

User's Manual

EHP-200

EHP-200A

**ELECTRIC AND MAGNETIC
FIELD PROBE - ANALYZER**

From 9 kHz up to 30 MHz

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:

© Names and Logo are registered trademarks of Narda Safety Test Solutions GmbH and L3 Communications Holdings, Inc. – Trade names are trademarks of the owners.

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.



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.

Contents

Safety requirements and instructions.....	Page VI
EC Conformity Certificate.....	VII
1 General information	Page
1.1 Documentation.....	1-1
1.2 Introduction	1-1
1.3 Standard accessories.....	1-2
1.4 Optional accessories	1-2
1.5 EHP-200 Main specifications.....	1-3
1.6 EHP-200 panel.....	1-3
1.7 EHP-200A Main specifications.....	1-4
1.8 EHP-200A panel.....	1-4
2 Installation and Use	Page
2.1 Introduction.....	2-1
2.2 Preliminary Inspection.....	2-1
2.3 Work environment.....	2-1
2.4 To return for repair.....	2-1
2.5 To clean the meter.....	2-1
2.6 Installation of the EHP-200/A.....	2-2
2.7 EHP200/A Battery management.....	2-3
2.8 EHP200/A Power supply and battery charging.....	2-4
2.9 Avoiding measurement errors.....	2-5
3 EHP-TS Software	Page
3.1 Introduction.....	3-1
3.2 Hardware requirements.....	3-1
3.3 Installing EHP-TS Software.....	3-2
4 USB-OC Installation	Page
4.1 USB-OC Optical to USB Converter driver installation.....	4-1
4.2 Hardware installation.....	4-6
4.3 COM Port setting with 8053-OC.....	4-7
5 Description	Page
5.1 EHP-TS Applications.....	5-1
5.2 EHP-200/A Applications.....	5-2
5.2.1 Main menu.....	5-2
5.2.2 Plot ranges colours.....	5-3
5.3 Sweep section.....	5-4
5.4 Data section.....	5-5
5.4.1 Waterfall.....	5-8
5.4.1.1 Data recording.....	5-12
5.5 Mode section.....	5-13
5.6 Limit section.....	5-15
5.7 Appearance section.....	5-17
5.8 Additional functions provided by EHP200-TS	5-18
5.9 ICNIRP	5-20
5.10 IEEE.....	5-22

6 Update Firmware	Page
6.1 Update firmware.....	6-1
6.2 To run the update software.....	6-1
6.3 To transfer data	6-1
7 Uninstalling software	Page
7.1 Uninstalling EHP-TS Software	7-1
8 Uninstalling USB-OC	Page
8.1 Uninstalling driver for USB-OC.....	8-1
9 Accessories	Page
9.1 Introduction.....	9-1
9.1.1 Preliminary inspection.....	9-1
9.1.2 Work environment.....	9-1
9.1.3 Return for repair.....	9-1
9.1.4 Cleaning.....	9-1
9.1.5 Power supply and battery chargers.....	9-2
9.2 USB-OC Optical USB Converter.....	9-3
9.2.1 Introduction.....	9-3
9.2.2 Installation.....	9-3
9.3 8053-OC Optical RS232 Converter.....	9-4
9.3.1 Introduction.....	9-4
9.3.2 Installation.....	9-4
9.4 8053-OC-PS Power Supply.....	9-5
9.4.1 Introduction.....	9-5
9.4.2 Installation.....	9-5
9.5 8053 DISPLAY.....	9-6
9.5.1 Introduction.....	9-6
9.5.2 Standard accessories.....	9-6
9.5.3 Optional accessories.....	9-6
9.5.4 Main specification.....	9-7
9.5.5 Field probe.....	9-8
9.5.6 Front panel.....	9-9
9.5.7 Side panel.....	9-9
9.5.8 Battery charger.....	9-10
9.5.9 To substitute the mains connector.....	9-10
9.5.10 To check the internal batteries.....	9-10
9.6 TR-02A Tripod.....	9-11
9.6.1 Introduction.....	9-11
9.7 TT-01 Fiber glass Telescopic support.....	9-13
9.7.1 Introduction.....	9-13
9.8 Other accessories.....	9-14
10 Software command protocol	Page
10.1 Introduction.....	10-1
10.2 Input select commands.....	10-2
10.3 Setting command.....	10-3
10.4 Data request command.....	10-3
10.5 SWEEP Commands.....	10-4

Figures

Figure		Page
1-1	EHP-200 panel	1-3
1-2	EHP-200A panel	1-4
2-1	EHP-200 Battery Discharging.....	2-3
2-2	EHP-200A Battery Discharging.....	2-3
3-1	EHP-TS Installation.....	3-2
4-1	USB-OC converter.....	4-1
4-2	EHP-200/A link with USB-OC.....	4-6
4-3	EHP-200/A link with 8053-OC.....	4-6
5-1	EHP-200 EHP-TS Main Window.....	5-2
5-2	Waterfall - Graph 2D.....	5-8
5-3	Waterfall Main Window.....	5-9
5-4	Waterfall - Graph 3D.....	5-10
5-5	Both electric and magnetic fields displayed.....	5-18
5-6	Power density spectrum calculated and displayed .	5-18
5-7	New wave impedance function	5-19
6-1	EHP200 Upgrading Utility Main Window.....	6-1
7-1	Uninstalling EHP-TS.....	7-1
8-1	Uninstalling USB-OC.....	8-2
9-1	USB-OC Adapters.....	9-3
9-2	8053-OC Panels.....	9-4
9-3	8053-OC-PS Connectors.....	9-5
9-4	8053 DISPLAY Front Panel.....	9-9
9-5	8053 DISPLAY Side Panel.....	9-9
9-6	TR-02A Tripod.....	9-11
9-7	TT-01 Fiber Glass Telescopic Support.....	9-13

Tables

Table		Page
1-1	Technical Specifications of the EHP-200.....	1-3
1-2	Technical Specifications of the EHP-200/A.....	1-4
2-1	Led colour EHP-200/A.....	2-2
9-1	Technical Specifications of the USB-OC.....	9-3
9-2	Technical Specifications of the 8053-OC.....	9-4
9-3	Technical Specifications of the 8053-OC-PS.....	9-5
9-4	Technical Specifications of the 8053 DISPLAY...	9-7
9-5	Series of electric and magnetic field probe.....	9-8
9-6	Technical Specifications of the TR-02A.....	9-11
9-7	Technical Specifications of the TT-01.....	9-13



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

(in accordance with the ISO/IEC standard 17050-1 and 17050-2)

This is to certify that the product: EHP-200 Electric and Magnetic field Probe - Analyzer

Produced by: NARDA S.r.l.
Safety Test Solution
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)

This product complies with the requirements of the Low Voltage Directive 2006/95/EC and with the EMC Directive 2004/108/EC.

NARDA S.r.l..

EC Conformity Certificate

(in accordance with the ISO/IEC standard 17050-1 and 17050-2)

This is to certify that the product: EHP-200A Electric and Magnetic field Probe - Analyzer

Produced by: NARDA S.r.l.
Safety Test Solution
Via Benessea 29/B
17035 Cisano sul Neva (SV) – ITALY

complies with the following European Standards:

Safety: CEI EN 61010-1 (2001)

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This product complies with the requirements of the Low Voltage Directive 2006/95/EC and with the EMC Directive 2004/108/EC.

NARDA S.r.l..

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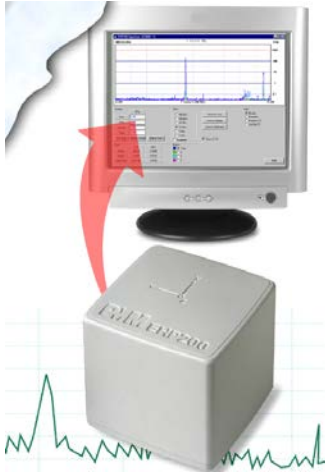
1 - General information

1.1 Documentation

Enclosed in this manual:

- service questionnaire to send back to NARDA
- check list of accessories enclosed in packaging.

1.2 Introduction



EHP-200/A E-H fields analyzer has been designed for accurate measurements of both electric (0,02 to 1000 V/m) and magnetic (6 mA/m to 300 A/m) fields, in the frequency range 9 kHz to 30 MHz.

Both the field sensors and the electronic measuring circuitry are accommodated in a robust housing, only 92x92x109 mm in size.

Measurements are given separately for the 3-axis, or total value (peak and average), with exceptional flatness and linearity.

Results are expressed in V/m, A/m, microT, mG, mW/cm², W/m² and % of a selected limit.

The EHP-200/A features built-in spectrum analysis with minimum resolution of 1 kHz for detailed measurements of the E and H field intensity vs. frequency over a great dynamic range of 80 dB.

The power supply is provided by an internal Li-Ion battery for up to 8 hours (EHP-200) or 12 hours (EHP-200A) of continuous operation, or from an external 10-15 V DC source by an AC adapter.

The EHP-200/A is controlled by a PC-based program, and measurements are transmitted in real time through a optical fiber link.

An auxiliary input allows for measuring the frequency spectrum of external signals from any other RF device.

Thanks to its very small size and to the optical fiber link, the EHP-200/A does not influence the electromagnetic fields under measure, thus ensuring more accurate and sensitive measurements.

Therefore the EHP-200/A is particularly suitable for nearby measurements of LW-AM-SW bands transmitters, metal detectors, and any other application requiring measurements of RF signals in the 9 kHz – 30 MHz range, with great advantage wherever the conventional antennas are inadequate due to their physical dimensions, and cable influence must be prevented.

EHP-200/A is housed in a small cubic case. Bottom: optical fiber connector, extension rod screw, battery charger connector, auxiliary RF input, ON/OFF button and operation LED.

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

1.3 Standard accessories

Standard accessories included with EHP-200/A:

- 8053-SC Soft carrying case, holds basic unit and accessories including 8053-Display (650.000.035);
- AC/DC battery charger (650.000.036);
- International AC plug adapter (UK:650.000.037, USA:650.000.038, Australia:650.000.039, Italy:650.000.040);
- FO-8053/10 Cable, fiber optic 10m (650.000.053)
- FO-10USB Cable, fiber optic 10m (650.000.177);
- USB-OC Optical-USB converter (650.000.176);
- Plastic rod support, 50cm (231.800.012);
- Mini tripod, bench top (650.000.151);
- EHP-TS software, CD-ROM;
- Operating Manual;
- Certificate of calibration;
- Return for Repair Form.

1.4 Optional accessories

The following accessories can be ordered separately:

- 8053-OC Optical RS232 converter (650.000.062);
- 8053-OC-PS Power Supply (650.000.179);
- FO-8053/20 Cable, fiber optic 20 m (650.000.055);
- FO-8053/40 Cable, fiber optic 40 m (650.000.052);
- FO-8053/80 Cable, fiber optic 80 m (650.000.128);
- FO-20USB Cable, fiber optic 20 m (650.000.178);
- FO-40USB Cable, fiber optic 40 m (650.000.182);
- TR-02A wooden tripod 1-2m with soft carrying bag (655.000.005);
- TT-01 telescopic mast (120-420 cm) with carrying bag (650.000.005)
- 8053-Display display unit (620.000.057)
- 8053-CA car adapter (650.000.058)
- 8053-CC rigid case (650.000.059)



Updates of the software and firmware of the EHP-200/A can be downloaded from the Web site www.narda-sts.it or requested directly from NARDA Sales Centers.

1.5 EHP-200 Main specifications

The following conditions apply to all specifications:

- Operating ambient temperature must be between -10°C and 50° C.

Table 1-1 Technical specifications of the EHP-200 Electric and Magnetic Field Analyzer				
	Electric Field	Magnetic Field Mode A	Magnetic Field Mode B	AUX Input
Frequency range	9 kHz ÷ 30 MHz	9 kHz ÷ 3 MHz	300 kHz ÷ 30 MHz	9 kHz ÷ 30 MHz
Measurement range				
@10kHz RBW	0,1 ÷ 1000 V/m	30 mA/m ÷ 300 A/m	3 mA/m ÷ 30 A/m	-80 ÷ 0 dBm
with preamplifier ON	0,02 ÷ 200 V/m	6 mA/m ÷ 60 A/m	0.6 mA/m ÷ 6 A/m	-94 ÷ -14 dBm
Dynamic range	> 80 dB			
Measurement range	> 94 dB			
Resolution	0.01 V/m	1 mA/m	0.1 mA/m	0.01 dB
Sensitivity @10kHz RBW (*)	0.1 V/m	30 mA/m	3 mA/m	-80 dBm
with preamplifier ON	0.02 V/m	6 mA/m	0.6 mA/m	-94 dBm
Flatness	0,5 dB 100 kHz – 27 MHz @ 20 V/m	0,8 dB 150 kHz – 3 MHz @ 166 mA/m	0,8 dB 300 kHz – 27 MHz @ 53 mA/m	0,4 dB @ -20dBm
Anisotropy @1MHz	0.8 dB			---
Linearity @1MHz	0,5 dB from FS to -60 dBFS			
SPAN	0 to FULL SPAN			
RBW	1 kHz – 3 kHz – 10 kHz – 30 kHz – 100 kHz – 300 kHz			
Rejection to E fields	---	> 20 dB		---
Rejection to H fields	> 20 dB	---		---
Calibration	internal E ² PROM			
Temperature error	0,02 dB/°C			
Dimensions	92 x 92 x 109 mm			
Weight	550 g			
Preamplifier	selectable ON/OFF, 14dB			
Units	V/m, A/m, uT, mW/cm ² , W/m ²			
Internal battery	3,7 V – 3,6 Ah Li-Ion, rechargeable			
Operation	> 8 hours			
Recharging time	< 8 hours			
External supply	10 ÷ 15 VDC, I = approx. 500 mA			
Optical fiber connection	up to 40 m (USB-OC) up to 80 m (8053-OC)			
Firmware updating	through the optical link			
Self test	automatic at power on			
Operating temperature	-10 to +50°C			
Storage temperature	-20 to +70°C			

(*) The maximum sensitivity is achieved with the filter to 10 kHz

1.6 EHP-200 Panel

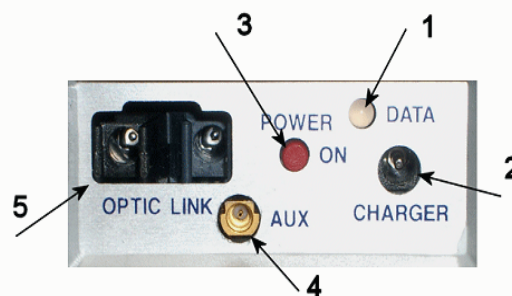


Fig. 1-1 EHP-200 Panel

Key:

1. Led
2. Battery charger connector
3. ON/OFF button
4. AUX input connector MMCX male type
5. Fiber optic connector

1.7 EHP-200A Main specifications

The following conditions apply to all specifications:

- Operating ambient temperature must be between -10°C and 50° C.

Table 1-2 Technical specifications of the EHP-200A Electric and Magnetic Field Analyzer				
	Electric Field	Magnetic Field Mode A	Magnetic Field Mode B	AUX Input
Frequency range	9 kHz ÷ 30 MHz	9 kHz ÷ 3 MHz	300 kHz ÷ 30 MHz	9 kHz ÷ 30 MHz
Measurement range				
@10kHz RBW	0,1 ÷ 1000 V/m	30 mA/m ÷ 300 A/m	3 mA/m ÷ 30 A/m	-80 ÷ 0 dBm
with preamplifier ON	0,02 ÷ 200 V/m	6 mA/m ÷ 60 A/m	0.6 mA/m ÷ 6 A/m	-94 ÷ -14 dBm
Dynamic range	> 80 dB			
Measurement range	> 94 dB			
Resolution	0.01 V/m	1 mA/m	0.1 mA/m	0.01 dB
Sensitivity @10kHz RBW (*)	0.1 V/m	30 mA/m	3 mA/m	-80 dBm
with preamplifier ON	0.02 V/m	6 mA/m	0.6 mA/m	-94 dBm
Flatness	0,5 dB 100 kHz – 27 MHz @ 20 V/m	0,8 dB 150 kHz – 3 MHz @ 166 mA/m	0,8 dB 300 kHz – 27 MHz @ 53 mA/m	0,4 dB @ -20dBm
Anisotropy @1MHz	0.8 dB			---
Linearity @1MHz	0,5 dB from FS to -60 dBFS			
SPAN	0 to FULL SPAN			
RBW	1 kHz – 3 kHz – 10 kHz – 30 kHz – 100 kHz – 300 kHz			
Rejection to E fields	---	> 20 dB		---
Rejection to H fields	> 20 dB	---		---
Calibration	internal E ² PROM			
Temperature error	0,02 dB/°C			
Dimensions	92 x 92 x 109 mm			
Weight	580 g			
Preamplifier	selectable ON/OFF, 14dB			
Units	V/m, A/m, uT, mW/cm ² , W/m ²			
Internal battery	3,7 V – 5,55 Ah Li-Ion, rechargeable			
Operation	> 12 hours			
Recharging time	< 8 hours			
External supply	10 ÷ 15 VDC, I = approx. 560 mA			
Optical fiber connection	up to 40 m (USB-OC) up to 80 m (8053-OC)			
Firmware updating	through the optical link			
Self test	automatic at power on			
Operating temperature	-10 to +50°C			
Storage temperature	-20 to +70°C			

(*) The maximum sensitivity is achieved with the filter to 10 kHz

1.8 EHP-200A Panel

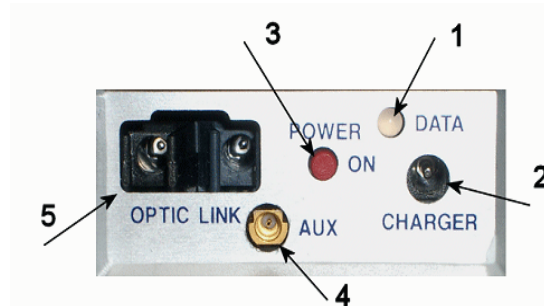


Fig. 1-2 EHP-200A Panel

Key:

1. Led
2. Battery charger connector
3. ON/OFF button
4. AUX input connector MMCX male type
5. Fiber optic connector

2 – Installation and Use

2.1 Introduction

This section provides the information required for installing and using the EHP-200/A Analyzer.

