narda Safety Test Solutions
an L3 Communications Company
http://www.narda-sts.it

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# User Manual

# PMM
# IMMUNITY SUITE

## DATA ACQUISITION PROGRAM FOR RADIATED & CONDUCTED IMMUNITY TESTS

**INSTRUMENT SERIAL NUMBER**
The release number is located on the top title bar of the main window.
The version number appears as "Rel. X.XX" (month.year).

**NOTE:**

® Names and logos are registered trademarks of Narda Safety Test Solutions GmbH and L3 Communications Holdings, Inc. - Trade names are the property of their respective owners.

For safe operation of the instrument, it must be used exactly as described in this manual.

Before operating the instrument in any way, the user must read the manual with care and become fully familiar with all precautions advised.

Proper use and safety can only be assured with thorough knowledge of all information contained herein.

This document may be revised without notice.

## SYMBOL USED IN THIS MANUAL

| | | |
|---|---|---|
|  | **DANGER** | **The DANGER symbol warns of a risk to human safety. All instructions must be fully understood and followed before proceeding.** |
|  | **WARNING** | **The WARNING symbol alerts the user to a risk of damage to the device or malfunction. All instructions must be fully understood and followed before proceeding.** |
|  | **ATTENTION** | **The ATTENTION symbol highlights actions necessary for the device to work properly.** |
|  | **NOTE** | **The NOTE symbol points out information of particular importance.** |

# Contents

# Figures

# 1 – Installing the program

## 1.1 Introduction

Technological advancements and the increasingly widespread use of electronic equipment for telecommunications, data processing, industrial automation, etc. have led to a growing new field: *electromagnetic compatibility (EMC).* Because many devices work in close contact with one another, they can generate electromagnetic interference and may therefore work less effectively. The PMM Immunity Test program will check for this on the basis of your equipment, setup and operating procedures.

## 1.2 Hardware requirements

- Pentium III processor
- At least 256 MB RAM
- At least 50 MB free hard disk space
- USB or RS232 port (or Bluetooth with optional adaptor)
- Windows™ 2000/XP/Vista operating system

NOTE

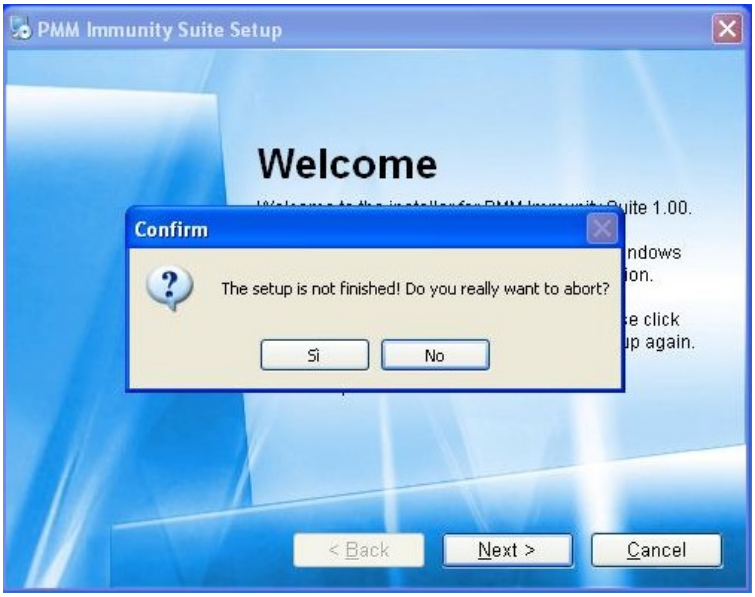
**Updates can be downloaded from www.narda-sts.it or obtained directly from our sales department.**

## 1.3 Installation

The program has to be installed from the CD-ROM to the hard disk before use.
Insert the program CD into the computer's CD-ROM drive. Go to My Computer and double-click the CD-ROM unit where the disc was inserted. To start the installation, double-click the icon **PMM Immunity Suite Setup.**

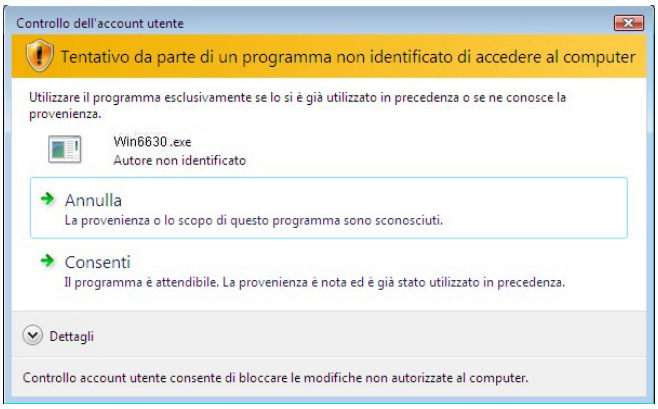


You can exit the installation by selecting **Cancel.** The following confirmation message will appear:

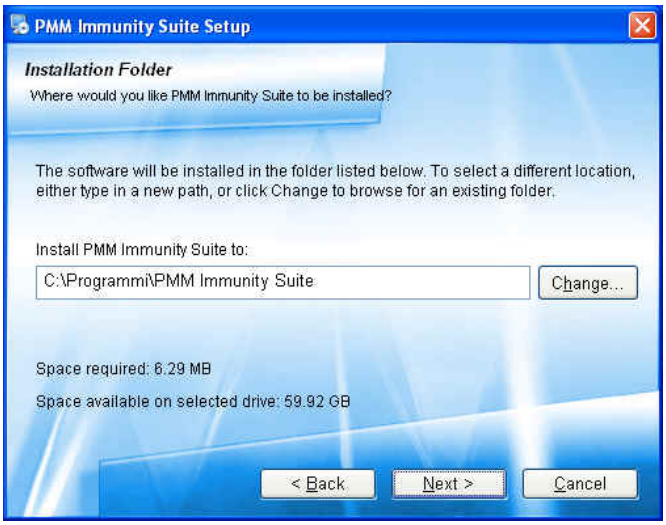


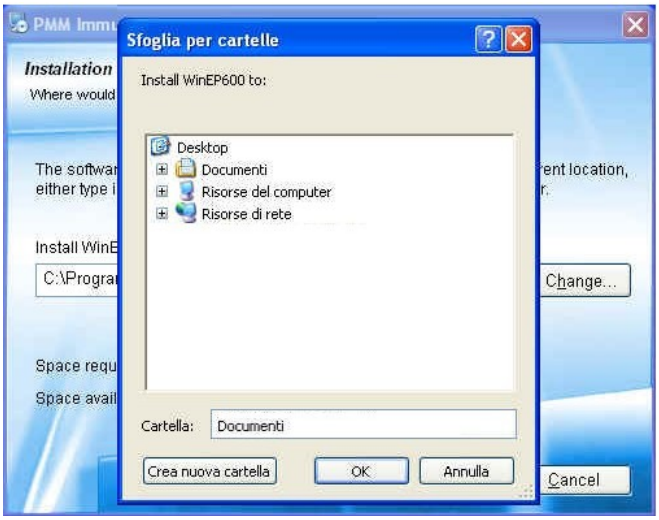
NOTE

**In Windows Vista, most programs are blocked to protect your computer. To start the installation, you may need to allow the program to communicate.**

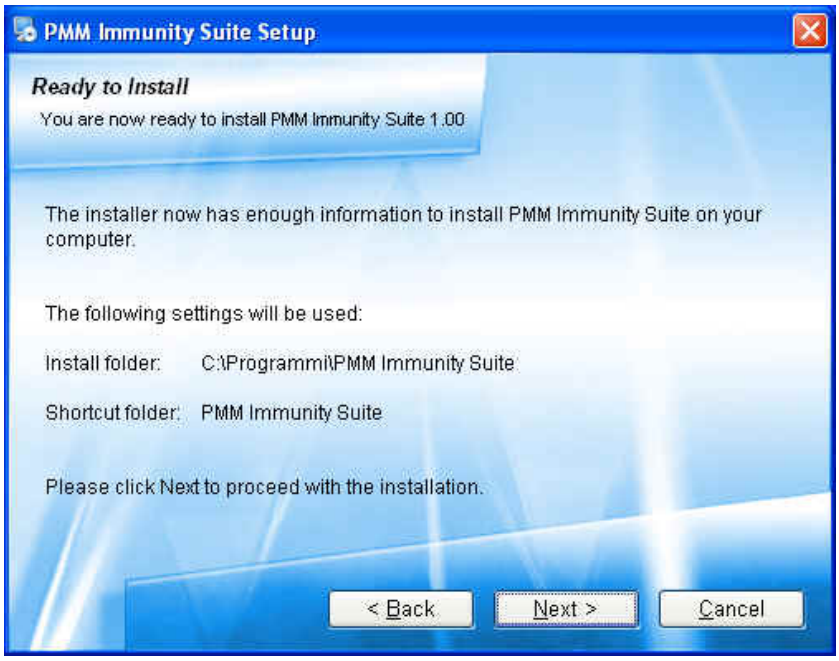



The program will ask you to confirm the installation folder. Choose **Next** to confirm the default directory, or **Change** to select a different folder.

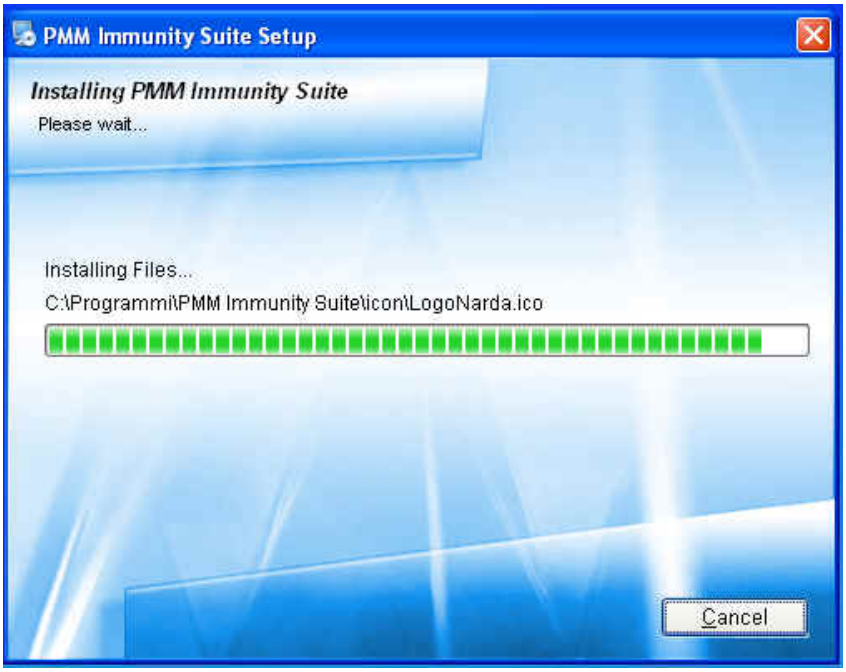


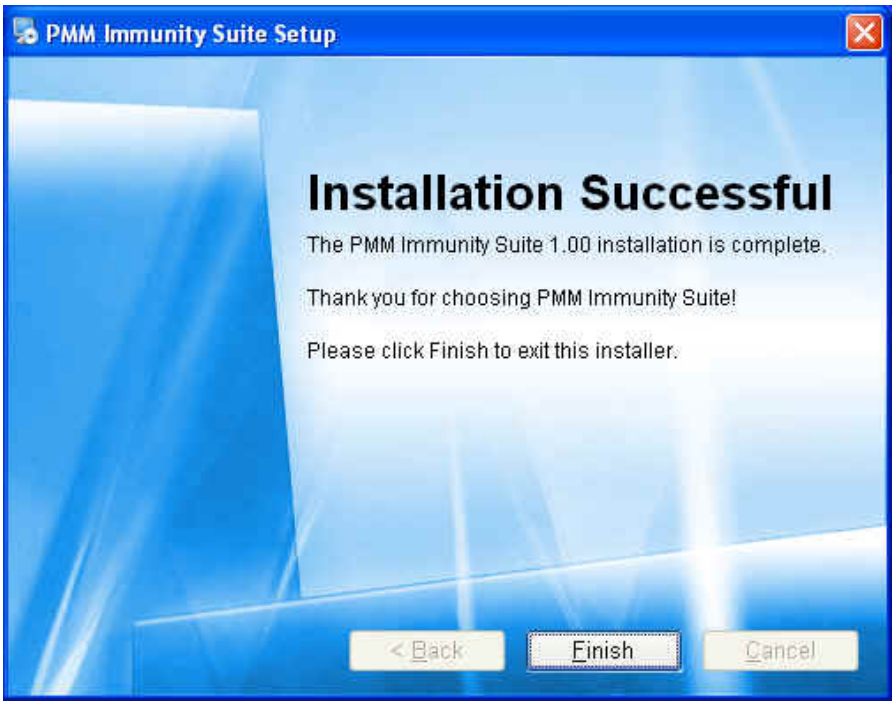
The software is now ready to be installed. Click **Next** to continue the installation.




A status window will appear, showing the percentage of files copied into the specified folder.



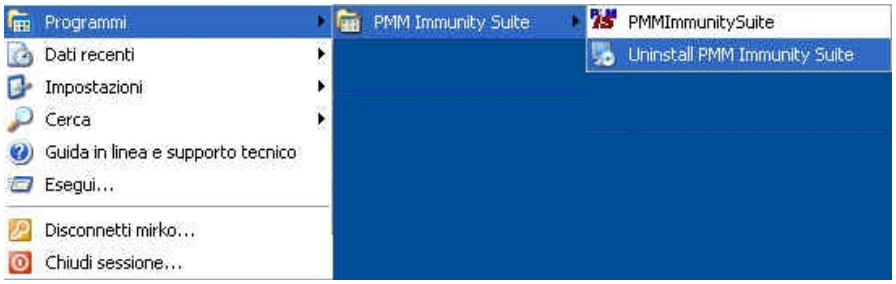
Once notified that the installation was successful, click **Finish** to complete the process. The folder **PMM Immunity Suite** will be created in your **Programs** folder.




A shortcut will appear on your desktop to allow easy access to the program.

## 1.4 Removal

The recommended procedure for uninstalling the program is as follows: Disconnect the devices attached to the computer. In Windows XP, click **Start** (in Windows Vista click the ) then **All Programs**, place the cursor on **PMM Immunity Suite,** and click **Uninstall PMM Immunity Suite.**




The program can also be uninstalled using the Control Panel.

NOTE

**Use this method if the Uninstall option is not available from Start -> All Programs.**

Disconnect the devices attached to the computer. Click **Start**, **Control Panel, Programs and Features** (in Windows Vista). Select the program from the application list and click **Remove.**


Follow the instructions displayed on the screen.

WARNING

**When you are prompted to remove shared files, select No. If these files are deleted, other programs that use them may not work properly..**

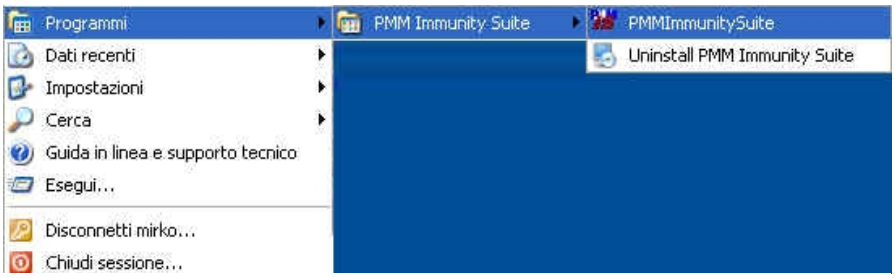
# 2 – Run the program

NOTE

**Before running the program, we recommend limiting the number of applications in use.**

You can now start the program using the desktop icon.


or, from the Windows XP **Start** button, selecting **All Programs**->**PMM Immunity Suite->PMM Immunity Suite.**

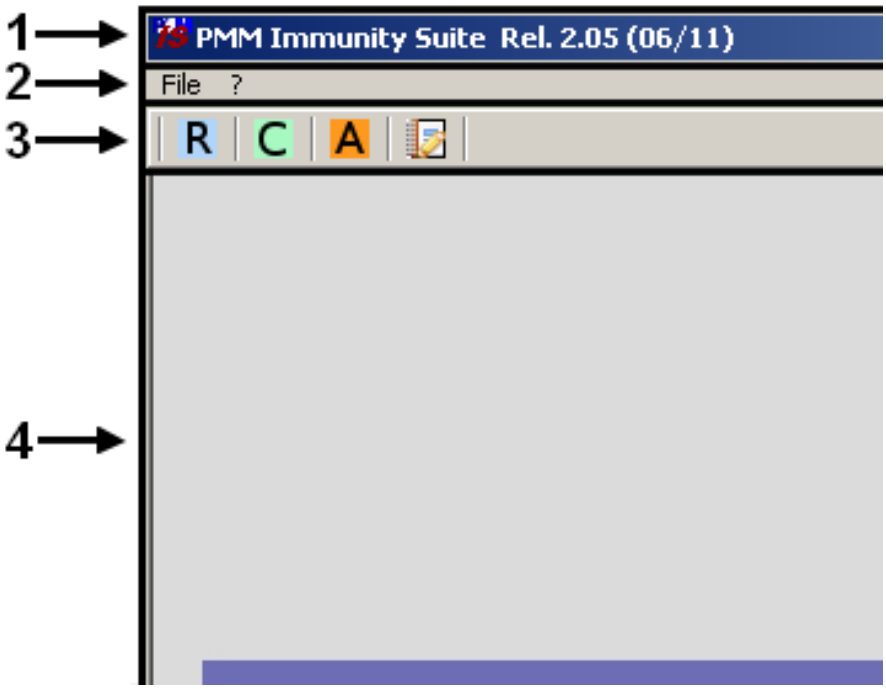



In Windows Vista, click the **Windows icon (** **),** then **All Programs->PMM Immunity Suite->PMM Immunity Suite.**

The title screen appears**:**

## 2.1 User interface

The title screen is followed by this interface:




The interface contains:

1. Title bar
2. Menu
3. Selection buttons
4. Main window

These are described in greater detail below.

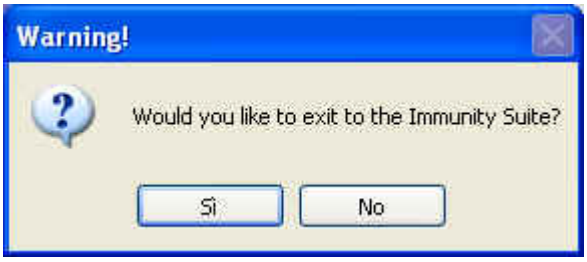
### 2.1.1 Title bar

From left to right, the title bar presents the icon, the name of the program, and its release. The date and year of the release are shown in parentheses.


The window control buttons (minimize/maximize/close) are also available.

If the main window is minimized, the information will be displayed on the Windows taskbar at the bottom of the screen.


The program can be closed at any time, and the following confirmation message will appear:



### 2.1.2 Menù

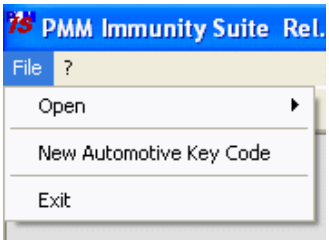
The main menu contains these commands:


- **File**:

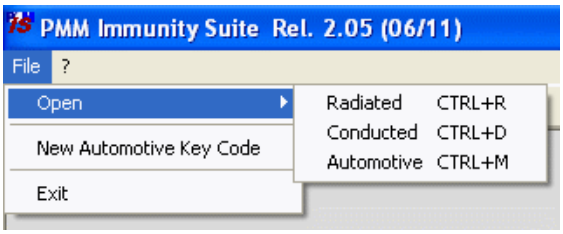
- **? (Info)**:

### 2.1.2.1 File

The **File** dropdown menu includes:




- **Open:** Opens a new work session in Radiated or Conducted or Automotive mode.

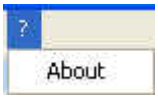



**- New Automotive Key Code:**

- **Exit:** Exits the program at any time (subject to confirmation):

### 2.1.2.2 ? (Info)

The **?** dropdown menu includes:




- **About**: Information on the program creator and customer support.

Press  to close the window


### 2.1.3 Selection buttons

A new work session can also be opened using the selection buttons under the main menu. The third button activates the Editor.

- Select  to open a new session in Radiated mode.

- Select  to open a new session in Conducted mode.

- Select  to open a new session in Automotive mode.

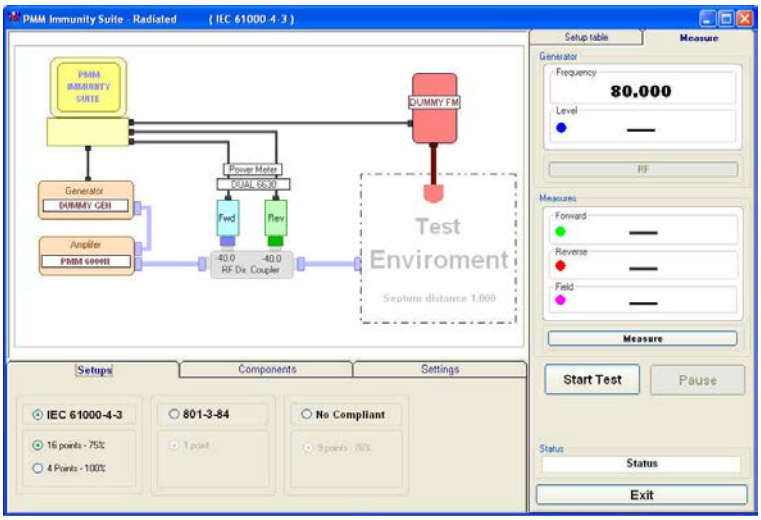
- Select  to open the Editor.

Detailed instructions for the different modes are provided below.

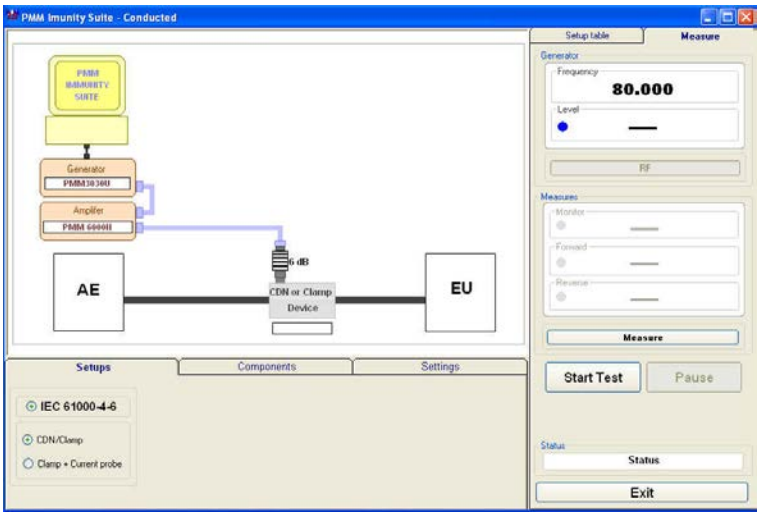
### 2.1.4 Main window

The main window displays the active work session or editor session.

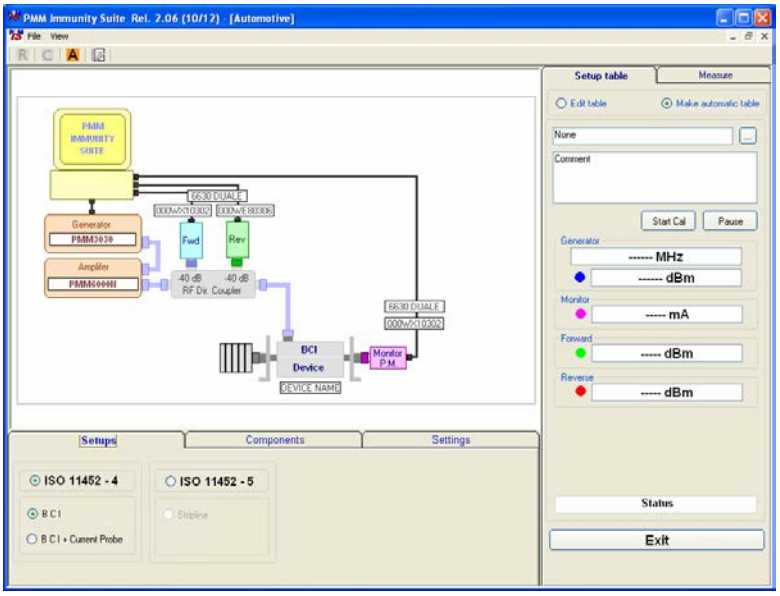
***Radiated mode***



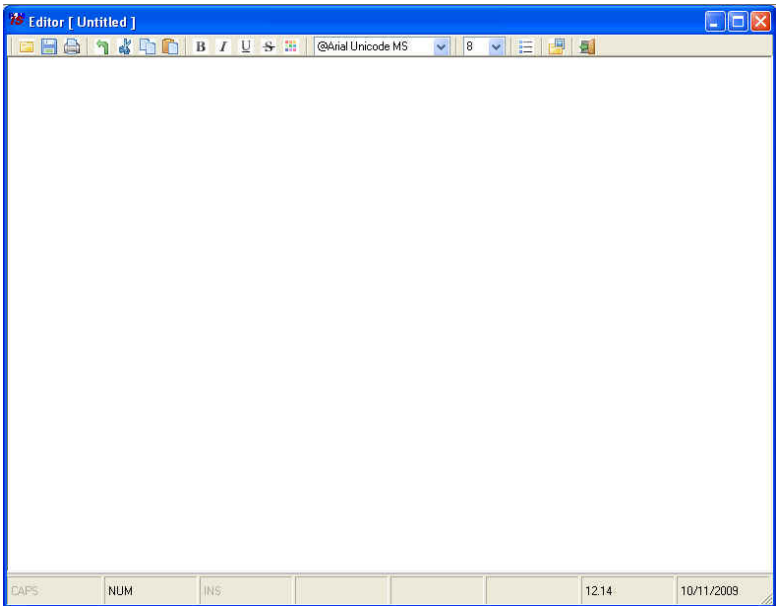

***Conducted mode***



***Automotive***




***Editor***




See below for further information on these windows

# 3 – PMM Immunity Test Radiated

## 3.1 Introduction to Radiated mode



Radiated mode tests your equipment's immunity to the magnetic fields produced by radio transmitters or any other device that emits radiated electromagnetic energy. This kind of radiation may be generated by portable transceivers, base stations, television transmitters, radio transmitters, and other electromagnetic or intermittent sources. To obtain reproducible results, the test should be performed in an anechoic chamber; the standard for equipment, setup and procedure is EN 61000-4-3.

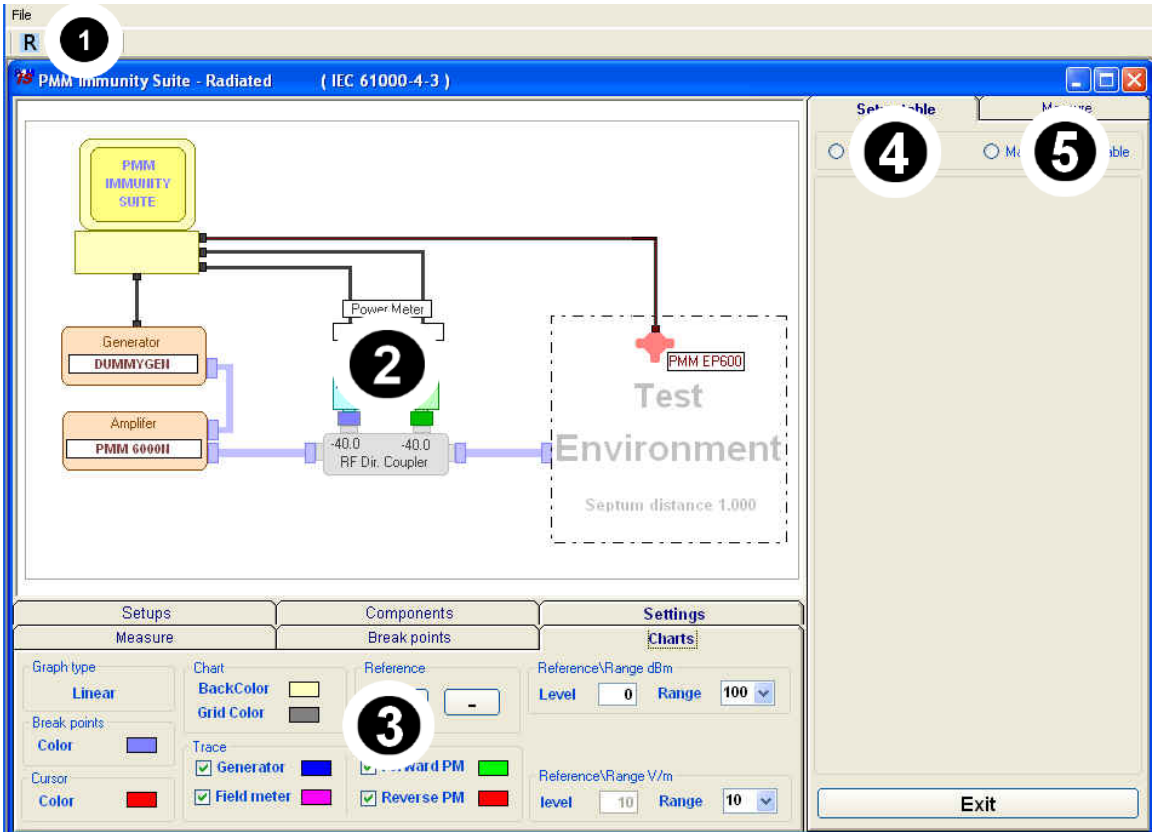




**Fig. 3-1** Main window - Radiated

This window contains:

1. Menu
2. Diagram window
3. Function tabs
4. Setup table
5. Measure

### 3.2 Choosing the compliance standard (Setups)

Once Radiated mode is launched, the compliance standard needs to be chosen. The program offers a selection under the **Setups tab**.

**- EN 61000-4-3**

**- 801-3-84**

**- No Compliant**

### 3.3 Equipment selection (Components)

After selecting the compliance standard, choose the equipment to be used during calibration or testing.

The program divides equipment by type; for your convenience, drivers from the PMM family can be used.

To enable the desired module, double click the corresponding line (a √ will appear next to the instrument selected).

**- Generators:** Lists the available field generators

Generators | Power Meters | Field Meters

| Selected | Name | Bus type | Bus addr. | Comm. port | Start freq. (MHz) | Stop freq. (MHz) | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|---|---|---|
| | DUMMY GEN | GPIB | X | 0 | 0.01 | 20000 | -100 | 20 |
| | PMM 3000 | RS232 | X | 3 | 0.01 | 1000 | -80 | 10 |
| | PMM 3030RS | RS232 | X | 1 | 0.009 | 3000 | -107 | 10 |
| V | PMM 3030USB | USB | X | X | 0.009 | 3000 | -107 | 10 |
| | PMM 3010USB | USB | X | X | 0.009 | 1000 | -107 | 10 |
| | PMM 3010RS | RS232 | X | 1 | 0.009 | 1000 | -107 | 10 |

**- Power Meter:** Lists the available power meters

Generators | Power Meters | Field Meters

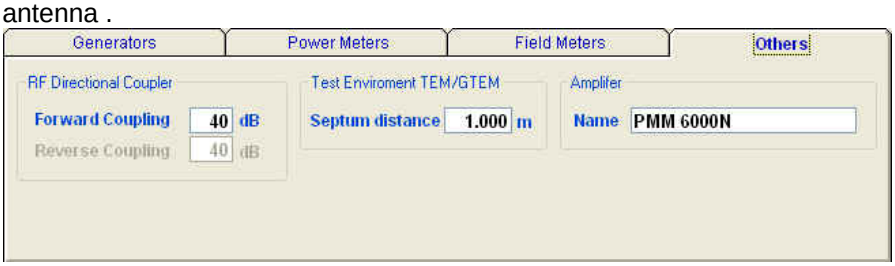
| Selected | Name | Bus type | Bus addr. | Comm. port | Start freq. (MHz) | Stop freq. (MHz) | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|---|---|---|
| | DUMMY PM | USB | 0 | 0 | 0.01 | 6000 | -40 | 30 |
| | PMM 6630 | USB | 0 | 0 | 0.009 | 3000 | -40 | 30 |
| V | DUAL 6630 | USB | 0 | 0 | 0.009 | 3000 | -40 | 30 |
| | PMM 6600 | RS485 | 1 | 1 | 0.01 | 1000 | -40 | 27 |
| | DUAL 6600 | RS485 | 1 | 1 | 0.01 | 1000 | -40 | 27 |

**- Field Meters:** Lists field probes, optical repeaters and field meters.

Generators | Power Meters | Field Meters

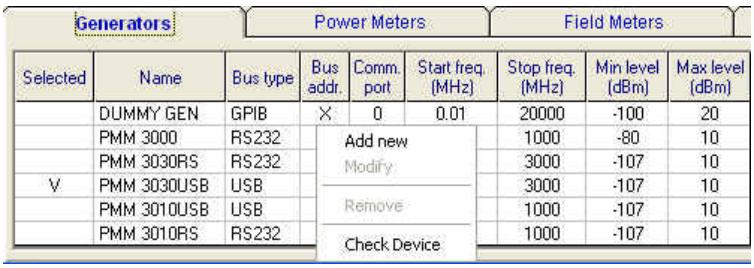
| Selected | Name | Bus type | Bus addr. | Comm. port | Probe name | Start freq. (MHz) | Stop freq. (MHz) | Min level (V/m) | Max level (V/m) |
|---|---|---|---|---|---|---|---|---|---|
| | DUMMY FM | GPIB | 0 | 0 | | 0.01 | 10000 | 0 | 200 |
| V | PMM EP601 | RS232 | 0 | 5 | PMM EP601 | 0.01 | 9250 | 0.5 | 500 |
| | PMM OR03 | RS232 | 0 | 5 | PMM EP330 | 0.1 | 3000 | 0.3 | 300 |
| | PMM 8053 | RS232 | 0 | 5 | PMM EP330 | 0.1 | 3000 | 0.3 | 300 |
| | PMM EP600 | RS232 | 0 | 5 | PMM EP600 | 0.1 | 9250 | 0.14 | 140 |

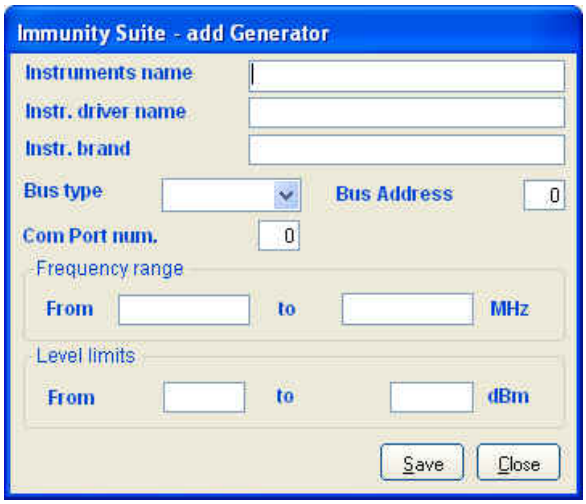
**- Others:** Lists the amplifier, directional coupler, TEM cell or GTEM antenna .



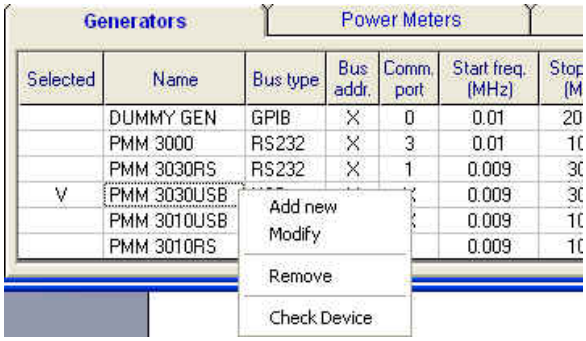

From this tab, you can set the coupling factors of the directional coupler, the septum distance of the TEM or GTEM (if any), and the name of the amplifier used.

Additional devices can be added to each of these tables by right-clicking and selecting **Add new.**




Devices can also be checked, modified or removed by right-clicking from the corresponding line:




NOTE **For connecting and setting the COM port of fiber optic equipment, see the user manual supplied with the device.**

- **Modify:** changes the properties of the device.


- **Remove:** removes the device and its driver from the list.

- **Check Device:** makes sure the driver is working and the device is properly connected. This option is only available for the device selected (√).

