

# User's Manual

## EHP-50D

### ELECTRIC AND MAGNETIC FIELD PROBE - ANALYZER

From 5 Hz up to 100 kHz

#### **SERIAL NUMBER OF THE INSTRUMENT**

You can find the Serial Number on the bottom cover of the instrument.

The Serial Number is in the form: 000XY00000.

The first three digits and the two letters are the Serial Number prefix, the last five digits are the Serial Number suffix. The prefix is the same for identical instruments, it changes only when a configuration change is made to the instrument.

The suffix is different for each instrument

**NOTE:**

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If the instrument is used in any other way than as described in this Users Manual, it may become unsafe



Before using this product, the related documentation must be read with great care and fully understood to familiarize with all the safety prescriptions.

To ensure the correct use and the maximum safety level, the User shall know all the instructions and recommendations contained in this document.

This product is a **Safety Class III** instrument according to IEC classification and has been designed to meet the requirements of EN61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use).



In accordance with the IEC classification, the battery charger of this product meets requirements **Safety Class II** and **Installation Category II** (having double insulation and able to carry out mono-phase power supply operations)..

It complies with the requirements of **Pollution Class II** (usually only non-conductive pollution). However, occasionally it may become temporarily conductive due to condense on it.

The information contained in this document is subject to change without notice.

**KEY TO THE ELECTRIC AND SAFETY SYMBOLS:**

You now own a high-quality instrument that will give you many years of reliable service. Nevertheless, even this product will eventually become obsolete. When that time comes, please remember that electronic equipment must be disposed of in accordance with local regulations. This product conforms to the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (Monitoring and Control Instruments). You can return the instrument to us free of charge for proper environment friendly disposal. You can obtain further information from your local Narda Sales Partner or by visiting our website at [www.narda-sts.it](http://www.narda-sts.it) .



Warning, danger of electric shock



Earth



Read carefully the Operating Manual and its instructions, pay attention to the safety symbols.



Unit Earth Connection



Earth Protection



Equipotential

**KEY TO THE SYMBOLS USED IN THIS DOCUMENT:**



**DANGER**

The DANGER sign draws attention to a potential risk to a person's safety. All the precautions must be fully understood and applied before proceeding.



**WARNING**

The WARNING sign draws attention to a potential risk of damage to the apparatus or loss of data. All the precautions must be fully understood and applied before proceeding.



**CAUTION**

The CAUTION sign draws attention against unsafe practices for the apparatus functionality.



**NOTE:**

The NOTE draw attention to important information.

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## **SAFETY RECOMMENDATIONS AND INSTRUCTIONS**

This product has been designed, produced and tested in Italy, and it left the factory in conditions fully complying with the current safety standards. To maintain it in safe conditions and ensure correct use, these general instructions must be fully understood and applied before the product is used.

- When the device must be connected permanently, first provide effective grounding;
- If the device must be connected to other equipment or accessories, make sure they are all safely grounded;
- In case of devices permanently connected to the power supply, and lacking any fuses or other devices of mains protection, the power line must be equipped with adequate protection commensurate to the consumption of all the devices connected to it;
- In case of connection of the device to the power mains, make sure before connection that the voltage selected on the voltage switch and the fuses are adequate for the voltage of the actual mains;
- Devices in Safety Class I, equipped with connection to the power mains by means of cord and plug, can only be plugged into a socket equipped with a ground wire;
- Any interruption or loosening of the ground wire or of a connecting power cable, inside or outside the device, will cause a potential risk for the safety of the personnel;
- Ground connections must not be interrupted intentionally;
- To prevent the possible danger of electrocution, do not remove any covers, panels or guards installed on the device, and refer only to NARDA Service Centers if maintenance should be necessary;
- To maintain adequate protection from fire hazards, replace fuses only with others of the same type and rating;
- Follow the safety regulations and any additional instructions in this manual to prevent accidents and damages.

## **EC Conformity Certificate**

Compliant to the ISO/IEC standard 17050-1 and 17050-2

(In accordance with the Directives: EMC 2004/108/CE and Low Voltage 2006/95/CE)

This is to certify that the product: EHP-50D Electric and Magnetic field Probe - Analyzer

Produced by: Narda Safety Test Solutions  
Via Benessea 29/B  
17035 Cisano sul Neva (SV) – ITALY

complies with the following European Standards:

Safety: CEI EN 61010-1 (2001)

EMC: EN 61326-1 (2007)

Narda Safety Test Solutions

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# 1 - General information

## 1.1 Documentation

The following documents are included in this Manual:

- A questionnaire to be sent to NARDA together with the apparatus should service be required.
- A checklist of the Accessories included in the shipment.

This Manual includes description of EHP-50D standard and optional accessories.

## 1.2 Introduction



This section provides a general overview of EHP-50D Electric and Magnetic Field Analyzer.

EHP-50D is a low frequency electric and magnetic isotropic field probe-analyzer. It provides an advanced technology solution for field analysis in the 5 Hz to 100 kHz frequency range in an extremely high dynamic range. It includes X, Y and Z axes simultaneous measurements with a powerful, built in, spectrum analyzer.

EHP-50D can be used either connected to NBM-550 portable field meter or PC. Additionally, stand alone operation mode is provided for up to 24 hours continuous data collection.

EHP-50D includes a non volatile memory which stores frequency and level calibration tables and an internal optical repeater which allows connection to external devices through the optical fibre.

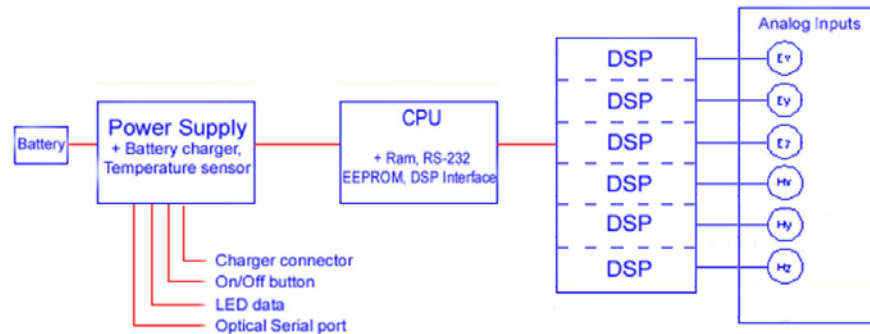
Spectral analysis, obtained through DSP (Digital Signal Processor), is performed on seven different frequency Span values and displayed on the PC monitor or NBM-550 .

Marker function is available to provide accurate field strength and frequency measurement.

EHP-50D is managed internally with a microprocessor that controls all the main functions, from the battery charging to the serial communication with the DSP unit.

Electric or Magnetic field is picked up by three sensors on the X, Y and Z orthogonal axes. A Digital/Analog conversion follows which transforms the signal into numeric information processed by a Digital Signal Processing unit.

EHP-50D is housed in a small cubic housing. The bottom side panel includes an optical fibre connector, extension rod screw, battery charger connector, ON/OFF button and Status LED.



**Fig. 1-1** Block diagram of the EHP-50D Analyzer

The magnetic sensor system is composed by three magnetic loops positioned orthogonal each other. The electric sensor system is composed by three orthogonal parallel capacitors installed on opposite side of the magnetic loops.

### 1.3 Configuration and Standard Accessories

EHP-50D can be purchased as part of two different sets, for NBM-550 or Stand-alone/PC use, which difference consist of the included accessories.

EHP-50D, Set for NBM-550 (P.N. 2404/101) includes the following accessories:

- AC/DC battery charger including international AC plug adapter (Europlug CEE 7/16, UK, USA, Australia);
- FO-10USB Cable, fibre optic 10m;
- USB-OC Optical to USB converter;
- Optical bridge connector;
- Non conductive tripod extension, 50cm;
- EHP-TS software, CD-ROM including user's manual;
- Foam insert for EHP-50D to fit into the NBM-550 hardcase;
- Certificate of calibration;
- Return for Repair Form

EHP-50D, Set for Stand-alone and PC use (P.N. 650.000.210) includes the following accessories:

- AC/DC battery charger including international AC plug adapter (Europlug CEE 7/16, UK, USA, Australia);
- FO-10USB Cable, fibre optic 10m;
- USB-OC Optical to USB converter;
- Optical bridge connector;
- Non conductive tripod extension, 50cm;
- Mini tripod, bench top
- EHP-TS software, CD-ROM;
- Soft carrying case;
- User's manual
- Certificate of calibration;
- Return for Repair Form

### 1.4 Optional Accessories

The following accessories may be ordered as options:

- FO-20USB Cable, fiber optic 20m;
- FO-40USB Cable, fiber optic 40m;
- FO-8053/80 Cable, fiber optic 80m;
- 8053-OC Optical to RS232 converter;
- 8053-OC-PS Power Supply;
- TR-02A wooden tripod 1-2m with soft carrying bag;
- TT-01 telescopic mast (120-420 cm) with carrying bag;
- 8053-SC Soft carrying case;
- 8053-CC Rigid case;
- 8053-CA Car Adapter.

## 1.5 EHP-50D Main specifications

When not differently specified the following specifications are referred to operating ambient temperature 23°C and relative humidity 50%.

<b>Table 1-1 Technical specifications of the EHP-50D Electric and Magnetic Field Analyzer</b>		
	<b>Electric Field</b>	<b>Magnetic Field</b>
<b>Frequency range</b>	5 Hz ÷ 100 kHz	
<b>Measurement range (1)</b>	5 mV/m ÷ 1 kV/m 500mV/m ÷ 100 kV/m (146 dB)	0.3 nT ÷ 100 µT 30 nT ÷ 10 mT (150 dB)
<b>Overload</b>	200 kV/m	20 mT
<b>Dynamic range</b>	106 dB	110 dB
<b>Resolution (2)</b>	1 mV/m with NBM-550 0.1 mV/m with EHP-TS SW 1 mV/m Stand alone	0.1 nT with NBM-550 0.1 nT with EHP-TS SW 1 nT Stand alone
<b>Displayed average noise level (3)</b> <b>Isotropic result</b> <b>Single axis</b>	5 mV/m 3 mV/m	0.3 nT 0.2 nT
<b>Flatness (@ 100 V/m and 2 µT)</b> <b>(5 Hz ÷ 40 Hz)</b> <b>(40 Hz ÷ 100kHz)</b>	0.8 dB 0.35 dB	0.8 dB 0.35 dB
<b>Anisotropy</b>	0.54 dB	0.12 dB
<b>Linearity</b> (referred to 100 V/m and 1 µT)	0.2 dB (1 V/m ÷ 1 kV/m)	0.2 dB (200 nT ÷ 10 mT)
<b>Internal memory</b>	Up to 24 hours regardless the logging rate.	
<b>Internal data logger</b>	1 measurement every 30 or 60 seconds	
<b>Spectrum analysis method</b>	FFT	
<b>Acquisition method</b>	Simultaneous three axis acquisition	
<b>SPAN</b>	100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 10 kHz, 100 kHz (500Hz to 100kHz in Stand Alone mode)	
<b>Start frequency</b>	1.2 % of the SPAN	
<b>Stop frequency</b>	Equal to the SPAN	
<b>Rejection to E fields</b>	---	> 20 dB
<b>Rejection to H fields</b>	> 20 dB	---
<b>Calibration</b>	internal E <sup>2</sup> PROM	
<b>Typical temperature deviation</b> <b>@ 55 Hz referred to 23°C</b> (@ 50% of relative humidity when applicable)	-4x10 <sup>-3</sup> dB/°C between -20 and +55 °C	-8x10 <sup>-3</sup> dB/°C between -20 and +23 °C +13x10 <sup>-3</sup> dB/°C between 23 and 55 °C
<b>Typical relative humidity deviation</b> <b>@ 55 Hz referred to 50%</b> (@ 23 °C)	+11x10 <sup>-3</sup> dB/% between 10 and 50 % +22x10 <sup>-3</sup> dB/% between 50 and 90 %	-7x10 <sup>-3</sup> dB/% between 10 and 50 % +10x10 <sup>-3</sup> dB/% between 50 and 90 %
<b>Dimensions</b>	92 x 92 x 109 mm	
<b>Weight</b>	550 g	
<b>Tripod support</b>	Threaded insert ¼"	
<b>Internal battery</b>	3.7 V / 5.4 Ah Li-Ion, rechargeable	
<b>Operating time</b>	>9 hours in standard mode 24 hours in stand alone mode	
<b>Recharging time</b>	< 6 hours	
<b>External supply</b>	10 ÷ 15 VDC, I = approx. 500 mA	
<b>Optical fiber connection</b>	up to 40 m (USB-OC) up to 80 m (8053-OC)	
<b>Firmware updating</b>	through the optical link by USB or RS232	
<b>Self test</b>	automatic at power on	
<b>Operating temperature</b>	-20 to +55 °C	
<b>Operating relative humidity (4)</b>	0 to 95 %	
<b>Charging temperature</b>	0 to +40°C	
<b>Storage temperature</b>	-30 to +75°C	

(1) For each single axis. Ranges to be selected manually

(2) For the lower measurement range

(3) DANL is frequency and SPAN depending. The specified best performance is referred to f ≥ 50 Hz and SPAN ≤ 1 kHz

(4) Without condensation

Specification are subject to change without notice

## 1.6 Isotropic E&H field analyzer EHP50D typical uncertainty and anisotropy

### 1.6.1 Typical uncertainty of EHP50D

The uncertainties stated in this document have been determined according to EA-4/2 [4].

They were estimated as expanded uncertainty obtained multiplying the standard by the coverage factor  $k=2$ , corresponding to a confidence level of about 95%.

The total uncertainty of the probe derived from typical contributions of linearity, anisotropy, frequency response, temperature, relative humidity and with/without contribution of uncertainty of calibration.

Magnetic probe <sup>(1)</sup>	Magnetic flux density range	Total expanded uncertainty (k=2)	
		Without contribution of uncertainty of calibration $U_{EHP50D}$ (%)	With contribution of uncertainty of calibration $U_T$ (%)
Frequency at 50Hz	0.1 $\mu$ T to < 0.3 $\mu$ T	4.1	4.2 <sup>(2)</sup>
	0.3 $\mu$ T to < 10.0 $\mu$ T	3.3	3.5 <sup>(2)</sup>
	10.0 $\mu$ T to < 100 $\mu$ T	3.7	4.3 <sup>(3)</sup>
	100 $\mu$ T to 500 $\mu$ T	4.1	4.8 <sup>(4)</sup>
Frequency from 40 to 10kHz	0.1 $\mu$ T to < 0.3 $\mu$ T	6.5	6.7 <sup>(5)</sup>
	0.3 $\mu$ T to > 10.0 $\mu$ T	6.1	6.3 <sup>(5)</sup>

(1) The temperature range is from -10°C to 23 °C and relative humidity is from 20% to 50%

(2) (5) The uncertainty of calibration used is 1,5%

(3) The uncertainty of calibration used is 2,0%

(4) The uncertainty of calibration used is 2,7%

Electric probe <sup>(6)</sup>	Electric field range	Total expanded uncertainty (k=2)	
		Without contribution of uncertainty of calibration $U_{EHP50D}$ (%)	With contribution of uncertainty of calibration $U_T$ (%)
Frequency at 50Hz	10 V/m to 500 V/m	7.8	8.2 <sup>(7)</sup>
	10 V/m to < 100 kV/m	8.4	8.8 <sup>(8)</sup>
Frequency from 40 to 10kHz	10 V/m to < 500 V/m	9.5	9.9 <sup>(8)</sup>

(6) The temperature range is from -10°C to 23 °C and relative humidity is from 20% to 50%

(7) The uncertainty of calibration used is 2,0%

(8) The uncertainty of calibration used is 2,5%

### 1.6.2 Explication Notes

- a) If we have the certificate with different values of the uncertainty of calibration, in order to calculate the total expanded uncertainty  $U_T$ , the uncertainty of calibration has to be taken into account::

$$U_T = \sqrt{(U_{EHP50C})^2 + (U_{Cal})^2}$$

- b) When the environmental temperature is higher than 23 °C the contribute due to the temperature must be added quadratically to the uncertainty.

Example: if the temperature is 38°C we get a variation of 15°C in comparison to 23°C, corresponding to a variation of 0.15 dB ( 0.01dB/°C) equivalent to 1,74% and therefore the standard uncertainty is 1% ( $=0,0174/ \sqrt{3}$ ).

Assuming an expanded uncertainty  $U_T = 4.2\%$ ,

$$U_{TOT} = \sqrt{\left(\frac{0.042}{2}\right)^2 + (0.01)^2} = 0.0465 \text{ is obtained.}$$

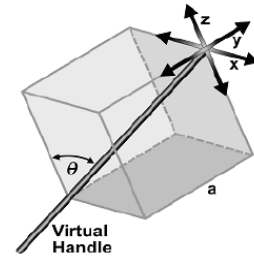
A similar calculation can be made in case the relative humidity overcomes 50%.

### 1.7 Anisotropy

1) The IEEE 1309-2005 [3] defined the anisotropy (A) as the maximum deviation from the geometric mean of the maximum response and minimum response when the probe is rotated around the ortho-axis (e.g. "virtual handle") as shown in the example in figure below.

$$A = 20 \cdot \log_{10} \left( \frac{S_{\max}}{\sqrt{S_{\max} \cdot S_{\min}}} \right) \text{ dB} \quad \text{equation (1)}$$

where S is the measured amplitude in field strength units.



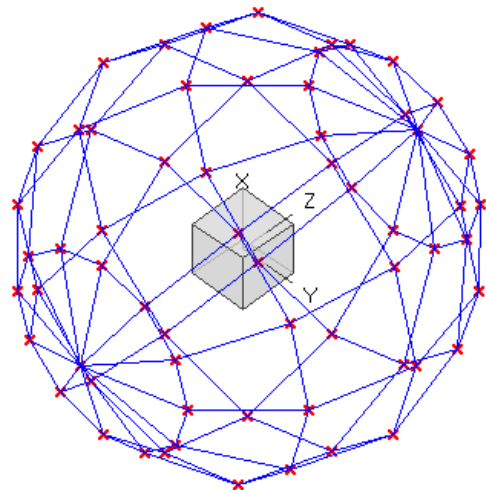
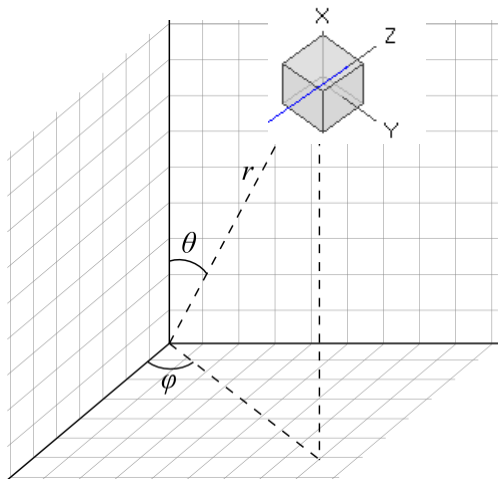
$$\theta = \sin^{-1} \left( \frac{\sqrt{2}a}{\sqrt{3}a} \right) = 54.7^\circ$$

2) The IEC 61786 [2] "Measurement of low-frequency magnetic and electric fields with regards to exposure of human beings - special requirements for instruments and guidance for measurements" don't define the anisotropy and suggest, for three-axis probes, the calibration of each axis when each element is aligned with the incident field.