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

2.2 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 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 -10°C to +50°C
- Humidity < 90% 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 -20°C to + 70°C
- Humidity < 95% relative

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

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



WARNING

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

2.6 Installation of the EHP-200/A

To install EHP-200/A, connect the supplied fiber optic to the **OPTIC LINK** connector taking care that the spigot matches the housing. Connect the other end of the fiber optic to the **OPTIC LINK** connector of the USB-OC or 8053-OC. Connect the converter to a port of the PC.

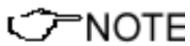


Do not pull the fiber optic by holding onto the cable but use the connector so that the head does not get damaged. Avoid dirt and other particles getting into the transducers of the fiber optic.



The fiber optic of the EHP-200/A Analyzer can be disconnected and reconnected while in use. In this case, communication will be restarted automatically.

Turn on EHP-200/A by pushing the Red **POWER** button for one second.
Run EHP-200 control software.
Communication with PC is shown by the blinking green LED.



EHP-200/A must be ON before running EHP-200 control software. EHP-200/A may not be correctly recognized if switched ON when the control software is already running.



Pressing the POWER down button for more than 4 seconds forces the hardware of the apparatus to shut down. Then, it is necessary to wait several seconds before switching it on again.

When switched on, the three-color **ON DATA** LED will provide the following information:

After switching on the analyzer, the **ORANGE** LED lights up for about ½ second as an auto-check, after that the **Green** light starts blinking which means that the firmware has been correctly downloaded.

TABLE 2-1 Led colour

Blinking speed	Colour of the LED	Meaning
Changes depending on the SPAN	Green	Communication with PC in progress and correct
Medium	Red	PC disconnected or error in communication
FIX	Green	Recharging battery
Off	Off	Battery recharging completed



The EHP-200/A can be switched off manually by pressing the Red POWER button. If the attempt to communicate is not successful or if the fiber optic is not connected to the PC, the EHP-200/A will automatically switch off after about 30 minutes to preserve the battery charge.

2.7 EHP200/A
Battery management

EHP-200/A features an efficient control of the Li-Ion internal battery. The picture below shows the typical discharging curve of EHP200:

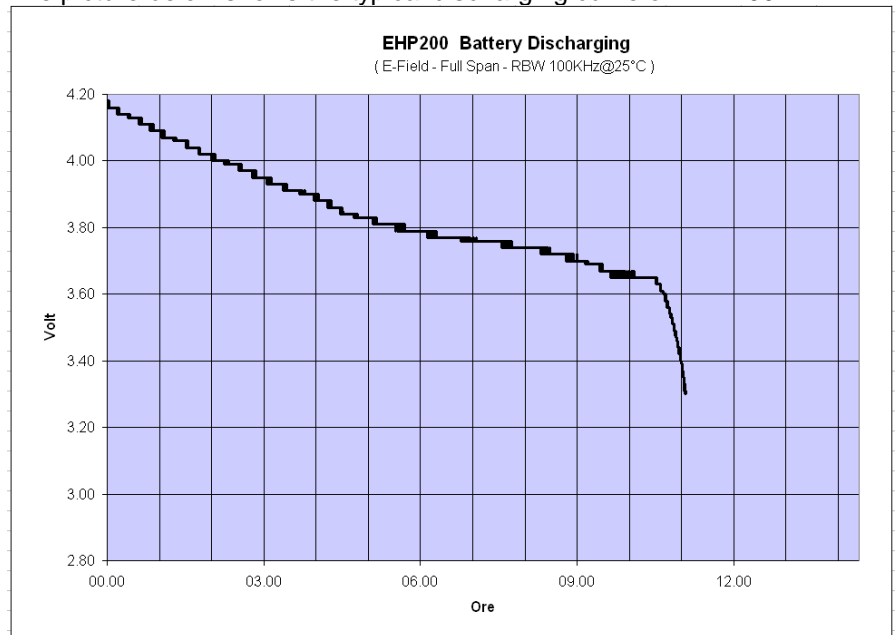


Fig. 2-1 EHP-200 Battery Discharging

The picture below shows the typical discharging curve of EHP200A;

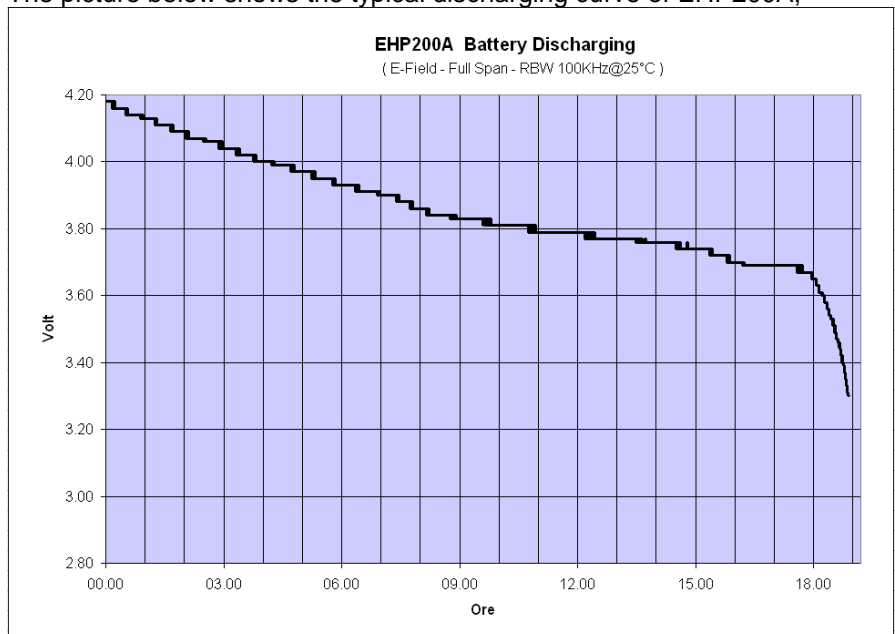


Fig. 2-2 EHP-200A Battery Discharging

2.8 EHP200/A Power supply and battery charging

EHP-200/A has an internal rechargeable Li-Ion battery to be recharged by the supplied battery charger (the battery charger is the same as that of 8053 DISPLAY).

The charge of the probe, must come within the following conditions:

- Temperature From 0°C to +35°C
- Humidity < 90% relative

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

It is recommended to connect the battery charger to the AC mains BEFORE connecting it to the EHP-200/A.

The battery charger has an internal output current limiter in case of overload when connecting to the mains.



Battery charger for EHP200:
output: DC, 10 - 15 V, ~ 500 mA

Connector:



Battery charger for EHP200A:
output: DC, 10 - 15 V, ~ 560 mA

Connector:



The minimum voltage level for operation is 3.25V. Under this battery voltage the analyzer will turn OFF automatically and the battery must be charged.

Charging time is of 4-5 hours. Battery recharging is indicated when the Led of EHP-200/A is green. When the charge is complete the led turns off.



The battery status is reported by the EHP-200 control program



When charging is in progress the operator is warned in the battery sub-window.

2.9 Avoiding measurement errors

To avoid disturbing the measurements in progress, the user or other People or mobile vehicles should stay at least 5 meters away from the EHP-200/A Analyzers. We also recommend that the probe be set up far from metal objects or masses.



To perform correct measurements, the tripod TR-02A to hold EHP-200/A is recommended. Using an unsuitable support could influence the measurements thus giving incorrect results.

We recommend always using the supplied isolated extension rod together with the TR-02A optional tripod to positioning the EHP-200/A at the height stated by the reference standards for the measurement in progress.

Use the same configuration to ensure the measurements taken can be repeated.

The intensity of the measured field mainly depends on its voltage and the geometry of the system under analysis, as well as on the distance between the conductors and the measurement points. In proximity of the cables the field value reading may be very high and will vary according to 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.

E.g.: the electric field intensity 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.

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3 – EHP-TS software

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-50C and EHP-200/A 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.

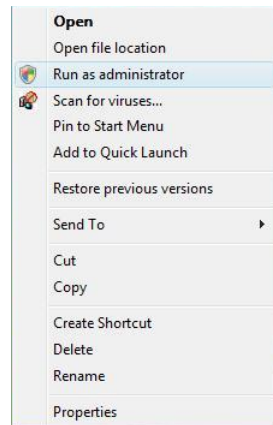
3.3 Installing EHP-TS Software

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

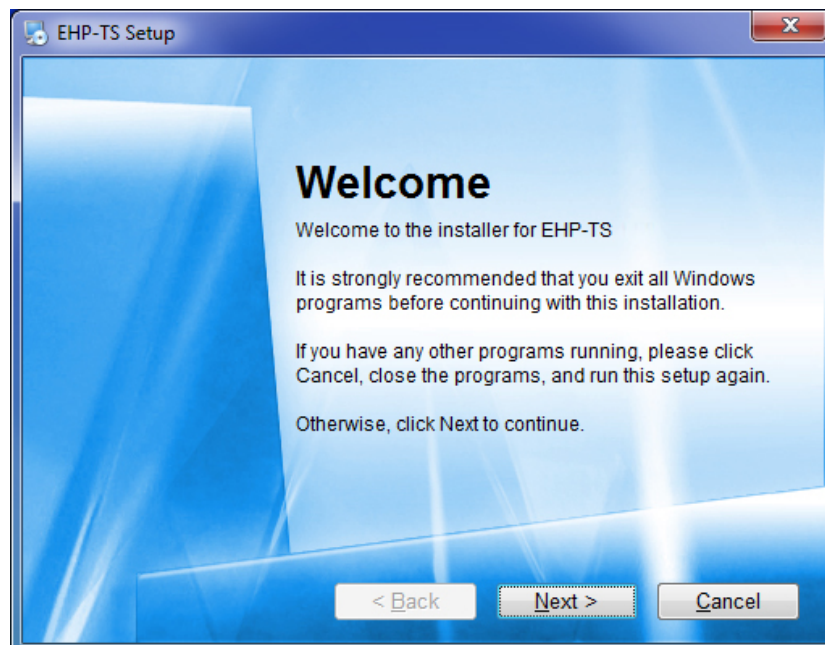
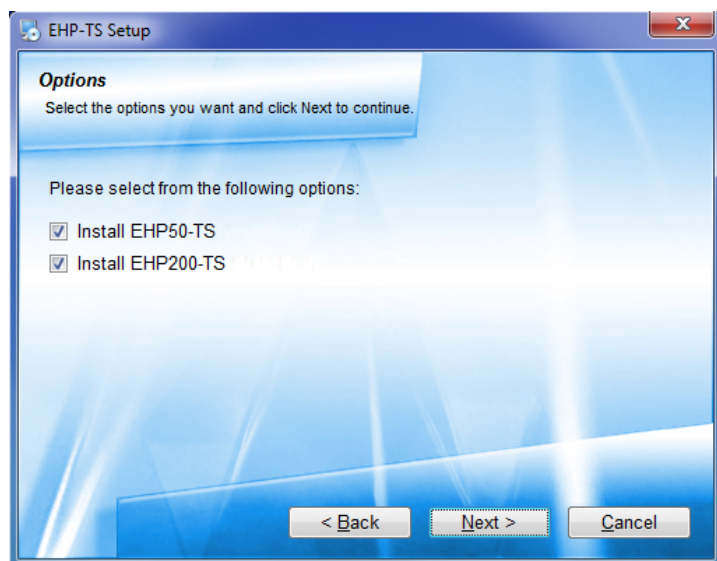
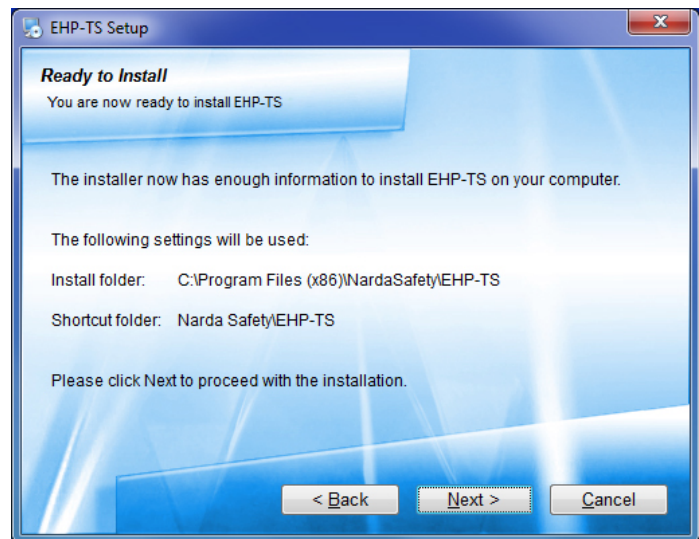
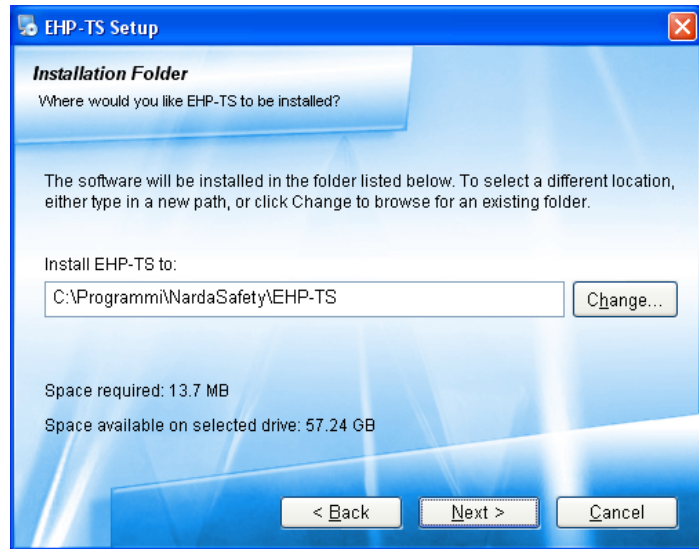
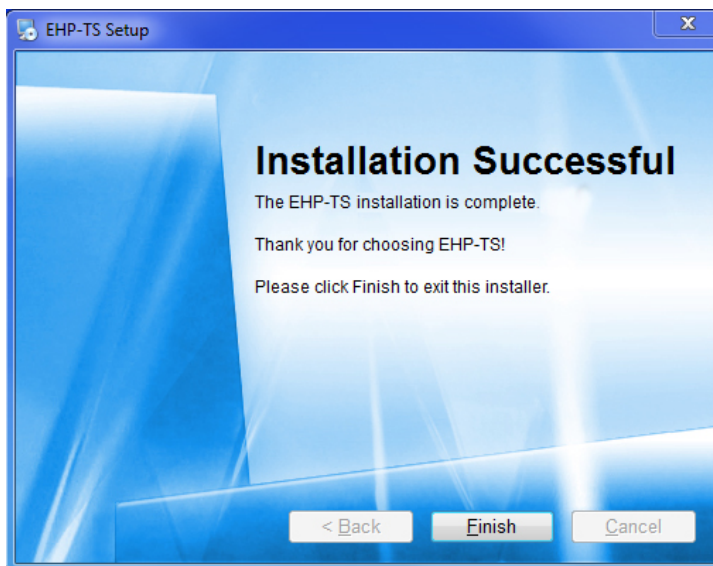
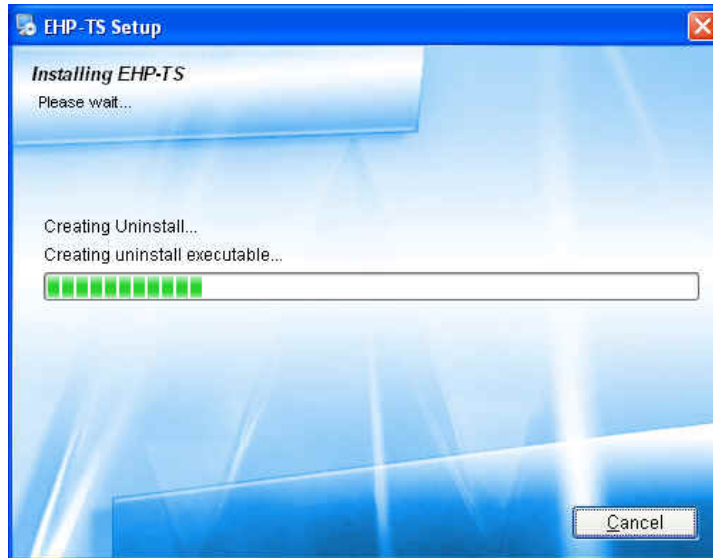
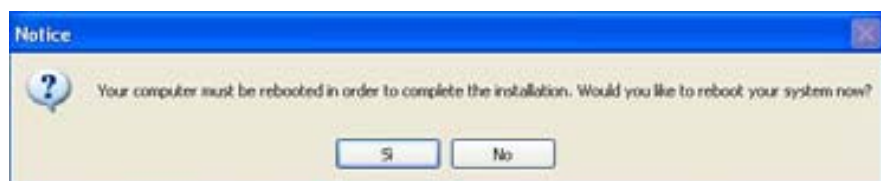


Fig.3-1 EHP-TS installation





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.7)

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 creates 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.