If the device is connected and the driver has been correctly installed, the following message will appear:


This message will appear if the device has not been connected properly to the work setup

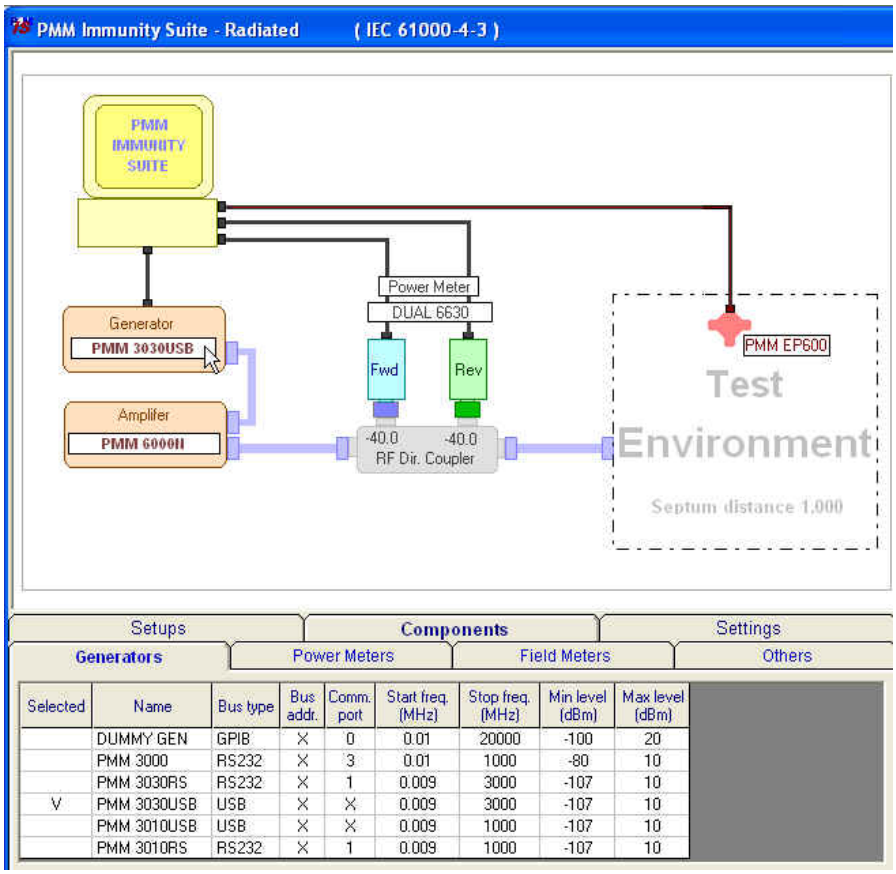

If the driver of the device has not been installed properly, the screen will show:



We recommend performing a device check before starting the calibration phase or immunity test. In any case, before calibration or testing, the program runs an automatic check and reports any errors as described above.

### 3.4 Diagram window

The diagram window shows the setup to be followed on the basis of the compliance standard and equipment selected.

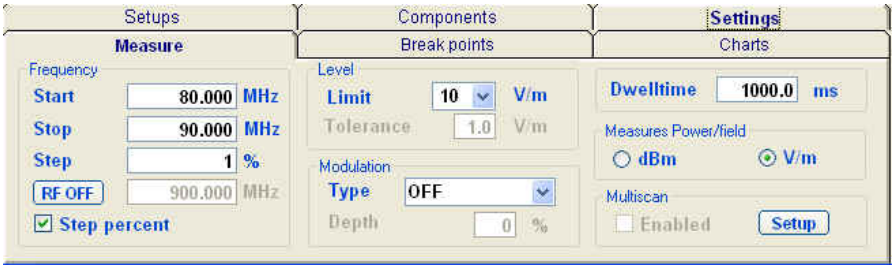



The selected devices (√) are shown at the bottom of the panel.

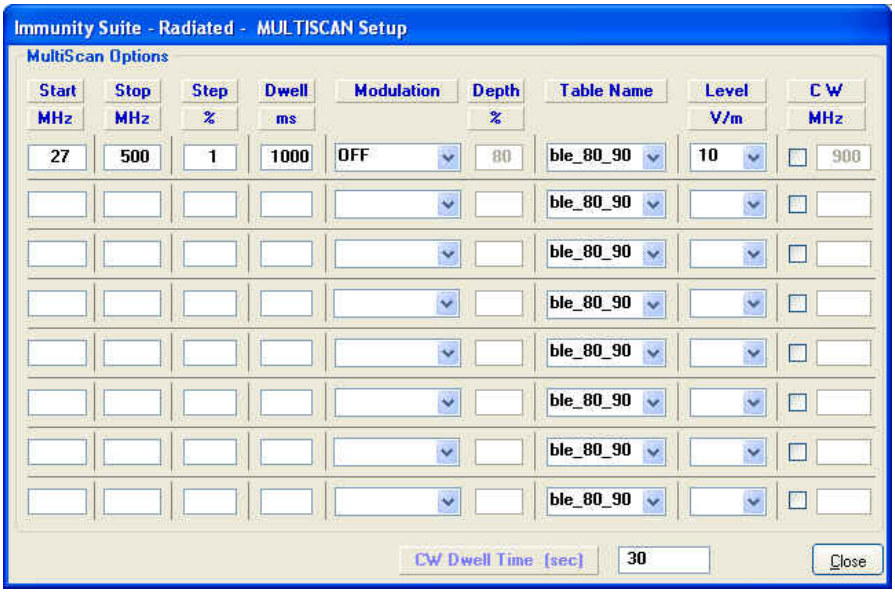
In addition to using the **Components** tab, you can move from one type of equipment to another by clicking the label with the device's name PMM 3030USB in the diagram window.

## 3.5 Settings

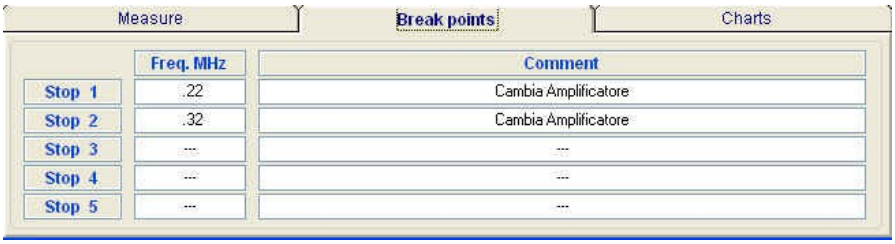
After performing the setup shown in the diagram window, the calibration and test parameters need to be set using the **Measure** tab:




The **Multiscan** feature allows you to modify measurement parameters within a given frequency range.



With the **Break points** tab, you can set the frequencies at which measurement will be temporarily suspended to allow a change in setup.

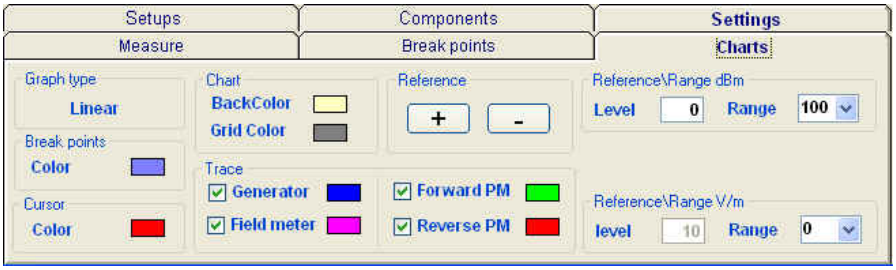



Each time the stop frequency is reached, a message will display the scheduled action.


Click **OK** to continue measuring.

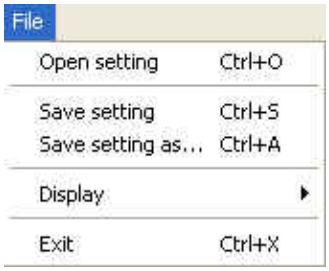
The **Charts** tab allows visual modifications to suit your preferences. For each element, click on the color shown, and change it using the Windows color box if desired.

In this tab, you can also move the reference level along the y-axis (+ and - buttons), or change the power level and range (in dBm) and the magnetic field range (in V/m).

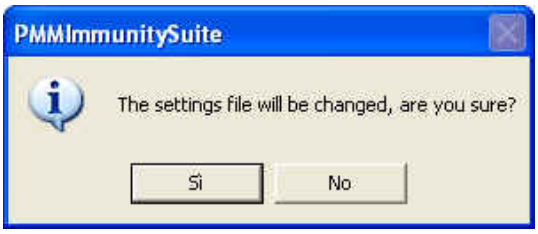


### 3.6 Settings management

For each new session, the default file RadDefault.tst is loaded.
To avoid having to re-enter preferred settings, they can be saved in a single .tst file:

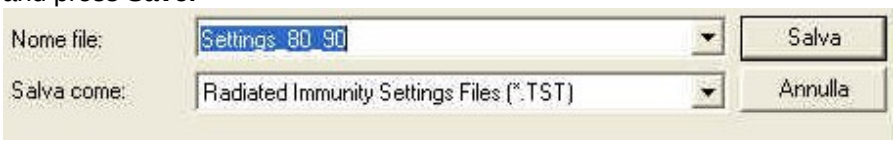



The command **File -> Save setting** overwrites the file in use. If no file was called up when the program was opened, the default file will be overwritten. The following message will appear:

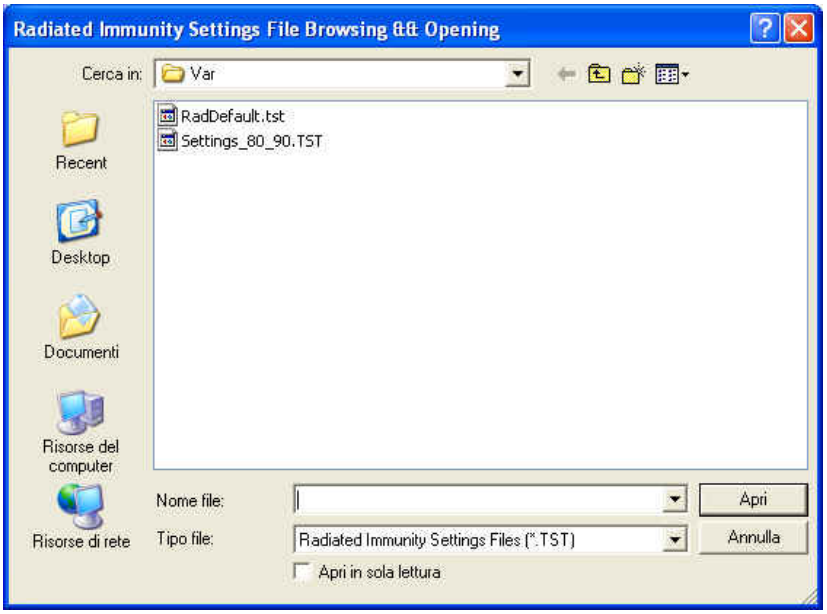



Choose **YES** to overwrite the file in use. Choose NO to cancel the operation and return to the main window.

**File -> Save setting as...** Enter the file name assigned to the work session and press **Save.**




The file can be called up at any time with the command **File -> Open setting.**




**File -> Display -> Default colors** is used to restore the original display.

## 3.7 Setup table

You can now calculate the levels assigned to the generator in order to have a constant field value within the chosen frequency range.

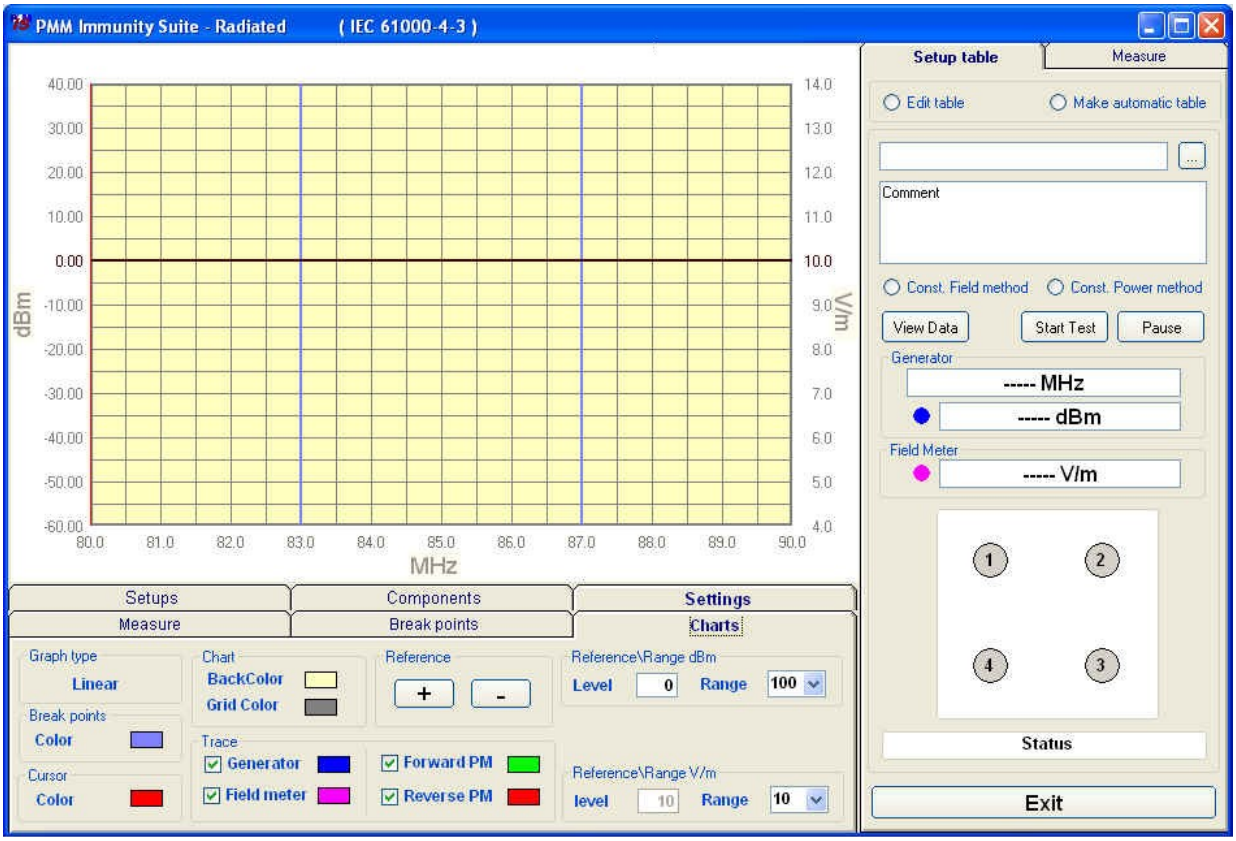
There are different ways to create the table:

- Automatically (select **Make automatic table)**

- By adapting the automatically created table to the instrumentation used (select **Edit table)**

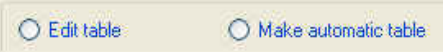
- By completing the entire table manually (select **Edit table)**

### 3.7.1 Automatic table creation



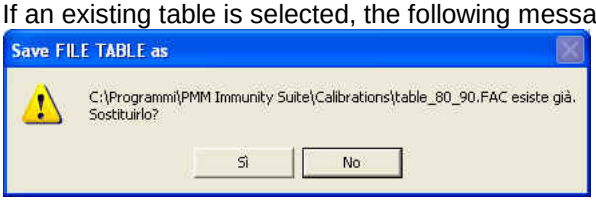
To create a table automatically:

- Select **Make automatic table**




Select  , assign a name to the table and press **Save**


If an existing table is selected, the following message will appear:

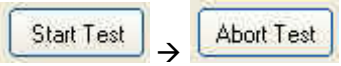



Choose YES to overwrite the table.
Choose NO to cancel the operation and return to the main window.

- A comment can be added, if desired.

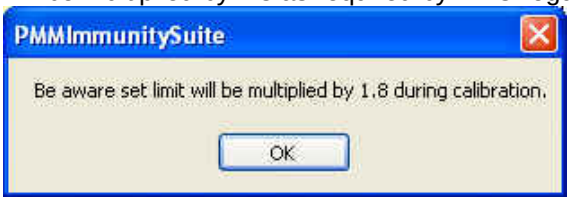

- Calibration can be performed using the constant field strength method or the constant power method (consult EMC regulations for further details.


- Press **Start test**, then **Abort test** if you wish to terminate the process at any time.

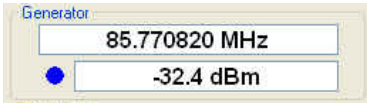



A **Pause** button is also available, and becomes **Continue** to resume the process.


Once the calibration has begun, a message will appear stating that the limit will be multiplied by 1.8 as required by EMC regulations.

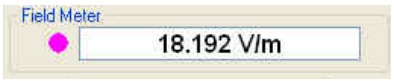


The **Generator** window shows the level (in dBm) entered by the generator, at a given frequency (in MHz), to generate the chosen magnetic field level.




The color of the dot corresponds to the color of the line on the graph.

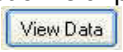
The field level generated inside the cell is displayed in the **Field Meter** window**.**

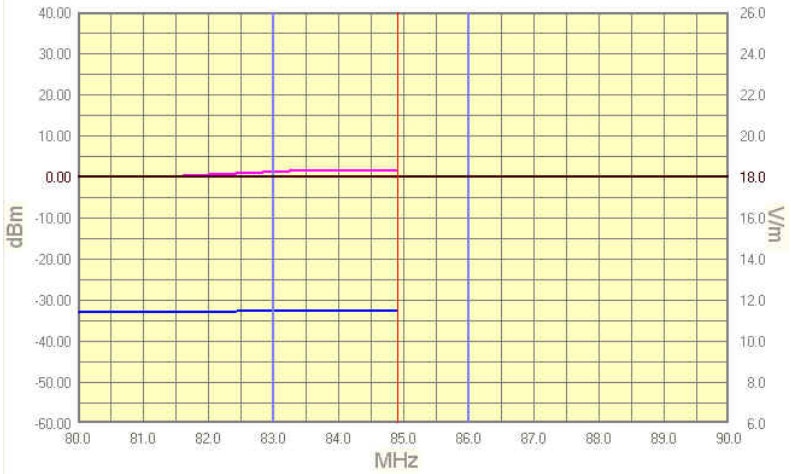




Values outside the selected tolerance will be shown in red; the generator will adjust the level to bring the magnetic field back into range. The color of the dot corresponds to the color of the line on the graph.

During the work session, the frequency range, the generator level, and the magnetic field produced can be viewed graphically 

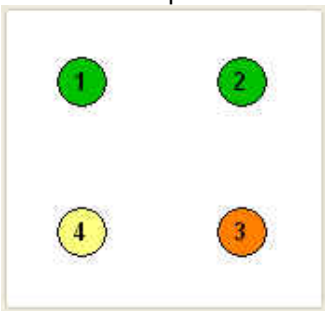
or in table form 


Measures

| Frequency | Points 1 | Points 2 | Points 3 | Points 4 |
|---|---|---|---|---|
| 80.0000 | -32.8 | ----- | ----- | ----- |
| 80.8000 | -32.8 | ----- | ----- | ----- |
| 81.6080 | -32.8 | ----- | ----- | ----- |
| 82.4241 | -32.7 | ----- | ----- | ----- |
| 83.2483 | -32.6 | ----- | ----- | ----- |
| 84.0808 | -32.6 | ----- | ----- | ----- |
| 84.9216 | -32.6 | ----- | ----- | ----- |
| 85.7708 | -32.6 | ----- | ----- | ----- |
| 86.6285 | ----- | ----- | ----- | ----- |
| 87.4948 | ----- | ----- | ----- | ----- |
| 88.3698 | ----- | ----- | ----- | ----- |
| 89.2535 | ----- | ----- | ----- | ----- |
| 90.0000 | ----- | ----- | ----- | ----- |
| | ----- | ----- | ----- | ----- |

Because the immunity test is only valid if there is an area within the shielded chamber where field uniformity complies with the standard, the field sensor has to be arranged in different positions. The program keeps track of those positions in the following window:

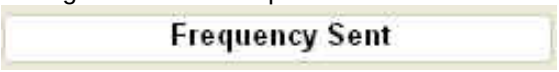



- A *Green* circle indicates that the calibration has been completed.

- An *Orange* circle indicates calibration in course.

- A *Yellow* circle shows where the next calibration will take place.

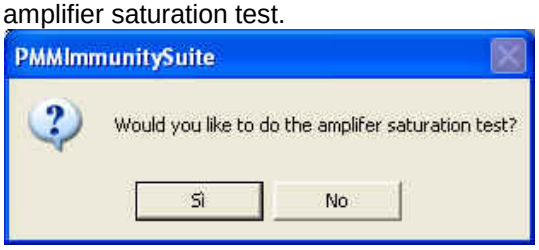
The Status window shows each operation performed by the program during the calibration phase.




Press the **Exit** button to leave **Radiated mode** (the button is deactivated during the calibration phase).

### 3.7.1.1 Amplifier saturation test

When constant field calibration is complete, you may choose to run the amplifier saturation test.

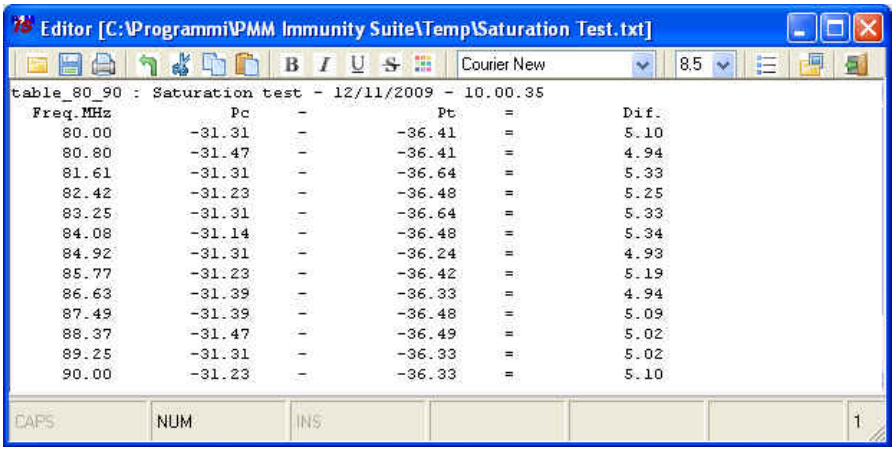



Select **YES** to run the saturation test within the frequency range.


The test verifies the difference specified in EMC regulations between the power calculated during the calibration phase with the limit 1.8 times that of the test (Pc) and the power to be applied during the testing phase (Pt). If the outcome is positive, the amplifier is not saturated and the system is suitable for the immunity test.

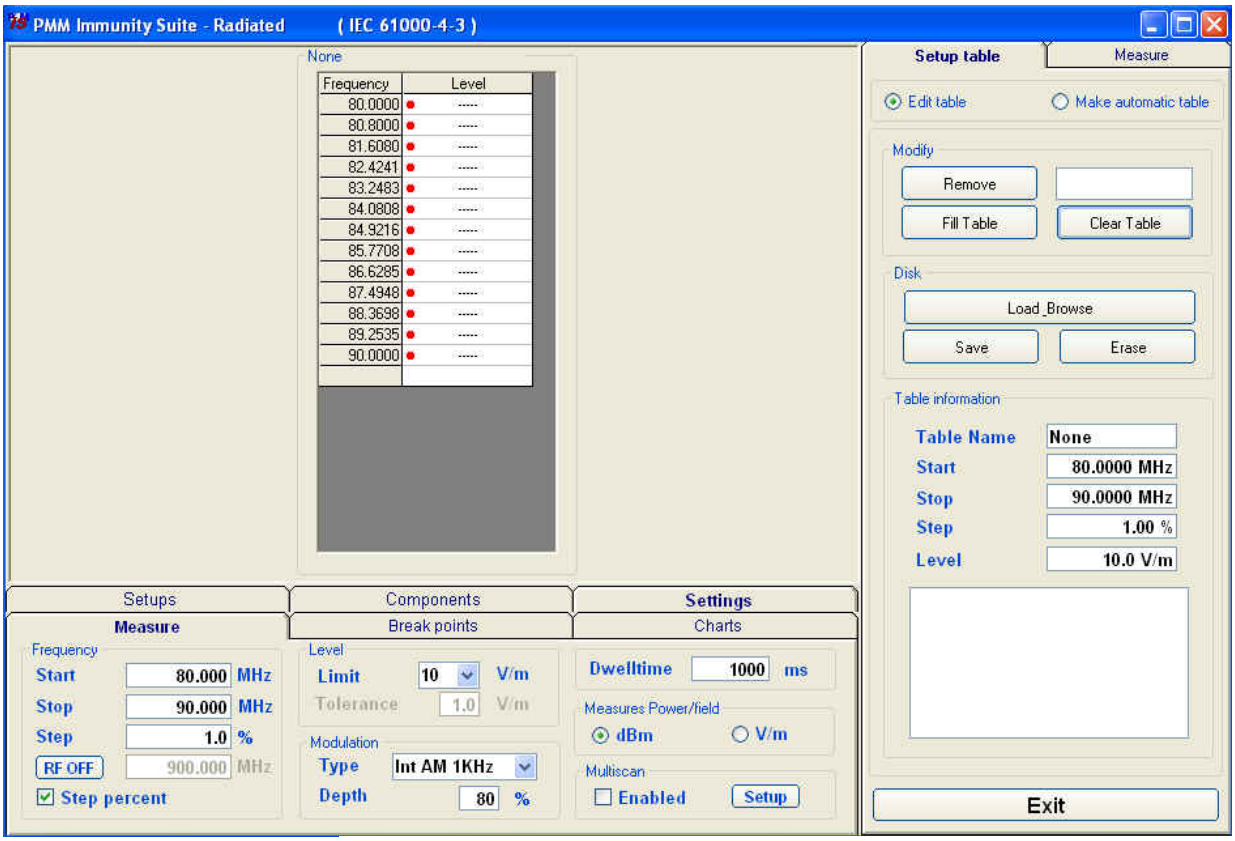
Otherwise, the following message will be displayed:


In both cases, a .txt file is generated at the end of the saturation test; the file is located in the folder **PMM Immunity Test/Temp** and can be viewed from the Editor feature (see the Editor section for further information).



### 3.7.2 Manual table creation

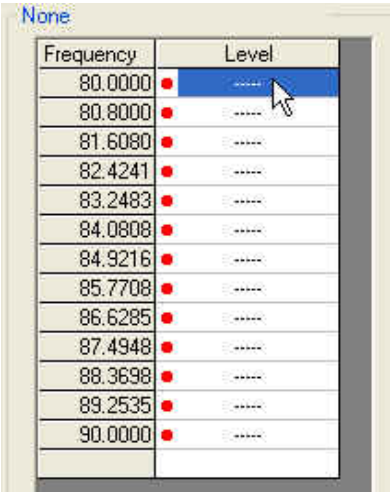
You may also fill in the entire table manually.




Check the information in **Setups, Components** and **Settings.**

Go to **Setup table -> Edit table.**

Select the desired cell, type in the value, and confirm by pressing ENTER.



The amount entered can be deleted by clicking **Remove**.


If several values need to be entered between two end points, use the **Fill Table** command. The required values are generated by a mathematical formula and marked with a red dot.

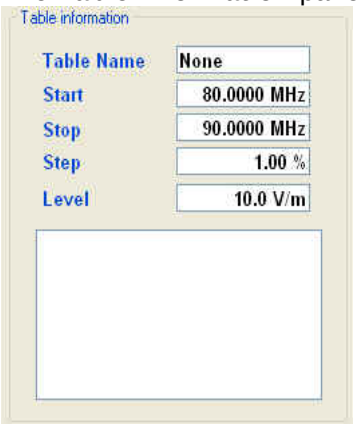
| Frequency | Level |
|---|---|
| 80.0000 | -32.1 |
| 80.8000 | ----- |
| 81.6080 | ----- |
| 82.4241 | ----- |
| 83.2483 | ----- |
| 84.0808 | ----- |
| 84.9216 | ----- |
| 85.7708 | ----- |
| 86.6285 | ----- |
| 87.4948 | ----- |
| 88.3698 | ----- |
| 89.2535 | ----- |
| 90.0000 | -33.1 |

| Frequency | Level |
|---|---|
| 80.0000 | -32.1 |
| 80.8000 | -32.2 |
| 81.6080 | -32.3 |
| 82.4241 | -32.4 |
| 83.2483 | -32.4 |
| 84.0808 | -32.5 |
| 84.9216 | -32.6 |
| 85.7708 | -32.7 |
| 86.6285 | -32.8 |
| 87.4948 | -32.8 |
| 88.3698 | -32.9 |
| 89.2535 | -33.0 |
| 90.0000 | -33.1 |

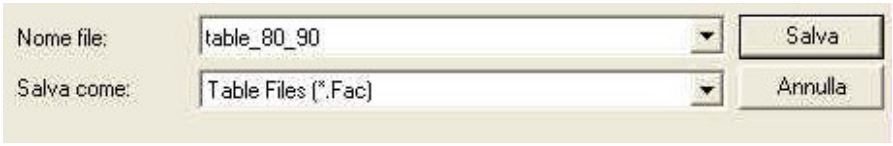
The **Clear Table** command deletes all of the values entered. The command must be confirmed.

| Frequency | Level |
|---|---|
| 80.0000 | -32.1 |
| 80.8000 | -32.2 |
| 81.6080 | -32.2 |
| 82.4241 | -32.3 |
| 83.2483 | -32.4 |
| 84.0808 | -32.5 |
| 84.9216 | ----- |
| 85.7708 | ----- |
| 86.6285 | ----- |
| 87.4948 | ----- |
| 88.3698 | ----- |
| 89.2535 | ----- |
| 90.0000 | ----- |

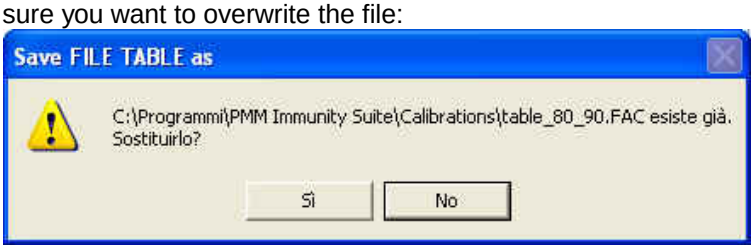

The **Table information** pane displays the main measurement settings.



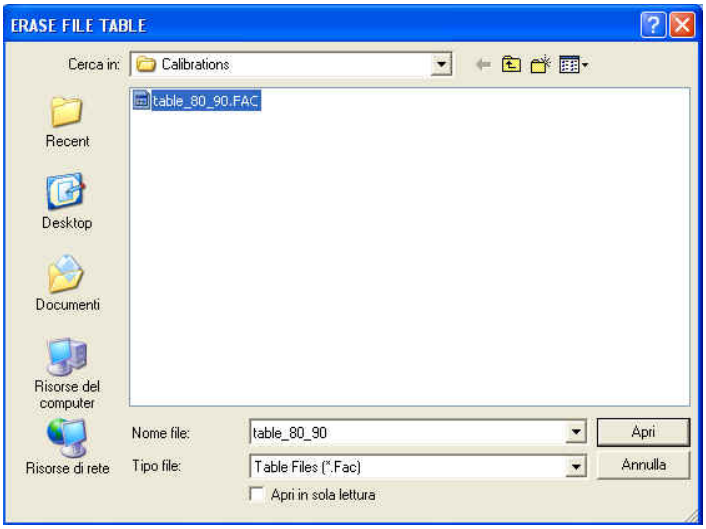
Once all values have been entered, click **Save,** then type in the name of the table and click **Save** again

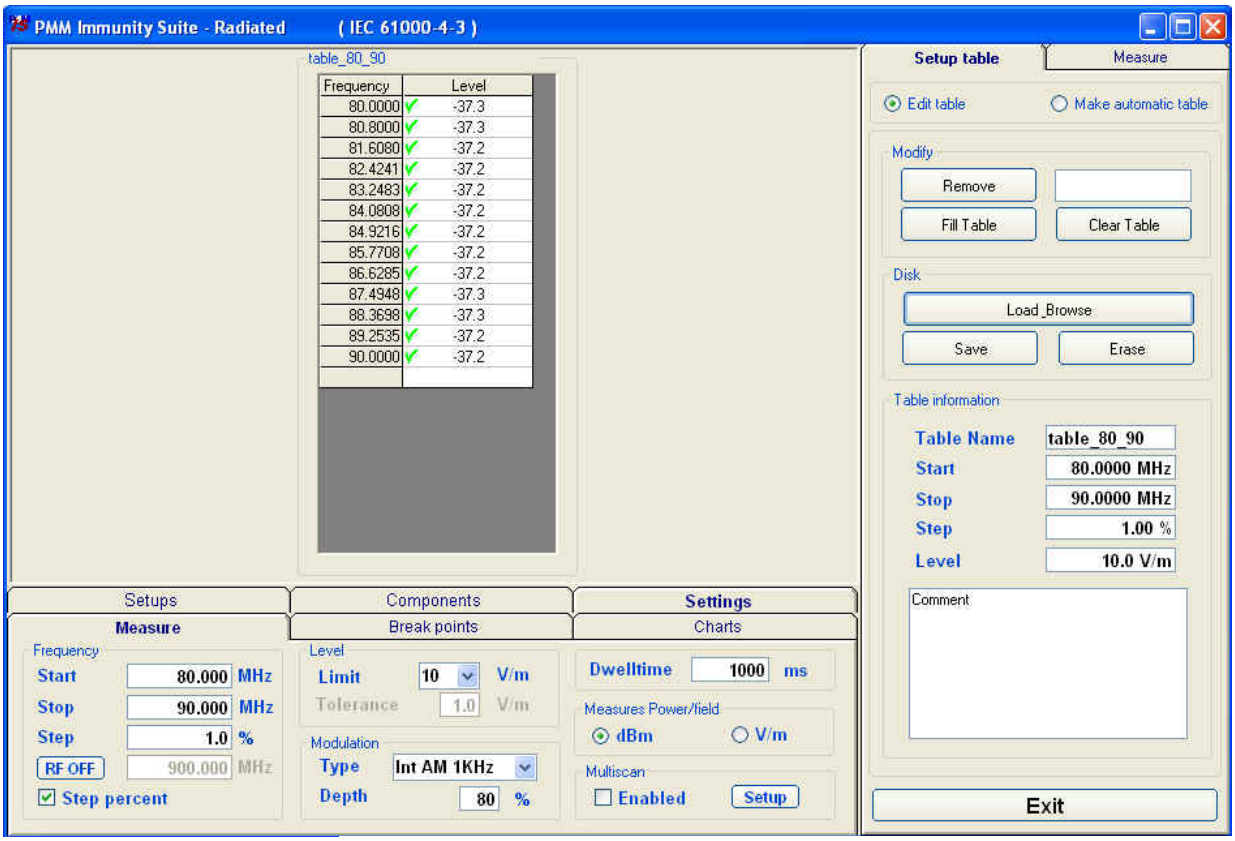

If an existing table is selected, a confirmation message will appear to make sure you want to overwrite the file:




The **Erase** command deletes all data in an existing table. Select the table in the *ERASE FILE TABLE* window and click **Open,** then confirm the command.




### 3.7.3 Modifying an existing table

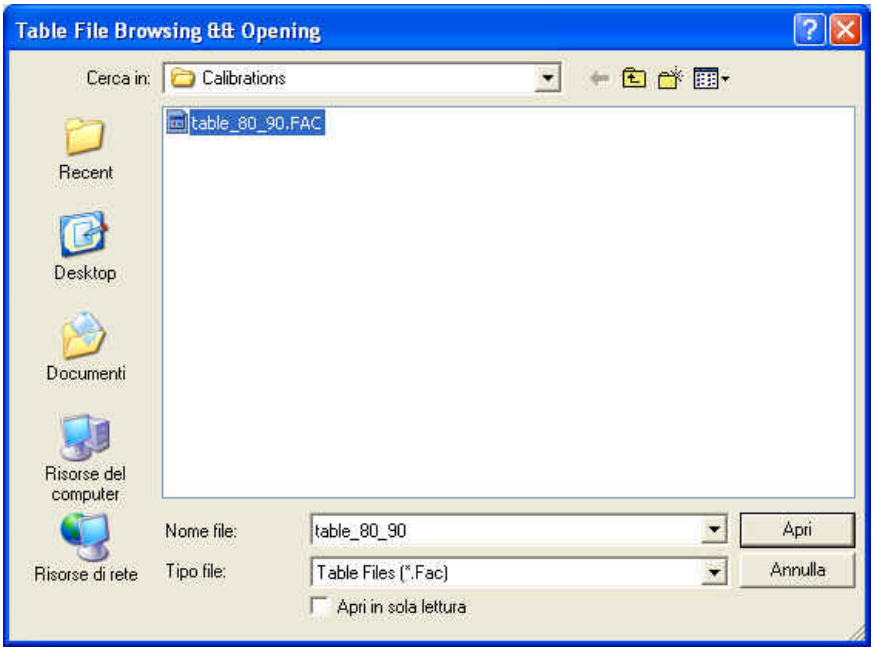



An existing table can be adapted to the instrumentation used.

