

NBM-550

Narda Broadband Field Meter

Operating manual



This product is protected by the following patents:

China Design Patent	ZL 2006 3 0303322.X
China Design Patent	ZL 2006 3 0190679.1
European Design Patent	000594254-001
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Contents

1	Useful information	1
1.1	Measuring electromagnetic fields	2
1.2	About this instrument	2
	Applications	3
1.3	About this operating manual	4
	Structure of this operating manual	4
	User interface language	4
	Characters and symbols used	5
	Terminology	6
2	Safety instructions	7
2.1	Using this operating manual	8
2.2	Proper use	8
2.3	Improper use	8
2.4	Dangers from electromagnetic fields	9
	Strong Fields	9
	Measurement Errors	9
	Probe is not operating properly	9
2.5	Dangers when handling rechargeable batteries	10
2.6	Dangers from AC Adapter / Charger	10
3	Preparing the NBM-550 for use	11
3.1	Unpacking	12
	Packaging	12
	Items included	12
	Unpacking the probes	12
	Transport damage	13
	Equipping the case	14
	After transport and storage	14

3.2	Instrument overview	15
3.3	Power supply	17
	Operation from rechargeable batteries	17
	Charge state and power source indicator	19
3.4	Connecting the probe.	20
	Probe with “Push-Pull” connector	21
	Probe with threaded coupling connector	21
3.5	Fitting the GPS module	22
3.6	Using the table top tripod	22
4	Getting started	23
4.1	Switching on.	24
	Self test	24
	Calibration	24
	GPS reception	25
4.2	The NBM-550 operating concept	26
	Measurement screen overview	26
	The menu levels.	27
	Navigating in the menus	28
4.3	Making basic settings.	29
	Selecting the language	29
	Setting the auto zero adjustment	29
	Setting the auto off function	30
	Setting the backlight.	31
	Setting the contrast	31
	Changing the display units.	31
	Changing the units format	32
	Setting the date and time	32
	Changing the GPS display	33
	Selecting the field type and units for combination probes	34
	Locking the keypad	35

5	Measuring with the NBM-550	37
5.1	Avoiding measurement errors	38
	Electrostatic charges	38
	Changes in temperature	38
	Strong low frequency fields	39
5.2	Measuring in Normal display mode	40
	Selecting the result type	40
	Freezing a measured value	41
	Storing a measured value	41
	Add voice comments (optional)	42
	Setting the averaging time	43
5.3	Measuring the spatial average	43
	Measuring discrete values	44
	Measuring values continuously	45
5.4	Measuring in History display mode	46
	Display overview	46
	Evaluating the curve	47
	Storing the graphical record	48
5.5	Measuring in XYZ display mode	48
	Display overview	49
5.6	Measuring in Monitor display mode	50
	Display overview	50
5.7	Activating the alarm function	51
5.8	Audible Indicator (hot spot search)	52
5.9	Measuring with a test standard	52
	Possible displays when using a test standard	54
5.10	Measuring with a correction frequency	56

6	Recording and managing measured values	57
6.1	Storage types	58
6.2	Recording measurements by timer control	58
	Setting the recording parameters	59
	Starting the recording	60
6.3	Recording conditional measurements (optional)	60
	Setting the recording parameters	61
	Starting / stopping the recording	62
6.4	Managing result data	62
	Using the Memory Manager	63
	Using the Data Viewer	63
	Data Viewer display examples	64
7	Setup and configure	67
7.1	Configuring the interface	68
7.2	Saving and loading instrument settings	68
	Menu overview	68
7.3	Displaying instrument and probe information	70
7.4	Using the NBM-550 as a controller	71
7.5	Activating instrument options	72
8	PC software	73
8.1	Using the PC software	74
	Minimum system requirements	74
8.2	Connecting the NBM-550	75
8.3	Working with the PC software	75
8.4	Updating the firmware	76
8.5	Performing a reset	77

9	Overview of all menus and functions	79
9.1	Measurement menus	80
9.2	Main menu	81
9.3	Measurement Settings	82
	Page 1	82
	Page 2	83
9.4	Data Logger	84
9.5	Memory Manager	86
9.6	Interface	87
9.7	Information	88
9.8	Setup	89
9.9	Clock	90
10	Instrument maintenance	91
10.1	Cleaning the instrument	92
10.2	Replacing / removing the batteries	93
10.3	Disposal	95
	Rechargeable batteries	95
	Instrument	95
10.4	Checking instrument functions	96
	Appropriate test sources	98
11	Specifications	99
11.1	Display	100
11.2	Measurement functions	100
11.3	Result memory	101
11.4	Interfaces	101
11.5	Options	102
11.6	General specifications	103
11.7	Standards compliance	104
11.8	AC Adapter / Charger	104
11.9	CE Declaration of Conformity	105
11.10	Declaration of origin	107

12	Ordering information	109
	12.1 NBM-550	110
	12.2 Probes	110
	12.3 Accessories	111
13	Glossary	113
	Index	117

1

Useful information

This chapter contains basic information about measuring electromagnetic fields, about using the NBM-550, and about the structure of this operating manual.

- 1.1** [Measuring electromagnetic fields \(page 2\)](#)
- 1.2** [About this instrument \(page 2\)](#)
- 1.3** [About this operating manual \(page 4\)](#)

1.1 Measuring electromagnetic fields

In today's world, practically everyone lives and works in an environment surrounded by technical equipment that generates electromagnetic fields. Our recognition of the problems associated with such fields and our depth of information in this area has increased as the effects of such fields on the human body have been examined more closely. Various authorities have long defined limit values designed to protect users from the dangers of exposure to such emissions.

1.2 About this instrument

The Narda Broadband Field Meter NBM-550 provides virtually everyone concerned with this subject with an instrument for measuring non-ionizing radiation with utmost accuracy within the frequency range from 100 kHz to 60 GHz (depending on the probe used). The instrument has a wide range of functions, yet it is very easy to use. It also features a handy design, robust casing, long battery life, and high measurement accuracy.

Probes for various measurement applications are connected to the NBM-550 basic unit. Flat frequency response probes are available, as well as so-called shaped probes that evaluate the field according to a specific human safety standard. These probes are calibrated separately from the measuring instrument, and include a non-volatile memory containing the probe parameters and calibration data. They can therefore be used with any instrument in the NBM-500 family without any loss in calibration accuracy.

The PC software supplied with the instrument allows you to remote control the NBM-550 as well as to export saved measurement data and to analyze the results.

Applications

The NBM-550 makes precision measurements for human safety purposes, particularly in workplace environments where high electric or magnetic field strengths are likely. It can also be used to demonstrate the electromagnetic compatibility (EMC) of devices and equipment.