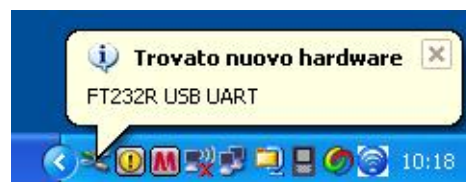
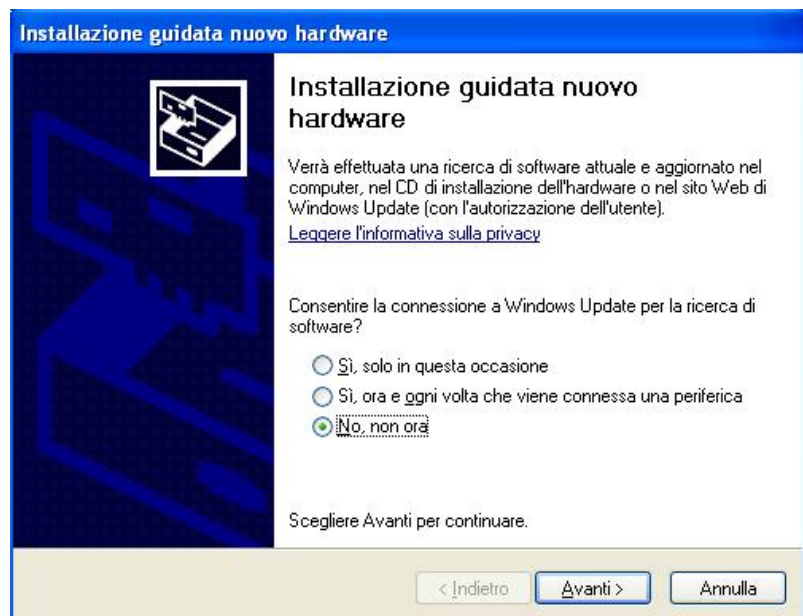


Fig.4-1 USB-OC Converter

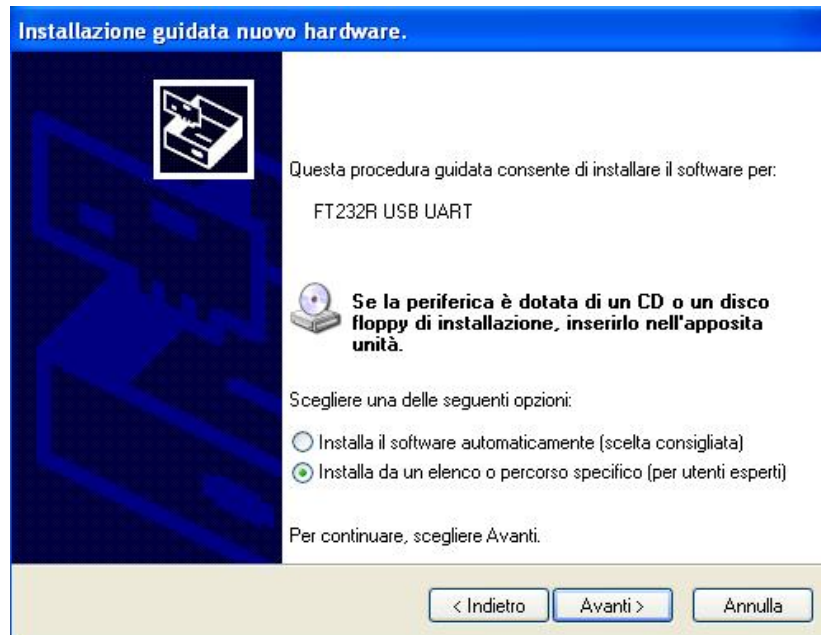
NOTE

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

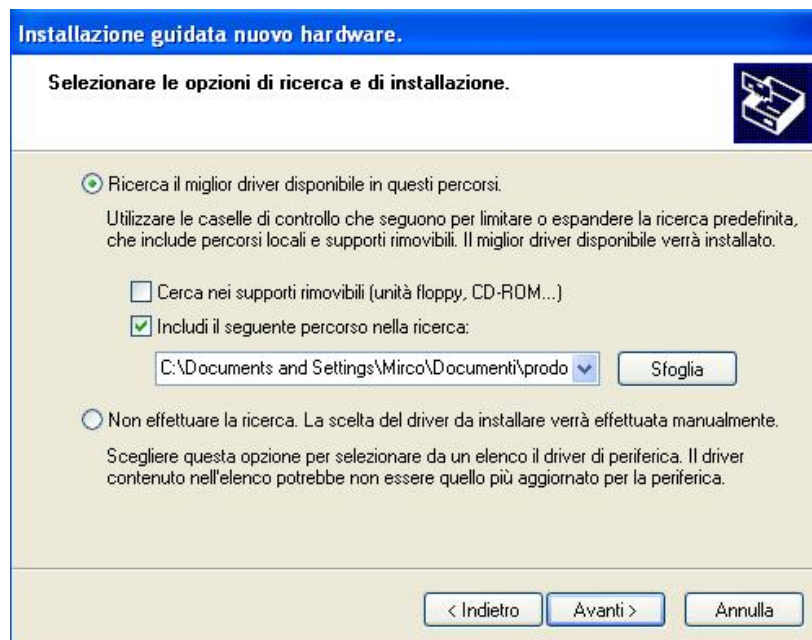
In case the driver is not already installed, a message informing that new hardware has been found will be shown and a guided installation will start:



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”

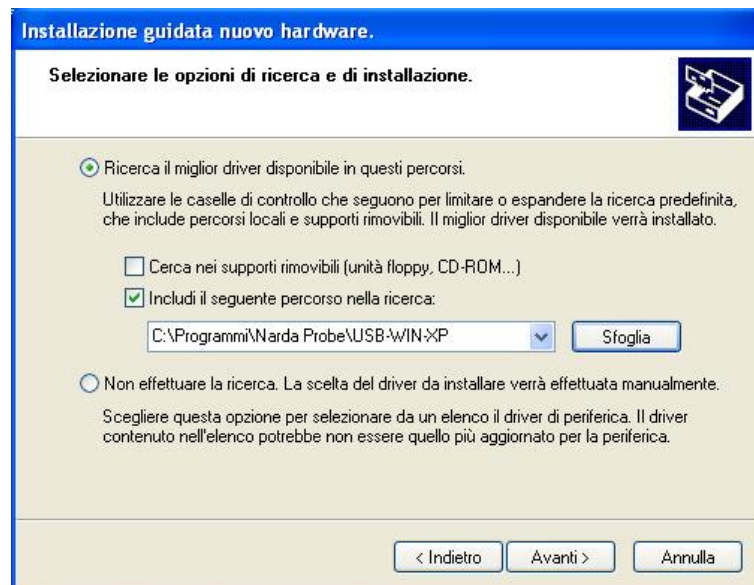


Select options as in the previous picture and click “browse” to select the directory containing the requested files:

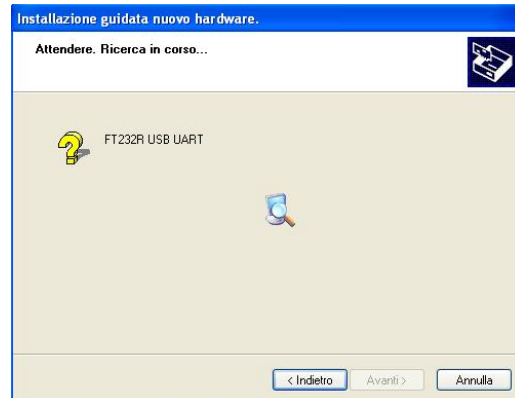


The folder “USB-WIN-98” includes driver for Windows 98.
The folder “USB-WIN-XP” includes driver for Windows XP and Vista.
The folder “WIN-7” includes driver for Windows 7.

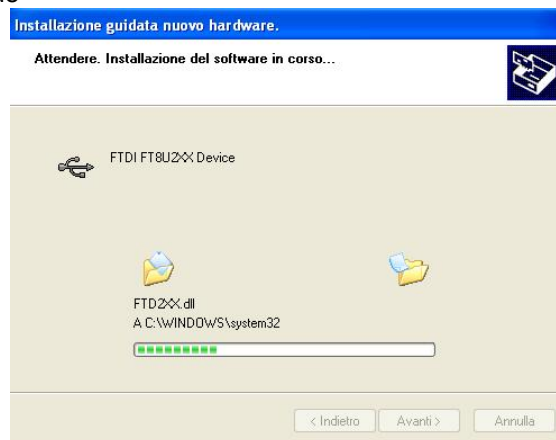
You can find the folders in the following path:
C:\Programmi\NardaSafety\EHP-TS, select it and click “OK”



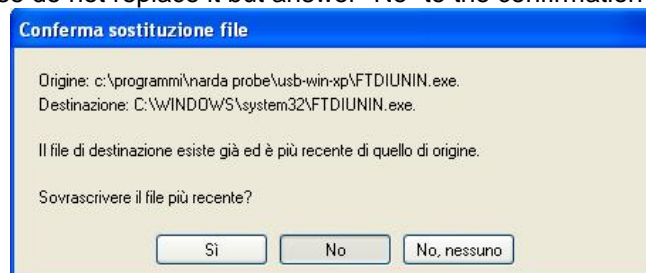
Click “next” to start installation.




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.8.

4.2 Hardware installation

Connect the USB-OC supplied with EHP-200/A to a USB port of the PC, and the optic fiber cable to the EHP-200/A. 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-200/A link with USB-OC




Fig. 4-3 EHP-200/A link with 8053-OC




EHP-200/A 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-200/A 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

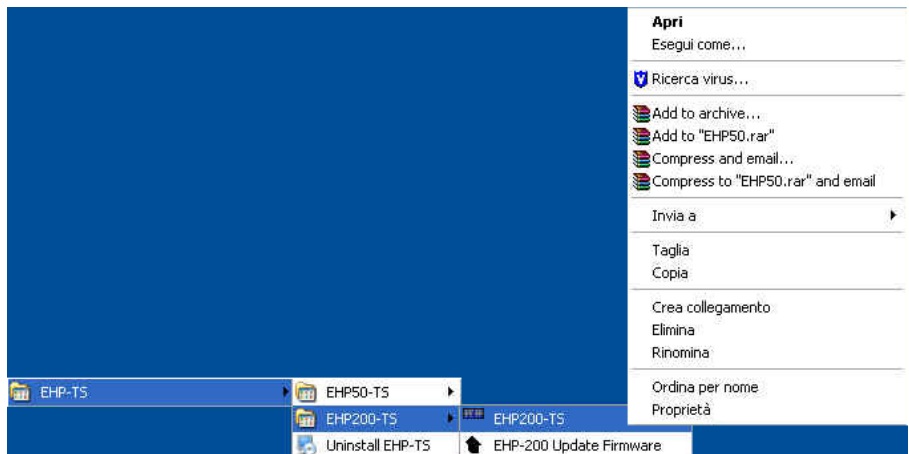
The energy available on the DB9 connector of some PC model could be not sufficient to guarantee a good link with 80 meter fibre.

 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, is necessary use 8053-OC-PS between the converter and PC. (for more information see Accessories).

Whenever a port is tied up by a device which is not active or turned off at that time, the program recognises it as free and will therefore attempt to connect EHP-200/A 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 EHP200/A 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.

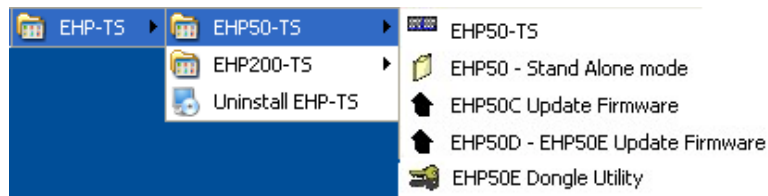
 NOTE

EHP-200/A must be ON before running EHP-200 control software. EHP-200/A may not be correctly recognized if switched ON when the control software is already running.

5 – EHP-TS software description

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-50C/D/E 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-50C analyzer is connected to PC

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

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

The **EHP-200** section includes two applications:



EHP200-TS: this program is used to perform live Spectrum analysis measurements when an EHP-200/A analyzer is connected to PC

EHP-200 Update Firmware: this is a tool to update EHP-200/A firmware

This document describes applications for EHP-200/A 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.

5.2 EHP200-TS Application

This chapter describes controls and function provided by EHP200-TS application for spectrum analysis included in EHP-TS software package. Connect EHP-200/A 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 EHP200-TS application.



After the welcome screenshot appears for few seconds the program main window will be shown:

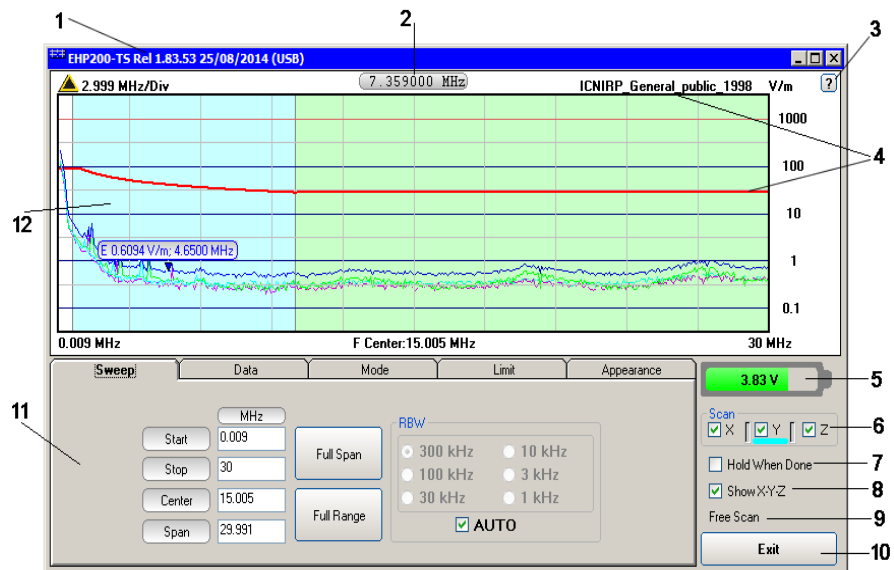


Fig.5-1 EHP200 EHP-TS Main Window

Description:

- 1 – EHP200 software release (communication port)
- 2 – Shows frequency while scanning
- 3 - Click “?” to display Serial Number, EHP-50C analyzer **Firmware** release and Date of calibration of EHP-200/A analyzer.
- 4 – name and trace of selected Limit
- 5 – EHP-200/A analyzer battery status
- 6 – **Scan** activation for each axis (default setting: all axis activated)
- 7 – **Hold When Done**: stops scan 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 – **Exit** button to terminate application
- 11 – Control panel
- 12 – Display for spectrum analysis

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

Sweep: to set sweep parameter and Resolution Bandwidth

Data: to display measurement results and save data

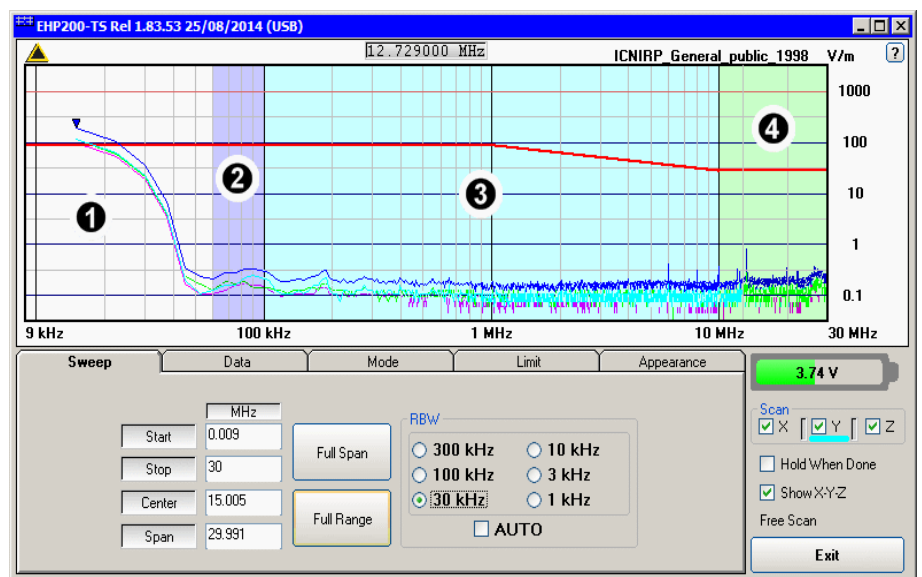
Mode: to set different operating modes

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.