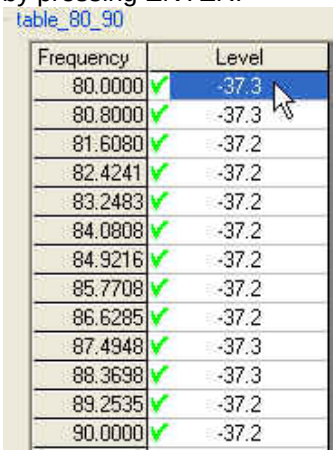
Check the information in **Setups, Components** and **Settings.**

Go to **Setup table -> Edit table**.

Call up a previously created table by clicking **Load_Browse,** then selecting the table in the *Table File Browsing & Opening* window and clicking **Open.**


Select the desired cell, click **Remove,** type in the new value, and confirm by pressing ENTER.




To delete all data, select **Clear Table** and confirm


If several points need to be entered between two end points, use the **Fill Table** command. The required values are generated by a mathematical formula and marked with a red dot.


table_80_90

| Frequency | Level |
|---|---|
| 80.0000 | -37.2 |
| 80.8000 | -37.3 |
| 81.6080 | -37.2 |
| 82.4241 | ---- |
| 83.2483 | ---- |
| 84.0808 | ---- |
| 84.9216 | ---- |
| 85.7708 | ---- |
| 86.6285 | ---- |
| 87.4948 | -37.3 |
| 88.3698 | -37.3 |
| 89.2535 | -37.2 |
| 90.0000 | -37.2 |

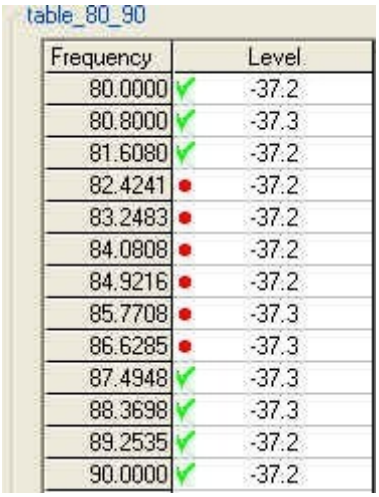
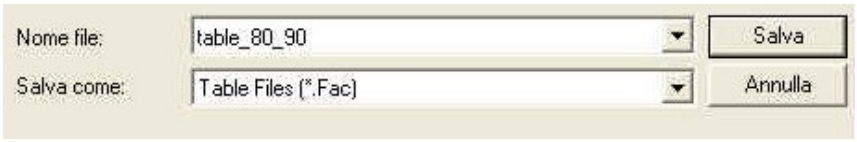


table_80_90

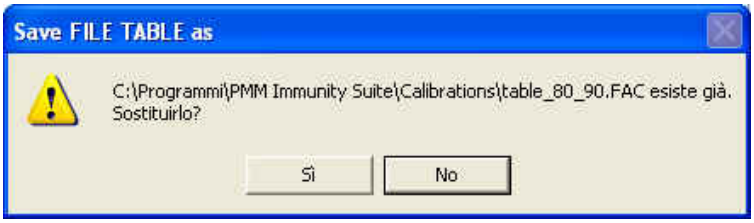
| Frequency | Level |
|---|---|
| 80.0000 | -37.2 |
| 80.8000 | -37.3 |
| 81.6080 | -37.2 |
| 82.4241 | -37.2 |
| 83.2483 | -37.2 |
| 84.0808 | -37.2 |
| 84.9216 | -37.2 |
| 85.7708 | -37.3 |
| 86.6285 | -37.3 |
| 87.4948 | -37.3 |
| 88.3698 | -37.3 |
| 89.2535 | -37.2 |
| 90.0000 | -37.2 |

The **Table information** pane displays the main measurement settings.

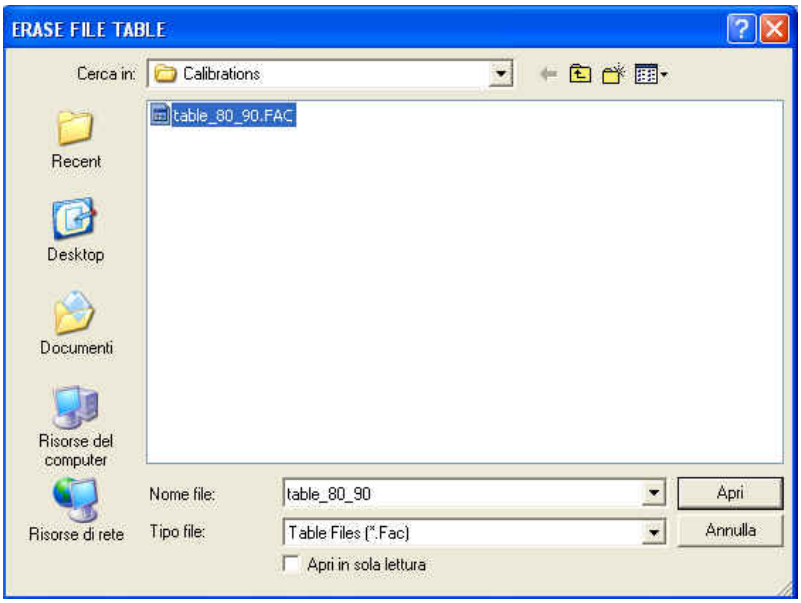
When all changes have been made, click **Save,** then type in the name of the table and click **Save** again.


If an existing table is selected, a confirmation message will appear to make sure you want to overwrite the file.



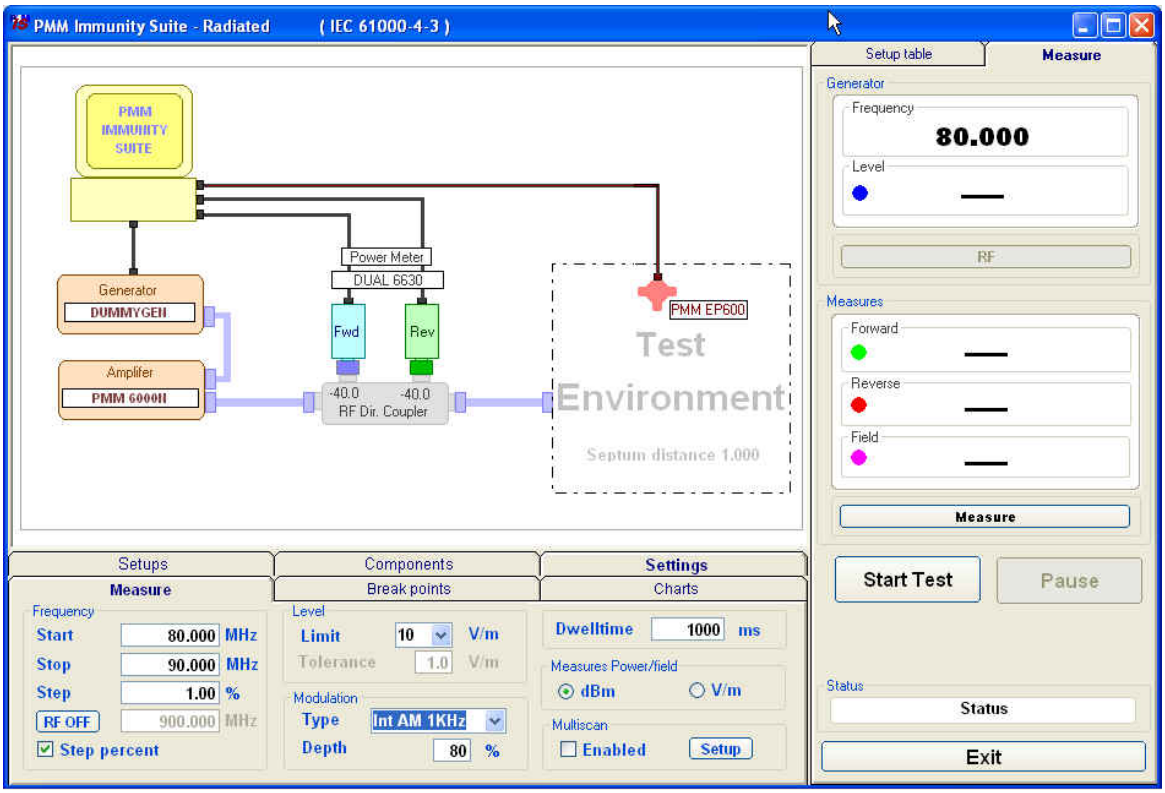

The **Erase** command deletes all data in an existing table. Select the table in the *ERASE FILE TABLE* window and click **Open**.




Confirm as requested.

### 3.8 Radiated immunity test

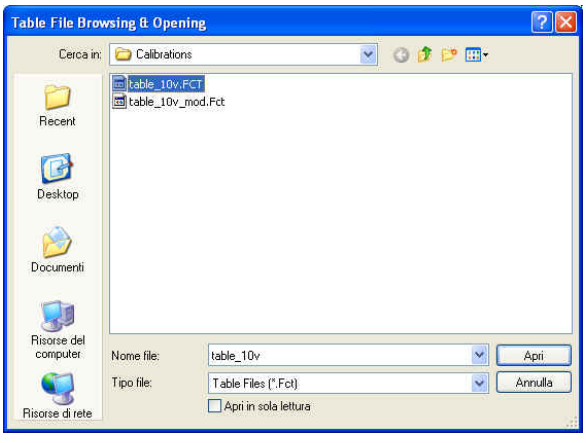
Once the setup table is ready, the radiated immunity test can be run. Go to **Measure**.




Click **Start Test**.

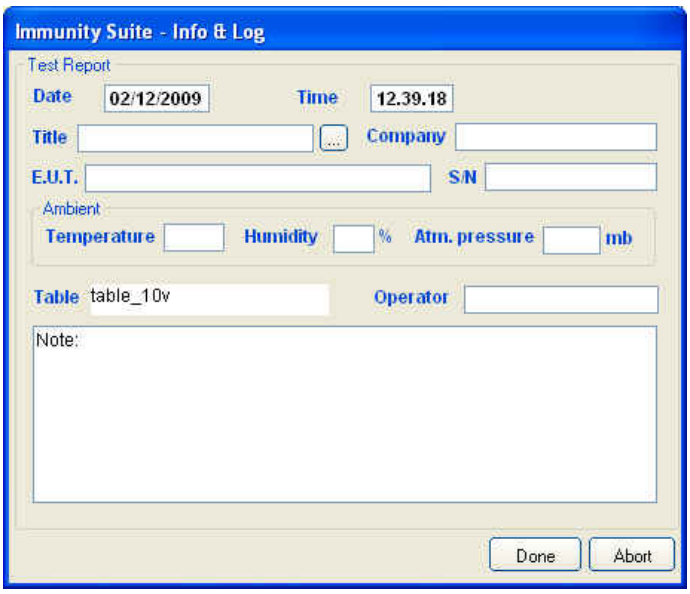
If no setup table has been selected, the following message will appear:


Click OK, then select the table and confirm with **Open.**



Otherwise the message that appears is as follows:


Choose **Yes** to view the *Table File Browsing & Opening* window and select a different table. Choose **No** to use the file shown and open the following data entry window (the date and time are entered automatically).



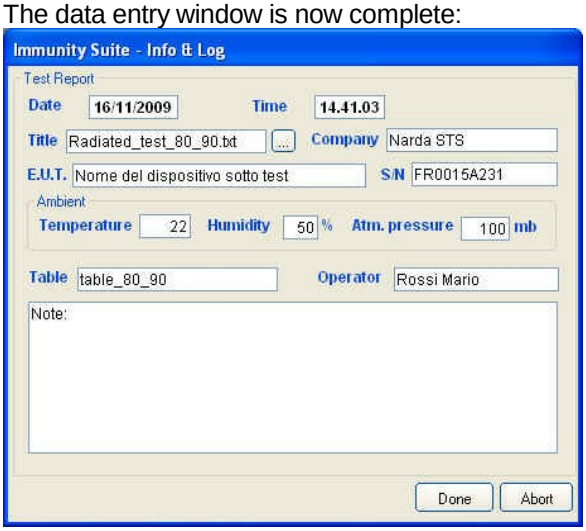

Enter the name of the immunity test.


Click and enter the test name, then **Save**.


If an existing test is selected, a confirmation message will appear.

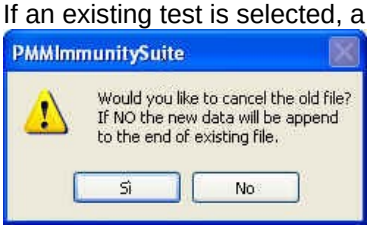

Fill in the fields **Company, E.U.T., S/N, Temperature, Humidity, Atm. Pressure, Operator** and **Note**.

The data entry window is now complete:

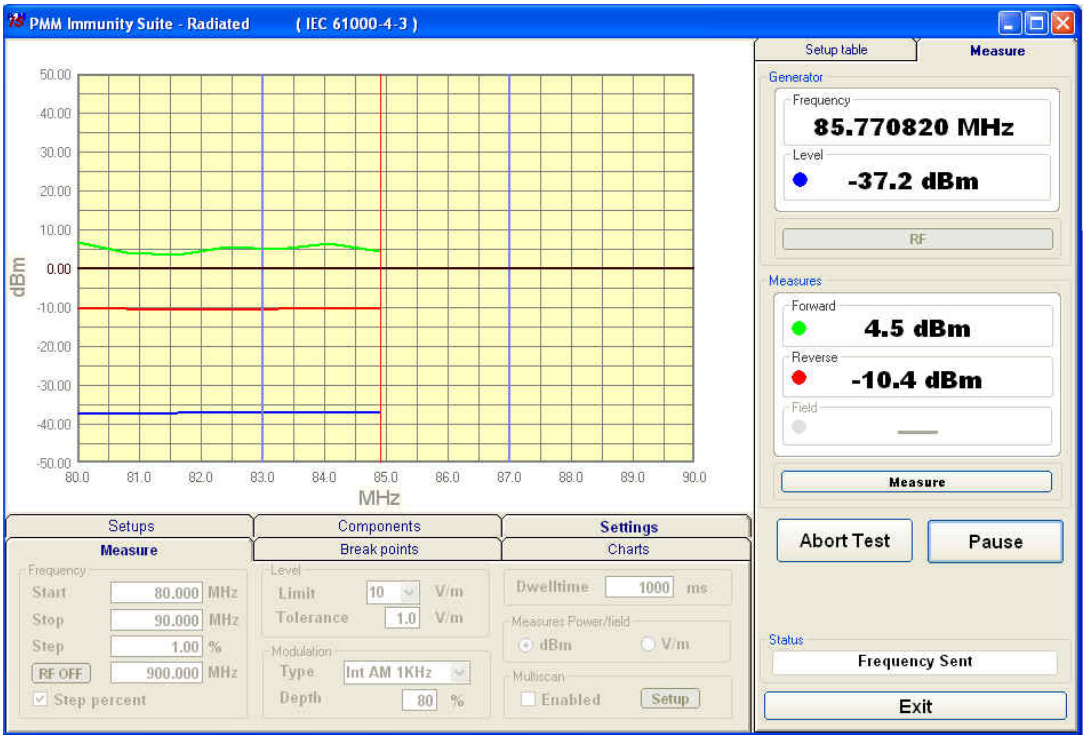



Confirm with **Done** to start the immunity test.

If an existing test is selected, a confirmation message will appear:




Choose **Yes** to overwrite the data with the test in course.
Choose **No** to append the new data.

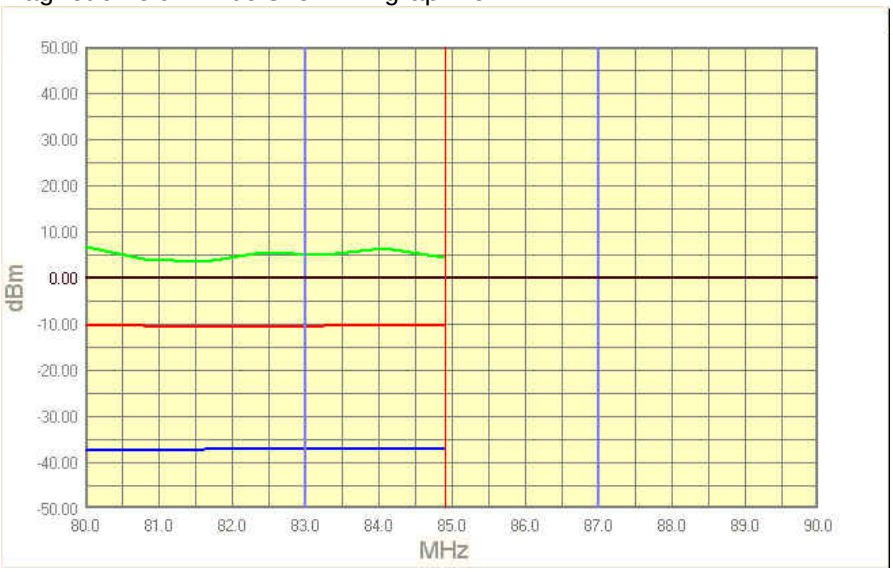


During the test, the **Generator** window shows the level extrapolated from the setup table and used by the generator to obtain a constant magnetic field in the selected frequency range. The color of the dot corresponds to the color of the line on the graph.


The **Measures** pane includes:
- **Forward:** shows the direct power measured by the power sensor.
- **Reverse:** shows the reflected power measured by the power sensor.

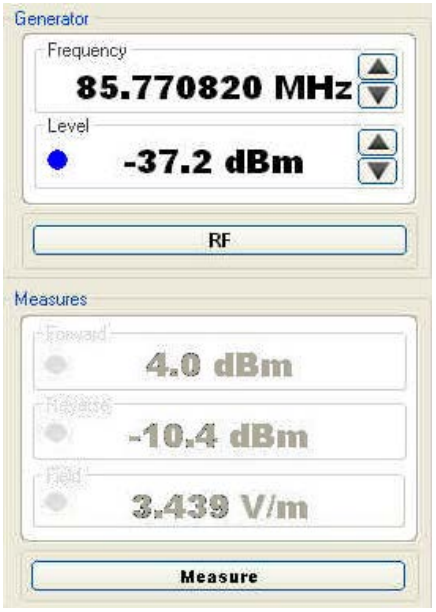
**Field:** shows the magnetic field generated within the cell. The color of the dot corresponds to the color of the line on the graph.


During the immunity test, the frequency range, generator level and magnetic field will be shown in graph form.

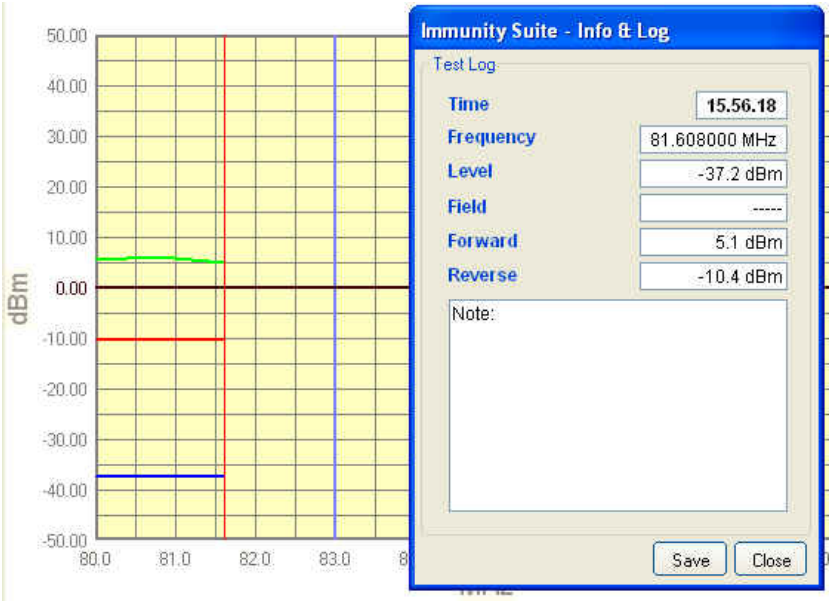



At any time, the test can be terminated by clicking the **Abort Test** button and confirming:

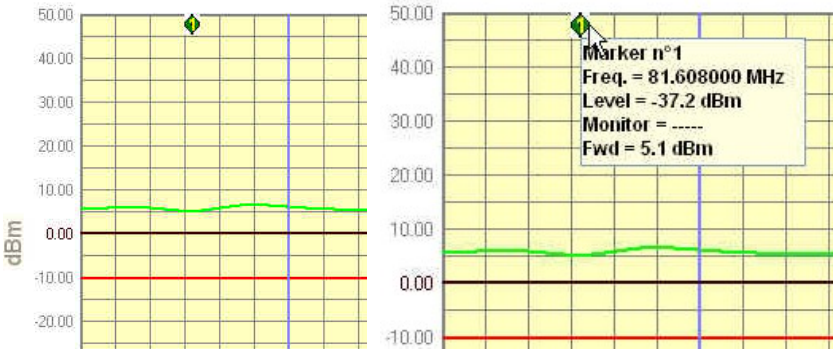
The **Pause** button can also be used at any time to stop the test momentarily (the generator is set to RF OFF). In this state, an earlier situation can be recreated or a later one can be simulated; click the RF button (the generator is set to RF ON), adjust the frequency and level, and click **Measure** to display the values.



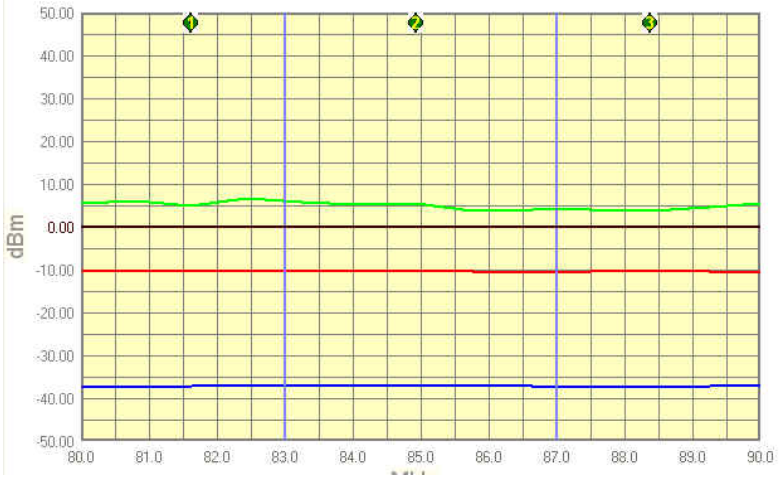

Each time the **Pause** button is clicked, the following window will appear:



Pressing **Save** assigns a marker to the current position for future reference. At the end of the test, the saved information can be viewed simply by hovering the cursor over the marker.

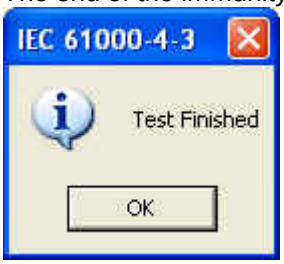



The button will now read **Continue** to resume the test.

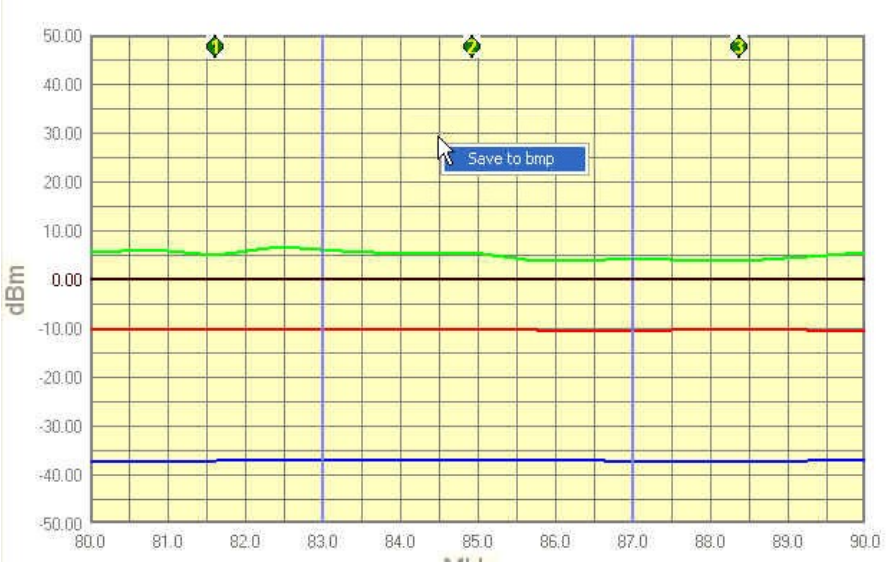



The status window shows each operation performed by the software during the test.


The end of the immunity test will be announced with the message:



When the test is over, the graph can be saved in .bmp format by right-clicking anywhere in the graph and selecting **Save bmp.**




In the next window, assign a name to the graph and press **Save**.


The saved graph can be inserted into a text file using the Editor feature (see the Editor section for details).

Press the **Exit** button to leave the immunity test.

# 4 – PMM Immunity Test Conducted

## 4.1 Introduction to conducted mode


The purpose of the test is to check the immunity of equipment, individual devices or systems to disturbances caused by radiofrequency electromagnetic fields to connection cables, power cords, signal lines and ground wires. The standard for equipment, setup and procedure is EN 61000-4-6

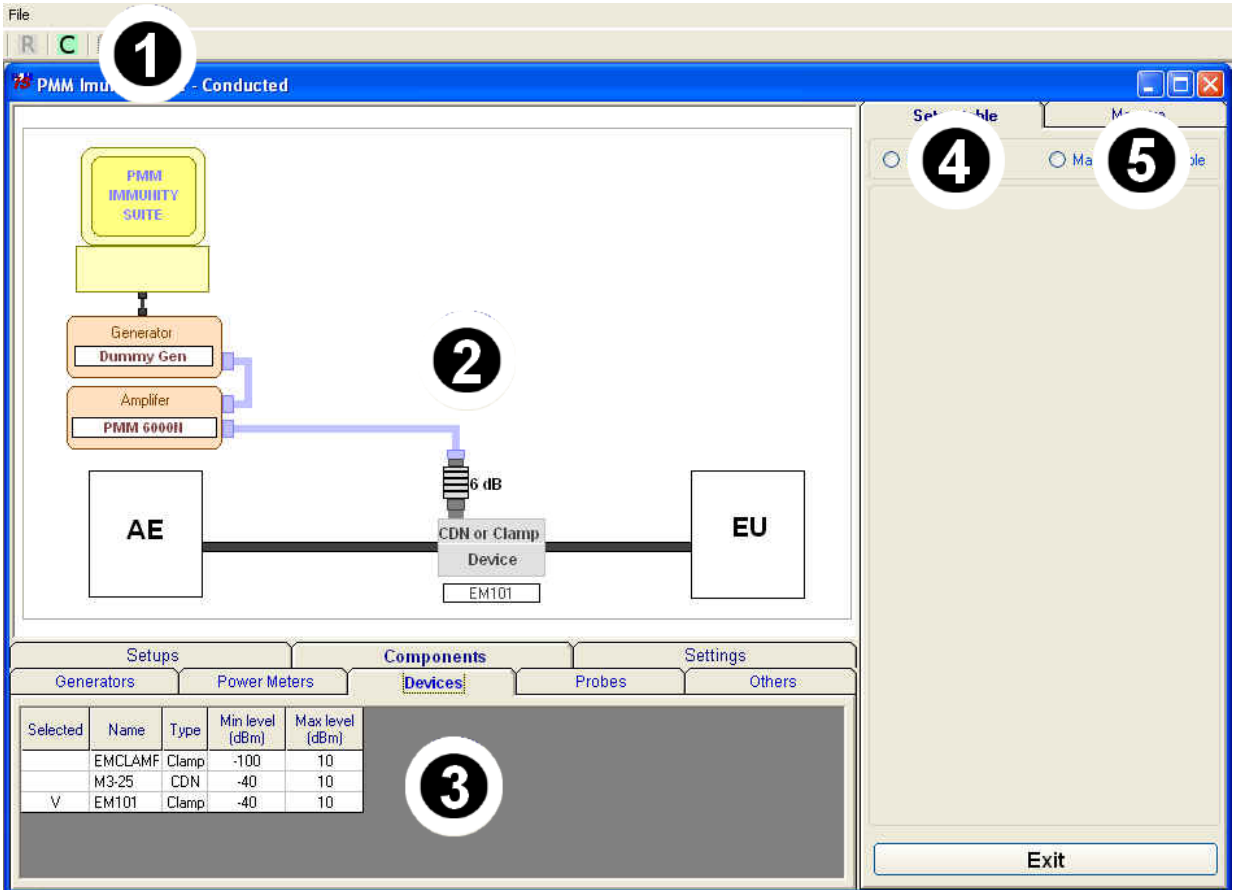




**Fig. 4-1** Main window - Conducted

This window contains:

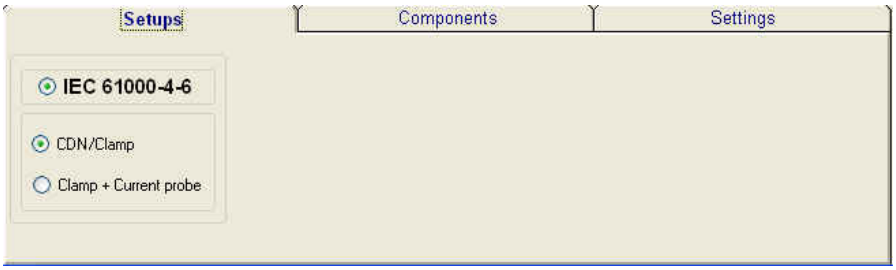
1. Menu
2. Diagram window
3. Function tabs
4. Setup table
5. Measure;

## 4.2 EN 61000-4-6 Setups

Once Conducted mode is launched, the type of setup needs to be chosen. The program offers:

**- CDN/Clamp**

**- Clamp + Current probe**



## 4.3 Equipment selection (Components)

In this phase you will select the equipment to be used during calibration or testing. The program divides equipment by type; for your convenience, drivers from the PMM family can be used. To enable the desired module, double click the corresponding line (a √ will appear next to the instrument selected).

**- Generators:** Lists the available field generators

Generators | Power Meters | Devices | Probes

| Selected | Name | Bus type | Bus addr. | Comm. port | Start freq. (MHz) | Stop freq. (MHz) | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|---|---|---|
| | DUMMY GEN | GPIB | X | 0 | 0.01 | 20000 | -100 | 20 |
| | PMM 3000 | RS232 | X | 3 | 0.01 | 1000 | -80 | 10 |
| | PMM 3030RS | RS232 | X | 1 | 0.009 | 3000 | -107 | 10 |
| V | PMM 3030USB | USB | X | X | 0.009 | 3000 | -107 | 10 |
| | PMM 3010USB | USB | X | X | 0.009 | 1000 | -107 | 10 |
| | PMM 3010RS | RS232 | X | 1 | 0.009 | 1000 | -107 | 10 |

**- Power Meter:** Lists the available power meters

Generators | Power Meters | Devices | Probes

| Selected | Name | Bus type | Bus addr. | Comm. port | Start freq. (MHz) | Stop freq. (MHz) | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|---|---|---|
| | DUMMY PM | USB | X | X | 0.01 | 6000 | -40 | 30 |
| V | PMM 6630 | USB | X | X | 0.009 | 3000 | -40 | 30 |
| | PMM 6600 | RS485 | 1 | 1 | 0.01 | 1000 | -40 | 27 |

**- Device:** Includes all Clamp and CDN models.

Generators | Power Meters | Devices

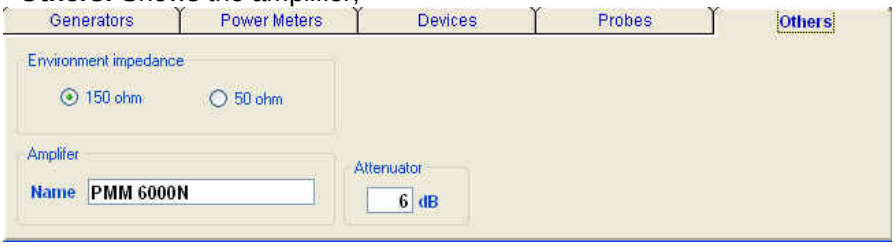
| Selected | Name | Type | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|
| | EMCLAMP | Clamp | -100 | 10 |
| | M3-25 | CDN | -40 | 10 |
| V | EM101 | Clamp | -40 | 10 |

**- Current Probes:** Shows current probes with the names of their calibration files.

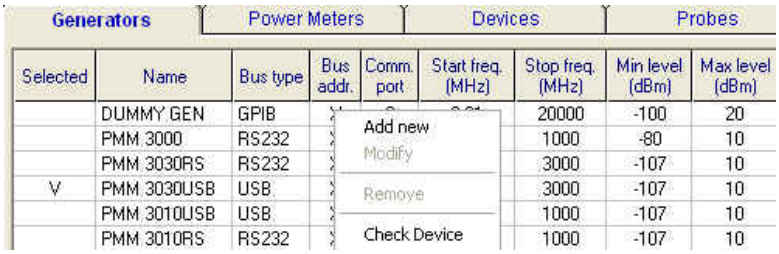
Generators | Power Meters | Devices | Probes

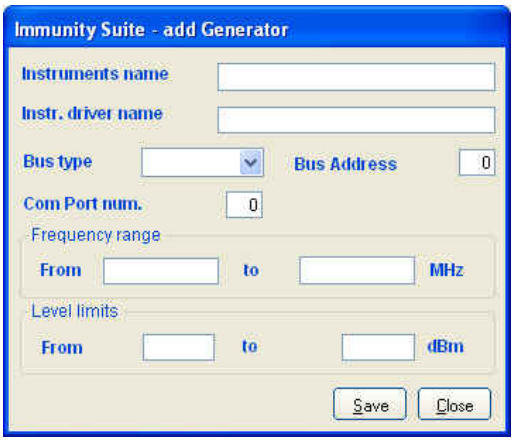
| Selected | Name | Cal .File |
|---|---|---|
| V | 33_1_411 | 33_1_411.cpf |

**- Others:** Shows the amplifier,

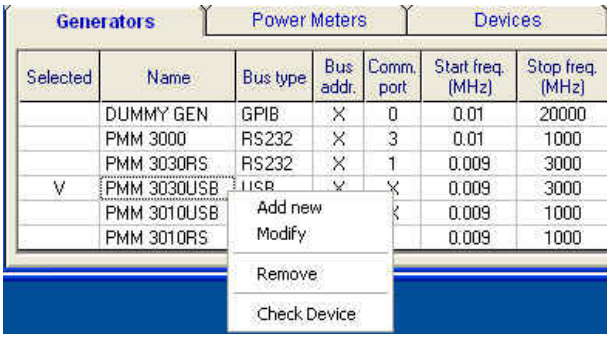


Additional devices can be added to each of these tables by right-clicking and selecting **Add new.**



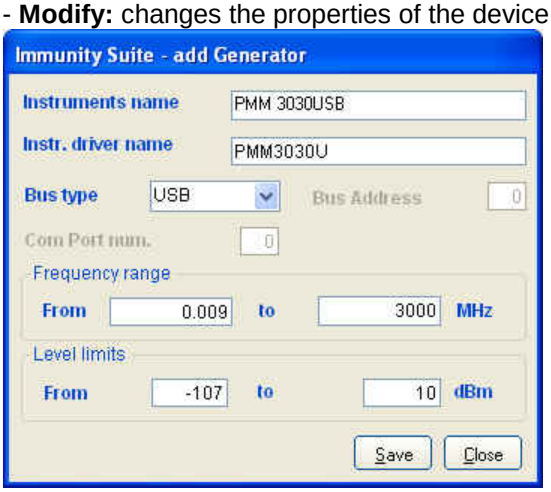

Devices can also be checked, modified or removed by right-clicking from the corresponding line:




NOTE

**For connecting and setting the COM port of fiber optic equipment, see the user manual supplied with the device.**

- **Modify:** changes the properties of the device




- **Remove:** removes the device and its driver from the list.