Examples:

- Measuring field strengths as part of general safety regulations
- Measuring the field strengths around transmitting and radar equipment to establish safety zones and for monitoring during operations
- Measuring the field strength emanating from mobile phone repeaters and satellite communications systems to ensure compliance with human safety limit values
- Measuring the field strength in the industrial workplace environment, such as plastics welding equipment, RF heating, tempering, and drying equipment
- Measurements to ensure the safety of persons using diathermy equipment and other medical equipment that generates high frequency radiation
- Field strength measurements in TEM cells and absorber chambers

1.3 About this operating manual

Structure of this operating manual

This operating manual is divided into two main parts:

1. Operating the NBM-550
 - You will find all you need to know about making the most important settings on the NBM-550 and how to deal with most measurement tasks in chapters [4](#) through [10](#).
2. Overview of menus and their functions
 - You will find an overview of all menu functions, together with a brief description of each function in chapter [9](#). You can use this overview to find a function quickly.

User interface language

English language terms are used in this operating manual to describe the user interface.

You can display the user interface of the NBM-550 in other languages (see [“Selecting the language”](#) on page 29).


⇒ Please note that if you change the language, the displayed terms will differ from those described in this manual.

Characters and symbols used

Various elements are used in this operating manual to indicate special meanings or particularly important passages in the text.


Symbols and terms used in warnings

According to the American National Standard ANSI Z535.6-2006, the following warnings, symbols, and terms are used in this document:

	<p>The general danger symbol warns of risk of serious injury when used with the signal words CAUTION, WARNING, and DANGER. Follow all the instructions in order to avoid injuries or death.</p>
<p>NOTICE</p>	<p>Indicates a danger that results in damage to or destruction of the instrument.</p>
<p>CAUTION</p>	<p>Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p>
<p>WARNING</p>	<p>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>
<p>DANGER</p>	<p>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>

Structure of warnings

All warnings are structured as follows:

<p> SIGNAL WORD</p>
<p>Type and source of danger Consequences of failure to observe warning ⇒ Instructions for preventing danger</p>

Symbols and marks used in this document

!	Important instruction Indicates an instruction that must be followed to avoid danger.
✓	Requirement Indicates a requirement that must be met before the next instruction can be carried out, e.g. ✓ The instrument is switched off.
⇒	Instruction Indicates a single instruction, e.g. ⇒ Switch the instrument on.
1. 2. 3.	Sequence of instructions Indicates a sequence of instructions that must be carried out in the order given.
↵	Result Indicates the result of carrying out an instruction, e.g. ↵ The instrument starts a self test.
Bold type	Control element Indicates a control element on the instrument, e.g. ⇒ Press the ENTER key.
CAPITALS	Menu name Indicates a menu name, e.g. ⇒ Open the MAIN menu.
Blue type	Cross reference (in PDF document only) Indicates a cross reference to another part of the document. Click on the blue type in the PDF document to jump directly to the cross reference.

Terminology

Item	Meaning
Battery	Rechargeable battery
Dry battery	Non-rechargeable battery

2

Safety instructions



This chapter contains important instructions on how to use the NBM-550 safely. Please therefore read this chapter carefully and follow the instructions closely.

- 2.1 Using this operating manual (page 8)**
- 2.2 Proper use (page 8)**
- 2.3 Improper use (page 8)**
- 2.4 Dangers from electromagnetic fields (page 9)**
- 2.5 Dangers when handling rechargeable batteries (page 10)**
- 2.6 Dangers from AC Adapter / Charger (page 10)**

2.1 Using this operating manual

- ! Carefully read this entire operating manual before you start using the instrument.
- ! Keep this operating manual so that it is available to everyone who uses the instrument, and ensure that this operating manual is with the instrument if you pass it on to a third party.

2.2 Proper use

The NBM-550 is designed to measure and evaluate electromagnetic fields.

- ! Only use the instrument for the purpose and under the conditions for which it has been designed.
- ! In particular, observe the technical data given in the “**Specifications**” on page 99.

Proper use also includes:

- ! observing any national accident prevention regulations at the place of use.
- ! ensuring that the instrument is used only by appropriately qualified and trained persons.

2.3 Improper use

The NBM-550 is not a warning device that gives active notice of the existence of dangerous fields by means of a visible or audible warning signal.

- ! Remember that this instrument is a measuring device, not a warning device.
- ! Carefully observe the actual measurement displayed when you are approaching an unknown field source.
- ! If in doubt, use an additional warning device such as “RadMan” or “Nardalert XT”, available from Narda Safety Test Solutions.

2.4 Dangers from electromagnetic fields

Strong Fields

Very high field strengths can occur in the vicinity of some radiation sources.

- ⇒ Do not cross or ignore safety barriers or markings.
- ⇒ Persons with electronic implants (e.g. heart pacemakers) must avoid danger zones.

Measurement Errors

Metallic labels (stickers) affixed to the yellow sensor area of the probe can lead to measurement errors, usually an underestimation of the electromagnetic field strength.

- ⇒ Affix labels of any type only to the black probe shaft.
- ⇒ If the instrument malfunctions, take it out of service and contact your Narda Service Center. The addresses are listed at the end of this operating manual and on the Internet at <http://www.narda-sts.com>.

Probe is not operating properly

Possibly present high radiation values are not recognized.

- ⇒ Check probes for proper operation with a signal source before using this measuring instrument. This is especially important for thermocouples because the sensors can be affected by various mechanical and environmental stressors.
Narda offers portable sources to accomplish this important step (see “**Accessories**” on page 111).
- ⇒ Before beginning any RF radiation measurement, always inform yourself of the frequencies and field strengths that you could expect to encounter.

2.5 Dangers when handling rechargeable batteries

When handled improperly, rechargeable batteries can overheat, explode, or ignite.

- ⇒ Only use the NBM-550 with NiMH rechargeable batteries (AA, Mignon).
- ⇒ Do not use dry batteries.
- ⇒ Do not replace individual batteries; always replace the entire set.
- ⇒ Always use identical batteries.
- ⇒ Never touch both poles of the batteries simultaneously with a metal object.
- ⇒ Make sure you insert the batteries correctly as shown on the base of the battery compartment.
- ⇒ Always close the battery compartment immediately after replacing batteries.
- ⇒ Never use the NBM-550 with the battery compartment open.

2.6 Dangers from AC Adapter / Charger

You could experience electric shock from the AC adapter/charger.

- ⇒ Do not use the instrument when the casing is damaged because parts carrying dangerous voltages could be exposed.
- ⇒ Do not use an AC adapter/charger that has been moved from a cold to a warm room, thereby forming condensation.
- ⇒ Only use the AC adapter/charger indoors and at temperatures between 0 °C and +40 °C.

The AC adapter/charger could be destroyed if the voltage specification on the AC adapter/charger does not match the AC line voltage.

- ⇒ Only use the AC adapter/charger if the voltage specification on the AC adapter/charger matches the AC line voltage.

3

Preparing the NBM-550 for use

This chapter describes all you need to do before starting to use the NBM-550.