5.2.2 Plot ranges colours



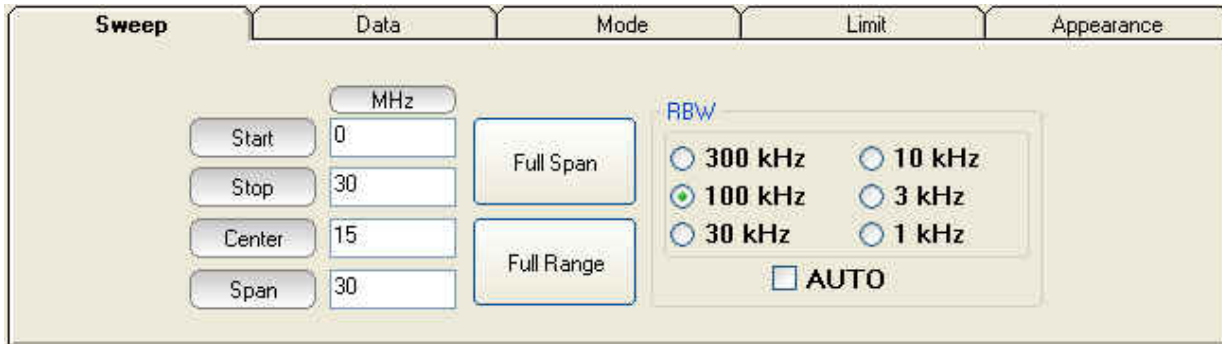
As it is visible in the picture above, when a three axial measurement is selected, together with an active limit, the plot area is divided into up to 4 zones, of different colours.

The first (#1, white in the example) is the range affected by the DC offset and so it is not taken into account for the measurement result.

The other three areas become coloured when the measurement is completed and ready. So at least three sweeps are needed to light up the coloured zones. In the example, one of the ICNIRP limits is active.

The third zone (#3, cyan in the example) refers to the linear range of the limit and the fourth zone (#4, green in the example) refers to the quadratic range of the limit.

5.3 Sweep section



EHP-200/A does not include an FFT analyzer but a powerful receiver in the 9kHz – 30MHz frequency range. The sweep section includes the following controls:

Start, Stop, Center, Span: to easily set, as in any spectrum analyzer, the frequency sweep parameters.

Full Span button: to quickly set the frequency sweep parameters from 0Hz to 30MHz.

Even if in this condition the graphical representation includes frequencies below the minimum operating range (9kHz), it shows round values on each division of the vertical grid.

Full Range button: to quickly set the frequency sweep parameters from 9kHz to 30MHz (full frequency range)

RBW: six different settings for the Resolution Bandwidth filter. This setting affects the sweep time (the higher RBW, the faster sweep) and frequency resolution (Lower RBW shows more details in the frequency axis)

When the RBW is set to **Coupled** the filter width is set automatically depending on the sweep setting

Depending on the **Sweep – Start** setting, the RBW filter should be set as narrow as enough to avoid the spectrum analyzer 0Hz signal to be included in the displayed spectrum when an integration over the frequency range has to be performed.

NOTE

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

5.4 Data section

Sweep	Data	Mode	Limit	Appearance																				
	<table border="1"> <tr> <td></td> <td>V/m</td> <td>MHz</td> <td>%</td> </tr> <tr> <td>Highest Peak</td> <td>207.76</td> <td>0.0750</td> <td>100.0</td> </tr> <tr> <td>Marker</td> <td>207.76</td> <td>0.0750</td> <td>100.0</td> </tr> <tr> <td>Delta</td> <td>0.0000</td> <td>0.0000</td> <td></td> </tr> <tr> <td>WideBand</td> <td>208.08</td> <td colspan="2">29.9910 bandwidth</td> </tr> </table>		V/m	MHz	%	Highest Peak	207.76	0.0750	100.0	Marker	207.76	0.0750	100.0	Delta	0.0000	0.0000		WideBand	208.08	29.9910 bandwidth		Marker <input checked="" type="radio"/> Total <input type="radio"/> X <input type="radio"/> Y <input type="radio"/> Z <input type="checkbox"/> Limit	Save <input type="button" value="Save as bitmap"/> <input type="button" value="Copy to clipboard"/> <input type="button" value="Save as text"/> <input type="checkbox"/> Auto save text	Waterfall <input type="button" value="Start Waterfall"/> <input type="button" value="Open Waterfall"/>
	V/m	MHz	%																					
Highest Peak	207.76	0.0750	100.0																					
Marker	207.76	0.0750	100.0																					
Delta	0.0000	0.0000																						
WideBand	208.08	29.9910 bandwidth																						
	<table border="1"> <tr> <td>Σ</td> <td>ICNIRP 1998 COMPLIANT:22.195 %</td> <td>Σ^2</td> <td>ICNIRP 1998 COMPLIANT:1.855 %</td> </tr> </table>	Σ	ICNIRP 1998 COMPLIANT:22.195 %	Σ^2	ICNIRP 1998 COMPLIANT:1.855 %	<input type="button" value="Highest Peak"/> <input type="button" value="Next Peak"/> <input type="button" value="Previous Peak"/> <input type="button" value="Marker Center"/>																		
Σ	ICNIRP 1998 COMPLIANT:22.195 %	Σ^2	ICNIRP 1998 COMPLIANT:1.855 %																					

Measurement result: the following values are showed 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

When a limit is selected and activated the its compliance situation to the linear and quadratic ranges is shown in the two left bottom boxes.

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 (expressed in dB) and frequency (Hz) between Highest Peak and Marker

WideBand: integration over the displayed frequency band

Showned parameters:

Field strength in the selected unit calculated over

Bandwidth (Hz)

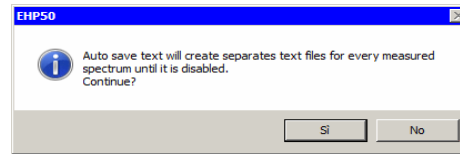
Marker: in this area you can select on which trace to place the Marker: specific axis (X,Y,Z) or Total result. Traces of single axis can be displayed or not according to **Show X-Y-Z** command.

Three buttons in this area to easily position marker over peaks, a dedicated button, **Marker Center**, to change automatically sweep parameters in order to obtain, as center frequency, the actual marker position.

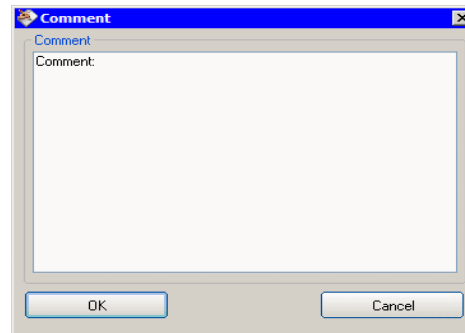
If activated, **Limit** checkbox allows displaying of the Limit value corresponding to the Marker frequency.

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.

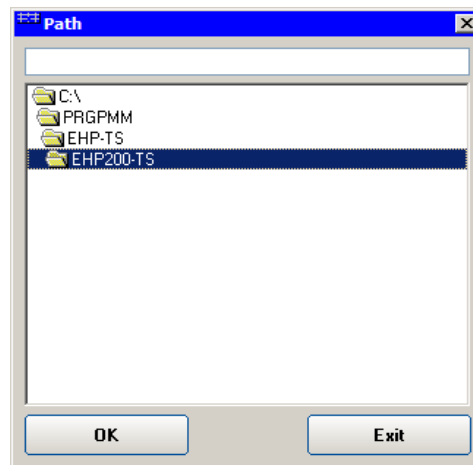
Auto save text: it is a functionality provided to automatically save a text file containing the measurements data and information.



It is also possible to insert a comment.



The user can select the path where the files will be stored.



The saved files will be structured as following:

Folder Structure	Nome	Ultima modifica
EHP200-TS		
2014		
08		
27	12_20_13_20.TXT	27/08/2014 12:20
	12_20_15_92.TXT	27/08/2014 12:20
	12_20_19_00.TXT	27/08/2014 12:20
	12_20_21_72.TXT	27/08/2014 12:20
	12_20_24_43.TXT	27/08/2014 12:20
	12_20_27_14.TXT	27/08/2014 12:20

Under the selected folder (EHP200-TS in the example) a folder will be created and called like the current year (ex. 2014). Inside this folder, another one will be created and called like the current month (ex. 08, that is to say August). Again inside a folder will be created for each day of saving (ex. 27). The measurements will be in this last folder and their names will be in the format *hh_mm_ss_cc.TXT*

EHP200-TS Spectrum 27/08/14 12:22 Narda Safety Test Solutions
 RBW: 300 kHz Span: 29.991MHz
 wideBand: 207.64 v/m (0.0750 - 30.0000) MHz
 Square index: 238.67 % (0.0750 - 30.0000) MHz
 Highest Peak 207.64 v/m @ 0.0750 MHz
 Induced current density and electrical stimulation effects
 ICNIRP 1998 COMPLIANT:21.831 % (0.6000 - 9.9750) MHz
 Thermal considerations:
 ICNIRP 1998 COMPLIANT:1.75 % (0.6000 - 30.0000) MHz
 Acquisition: Free Scan
 Limit: ICNIRP_General_public_1998

Freq MHz	Total V/m	X V/m	Y V/m	Z V/m	Limit V/m
0.0750	207.64	124.20	126.98	107.54	87.000
0.1500	158.89	92.640	98.718	83.187	87.000
0.2250	96.956	56.671	60.031	50.843	87.000
0.3000	43.293	25.015	26.984	22.812	87.000
0.3750	15.852	9.2344	10.375	7.6406	87.000
0.4500	16.022	5.9063	7.1563	13.062	87.000
0.5250	16.373	14.812	5.8750	3.7656	87.000
0.6000	7.1809	4.0938	4.8281	3.3906	87.000

Auto save text extract example

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

5.4.1 Waterfall

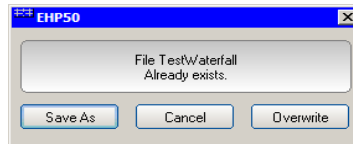
In addition to the spectrum view, another representation has been introduced in the software, commonly called Waterfall.

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.

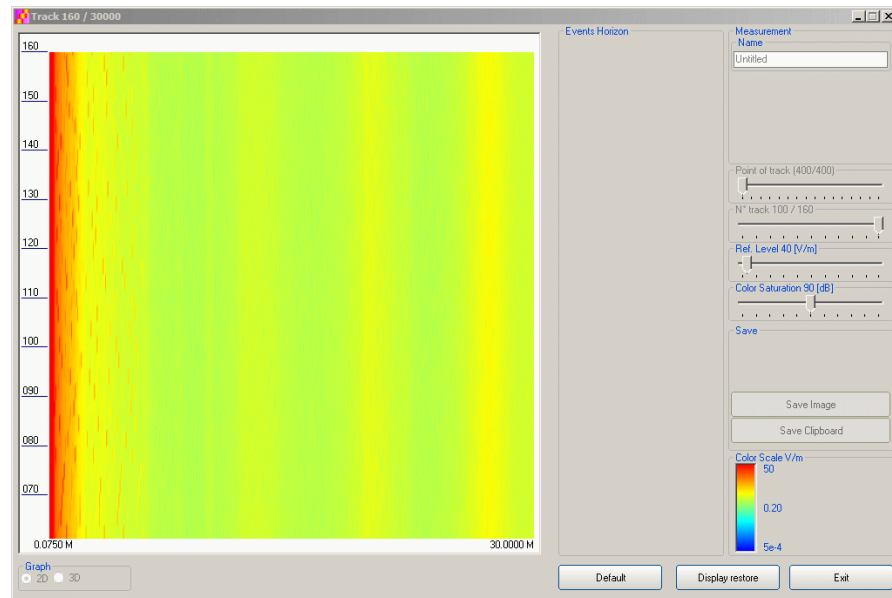


Fig.5-2 Waterfall - Graph 2D

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:

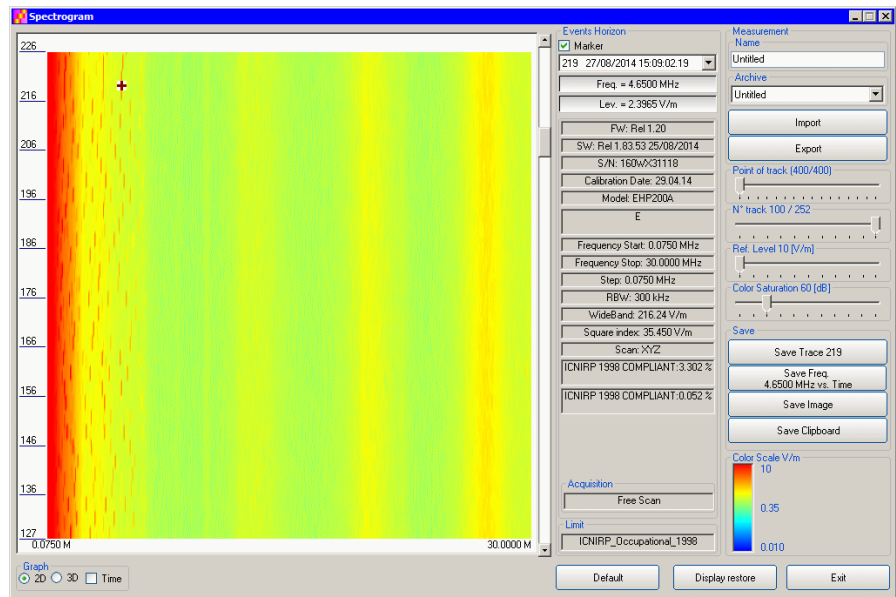


Fig.5-3 Waterfall Main Window

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

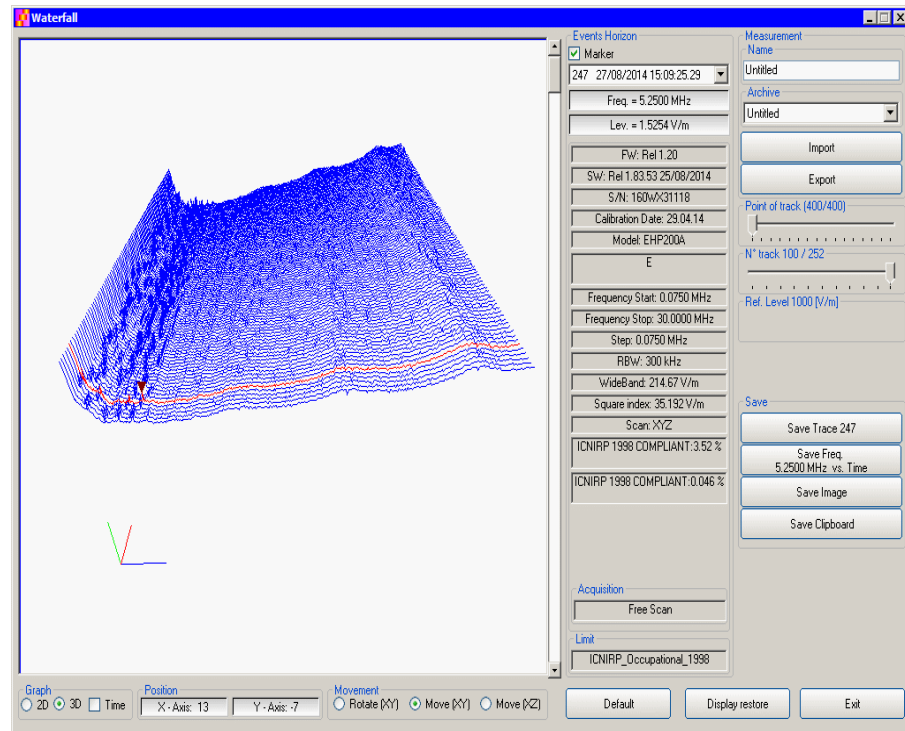


Fig.5-4 Waterfall - Graph 3D

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.