- **Check Device:** makes sure the driver is working and the device is properly connected. This option is only available for the device selected (√).

If the device is connected and the driver has been correctly installed, the following message will appear:


This message will appear if the device has not been connected properly to the work setup

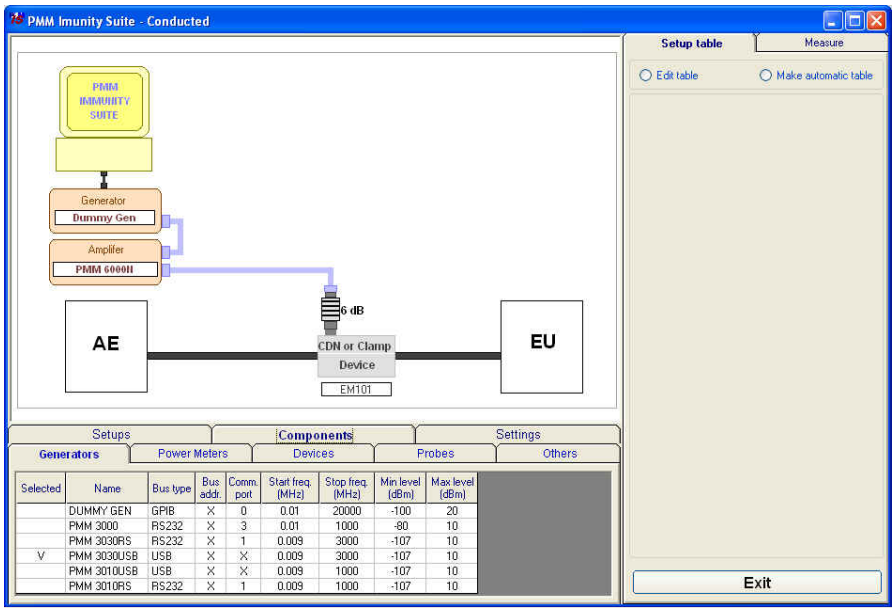

If the driver of the device has not been installed properly, the screen will show:



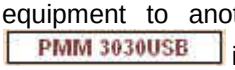
We recommend performing a device check before starting the calibration phase or immunity test. In any case, before calibration or testing, the program runs an automatic check and reports any errors as described above.

## 4.4 Diagram window

The diagram window shows the setup to be followed on the basis of the equipment selected.




The selected devices (√) are shown at the bottom of the pane.

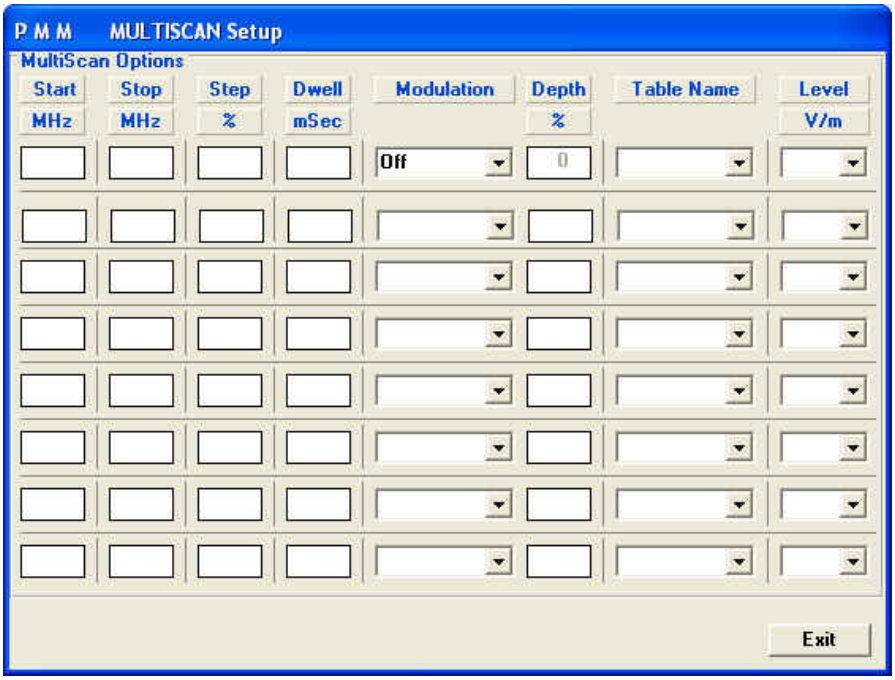
In addition to using the Components tab, you can move from one type of equipment to another by clicking the label with the device's name 

in the diagram window

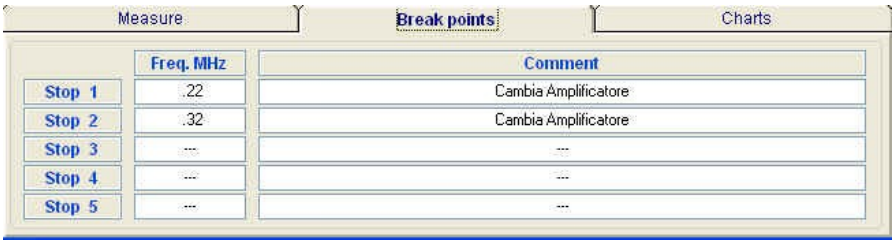
## 4.5 Settings

After performing the setup shown in the diagram window, the calibration test parameters need to be set using the **Measure** tab:


The **Multiscan** feature allows you to modify measurement parameters within a given frequency range.



With the **Break Points** tab, you can set the frequencies at which measurement will be temporarily suspended to allow a change in setup.

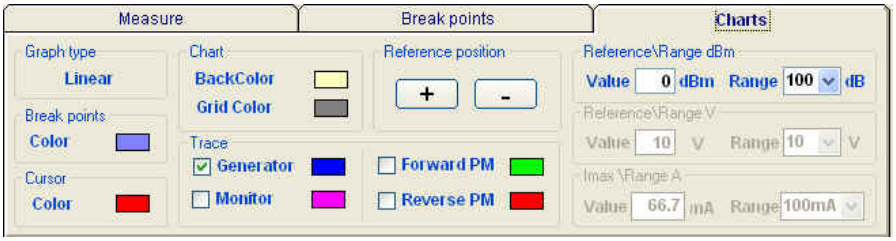



Each time the stop frequency is reached, a message will display the scheduled action.


The break points are shown as vertical stripes in the graph.

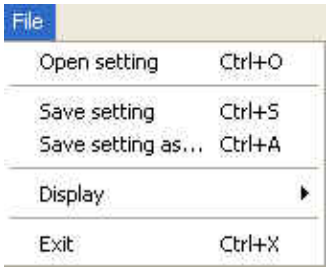
Click **OK** to continue measuring.

The **Charts** tab allows visual modifications to suit your preferences. For each element, click on the color shown, and change it using the Windows color box if desired.
In this tab, you can also move the reference level along the y-axis (+ and - buttons), or change the power level and range (in dBm), the voltage (in V) and the current (in mA).



## 4.6 Settings management

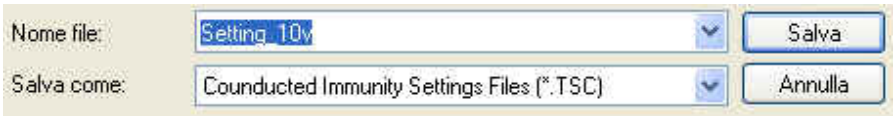
For each new session, the default file CondDefault.tsc is loaded. To avoid having to re-enter preferred settings, they can be saved in a single .tsc file:



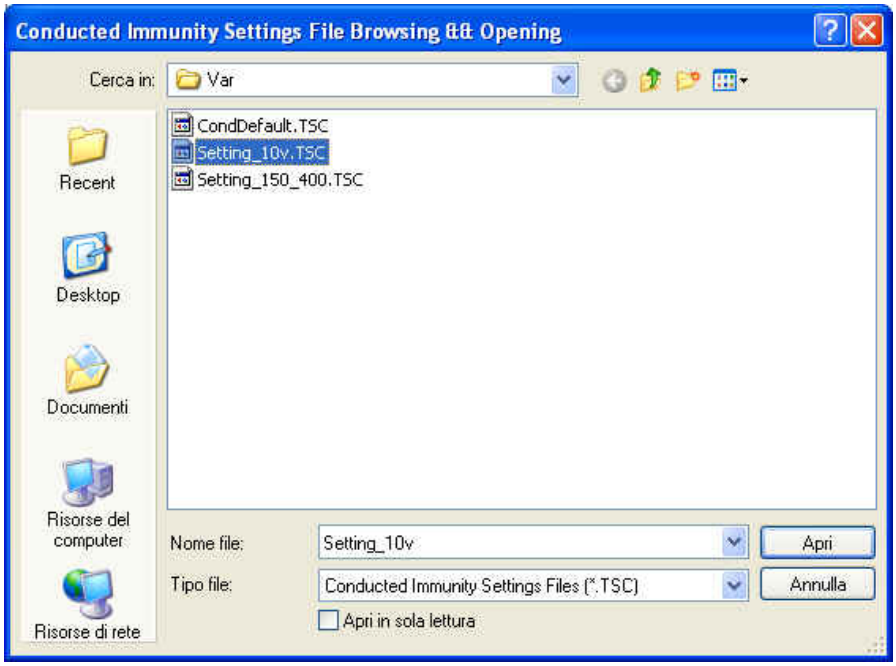

The command **File -> Save setting** overwrites the file in use. If no file was called up when the program was opened, the default file will be overwritten: The following message will appear


Choose **YES** to overwrite the file in use. Choose **NO** to cancel the operation and return to the main window.

**File -> Save setting as...** Enter the file name assigned to the work session and press **Save**.




The file can be called up at any time with the command **File -> Open setting.**

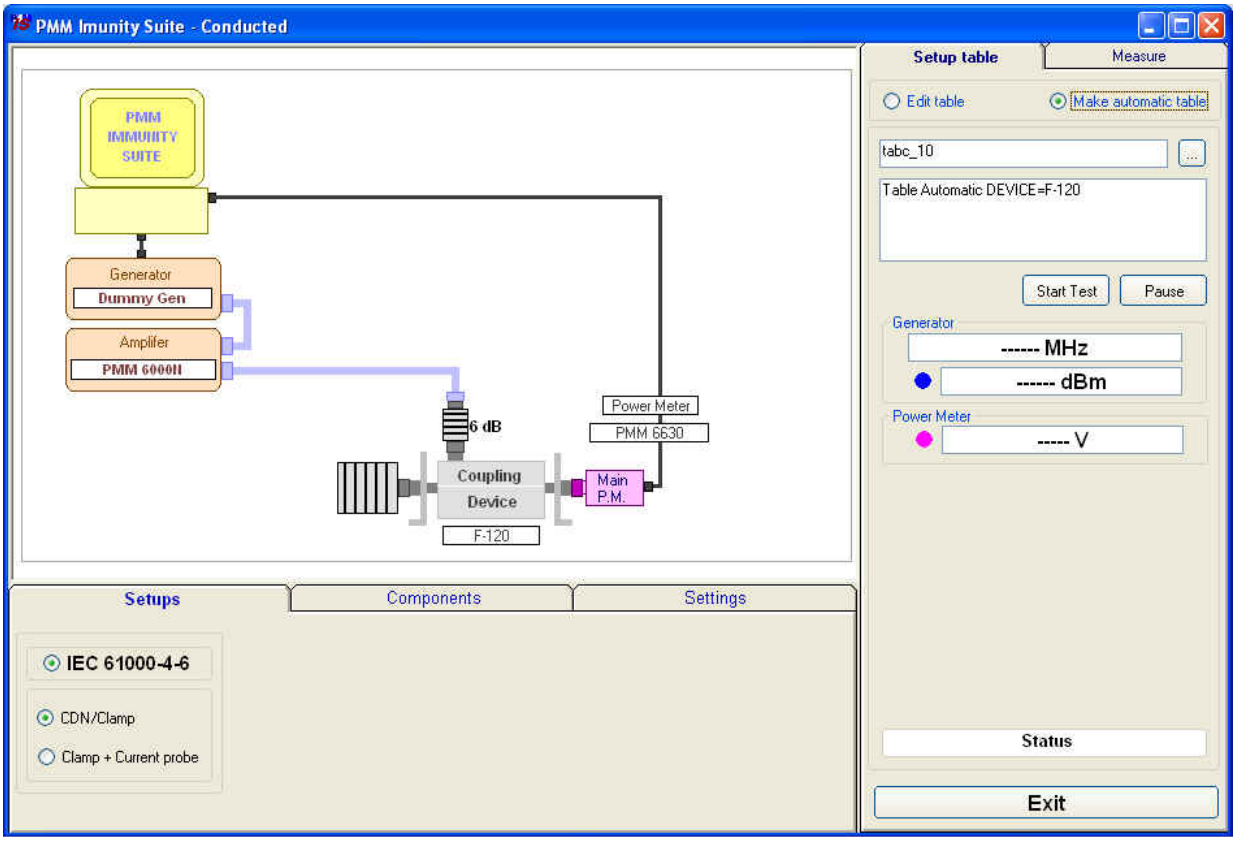



**File -> Display -> Default colors** is used to restore the original display.

## 4.7 System calibration

You can now calculate the levels assigned to the generator in order to have a constant voltage within the chosen frequency range.

Arrange the setup as shown in the graph:




### 4.7.1 Setup table

There are different ways to create the table:

- Automatically (select **Make automatic table)**

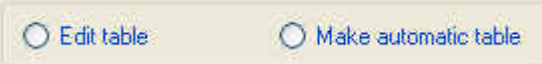
- By adapting the automatically created table to the instrumentation used (select **Edit table)**

- By completing the entire table manually (select **Edit table)**

#### 4.7.1.1 Automatic table creation

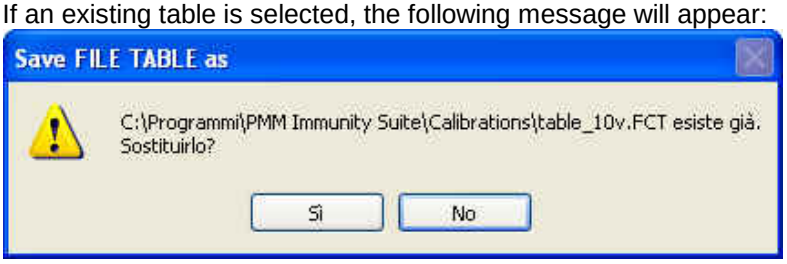
To create a table automatically:

- Select **Make automatic table**



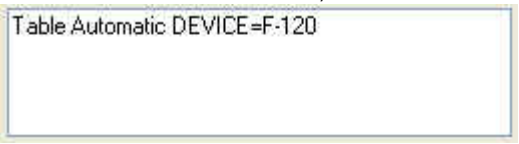

- Select  , assign a name to the table and press **Save**.


If an existing table is selected, the following message will appear:

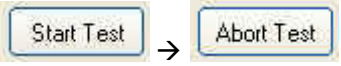



Choose **YES** to overwrite the table.
Choose **NO** to cancel the operation and return to the main window.

- A comment can be added, if desired.

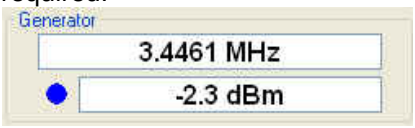



- Press **Start test**, then **Abort test** if you wish to terminate the process at any time.



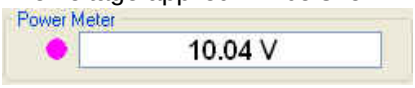

A **Pause button is also available,** and becomes **Continue** to resume the process.

The **Generator** window shows the level (in dBm) entered by the generator, at a given frequency (in MHz), to generate the voltage required.




The color of the dot corresponds to the color of the line on the graph.

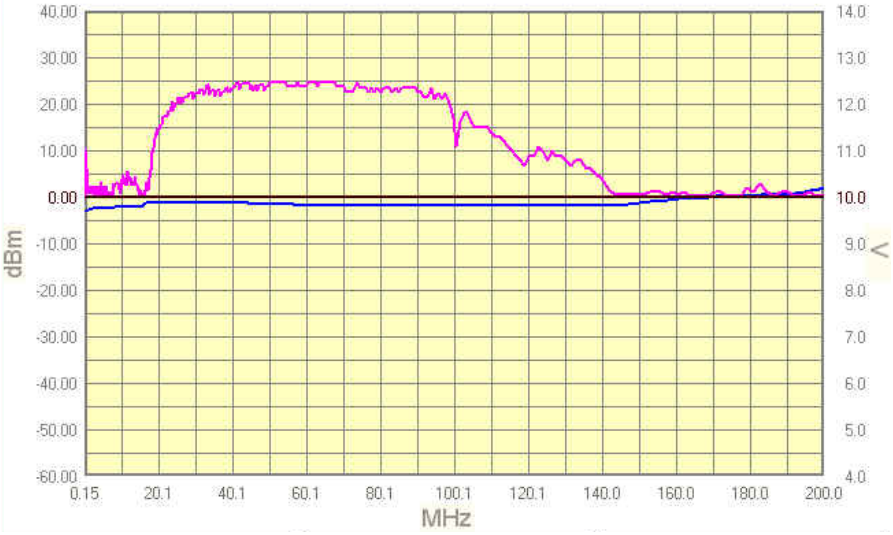
The voltage applied will be shown in the **Power Meter** window**.**





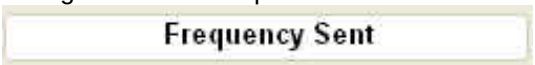
Values outside the selected tolerance will be shown in red; the generator will adjust the level to bring the voltage back into range. The color of the dot corresponds to the color of the line on the graph.

During the work session, the generator level and voltage within the frequency range selected will be shown as a graph.

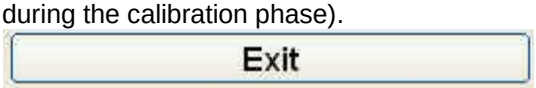



Wait for the calibration to finish.


The Status window shows each operation performed by the program during the calibration phase.

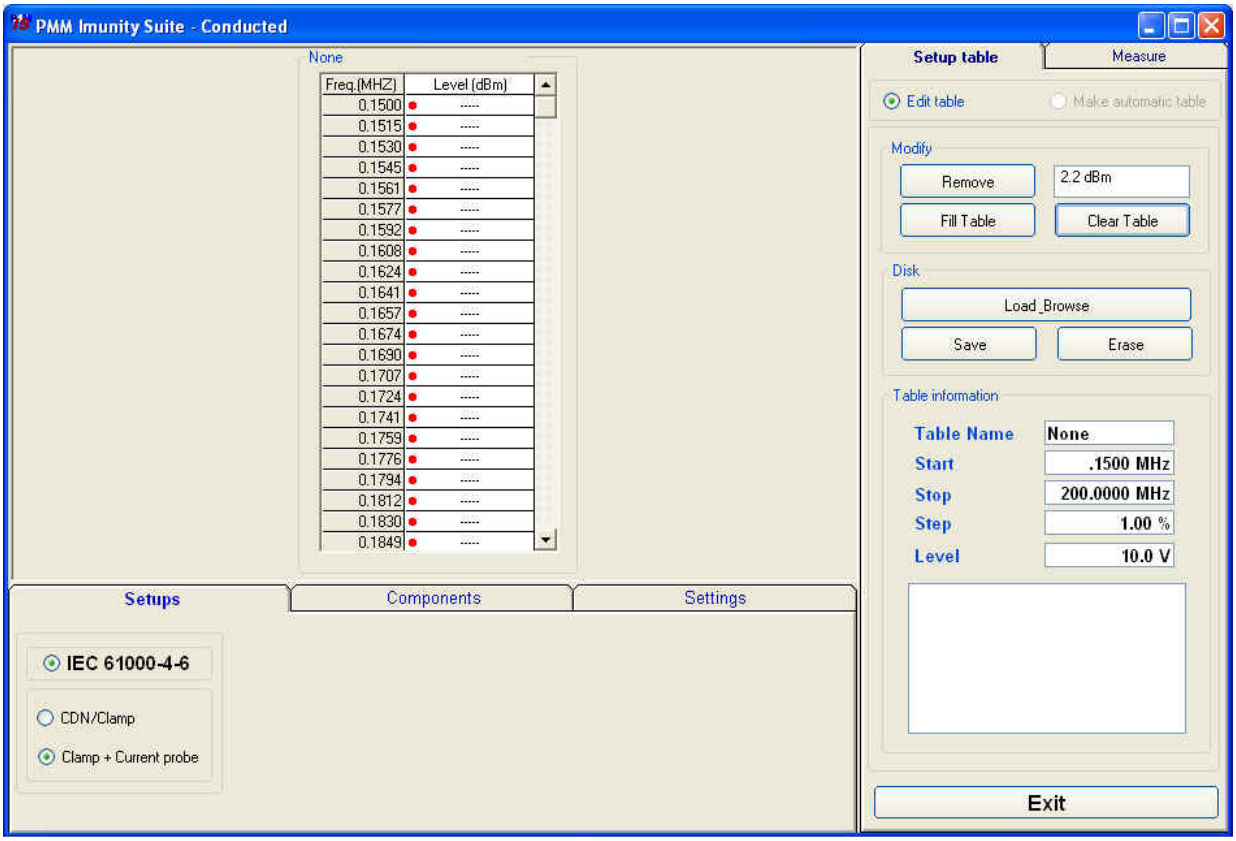



Press the **Exit** button to leave **Conducted mode** (the button is deactivated during the calibration phase).



### 4.7.1.2 Manual table creation

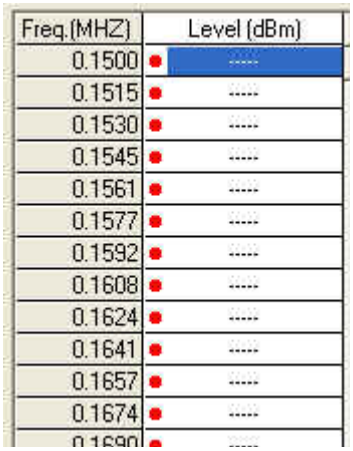
You may also fill in the entire table manually.




Check the information in **Setups, Components** and **Settings.**

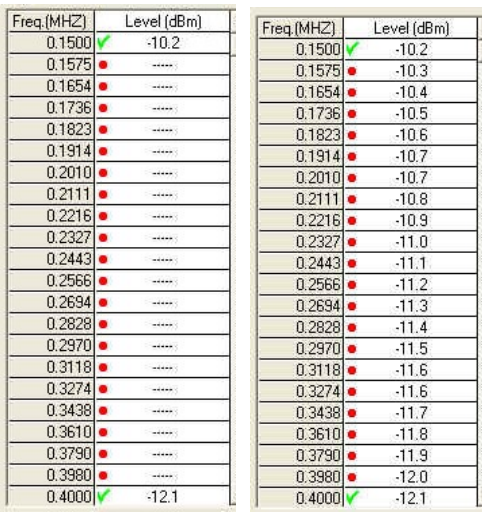
Go to **Setup table -> Edit table.**

Select the desired cell, type in the value, and confirm by pressing ENTER.



The amount entered can be deleted by clicking **Remove**.

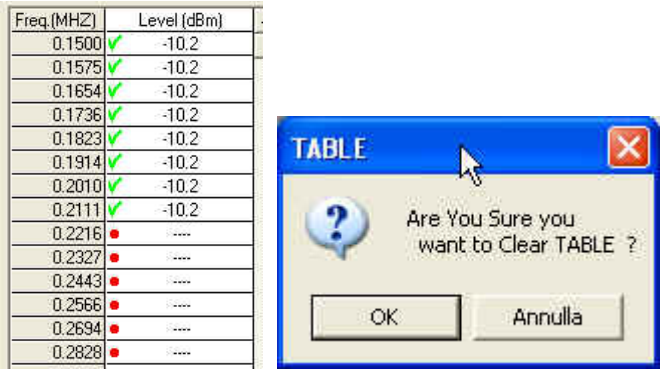

If several values need to be entered between two end points, use the **Fill Table** command. The required values are generated by a mathematical formula and marked with a red dot.



| Freq.(MHZ) | Level (dBm) |
|---|---|
| 0.1500 | -10.2 |
| 0.1575 | ----- |
| 0.1654 | ----- |
| 0.1736 | ----- |
| 0.1823 | ----- |
| 0.1914 | ----- |
| 0.2010 | ----- |
| 0.2111 | ----- |
| 0.2216 | ----- |
| 0.2327 | ----- |
| 0.2443 | ----- |
| 0.2566 | ----- |
| 0.2694 | ----- |
| 0.2828 | ----- |
| 0.2970 | ----- |
| 0.3118 | ----- |
| 0.3274 | ----- |
| 0.3438 | ----- |
| 0.3610 | ----- |
| 0.3790 | ----- |
| 0.3980 | ----- |
| 0.4000 | -12.1 |

| Freq.(MHZ) | Level (dBm) |
|---|---|
| 0.1500 | -10.2 |
| 0.1575 | -10.3 |
| 0.1654 | -10.4 |
| 0.1736 | -10.5 |
| 0.1823 | -10.6 |
| 0.1914 | -10.7 |
| 0.2010 | -10.7 |
| 0.2111 | -10.8 |
| 0.2216 | -10.9 |
| 0.2327 | -11.0 |
| 0.2443 | -11.1 |
| 0.2566 | -11.2 |
| 0.2694 | -11.3 |
| 0.2828 | -11.4 |
| 0.2970 | -11.5 |
| 0.3118 | -11.6 |
| 0.3274 | -11.6 |
| 0.3438 | -11.7 |
| 0.3610 | -11.8 |
| 0.3790 | -11.9 |
| 0.3980 | -12.0 |
| 0.4000 | -12.1 |

The **Clear Table** command deletes all of the values entered. The command must be confirmed.



| Freq.(MHZ) | Level (dBm) |
|---|---|
| 0.1500 | -10.2 |
| 0.1575 | -10.2 |
| 0.1654 | -10.2 |
| 0.1736 | -10.2 |
| 0.1823 | -10.2 |
| 0.1914 | -10.2 |
| 0.2010 | -10.2 |
| 0.2111 | -10.2 |
| 0.2216 | ---- |
| 0.2327 | ---- |
| 0.2443 | ---- |
| 0.2566 | ---- |
| 0.2694 | ---- |
| 0.2828 | ---- |

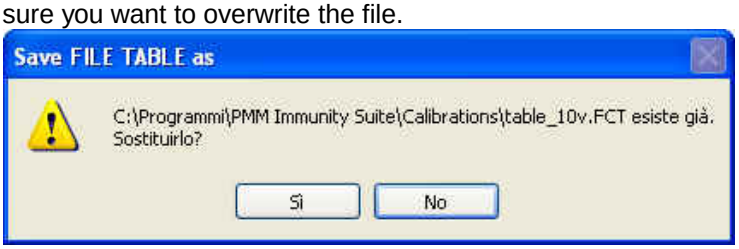


The **Table information** pane displays the main measurement settings:

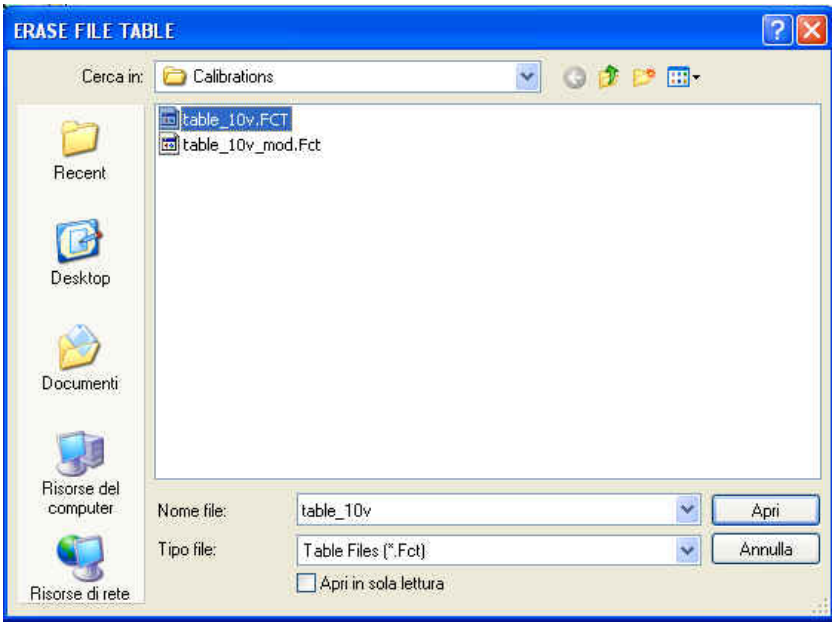
Once all values have been entered, click **Save,** then type in the name of the table and click **Save** again.



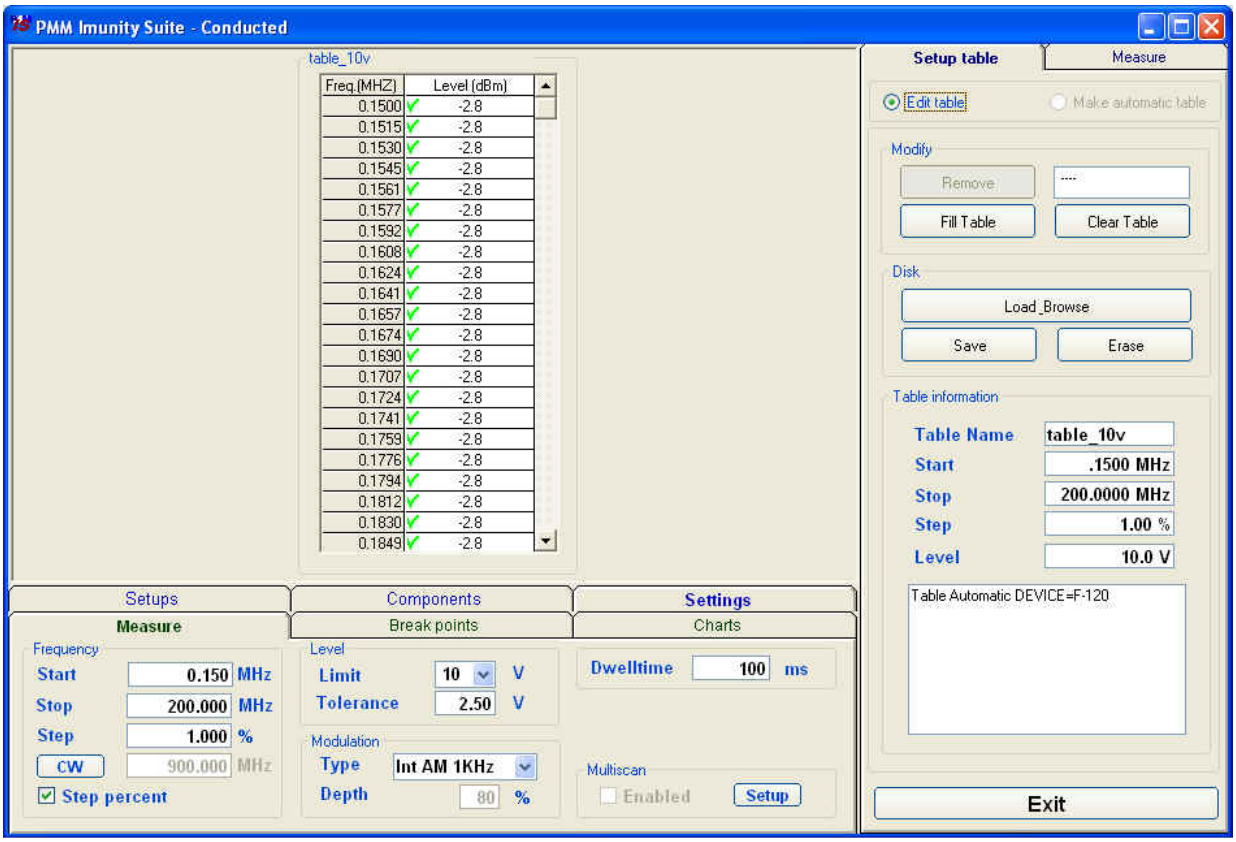
If an existing table is selected, a confirmation message will appear to make sure you want to overwrite the file.




The **Erase** command deletes all data in an existing table. Select the table in the *ERASE FILE TABLE* window and click **Open,** then confirm the command.




### 4.7.1.3 Modifying an existing table

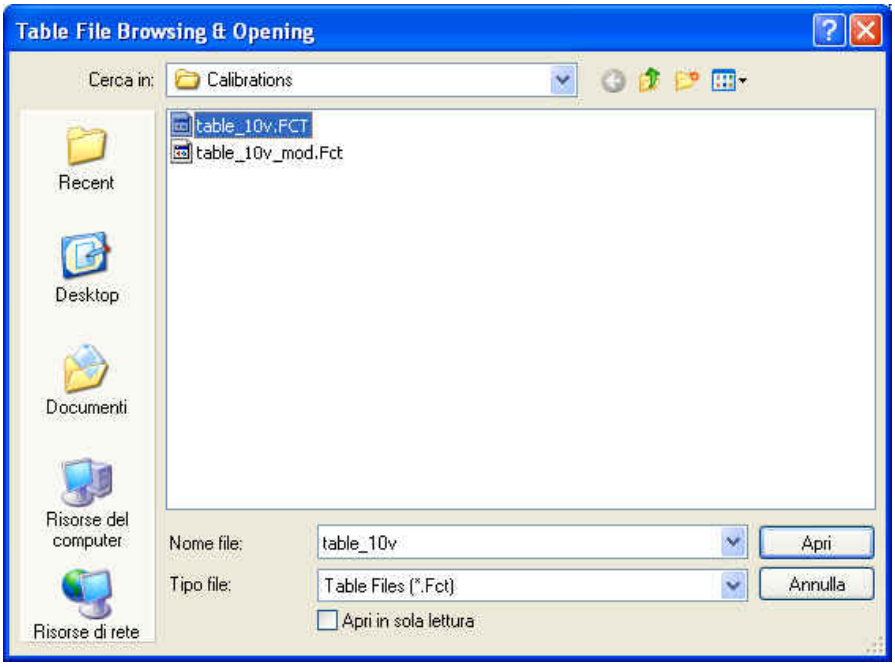



An existing table can be adapted to the instrumentation used.

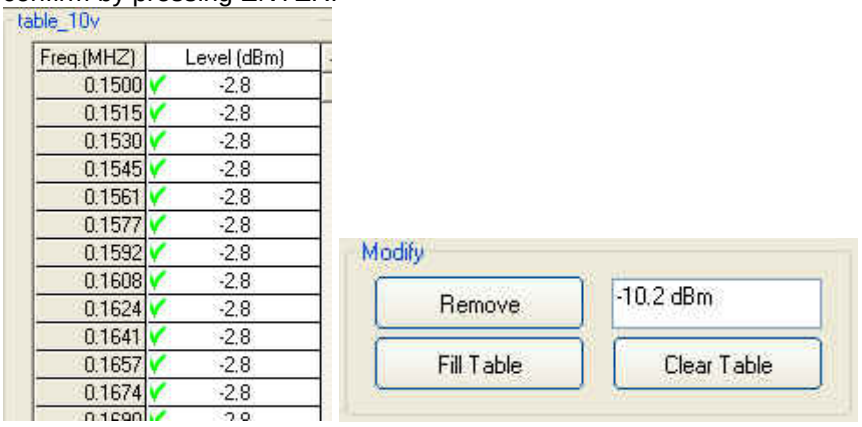
Check the information in **Setups, Components** and **Settings.**

Go to **Setup table -> Edit table**.

Call up a previously created table by clicking **Load_Browse,** then selecting the table and clicking **Open.**

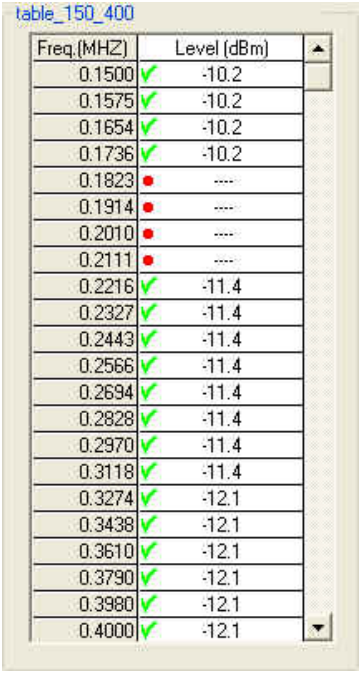



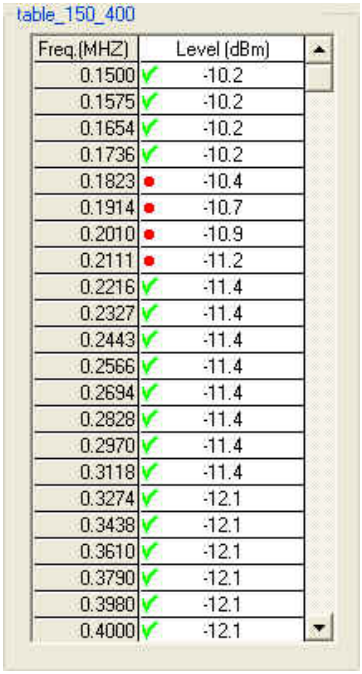

Select the desired cell, click **Remove,** type in the new value, and confirm by pressing ENTER.