The calibration should also be checked for a specific orientation where approximately there is the same indication for each one of the three axis (XYZ measurement).

Following this suggestion some laboratories find the minimum and the maximum values of the X,Y,Z and XYZ measure and calculate the anisotropy using equation (1).

3) We calculated the anisotropy with equation (1) but with 3D mesh measurements to cover 4π steradian.



**Fig. 1-2** 3D mesh measurements of magnetic probe

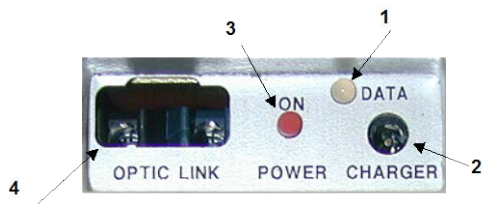
Each x marker in the fig.1 indicates the coordinates surface of the spherical coordinates (r, θ, φ).

The anisotropy is evaluated with 30 degree steps for θ and φ, and r shows the calibration factor at each position.

The typical value of anisotropy is 1,4% (0.12 dB) for magnetic probe and 6,5% (0,54 dB) for electric probe.

The anisotropy calculated in this way is worse respect to other cases above described and it is more representative of the reality.

## 1.8 EHP-50D Panel



**Fig. 1-3** Panel of EHP-50D

### Key:

1. Led
2. Battery charger connector
3. ON/OFF button
4. Fiber optic connector



## 2 - Installation and use

### 2.1 Introduction

This section provides the information required for installing and using the EHP-50D Analyzer.

Information is included regarding initial inspection, power requirements, interconnections, work environment, assembly, cleaning, storage and shipment.

### 2.2 Preliminary inspection



**WARNING**

Inspect the packaging for any damage.

**If the packaging or anti-shock material have been damaged, check that the contents are complete and that the meter has not suffered electric or mechanical damage.**

**Check that all the Accessories are there against the checklist found with the apparatus.**

**Inform the carrier and NARDA of any damage that has occurred.**

### 2.3 Work environment

The work environment of the Accessories, must come within the following conditions:

- Temperature From -20°C to +55°C
- Humidity 0 to 95% relative

The meter must be stored in a clean and dry environment, free from acid dusts and humidity.

The storage environment must come within the range of the following conditions:

- Temperature From -30°C to + 75°C
- Humidity < 100% relative without condense

### 2.4 To return for repair

When the meter needs to be returned to NARDA for repair, please complete the questionnaire appended to this User's Manual, filling in all the data that will be useful for the service you have requested.

For reducing the period of time required for the repairs, it is necessary to be as specific as possible in describing the problem. If the problem only occurs in certain circumstances, please describe in detail how it happens.

If possible it is better to reuse the original packaging; making sure that the apparatus is wrapped in thick paper or plastic.

Otherwise, use strong packaging by using a sufficient quantity of shock absorbent material around all sides of the meter to ensure that it is compact and does not move around inside the package.

In particular, take every precaution to protect the front panels.

Finish the package by sealing it up tightly.

Apply a FRAGILE label to the package to encourage greater care in its handling.

### 2.5 To clean the meter



**WARNING**

Use a dry, clean and non-abrasive cloth for cleaning the meter.

**Do not use solvents, acids, turpentine, acetone or other similar products for cleaning the meter in order to avoid damaging it.**

## 2.6 Power supply and battery recharging

EHP-50D has an internal rechargeable Li-Ion battery that can be recharged with the battery charger supplied with it.

Make a full charging cycle before using the Analyzer for longest battery operation time.

**ALWAYS connect the battery charger to the power supply BEFORE connecting it to the EHP-50D.**



The battery charger has an internal protective circuit that will limit the output of current if there is any load when connecting to the mains. Always remove the shorting loop connector when recharging EHP-50D.

Battery charger:  
output: DC, 10 - 15 V, ~ 500 mA



Connector:



In order to safeguard the features of the batteries, it is crucial to have a complete recharge before storing them for periods longer than 4 months. Therefore, it is warmly suggested recharging the batteries at least every 4 months even though the device has not been used.



The minimum voltage level for operation is about 3.25V. The batteries must be recharged for lower voltages. Below such voltage the analyzer will turn OFF automatically.



The time required for recharging the batteries is about 4-5 hours. When the recharge is complete, this is indicated by the Led of the EHP-50D, with a rapidly blinking Green light.

To take measurements **ALWAYS** remove the battery charger from the EHP-50D Analyzer otherwise the system does not work.



The battery status is reported by the EHP-50 control program

When charging is in progress the connection to the probe is not available.

**2.7 EHP-50D connected to a PC**


Using the EHP-TS software spectrum analysis can be displayed on a PC

**2.8 EHP-50D stand alone Mode**

The EHP-50D offers a Stand-alone mode of operation and thanks to its internal memory is possible to perform a long term acquisition without connecting it to any external device.  
With EHP-50D is possible to collect data every 1 minute or every 30 seconds for 24 hours. Later on, it is possible to download all collected data to any PC by using the provided EHP-TS PC software.

**2.9 EHP-50D with NBM-550**

EHP-50D is linked to NBM-550 via the fiber optic link.

 **NOTE**

**See NBM-550 Manual for further details**

**2.10 Battery management**

The Table summaries the battery autonomy of the Analyzer depending on its mode of operation.

<b>TABLE 2-1 Autonomy of the battery</b>			
		<b>STAND ALONE MODE</b>	
<b>Span</b>	<b>Normal functioning Autonomy (hours)</b>	<b>30s Sample</b>	<b>60s Sample</b>
100 Hz	>11	---	---
200 Hz	>11	---	---
500 Hz	>10	>24	>24
1 kHz	>10	>24	>24
2 kHz	>9	>24	>24
10 kHz	>9	>24	>24
100 kHz	>9	>24	>24

## 2.11 Avoiding measurement errors

To avoid disturbing the measurements in progress, the user or other persons or mobile vehicles should stay at least 5 meters away from the Analyzers. We also recommend that the probe be set up a long way from metal objects or masses.



To perform correct measurements, the tripod TR-02A to hold EHP-50D is mandatory. Using an unsuitable support could influence the measurements that have been taken and, therefore, determine incorrect results. We recommend always using the isolated extension support supplied with EHP-50D for supporting the Analyzer.

We also recommend that the TR-02A optional tripod be used for positioning EHP-50D at the height set out in the reference standards for the measurement in progress and that this configuration is always maintained so that the measurements taken can be repeated.



The intensity of the measured field mainly depends on its voltage and the geometry of the system under examination as well as the distance between the conductors and the measurement points. In the vicinity of cables, the reading of the field value may be very high and vary with the location of the probe.

From the definition of the potential difference between two points:

$$V_{21} = - \int_{r_1}^{r_2} \vec{E} dr$$

It is evident that, keeping the potential difference constant as the distance between the two points under examination decreases, the intensity of the field necessarily increases.

For example: the intensity of the electric field between two armatures of a parallel-plate capacitor situated at a distance of 0.1 m and having a potential difference of 100 V is equal to:

$$E = \frac{100V}{0,1m} = 1KV/m$$

It should be noted that a voltage of 100 V, in these conditions, generates a field of 1000 V/m. It is, therefore, possible, in the vicinity of 220 V conductors, that there may be a field, which is much higher than 220 V/m.

## 3 – EHP-TS installation

### 3.1 Introduction

EHP-TS is a useful software tool developed for remote PC control, through fibre optic link, of EHP family Electromagnetic field analyzers.

By means of the recently introduced USB-OC optical to USB converter, EHP-50D and EHP-200A can be connected to a PC USB port.

Using the former optical/RS232 adapter, the selected COM port should be assigned to the application software (see cap.5 EHP-TS applications).

EHP-TS software requires that at least one of the mentioned analyzers is connected to PC in order to run.

The EHP-TS installation program doesn't install any driver for USB-OC converter but makes the driver file available for its installation.

### 3.2 Hardware requirements

Minimum requirements:

- Processor: Pentium or equivalent
- 256 MB RAM
- At least 32 MB of free space on hard disk
- 1 free USB or RS232 port
- Windows Operating system™ XP/Vista/Win7



**WARNING**

**The User might have the need of administrator privileges to install and run the software in Windows 7; for further information see the next paragraph.**



**WARNING**

**EHP-TS software does not work with EHP50A/B which can be anyway factory upgraded to the EHP-50C version (please contact your local Narda distributor for details)**

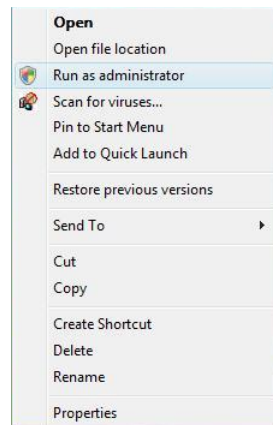
### 3.3 Installing EHP-TS Software

Before connecting the EM field analyzer to PC the EHP-TS software installation should be performed:  
 Insert the EHP-TS CD into the driver of your PC and run the file “EHP-TS Setup.exe”.



#### NOTE

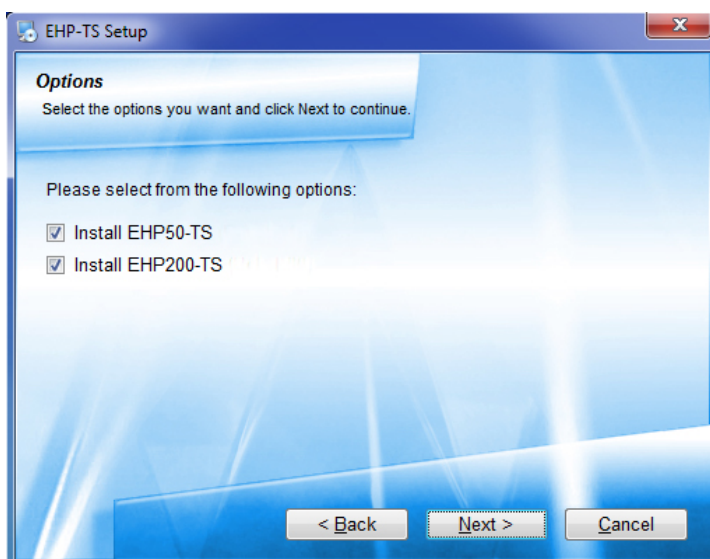
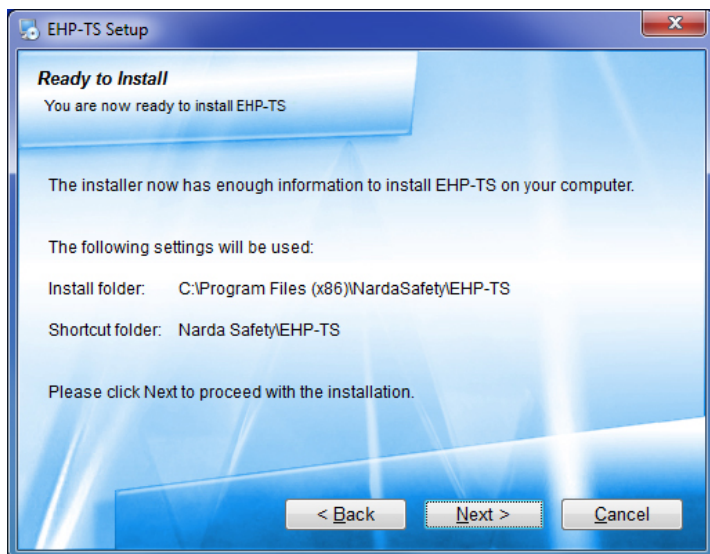
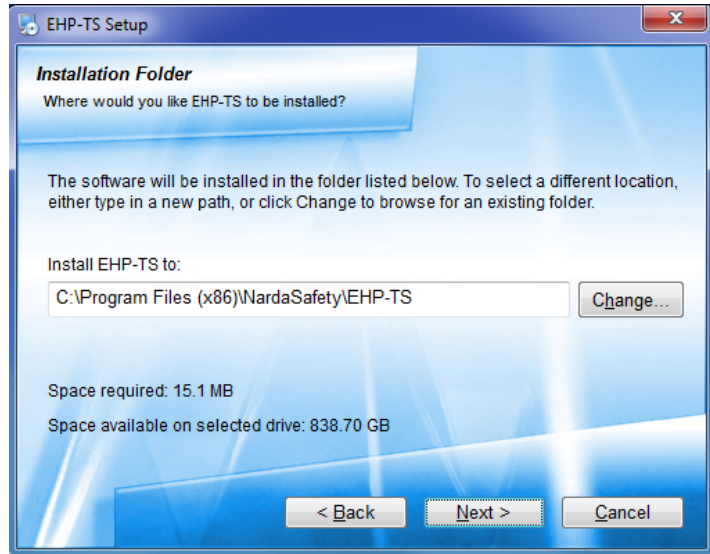
The User must have administrator privileges to install the EHP-TS software in Windows 7; right click on the program .exe file and click on “Run as administrator” to temporarily run the program or application as an administrator until close it (Windows 7 also allows to mark an application so that it always runs with administrator rights).



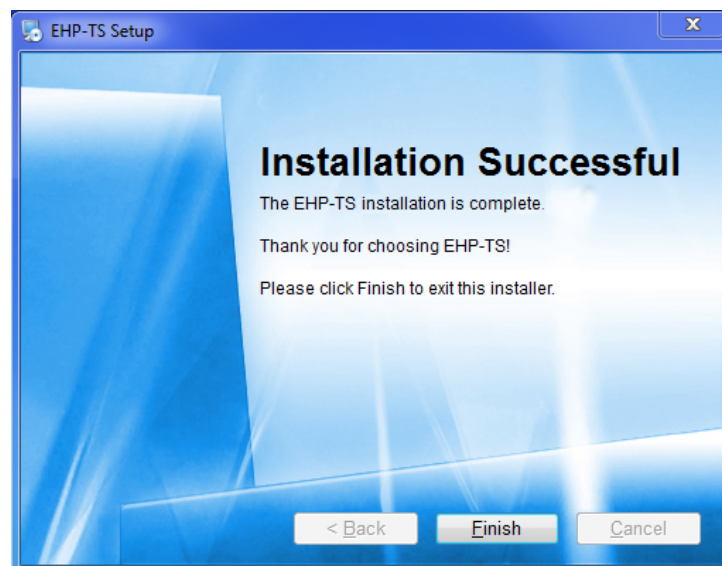
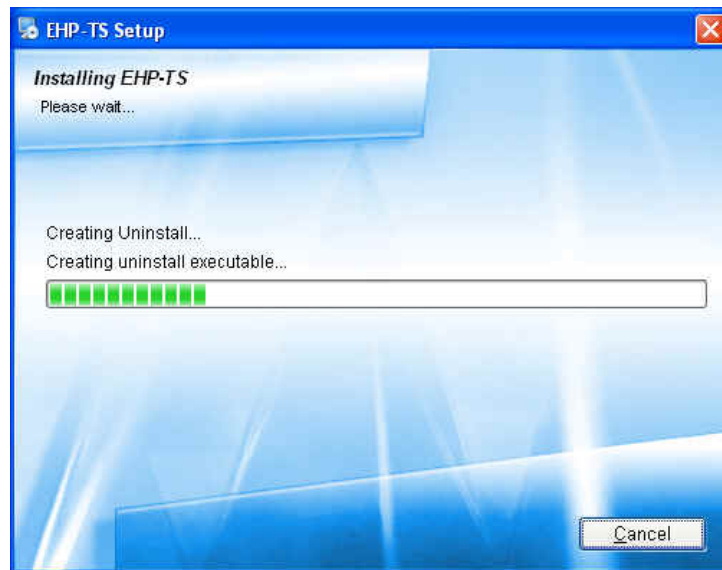
Follow set-up program instructions



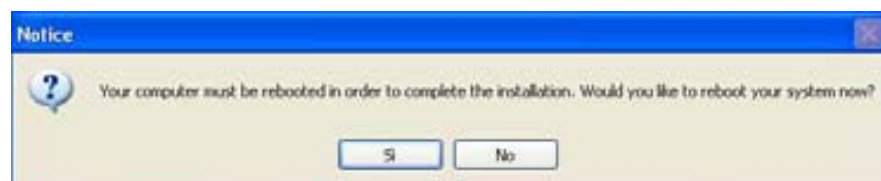
Fig.3-1 EHP-TS installation







When asked for, reboot your system to complete installation



EHP-TS software is now installed in your PC, you can remove it, if needed, simply running the "Uninstall EHP-TS" application (see cap.8).



## 4 – USB-OC Installation

### 4.1 USB-OC optical to USB converter driver Installation

USB-OC optical to USB converter requires a driver program to be installed in your system. EHP-TS software create a folder including all files requested for the driver installation. Before running EHP-TS, please connect the USB-OC converter to a USB port of your PC.

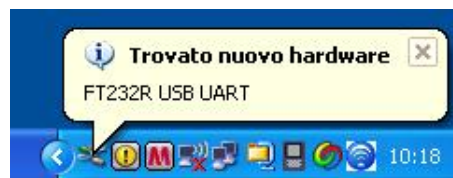
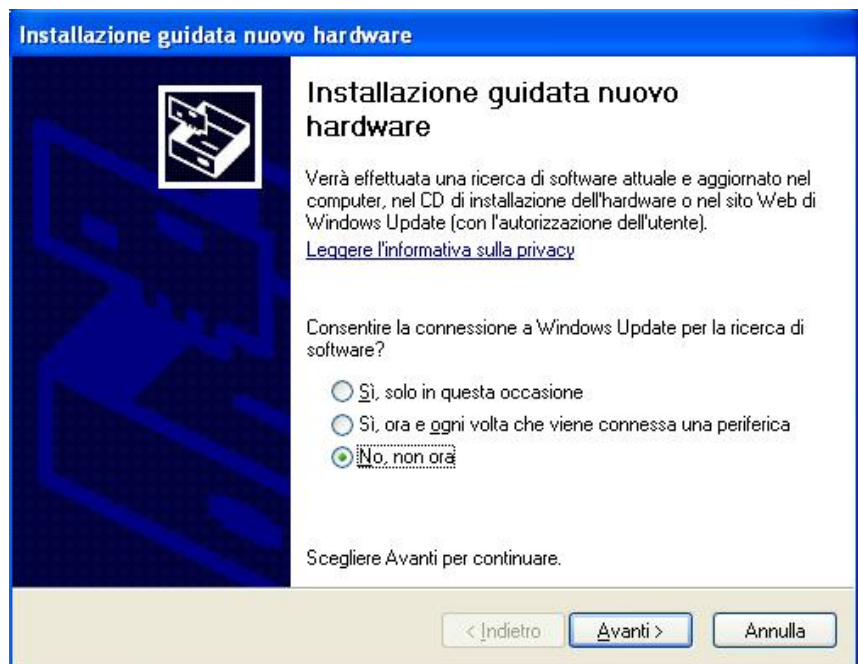


Fig. 4-1 USB-OC Converter

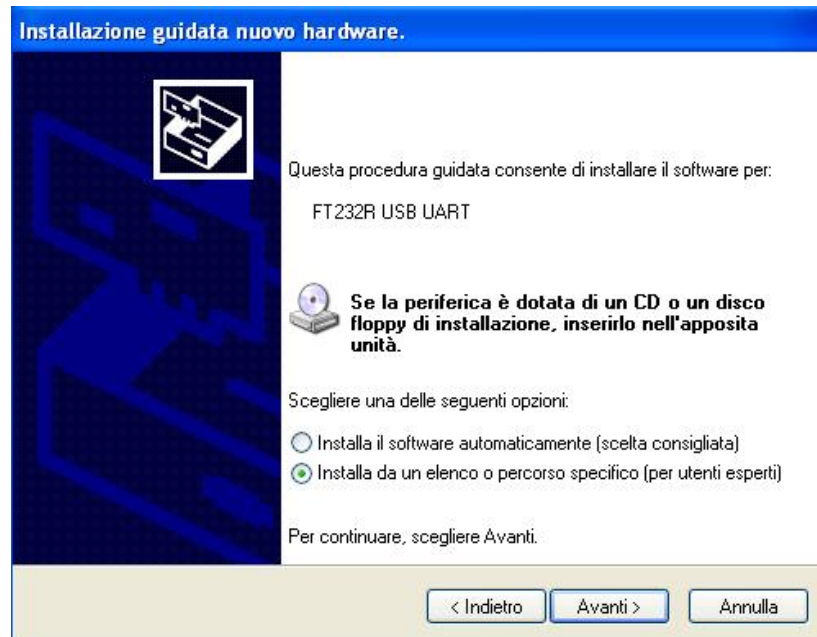
#### NOTE

The following provides, as an example, USB converter installation instructions for Windows XP O.S. The procedure to select location of the driver directory will be different in case of different operating systems.