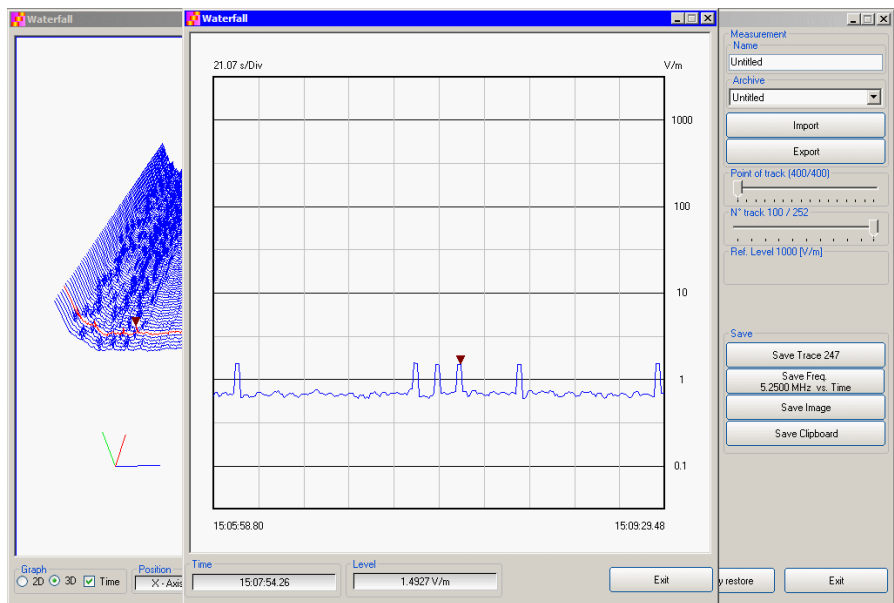
For this mode, another box, called **Movement**, will appear. Selecting the appropriate functions, you can move, rotate or zoom the view to your liking, using the mouse.

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

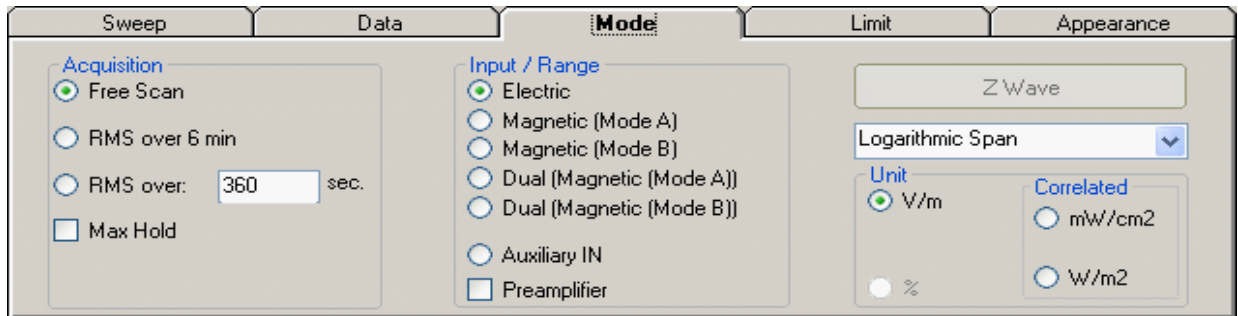
The subsequent spectra are automatically recorded and saved in a single file *.WF2 localized in the folder Waterfall in the program root, inclusive of all the analyzer settings.

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



Acquisition: spectrum is displayed in different acquisition modes.

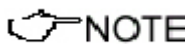
Free Scan: instantaneous values are showed.

RMS over 6 min: square averaging calculated over 6 minutes time period as requested by several regulation for high frequency field measurement.

RMS over: square averaging calculated over the specified time period (sec) is showed.

Max Hold: the maximum field strength value of each frequency step is retained and displayed since the Max Hold function has been activated.

Input/Range: to select electric field, magnetic field in two different ranges, auxiliary input (50 Ohm input connector) and dual field mode in two different ranges.

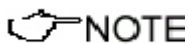


Move the mouse cursor over “Magnetic” to display frequency range and level range of “Mode A” and “Mode B”.

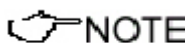
Preamplifier: for best sensitivity when activated (vertical range changes accordingly).

Linear Span or Logarithmic Span: this is used to select the linear or logarithmic frequency scale.

Unit: to select unit according to the Input setting. Unless a **Dual** mode has been selected, Power density units are correlated ones assuming measurement to be performed in far field condition.

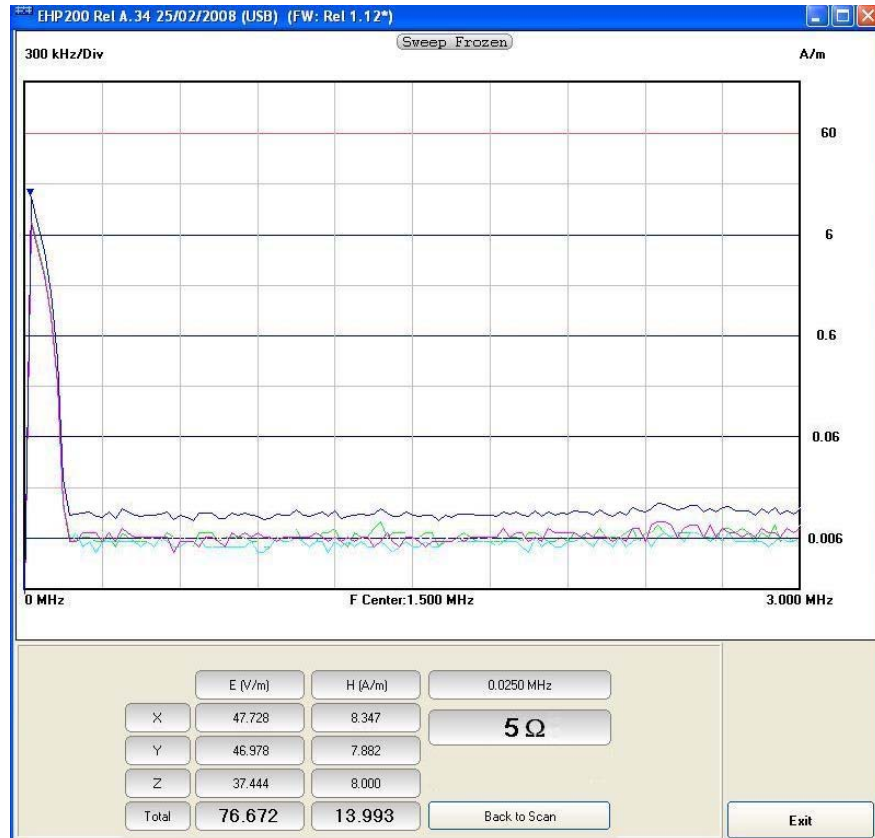


Power density units in Dual mode are calculated from both electric and magnetic field measurements (no correlated units included in the calculation) and therefore valid in both far field and near field condition.



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.


Z wave button: it can be selected only after complete scan in Hold When Done mode. The selected input must be Magnetic (mode A or B). When selected, the Zwave button shows the following display.



It represents the 3 axis and total E and H field strength at the marker frequency.

The marker frequency is displayed in the upper position of the right column (0.0250 MHz in the previous picture).

The wave impedance (in this case 5 Ohm) is the ratio between Electric and Magnetic field at the marker frequency. It is used for evaluations in near field condition.

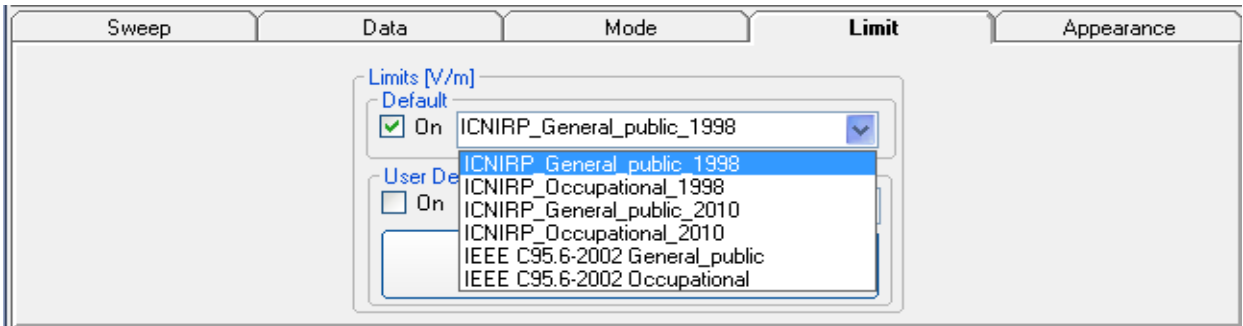
 NOTE

To prevent measurement errors the wave impedance is obtained by the ratio $\frac{|E|}{|H|}$ at frequencies where both the fields are at least 10dB above the noise floor of the instrument.

Back to Scan button: to close the wave impedance display and switching back to the control panel.

5.6 Limit section

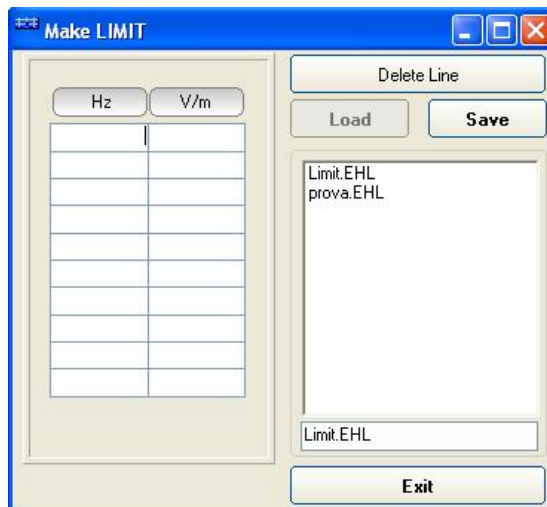
Limit section allows the user to select standard ICNIRP and IEEE limits, already included by the software installation, as well as user's limits which can be created through the "Make Limit" function provided by this section.



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 or correlated 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.

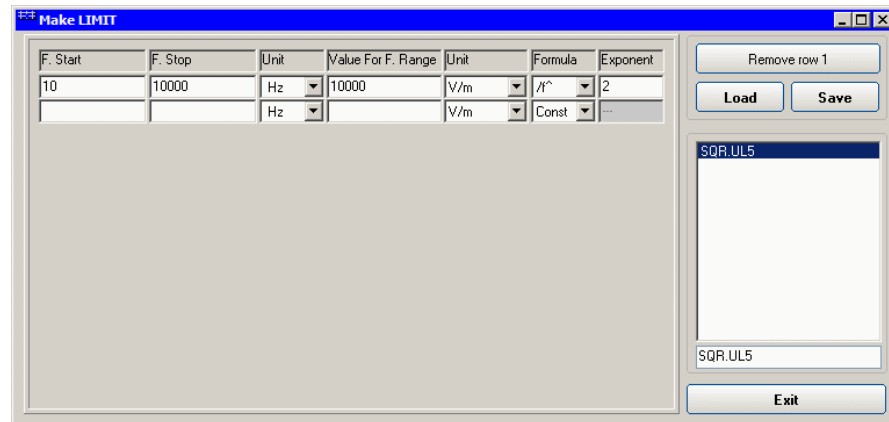


Type frequency and field strength for each point of the required limit and click save to save it under the program directory. The limit file will be created as a linear interpolation between specified points.

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.

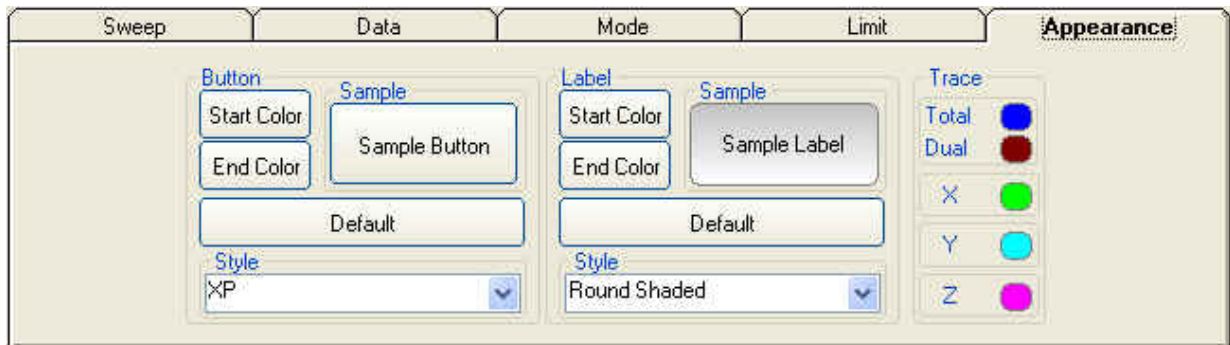
Type in the Start and Stop frequencies in the appropriate boxes, and choose the right Unit.

Introduce the strength Value and choose its Unit.

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

Click Save to save the limit under the program directory. The limit curve 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 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-50C/D/E 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 definable 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.

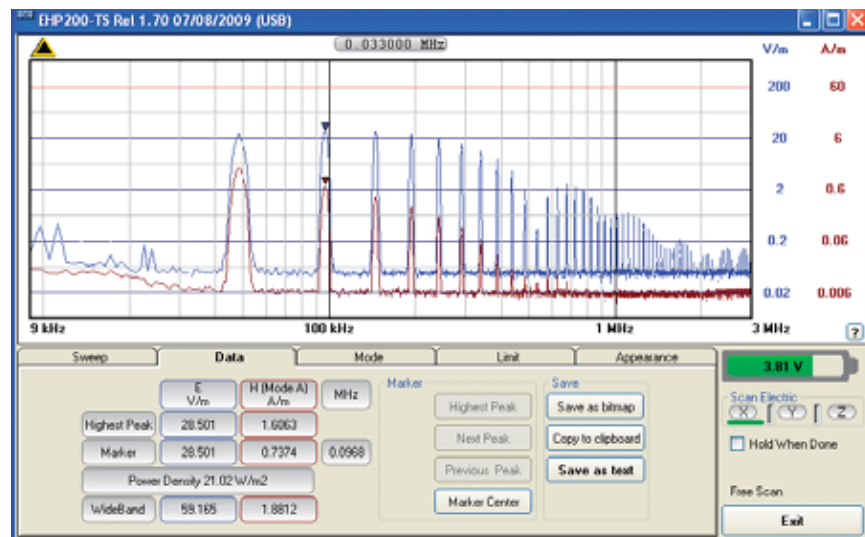


Fig.5-5 Both electric and magnetic fields can be displayed on the same graph.

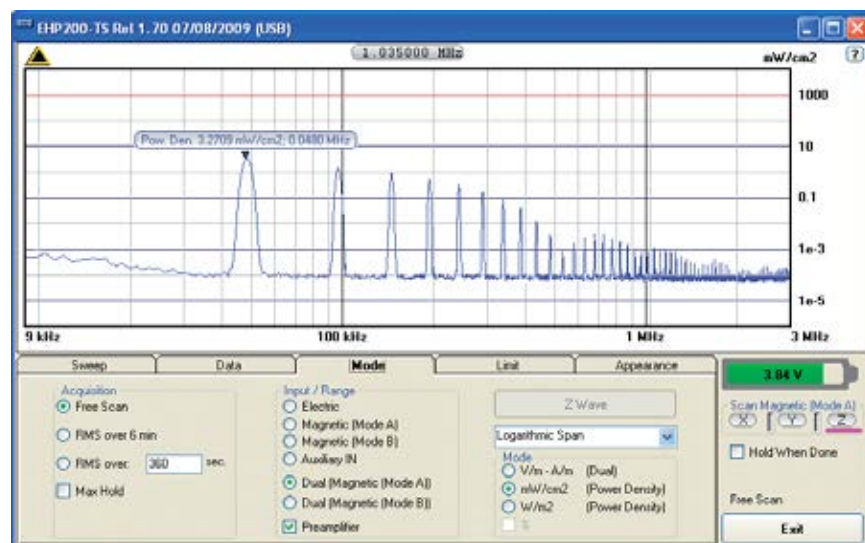


Fig.5-6 Power density spectrum is calculated over real electric and magnetic field measurement and therefore applicable to both far and near field conditions.