- 3.1 Unpacking (page 12)**
- 3.2 Instrument overview (page 15)**
- 3.3 Power supply (page 17)**
- 3.4 Connecting the probe (page 20)**
- 3.5 Fitting the GPS module (page 22)**
- 3.6 Using the table top tripod (page 22)**

3.1 Unpacking

Packaging

The packaging is designed to be re-used as long as it has not been damaged.

⇒ Keep the original packaging and use it whenever the instrument needs to be shipped or transported.

Items included

- ⇒ Check that all the following items have been delivered:
- NBM-550
 - 4 x NiMH Mignon/AA batteries (packaged separately)
 - Case
 - Probe (type and quantity as ordered)
 - AC Adapter / Charger
 - Shoulder strap
 - USB cable
 - Table top tripod
 - NBM-TS PC software
 - Operating manual
 - Calibration certificate

Unpacking the probes

1. Carefully open the foil bag to prevent damage to the probes. Use a pair of scissors to cut open the outer edge of the bag at the plug end of the probe.
2. Hold the probe by the plug body to remove it from the bag.
3. Place the probe in the appropriate recess in the case to store it safely.

The plastic bag is no longer needed and can be disposed of.

Note: Factory-fresh NBM probes are usually supplied sealed in a plastic foil under vacuum. This prevents any degradation due to moisture and means that the recommended calibration interval can be increased by as much as 6 months. This is intended to ensure that the recommended period of use of 24 months can still be achieved even if delays occur in transit or due to customs procedures.

Transport damage

NOTICE

Instrument/accessories damaged during transportation

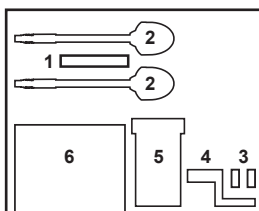
Using damaged instrument/accessories can lead to subsequent damage.

- ⇒ Check the instrument and all accessories for damage when you have unpacked them.
- ⇒ If the instrument is damaged, contact your Narda Service Center.

The addresses of your Narda Service Center are listed at the end of this operating manual and on the Internet at <http://www.narda-sts.com>.

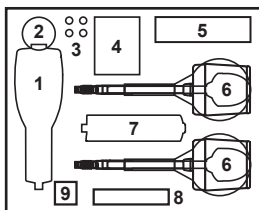
Equipping the case

You can use the case provided to store a wide range of optional accessories in addition to the items supplied. The figures below show the compartments in the case lid and case base.



Case lid

1	Test generator	5	RadMan Personal Monitor
2	Probe	6	Compartment for cables and operating manual
3	Adapters		
4	GPS fitting set		



Case base

1	NBM-550 basic unit	6	Probe
2	GPS (assembled)	7	NBM-520 basic unit
3	Rechargeable batteries	8	Shoulder strap
4	AC adapter	9	Earphone
5	Table top tripod		

After transport and storage

NOTICE

Condensation on an instrument can lead to damage

Condensation can form on an instrument that has been stored at a low temperature when it is brought into a warm room. It may be damaged if used.






⇒ Wait until all visible condensation has evaporated from the instrument surface to avoid damaging the instrument.

Note: The instrument is not ready for use until it has reached a temperature within the operating range of -10 to +50 °C.

3.2 Instrument overview



3 Preparing the NBM-550 for use

1	Probe connector socket
2	Microphone
3	Display
4	Operating panel
	Function keys Used to select the menu functions shown on the display
	ESC key Used to exit from a menu / reset functions and measured values
	OK key Used to open a menu or function / confirm a setting
	UP/DOWN arrow keys Used to select menus and functions / change values / lock the keypad / change the contrast
	ON/OFF key Used to switch the instrument on or off
Charge	Charge state Indicates the charge state (red = rapid charging, green = trickle charging)
Status	Operating status Indicates the instrument operating status: Green = normal operation, red = remote operation, flashing red = firmware update or exceeded alarm threshold
5	Tripod bush
6	Electrical and optical connectors
6a	Multi-function socket for USB / GPS (optional) / external trigger
6b	Earphone
6c	Optical connector
6d	AC Adapter / Charger
7	Tripod bush (on back of instrument)
8	Battery compartment (on back of instrument)
Probe (various models available)	
9	Probe head
10	Probe plug

3.3 Power supply

The power supply is normally taken from the batteries provided. You can use the AC Adapter / Charger supplied as an alternative power source.

Note: We do not recommend that you operate the instrument with the AC Adapter / Charger connected, as this can significantly degrade the measurement performance of the NBM-550. The measurement accuracy figures given in the specifications cannot then be guaranteed.

Operation from rechargeable batteries

The rechargeable NiMH batteries for this device are packaged separately. You must insert the batteries into the device and then charge them up fully before using the device. The charging cycle takes about 2 hours. Do not use dry batteries in this device.

Notice

Improper pole positions

The batteries can explode and damage the instrument if you put the batteries in the wrong way round.

⇒ Observe the positions of the positive and negative poles marked in the battery compartment.

Inserting the batteries

1. Open the battery compartment cover underneath the device by undoing the two screws with a screwdriver or the edge of a coin.
2. Take the NiMH batteries provided out of their protective foil and insert them into the battery compartment. Make sure you put them in the right way round. The positions of the positive and negative poles are marked in the battery compartment by "+" and "-" respectively. Match the markings to the markings on the batteries.
3. Close the battery compartment cover and do up the two screws again to secure it.

Charging the batteries

If the device is probably not going to be used for several weeks, it should be recharged before being stored to avoid the possibility of deep discharge of the batteries. If storage is likely to be for a period of more than two months, remove the batteries from the device after recharging them.

Note: Deep discharge can significantly reduce the battery capacity. This is indicated by unusually short charging cycles. If this happens, the nominal capacity can be restored by discharging and recharging the batteries several times. Regeneration usually takes four to five recharging cycles.

WARNING

Charging the batteries with wrong AC Adapter / Charger

Overheating, explosion, or ignition of rechargeable batteries/batteries or their surroundings

⇒ You must use only the AC Adapter / Charger supplied to charge the batteries.

Note: A complete charge cycle takes about 2 hours (with the instrument switched off).

Starting the charge cycle

- ✓ The AC line voltage must match the operating voltage of the AC Adapter / Charger.
- 1. Connect the AC Adapter / Charger to the charging socket of the NBM-550.
- 2. Connect the AC Adapter / Charger to the AC line
 - ↳ The charge cycle starts.
 - ↳ The **Charge** LED glows red during the entire charge cycle.

As soon as the batteries are fully charged, the AC Adapter / Charger switches to trickle charge mode and the **Charge** LED glows green.