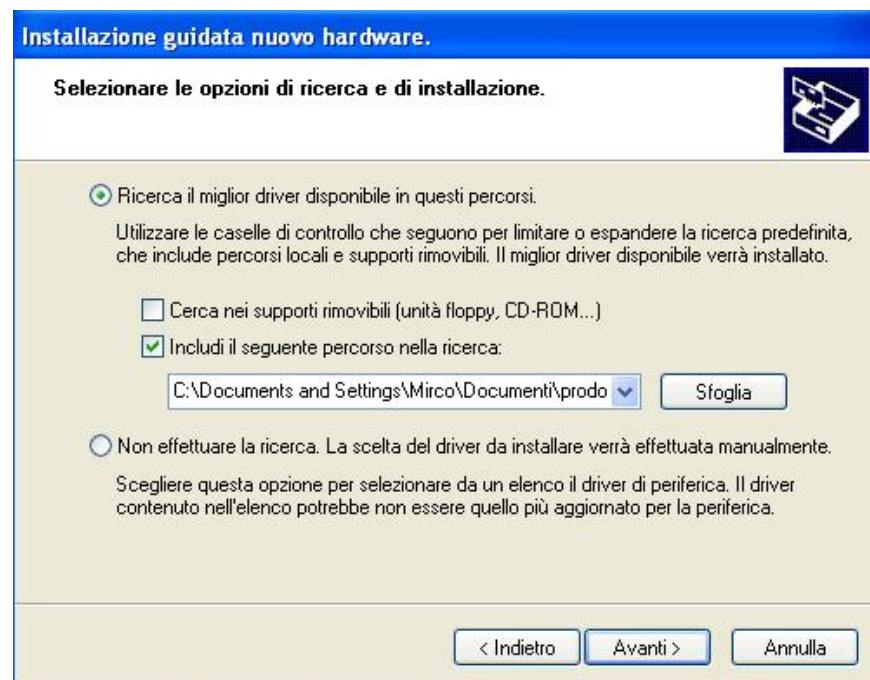
In case the driver is not already installed, a message informing that new hardware has been found will be shown and a guided installation will start:



Do not allow connection to Windows Update but select “No, not now” and click “next”



Select “Install from a list or specific path” and click “next”

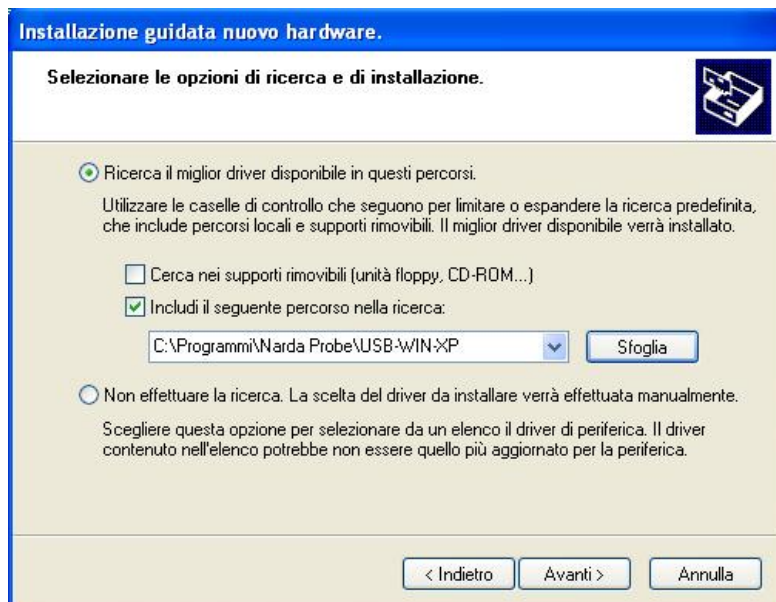


Select options as in the previous picture and click “browse” to select the directory containing the requested files:

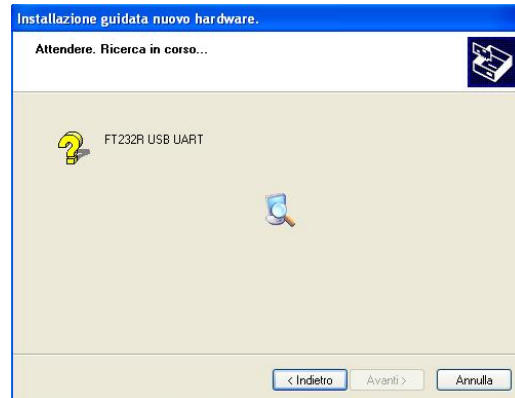


The folder “USB-WIN-98” includes driver for Windows 98.  
The folder “USB-WIN-XP” includes driver for Windows XP and Vista.  
The folder “WIN-7” includes driver for Windows 7.

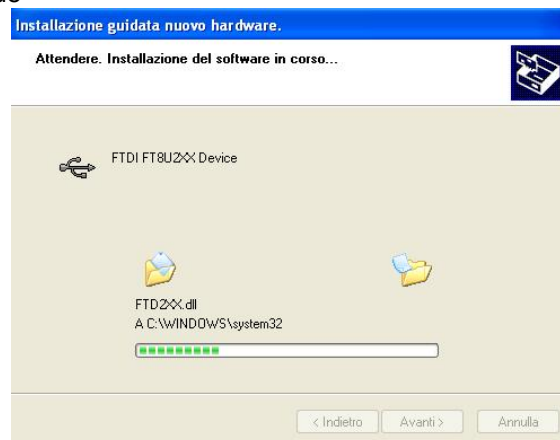
You can find the folders in the following path:  
C:\Programs\NardaSafety\EHP-TS, select it and click “OK”



Click “next” to start installation.

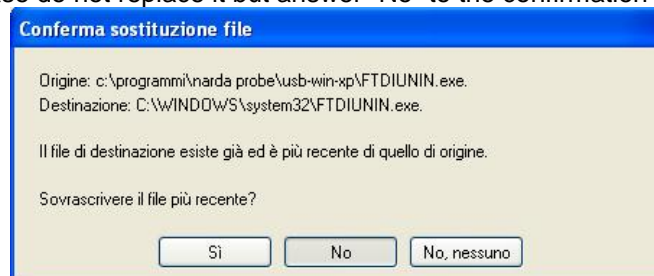


Click "continue"




It may happen that a more recent version of a requested file is already present in your system.

In this case do not replace it but answer "No" to the confirmation request:





 **NOTE**

**In case of Windows XP operating system the entire procedure will be executed twice as two different drivers will be installed. Same steps as above should be followed and same path C:\Programs\NardaSafety\EHP-TS must be selected.**



Click "Finish" to complete driver installation, the new hardware is now ready to be used.

USB-OC converter driver is now installed in your PC, you can remove it, if needed, following instructions in cap.9.

## 4.2 Hardware installation

Connect the USB-OC supplied with EHP-50D to a USB port of the PC, and the optic fiber cable to the EHP-50D. Instead if you connect the probe to the RS232 port, you must use the optional accessories 8053-OC.



**Do not pull the optic fiber by holding onto the cable but use the connector so that the head does not get damaged.**  
**Avoid dirt and other particles getting into the transducers of the optic fiber.**

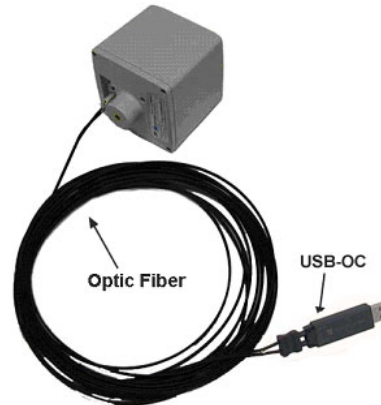


Fig. 4-2 EHP-50D link with USB-OC




Fig. 4-3 EHP-50D link with 8053-OC




**EHP-50D should be OFF.**

### 4.3 COM Port setting with 8053-OC

The optional accessory 8053-OC Optical/RS232 adapter can be used to connect EHP-50D to PC allowing thus 80 m maximum fibre length. With 8053-OC the program automatically establishes the connection on the first RS232 port that is not in use at that time, in the following order: COM1, COM2, COM3, etc.

 NOTE

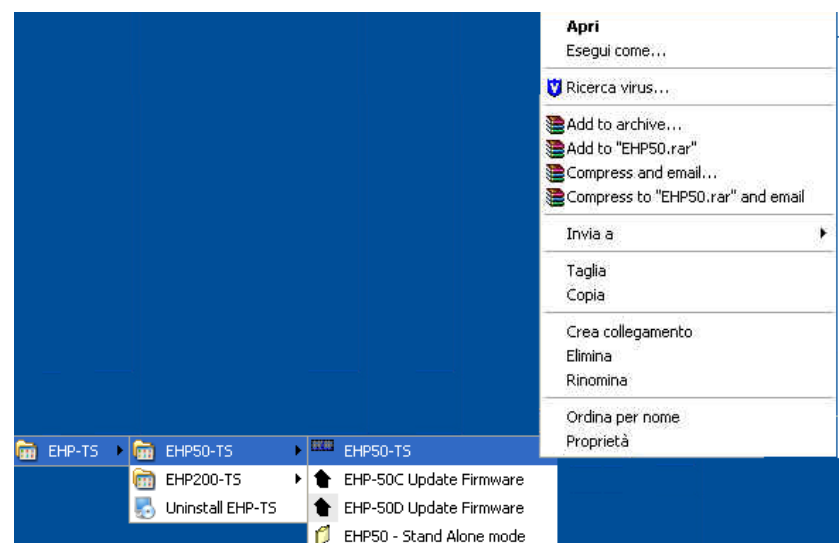
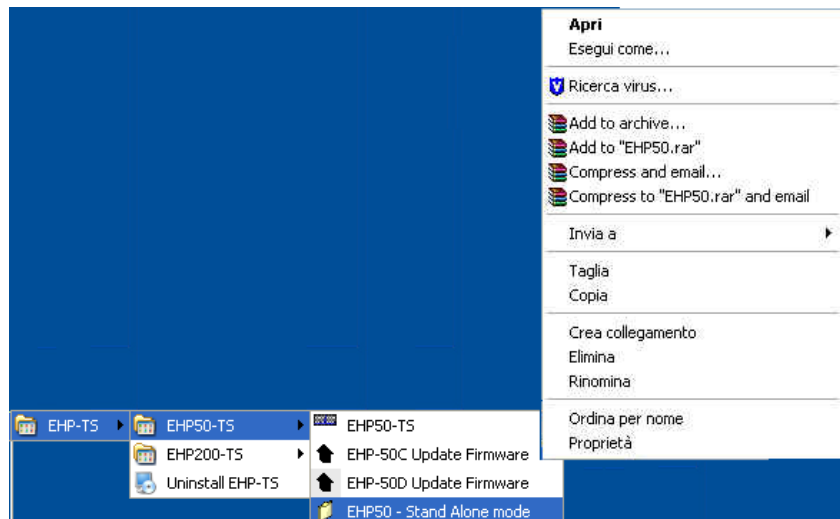
**The energy available on the DB9 connector of some PC model could be not sufficient to guarantee a good link with 80 meter fibre.**

 NOTE

**The energy available on the DB9 connector of some PC model could be not sufficient to guarantee a link with 8053-OC. In this case, it is necessary to use 8053-OC-PS between the converter and PC. (for more information see Accessories).**

Whenever a port is tied up by a device (e.g. modem) which is not active or turned off at that time, the program recognises it as free and will therefore attempt to connect EHP-50D to that port. In this case, it is necessary to “force” the next serial port by the following procedure:

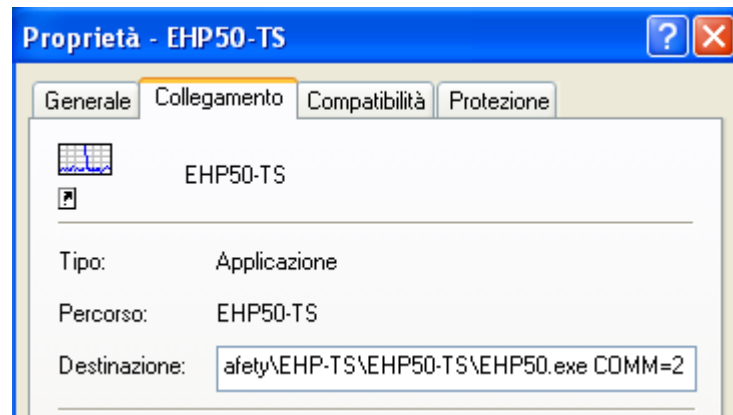
- Click right the requested program icon and select “properties”.



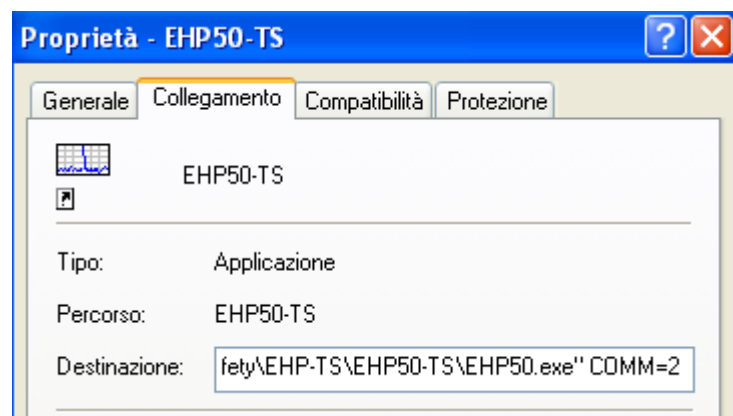


- Add the command COMM=N preceded by a space (in capital letters) at the end of the Destination field where N indicates the serial port to be used; for example, if the EHP-50D is connected to port 2, add the command COMM=2.

The assigned COM port nr. must be between 1 and 9.



- In some operating system the Destination field is enclosed in double quotation marks (“); in this case, the command COMM=N, preceded by a space must be outside as in the example below;



- Then confirm by selecting Apply
- After switching the analyzer ON, run the control software.


 NOTE

**EHP-50D must be ON before running EHP-50 control software.**  
**EHP-50D may not be correctly recognized if switched ON when the control software is already running.**



## 5 – EHP-TS software

### 5.1 EHP-TS applications

EHP-TS software includes different applications to be used with EHP family analyzers. Shortcuts are shown, selecting “all programs” from the windows XP “start” button or, using Windows Vista or 7, by clicking **Windows**  and **Programs**:



The EHP-50 section includes three different applications:

**EHP50 – Stand Alone Mode:** main task of this program is to set up EHP-50D for standalone mode. The analyzer will take and log E or H field measurements (according to the setting) for up to 24 hours, when switched on without any connection to external devices (see operating manual for details). Using EHP-50-Stand Alone mode program is then possible to download measurement results and store them as a text file.


**EHP50-TS:** this program is used to perform live Spectrum Analysis measurements when an EHP-50D analyzer is connected to PC

**EHP-50C Update Firmware:** this is a tool to update EHP-50C firmware.


**EHP-50D – EHP50E Update Firmware:** this is a tool to update the firmware and FPGA of the EHP-50D and EHP50E.

**EHP-50E Dongle Utility:** this is a tool to allows to enable the function WP10 ordered such Options.

This document describes applications for EHP-50D analyzer only

 **NOTE**


**The User might have the need of administrator privileges to install and run the software in Windows 7; for further information see the paragraphs in Chapter 3.**

<sup>1</sup>  
 **WARNING**

**EHP-TS software does not work with EHP50A/B which can be anyway factory upgraded to the EHP-50C version (please contact your local Narda distributor for details).**

 **NOTE**

**If the battery charger is plugged in to the EHP-50D while the software is running, the analyzer will be disconnected.**

 **NOTE**

**During the charging process, always remove the bridge (stand-alone) connector from the EHP-50D**

## 5.2 EHP50-TS Application

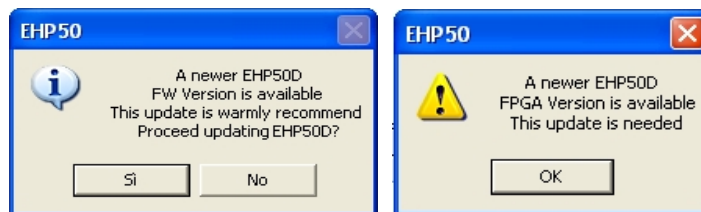
This chapter describes controls and function provided by EHP50-TS application for spectrum analysis included in EHP-TS software package. Connect EHP-50D to the USB port of your PC using provided optical fibre and USB-OC optical to USB converter. Optional 8053-OC optical to RS232 converter can be used, as an alternative, to connect the analyzer to the PC RS232 connector.

### 5.2.1 Main menu

Switch the analyzer ON and run EHP50-TS application; a welcome screenshot will appear for few seconds.



If the stored Firmware and/or FPGA version is older than what is available, the software will inform you that a update is needed. Confirm with OK and the Firmware/FPGA updating utility will be automatically run (for further information please see chapter 7).