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

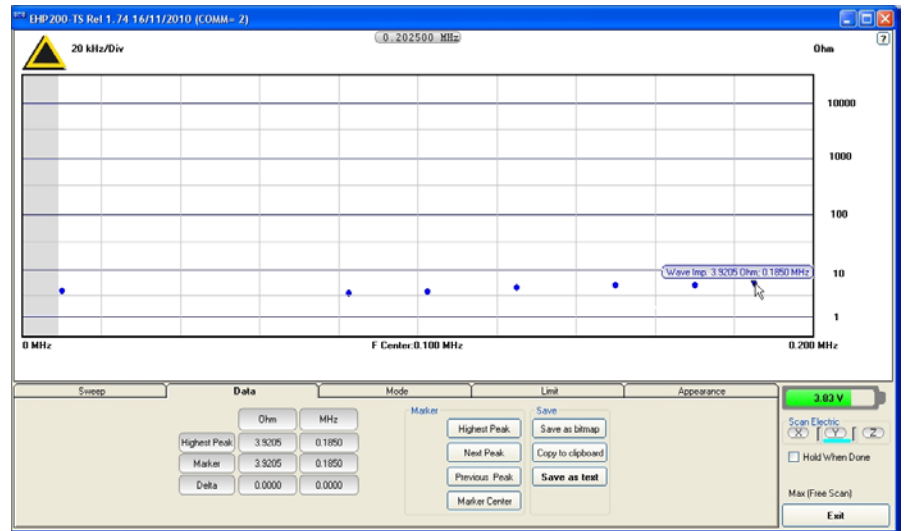
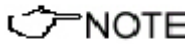


Fig.5-7 New wave impedance function



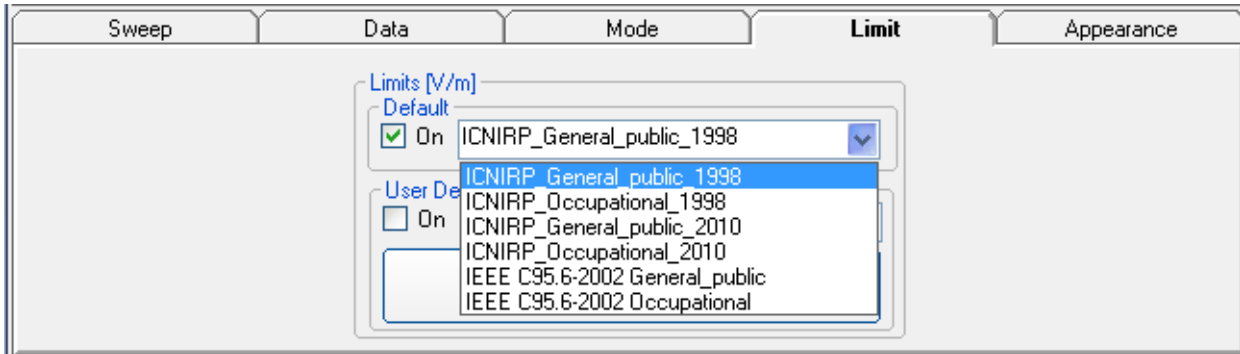
To prevent measurement errors the wave impedance is obtained by the ratio $|E|/|H|$ at frequencies where both the fields are at least 10dB above the noise floor of the instrument.

5.9 ICNIRP

One of the purposes of the **International Commission on Non-Ionizing Radiation Protection** is to establish guidelines for limiting EMF exposure that could affect human health.

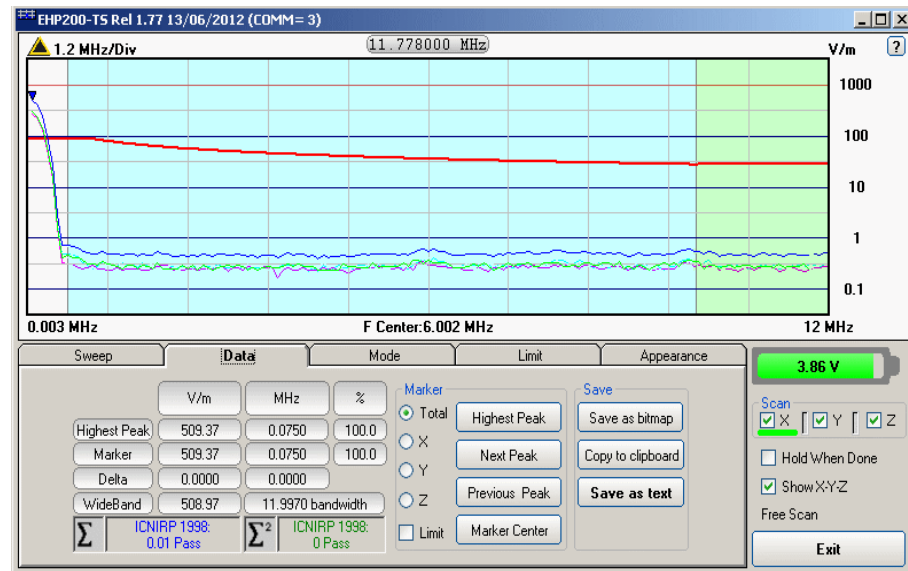
In the context analyzed here, the focus was oriented to the time-varying ElectroMagnetic Fields.

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



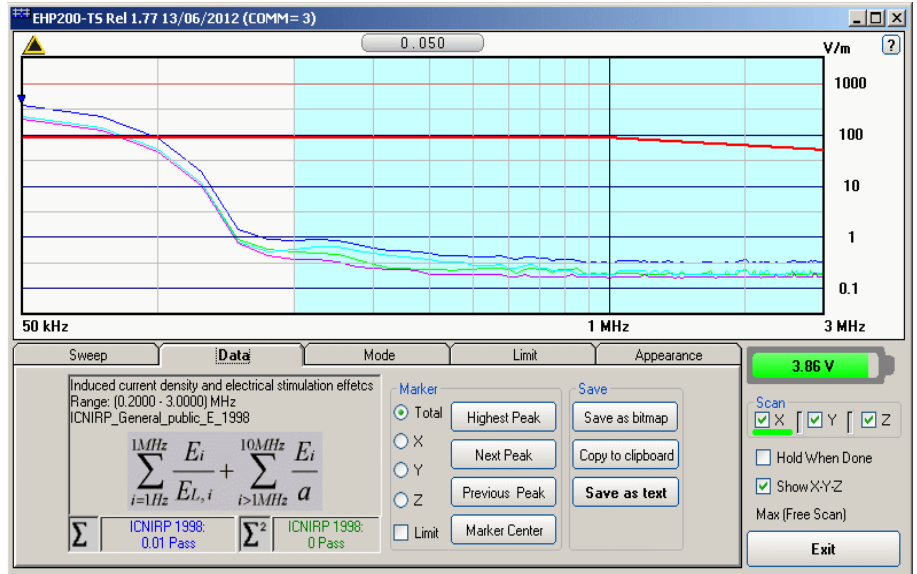
NOTE

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.

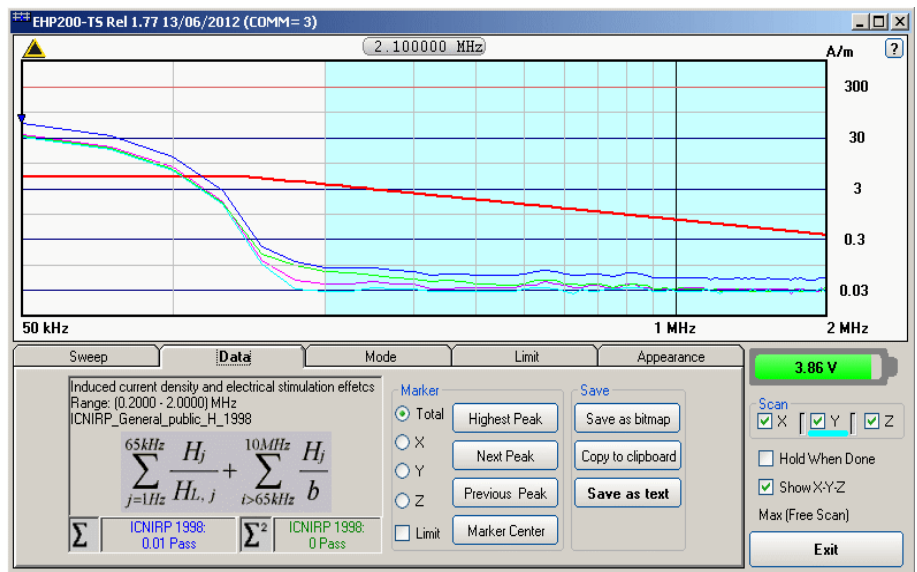


NOTE

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.

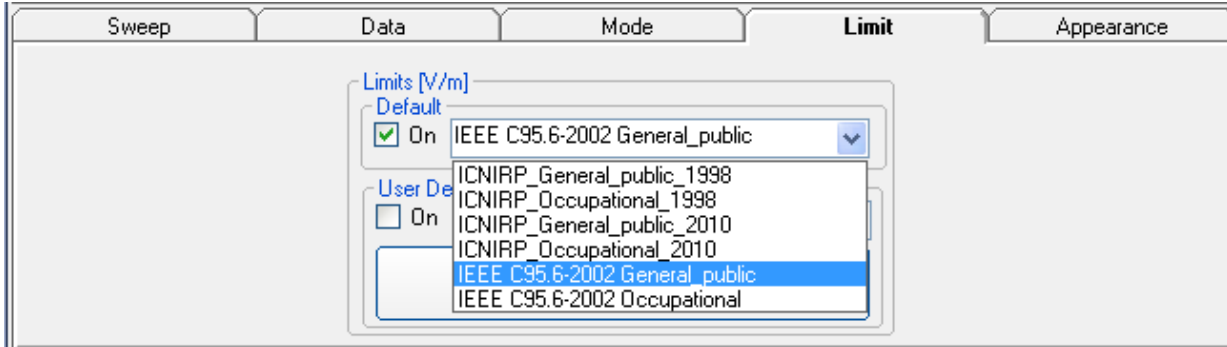
 NOTE


The limit cannot be activated when using Dual Mode.

5.10 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.

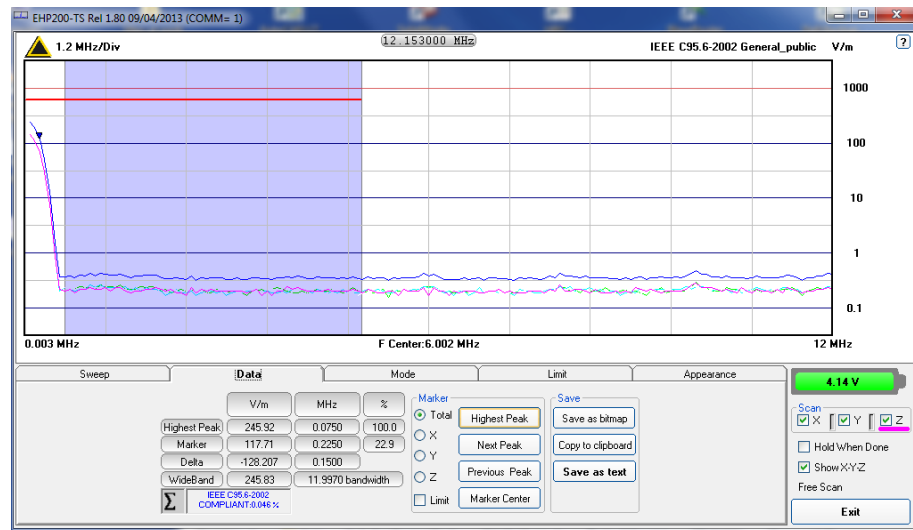



 **NOTE**

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.

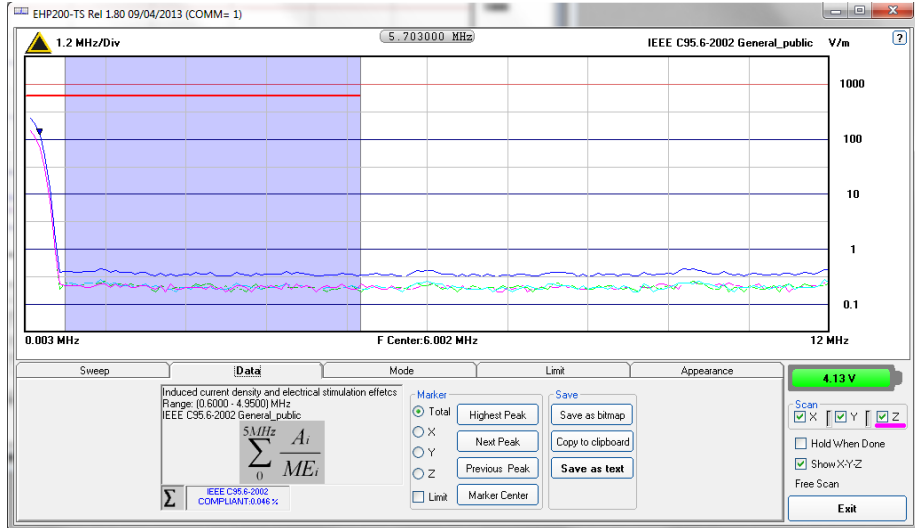
 **NOTE**

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.

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6 – Update Firmware

6.1 Update firmware

The EHP-200/A 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.

6.2 To run the update software

Turn off the EHP-200/A and connect it to a free USB or RS232 port of the PC.

Run **EHP-200 Update Firmware** to start the update program.



6.3 To transfer data

Main window displayed after the updating program **EHP-200 Update Firmware** has been run:



Fig.6-1 EHP-200 Upgrading Utility Main Window

Select USB or RS232 communication port.

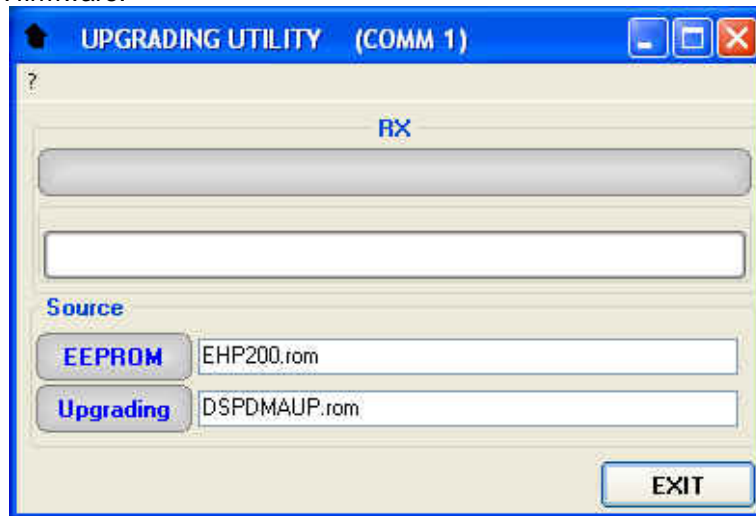
Before selecting RS232 port, choose the COM port used.

NOTE

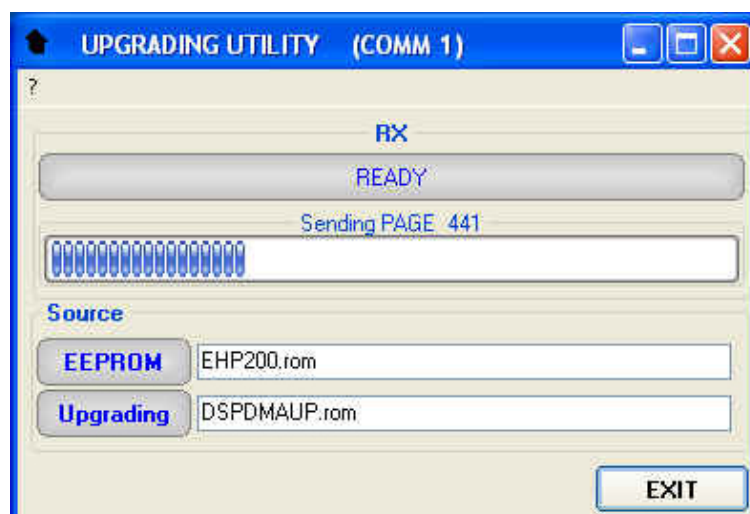
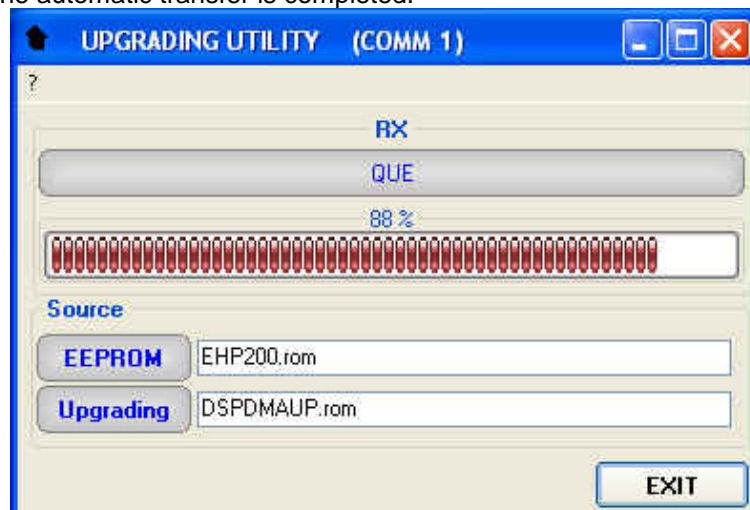
In case the software doesn't detect any EHP-200/A in the USB port, the following message will be displayed.