To delete all data, select **Clear Table** and confirm.


If several values need to be entered between two end points, use the **Fill Table** command. The required values are generated by a mathematical formula and marked with a red dot.



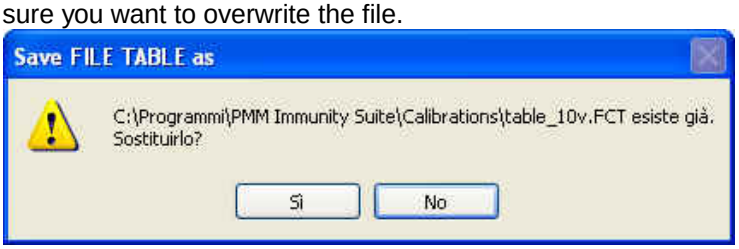




The **Table information** pane displays the main measurement settings.

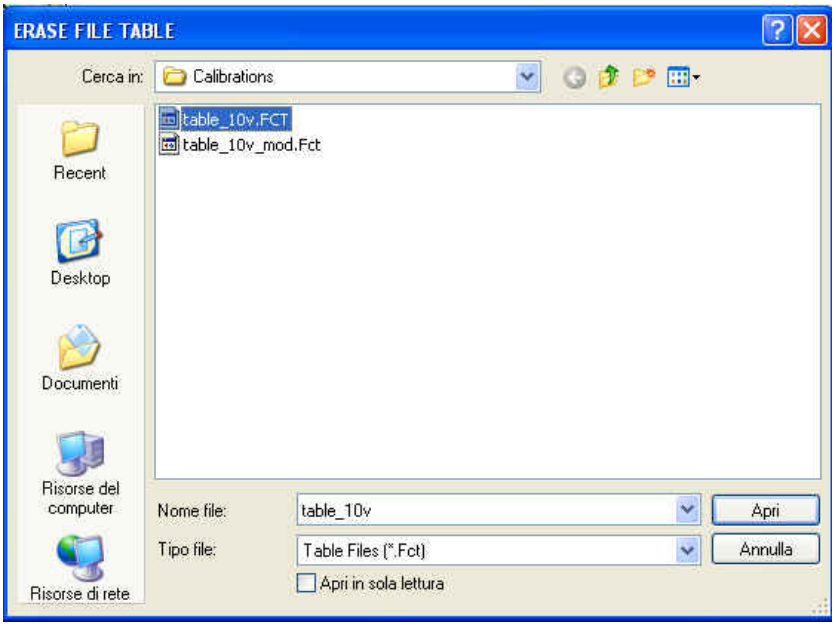
Once all values have been entered, click **Save,** then type in the name of the table and click **Save** again.



If an existing table is selected, a confirmation message will appear to make sure you want to overwrite the file.



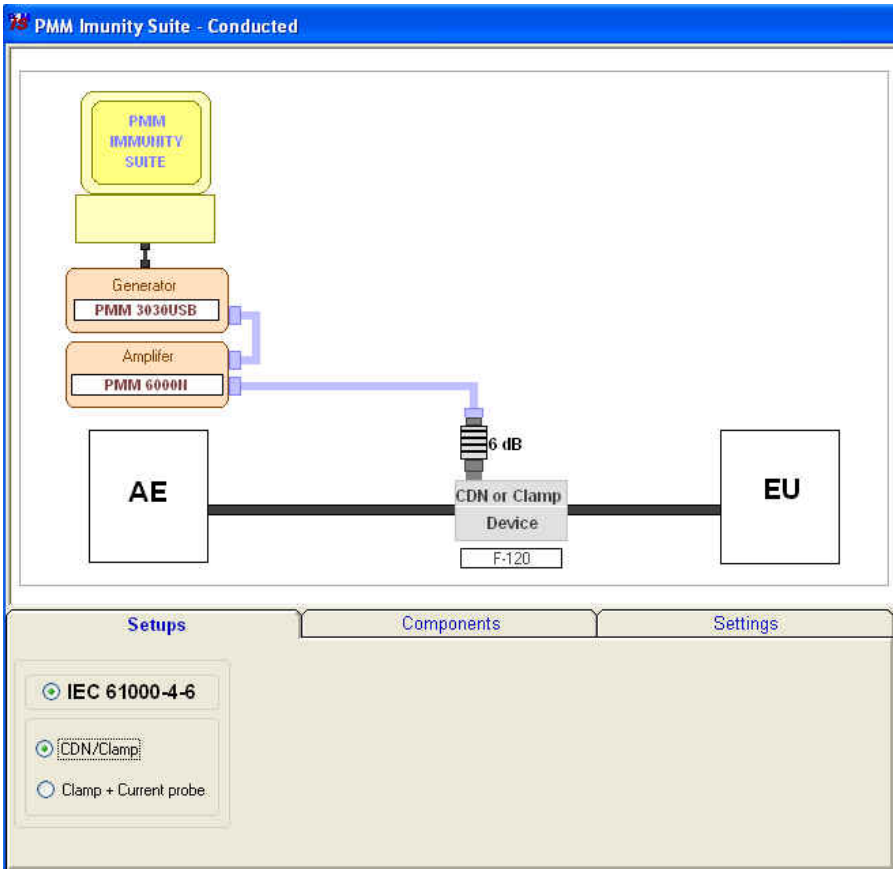

The **Erase** command deletes all data in an existing table. Select the table in the *ERASE FILE TABLE* window and click **Open,** then confirm the command.




### 4.8 Immunity test WITH Impedance Requirements (Setups)

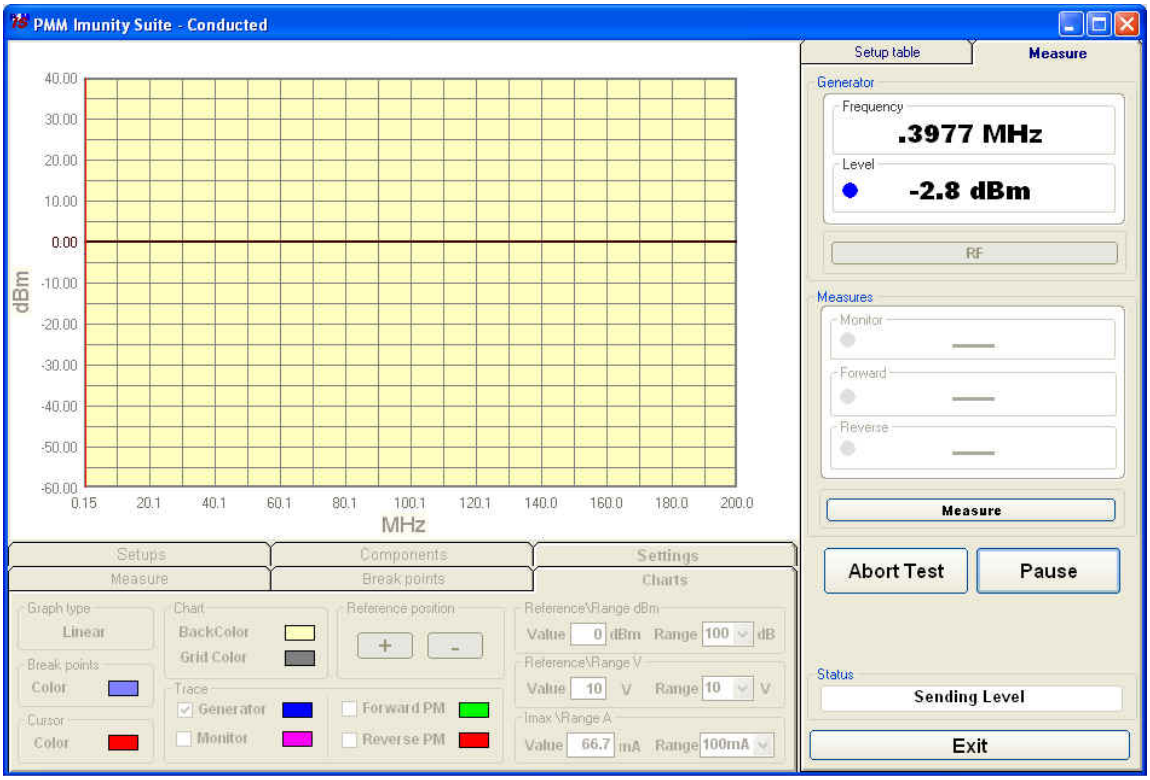
If an injection clamp is used, the AE configuration must present common-mode impedance (consult EMC regulations for further details).

If the impedance requirements are satisfied, select **CDN/Clamp.**



### 4.8.1 Starting the test

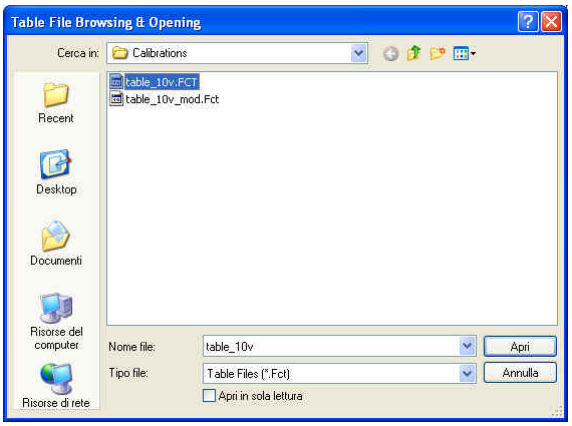
Go to **Measure**.



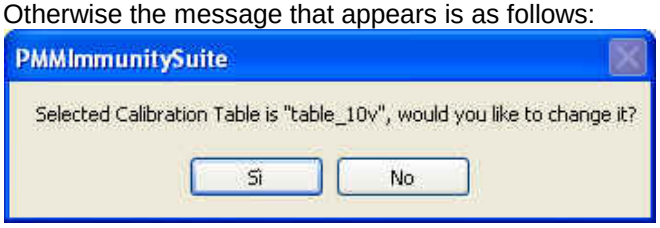

Click **Start Test**.

If no setup table has been selected, the following message will appear:

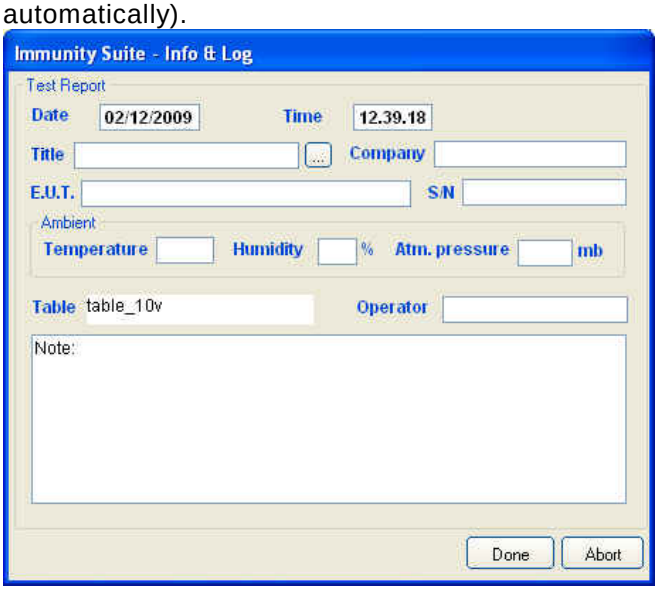

Click OK, then select the table and confirm with **Open.**



Otherwise the message that appears is as follows:

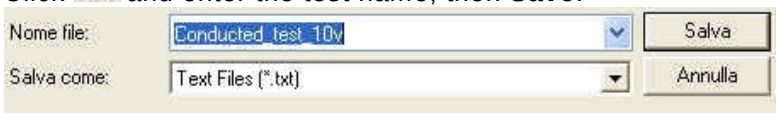



Choose **Yes** to view the *Table File Browsing & Opening* window and select a different table. Choose **No** to use the file shown and open the following data entry window (the date and time are entered automatically).

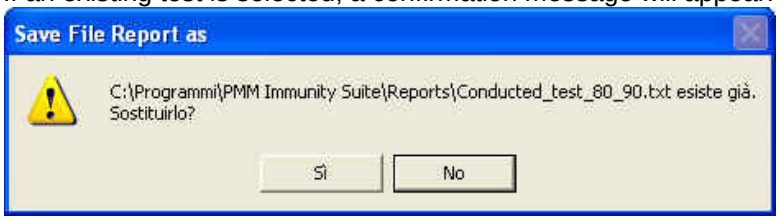



Enter the name of the immunity test.


Click  and enter the test name, then **Save**.

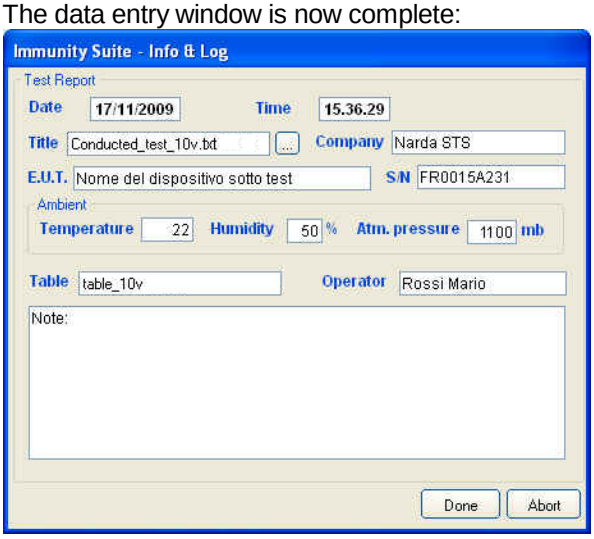



If an existing test is selected, a confirmation message will appear.

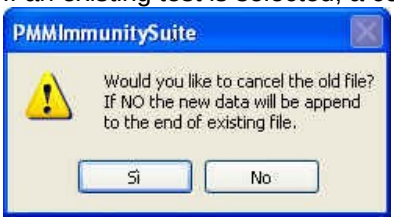



Fill in the fields **Company, E.U.T., S/N, Temperature, Humidity, Atm. Pressure, Operator** and **Note**.

The data entry window is now complete:

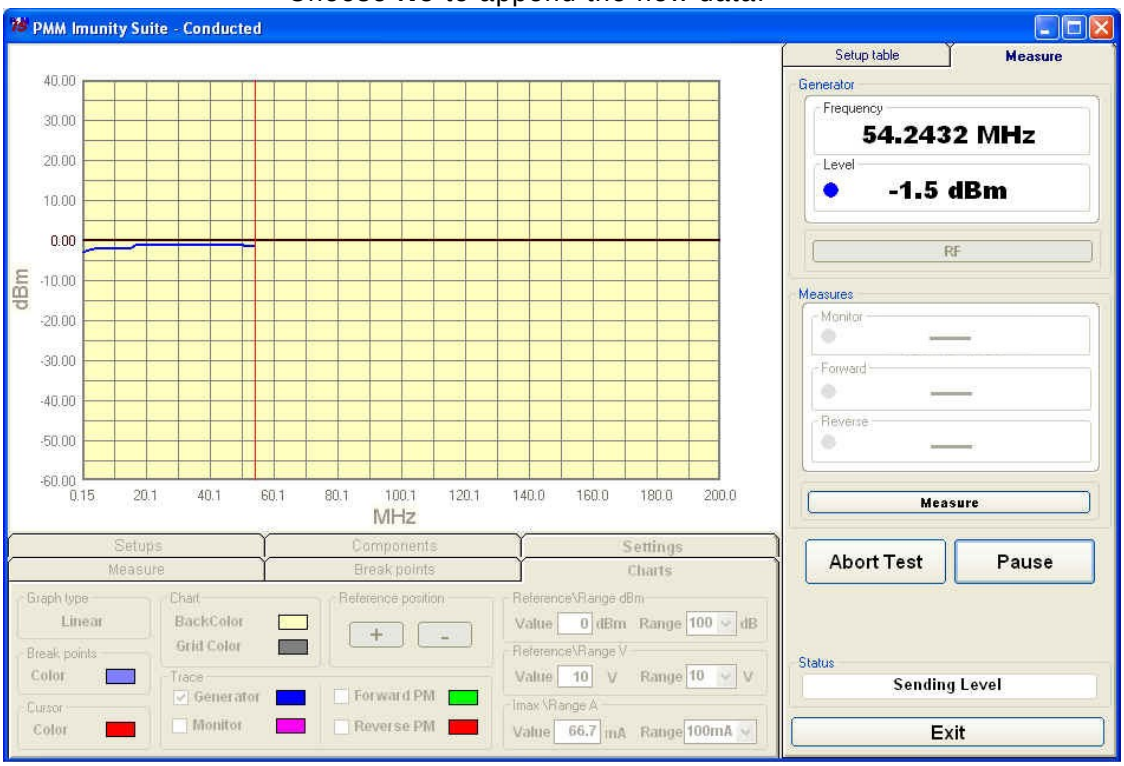



Confirm with **Done** to start the immunity test.
If an existing test is selected, a confirmation message will appear:




Choose **Yes** to overwrite the data with the test in course.

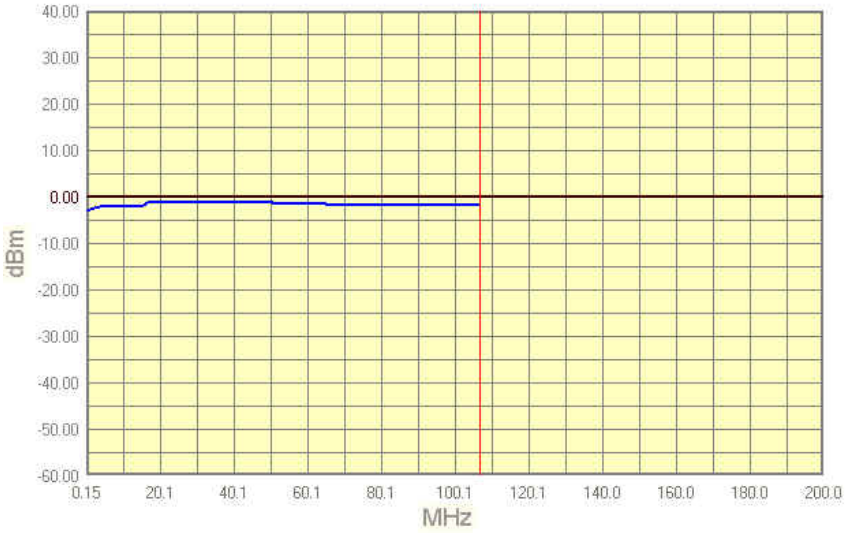
Choose **No** to append the new data.



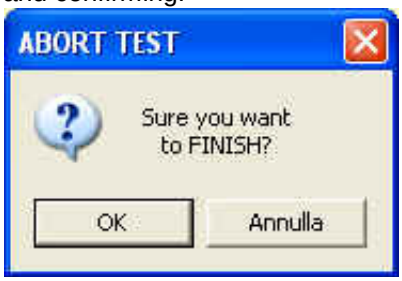
During the test, the **Generator** window shows the level extrapolated from the setup table and used by the generator to obtain the required voltage.

The color of the dot corresponds to the color of the line on the graph


During the test, the frequency range and generator level will be shown in graph form.

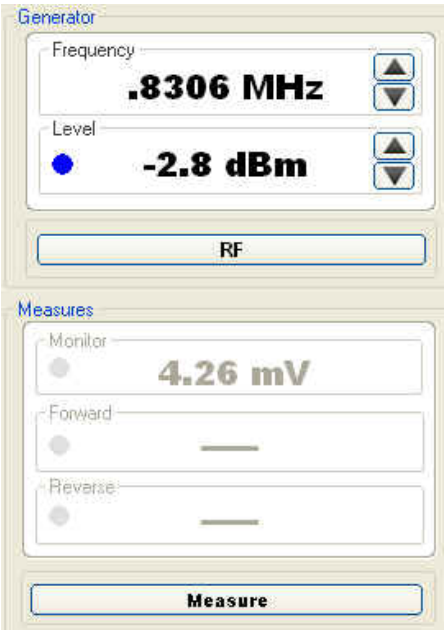



At any time, the test can be terminated by clicking the **Abort Test** button and confirming:

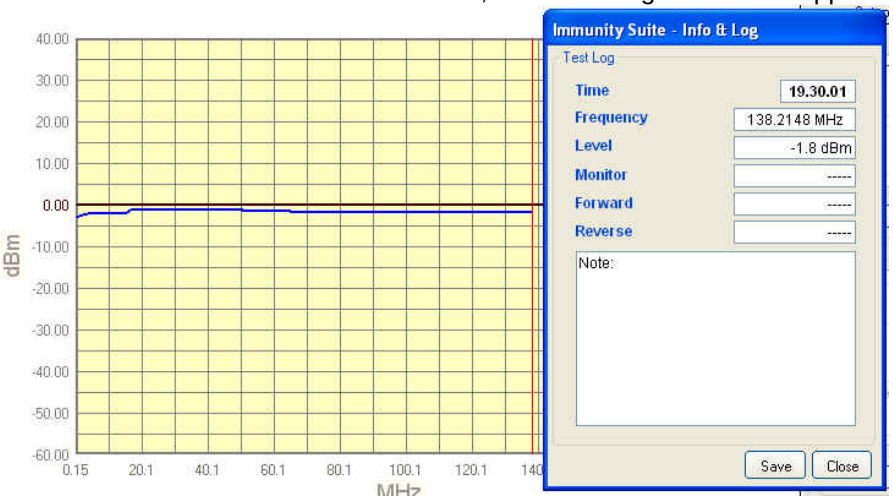


The **Pause** button can also be used at any time to stop the test momentarily (the generator is set to RF OFF).

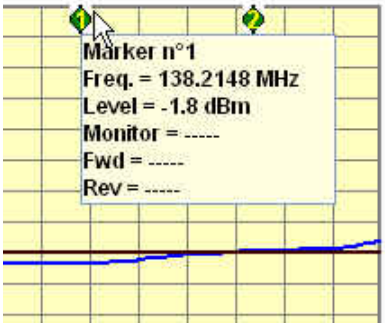
In this state, an earlier situation can be recreated or a later one can be simulated; click the RF button (the generator is set to RF ON), adjust the frequency and level with the arrows, and click **Measure** to display the voltage.



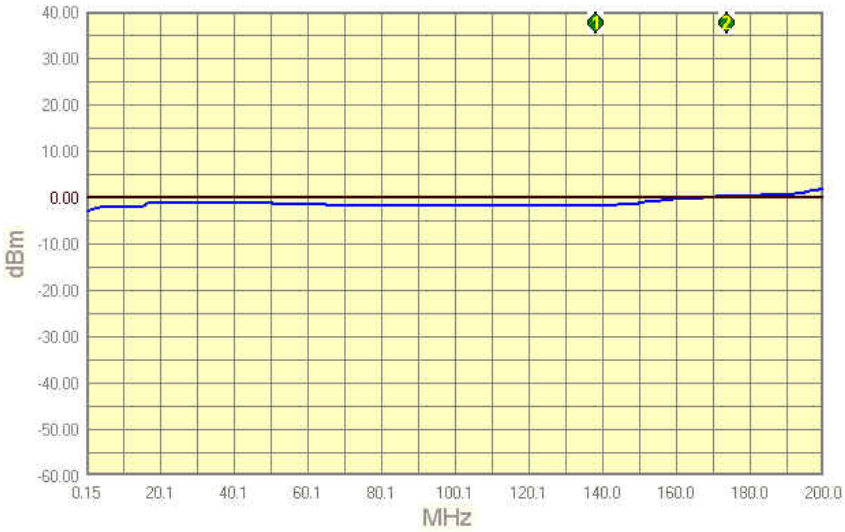

Each time the **Pause** button is clicked, the following window will appear:



Pressing **Save** assigns a marker to the current position for future reference. At the end of the test, the saved information can be viewed simply by hovering the cursor over the marker.

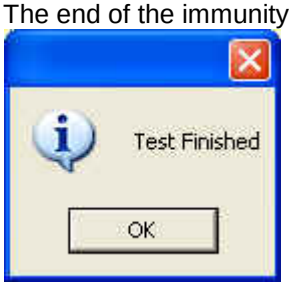



The button will now read **Continue** to resume the test.

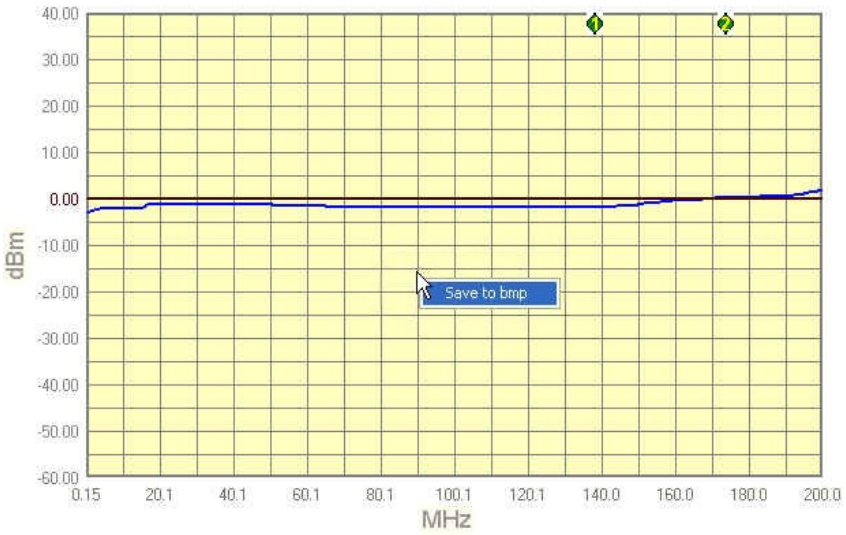



The status window shows each operation performed by the software during the test.


The end of the immunity test will be announced with the message:



When the test is over, the graph can be saved in .bmp format by right-clicking anywhere in the graph and selecting **Save bmp.**



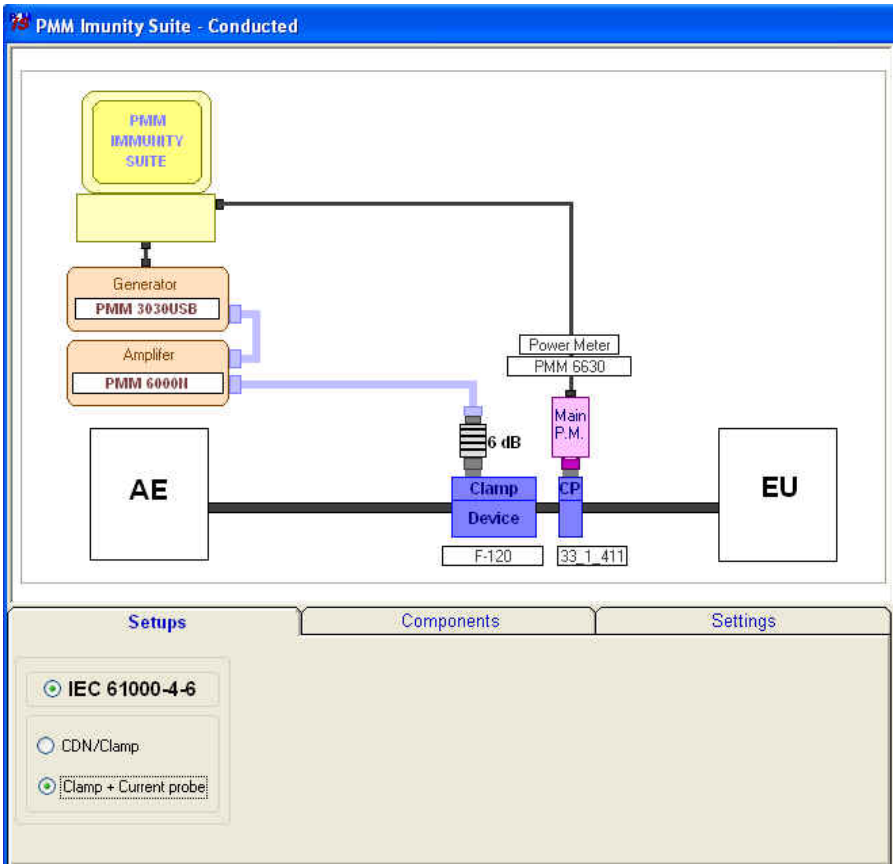

In the next window, assign a name to the graph and press **Save**.


The saved graph can be inserted into a text file using the Editor feature (see the Editor section for details).

Press the Exit button to leave the immunity test..

### 4.9 Immunity test WITHOUT impedance requirements (Setups)

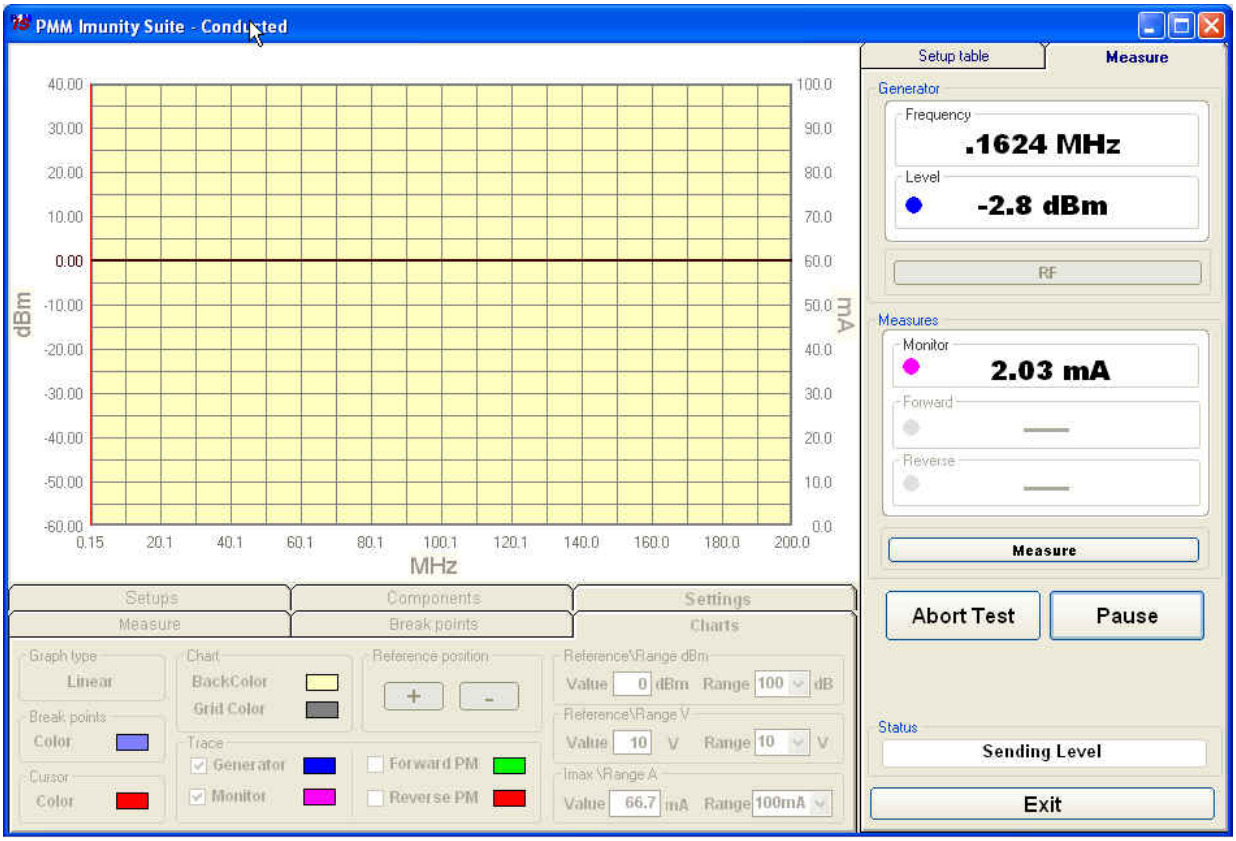
If the impedance requirements cannot be met, the current produced by the induced voltage must be checked using a supplementary probe placed between the injection clamp and the EUT (see EMC regulations for further details). For this configuration, select **Clamp + Current probe.**



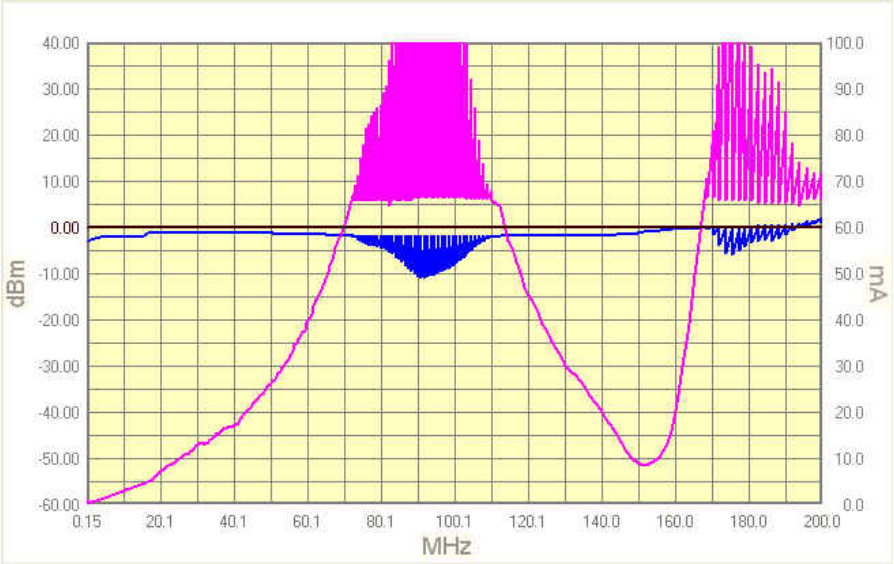

This procedure provides only significant differences with respect to the previous test.

### 4.9.1 Monitoring the current

Go to **Measure.**



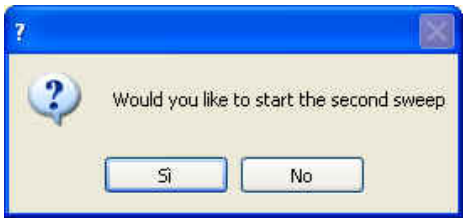

The example below shows the current and the generator level during a test in which the current limit is exceeded and then brought back into range by the software. The correct generator levels will be saved and used during the second sweep.



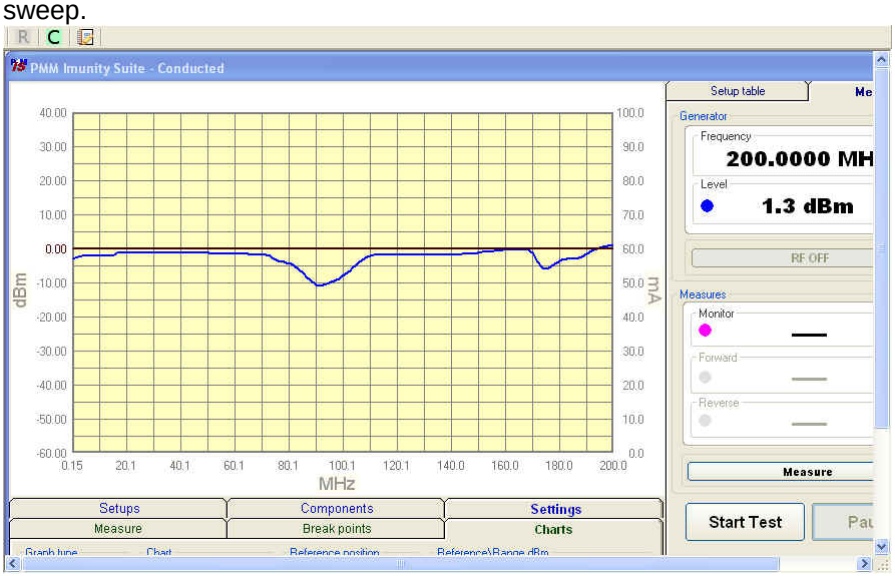
### 4.9.2 Second Sweep

When the process has finished, you can save the new table calculated during the first sweep. If no name is assigned, the program will use the name of the previous table and add *"_ modified" (e.g. tabc_ 10v_modified.fct).*

After the file is saved, a prompt will appear to conduct a second sweep with the new table.