Otherwise the program EHP-TS main window will be shown:

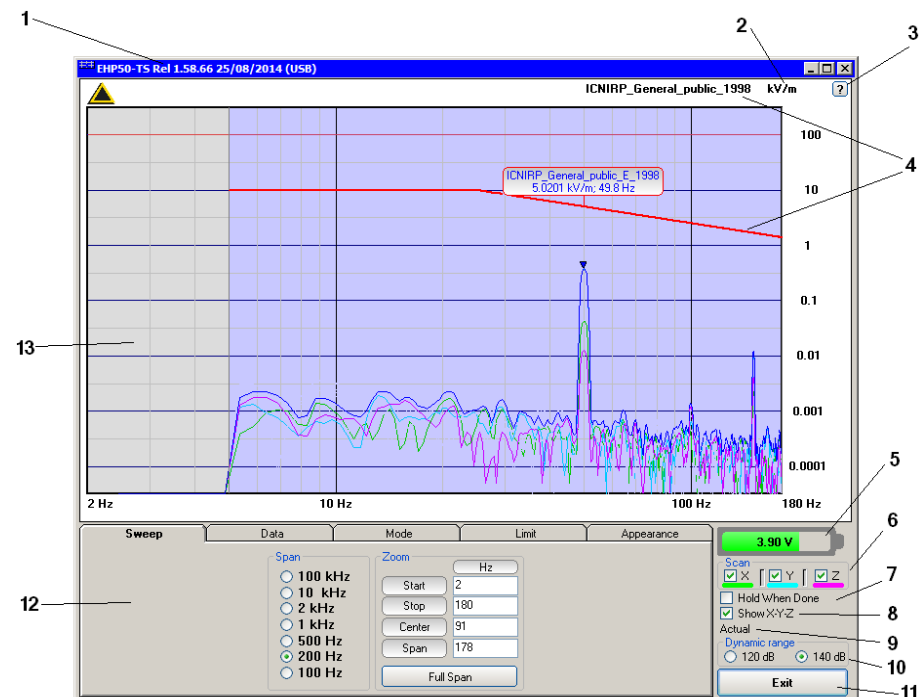


Fig.5-1 EHP50-TS Main Window

Description:

- 1 - EHP50-TS software release, (communication port)
- 2 - Shows unit
- 3 - Click “?” to display EHP-50D analyzer informations
- 4 – Name and trace of selected Limit
- 5 - EHP-50D analyzer battery status
- 6 - **Scan** activation for each axis (default setting: all axis activated)
- 7 - **Hold When Done**: stops acquisition to allow data analysis as soon as all axis have been measured
- 8 - **Show X-Y-Z**: to display or not the traces of single axis.
- 9 - Acquisition mode selected (see **Mode** section)
- 10 - **Dynamic range** (chosen between 120 and 140dB)
- 11 - **Exit** button to terminate application
- 12 - Control panel
- 13 – Display for spectrum analysis

Commands are grouped in the control panel in 5 different sections:

**Sweep**: to select a specific frequency span and, within the selected span, to set zoom function

**Data**: to display measurement results and save data

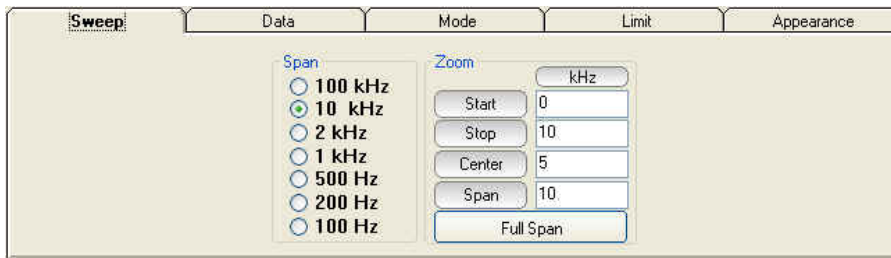
**Mode**: to set different operating modes

**Limit**: to create and save limit traces, to activate a specific limit

**Appearance**: to change colour and button aspect

Each section can be activated with a mouse click.

### 5.3 Sweep section



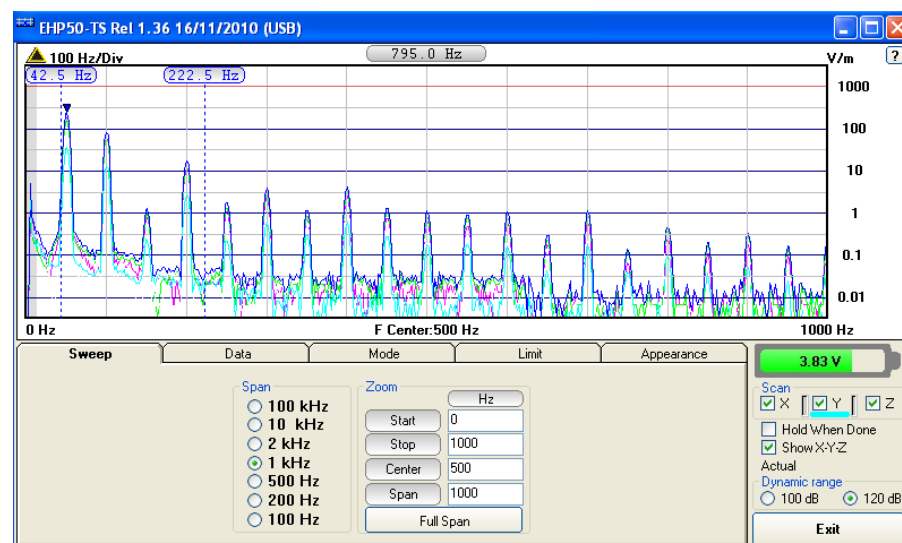
EHP-50D includes an FFT analyzer to show frequency spectrum of measured field. The sweep section includes the following:

**Span:** select one of the 7 available **span** keeping in mind that beside the EHP-50D minimum operating frequency of 5 Hz, the minimum **start** frequency of each Span is 1,2% of Span. For example, selecting 1kHz span the minimum start frequency should be 12Hz (automatically adjusted to the nearer step available of 12.5Hz). This to avoid that the 0Hz signal, common to every spectrum analyzer, is included in the measurement result. Start frequency of 100Hz and 200Hz span is therefore 5Hz (minimum operating frequency).

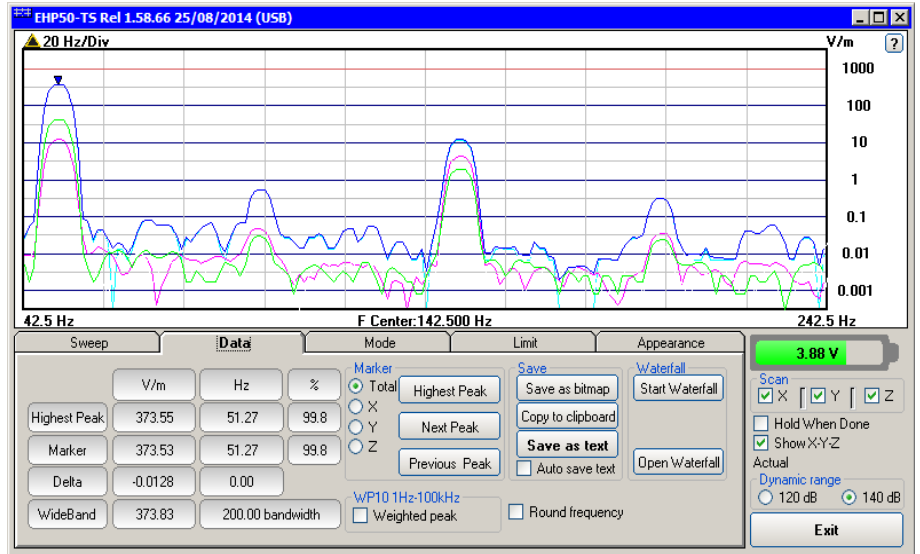
**Zoom:** EHP-50D performs selective measurement over the entire frequency range defined by the Span setting. EHP50-TS is able to select data in order to display a user specified frequency band within the selected span. For this purpose the Zoom function can be set by typing the relevant parameters through the PC keyboard or, graphically, by means of the PC mouse. Within the selected frequency **span**, you can operate a zoom function to define a specific frequency range over which perform your measurement. For this purpose **Start**, **Stop**, **Center** and **Span** can be set to easily define frequencies to be displayed. The **Full Span** button deactivate the Zoom function showing the whole Span selected.



**Right click and drag on the graph window to define graphically the Zoom frequency range.**



**Fig.5-2** Defining frequency band through the PC mouse

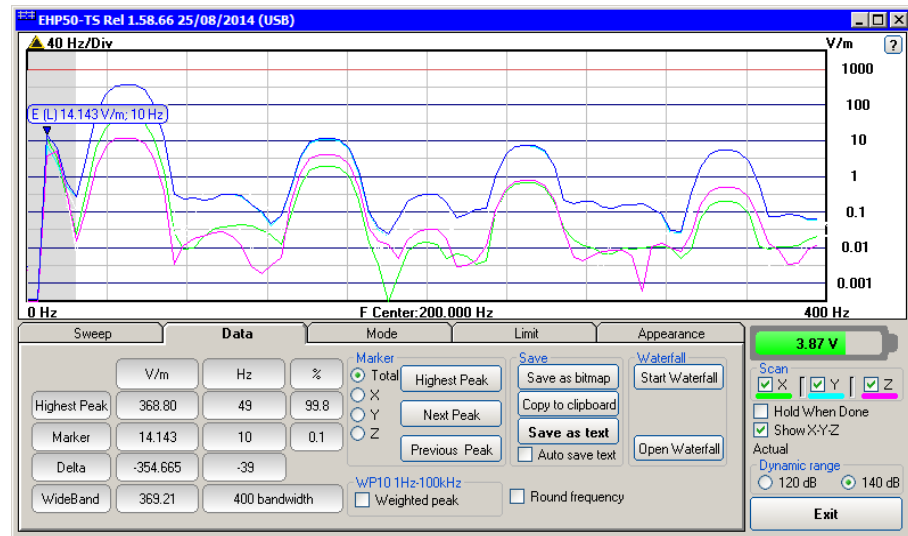


**Fig.5-3** Zoom window

Also choosing the best dynamic between 120 and 140 dB can be helpful to better distinguish signals and disturbances.

### 5.4 Data section

Even if EHP-50D takes measurement over the entire selected span, shown results are related to the displayed spectrum only, allowing thus detailed evaluation of user defineable frequency range through the zoom function.



The gray band on the left side of the graph highlights signals below the minimum start frequency (1,2 % of Span) which are affected by residual 0Hz peak. Calculation of Wideband result (see below) does not include any spectral line within the gray band.

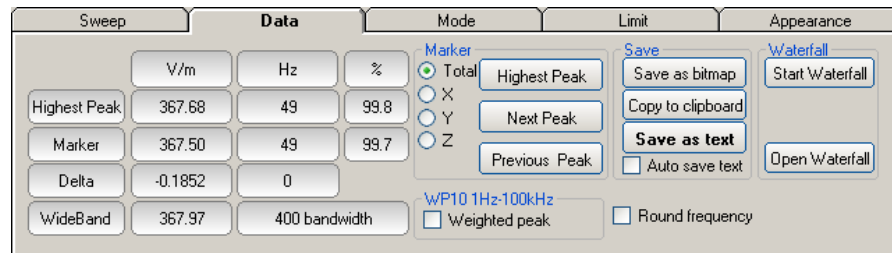


Fig.5-4 Data section

**Measurement result:** the following values are shown in a table form:

**Highest Peak:** Maximum value within the displayed spectrum.

Showned parameters:

Highest Peak field strength in the selected Unit (V/m in the above picture)

Highest Peak frequency (Hz)

% of contribution to the WideBand result

**Marker:** you can place a marker anywhere on the spectrum display with a mouse click

Showned parameters:

Field strength at Marker frequency in the selected Unit (V/m in the above picture)

Marker frequency (Hz)

% of contribution to the WideBand result

**Delta:** Difference in Field strength and frequency (Hz) between Highest Peak and Marker

**WideBand:** integration over the displayed frequency band

It is the square sum of all contributions within the displayed spectrum. Result of calculation is the field strength expressed in the selected unit while "Bandwidth" is the difference between Stop and Start frequency.

Four additional frames, Marker, WP10, Save and Waterfall, are included in the Data section:

**Marker:** in this area you can select on which trace to place the Marker: specific axis (X,Y,Z) or Total result.

Three dedicated buttons, Highest Peak, Next Peak and Previous Peak, allow Marker positioning over peaks shown by the graph.

If activated, Limit checkbox allows displaying the Limit value corresponding to the Marker frequency.

**WP10** 1Hz-100kHz (optional) to activate the Weighted peak function. Please refer to par. 1.4 for more information about optional accessories.

**Save:** three buttons in this area to save spectrum as a picture file (.bmp), as a text file (.txt) or to copy the spectrum picture to the Windows Clipboard.

**Waterfall:** press Start Waterfall to run the function, or Open Waterfall to load previously saved measurements.

### 5.4.1 Waterfall

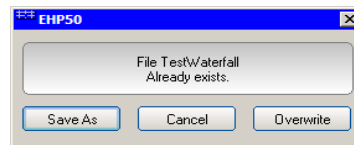
In addition to the spectrum view, another representation has been introduced in the software, commonly called Waterfall.

The advantage of this view is that the disturbances are shown in a tridimensional plot. Two dimensions are, as usual, frequency and level, and the third is the time.

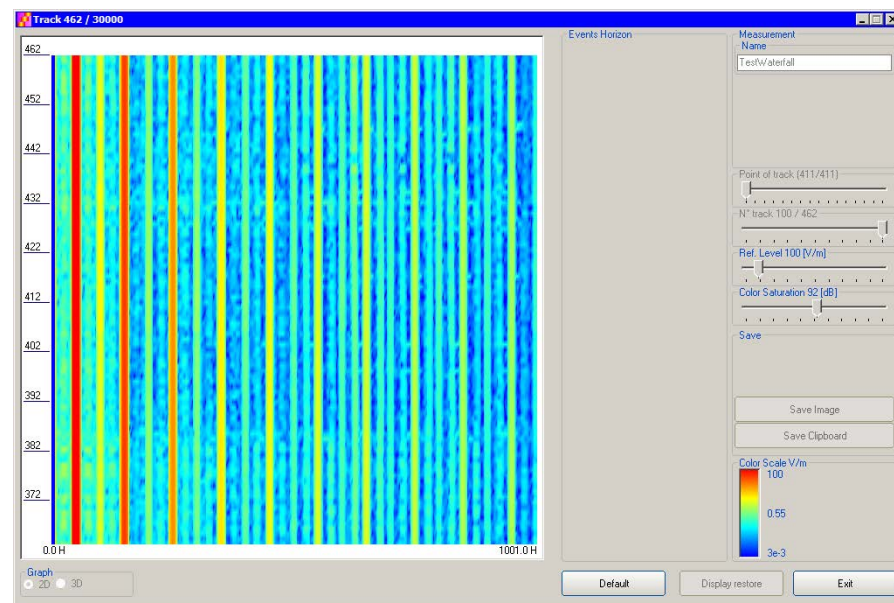
In this way it is possible to detect and track time-varying signals.

The ranges for Frequency and Level are the same as the Spectrum view.

When pressing the **Start Waterfall** button, a pop-up message can appear warning the operator if a file with the same name as the one in use, already exists.



Press **Save As** to maintain the original file, or **Overwrite** to cancel the old measurement with the starting new one.



**Fig.5-5 Waterfall - Graph 2D**

In the **Graph 2D**, the horizontal axis represents Frequency, the vertical axis is the Time and the colour is the Level.

The signal amplitude is represented in a scale of arbitrary colours, usually the darker the lower and the brighter the higher, like in thermography.

The Color Scale referenced to levels and units, is indicated on the right bottom of the screen.

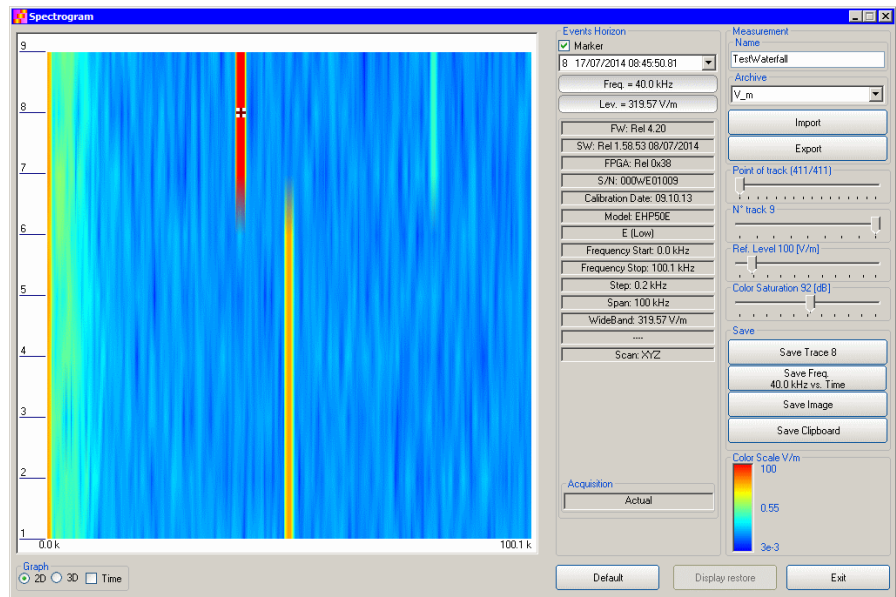
The status-bar shows the number of tracks already acquired and the maximum available.

On the right two sliders permit to set the preferred Reference Level and Color Saturation (level dynamic range).

Press the **Default** button to reload standard settings.



When entering the **Open Waterfall** function a screen similar to the following appears:



**Fig.5-6** Waterfall Main Window

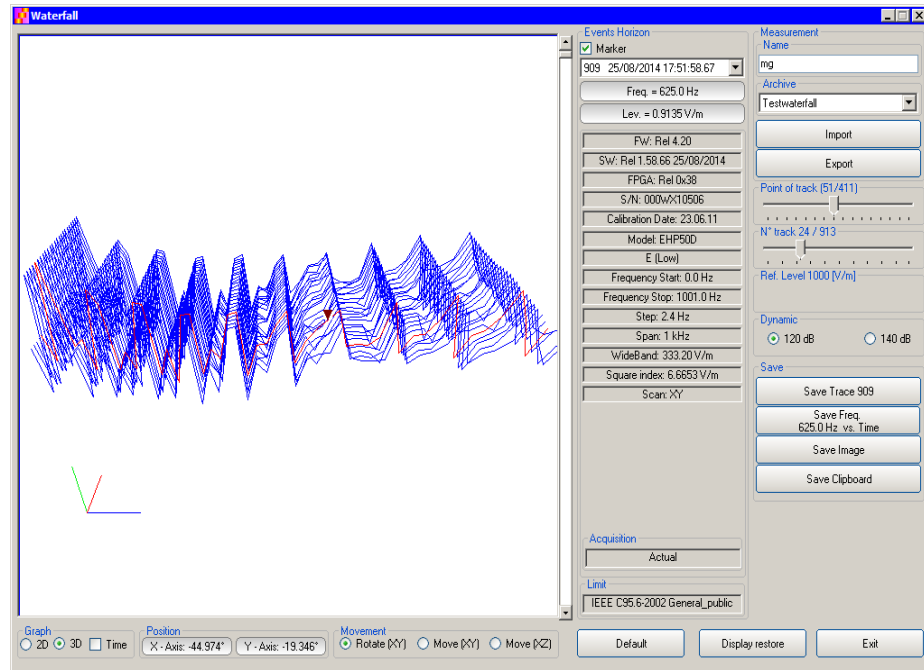
Like during the scan, on the left is the spectrogram of the measurements. The column in the middle, called Events Horizon, reports the Marker with its frequency and level and many parameters of the measurement setup and of the probe used.

On the right, in addition to Ref. Level and Color Saturation, there are two more sliders, useful to set the frequency resolution (Point of Track) and the time interval (N° track).

It is also possible to Import or Export a full acquisition by pressing the corresponding button in the Archive box. The name of the measurement can be typed in the Name box and from the list it is possible to select an already saved one.

In the Save box two or four buttons (depending on the marker activation) can be pressed to save:

- a single trace (Levels vs Frequencies)
- a single Frequency (Levels vs Time)
- an image of the spectrogram
- the clipboard



**Fig.5-7 Waterfall - Graph 3D**

In the **Graph 3D**, one axis (blue) represents Frequency, another the Level (green) and the third the Time (red). So the Frequency can be on the horizontal axis, the Level on the vertical axis and the Time in depth.