As soon the connection is established, the program is ready to update EHP-200/A firmware.



To start the process simply switch EHP-200/A on 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-200/A **OFF** (it seems already OFF but it is not) and turn it **ON** again.

The EHP-200/A is now updated with the new version of the internal firmware.

It is now possible to disconnect the cable connected to the PC, with the EHP-200/A meter either switched on or off.

Subsequently, when the meter is switched on again, the new version of the firmware will be displayed in the 8053 DISPLAY or EHP200-TS Software.

 **NOTE**

To obtain firmware or programs updates for EHP-200/A, please contact your NARDA distributor or download it directly from the NARDA Web site: www.narda-sts.it

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7 – Uninstalling Software

7.1 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.

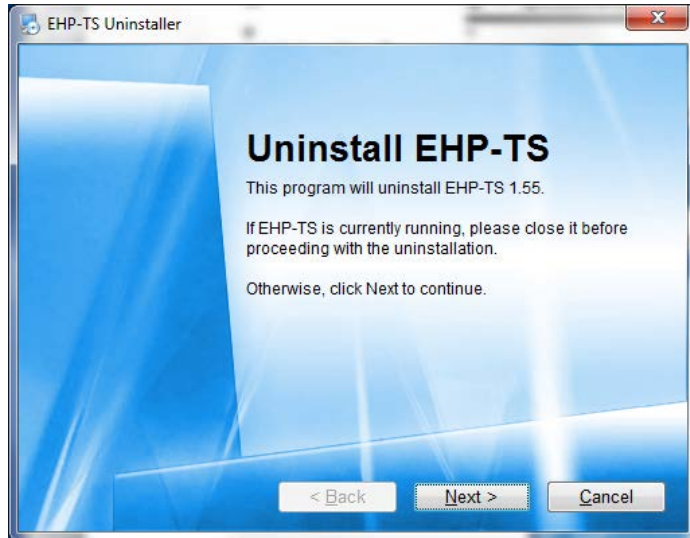
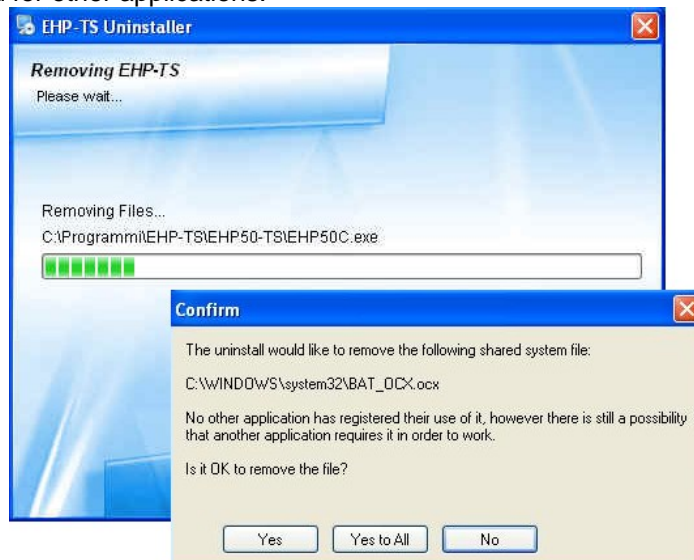


Fig.7-1 Uninstalling EHP-TS

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

8 – Uninstalling USB-OC

8.1 Uninstalling driver for USB-OC

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

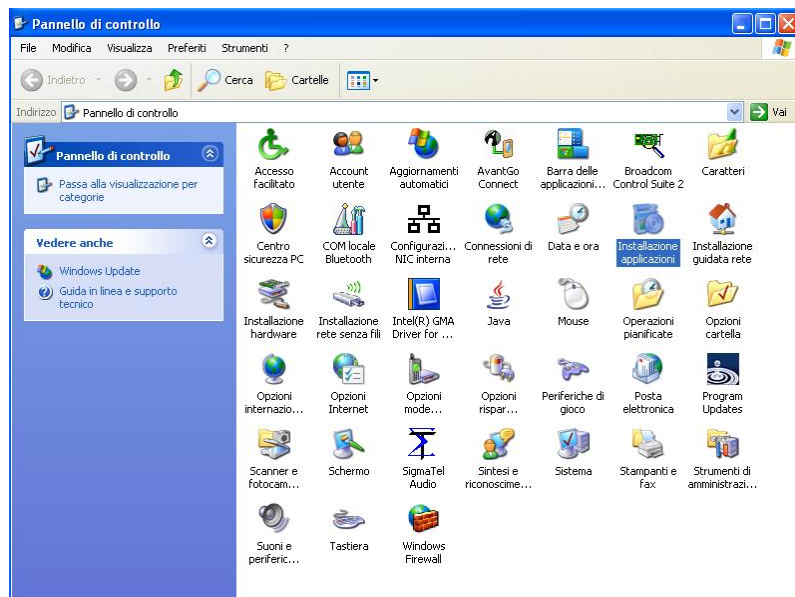
Open the Windows Control Panel.

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.



Double click “Application Installation”.



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

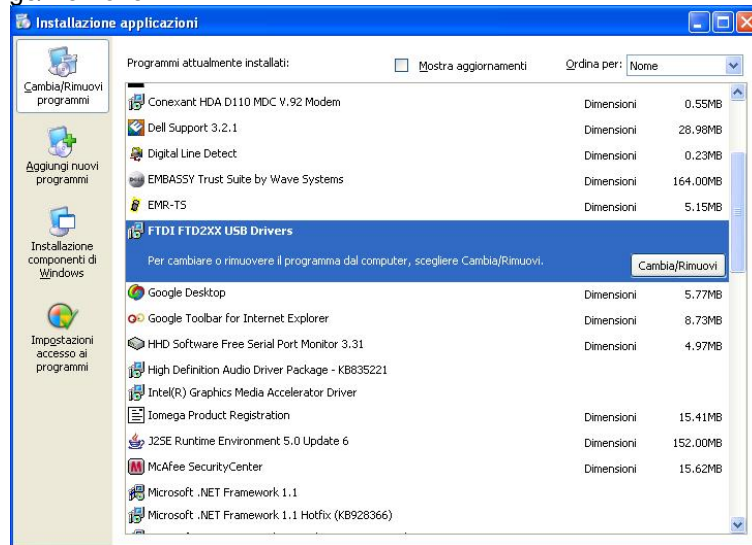
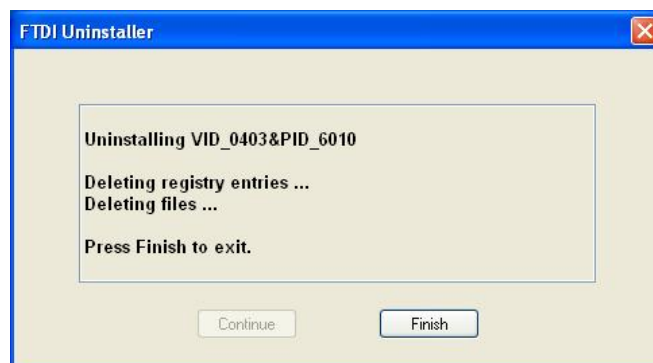


Fig.8-1 Uninstalling USB-OC

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



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

9 - Accessories

9.1 Introduction

This section provides the information required for installing and using the accessories of the EHP-200/A 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.

9.1.1 Preliminary inspection

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 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.

9.1.2 Work environment

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

- Temperature From -10°C to +50° C
- 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 -20°C to + 70° C
- Humidity < 95% relative

9.1.3 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.

9.1.4 Cleaning

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



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

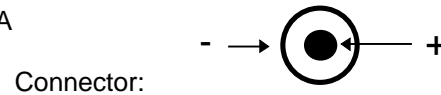
9.1.5 Power supply and battery chargers

All the accessories of EHP-200/A have a power system, which is autonomous from the mains and is supplied by either internal rechargeable batteries or directly from other devices to which they are connected. The accessories use the same battery charger supplied with the meter. The 8053-BC battery charger can be used with a power frequency at either 50 Hz or 60 Hz with a supply voltage between 100 and 240 AC Volt. It can be supplied with different connectors to the supply mains in accordance with the various national standards. The connector to the mains supply is fitted to the battery charger, to substitute it just disconnect it and fit the new connector. To have the greatest autonomy, a full recharging cycle should be carried out before using the Accessories.

NOTE

ALWAYS connect the battery charger to the power supply BEFORE connecting to the Charge input of the Accessories. The battery charger has an internal protective circuit that will break the output of current if there is a charge in output when connecting to the mains.

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



NOTE

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.

NOTE

Updates of the software and firmware of the Accessories can be downloaded from the Web site <http://narda-sts.it> or requested directly from NARDA Sales Centres.

9.2

USB-OC Optical USB Converter

9.2.1 Introduction



USB-OC is an standard accessory of the EHP-200/A 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-50C Electric and Magnetic Field Analyzers
- EHP-200 Electric and Magnetic Field Analyzers
- EHP-200A Electric and Magnetic Field Analyzers
- 8053-GPS Global Positioning System

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>

9.2.2 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 9-1 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. 9-1 USB-OC adapters

Power supply

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

9.3

8053-OC Optical RS232 Converter

9.3.1 Introduction



8053-OC is an optional accessory of the EHP-200/A 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-50C Electric and Magnetic Field Analyzers
- EHP-200 Electric and Magnetic Field Analyzers
- EHP-200A Electric and Magnetic Field Analyzers
- 8053-GPS Global Positioning System

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>

9.3.2 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 9-2 Technical specifications of the 8053-OC Serial Optical Converter

Max. length of the fiber optic	80 m
RS 232 Connector	9 pin DB9



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



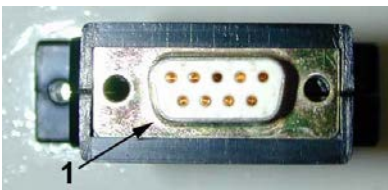
The energy available on the DB9 connector of some PC model could be not sufficient to guarantee a link with 8053-OC. In this case, is necessary use 8053-OC-PS between the converter and PC.



Front panel

Key:

1 – Fiber optic connector



Rear panel

Key:

1 - RS232 female DB9 connector

Fig. 9-2 8053-OC Panels

Power supply

8053-OC is powered directly from the serial port of the PC.

9.4

8053-OC-PS Power Supply

9.4.1 Introduction

8053-OC-PS is an optional accessory of the EHP-200/A 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.

9.4.2 Installation

Insert 8053-OC-PS in the connector of a free serial port of the PC or serial cable and connect the 8053-OC to 8053-OC-PS. To supply the 8053-OC-PS with 230Vac - 9Vdc Wall Adapter. Connect the fiber optic coming from the probe or other Accessories to 8053-OC.

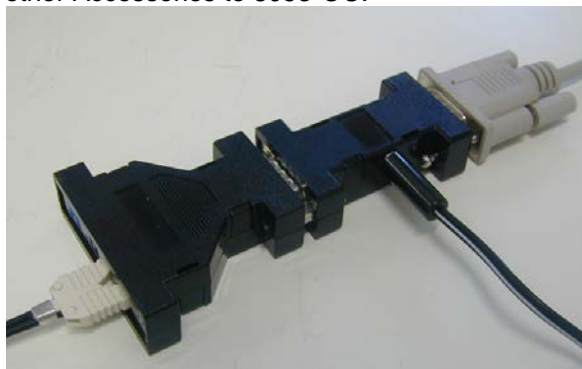


Table 9-3 Technical specifications of the 8053-OC-PS Power Supply	
RS 232 Connectors	9 pin DB9



Front panel

RS232 male DB9 connector



Rear panel

RS232 female DB9 connector



Side panel

Supply male connector

Fig. 9-3 8053-OC-PS Connectors

Power supply

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

9.5

8053 Display

9.5.1 Introduction

8053 DISPLAY is an Optional accessory of the EHP-200/A Analyzer. 8053 DISPLAY is a versatile and expandable test system suitable for measuring electric and magnetic fields relating to electrosmog. The system consists of various electric and magnetic field probes and of a compact and portable meter equipped with a wide LCD display, 4 simple function keys (which allow different actions and settings, in accordance with the selected menu), internal rechargeable batteries and RS232 and fiber optic interfaces. The system also has a wide range of Accessories, which have been designed for all the needs of the tests.

9.5.2 Standard accessories

The standard accessories included with 8053 DISPLAY are:

- Soft Carrying Case;
- Serial Cable (1.5m long);
- Battery Charger;
- Downloading & firmware update Program Disk;
- 8053SW-02 Data acquisition software
- User's Manual;
- Calibration Certificate;
- Return for Repair Form.

9.5.3 Optional accessories

The following accessories may be ordered separately:

- FO-8053/10 Fiber Optic Cable (10m);
- FO-8053/20 Fiber Optic Cable (20m);
- FO-8053/40 Fiber Optic Cable (40m);
- FO-8053/80 Fiber Optic Cable (80m);
- FO-10USB Fiber Optic Cable (10m);
- FO-20USB Fiber Optic Cable (20m);
- FO-40USB Fiber Optic Cable (40m);
- TR-02A Tripod with Swivel;
- TT-01 Fiber Glass Telescopic Support;
- SB-04 Switching Control Box;
- 8053-CC Rigid Carrying Case;
- 8053-CA Car Adapter;
- 8053-BC Additional Battery Charger;
- 8053-OC Optical Converter;
- USB-OC Optical Converter;
- 8053-GPS GPS Unit;
- 8053-RT Remote Trigger;

NOTE

To allow a correct support of the EHP200 and EHP200A new features it is essential the 8053 runs the latest internal firmware revision. The release should be the 3.16 or higher.

NOTE

To obtain firmware or programs updates for 8053 and EHP-200/A, please contact your NARDA distributor or download it directly from the NARDA Web site: www.narda-sts.it

9.5.4 Main specifications

Table 1-1 lists the specifications of 8053 DISPLAY. The specifications of all accessories are listed in the Chapter on Accessories.
 The following conditions apply to all specifications:

- Temperature for use must be between -10°C and +40°C.

TABLE 9-4 Technical Specifications of 8053 DISPLAY

Frequency range	Depending on the probe
Dynamic range	>140 dB (depending on the probe)
Operating range	
Resolution	Depending on the probe (See Table 1-2)
Sensitivity	
Units	V/m, kV/m, μ W/cm ² , mW/cm ² , W/m ² , A/m, nT, μ T, mT;
LCD Display	
Field measured	X, Y, Z in absolute values, percent and total.
Time	Internal clock in real time
Probe	Display of the model and date of calibration
Graphic bar	The analog bar displays: - real time value with respect to full scale; - field versus time (in linear or logarithmic form) with automatic time scaling; - alarm threshold.
Measuring function	
Internal memory	Up to 32.700 measurements (up to 8.100 standard memory, up to 21.600 extended memory)
Alarm	Variable threshold from 0 to 100% of full scale. Internal sound and blinking symbol on the display when the level is greater than the alarm threshold
Functions	Minimum, Maximum and Averaging
Averaging mode	Arithmetic, quadratic (RMS), manual, rolling and spatial
Averaging time	Definable 30 sec, 1, 2, 3, 6, 10, 15, 30 min or manual
Data acquisition (Logger)	Sampling mode (1, 10-900 sec/sample), data change, over the limit, average on 6 min, manual, spectrum (with EHP-50C)
General specifications	
Output	LCD display 72x72mm 128x128 pixel, RS232 (with cable or fiber optic)
Input	Fiber optic connector
Internal battery	Rechargeable at NiMH (5 x 1.2 V)
Operational time	24 hours normal mode, 48 hours (in SAVE MODE function: display off)
Recharge time	< 4 hours (15 minutes charge for 1 hour of use)
External power supply	DC, 10 - 15 V, I = about 500 mA
Interfaces	RS232 (calibration and firmware update)
Software/Firmware	Upgrade available via Internet at the Web site: http://www.narda-sts.it
Autotest	Automatic during switch-on of all functions;
Calibration	Inside the built-in E ² PROM of the probe
Conformity	With Directives 89/336 and 73/23 and the amendments to them CEI 211-6 and 211-7
Operating temperature	From -10 to +40°C
Storage temperature	From -20 to +70°C
Size (WxHxD)	108 x 240 x 50 mm
Weight	1.07 kg
Tripod support	Threaded insert ¼"

9.5.5 Field probes

Beside EHP-200/A, other probes are available for using with 8053 DISPLAY as EHP-50C and other models to be launched in the near future.