Proper handling of rechargeable batteries

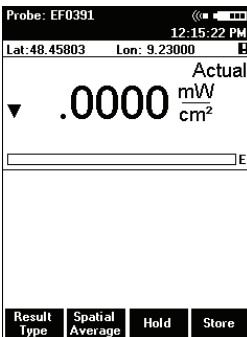
⇒ Observe the following precautions when handling rechargeable batteries:

- Always handle the batteries with care.
- Do not drop or damage the batteries or expose them to excessively high temperatures.
- Do not leave the batteries inside or outside the instrument for more than one or two days in a very warm place (e.g. in an automobile).
- Do not leave the discharged batteries in the unused instrument for a long period of time.
- Do not store the batteries for more than six months without discharging and recharging them in the meantime.
- Avoid deep discharging the batteries as this could cause the cells to reverse polarity and make them useless.

Charge state and power source indicator

The battery charge state and the power source used are indicated at the top right of the display:

Table 1 Charge state and power source indication



	<p>Power is supplied by the rechargeable batteries:</p> <ul style="list-style-type: none"> • Continuous display: Charge level = 10% • Flashing display: Charge level \leq 5% <p>If the charge level drops to \leq 5%, the instrument will switch off automatically within a few minutes.</p>
	<p>Power is supplied by the rechargeable batteries.</p> <p>The charge level is indicated in 20% steps by black bars within the battery symbol. The batteries are fully charged when all five bars are shown.</p>
	<p>Power is supplied by the AC Adapter / Charger.</p> <p>The batteries are charged at the same time.</p>

3.4 Connecting the probe

WARNING

Probe is not operating properly

Possibly present high radiation values can not be recognized when a probe is defective.

⇒ Check probes for proper operation with a signal source before using this measuring instrument. This is especially important for thermocouples because the sensors can be affected by various mechanical and environmental stressors.

Narda offers portable sources to accomplish this important step (see “**Accessories**” on page 111).

⇒ Before beginning any RF radiation measurement, always advise yourself of the frequencies and field strengths that you could expect to encounter.

There are many different probes available for different applications for the NBM-550. You can find more information about the order numbers and specifications of the probes under “**Ordering information**” on page 109, as well as in the data sheets of the NBM-550 and probes. These documents can also be downloaded from the Narda web site on the Internet at <http://www.narda-sts.com>.

NOTICE

Wrong handling of the probe

Damage of the probe head

⇒ Always hold the probe at the metal plug end.

Probe with “Push-Pull” connector

Connecting the probe

- ✓ The red mark on the probe plug **(10)** is pointing towards the front of the instrument.
- ⇒ Push the probe plug **(10)** straight down into the probe socket **(1)** until it clicks into place.

Disconnecting the probe

- ⇒ Slide the sleeve on the probe plug **(10)** upwards and pull the probe upwards to remove it.

Probe with threaded coupling connector

Threaded connectors are now being used for the link between the probe and the basic unit. For this purpose, the basic unit is fitted with a longer socket which can be recognized by the approximately 1 cm long threaded section. Probes fitted with "push-pull" connectors can still be used with this connector. Probes with threaded coupling connectors can only be used with this new, longer connecting socket.

Connecting the probe

- ✓ Make sure the guide lug on the probe plug **(10)** is pointing towards the front of the instrument.
- ⇒ Push the probe plug **(10)** straight down into the probe socket **(1)** and tighten the threaded coupling using your thumb and forefinger. Never tighten the coupling using pliers or other tools.

Disconnecting the probe

- ⇒ Undo the threaded coupling using your thumb and forefinger and then pull the probe upwards to release it.

3.5 Fitting the GPS module



The GPS receiver module is included in the option set as an accessory (see “**Ordering information**” on page 109). It allows you to determine the exact position of the instrument using GPS (Global Positioning System).

Fitting the GPS module

1. Remove the probe.
2. Place the handle against the casing from below so that the thread of the knurled screw fits into the tripod bush.
3. Do up the knurled screw and plug the GPS module cable into the multi-function socket.
4. Reconnect the probe.

Note: The GPS module can only be used with NBM-550 devices for which a GPS option was ordered and activated (see “**Activating instrument options**” on page 72). When reordered, activation is carried out via the supplied activation code (contained in the Options Passport Document).

3.6 Using the table top tripod

A table top tripod is included with the NBM-550. This makes the instrument easier and more convenient to use.

Attaching the tripod

1. Loosen the butterfly screw on the side.
 - ↳ You can now easily move the ball joint and tripod screw.
2. Screw the knurled screw into the threaded bush on the back panel of the NBM-550.
3. Fold out the tripod legs, adjust the position of the instrument and tighten up the butterfly screw.
4. To remove the tripod at any time, loosen the butterfly screw and unscrew the knurled screw.

4

Getting started

This chapter describes how to switch on the NBM-550, the operating concept, and the initial settings.

- 4.1** [Switching on \(page 24\)](#)
- 4.2** [The NBM-550 operating concept \(page 26\)](#)
- 4.3** [Making basic settings \(page 29\)](#)

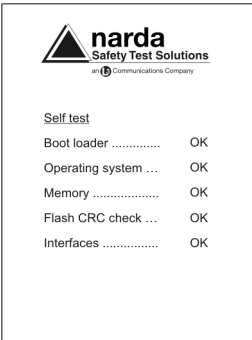
4.1 Switching on

Now that you have prepared the instrument for use, you can switch it on

- ⇒ Press the **ON/OFF** key to switch the instrument on.
 - ↳ The instrument performs a self test.

Self test

The progress of the self test is displayed on the screen. The instrument is not ready for use until all tests have been completed successfully and **OK** is displayed.



If an error message is displayed

- ⇒ Press the **ON/OFF** key to switch the instrument off and then switch it on again.

If an error message is displayed again:

- ⇒ Switch the instrument off and contact your nearest Service Center.

Calibration

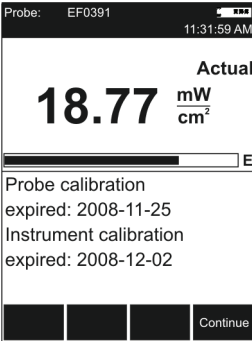
The NBM-550 and probes must be calibrated at certain intervals to guarantee the quality of the measurement results. If you have missed the date for a calibration, this will be displayed by default after the self test is complete.

Note: You can deactivate the calibration date reminder under MAIN/MEASUREMENT SETTINGS/Cal. Date Check.

To display the measurement screen after viewing the calibration date reminder

- ⇒ Press the **Continue** key.

Tip: You can view the last and next calibration dates under MAIN/INFORMATION/DEVICE INFORMATION and .../PROBE INFORMATION.



GPS reception

The GPS receiver module is included as an accessory in the option set (see “**Ordering information**” on page 109) and allows you to determine the exact position of the instrument using GPS (Global Positioning System).

When the GPS module is connected, the coordinates along with other information are shown in the upper section of the display.

If GPS cannot be received despite a GPS module connection (e.g. in closed rooms), **Lat:** and **Lon:** are displayed without appropriate values.