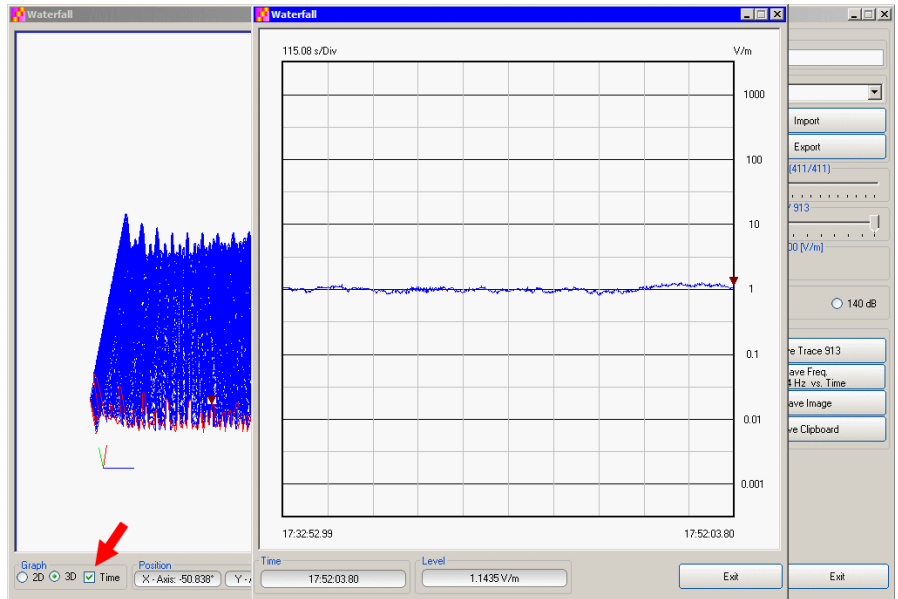
For this mode, another box, called **Movement**, will appear. Selecting the appropriate functions, you can move, rotate or zoom the view to your liking, using the mouse.

Another option of the **Graph 3D**, the Time plot, is available when the Marker is active.

Tick the Time label to enter this view.

A new window pops up and the plot represents the level at the marker frequency versus time.

The horizontal axis of the grid is the time and the vertical axis is the field level.



The Marker can be moved with the mouse to look for the desired frequency.

In the 3D view also the dynamic can be selected between 120 and 140 dB, to help for the best identification of disturbances.

#### 5.4.1.1 Data recording

The subsequent spectra are automatically recorded and saved in a single file \*.WF5 localized in the folder Waterfall in the program root, inclusive of all the analyzer settings.

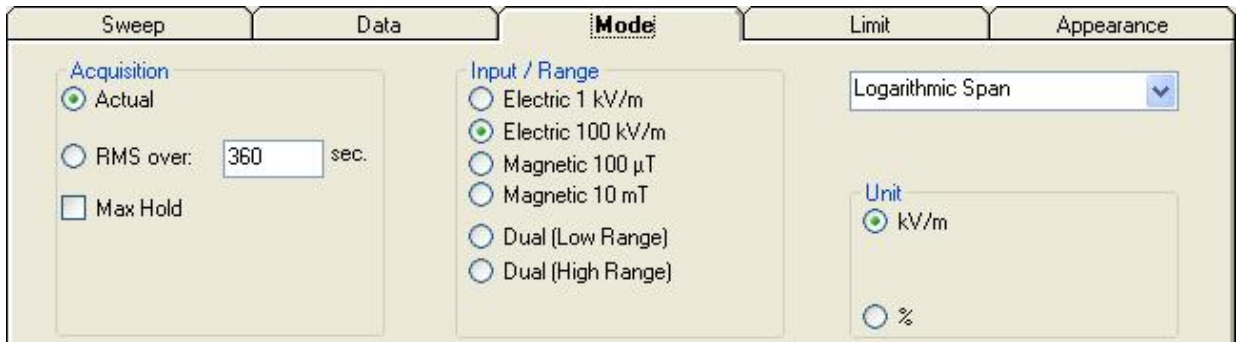
The stored files can be recalled when in Data mode or at startup entering the Open Waterfall window.

The filename is set by the operator prior to starting the test and it is indicated at the upper right corner of the Waterfall window.

The maximum number of spectra that can be recorded is of 30.000 and it is indicated, together with the current track number, in the status bar of the Waterfall window.

## 5.5 Mode section

Mode section allows setting different acquisition modes, including Max and Average result, as well as defining Electric, Magnetic field, or both in the same graph, and preferred Unit. Logarithmic or Linear frequency axis can be set in this section too.



**Acquisition:** spectrum is displayed in different acquisition modes:

**Actual:** instantaneous values are shown, display is continuously updated with new instantaneous reading.

**RMS over:** square average calculated over the specified time period (sec) is shown. This is a moving average. Once the first time period has been completed, oldest data is discarded to be replaced by the newest one showing thus the average value of the latest time period as specified.

**Max Hold:** the maximum field strength value of each frequency step is retained and displayed since the Max Hold function has been activated. Every spectral line is therefore updated only if the new value is greater than the previously displayed one showing thus the Maximum of each spectral line since the Max hold function was activated.

**Input/Range:** to select electric, magnetic or dual mode field (contemporary displaying of both Electric and Magnetic fields) in two different ranges. Dual (Low Range) shows Electric and Magnetic field which full range values are 1kV/m and 100 $\mu$ T respectively. Full scale ranges of Dual (High Range) are therefore 100kV/m and 10mT.

**Linear Span or Logarithmic Span:** this is used to choose between linear or logarithmic frequency scale. Logarithmic scale is used to emphasize and clearly display low frequencies even though high ones are included in the graph. High frequencies are therefore compressed to the high side of displayed range.

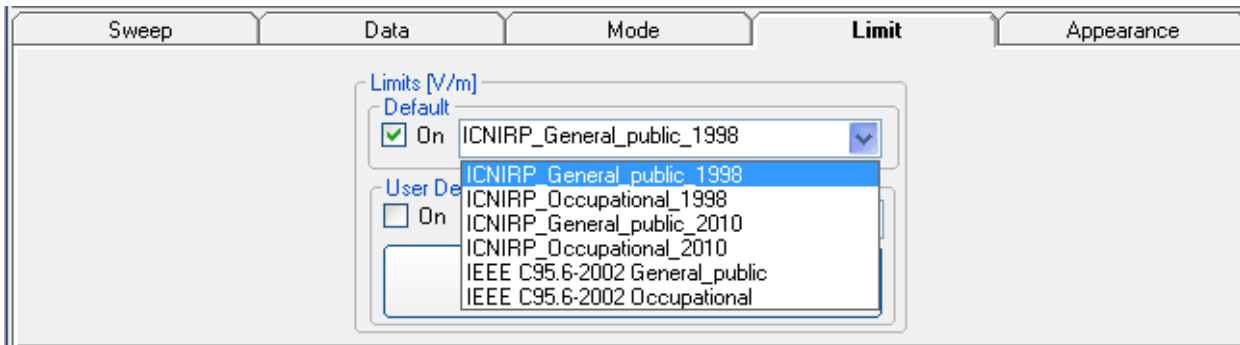
**Unit:** to select unit according to the Input setting. Electric field can be expressed in V/m and % of the limit only while Magnetic field can be expressed in A/m,  $\mu$ T (magnetic induction), mG or % of selected limit. Dual mode units are always V/m and A/m.

### NOTE

**The unit “%” can be selected only if a Limit has been activated. Each spectrum line will then represent the field strength expressed as percent of the selected limit.**

## 5.6 Limit section

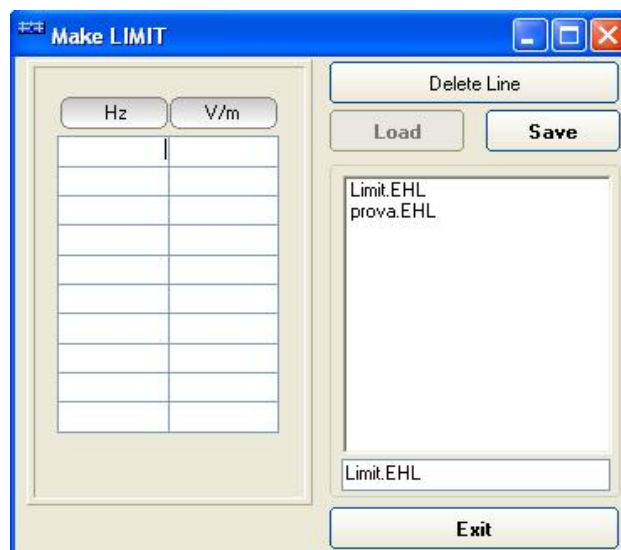
Limit section allows the user to select standard ICNIRP and IEEE limits, already included by the software installation, as well as user's limits which can be created through the "Make Limit" function provided by this section.



**Default:** The default limit section can be used to load a default standard limit saved into the memory at the factory. Default limit list shows limits which are compatible to the actual setting only. If Electric field was selected in the Mode section, electric field limits only are displayed by the limit list. No default limit is shown in case mG unit was selected.

**User Defined:** This limit section allows to select and activate a specific limit among limits created and saved by the user. They can be Linear or Non Linear (governed by a mathematic formula).

The **Make Limit** button opens a window to edit linear limits and create new ones:

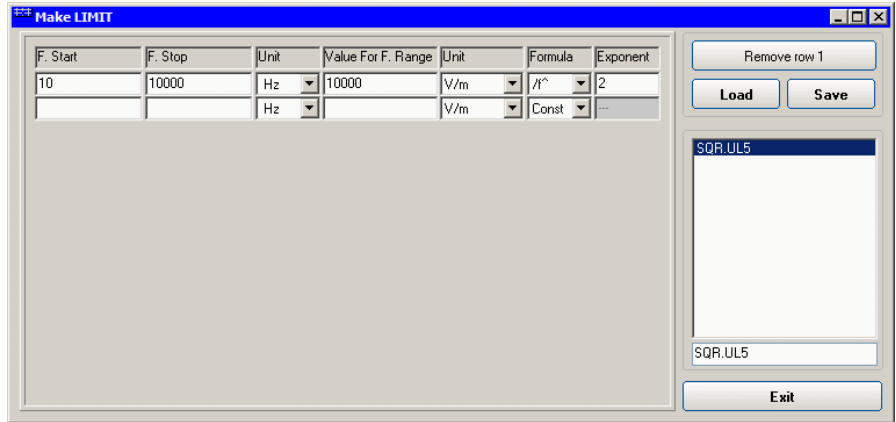


Type frequency and field strength for each point of the required limit and click save to save it under the program directory. The limit file will be created as a linear interpolation between specified points.

### NOTE

**When the ICNIRP or IEEE limit is selected, the software automatically calculates the corresponding total integration of the measured signals, and compares the result with the threshold set by the standard, considering whether it is or is not exceeded.**

The **Make Non Linear Limit** button opens a window to edit those limits that are related to a mathematic formula, and create new ones:



Click Load to edit a previously saved limit.

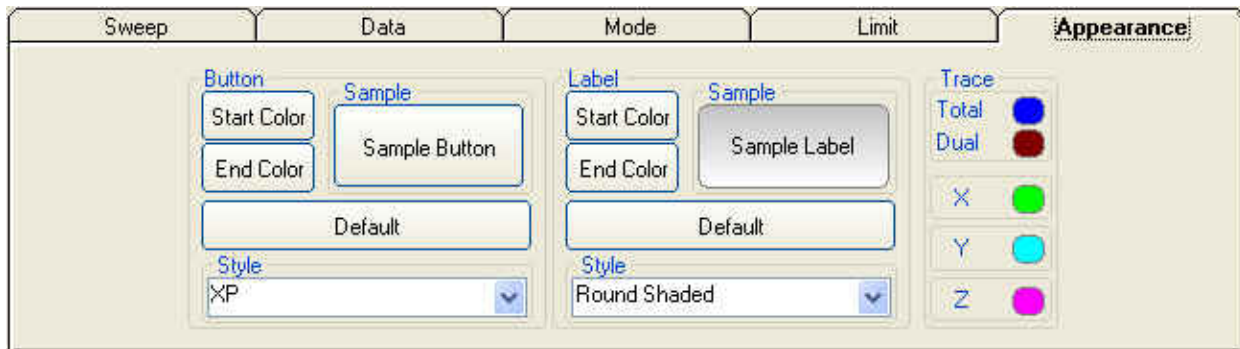
Type in the Start and Stop frequencies in the appropriate boxes, and choose the right measurement Unit.

Introduce the strenght Value and choose its Unit.

Then choose the formula from the list and type the exponent value.

Click save to save it under the program directory. The limit file will be created as a calculation of the mathematic expression.

## 5.7 Appearance section



Button and label style can be selected from a **Style** list

**Start** and **End Color** button allow selection from a color palette

**Sample Button** and **Sample Label** show the appearance preview

**Default** button to set appearance to the default parameters

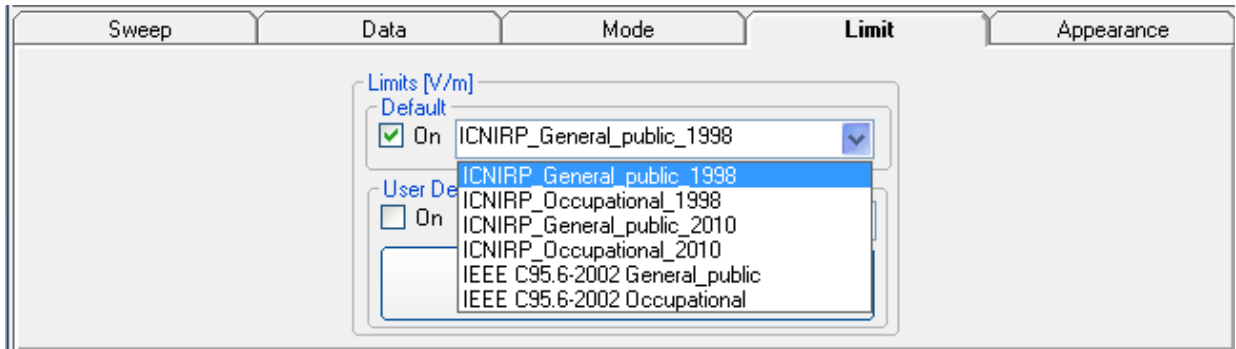
**Trace** to set trace colours by means of the colour palette



### 5.8 ICNIRP

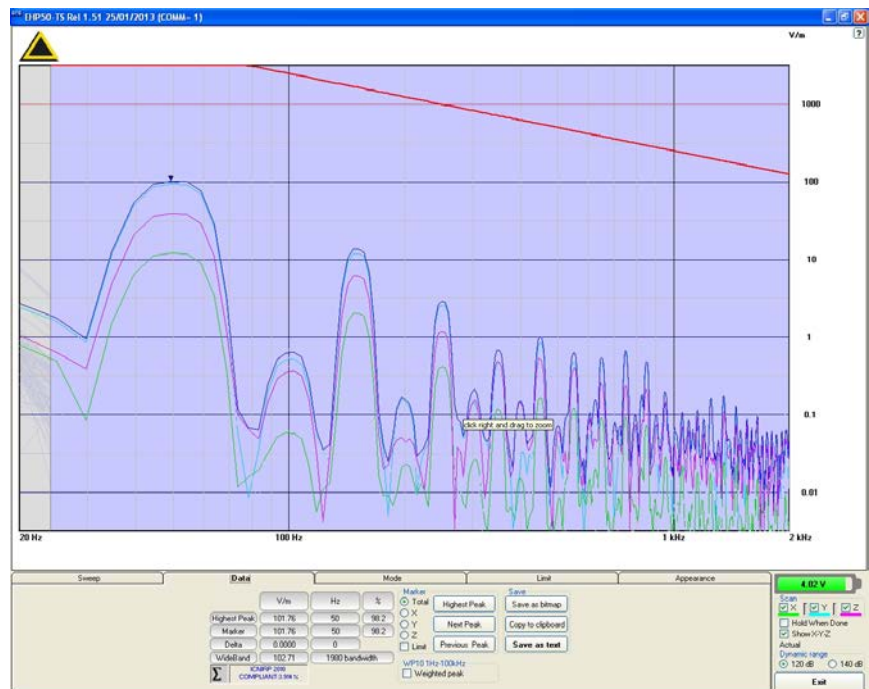
The **International Commission on Non-Ionizing Radiation Protection** establishes guidelines for limiting EMF exposure that could affect human health.

Limit section allows the user to select **standard ICNIRP limits**, already included by the software installation.



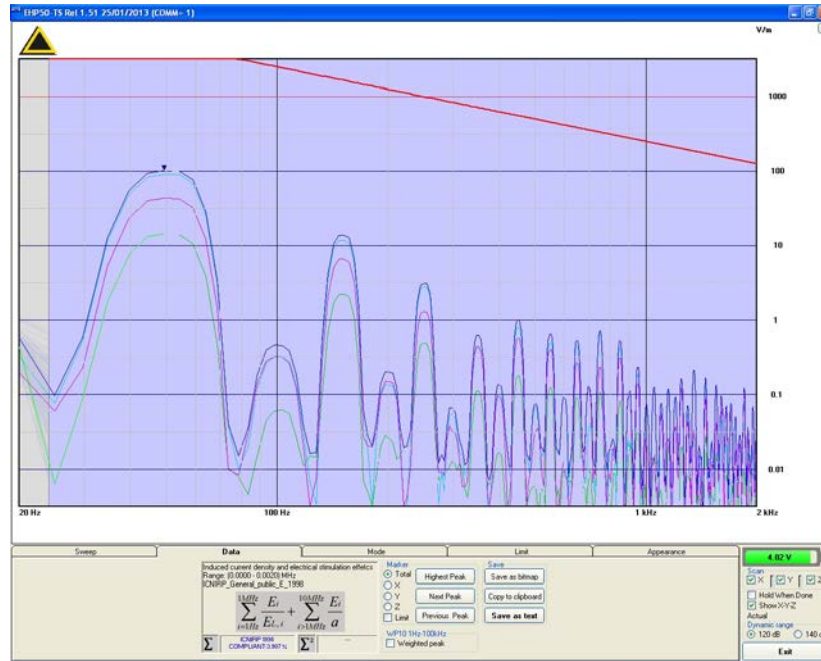
#### NOTE

When the **ICNIRP limit** is selected, the software automatically calculates the corresponding total integration of the measured signals, and compares the result with the threshold set by the standard, considering whether it is or is not exceeded.