The graph below shows the new generator levels applied during the second sweep.

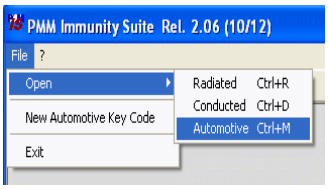


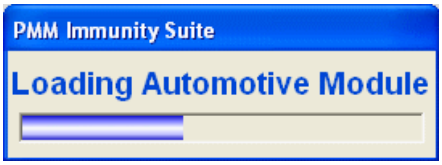

At the end of the test, the table will appear with the new values marked by a red dot.

# 5 – PMM Immunity Test Automotive

## 5.1 Introduction to conducted mode

The purpose of the test is to check the immunity of equipment, individual devices or systems to disturbances caused by radiofrequency electromagnetic fields to connection cables, power cords, signal lines and ground wires. The standard for equipment, setup and procedure is EN 61000-4-6.



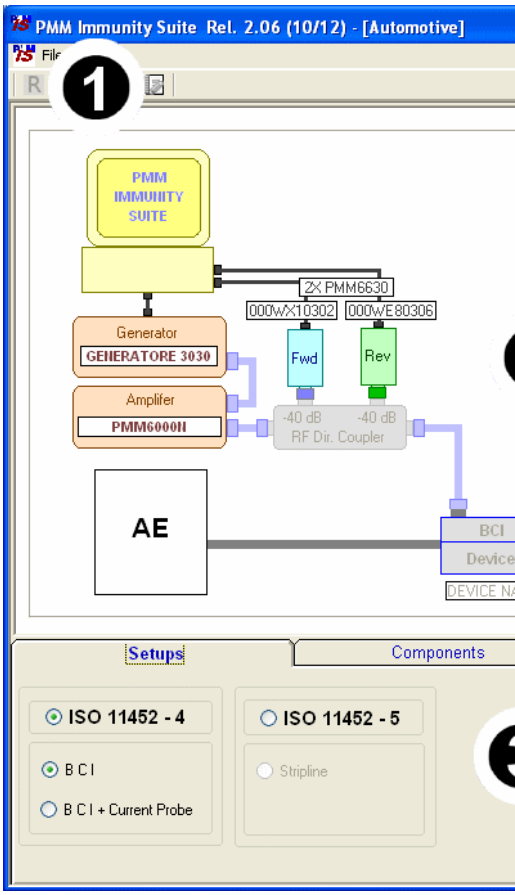




**Fig. 5-1** Main window - Automotive

This window contains:

1. Menu
2. Diagram window
3. Function tabs
4. Setup table
5. Measure;

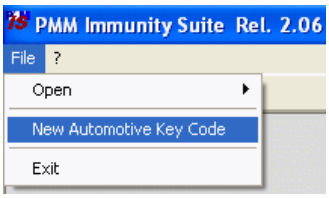
### 5.1.1 Automotive option activation

**The Automotive section of the Software suite is an optional feature.**

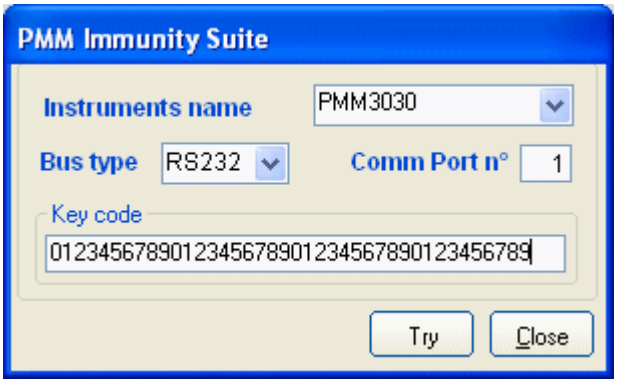
To enable the Automotive test, use the Automotive Key Code tool in the program.

NOTE

**For further information on software installation refer to the "Installing the program" chapter.**

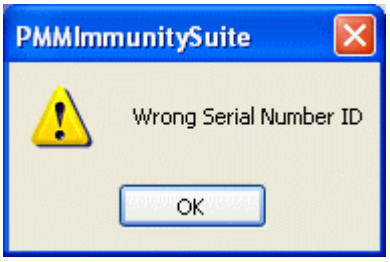



Click on **"File"** and choose **"New Automotive Key code"** for running the Set code utility, so getting the following window:




Select the proper instrument model, the bus type and eventually the port for communicating with it, and simply copy the 40 Digit Serial Code in the Key Code text box, then select Window and select the **Try** button.

This message appears when the Key code is not valid.




Or it is not the right code for your instrument:

It will be shown the following progress bar indicating the module is being loaded.

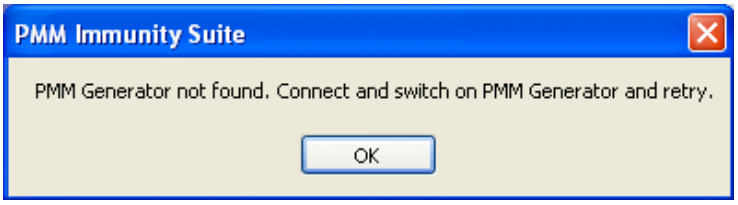

This means also the Key Code has been successfully stored.

Then the module is ready to be used.

NOTE

To use the Automotive tool, the registered PMM signal generator must be correctly connected to the PC running the software and switched on.

If the generator is unconnected or switched off the following message appears:

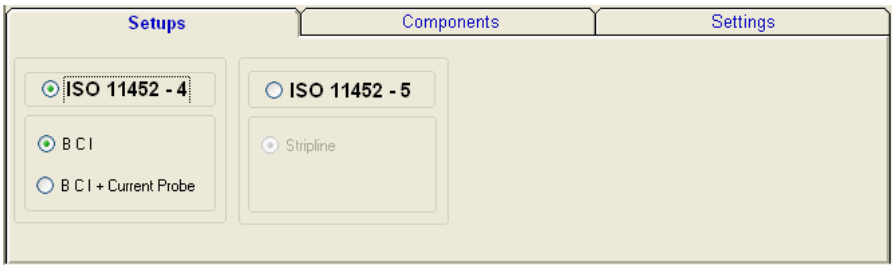



## 5.2 EN 61000-4-6 Setups

Once Automotive mode is run, the type of setup needs to be chosen.
The program offers:

**- ISO 11452-4 with BCI and, in case, Current Probe**

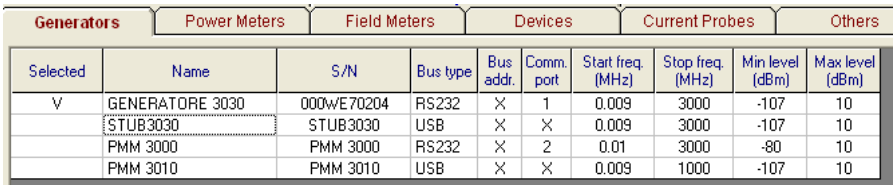
**- ISO 11452-5 with Stripline**



## 5.3 Equipment selection (Components)

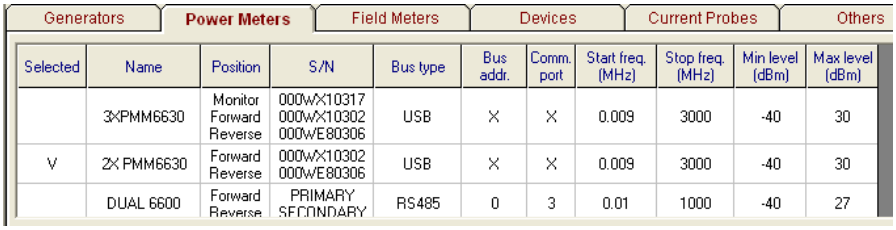
In this phase you will select the equipment to be used during calibration or testing. The program divides equipment by type; for your convenience, drivers from the PMM family can be used. To enable the desired module, double click the corresponding line (a √ will appear next to the instrument selected).

**- Generators:** Example list of the available field generators



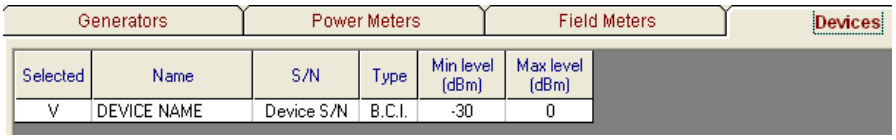

| Selected | Name | S/N | Bus type | Bus addr. | Comm. port | Start freq. (MHz) | Stop freq. (MHz) | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|---|---|---|---|
| V | GENERATORE 3030 | 000WE70204 | RS232 | X | 1 | 0.009 | 3000 | -107 | 10 |
| | STUB3030 | STUB3030 | USB | X | X | 0.009 | 3000 | -107 | 10 |
| | PMM 3000 | PMM 3000 | RS232 | X | 2 | 0.01 | 3000 | -80 | 10 |
| | PMM 3010 | PMM 3010 | USB | X | X | 0.009 | 1000 | -107 | 10 |

**- Power Meter:** Lists the available power meters




| Selected | Name | Position | S/N | Bus type | Bus addr. | Comm. port | Start freq. (MHz) | Stop freq. (MHz) | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3XPMM6630 | Monitor<br>Forward<br>Reverse | 000WX10317<br>000WX10302<br>000WE80306 | USB | X | X | 0.009 | 3000 | -40 | 30 |
| V | 2X PMM6630 | Forward<br>Reverse | 000WX10302<br>000WE80306 | USB | X | X | 0.009 | 3000 | -40 | 30 |
| | DUAL 6600 | Forward<br>Reverse | PRIMARY<br>SECONDARY | RS485 | 0 | 3 | 0.01 | 1000 | -40 | 27 |

**- Device:** Includes all BCI models.

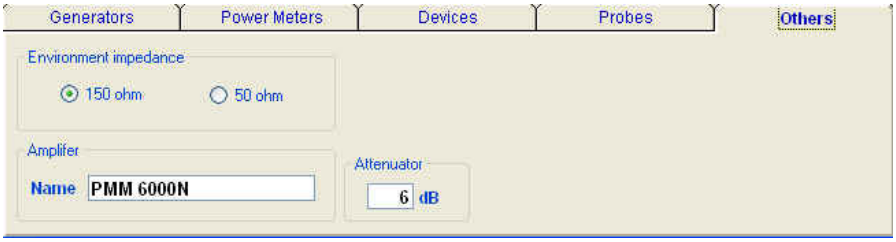



| Selected | Name | S/N | Type | Min level (dBm) | Max level (dBm) |
|---|---|---|---|---|---|
| V | DEVICE NAME | Device S/N | B.C.I. | -30 | 0 |

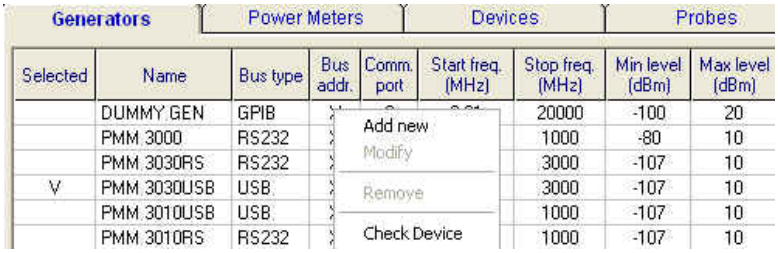
**- Current Probes:** Shows current probes with the names of their calibration files.

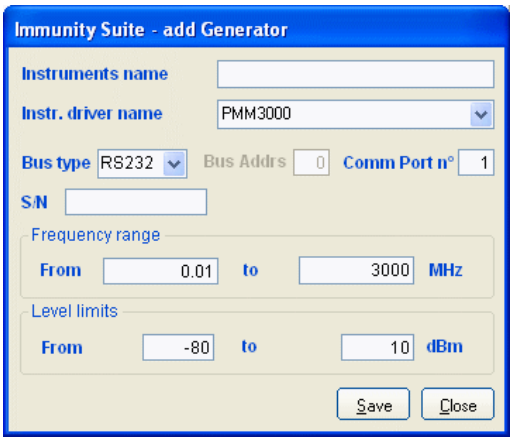

| Selected | Name | Cal.File |
|---|---|---|
| V | 33_1_411 | 33_1_411.cpf |

**- Others:** Shows the amplifier,

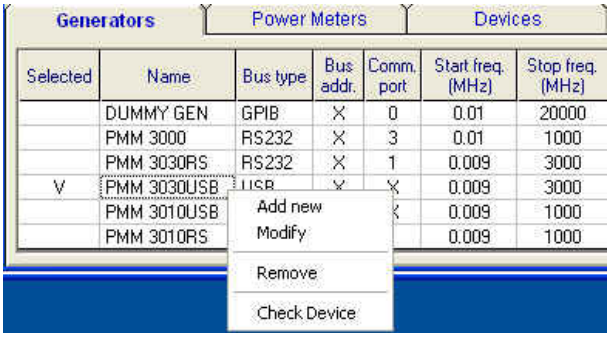


Additional devices can be added to each of these tables by right-clicking and selecting **Add new.**



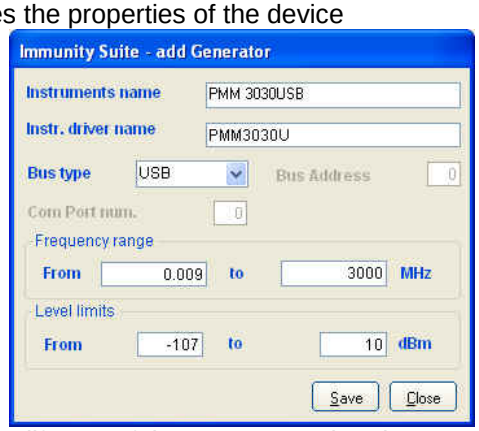

Devices can also be checked, modified or removed by right-clicking from the corresponding line:




NOTE

**For connecting and setting the COM port of fiber optic equipment, see the user manual supplied with the device.**

- **Modify:** changes the properties of the device




It is possible to modify any of the parameters but the name.

- **Remove:** removes the device and its driver from the list.

- **Check Device:** makes sure the driver is working and the device is properly connected. This option is only available for the device selected (√).

If the device is connected and the driver has been correctly installed, the following message will appear:


This message will appear if the device has not been connected properly to the work setup

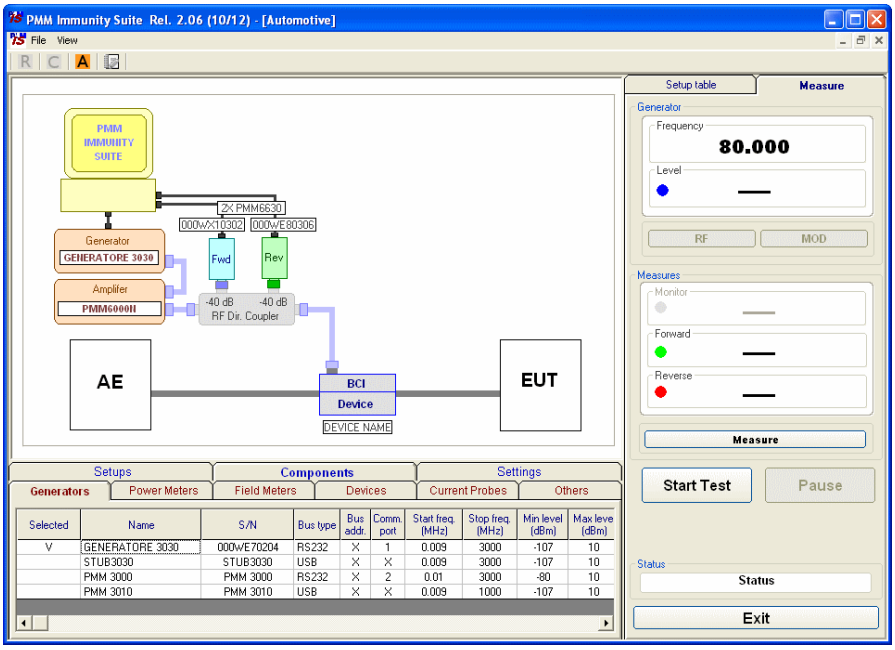

If the driver of the device has not been installed properly, the screen will show:



We recommend performing a device check before starting the calibration phase or immunity test. In any case, before calibration or testing, the program runs an automatic check and reports any errors as described above.

## 5.4 Diagram window

The diagram window shows the setup to be followed on the basis of the equipment selected.

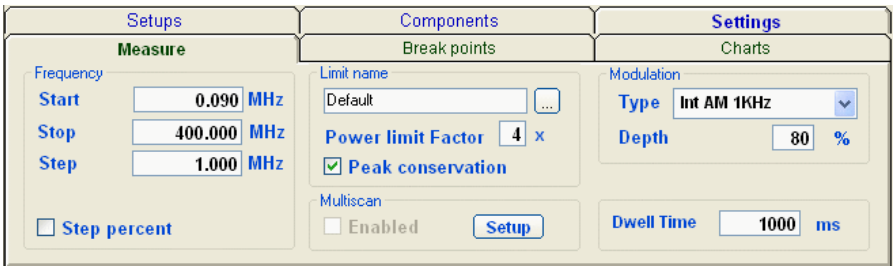



The selected devices (√) are shown at the bottom of the pane.

In addition to using the Components tab, you can move from one type of equipment to another by clicking the label with the device's name PMM 3030USB in the diagram window

## 5.5 Settings

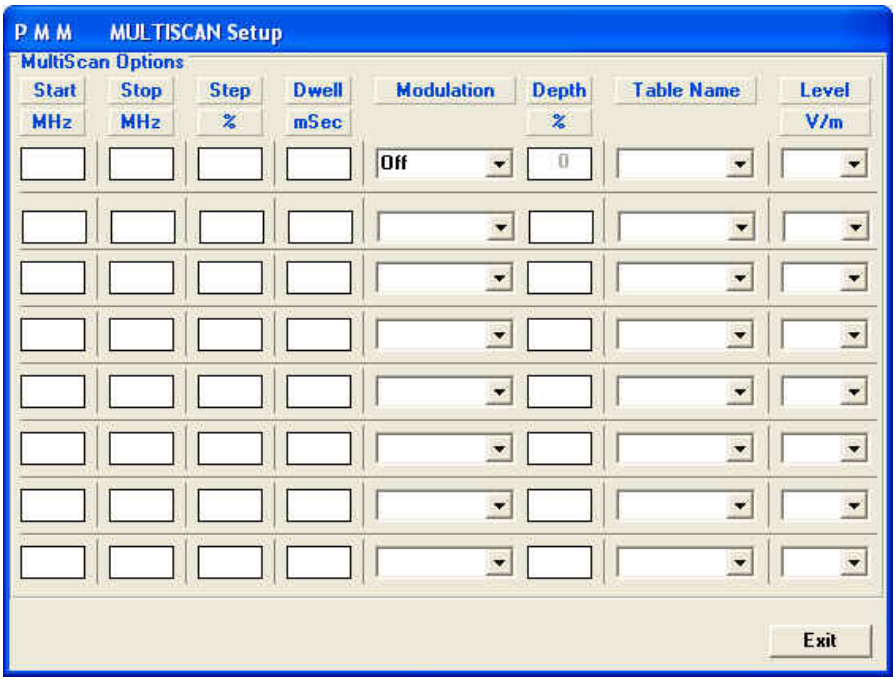
After performing the setup shown in the diagram window, the calibration test parameters need to be set using the **Measure** tab:



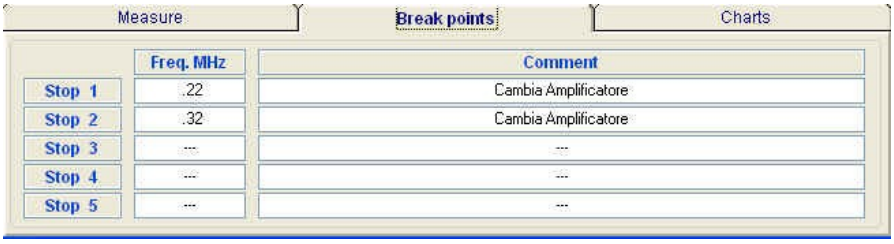

In the limit box there is also the choice for the **Peak conservation**. This is useful to satisfy those regulations requiring that under the condition of amplitude modulated signals the peak level must be the same of the unmodulated ones used for system calibration. It works both for AM and Pulse modulations.

All the modulation types, most common in the standards, are available depending on the model of the generator in use.

The **Multiscan** feature allows you to modify measurement parameters within a given frequency range.



With the **Break Points** tab, you can set the frequencies at which measurement will be temporarily suspended to allow a change in setup.

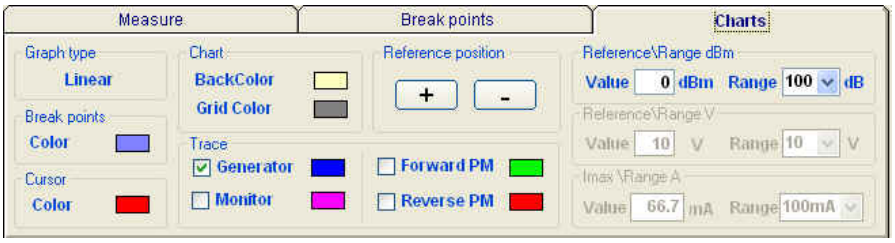



Each time the stop frequency is reached, a message will display the scheduled action.

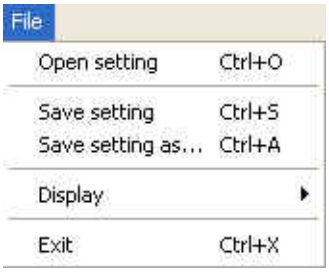

The break points are shown as vertical stripes in the graph.

Click **OK** to continue measuring.

The **Charts** tab allows visual modifications to suit your preferences. For each element, click on the color shown, and change it using the Windows color box if desired.
In this tab, you can also move the reference level along the y-axis (+ and - buttons), or change the power level and range (in dBm), the voltage (in V) and the current (in mA).



## 5.6 Settings management

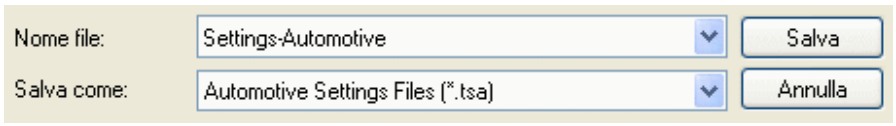



For each new session, the default file CondDefault.tsc is loaded. To avoid having to re-enter preferred settings, they can be saved in a single .tsc file:

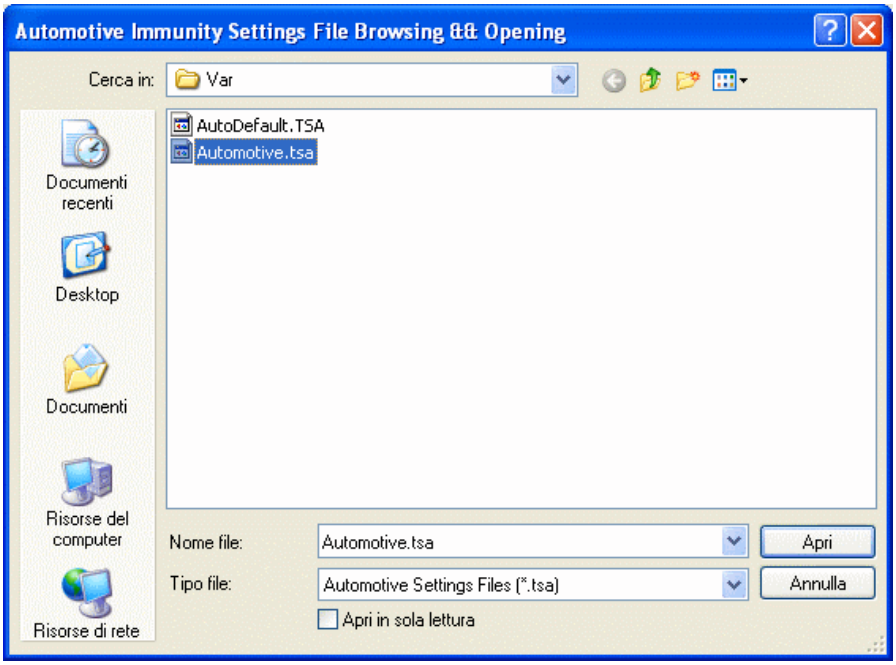
The command **File -> Save setting** overwrites the file in use. If no file was called up when the program was opened, the default file will be overwritten: The following message will appear


Choose **YES** to overwrite the file in use. Choose **NO** to cancel the operation and return to the main window.

**File -> Save setting as...** Enter the file name assigned to the work session and press **Save**.




The file can be called up at any time with the command **File -> Open setting.**

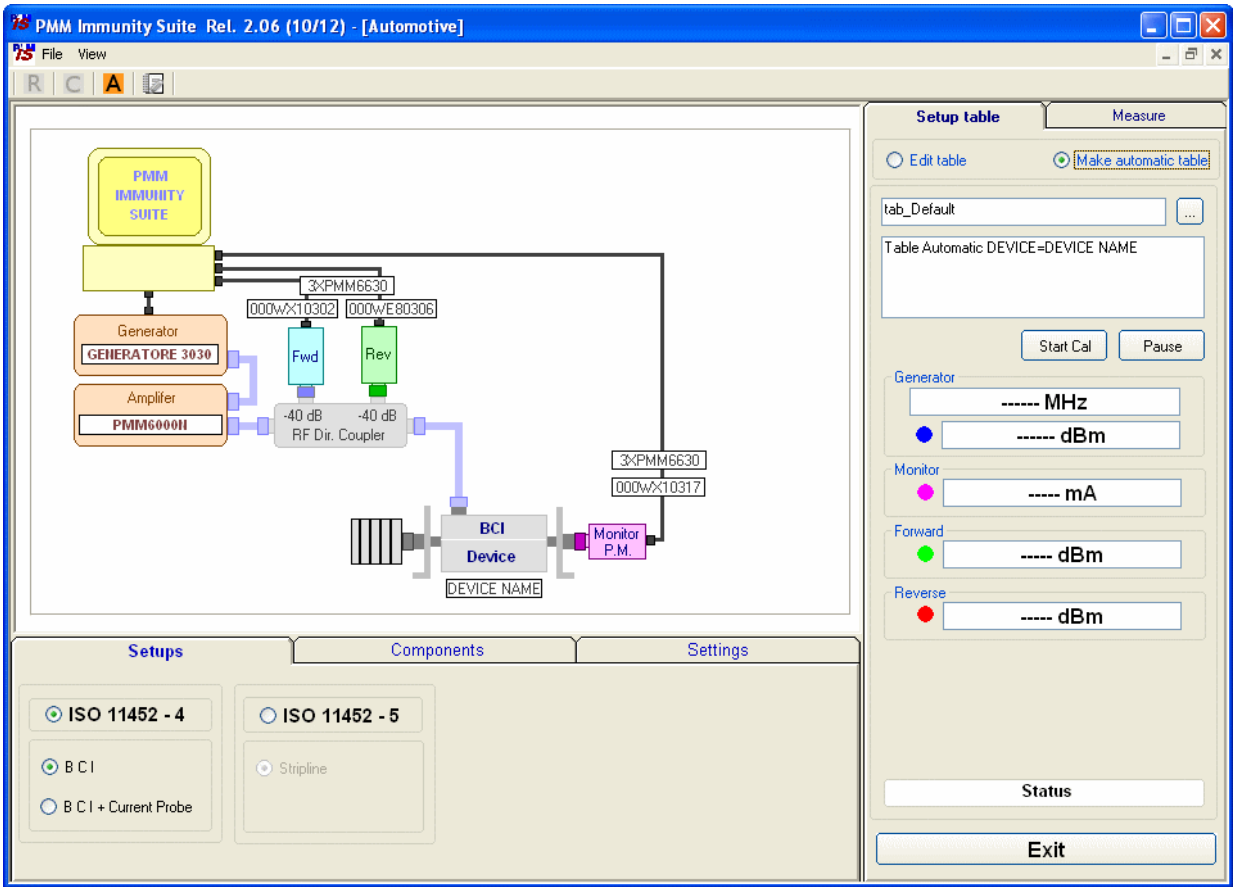



**File -> Display -> Default colors** is used to restore the original display.

## 5.7 System calibration

You can now calculate the levels assigned to the generator in order to have a constant voltage within the chosen frequency range.

Arrange the setup as shown in the graph:




### 5.7.1 Setup table

There are different ways to create the table:

- Automatically (select **Make automatic table)**

- By adapting the automatically created table to the instrumentation used (select **Edit table)**

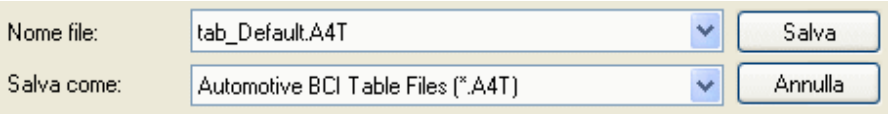
- By completing the entire table manually (select **Edit table)**

### 5.7.1.1 Automatic table creation

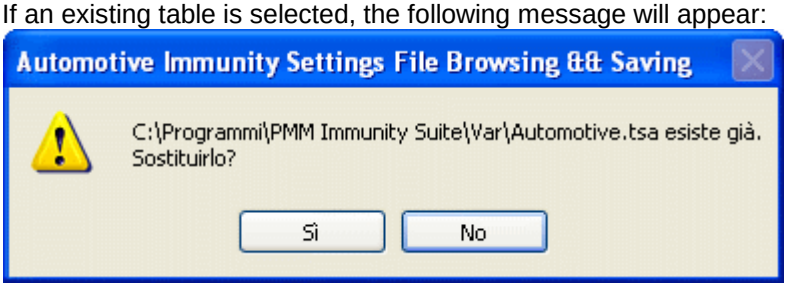
To create a table automatically:

- Select **Make automatic table**


- Select  , assign a name to the table and press **Save**.

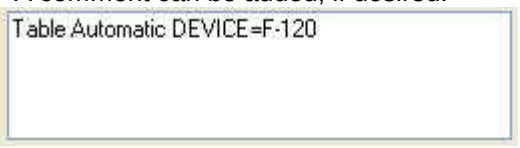



If an existing table is selected, the following message will appear:

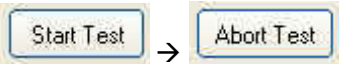



Choose **YES** to overwrite the table.
Choose **NO** to cancel the operation and return to the main window.

- A comment can be added, if desired.

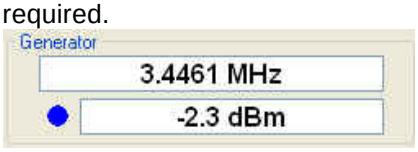



- Press **Start test**, then **Abort test** if you wish to terminate the process at any time.



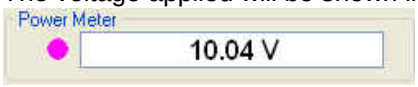

A **Pause button is also available,** and becomes **Continue** to resume the process.

The **Generator** window shows the level (in dBm) entered by the generator, at a given frequency (in MHz), to generate the voltage required.




The color of the dot corresponds to the color of the line on the graph.

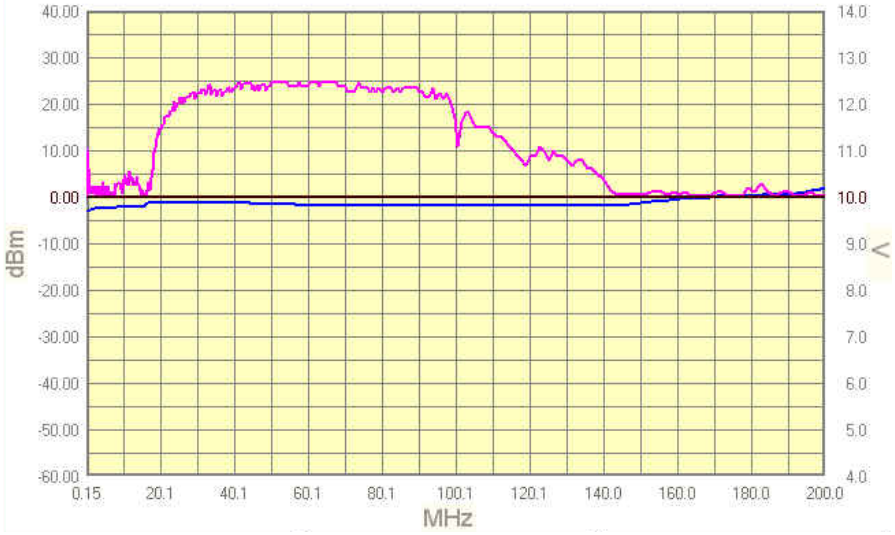
The voltage applied will be shown in the **Power Meter** window**.**





Values outside the selected tolerance will be shown in red; the generator will adjust the level to bring the voltage back into range. The color of the dot corresponds to the color of the line on the graph.

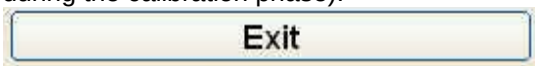
During the work session, the generator level and voltage within the frequency range selected will be shown as a graph.




Wait for the calibration to finish.

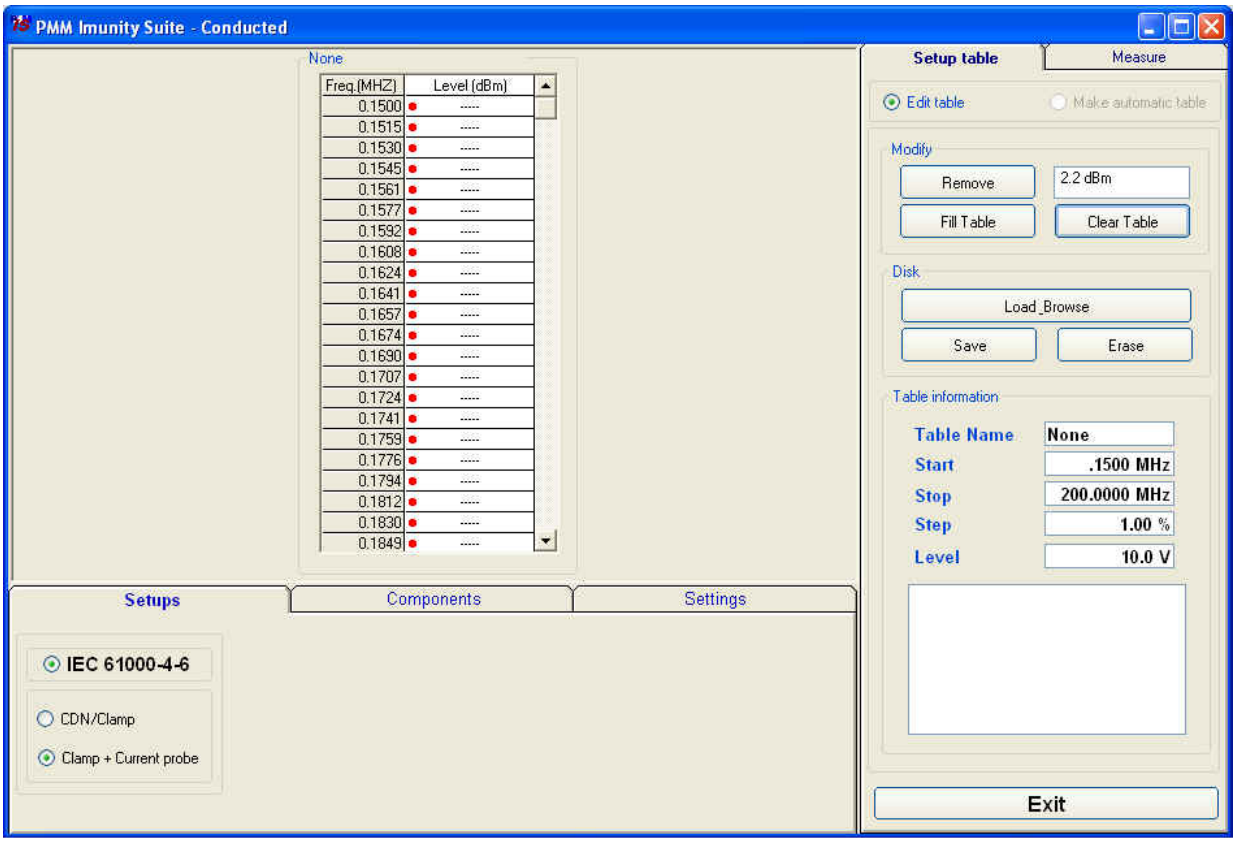

The Status window shows each operation performed by the program during the calibration phase.


