

# IEC61000-4-3/-6 Compliant Immunity Measurement Software

The IM5 series of automatic immunity measurement software is a line of software products developed to evaluate the susceptibility of electronic equipment to electromagnetic interference.

The software automatically controls the immunity measurement apparatus: the signal generator, power amplifier, field-strength meter, power meter, and turntable/antenna mast controller; this makes it easy for even the novice to efficiently and completely conduct measurement and output measurements to the printer or save them to the HDD, FDD, or other medium.

## ■ Conforming Standards

IEC, EN, MIL, 95/54/EC, JEIDA and other extra-domestic immunity standards

## ■ Features

- Sophisticated user interface
- Measurement procedure that dramatically reduces measurement time
- Capable of exporting measurement data in CSV format
- Capable of saving standard values, factors, and measurement conditions to files, enabling them to be set, edited, and created easily.
- Supports a wide range of hardware of various manufacture
- Various password functions are provided for a range of password levels, from the staff in charge of making measurement and to the system administrator.
- Supports Windows 95, 98, and NT

## ■ IM5 Series of Immunity Measurement Software Products

- **IM5/RS** : Radiation field immunity measurement software
- **IM5/CS** : Conducted immunity measurement software
- **IM5/TEM** : TEM-CELL (GTEM) immunity measurement software
- **VI5/RS** : 95/54/EC (Vehicle directive) immunity measurement software

## ■ Supported test equipment

### ● Signal generators

- Rohde & Schwartz : SML, SMR, SMY, SMT, SMP, SMG series, etc.  
Agilent Technologies : PSG, ESG, 8648, 8656, 8657, 83731 series, etc.  
IFR : 2030, 2023, 2024 series  
Fluke : 6060, 6061 series  
Others : Anritsu and Panasonic

### ■ Power amplifiers

Bonn, Milmega, etc.

### ● Field-strength meters, field probes

- Holaday : HI-6105, HI-6005, HI-4422, HI-4433 series, etc.  
EMC Automation : SI-200, SI-100 series  
EMCO : 7201

### ● Power meters, voltmeters

- Rohde & Schwartz : NRVD, NRT, NAP, URV55, NRV series, etc.  
Others : Agilent Technologies, Bird, Keithley, etc.

### ● Level measurement instruments (Spectrum analyzers)

- Rohde & Schwarz : ESCI, ESIB series, ESPI series, FSL series, FUS series, FSP series, etc.  
Agilent Technologies: E4440 series, E4400/7400 series, 8560 series, 8590 series, etc.  
ADVANTEST : R3131, R3132, R3260/R3270 series, etc.  
Others : Anritsu, Tektronix

### ● Turntables and antenna masts

ETS/EMCO, INCO, TDK, Tokin, Device, etc. (Consult TOYO for other maker/models.)

# IM5/RS: Radiation Field Immunity Measurement Software

IM5/RS is radiation field immunity measurement software compliant with IEC61000-4-3 and ENV50140.

## ■ Conforming Standards

IEC61000-4-3 Edition 3.0  
IEC61000-4-3 Edition 2.1  
EN61000-4-3  
JIS C 61000-4-3  
JEITA IT-3001, etc.

## ■ Basic Functions

### ● Uniformity measurement

The software checks the electric distribution around the equipment under test (EUT), and checks whether the measurement site is suitable for immunity measurement (field uniformity). The software determines the output level of the RF signal generator to obtain the electric field to which the EUT is to be subjected in immunity measurement.

### ● System linearity verification

The performance evaluation at maximum output of a power amplifier, which is a major component of a test system, will not be good enough. If you use a power amplifier with a low compression point (output that assures linearity), the system cannot generate the AM 80% modulation demanded by the immunity test and the degree of modulation becomes shallow, which compromises the reliability and reproducibility of the test. To prevent such a problem, a test system linearity verification newly added to the IEC61000-4-3rd Edition is performed. A test system that does not satisfy 2dB compression cannot be used.

### ● Electric field reference value measurement/electric field check measurement

These measurements are performed to improve the measurement accuracy of immunity measurement. Before performing the immunity measurement, this software corrects the reference factor and measures the correction value in order to generate a more accurate and uniform electric field strength.

### ● Field reference factor measurement/Calibration measurement

The software performs these measurements to improve immunity measurement accuracy.

Before immunity measurement, the software corrects the reference factor and makes calibration measurements for more accurate field uniformity.

### ● Immunity measurement

The software performs immunity measurement by subjecting the EUT to the specified electric field using the reference factor obtained from the uniformity measurement and the factor obtained by field check measurement.

### ● Measurement result display

The software brings up the measurement result display window corresponding to the measurement type selected. The window displays measurement results.