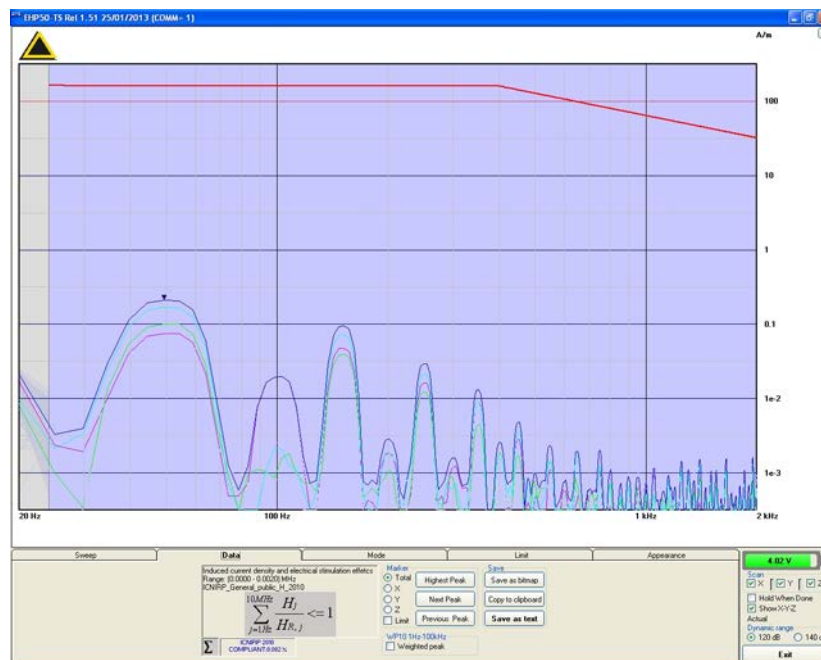


#### NOTE


The calculation of the ICNIRP value is performed if all three axes are enabled



In the screenshot above it is depicted an example how the software shows the calculation of the ICNIRP value for the Electric Field measurement.



In the screenshot above it is depicted an example how the software shows the calculation of the ICNIRP value for the Magnetic Field measurement.

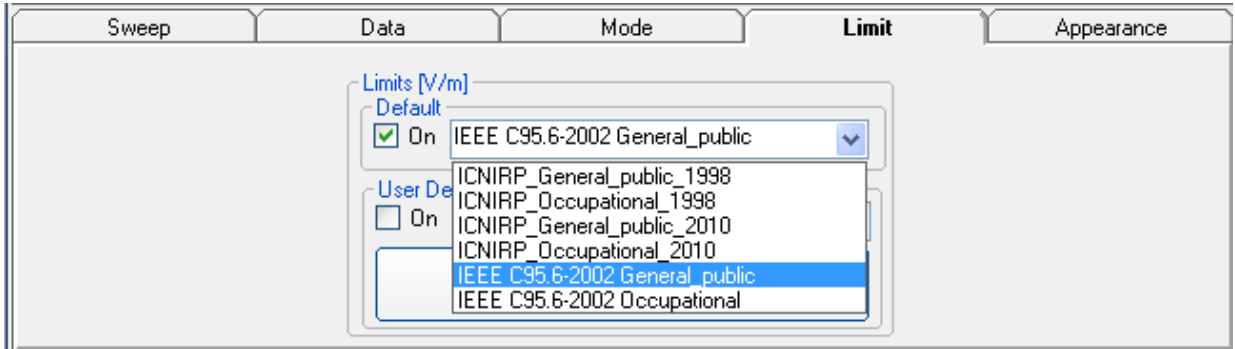
 **NOTE**


**The limit cannot be activated when using Dual Mode.**

### 5.9 IEEE


One of the purposes of the **Institute of Electrical and Electronic Engineers, Inc. ("IEEE")** is to establish exposure standards.

Limit section allows the user to select **standard IEEE limits**, already included by the software installation.

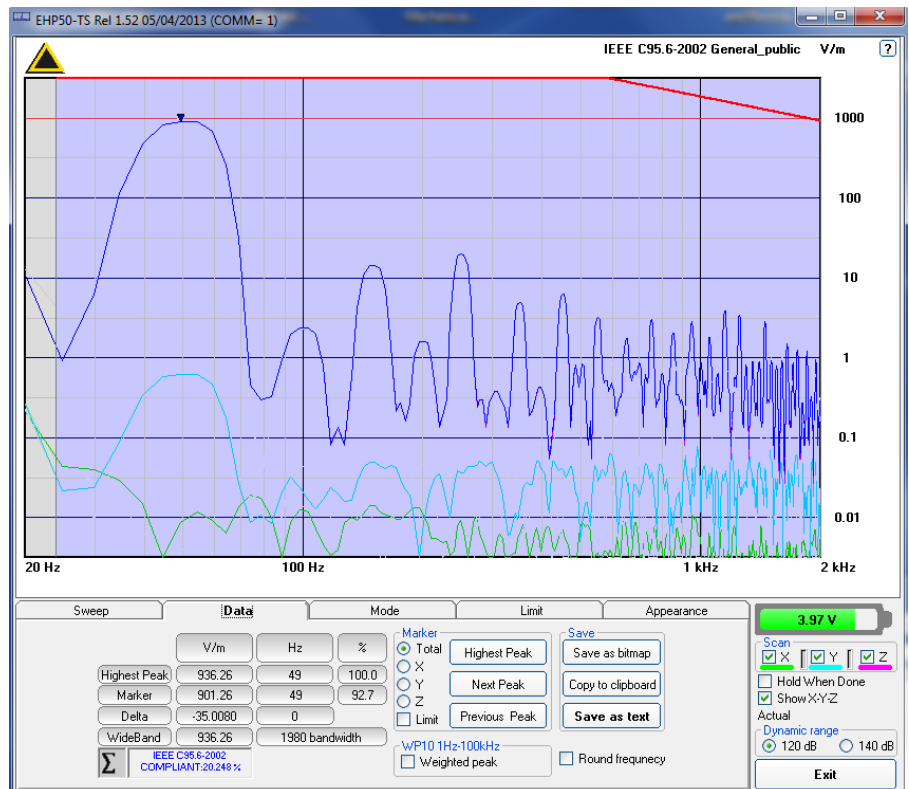


 **NOTE**

When the **IEEE limit** is selected, the software automatically calculates the corresponding total integration of the measured signals, and compares the result with the threshold set by the standard, considering whether it is or is not exceeded.

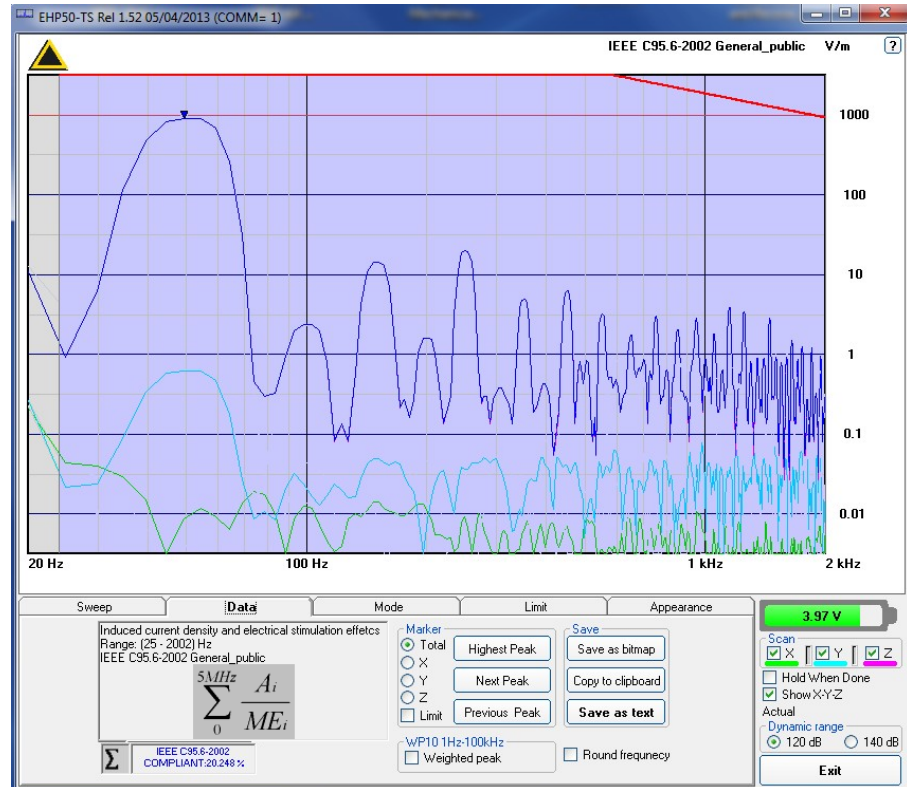
 **NOTE**

**With coherent signals the result can be overestimated**




 **NOTE**

The calculation of the IEEE value is performed if all three axes are enabled



In the screenshot above it is depicted an example how the software shows the calculation of the IEEE value for the Electric Field measurement.

 NOTE

The limit cannot be activated when using Dual Mode.

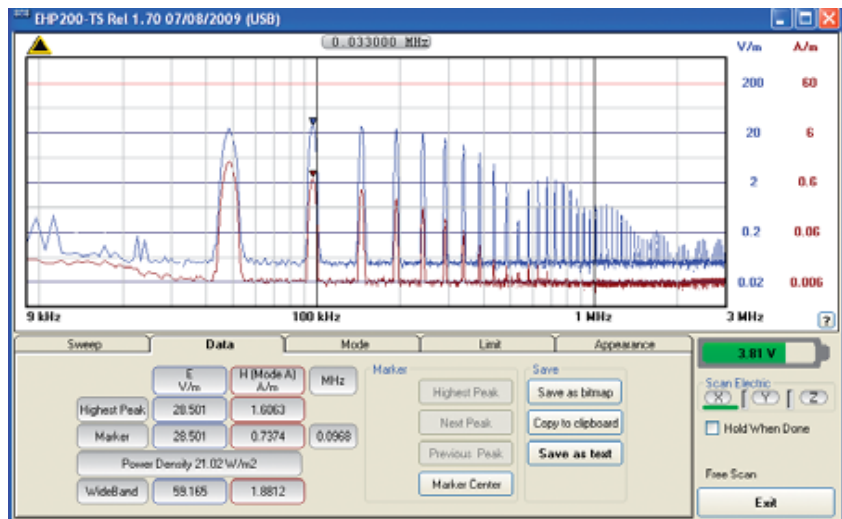
### 5.10 Additional functions provided by EHP200-TS

**EHP-200A** electromagnetic field analyzer provides Electric and Magnetic field selective measurement in the 9kHz – 30MHz frequency range. Even though there is no difference from EHP-50D regarding minimal physical overall dimensions and sensor positioning, a high frequency selective receiver is housed within this product. Additional settings and functions are therefore available.

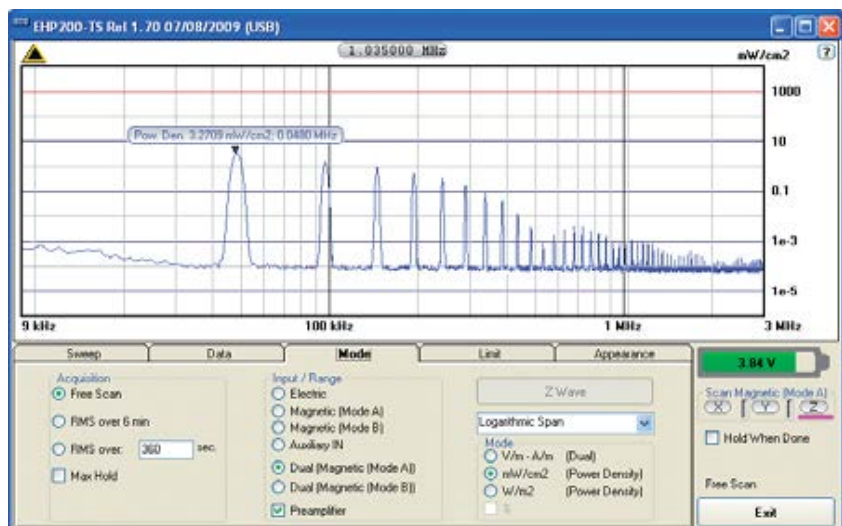
Regarding settings, Span can be set as desired within the entire frequency range and required RBW filter can be selected down to 1kHz allowing thus optimum selectivity.

As requested by reference standards, Average value can be automatically calculated over 6 minutes as well as over customer defineable time periods.

An important advantage, which is provided thanks to the Dual (E and H), Tri-axial sensor technology implemented in EHP-200A is the new concept of power density calculation which, unlike common practice, makes use of both E and H real measurements providing thus accurate results which are still valid in both Near and Far Field conditions.



**Fig.5-8** Both electric and magnetic fields can be displayed on the same graph.



**Fig.5-9** Power density spectrum is calculated over real electric and magnetic field measurement and therefore applicable to both far and near field conditions.

New wave impedance function is provided too by selecting the Ohm unit. This function automatically searches and displays result at frequencies showing effective fied ratio calculation.

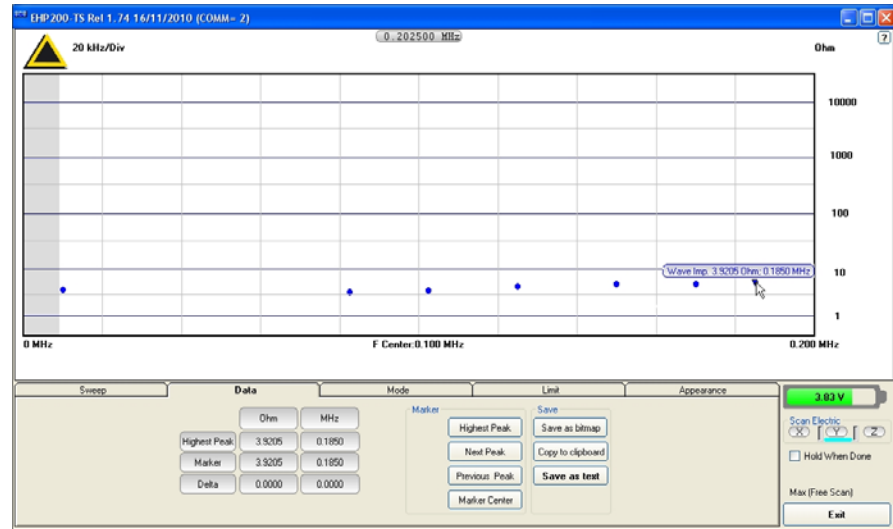


Fig.5-10 New wave impedance function

 NOTE

Please refer to EHP-200A user's manual for detailed informations regarding EHP200-TS application software.

## 6 - EHP-50D Stand alone mode

### 6.1 Stand alone mode description

EHP-50D has been designed to be used also in stand-alone mode. This mode is useful because no external devices is connected to the analyzer during measurements. Once the measurement parameters have been programmed through a PC, the EHP-50D analyzer can start its acquisition by storing the data over 24 hours in a stand-alone mode. It is necessary to position it over the TR-02A tripod and to activate the start. After 24 hours it will stop automatically and later it would be possible to download all data to the PC by using the provided EHP-TS PC software. From PC it is possible to select to measure the electric or magnetic field, to select the range, the Highest or Wideband mode, the SPAN wished and the sampling rate of one minute or 30 seconds.

Some typical applications are:

- Magnetic fields near high, medium and low voltage transformers
- Measurements in proximity of power line
- Safety measurement at worker's site
- Measurements close to machines, air conditioning systems, home appliances etc.
- Development of new products

To start the stand-alone acquisition it is necessary to follow this procedure:

- Turn OFF the EHP-50D.
- Remove the fiber optic connected to PC.
- Insert the small optical bridge connector into the fiber receptacle of EHP-50D.
- Position it on TR-02A tripod or use the small tripod supplied with EHP-50D (the provided 50cm extension rod must be used, specially in case of Electric field measurement, to avoid any influence from the mini tripod).
- Turn ON the EHP-50D and you will see the led flashing red and green for about one minute.
- Go away from the analyzer in order to non influence the measurement.
- Wait 24 hours for the completion of the one day measurement.



**Fig. 6-1** Shorting loop

The led of EHP-50D will flash every second to inform that it is ON with red light. After every minute (or 30 sec) the led will become green for the time requested by the analyzer to perform one measurement. The time that the led remain green will depend by the selected SPAN. Lower Span requires longer measurement time.

### NOTE

**The acquisition can be terminated earlier than 24 hours. Just turn off the EHP-50D and run EHP50D application to download the data to the PC.**

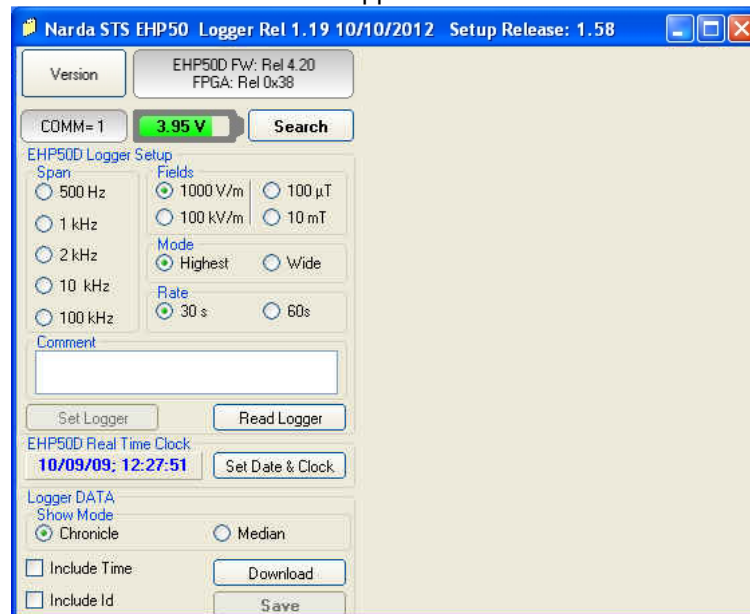


## 6.2 EHP-50D Data Logger

Once the data has been collected by EHP-50D, you should connect it to the PC to download all measurement results.

### 6.2.1 Run EHP-50D-Stand Alone mode software

Run “EHP-50D Stan Alone mode” application

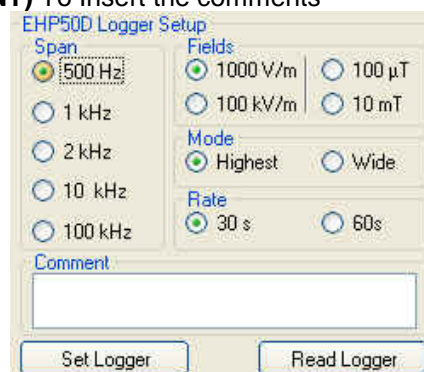


During the communication process for searching the analyzer EHP-50D, the following messages will appear in sequence for a few seconds:



To define measurement parameters for a new stand alone acquisition you may need to select:

- **(SPAN)** The Span
- **(FIELD)** The electric or magnetic field with the proper range
- **(MODE)** The Wide or Highest mode
- **(RATE)** The Storing Rate
- **(COMMENT)** To Insert the comments



The **Read Logger** will not be available unless the communication between the PC and the analyzer has been established. Click this button to read the actual EHP-50D setup.

The **Set Logger** window will not be available unless you change some parameters. The **Set Logger** will be active and available for the user to transfer all measurement parameters (setup) to the EHP-50D internal memory.

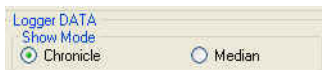




It is possible to set the date & clock inside the EHP-50D by transferring the actual date & time of your PC. Pushing the button **Set Date & Clock** you will get the following window:



Answering YES, the date & time of your PC will be transferred inside the analyzer.



The measurement results can be shown in two modes:  
**Chronicle:** the data are ordered by increasing time like in the following example:

Logger Started 11/07/08; 09:58:27    Rate: 30s.