Press the **Exit** button to leave **Conducted mode** (the button is deactivated during the calibration phase).



### 5.7.1.2 Manual table creation

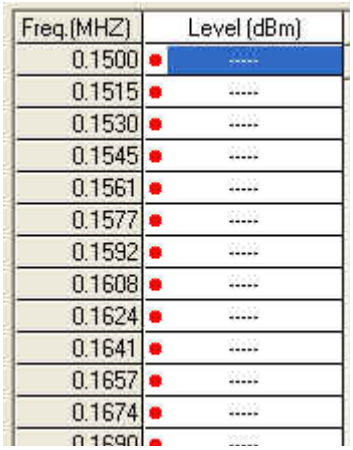
You may also fill in the entire table manually.




Check the information in **Setups, Components** and **Settings.**

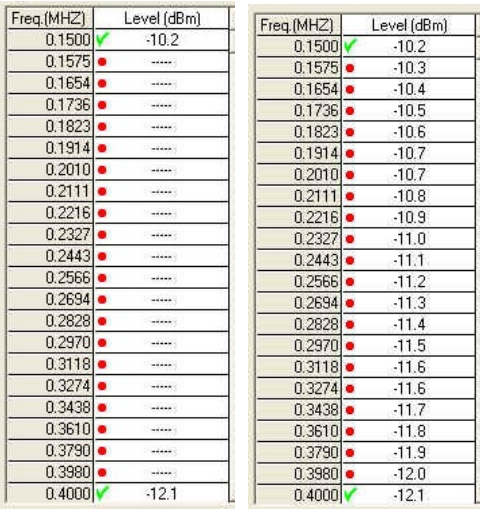
Go to **Setup table -> Edit table.**

Select the desired cell, type in the value, and confirm by pressing ENTER.



The amount entered can be deleted by clicking **Remove**.

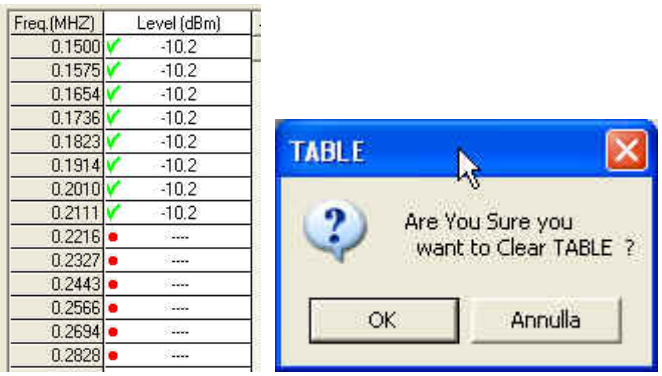

If several values need to be entered between two end points, use the **Fill Table** command. The required values are generated by a mathematical formula and marked with a red dot.



| Freq.(MHZ) | Level (dBm) |
|---|---|
| 0.1500 | -10.2 |
| 0.1575 | ----- |
| 0.1654 | ----- |
| 0.1736 | ----- |
| 0.1823 | ----- |
| 0.1914 | ----- |
| 0.2010 | ----- |
| 0.2111 | ----- |
| 0.2216 | ----- |
| 0.2327 | ----- |
| 0.2443 | ----- |
| 0.2566 | ----- |
| 0.2694 | ----- |
| 0.2828 | ----- |
| 0.2970 | ----- |
| 0.3118 | ----- |
| 0.3274 | ----- |
| 0.3438 | ----- |
| 0.3610 | ----- |
| 0.3790 | ----- |
| 0.3980 | ----- |
| 0.4000 | -12.1 |

| Freq.(MHZ) | Level (dBm) |
|---|---|
| 0.1500 | -10.2 |
| 0.1575 | -10.3 |
| 0.1654 | -10.4 |
| 0.1736 | -10.5 |
| 0.1823 | -10.6 |
| 0.1914 | -10.7 |
| 0.2010 | -10.7 |
| 0.2111 | -10.8 |
| 0.2216 | -10.9 |
| 0.2327 | -11.0 |
| 0.2443 | -11.1 |
| 0.2566 | -11.2 |
| 0.2694 | -11.3 |
| 0.2828 | -11.4 |
| 0.2970 | -11.5 |
| 0.3118 | -11.6 |
| 0.3274 | -11.6 |
| 0.3438 | -11.7 |
| 0.3610 | -11.8 |
| 0.3790 | -11.9 |
| 0.3980 | -12.0 |
| 0.4000 | -12.1 |

The **Clear Table** command deletes all of the values entered. The command must be confirmed.



| Freq.(MHZ) | Level (dBm) |
|---|---|
| 0.1500 | -10.2 |
| 0.1575 | -10.2 |
| 0.1654 | -10.2 |
| 0.1736 | -10.2 |
| 0.1823 | -10.2 |
| 0.1914 | -10.2 |
| 0.2010 | -10.2 |
| 0.2111 | -10.2 |
| 0.2216 | ---- |
| 0.2327 | ---- |
| 0.2443 | ---- |
| 0.2566 | ---- |
| 0.2694 | ---- |
| 0.2828 | ---- |

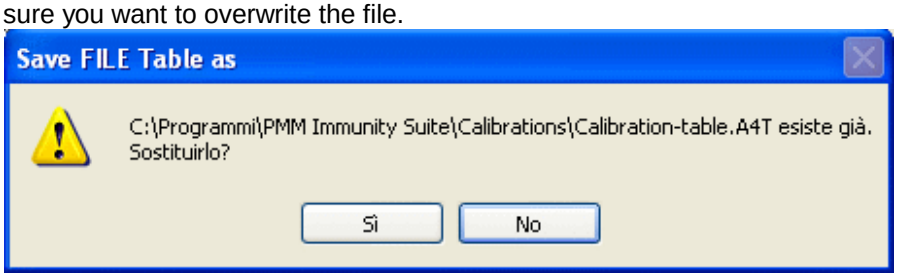


The **Table information** pane displays the main measurement settings:

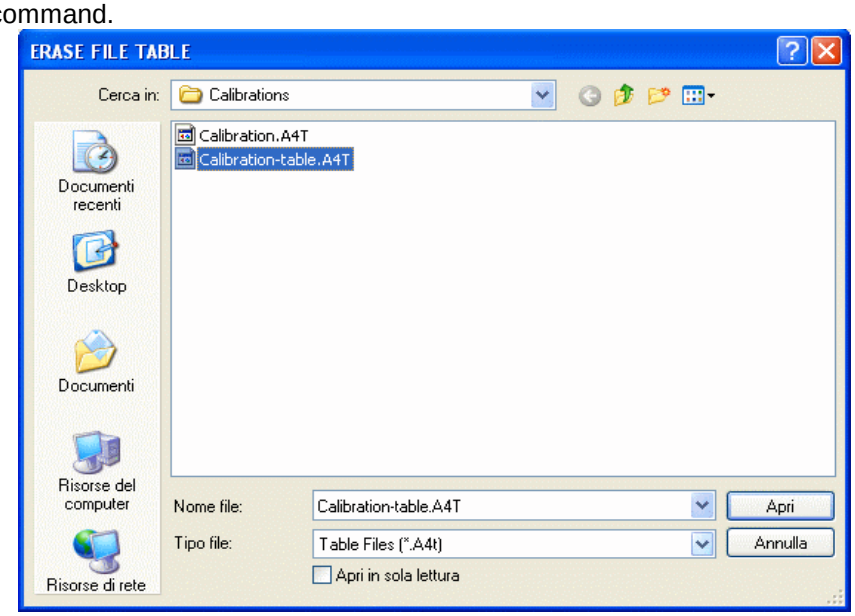
Once all values have been entered, click **Save,** then type in the name of the table and click **Save** again.

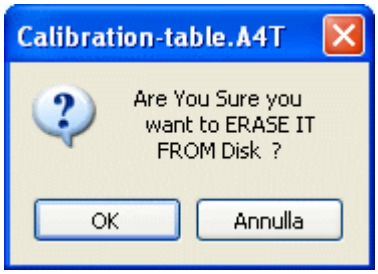


If an existing table is selected, a confirmation message will appear to make sure you want to overwrite the file.

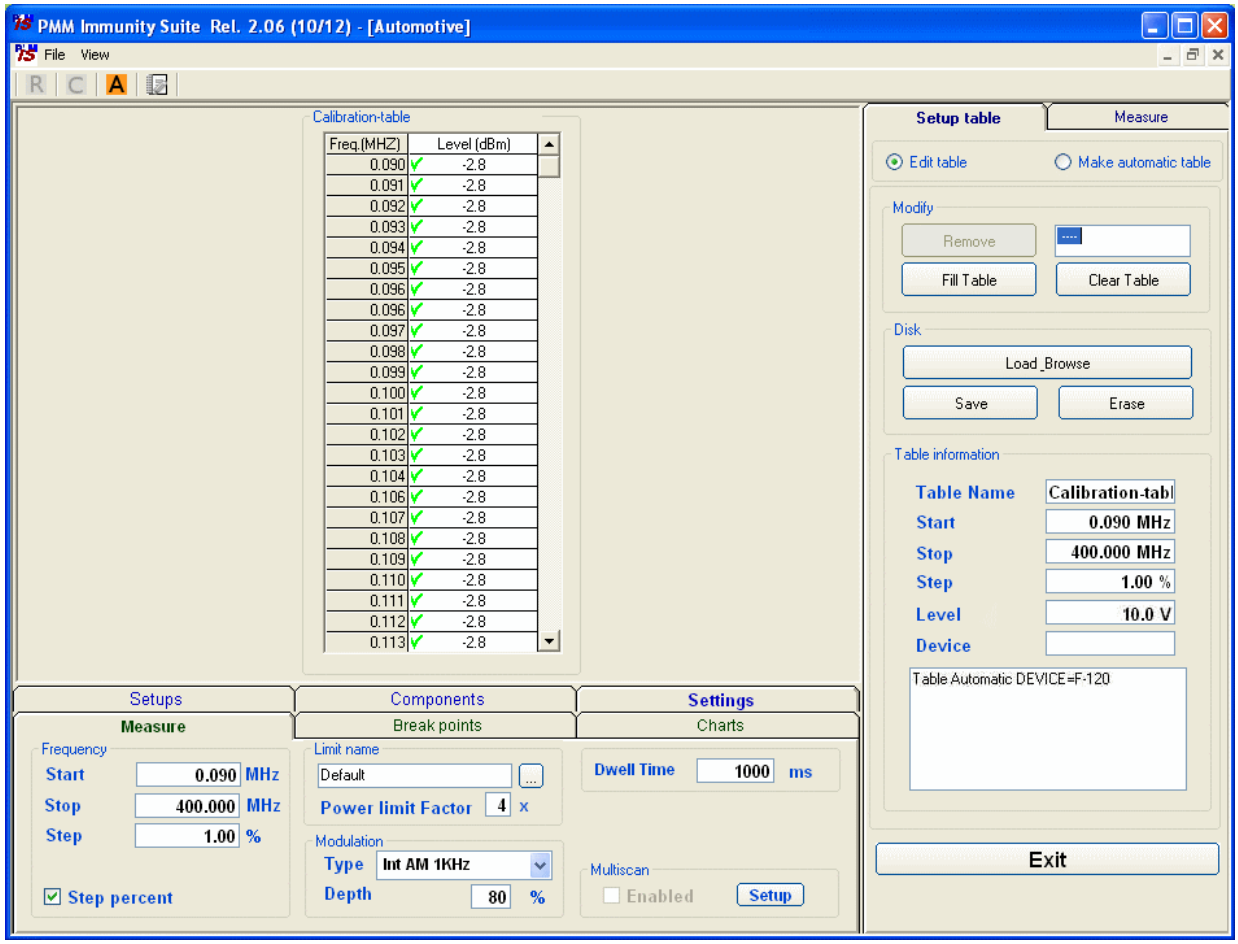



The **Erase** command deletes all data in an existing table. Select the table in the *ERASE FILE TABLE* window and click **Open,** then confirm the command.



### 5.7.1.3 Modifying an existing table

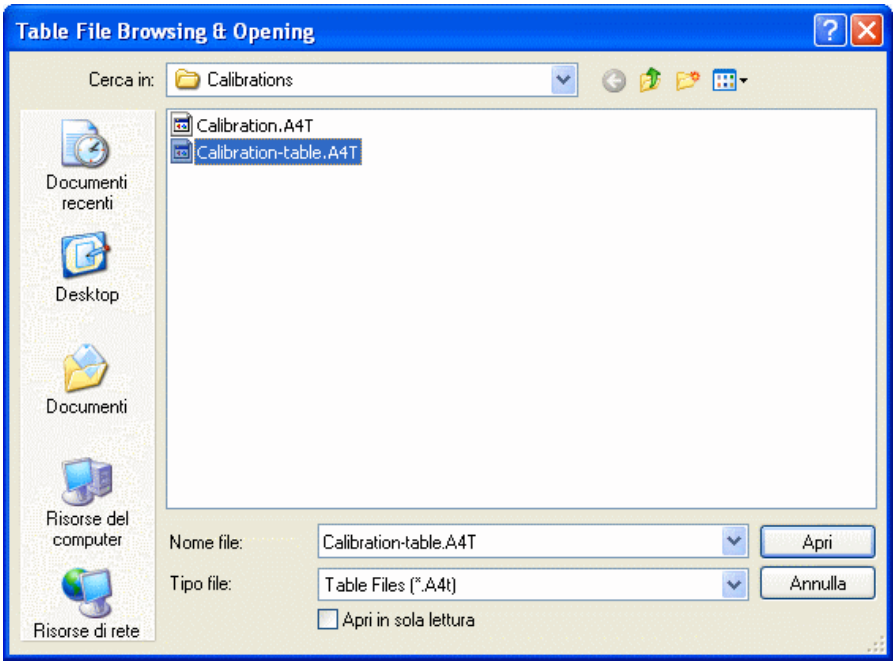



An existing table can be adapted to the instrumentation used.

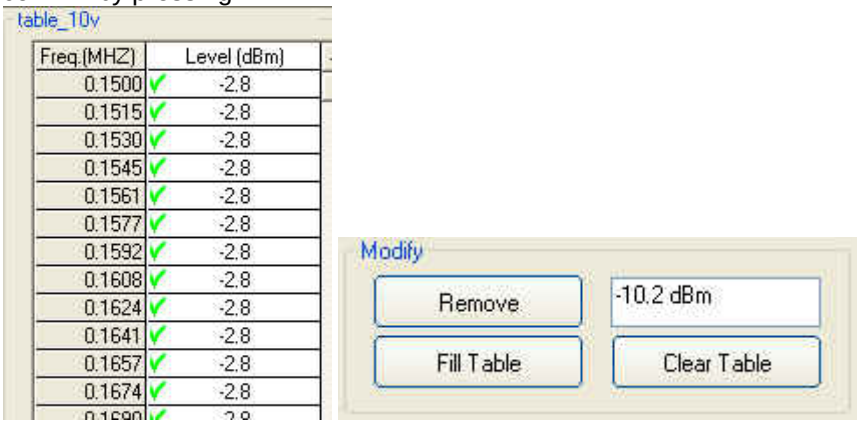
Check the information in **Setups, Components** and **Settings.**

Go to **Setup table -> Edit table**.

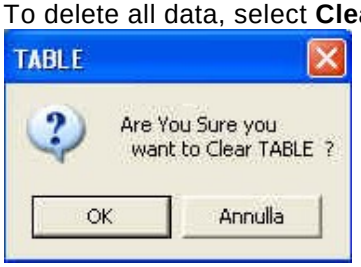
Call up a previously created table by clicking **Load_Browse,** then selecting the table and clicking **Open.**

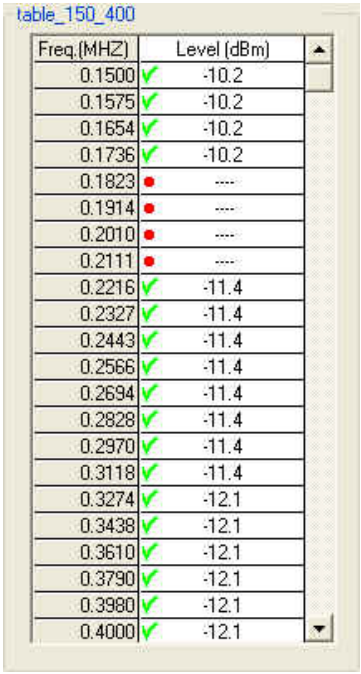

Select the desired cell, click **Remove,** type in the new value, and confirm by pressing ENTER.

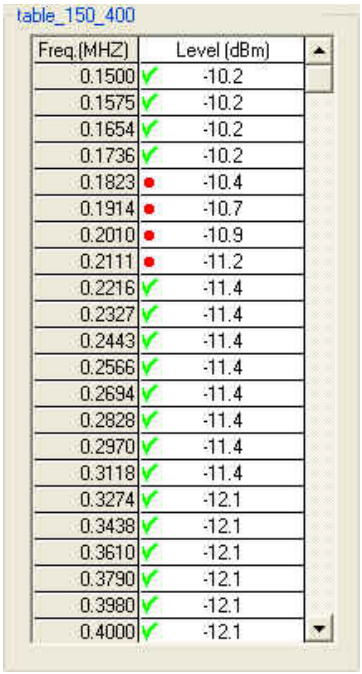


To delete all data, select **Clear Table** and confirm.



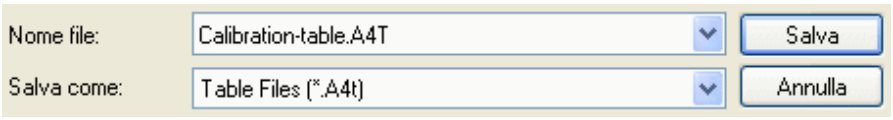

If several values need to be entered between two end points, use the **Fill Table** command. The required values are generated by a mathematical formula and marked with a red dot.



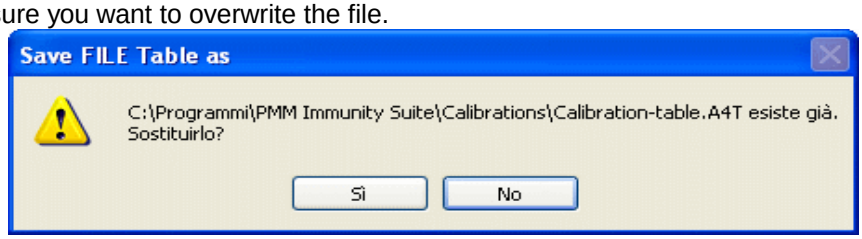




The **Table information** pane displays the main measurement settings.

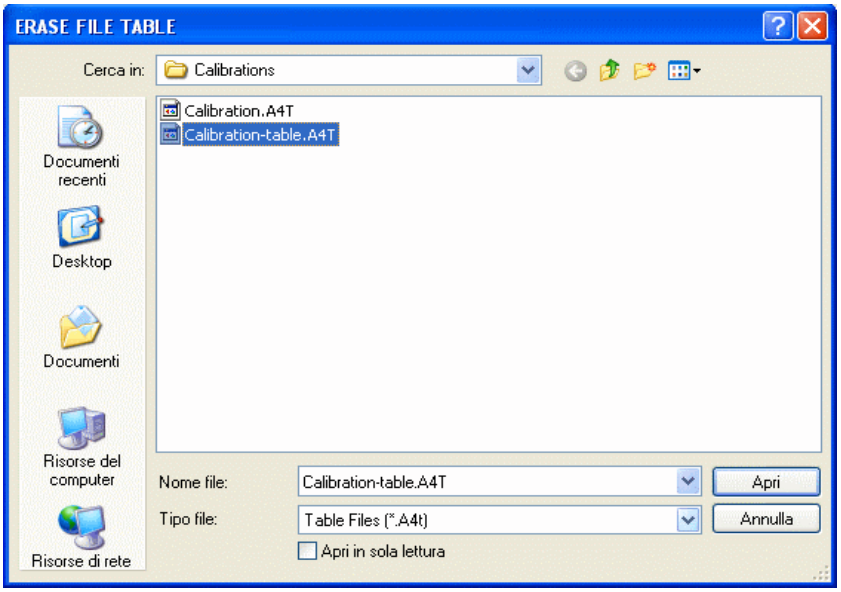
Once all values have been entered, click **Save,** then type in the name of the table and click **Save** again.

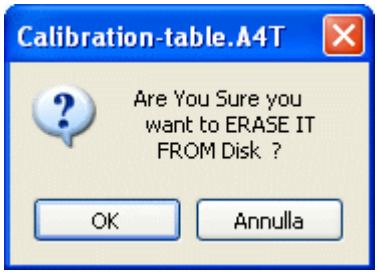




If an existing table is selected, a confirmation message will appear to make sure you want to overwrite the file.




The **Erase** command deletes all data in an existing table. Select the table in the *ERASE FILE TABLE* window and click **Open,** then confirm the command.

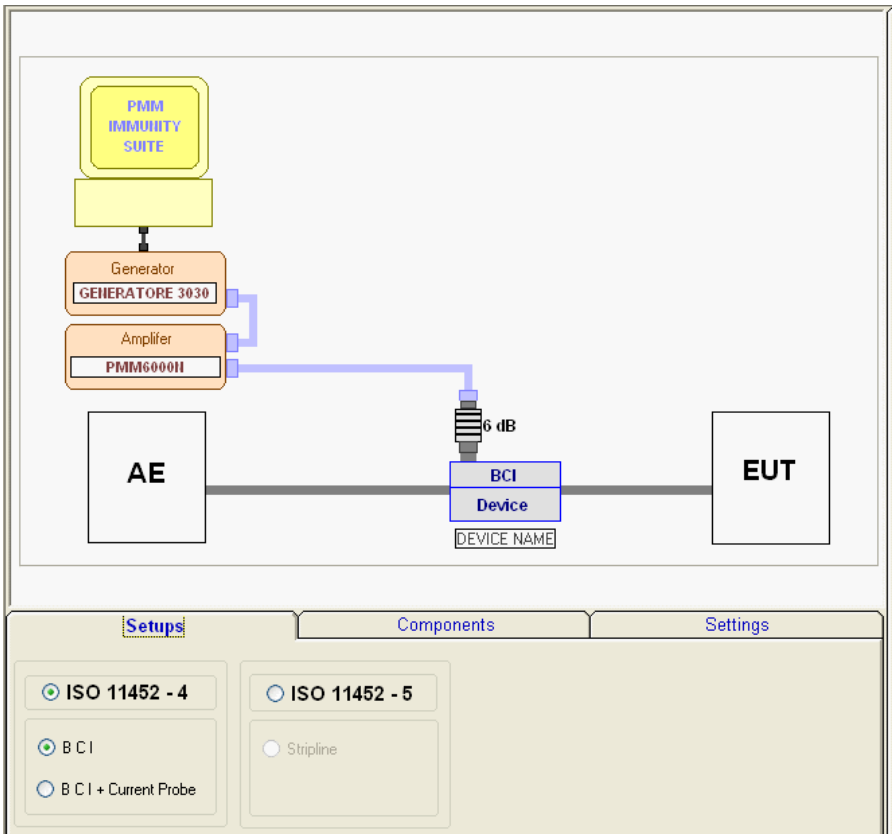


## 5.8 Immunity test WITH Impedance Requirements (Setups)

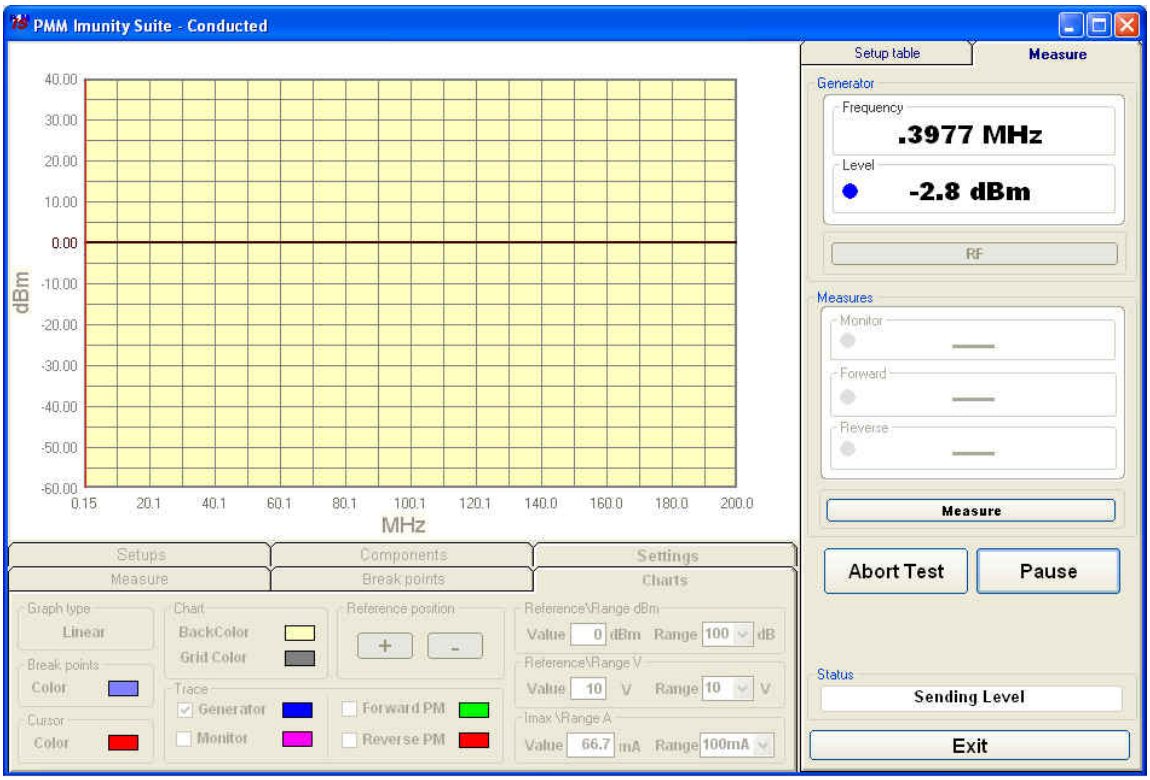
If a bulk current injector is used, the AE configuration must present common-mode impedance (consult EMC regulations for further details).

If the impedance requirements are satisfied, select **BCI**.



### 5.8.1 Starting the test

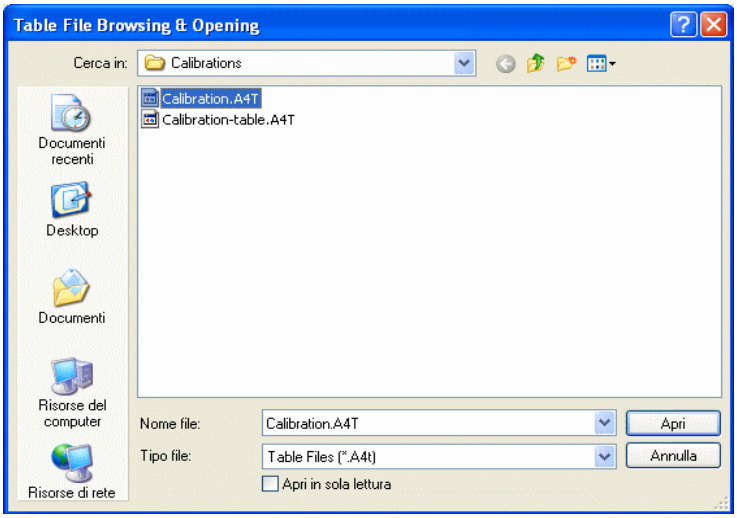
Go to **Measure**.



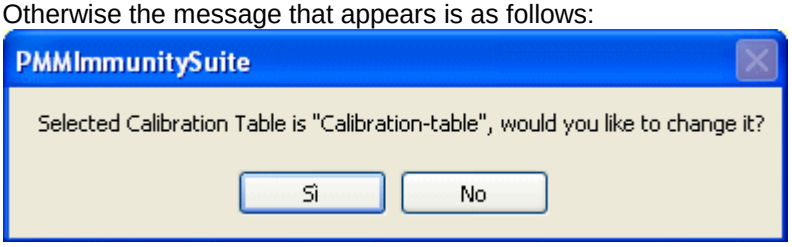

Click **Start Test**.

If no setup table has been selected, the following message will appear:

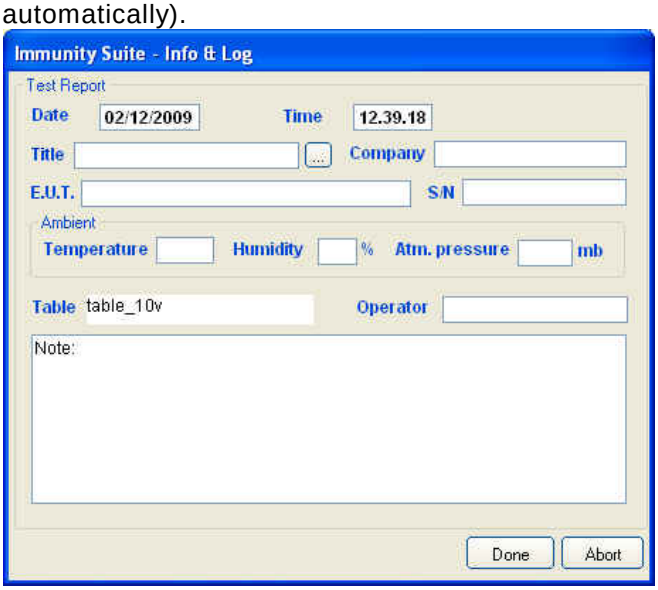

Click OK, then select the table and confirm with **Open.**



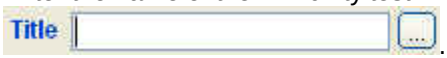
Otherwise the message that appears is as follows:



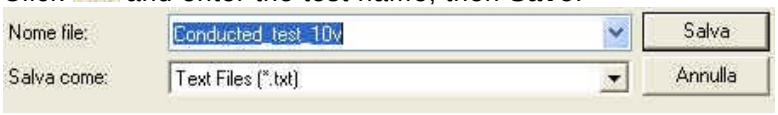

Choose **Yes** to view the *Table File Browsing & Opening* window and select a different table. Choose **No** to use the file shown and open the following data entry window (the date and time are entered automatically).



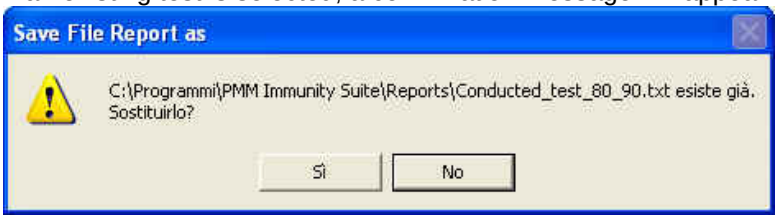

Enter the name of the immunity test.




Click  and enter the test name, then **Save**.

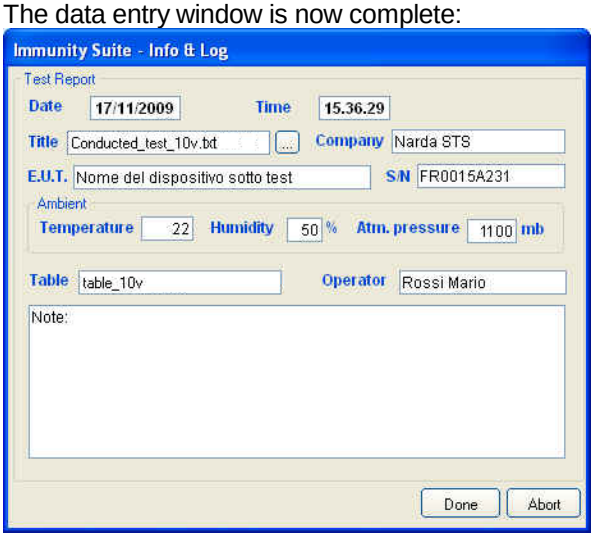



If an existing test is selected, a confirmation message will appear.

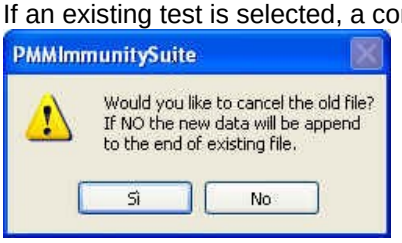



Fill in the fields **Company, E.U.T., S/N, Temperature, Humidity, Atm. Pressure, Operator** and **Note**.

The data entry window is now complete:

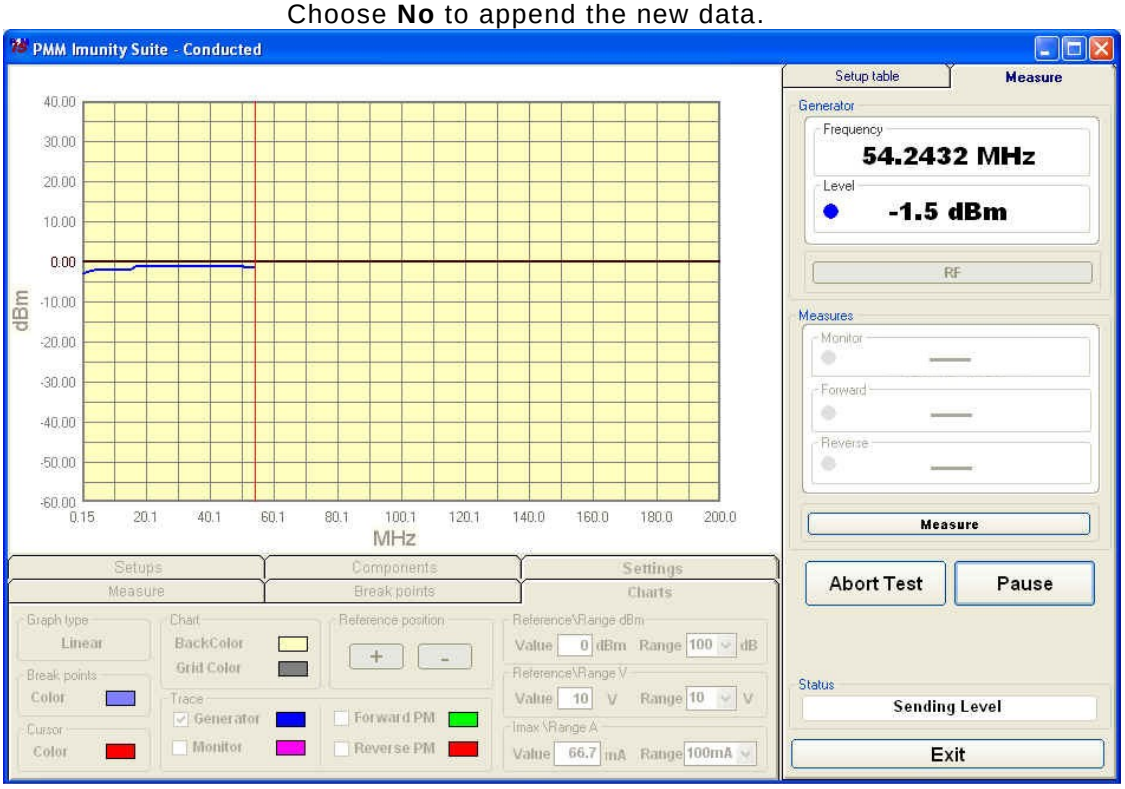



Confirm with **Done** to start the immunity test.
If an existing test is selected, a confirmation message will appear:



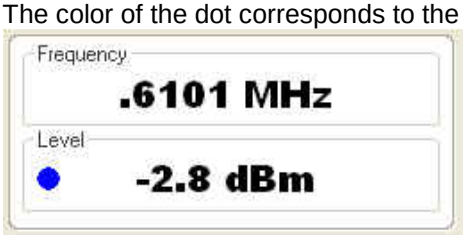

Choose **Yes** to overwrite the data with the test in course.

Choose **No** to append the new data.