The window can also be used to print the displayed data or save it in CSV format.

### ● Report printing

The Report Wizard is available to output a report of measurement results in the specified format.

## ■ Uniformity Measurement

### ● Capable of measuring at up to 50 positions

The frequency scale can be set to linear or logarithmic scale. If uniformity cannot be obtained at a constant antenna height, the height can be changed to obtain more data. The software changes the antenna height automatically during immunity testing, eliminating the need for interrupting the test to change antenna height.

### ● Clear evaluation of uniformity

The software can visually compare data on different measurement positions, making it easy to check whether the measurement results conform to the standard.

### ● Bar graph

The bar graph displayed at the top of the graph shows what percent of the measurement positions fall within 6 dB using different colors for each frequency. You can tell at a glance whether measurement results conform to the standard field uniformity characteristic.

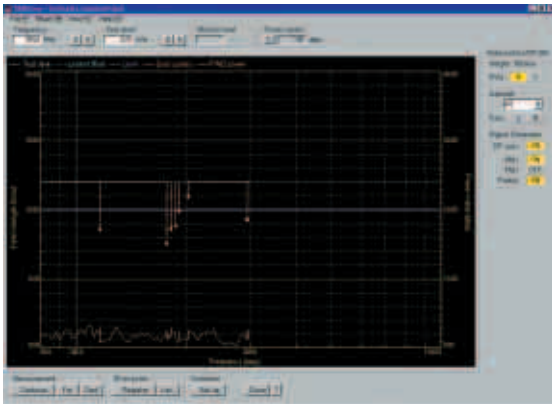
### ● Matrix

At a frequency indicated to by the cursor, the software displays positions where measured uniformity within 6 dB in a different color from those with uniformity 6 dB.

The field can be evaluated and analyzed for uniformity at each frequency.



## Immunity Measurement



Immunity Measurement Window

### ● Easy to start measurement

To start immunity measurement, click on the <Start> button after selecting a measurement condition file.

To perform additional measurement using existing measurement results, load the measurement results.

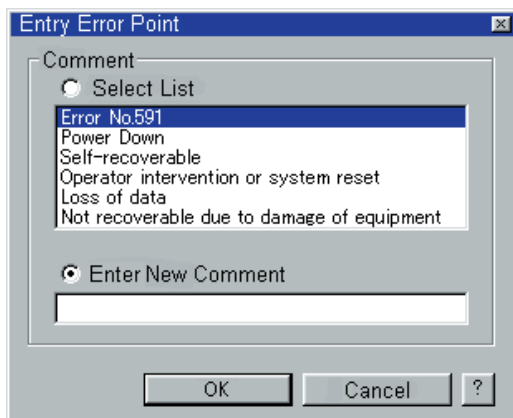
### ● Seamless measurement environment

The <Start> button causes the software to start an automatic scan through the test frequency range (selectable: linear or logarithmic scale). You can also move easily to an arbitrary frequency by dragging the cursor or by entering the appropriate numbers.

Also, the progressive wave/reflected wave levels of the power amplifier and the field levels at arbitrary positions can be obtained at the same time and displayed on a graph.

The software also supports the feedback test method, in which the field strength is maintained at a constant level at the field sensor position.

If the EUT fails the immunity test, you can perform the following operations to detect and register the error level on the current screen.



Error Point Registration Dialog Box

- Changing the frequency or test level
- Turning on/off the RF output/modulations of the signal generator
- Controlling the antenna mast and turntable
- Registering the error point
- Viewing the error point list
- Registering an error point

Pressing the <Error Point Register> button brings up the registration dialog box. Select a status from the list or enter a new comment. The current measured value is recorded along with the comment.

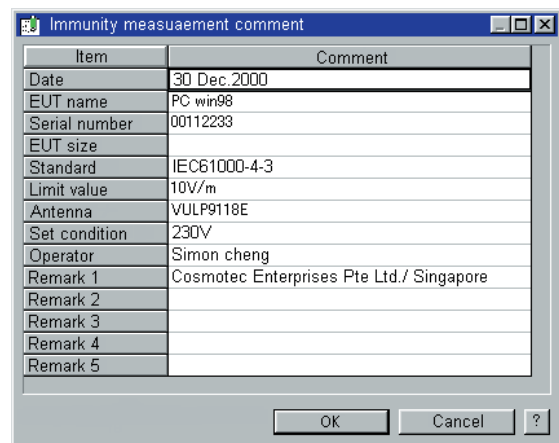
### ● Displaying measurement results

Measurement results are displayed on graph. The frequency and level at the cursor are displayed in the text boxes above the graph.

### ● Entering comments

Enter desired comments, if any, for each measurement.