Time	V/m
9.58.30	221.564
9.59.00	181.761
9.59.30	192.088
10.00.00	192.531
10.00.30	183.231
10.01.00	184.502
10.01.30	184.927
10.02.00	184.077
10.02.30	184.714
10.03.00	183.654
10.03.30	183.865
10.04.00	184.289
10.04.30	184.502
10.05.00	183.654
10.05.30	184.077
10.06.00	183.231
10.06.30	181.552
10.07.00	183.443

**Median:** the data are ordered from the lowest value to the highest like in the following example:

Logger Started 24/06/09; 15:56:02    Rate: 30s.

Time	V/m
03:58:00	1,756
17:10:30	5,702
17:11:30	5,708
17:12:00	5,721
17:25:30	5,721
17:38:00	5,721
17:41:00	5,721
17:46:30	5,721
18:00:00	5,721
17:13:30	5,728
17:26:30	5,728
17:38:30	5,728
17:16:00	5,735
17:18:30	5,735
17:26:00	5,735
17:27:30	5,735
17:30:30	5,735
17:34:00	5,735

Include Time      
 Include Id       

If the checkbox **Include Time** is activated, the absolute time will be shown together with the collected data

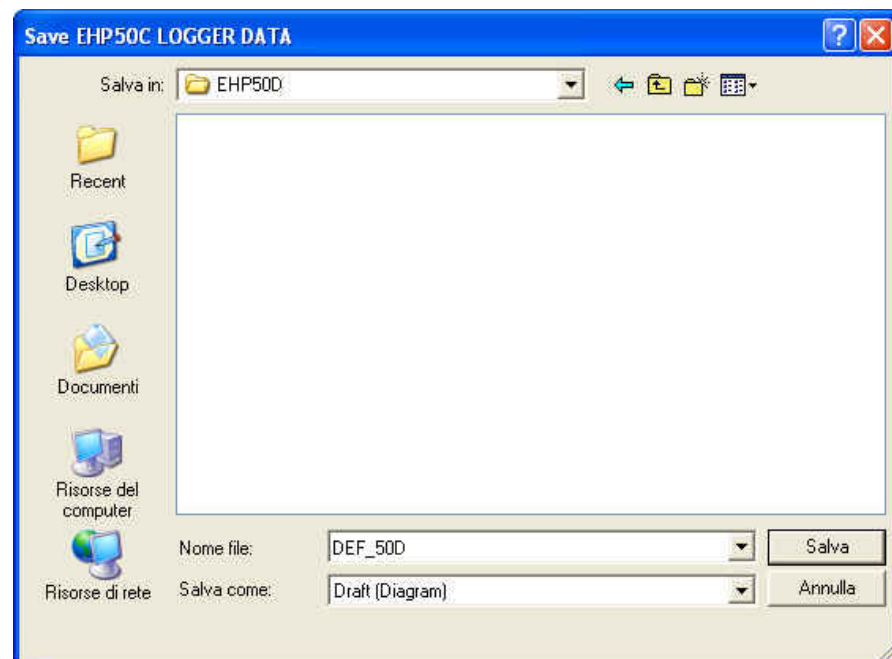
If the checkbox **Include Id** is activated, a number representing the position of the data inside the EHP-50D memory will be shown, like in the following example.

Id	Time	$\mu T$
1	18.31	0.010
2	18.32	0.012
3	18.33	0.015
4	18.34	0.011
5	18.35	0.012
6	18.36	0.009
7	18.37	0.010
8	18.38	0.042
9	18.39	0.043
10	18.40	0.042
11	18.41	0.042
12	18.42	0.043
13	18.43	0.043
14	18.44	0.041
15	18.45	0.043
16	18.46	0.043
17	18.47	0.043

Push the button **Download** to transfer all data from the analyzer to the PC

To save the data into your own PC directory, it is necessary to activate the button **Save**.

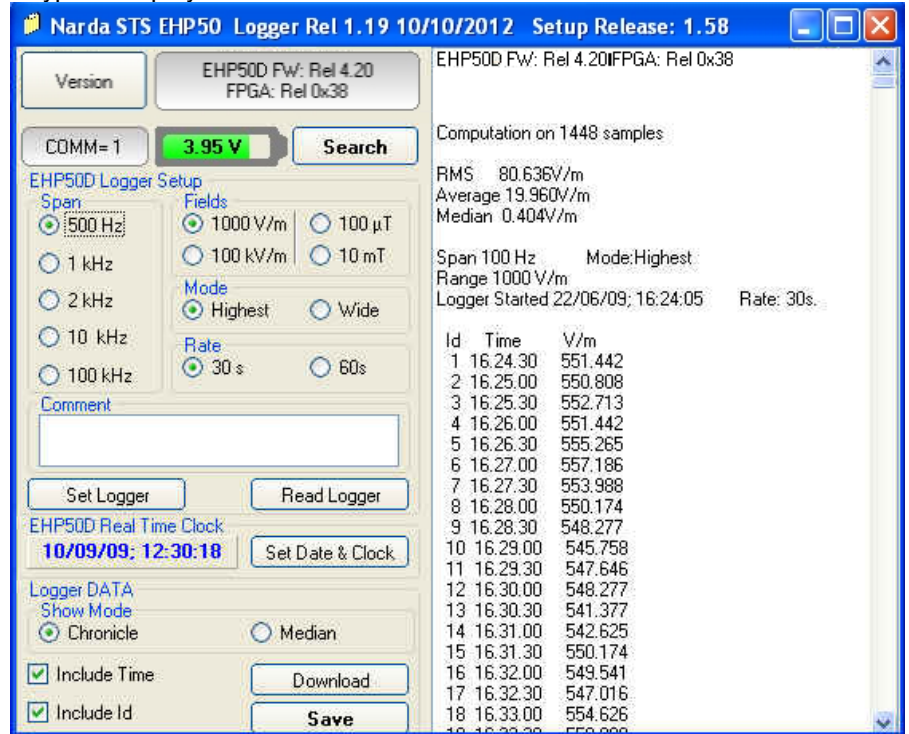
Data will be saved in TXT format according to the following window:



### 6.2.2 Use EHP-50D Logger

When the communication between the PC and the analyzer has been established, push the button **Download** to transfer all data from the analyzer to the PC.  
To use such data you must save them into a file.

A typical display will be:



On the right side of the display, the software shows:

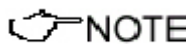
- Firmware and FPGA release of EHP-50D
- The comment that you wrote inside the memory of EHP-50D typing few words in the **Comment** window
- Number of samples stored
- RMS, Average and Median values
- Span and Mode used during the acquisition
- Range
- Starting date and time
- All values collected

### 6.2.3 EHP-50D battery charging

If the battery charger is plugged to the EHP-50D while the software is running, the analyzer will be disconnected and the software will display:



and the led is flashing quickly.



**During the charging process, always remove the bridge connector from the EHP-50D**

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## 7 – Update Firmware

### 7.1 Update firmware

The EHP-50D internal firmware can be updated easily by the user itself.

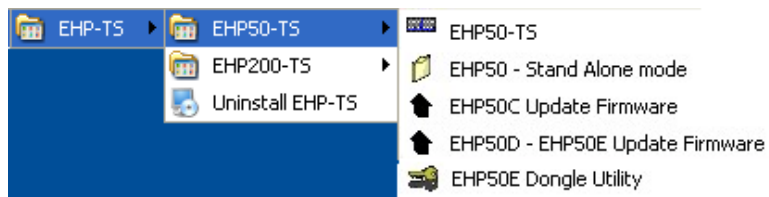
This section provides all the information required for firmware updating.

The Update Firmware Program is available after EHP-TS package installation.

### 7.2 To run the update software

Turn off the EHP-50D and connect it to a free USB or RS232 port of the PC.

Run **EHP-50D Update Firmware** to start the update program.



### 7.3 To transfer data

Main window displayed after the updating program **EHP-50D Update Firmware** has been run:



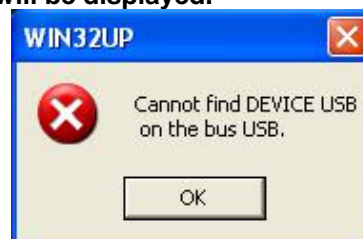
Fig.7-1 EHP-50D Upgrading Utility Main Window

Select USB or RS232 communication port.

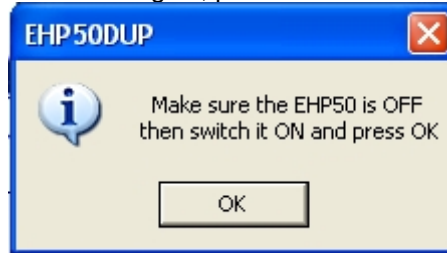
Before selecting RS232 port, choose the COM port used.

### NOTE

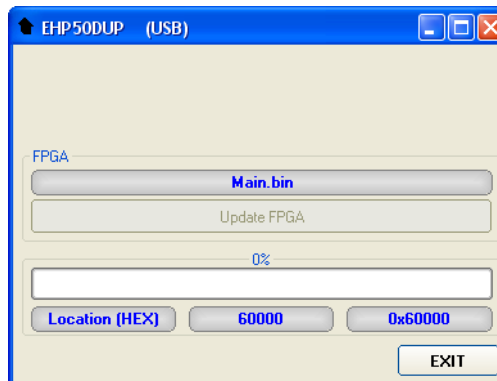
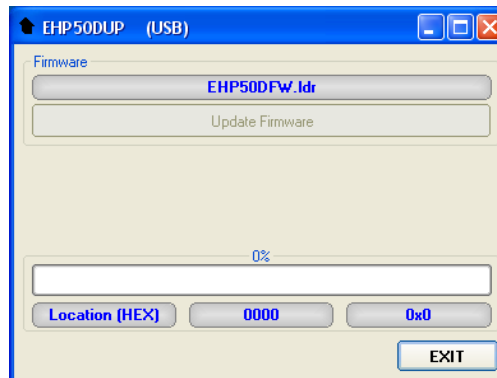
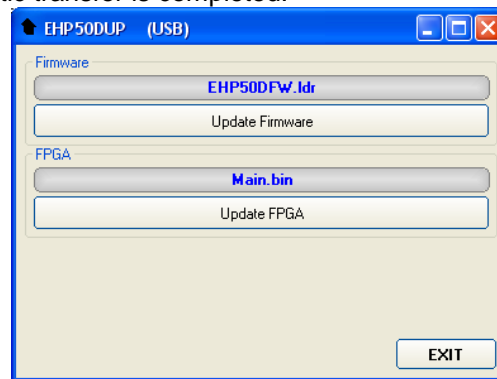
In case the software doesn't detect any EHP-50D in the USB port, the following message will be displayed.



As soon as the connection is established, a message informs to turn the EHP-50E **OFF** and turn it **ON** again; press **OK** to confirm.



Two firmware components can be updated by this application: Firmware, which is the main analyzer internal program, and FPGA, to update parameters of the analyzer Field Programmable Gate Array. Both files, required for updating, are automatically stored within the EHP-TS directory during EHP-TS software installation. To start the process simply select **Update Firmware** or **Update FPGA** button, and wait (few minutes) until the automatic transfer is completed.




At the end, a message informs if the update has been successfully performed.

Turn the EHP-50D **OFF** (it seems already OFF but it is not) and turn it **ON** again.

The EHP-50D is now updated with the new version of the internal firmware or FPGA.

It is now possible to disconnect the cable connected to the PC, with the EHP-50D meter either switched on or off.

Subsequently, when the meter is switched on again, the new version will be displayed in the NBM-550, EHP50-TS or EHP-50D Stand Alone Mode application software.

 **NOTE**

**To obtain firmware or FPGA or programs updates for EHP-50D, please contact your NARDA distributor or download it directly from the NARDA Web site: [www.narda-sts.it](http://www.narda-sts.it)**

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## 8 – Uninstalling Software

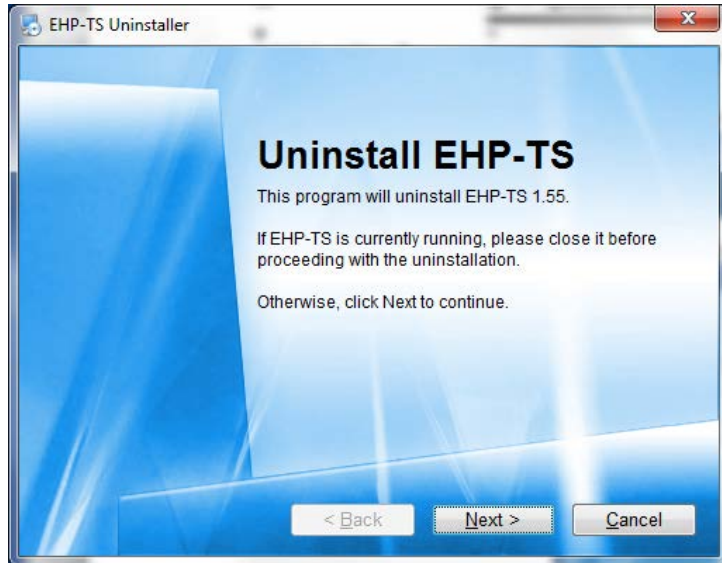
### 8.1 Uninstalling EHP-TS Software

It is possible to remove the EHP-TS software from the PC according to the following procedure:

Run the Uninstall EHP-TS utility.



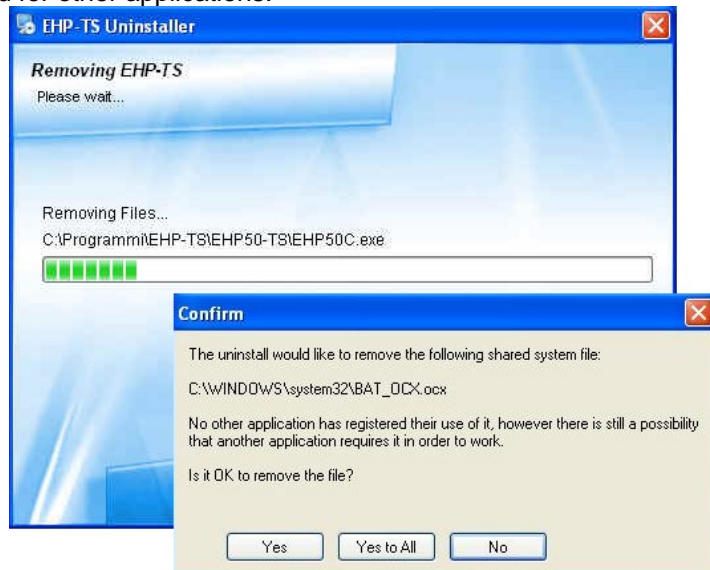
Follow the uninstaller instructions.



**Fig. 8-1** Uninstalling EHP-TS

Before removing any shared system file, the uninstaller will ask for a confirmation.

Answer “NO” in case you are not sure whether the showed system file is required for other applications.





EHP-TS software is now removed from the system, click “Finish” to close uninstaller utility

## 9 – Uninstalling USB-OC

**9.1 Uninstalling driver for USB-OC** It is possible to remove the USB-OC driver from the PC according to the following procedure:

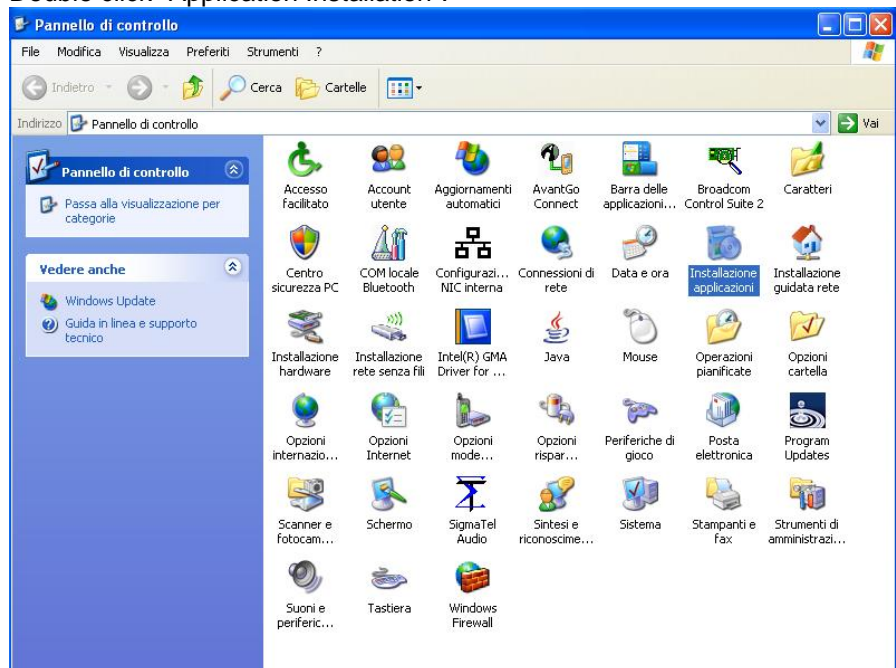
### NOTE

The following procedure shows how to remove the driver in Windows XP environment. It may be different depending on the operating system in use.

Open the Windows Control Panel.



Double click “Application Installation”.



From the application list select “FTDI FTD2XX USB Drivers” and click “Change/Remove”.

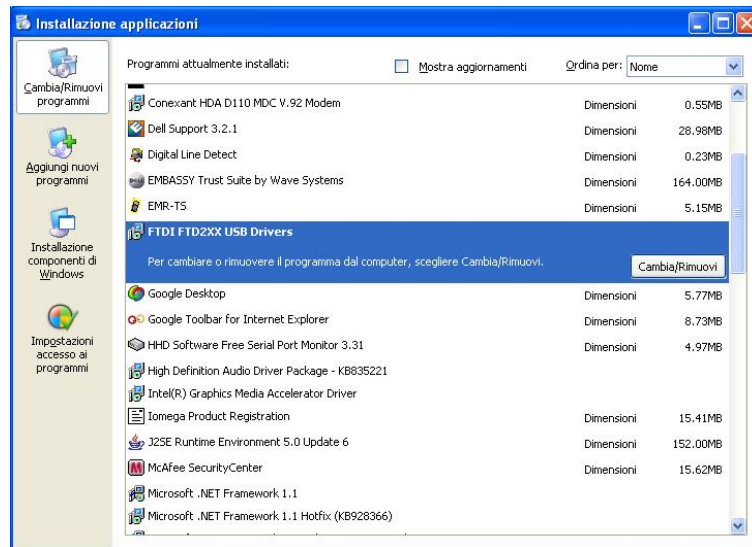
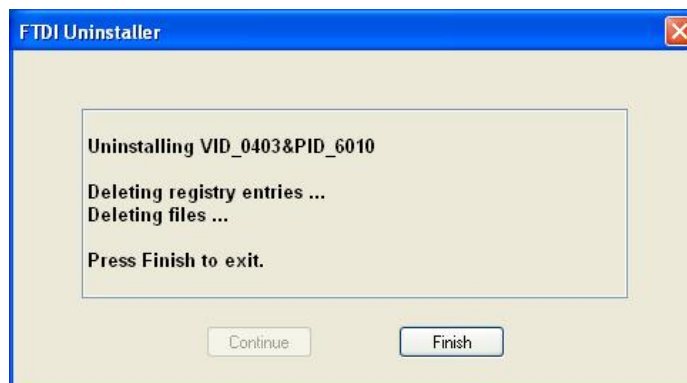


Fig.9-1 Uninstalling USB-OC

Unplug the USB-OC converter, if connected, and click “Continue”.