If GPS was received but suddenly interrupted (e.g. due to poor signal quality or an unplugged GPS plug), the most recent available coordinations remain displayed and are marked with an exclamation point.

The information is explained in the table below.

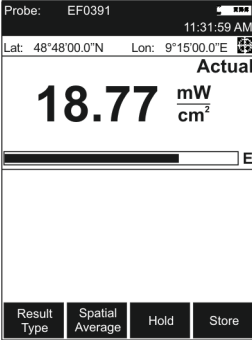




Table 2 GPS symbols in the display

Symbol	Meaning
Lat	Latitude
Lon	Longitude
	Warning that the displayed GPS data is not up to date.
	GPS data is being received with enhanced accuracy (deviation < 3 m). This type of reception is only possible in regions where the corresponding satellite service is available.

Note: After connecting to the GPS module, it can take up to 5 minutes for a position display to appear. The waiting time decreases with short-term switching off and on, i.e. when the satellite positions are only marginally changed. GPS reception may be impaired by high field levels and, in particular, by field levels in the L-band (1 to 2 GHz).

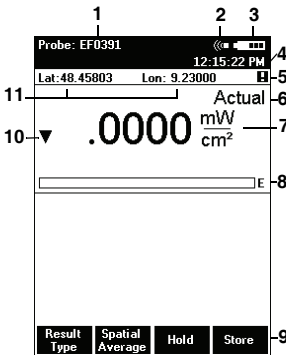
4.2 The NBM-550 operating concept

When the self test is complete, the display switches to measurement mode.

The settings will depend on the power on behavior that you have selected (see “[Saving and loading instrument settings](#)” on page 68).

Measurement screen overview

The description below gives you an initial overview of the display elements in the measurement screen display. Other elements are described in the chapters dealing with the individual functions and in the “[Overview of all menus and functions](#)” on page 79.



-
- 1 Probe used
 - 2 Alarm function (switched on)
 - 3 Battery charge state
 - 4 Time
 - 5 Warning: displayed GPS data is not up to date.
 - 6 Present display mode selection
 - 7 Measured value and units
 - 8 Bar graph of measured value with display of field type: E = E field, H = H field, S = S field
 - 9 Function keys
 - 10 Out of measurement range display.
 - **Down arrow**: signal too small
 - **Up arrow**: signal too large.
 - 11 GPS coordinates (optional)
-

The menu levels

The NBM-550 operating concept is context sensitive. It only displays the functions that are possible based on the probe being used, the settings selected, and the menu that is open.

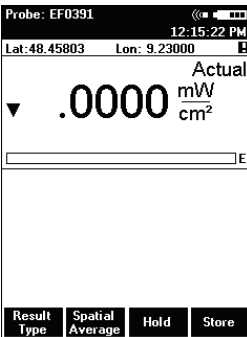
Settings are divided into different levels to separate functions that are used often from those that are used less often:

- 1st level: The measurement screen
- 2nd level: The main menu
- 3rd level: The sub-menus
- 4th level: The functions

The measurement screen

You can directly activate a function or make a selection by pressing one of the four function keys in the measurement screen.

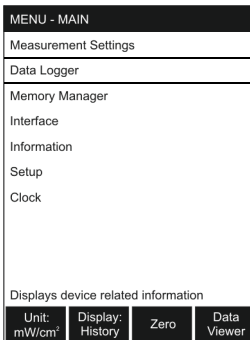
All other settings have to be made using the menus described below.



The main menu

The MAIN menu opens when you press the **OK** key. All other settings are made from this menu.

The most important settings are once again assigned to the function keys in the MAIN menu.



MENU - DATA LOGGER	
History Time Scale	20 min
Timer Start	00:00:00
Timer Duration	00:00:00
Timer Interval	1 s
Store Condition	Upper THRHL D
Storing Range	Store All
Upper Threshold	61.4 V/m
Lower Treshold	19.4 V/m
Voice Recorder	Off
Start of time controlled logging	
Unit: V/m	Condition Logging
Timer Logging	

MENU - DATA LOGGER	
History Time Scale	20 min
Timer Start	00:00:00
Timer Duration	00:00:00
Timer Interval	1 s
Store Condition	Upper THRHL D
Storing Range	Store All
Upper Threshold	1.0 mW/cm ²
Lower Treshold	0.1 mW/cm ²
Voice Recorder	Off
Start of time controlled logging	
◀	▶

The sub-menus

Select a sub-menu from the MAIN menu and press the **OK** key to open the selected sub-menu.

The example shows: DATA LOGGER.

The function levels

Select a function from the sub-menu and press the **OK** key to open the selected function. You can then make the settings you require or read out the desired information.

The example shows: **Timer Start**.

Navigating in the menus

Use the following keys to navigate through the menus and select the functions:



Function keys

Select the function shown in the display, which depends on the menu selected



ESC key

Exits from the menu (with or without making changes)



OK key

Opens a menu or a function and confirms a setting



▲/▼ key

Select a menu or a function and change values



To simplify the description of the selection of a menu level or function, the menu and function names will be listed one after the other and separated by a slash.

Example: ⇒ To change the start time, open the **Timer Start** function (MAIN/DATA LOGGER/...).

You can find an overview of all the menus and functions under “**Overview of all menus and functions**” on page 79.

4.3 Making basic settings

When the self test is complete, the display switches to measurement mode.

The settings will depend on the power on behavior that you have selected (see “**Saving and loading instrument settings**” on page 68).

Selecting the language

You can set the user interface language to a different language.

Changing the user interface language

1. Open the **Language** function (MAIN/MEASUREMENT SETTINGS/...).
2. Use the arrow keys ▲/▼ to select the desired language and then press the **OK** key to confirm the setting.

Setting the auto zero adjustment

Zeroing compensates for the influence of temperature fluctuations on the measurement results of the basic unit. No measurement is possible during a zeroing, which takes 7s. For this period, the last measurement value is displayed and a remaining time counter is shown.

If the **Auto-Zero Interval** function is activated, an automatic zero adjustment will be performed at the specified intervals.

The following settings are possible:

- **6/15/30/60 minutes:** Auto zero every 6/15/30/60 minutes
- **off:** Auto zero function disabled

The default setting is **15 minutes**.

Changing the setting

1. Open the **Auto-Zero Interval** function (MAIN/ MEASUREMENT SETTINGS/Next/...).
2. Use the arrow keys **▲/▼** to select the desired setting and then press the **OK** key to confirm the setting.

Starting a zero adjustment manually

1. Open the MAIN menu.
2. Press the **Zero** function key.
 - ↳ A zero adjustment is performed and the instrument finally changes back to the measurement display.

Setting the auto off function

You can set the instrument to switch off automatically after a specified time without any activity to protect the batteries from being discharged.

The following settings are possible:

- **6/15/30/60 minutes:** Switches off after 6/15/30/60 minutes
- **off:** Auto off function disabled

The default setting is **15 minutes**.