Right-click the mouse to display the input assistance menu. Use this menu to enter the date and time and to save the comments entered. You can copy a comment and add it to other measurement file when it is saved. Therefore, you do not need to enter the same comment again if you have saved it previously. After saving a comment, you can add such comments to other measurement files, making it unnecessary to reenter the comment manually in the future.



### ● Error detection option

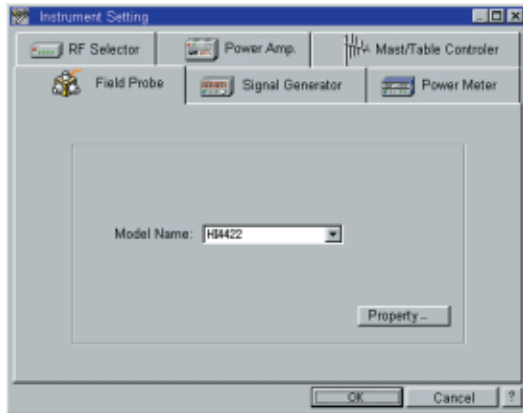
With the error detection option added, immunity can be measured automatically. The software checks the values obtained at several test frequencies from the test equipment (such as a voltmeter or audio analyzer) to determine whether the EUT is operating within its normal operating range (user-defined tolerance).

When an error is detected at a frequency, the test level is decreased and the EUT is tested again.

When the measurement falls within the normal range, that frequency is registered as an error pint and the test advances to the next frequency.

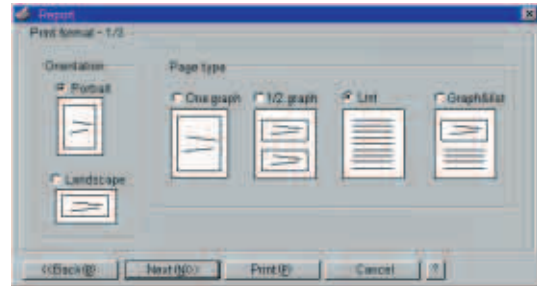
## Instrument Setting

The software supports a variety of test equipment, allowing you to easily change the model of the instrument to be used. This can be done only by selecting the desired instrument in the <Instrument\_Setting> dialog box.



## Report Printing

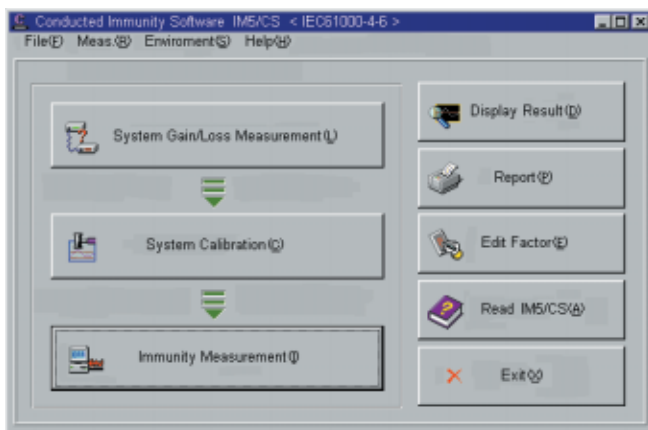
Follow the instructions of the Report Wizard to print reports efficiently in various formats.



# IM5/CS: Conducted Immunity Measurement Software

## Overview

IM5/CS is automatic measurement software compliant with the IEC61000-4-6 and ENV50141 standards designed to evaluate the level of conducted immunity to an RF electromagnetic field from the power line, conductive line, or signal conductor of electronic equipment. The software can calibrate the CDN, EM clamp, and system connection paths and save their calibration data to be used as correction values during measurement.



## Basic Functions

The software measures attenuator and cable losses that must be determined to measure the interference level of the EUT port, provided on the CDN or EM clamp, using a spectrum analyzer and/or RF voltmeter.

### System Calibration

The software measures the transmission factor from the RF signal generator to the 150  $\Omega$  side of the 150  $\Omega$  adapter.

### Immunity measurement

The software performs immunity testing by applying a specified interference signal to an EUT port, such as a coupled/decoupled circuit network.

The <Start> button causes the software to start an automatic scan through the test frequency range (linear or logarithmic scale). You can also move easily to an arbitrary frequency either by dragging the cursor or by entering numeric values.

Also, the progressive wave/reflected wave levels of the power amplifier and the voltage level of an arbitrary transmission subsystem can be obtained at the same time and displayed on a graph.

### Error detection option

Adding this error detection option provides automatic immunity measurement execution. The error detection option of IM5/CS has the same specifications as that of IM5/RS.