Click “finish” to exit the uninstaller, USB driver is now removed from your system.

## 10 - Accessories

### 10.1 Introduction

This section provides information required for installing and using accessories for EHP-50D Analyzer.

Information is included regarding initial inspection, power requirements, interconnections, work environment, assembly, cleaning, storage and shipment.

The following general information is applicable to all accessories.

#### 10.1.1 Preliminary inspection

Inspect the packaging for any damage.



**WARNING**

**If the packaging or anti-shock material have been damaged, check that the contents are complete and that the product has not suffered electric or mechanical damage.**

**Check that all the Accessories are there against the checklist found with the apparatus.**

**Inform the carrier and NARDA of any damage that has occurred.**

#### 10.1.2 Work environment

Unless otherwise specified, the work environment of the Accessories, must come within the following conditions:

- Temperature From -10°C to +50° C (0°C to 40°C for Battery Charger)
- Humidity < 90% relative

The Accessories must be stored in a clean and dry environment, free from dust, acids and humidity.

The storage environment must come within the range of the following conditions:

- Temperature From -30°C to + 70°C (-20°C to 60°C for Battery Charger)
- Humidity < 95% relative

#### 10.1.3 Return for repair

When the Accessories need to be returned to NARDA for repair, please complete the questionnaire appended to this User's Manual, filling in all the data that will be useful for the service you have requested.

For reducing the period of time required for the repairs, it is necessary to be as specific as possible in describing the problem. If the problem only occurs in certain circumstances, please describe in detail how it happens.

If possible it is better to reuse the original packaging; making sure that the apparatus is wrapped in thick paper or plastic.

Otherwise, use strong packaging by using a sufficient quantity of shock absorbent material around all sides of the product to ensure that it is compact and does not move around inside the package.

In particular, take every precaution to protect the front panels.

Finish the package by sealing it up tightly.

Apply a FRAGILE label to the package to encourage greater care in its handling.

#### 10.1.4 Cleaning

Use a dry, clean and non-abrasive cloth for cleaning the instruments.



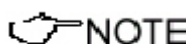
**WARNING**

**Do not use solvents, acids, turpentine, acetone or other similar products for cleaning the devices in order to avoid damaging them.**

### 10.1.5 Power supply and battery chargers

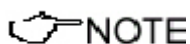
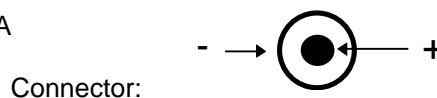
EHP-50D accessories are powered by either internal rechargeable batteries or directly from other devices to which they are connected. The AC/DC battery charger (650.000.036) can be used with a power frequency at either 50 Hz or 60 Hz with a supply voltage between 100 and 240 AC Volt. International AC plug adapters are provided according to the various national standards. AC plug adapter can be easily removed from the battery charger to be replaced by a different one.

To have the greatest autonomy, a full recharging cycle should be carried out before using the Accessories.

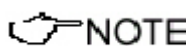


**ALWAYS connect the battery charger to the mains BEFORE connecting to the charge input of the accessories.**  
**The battery charger has an internal protective circuit that will break the output if any load is detected while connecting to the mains.**

Battery charger:  
output: DC, 10 - 15 V, ~ 500 mA



In order to preserve battery efficiency a complete recharge cycle is required before storing them for periods longer than 4 months. Therefore, it is warmly suggested recharging the batteries at least every 4 months even though the device has not been used.



Software and Firmware updates for Accessories can be downloaded from the Web site <http://narda-sts.it>, <http://narda-sts.de>, or requested directly from NARDA Sales Centres.



## NBM-550 Controller and Display Unit for EHP-50D



Fig. 10-1 NBM-550

EHP-50D can be easily operated using the Broadband Field Meter NBM-550 as a controller and display unit. In order not to influence the field to be measured, communication between the EHP-50D Analyzer and the NBM Unit is through a rugged optical fibre cable. The NBM-550 supports the following settings and measurement modes:

- Electric or magnetic field selection (1 kV/m; 100 kV/m; 100  $\mu$ T; 10 mT)
- Span selection (100 Hz ... 100 kHz)
- Wideband or highest peak modes
- Spectrum Mode
- Monitor Mode (Actual; Max; Avg; Min)
- XYZ Mode (wideband or highest peak)

Additional features include:

- Measurement setups
- Normalized spectrum in % related to a standard (e.g. ICNIRP)
- Alarm with adjustable thresholds for electric and magnetic field
- Averaging (4-32 samples) and Maximum Hold
- Unit selector for Tesla/Gauss
- Full resolution spectrum marker
- Data storage on NBM-550 including spectrum data
- Timer Logging
- Post-averaging for logged data on PC (RMS, Mean, Median)
- Powerful PC software NBM-TS for evaluation and documentation
- GPS receiver (optional)
- Operating languages: Chinese, English, French, German, Italian, Russian, Spanish, Turkish

For more information please refer to the NBM-550 product information on the Narda website.

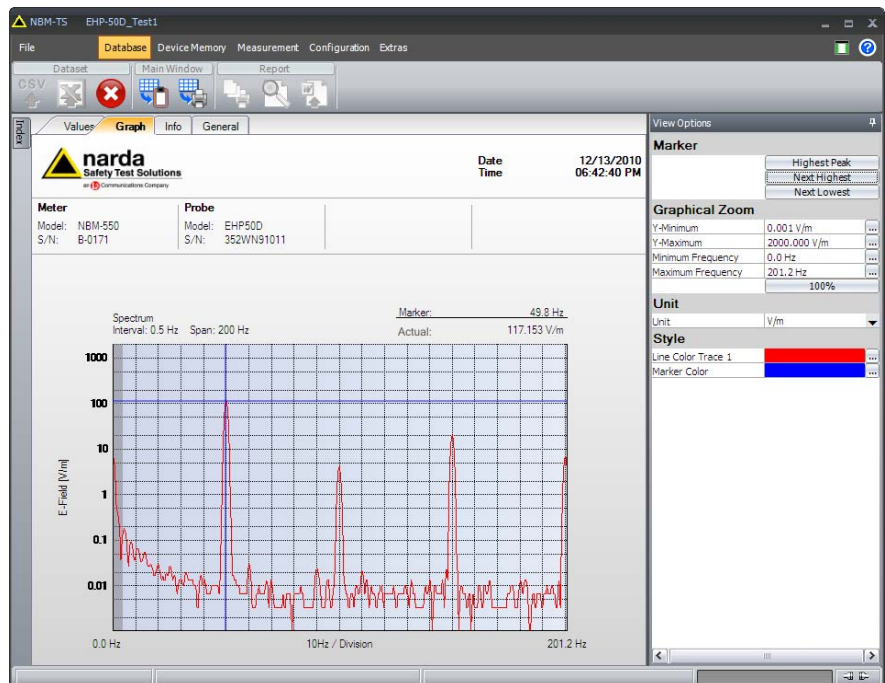


Fig. 10-2 NBM-TS software supports evaluation and documentation of results that have been saved on NBM-550

NBM-550 screenshots of EHP-50D results:

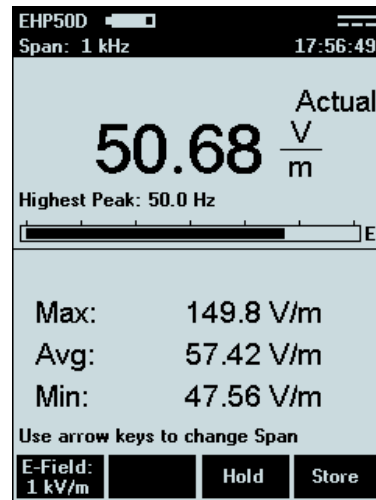


Fig. 10-3 Monitor Mode

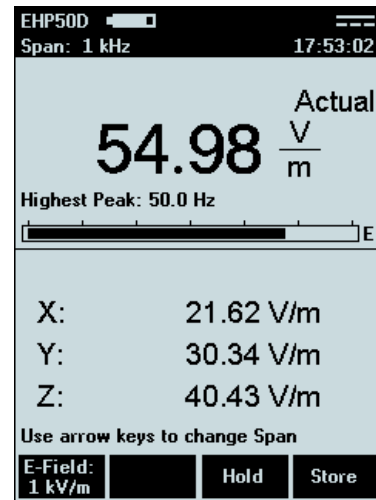


Fig. 10-4 XYZ Mode

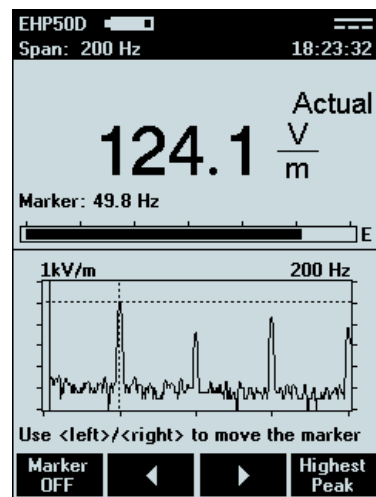


Fig. 10-5 Spectrum Mode

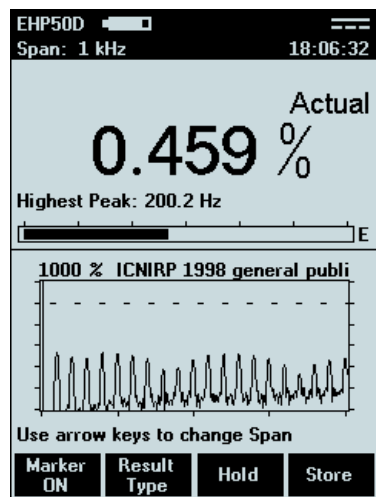


Fig. 10-6 Standard Mode (ICNIRP)



10.3

**USB-OC Optical USB Converter**

10.3.1 Introduction



USB-OC is standard accessory of the EHP-50D Analyzer. It converts the signals of some of the system's accessories, which are only connected via fiber optic, into USB-compatible signals. It, therefore, makes it possible to link the following items up to the USB port of any Personal Computer to operate them in conjunction with specific application software and for firmware updating:

- EHP-50D Electric and Magnetic Field Analyzers, 5Hz-100kHz
- EHP-200A Electric and Magnetic Field Analyzers, 9kHz-30MHz
- NBM550 Broadband meter


Either USB-OC or 8053-OC is indispensable for updating the internal firmware of the above-mentioned items via a Personal Computer and the relative update software is available free-of-charge on NARDA's Web site at: <http://narda-sts.it>

10.3.2 Installation

Insert USB-OC in the connector of a free USB port of the PC, connect the fiber optic coming from the probe or other Accessories treating the locating key with care.

Considering the very low consumption of the device, the power required by USB-OC is taken directly from the USB port of the PC. This means no maintenance is needed.

Table 10-1 Technical specifications of the USB-OC Optical USB Converter	
Max. length of the fiber optic	40 m
USB Connector	Type A Male

 NOTE

The link between USB-OC and a HUB USB device or USB cable extension could not work properly. Connect the USB-OC to the PC directly.

Front view



Key:

Fiber optic connector

Rear view



Key:

USB Type A Male

Fig. 10-7 USB-OC adapters

Power supply

USB-OC is powered directly from the USB port of the PC.

10.4

**8053-OC Optical RS232 Converter**

**10.4.1 Introduction**



8053-OC is an optional accessory of the EHP-50D Analyzer. It converts the signals of some of the system's accessories, which are only connected via fiber optic, into RS-232-compatible signals. It, therefore, makes it possible to link the following items up to the serial port of any Personal Computer to operate them in conjunction with specific application software and for firmware updating:

- EHP-50D Electric and Magnetic Field Analyzers, 5Hz-100kHz
- EHP-200A Electric and Magnetic Field Analyzers, 9kHz-30MHz

Either 8053-OC or USB-OC is indispensable for updating the internal firmware of the above-mentioned items via a Personal Computer and the relative update software is available free-of-charge on NARDA's Web site at: <http://narda-sts.it>

**10.4.2 Installation**

Insert 8053-OC in the connector of a free serial port of the PC, connect the fiber optic coming from the probe or other Accessories treating the locating key with care.

Considering the very low consumption of the device, the power required by 8053-OC is taken directly from the serial port of the PC. This means no maintenance is needed.

**Table 10-2 Technical specifications of the 8053-OC Serial Optical Converter**

<b>Max. length of the fiber optic</b>	80 m
<b>RS 232 Connector</b>	9 pin DB9

**Front panel**

**Key:**

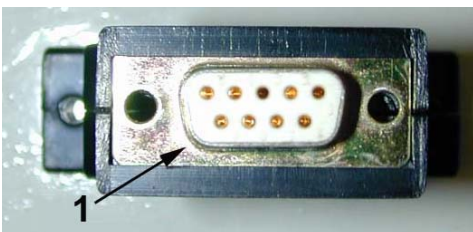
- 1 – Fiber optic connector



**Rear panel**

**Key:**

- 1 - RS232 female DB9 connector



**Fig. 10-8 8053-OC Panels**

### 10.4.3 8053-OC-PS Power supply

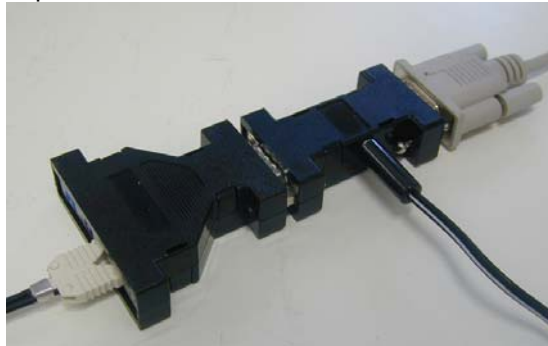


The energy available on the DB9 connector of some PC model could be not sufficient to guarantee a link with 8053-OC. In this case, it is necessary to use 8053-OC-PS between the converter and PC.

8053-OC-PS is an optional accessory of the EHP-50D Analyzer.

8053-OC-PS is indispensable for some PC model don't have sufficient energy on the Serial Port to guarantee a link with 8053-OC.

Connect 8053-OC-PS to a free serial port of the PC or serial cable and connect the 8053-OC to 8053-OC-PS. 8053-OC-PS is powered by means of the provided 230Vac - 9Vdc Wall Adapter. Connect the fiber optic coming from the probe or other Accessories to 8053-OC.



8053-OC-PS is powered through 230Vac - 9Vdc Wall Adapter.

10.5

**TR-02A Tripod**

10.5.1 Introduction



Optional accessory TR-02A tripod allows easy positioning of EHP-50D analyzer for accurate field measurement.

The standard ¼” threaded insert, located at the bottom of EHP-50D housing allows mounting the analyzer on the tripod through the provided swivel support.

Design and materials of the TR-02A tripod have been specially selected to avoid field perturbations which might otherwise affect measurement results if unsuitable support were adopted.

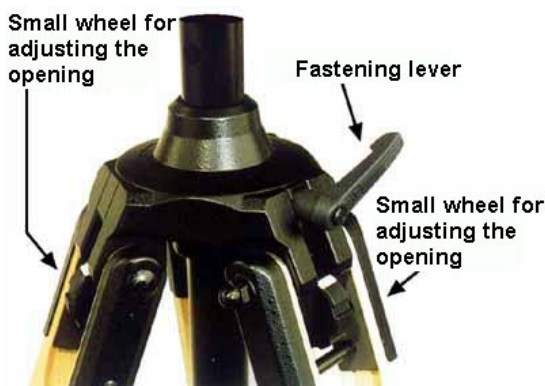
The height of the tripod can be adjusted by means of its extendable legs equipped with special feet which improve stability by adapting to all surfaces. The height of its central support can also be adjusted.

A soft carrying case is provided with TR-02A tripod.

**Table 10-3 Technical specifications of the TR-02A Tripod**

• <b>Legs</b>	3 legs x 3 extendable sections
• <b>Transport size:</b>	76 x 12 x 12 cm
• <b>Minimum height:</b>	60 cm
• <b>Maximum height:</b>	180 cm
• <b>Weight</b>	2.8 kg
• <b>Load capacity:</b>	10 kg
• <b>Tripod support</b>	Threaded insert ¼ “

Details of TR-02A and its adjustments:



**Fig. 10-9 TR-02A Tripod**

Opening angle of each leg can be adjusted in three different positions by means of special adjusting wheels.

- fixed opening of 20°: White adjustment indicator is visible (as shown in Fig. 10-9);
- fixed opening of 45°: Red adjustment indicator is visible;
- variable opening: no indicator is visible.

The central support can be adjusted and blocked by means of a special fastening lever.

Details of swivel support:

- full height: 8 cm
- weight: 160 g
- load capacity: 10 kg
- Threaded insert ¼ "

The adjustable swivel makes mounting and fastening the instrument easy as well as changing the angle in any directions via the locking knob.

10.6

***TT-01 Fiber Glass Telescopic Support***

**10.6.1 Introduction**

TT-01 is an Optional Accessory of the EHP-50D Analyzer. It allows EHP-50D Analyzer to be easily supported during field measurements.

A standard ¼” threaded insert allows easy mounting of EHP-50D on the telescopic support

**The design and materials of the TT-01 have been specially selected to prevent it from disturbing the sensors and, therefore, the measurements taken.**

Table 10-4 Technical specifications of the TT-01 Fiber Glass Telescopic Support	
• Diameter	32 mm
• Minimum height:	120 cm
• Maximum height:	420 cm
• Weight	500 g

TT-01 Fiber Glass Telescopic Support with soft carrying case



The height of the TT-01 can be adjusted.

**Fig. 10-10** TT-01 Fiber Glass Telescopic Support

## ***Other Accessories***

Other Accessories are available on request with the EHP50D, such as: car adapter, 12 V battery charger and Internal AC Plug Adapter.



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Caro cliente

grazie per aver acquistato un prodotto NARDA! Sei in possesso di uno strumento che per molti anni ti garantirà un'alta qualità di servizio. NARDA riconosce l'importanza del Cliente come ragione di esistenza; ciascun commento e suggerimento, sottoposto all'attenzione della nostra organizzazione, è tenuto in grande considerazione. La nostra qualità è alla ricerca del miglioramento continuo. Se uno dei Suoi strumenti NARDA necessita di riparazione o calibrazione, può aiutarci a servirla più efficacemente compilando questa scheda e accludendola all'apparecchio.

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Dear Customer

thank you for purchasing a NARDA product! You now own a high-quality instrument that will give you many years of reliable service. NARDA recognizes the importance of the Customer as reason of existence; in this view, any comment and suggestion you would like to submit to the attention of our service organization is kept in great consideration. Moreover, we are continuously improving our quality, but we know this is a never ending process. We would be glad if our present efforts are pleasing you. Should one of your pieces of NARDA equipment need servicing you can help us serve you more effectively filling out this card and enclosing it with the product.

Nevertheless, even this product will eventually become obsolete. When that time comes, please remember that electronic equipment must be disposed of in accordance with local regulations. This product conforms to the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (Monitoring and Control Instruments). You can return the instrument to us free of charge for proper environment friendly disposal. You can obtain further information from your local NARDA Sales Partner or by visiting our website at [www.narda-sts.it](http://www.narda-sts.it).

**Servizio richiesto:**  *Service needed:*

Solo taratura     Riparazione     Riparazione & Taratura     Taratura SIT     Altro:  
 Calibration only     Repair     Repair & Calibration     Certified Calibration     Other:

**Ditta:**

*Company:*

**Indirizzo:**

*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:*