Note: The auto off function is disabled during long-term measurements using the **Timer Logging** function (see “**Recording measurements by timer control**” on page 58) and **Conditional Logging** function (see “**Recording conditional measurements (optional)**” on page 60).

Changing the setting

1. Open the **Auto Power-Off** function (MAIN/ MEASUREMENT SETTINGS/Next/...).
2. Use the arrow keys **▲/▼** to select the desired setting and then press the **OK** key to confirm the setting.

Setting the backlight

The display backlight is activated every time you press a key and switches off after a specified time to preserve battery power.

The following settings are possible:

- **off**: Backlight disabled
- **5/10/30/60 s**: Backlight switches off after 5/10/30/60 seconds
- **permanent**: Backlight is switched on permanently

The default setting is **10 seconds**.

Changing the switch off delay time

1. Open the **LCD Backlight** function (MAIN/ MEASUREMENT SETTINGS/Next/...).
2. Use the arrow keys ▲/▼ to select the desired setting and then press the **OK** key to confirm the setting.

Setting the contrast

- ✓ The display shows the measurement screen.
- ⇒ Press the arrow keys ▲ or ▼ to increase or decrease the contrast.

Changing the display units

Power density or field strength units can be selected when using normal (flat) probes. The units can simply be converted, while the measurement will stay the same.

Results from shaped probes are always displayed in %. A shaped probe provides a frequency sensitivity that mirrors a particular standard, such as ICNIRP.

Values in % (of standard) are related to the equivalent power density limit, not to the field strength. A shaped probe can also display results as a field strength or power density value for a selected frequency of this particular standard (see “**Measuring with a test standard**” on page 52). This is why the display unit can be selected for shaped probes as well.

Changing the units

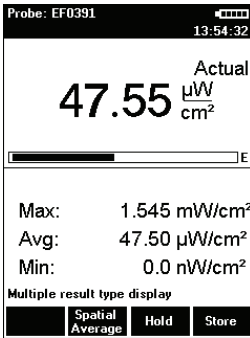
1. Open the MAIN menu.
2. Press the **Unit** function key repeatedly until the desired units are displayed.
 - ↳ Units are set in the following order:
 $W/m^2 - mW/cm^2 - V/m - A/m - W/m^2 - \dots$
3. Press the **ESC** key.
 - ↳ The display reverts to the measurement screen and the selected units are displayed.

Changing the units format

The units for the measurement values can be displayed in two different formats:

- **Fixed Triad**
 Units are displayed with a fixed format (mW/cm^2 , W/m^2 , V/m , A/m)
- **Variable Triads**
 Units are adjusted to match the size of the measured value ($47.55 \mu W/cm^2$ in the example shown on the left)

Tip: We recommend that you use the **Variable Triads** format for signals that have a high dynamic range, otherwise the display of very small or very large values will be meaningless.



Changing the units format

1. Open the **Results Format** function (MAIN/MEASUREMENT SETTINGS/Next/...).
2. Use the arrow keys **▲/▼** to select the desired format and then press the **OK** key to confirm the setting.

Note: Be careful not to make read-off errors due to the different formats when you use the **Variable Triads** setting.

Setting the date and time

Before you start using the instrument, set the date and time. This is particularly important if you want to save measured values, because the date and time of measurement are also saved.

Tip: Instead of making the setting manually, you can use the PC software supplied to synchronize the date and time.

MENU - CLOCK	
Time	11:31:59 AM
Time Format	12 h
Date	12/31/2006
Date Format	mm/dd/yyyy
Sets the date of the system clock	
<div style="display: flex; justify-content: space-around;"> <div style="width: 20px; height: 20px; background-color: black;"></div> <div style="width: 20px; height: 20px; background-color: black;"></div> <div style="width: 20px; height: 20px; background-color: black;"></div> <div style="width: 20px; height: 20px; background-color: black;"></div> </div>	

Setting the date and time

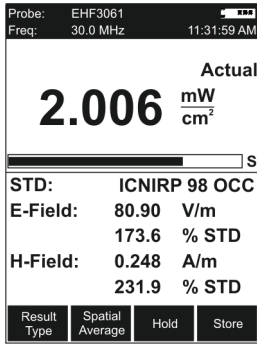
1. Open the **Clock** function in the MAIN menu.
2. Set the time format:
 - Select the **Time Format** function,
 - use the arrow keys ▲/▼ to select the 12-hour or 24-hour time format and press the **OK** key to confirm the selection.
3. Set the time:
 - Select the **Time** function,
 - use the </> function keys to select the seconds, minutes, or hours, and use the arrow keys ▲/▼ to change the value. If you choose the 12-hour time format, you must also select AM or PM,
 - press the **OK** key to confirm the selection.
4. Set the date format:
 - Select the **Date Format** function,
 - use the arrow keys ▲/▼ to select the format (mm/dd/yyyy, dd.mm.yyyy, yyyy-mm-dd) and press the **OK** key to confirm the selection.
5. Set the date:
 - Select the **Date** function,
 - use the </> function keys to select the day, month or year and use the arrow keys ▲/▼ to change the value,
 - press the **OK** key to confirm the selection.

Changing the GPS display

There are three formats used for displaying GPS coordinates:

- **DMS:** (d)dd° mm' ss.s" N
Example: Lat: 48° 48' 10.5" N / Lon: 9° 15' 00.0" E
- **MinDec:** (-)(d)dd° mm.mmm'
Example: Lat: 48° 48.175' / Lon: 9° 15.000'
- **DegDec:** (-)(d)dd.ddddd°
Example: Lat: 48.29166° / Lon: 9.25000°

The default setting is DegDec.



Selecting the field type and units for combination probes

Combination probes can measure E-fields and H-fields at the same time. If you are using a combination probe, you can select the field that is to be measured and the units that are to be shown in the lower half of the display

The simultaneous display of E and H-Field is only possible in NORMAL display mode.

Setting the field type

1. Select the **Combi Probe Use** function (MAIN/ MEASUREMENT SETTINGS/Next...).
2. Use the arrow keys ▲/▼ to select the desired format:
 - E-Field and H-Field
 - E-Field only
 - H-Field only
3. Press the **OK** key to confirm the selection.

Setting the units

1. Select the **E+H Field Units** function (MAIN/ MEASUREMENT SETTINGS/Next...).
2. Use the arrow keys ▲/▼ to select the desired units:
 - **Selected Unit:** The units selected using the **Unit** function key will be used
 - **V/m** for E-fields and **A/m** for H-fields
3. Press the **OK** key to confirm the selection.

Note: For simultaneous display of E and H-Field, always select the NORMAL display mode. In the other modes, display is limited to the S-Field.