TABLE 9-5 Series of Electric and Magnetic field probes

Field Probes	Frequency range	Level range	
		Electric field	Magnetic field
Electric and Magnetic Field Analyzer EHP50C	5 Hz ÷ 100 kHz	0.01 V/m – 100 kV/m	1 nT – 10 mT

9.5.6 Front panel

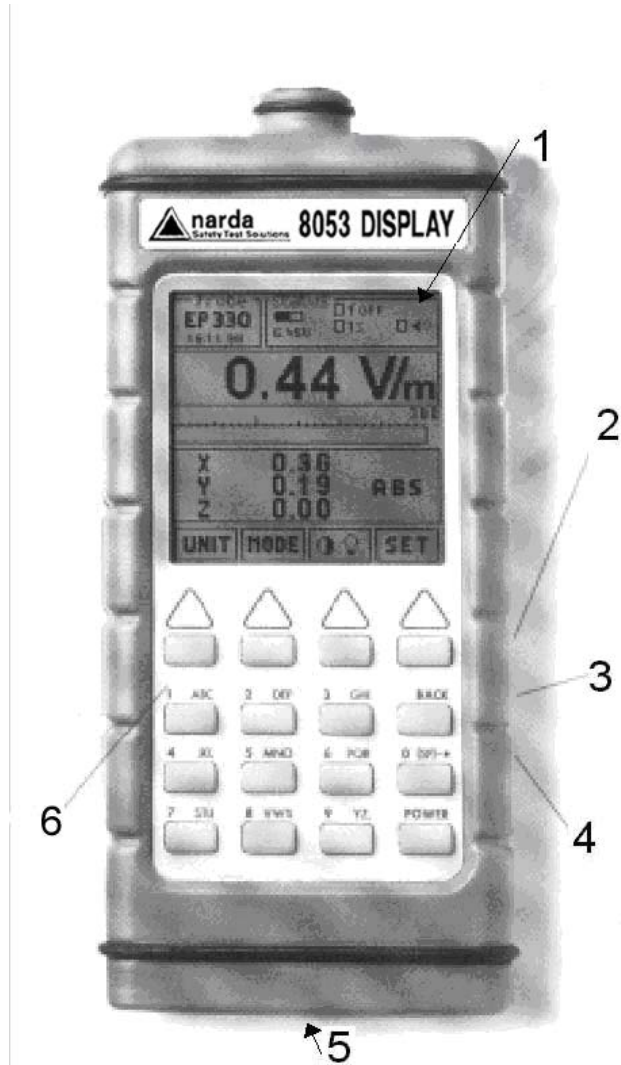


Fig. 9-4 Front panel

Key:

1. Display
2. Fiber optic Input/Output for additional probes, USB or RS232 interface via fiber optic link
3. RS232 interface
4. Battery charger input, from 10 to 15V DC, 500 mA
5. Securing screws to tripod
6. Alphanumeric keyboard

9.5.7 Side panel

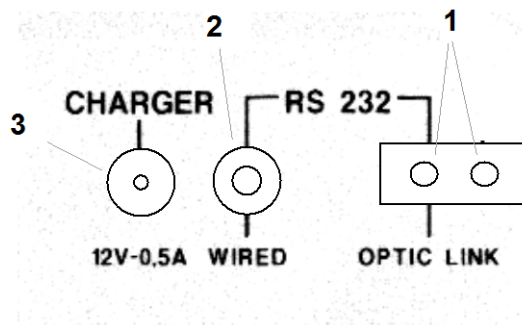


Fig. 9-5 Side panel

Key:

1. Connection EHP-50C or EHP200/A fiber optic link
2. Wired RS232 interface for direct connection to the PC
3. Battery charger connector (12V, 0.5A)

9.5.8 Battery charger The battery charger supplied with the meter can work at either 50 Hz or 60 Hz with a supply voltage range between 100 and 240 Volt. It is supplied with different connectors to the supply mains in accordance with the various national standards.

9.5.9 To substitute the mains connector To substitute the mains connector, simply remove the one installed on the battery charger and replace it with the one that is in compliance with its use.

9.5.10 To check the internal batteries If the internal batteries are to have the greatest autonomy, we recommend that a full recharging cycle be carried out before using the meter.

To do this, go through the following procedure:

- Connect the battery charger to the power socket
- Link the output connector of the battery charger to the input **CHARGER** on the side panel of the meter
- 8053 DISPLAY will switch on automatically, after making a sound produced by the internal buzzer, the display will be activated and the meter will start its auto-check and begin the procedure for recognising the probes.
- The main window will therefore be activated and the status of the charge (**CHG**) of the battery will be displayed in the **STATUS** box

Indications of the battery in the STATUS box:

The status of the charge of the battery is displayed in the top left-hand corner of the **STATUS** box. The symbol of a small battery will be filled up proportion to the status of the battery charge.

The battery charger will be automatically stopped when one of the following occurs and a small connector will be displayed relating to a letter indicating the end of the recharging cycle.

Display of the following letters means:

V – The voltage of the batteries has reached 1.45 V/element (7.25 total), and therefore the recharging cycle is complete.

H – The recharging cycles has lasted for more than 4 hours.

T – The temperature of the batteries, compared to the temperature stored after ten minutes recharging, has increased more than 10 °C, or the temperature of the battery has reached 65 °C.

When the recharging cycle is finished, the 8053 DISPLAY is ready for use.



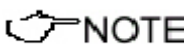
To avoid damage to the batteries, when the T symbol appears, the recharging cycle is stopped automatically.

To finish the recharging cycle wait for about ten minutes for the batteries to cool down then reconnect the battery charger.

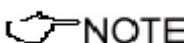
Battery charger: DC, 10 - 15 V, ~ 500 mA



Connector:



ALWAYS connect the battery charger to the mains power BEFORE connecting the DC output to 8053 DISPLAY. The battery charger has an internal protective circuit that will not let it work if there is a load connected to the battery charger before the connection to the mains is activated.



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.

9.6

TR-02A Tripod

9.6.1 Introduction



TR02A is an Optional Accessory of the EHP-200/A analyzer. It allows EHP-200/A Analyzer to be easily supported during field measurements. Each of these instruments has a securing screw, usually placed on the bottom part of its container, that enables it to be easily and quickly put into place through the 8053-SN swivel supplied with the tripod.

The design and materials of the TR-02A tripod have been specially selected to prevent it from disturbing the sensors and, therefore, the measurements taken.

The height of the tripod can be adjusted by means of its extendable legs and it is furnished with special feet that are able to adapt to all surfaces thereby improving stability. The height of its central support can also be adjusted.

It is supplied with a small protective carrybag to make it easy to carry.

Table 9-6 Technical specifications of the TR-02A Tripod

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

Details of the mounting head of the central column of the support and its adjustments:

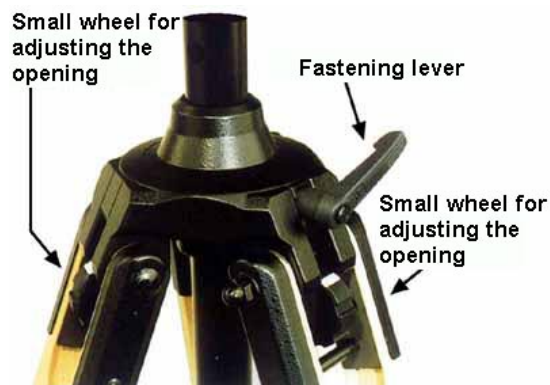


Fig. 9-6 TR-02A Tripod

The angle for opening each leg into three different positions can be adjusted by using special small adjustable wheels:

- fixed opening of 20°: White adjustment indicator is visible (as in the Figure);
- 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 the swivel for fastening to the **8053-SN**:

- full height: 8 cm
- weight: 160 g
- load capacity: 10 kg
- Threaded insert $\frac{1}{4}$ "

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



9.7

TT-01 Fiber Glass Telescopic Support

9.7.1 Introduction

TT-01 is an Optional Accessory of the EHP-200/A Analyzer. It allows EHP-200/A Analyzer to be easily supported during field measurements.

This device, on the top part of its container, has a screw to fix the relative apparatus.

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 9-7 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. 9-7 TT-01 Fiber Glass Telescopic Support

Other Accessories

Other Accessories are available on request with the EHP-200/A, such as: car adapter, 12 V battery charger and Internal AC Plug Adapter.



10 - Software command protocol

10.1 Introduction

EHP-200/A commands allow the user to set the analyzer and query for data through the serial communication interface.

Communication protocol is the following:

- Baud: 38400
- Parity: NONE
- Length: 8 bit
- Bit Stop: 1

To allow operation with 8053-Display accessory, EHP-200/A is automatically set in “Master” mode at power ON.

Measurement data are continuously sent over the communication port regardless of received commands.



Since this operating mode might be not useful when interfacing to other software, the command #00v* can be sent to the analyzer to turn it in “Slave” mode; while operating in Slave mode, EHP-200/A send answers to the received commands according to the communication protocol described below.

Sending the command (#00(g*)) the analyzer is turned in “Master” mode.

The EHP-200/A automatically turns off 30 minutes after receiving a command to save battery.

10.2 Input select commands

Name	Command	Description
AUX	"#00"+Chr(126)+"C"+Chr(7)+Chr(0)+"**"	Select Aux. input The answer is "C"<CR><LF> Example: "#00~C"+Chr(7)+Chr(0)+"**"
Ex	"#00"+Chr(126)+"C"+Chr(1)+Chr(0)+"**"	Select Electrical X axis input. The answer is "C"<CR><LF> Example: "#00~C"+Chr(1)+Chr(0)+"**"
Ey	"#00"+Chr(126)+"C"+Chr(2)+Chr(0)+"**"	Select Electrical Y axis input. The answer is "C"<CR><LF> Example: "#00~C"+Chr(2)+Chr(0)+"**"
Ez	"#00"+Chr(126)+"C"+Chr(3)+Chr(0)+"**"	Select Electrical Z axis input. The answer is "C"<CR><LF> Example: "#00~C"+Chr(3)+Chr(0)+"**"
Hxh	"#00"+Chr(126)+"C"+Chr(4)+Chr(0)+"**"	Select Magnetical X axis input. Mode A (9kHz-3MHz). The answer is "C"<CR><LF> Example: "#00~C"+Chr(4)+Chr(0)+"**"
Hyh	"#00"+Chr(126)+"C"+Chr(5)+Chr(0)+"**"	Select Magnetical Y axis input. Mode A (9kHz-3MHz). The answer is "C"<CR><LF> Example: "#00~C"+Chr(5)+Chr(0)+"**"
Hzh	"#00"+Chr(126)+"C"+Chr(6)+Chr(0)+"**"	Select Magnetical Z axis input. Mode (9kHz-3MHz). The answer is "C"<CR><LF> Example: "#00~C"+Chr(6)+Chr(0)+"**"
Hx	"#00"+Chr(126)+"C"+Chr(4)+ Chr(&H80) + "**"	Select Magnetical X axis input. Mode B (300kHz-30MHz). The answer is "C"<CR><LF> Example: "#00~C"+Chr(4)+Chr(80)+"**"
Hy	"#00"+Chr(126)+"C"+Chr(5)+ Chr(&H80) + "**"	Select Magnetical Y axis input. Mode B (300kHz-30MHz). The answer is "C"<CR><LF> Example: "#00~C"+Chr(5)+Chr(80)+"**"
Hx	"#00"+Chr(126)+"C"+Chr(6)+ Chr(&H80) + "**"	Select Magnetical Z axis input. Mode B (300kHz-30MHz). The answer is "C"<CR><LF> Example: "#00~C"+Chr(6)+Chr(80)+"**"

10.3 Settings commands

Name	Command	Description
PreON	"#00"+Chr(126)+"A" + Chr(3) +"*"	Activate Preamplifier The answer is "C"<CR><LF> Example: "#00~A"+Chr(3)+"*"
PreOFF	"#00"+Chr(126)+"A" + Chr(2) +"*"	De-Activate Preamplifier The answer is "C"<CR><LF> Example: "#00~A"+Chr(2)+"*"
RBW	"#00(b" + Chr(48 + Index) +"" INDEX= 0 ->300kHz 1 ->100kHz 2 ->30kHz 3 ->10kHz 4 ->3kHz 5 ->1kHz	Select filter. When the EHP-200/A receives this command the filter specified by Index parameter is selected. The answer is "#00(b" + Chr(48 + Index) Example: "#00(b1*" Set RBW filter to 100kHz The answer is "#00(b" + Chr(48 + Index)
Tune	"#00(t " + Freq+"" Freq is the frequency in Hz (can be expressed by a scientific notation).	Tuning Command for a single frequency. The EHP-200/A will be tuned and will read field value at the frequency specified by Freq parameter. Example: "#00(t 3256000*" tune to 3.256 MHz The answer is:"#00(t" + st

10.4 Data request commands

Name	Command	Description
Field	"#00(v*"	Field value request on previously settled axis, frequency and RBW filter. For electric field the unit is V/m, for magnetic field is A/m, if AUX is selected as signal input then the unit is Volt (on 50 ohm); to convert to dBm calculate with: $P(\text{dBm})=20 * \text{Log}10(\text{Lettura}/223.6)$ Example: "#00(v*" Could answer with: ".421875*"
S/N	"#00?S0*"	Probe serial number request Example: "#00?S0*" Could answer with: "040WX90606*"
DateCal	"#00?S1*"	Probe last calibration date request Example: "#00?S1*" Could answer with: "09.07.09*"

10.5 SWEEP Commands

Name	Command	Description
SetStart	"#00(i" + startfreq * startfreq is the frequency in Hz (can be expressed by a scientific notation).	Sweep Start frequency. If there is a sweep runnin it will stop. The answer is the command echo without the *. Example: #00(i300000* set Sweep Start freq. to 300kHz Answer : #00(i300000
SetStop	"#00(f" + stopfreq * stoptfreq is the frequency in Hz (can be expressed by a scientific notation).	Sweep Stop frequency If there is a sweep runnin it will stop. The answer is the command echo without the *. Example #00(f3000000* set Sweep Stop freq. to 30MHz Answer: #00(f3000000
SetStep	"#00(s" + stepfreq * steptfreq is the frequency in Hz (can be expressed by a scientific notation).	Sweep Step frequency If there is a sweep runnin it will stop. The answer is the command echo without the *. Example: #00(s7500* set Sweep Step freq. to 7.5kHz Answer: #00(s7500
DoSweep	"#00(g*"	Data request for previous commands. (start, stop and step previously set). The answer will be like the table in the following page:

Byte Position	Name	Description
1-11	Header	The Header string is as follow:
1	Bat	Battery voltage. Integer, without sign, 8 bit. To convert to voltage apply the following formula: Battery Voltage = Bat / 256 * 4.216
2	Chg	Battery charge status icabatteria. Integer, without sign, 8 bit. Possibile values are: <ul style="list-style-type: none"> • "0" (0x30) → battery charger NOT connected • "1" (0x31) → battery under charge • "2" (0x32) → battery charge completed Note: with a battery voltage higher than 4.12 Volt AND Chg = 1 the battery charge should be considered completed.
3-11	Res	Byte reserved to future use
From 12 to 5*(Stop-Start)/Step	Data Packet	The Data Packet string is as follow:
12, 12+5*n	Sync	Integer, without sign, 8 bit. Used for synchronizing control purposes. Sync is the modulus 256 of the actual Step starting at the Start frequency (the Sync at Start frequency is = 1). Example of sweep with the following parameters: <ul style="list-style-type: none"> • Start=0 • Stop=30MHz • Step= 75kHz The result will be : <ul style="list-style-type: none"> • Sync=1 at 0 MHz (Byte 12). [(0/.075) mod 256 +1=0] • Sync=41 at 3MHz (Byte 212). [(3/.075) mod 256 +1=41] • Sync=45 at 22.5MHz (Byte 1512). [(22.5/.075) mod 256+ 1=41]
13, 13+5*n	Exp	Integer, without sign, 16 bit., in the format HiLo, representing the exponent of the field value.
15, 15+5*n	Mantissa	Integer, without sign, 16 bit., in formato HiLo, representing the mantissa of the field value.
<p>The field value is acculated with the following formula: $Fld = Kf * Mantissa * Sqr(2 ^ Exp) / 8$ where Kf is as following: <ul style="list-style-type: none"> • Electric field E=0.125 • Magnetic field Mode A H=0.025 • Magnetic field Mode B H=0.0025 (2.5E-3) • AUX V=0.0138 When the Preampifier is active the coefficient Kf must be multiplied by 0.2</p>		

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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.

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:

