed as a function of the parameter level and the frequency. Irrespective of whether a malfunction is detected at the current frequency, measurements are continued at the next frequency.
- In the susceptibility mode, by contrast, the immunity threshold is automatically determined at the current frequency in the case of a nogo. The immunity level is gradually reduced until the malfunction of the EUT disappears and then increased again until it reappears.

EUT monitoring

Overall EUT monitoring covers three main tasks: EUT stimulation, monitoring of EUT response while a stress signal is applied and nogo reaction in the case of a malfunction. EMS-K1 offers a flexible solution in each case.

- Stimulation:
  Stimulation of the EUT is initiated by a trigger pulse which starts the user- and EUT-specific stimulation routine. Without this routine no stimulus is generated.
- Fault identification:
  Any number of channels can be set up for monitoring the EUT (dialog 6). Each channel monitors a specific EUT parameter. Examples of such monitoring channels are:

  – Manual monitoring by operator:
    The EUT is audio-visually monitored by the operator and malfunctions are recorded using the keyboard or the mouse.
  – Automatic monitoring of selected signal lines:
    The lines are permanently monitored during measurements. Malfunctions are automatically detected and recorded if the measurement parameter is outside the permissible tolerance.
  – Automatic video monitoring:
    Over the complete test run the EUT is monitored by a camera. The test run can in addition be recorded on a video recorder. A malfunction is automatically detected and recorded if the recorded picture changes by more than a specified degree.
  – Automatic monitoring with a separate controller:
    The EUT is monitored independently by a separate controller on which, for instance, a customer-specific monitoring program is running. Malfunctions are automatically detected and signalled to the other computer.
- Response to an error:
  If an error is detected, the nogo response predefined by the user is performed. For instance, an entry can be made in an error list or a user-specific error routine (eg EUT reset) called up.

Test reports

EMS-K1 supports the generation of three different types of test reports:

- brief report
- configurable comprehensive report
- user-defined report

The brief report comprises a header and graphic diagrams as displayed on the screen. The configurable comprehensive report provides all data required for a complete documentation of the current measurement. From this set the user may select data for his own report. In addition to the standard reports the user may define customized reports. Here fore measured data can be exported to a text processing program via the Windows™ DDE interface.

Service routines

In addition to the actual EMS measurement routines, EMS-K1 comprises a variety of service routines for the automatic calibration of signal paths and amplifiers and for a reference calibration of the test chamber including an evaluation of the field homogeneity.

Rohde & Schwarz System Software EMS-K1 under Windows™

The EMS Software EMS-K1 is a flexible software solution that can be tailored to the specific system configuration. Thanks to the wide variety of available device drivers, a great number of devices can be integrated. Generic drivers allow also devices outside this range to be used. Generic drivers are available, for instance, for generators, power meters and simple EUT monitoring devices. Customized drivers for special requirements and system components can also be implemented. The range of available drivers is continually updated and extended.

The EMS Test Systems TS9981, TS9982, TS9986 and TS9987 from Rohde & Schwarz for susceptibility measurements to IEC 1000-4 part 3 and part 6 are supplied with the complete application packages of EMS-K1. The packages are adapted to the respective standard system and configured ready for use.

Hardware requirements

Recommended controller configuration:

– Processor	Intel Pentium, 100 MHz
– Main memory	16 Mbyte
– Hard disk	≥200 Mbyte free memory
– Graphics board	SVGA: 1024 x 768 pixels
– Monitor	17" colour monitor
– IEC/IEEE-bus board	PS-B4 (model 04) from Rohde & Schwarz

Ordering information

Basic package		
System software for EMS test systems (EMS-K2 or EMS-K8 additionally required)	EMS-K1	1084.3548.00
Standard device driver package for system software EMS-K1	EMS-K2	1084.3748.00
Device driver package for EMS-K1 for EMS test system, 1 to 18 GHz	EMS-K8	1084.3890.00
Extensions		
Software extension for EMS-K1 (script development kit)	EMS-K3	1084.3790.00
EUT monitoring		
Extension for EMS-K1 (basic device driver package)	EMS-K20	1084.4196.00
Drivers for System Software EMS-K1:		
Additional PC for EUT monitoring	EMS-K21	1084.4244.02
Generic driver for EUT monitoring	EMS-K29	1084.6647.02

Other options available on request.

Certified Quality System
ISO 9001
DQS REG. NO 1954-04

Printed in Germany 197 (Pe sz)

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ROHDE & SCHWARZ

ROHDE & SCHWARZ GmbH & Co. KG · Mühldorfstraße 15 · D-81671 München
P.O.B. 801469 · D-81614 München · Telephone +4989 4129-0 · Fax +4989 4129-3567 · Internet: http://www.rsd.de