Locking the keypad

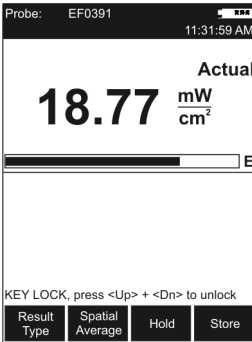
To prevent inadvertent operation of any of the keys, you can lock the keypad.

Locking the keypad

- ⇒ Press the two arrow keys ▲/▼ simultaneously.
 - ↳ The message KEY LOCK is displayed.

Unlocking the keypad

- ⇒ Press the two arrow keys ▲/▼ simultaneously again.



5

Measuring with the NBM-550

This chapter describes how to use the NBM-550 to make the usual kinds of measurements that are needed. You can find an overview of all the menus and functions under **“Overview of all menus and functions”** on page 79.

- 5.1 **Avoiding measurement errors (page 38)**
- 5.2 **Measuring in Normal display mode (page 40)**
- 5.3 **Measuring the spatial average (page 43)**
- 5.4 **Measuring in History display mode (page 46)**
- 5.5 **Measuring in XYZ display mode (page 48)**
- 5.6 **Measuring in Monitor display mode (page 50)**
- 5.7 **Activating the alarm function (page 51)**
- 5.8 **Audible Indicator (hot spot search) (page 52)**
- 5.9 **Measuring with a test standard (page 52)**
- 5.10 **Measuring with a correction frequency (page 56)**

5.1 Avoiding measurement errors

The measurement result can be falsified by external influences when measuring electromagnetic fields. Considerable measurement deviations can occur under certain circumstances, particularly when measuring low field strengths. The following tips may be of assistance in recognizing sources of interference so as to avoid measurement errors. The following factors can affect the measurement result:

- Electrostatic charges
- Changes in temperature
- Strong low frequency fields (e.g. due to high tension lines)

Electrostatic charges

The following effect will be noted with all field strength meters: If you move the probe quickly, excessive field strength values will be displayed which do not reflect the actual field conditions. This effect is caused by electrostatic charges.

The NBM has been designed in a way that minimizes this effect. However, if you move the probe very quickly, field strengths on the order of a few V/m can be displayed.

Recommendation: Hold the device steady during the measurement. Delete the stored maximum values and average values by pressing **Clear** before using the **Max**, **Average** or **Max Average** result types. Do not touch the probe at any time during the measurement.

Changes in temperature

Ambient temperature changes as well as warming by direct sunlight will create offset voltages that may impact the measurement result. Zeroing eliminates offset voltages within the instrument only. Offset voltages caused by the probe or the probe connector can not be eliminated. Particularly probes with thermocouple sensors are affected by offset voltages until stable temperature conditions are achieved.

Recommendation: Try to avoid heating caused by direct sunlight during measurements with thermocouple probes. Consider an adequate settling time for stabilization of the probe in case of temperature changes. A settling time of about 15 minutes will ensure stabilized conditions. Extremely high steps of the environmental temperature changes may require longer settling times.

Strong low frequency fields

The result display when measuring high frequency electromagnetic fields can be falsified by low frequency fields. Wideband probes will detect signals even if the frequency is well outside the specified measurement range (out-of-band attenuation is 20 dB/decade). A probe specified to measure from 100 kHz to 3 GHz would therefore attenuate signals down to 100 Hz by at least 60 dB (= field strength / 1000). However, very high field strengths of several thousand V/m can occur in the vicinity of high tension lines. An RF wideband probe would therefore register several V/m.

Recommendation: Thoroughly inspect every measurement location before any measurement and make a note of any possible sources of interference, such as high tension lines in the vicinity. Keep a critical eye on any possible increase in the minimum display value (noise floor) which may indicate interfering factors. Increase the distance from the source of low frequency interference or use a probe that has a higher frequency cutoff point at the lower end of its range.




Further useful information can be found under FAQ at www.narda-sts.com

5.2 Measuring in Normal display mode

The latest measurement results are displayed in Normal mode. You can also display maximum and average values.

Selecting the result type

You can select the following result displays on the NBM-550:

Result type	Description
Actual	The latest measured value of field strength is shown numerically and as a bar graph.
Max Hold	<p>The maximum field strength measured during the course of the measurement is frozen and displayed numerically and as a separate line on the bar graph. The bar graph continues to display the latest value.</p>  E <p>⇒ Press the ESC (Clear) key to reset the display value to 0.</p>
Average  154 s	<p>The average of the current measurement values is determined and displayed.</p> <p>The progress in forming the average value is shown as a bar graph until the first valid average value has been determined. The remaining measurement time in seconds is shown in the window on the right. You can set the averaging time in the MEASUREMENT SETTINGS/Averaging Time menu (see “Setting the averaging time” on page 43).</p> <p>The bar graph disappears once the first average value has been determined. The average result is then valid. As the measurement continues, the average is formed continuously using the results obtained during the time window (averaging time).</p> <p>⇒ Press the ESC (Clear) key to reset the display value to 0.</p>
Max Avg  154 s	<p>The maximum value of the measured average values is displayed.</p> <p>The average values are determined as described for the Average result type. Only the highest average value determined during the course of the measurement is displayed.</p> <p>⇒ Press the ESC (Clear) key to reset the display value to 0.</p>

The following averages are determined for result types **Average** or **Max Average**:

- Linear average of power values (e.g. W/m^2 or mW/cm^2)
- Root mean square (RMS) of field strength values (e.g. V/m or A/m)

Both types of average give the same result. The averaging process conforms to current safety standards for high frequency fields and normally takes place over a period of 6 minutes. The units of the measured value can be switched at any time without affecting the results already averaged.

Selecting a result type

⇒ Press the **Result Type** key repeatedly until the desired result type is shown.

Freezing a measured value

⇒ Press the **Hold** key to freeze the measured value being displayed at the moment.

↵ **Hold** appears in the display.

↵ The button label changes to **Release**.

⇒ Press the **Release** key to resume the measurement.

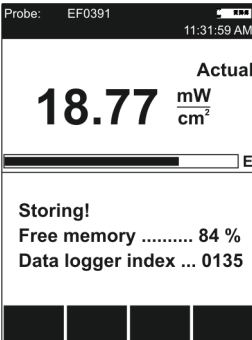
Storing a measured value

You can store the measured values in an internal memory in the NBM-550 for documentation.

Storing a measured value

⇒ Press the **Store** key.

↵ The measured value displayed at the moment is stored with the date and time under the index number displayed. The remaining memory space is also displayed.



You can also trigger storing of measured values using an external signal.

Storing measured values using an external trigger

1. Open the **External Trigger** function (MAIN/INTERFACE/...).
2. Use the arrow keys ▲/▼ to select the **On** setting and press the **OK** key.
3. Connect the trigger cable (optional accessory) to the multi-function socket and connect the other end (BNC) to a control contact (e.g. closing contact of an odometer).
4. A measured value will be stored every time the contact closes (just like pressing the **Store** function key).