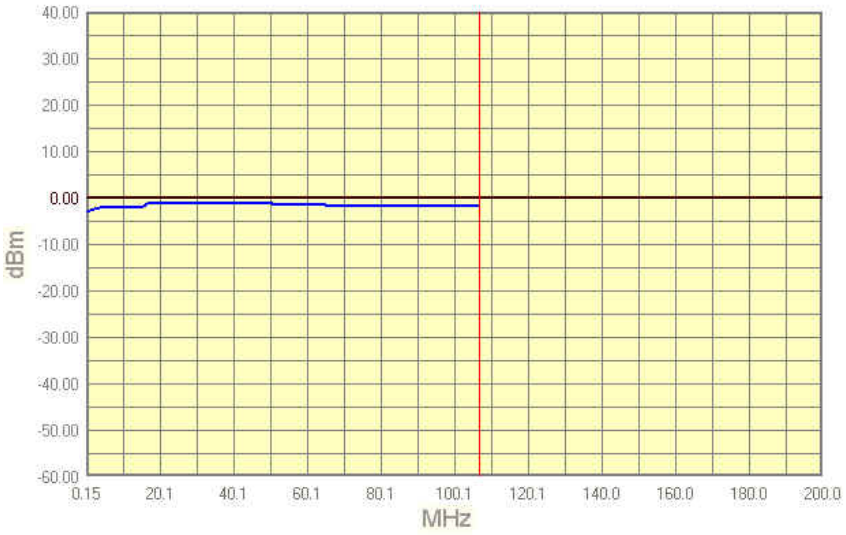


During the test, the **Generator** window shows the level extrapolated from the setup table and used by the generator to obtain the required voltage.

The color of the dot corresponds to the color of the line on the graph



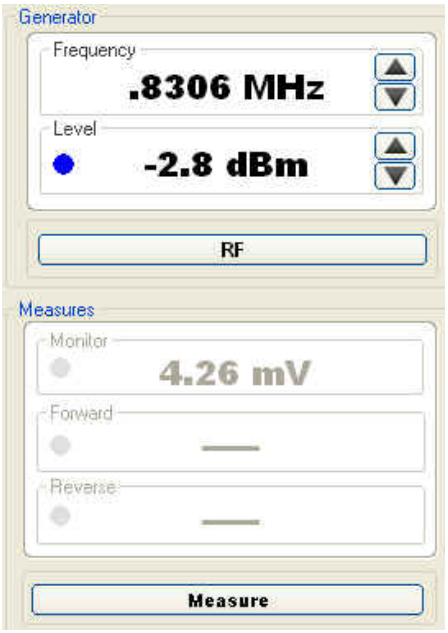

During the test, the frequency range and generator level will be shown in graph form.



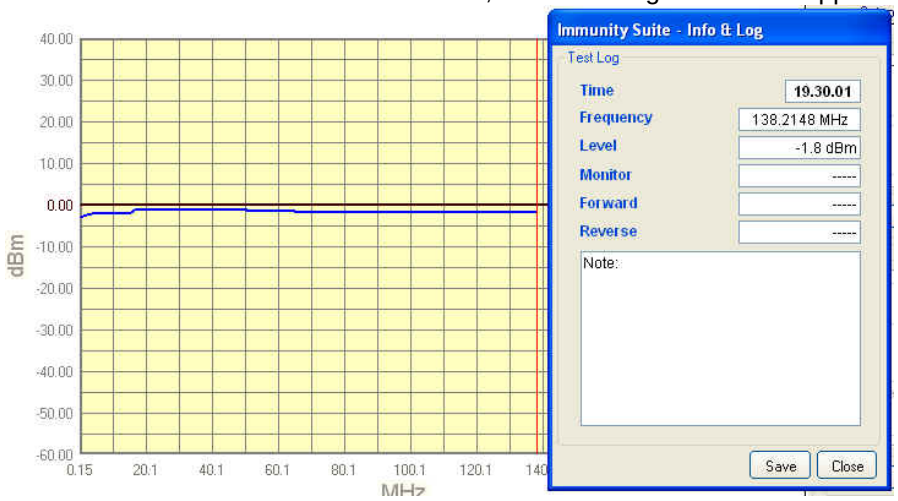

At any time, the test can be terminated by clicking the **Abort Test** button and confirming:

The **Pause** button can also be used at any time to stop the test momentarily (the generator is set to RF OFF).

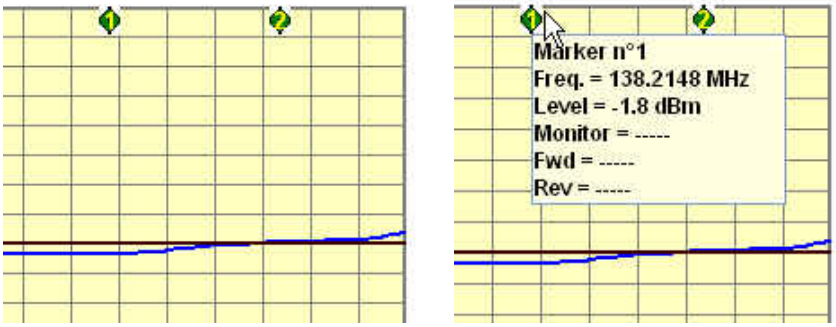
In this state, an earlier situation can be recreated or a later one can be simulated; click the RF button (the generator is set to RF ON), adjust the frequency and level with the arrows, and click **Measure** to display the voltage.



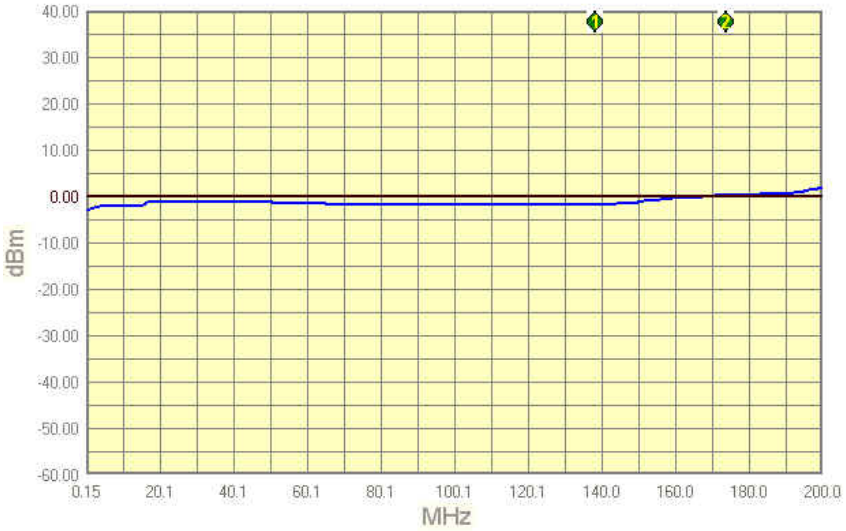

Each time the **Pause** button is clicked, the following window will appear:



Pressing **Save** assigns a marker to the current position for future reference. At the end of the test, the saved information can be viewed simply by hovering the cursor over the marker.

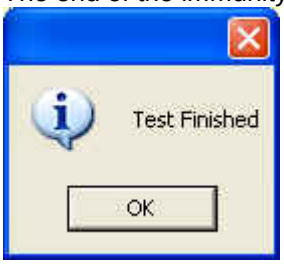



The button will now read **Continue** to resume the test.

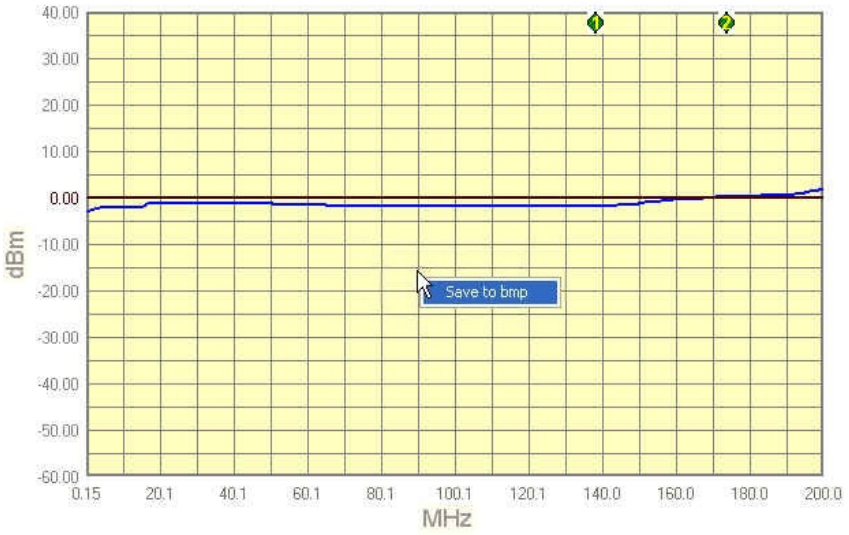



The status window shows each operation performed by the software during the test.


The end of the immunity test will be announced with the message:



When the test is over, the graph can be saved in .bmp format by right-clicking anywhere in the graph and selecting **Save bmp.**



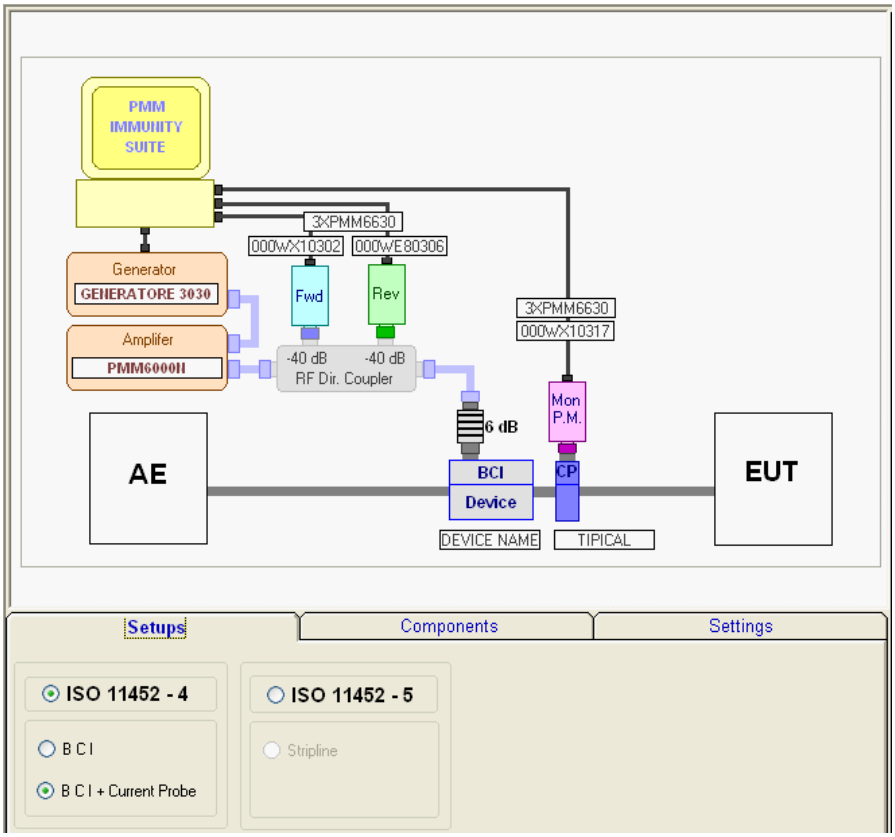

In the next window, assign a name to the graph and press **Save**.


The saved graph can be inserted into a text file using the Editor feature (see the Editor section for details).

Press the Exit button to leave the immunity test..

## 5.9 Immunity test WITHOUT impedance requirements (Setups)

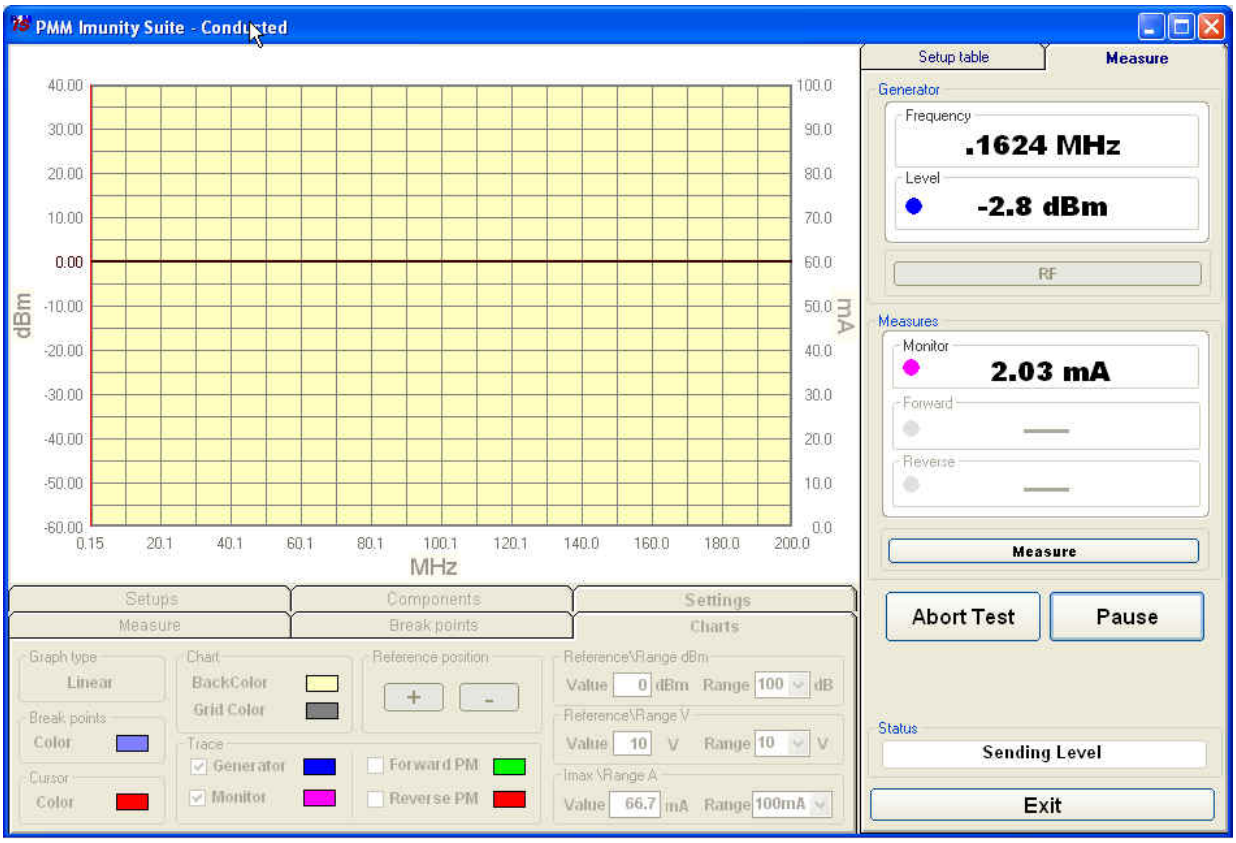
If the impedance requirements cannot be met, the current produced by the induced voltage must be checked using a supplementary probe placed between the Bulk Current Injector and the EUT (see EMC regulations for further details).
For this configuration, select **BCI + Current probe.**



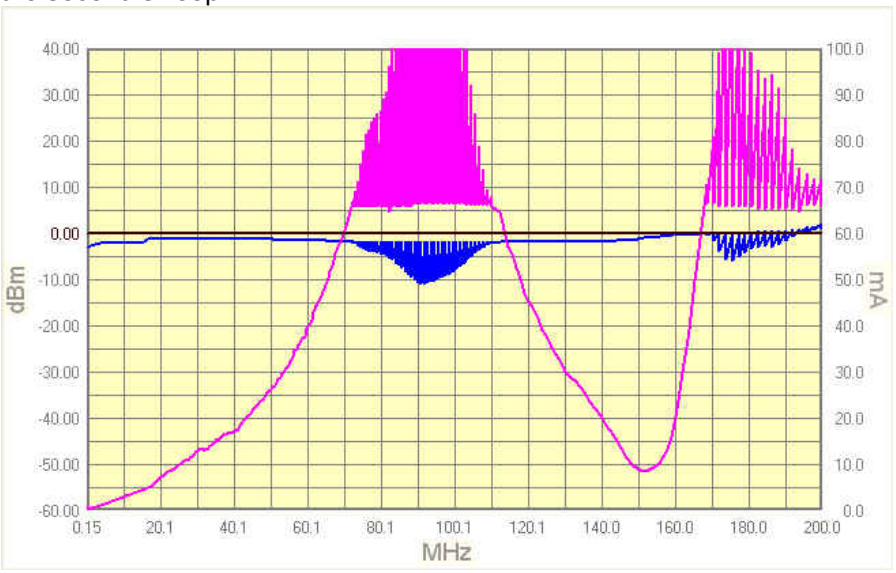

This procedure provides only significant differences with respect to the previous test.

### 5.9.1 Monitoring the current

Go to **Measure.**




The example below shows the current and the generator level during a test in which the current limit is exceeded and then brought back into range by the software. The correct generator levels will be saved and used during the second sweep.

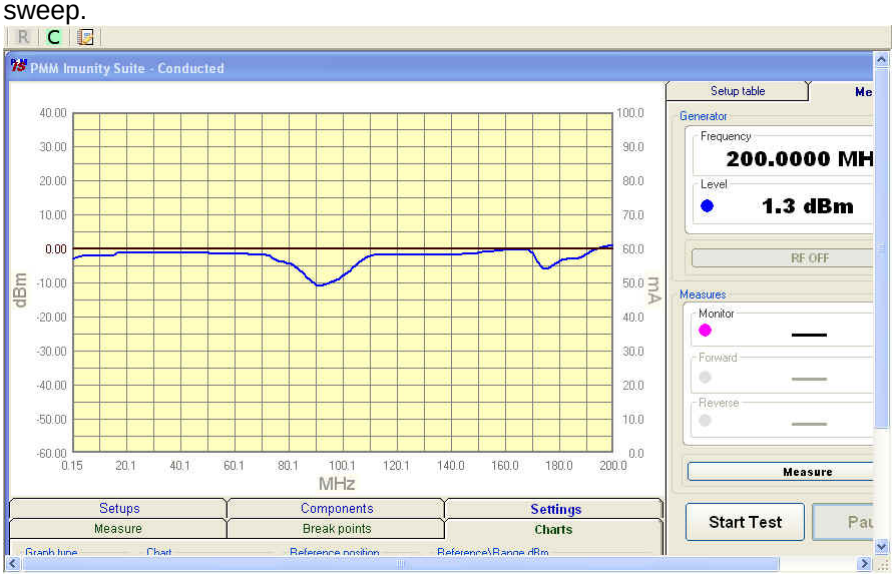


### 5.9.2 Second Sweep

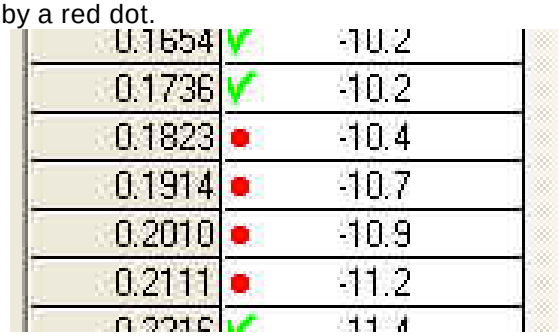
When the process has finished, you can save the new table calculated during the first sweep. If no name is assigned, the program will use the name of the previous table and add *"_ modified" (e.g. tabc_ 10v_modified.fct).*

After the file is saved, a prompt will appear to conduct a second sweep with the new table.


The graph below shows the new generator levels applied during the second sweep.




At the end of the test, the table will appear with the new values marked by a red dot.



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# 6 – PMM Immunity Test Editor

## 6.1 Introduction to Editor

This section explains how to view and correctly interpret the data acquired by the immunity tests.

Start Editor by clicking the button  .

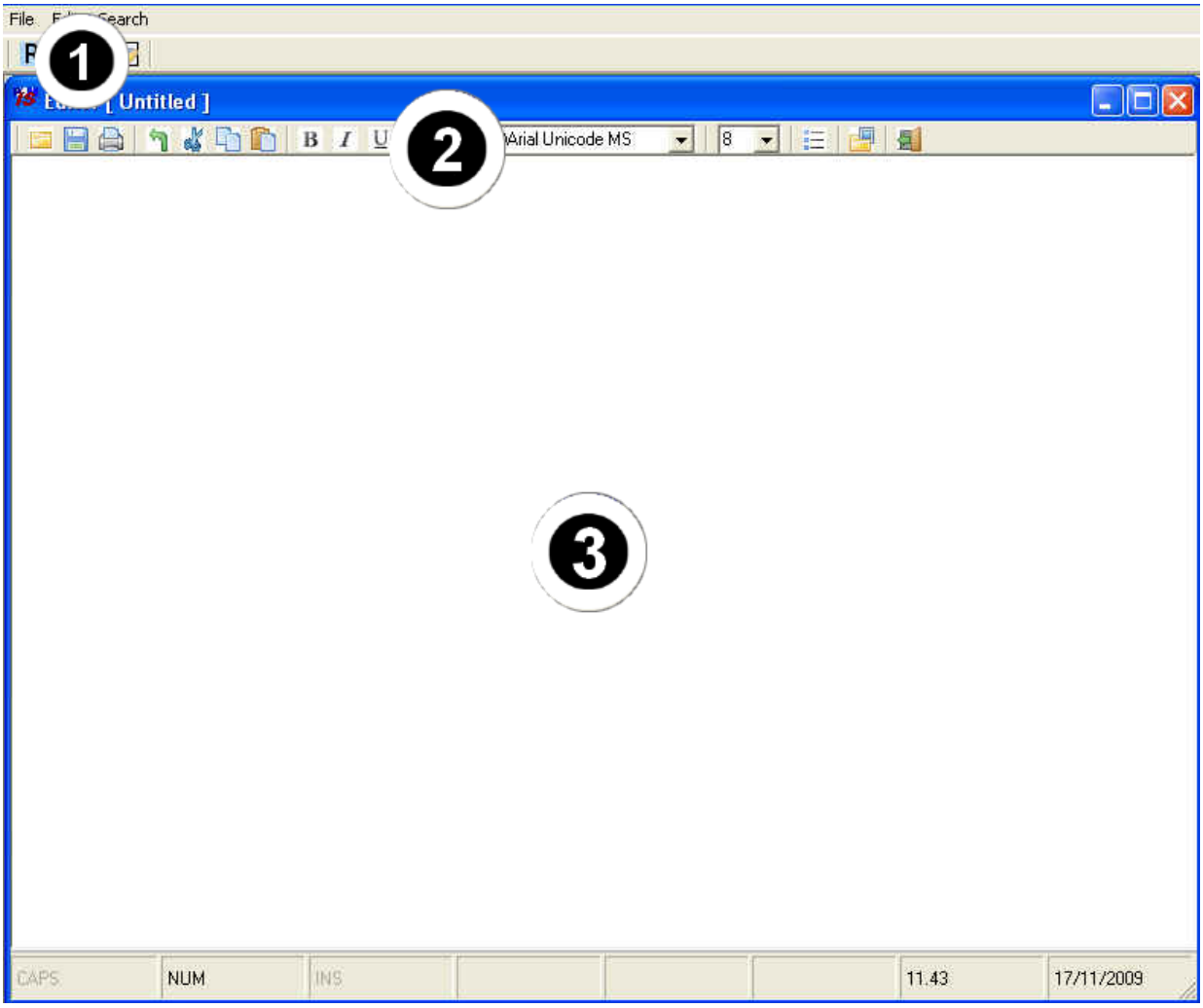


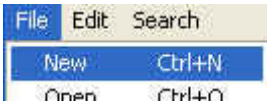

**Fig. 6-1** Main window – Editor

This window contains:

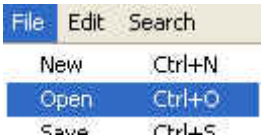
1. Menu
2. Command bar
3. Main window

## 6.2 Creating or opening a report

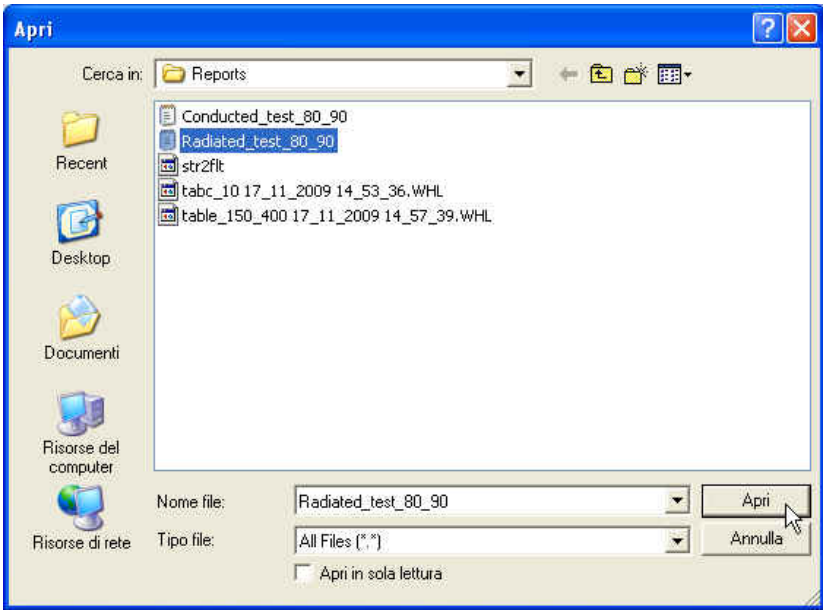
To create a new report, select **File** -> **New**



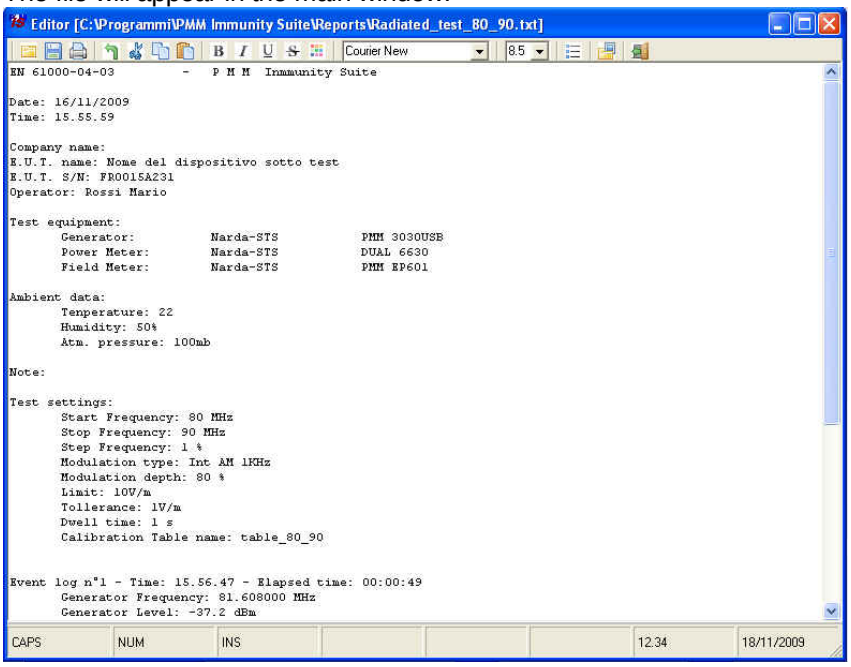

To open an existing report, select **File -> Open** or use the  button on the command bar.




In the window, select the file in the **Reports** folder and click **Open**.

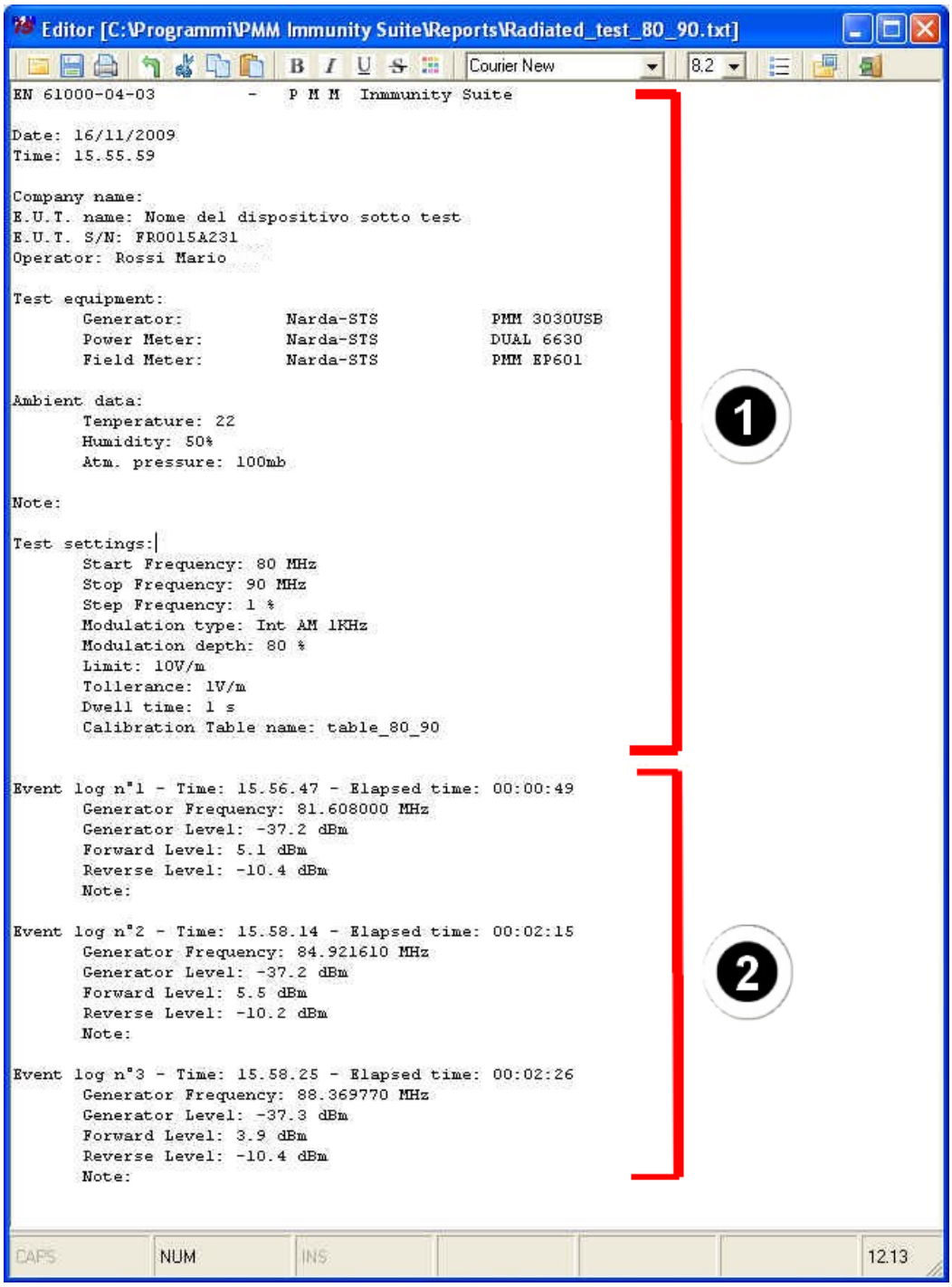



The file will appear in the main window.



## 6.3 Report format

Below is an example of the report generated at the end of the immunity test:

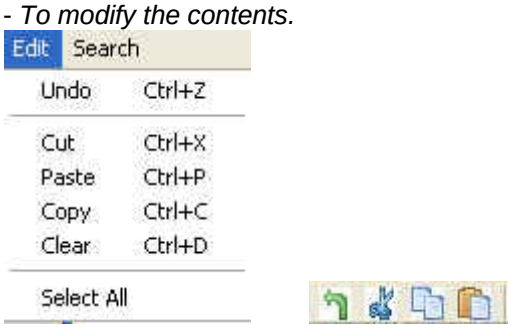



The format is highly user-friendly and clearly presents all of the information gathered during the test. The information in bracket 1 concerns the equipment under test, the instrumentation used and the ambient data. The rest includes all events that interrupted the test; they are listed in chronological order along with the data acquired at the time of the interruption.

## 6.4 Modifying the report

The report can be adapted to your needs through a series of commands:

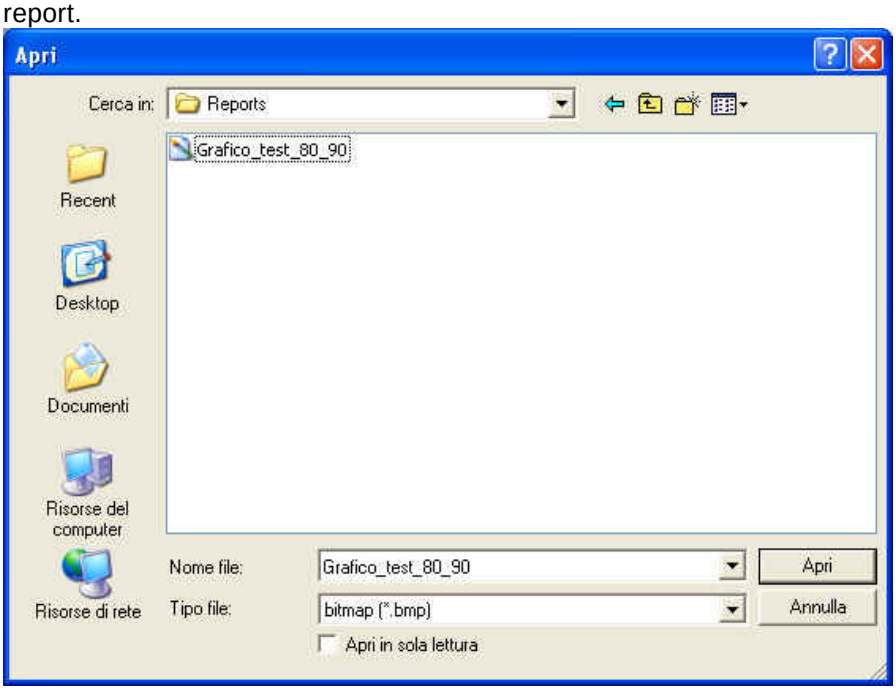
*- To modify the contents.*




The **Edit** menu allows you to **Copy, Cut, Paste,** and **Clear** text.
The entire text can be selected with the **Select All** command.
In case of error, the **Undo** feature will reverse unwanted modifications.

*- To add images:*

Click the  icon on the command bar to insert .bmp images into the report.

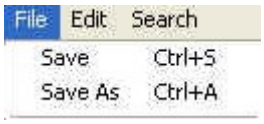



Select the file and press **Open**.

*- - To change text and color formatting.*

Select the part to be modified (by holding down the left mouse button) or the entire report (**Edit ->Select All,** then change the appearance of the text using the buttons and dropdown menus on the command bar:

### 6.5 Saving the report




To save the report, click:

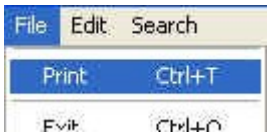
- **Save**: to overwrite the document in use, or.

- **Save As** : to save in one of three formats:
  - Calibration log Files (*.WHL)
  - Text files (*.txt)
  - Rich Text Files (*.rtf)

NOTA

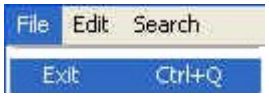
**All files saved in .txt can be viewed by other applications. In Word or Excel, search for the report using the Open file command with File type: All files (*.*). Select the report from your folders and click Open.**

### 6.6 Printing the report




Print the report by clicking **File -> Print** or the  button on the command bar

### 6.7 Leaving Editor




Close the file with **File -> Exit** or the  button on the command bar.

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*Address:*

**Persona da contattare:** *Technical contact person:* **Telefono:** *Phone n.*

**Modello:** *Equipment model:* **Numero di serie:** *Serial n.*

☑ ***Accessori ritornati con l'apparecchiatura:*** ☐ **Nessuno** ☐ **Cavo(i)** ☐ **Cavo di alimentazione** **Altro:**
☑ *Accessories returned with unit:* ☐ None ☐ Cable(s) ☐ Power cable Other:

☑ ***Sintomi o problemi osservati:*** ☑ *Observed symptoms / problems*:

☑ ***Guasto*:** ☐ **Fisso** ☐ **Intermittente** ***Sensibile a*:** ☐ **Freddo** ☐ **Caldo** ☐ **Vibrazioni** ☐ **Altro**
☑ *Failure*: ☐ Continuous ☐ Intermittent *Sensitive to*: ☐ Cold ☐ Heat ☐ Vibration ☐ Other

***Descrizione del guasto/condizioni di funzionamento:***
*Failure symptoms/special control settings description:*

***Se l'unità è parte di un sistema descriverne la configurazione:***
*If unit is part of system please list other interconnected equipment and system set up:*

***Suggerimenti / Commenti / Note:***
*Suggestions / Comments / Note:*