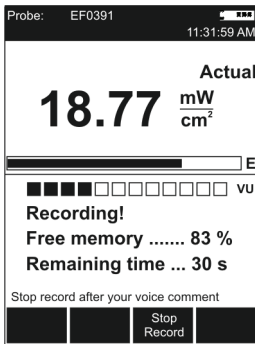
Add voice comments (optional)

You can add a spoken comment up to 30 s in length to the stored measured values. To do this, you must activate voice recording (default setting: deactivated).

Note: The user is automatically asked for voice comments. When measurements are saved manually, this is carried out by pressing the **STORE** button. Comments are only recorded before beginning the measurement at measurement series (Condition Logging or Timer Logging).

Activating voice recording

1. Open the **Voice Recorder** function (MAIN/DATA LOGGER/...).
2. Use the arrow keys ▲/▼ to select the **On** setting and press the **OK** key.
 - ↳ The voice recording function is activated.



Adding a comment

- ✓ You have just stored a measured value.
 - ↳ The message “Voice recorder enabled” is displayed when voice recording has been enabled.

In case you do not want any comments:

⇒ Press **Cancel Record**.

In case you want to record a comment:

1. Press the **Start Record** function key and speak the comment.
 - Speak in the direction of the microphone (above the display) from a distance of 20 to 30 cm, and
 - speak loudly enough, so that the bar reaches at least two-thirds of its maximum length.
 - ↳ Recording starts. The bar graph (VU meter) shows the level of the recorded signal.
2. Press the **Stop Record** function key to stop recording.
3. Press the Store Record function key in order to save voice comments.

Note: The recording will automatically be ended after 30 seconds. Before saving, you have the option to repeat the voice comments by pressing the **Repeat Record** button, or to proceed without comments by pressing the **Cancel Record** button.

Setting the averaging time

You can set the time used to form the average for **Average** and **MaxAvg** display types in the range 4 s to 30 min in 2 second steps.

Setting the time and resolution

1. Open the **Averaging Time** function (MAIN/MEASUREMENT SETTINGS/...).
2. Select the digit using the </> function keys.
3. Change the value using the arrow keys ▲/▼.
4. Press the **OK** key to confirm the settings.

5.3 Measuring the spatial average

You can determine the spatial average of the field strength using the Spatial Average function. This function is used to determine the exposure to electromagnetic radiation of the human body, for example.

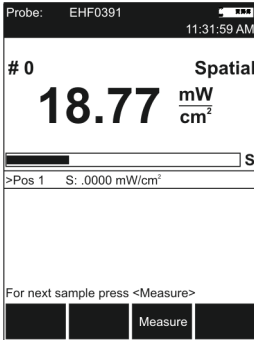
Two measurement methods are available:

- **Discrete**
Individual results are recorded and averaged. You can measure at specific locations using this method.
- **Continuous**
Results are recorded and averaged continuously during the time that the probe is moved around the area of interest. You can measure the field strength affecting a particular space using this method.

Selecting the measurement method

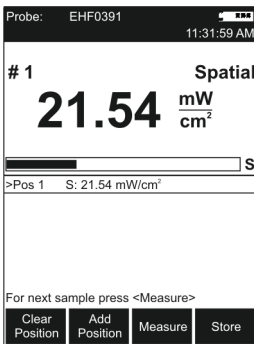
1. Open the **Spatial AVG Mode** function (MAIN/MEASUREMENT SETTINGS/Next/...).
2. Use the arrow keys ▲/▼ to select the method and press the **OK** key.

Measuring discrete values



- ✓ You selected **Discrete** as the **Spatial AVG Mode**.

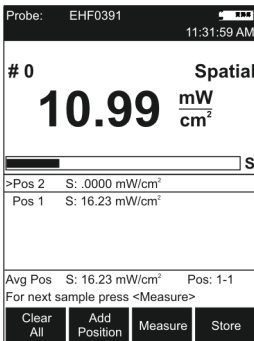
1. Press the **Spatial Average** key.
 - ↳ **Spatial** measurement mode is displayed
The result counter top left shows #0, indicating that no values have been measured yet.
2. Press the **Measure** key.
 - ↳ The measured value is stored,
#1 indicates that one result has been stored,
Pos. 1 shows the measured value.
3. Press the **Measure** key again to make another measurement.
 - ↳ The measured values are stored,
#... indicates the number of measurements.
The average of all the measurements is shown after Pos. 1.
4. When you have recorded all the measured values,
 - you can either add positions so you can record more results (e.g. at different locations) or
 - you can store the entire measurement.



Adding a position

1. Press the **Add Position** key.
 - ↳ **Pos. 2** is displayed,
The result counter shows **#0**.
2. Record new measured values as described above.
3. You can add more positions and record more results if necessary.
 - ↳ **Avg Pos** shows the average value for all the positions measured, along with the positions used to form the average (e.g. 1-4 for positions 1 through 4).

You can store the measurement results when you have recorded all the measured values.



Storing the results

- ⇒ Press the **Store** key.
 - ↳ The average of all positions and the averages for each separate position are stored.

Measuring values continuously

Making the measurement

- ✓ You have selected **Continuous** as **Spatial AVG Mode**.

 1. Press the **Spatial Average** key.
 - ↪ **Spatial** measurement mode is displayed.
 2. Press the **Start** key.
 - ↪ The measurement starts. The elapsed measurement time is shown top left in the display.
 3. Move the NBM-550 evenly around the space to be measured. Press the **Stop** key to end the measurement.
 - ↪ **Pos.1** displays the measured average value.
 4. You can then
 - add positions to record further average values or
 - store the entire measurement.

Note: The NBM-550 emits an audible signal every second to assist you in moving it evenly.

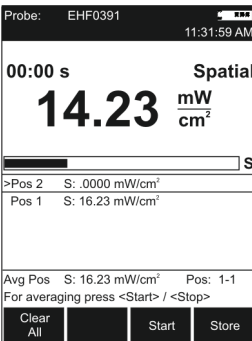
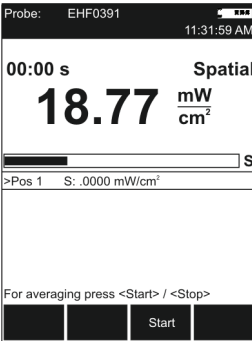
Adding a position

1. Press the **Add Position** key.
 - ↪ **Pos. 2** is displayed, the elapsed time counter shows **00:00 s**.
2. Record new measured values as described above.
3. You can add more positions and record more results if necessary.
 - ↪ **Avg Pos** shows the average value for all the positions measured, along with the positions used to form the average (e.g. 1-4 for positions 1 through 4).

You can store the measurement results when you have recorded all the measured values.

Storing the results

- ⇒ Press the **Store** key.
 - ↪ The average of all positions and the averages for each separate position are stored.



5.4 Measuring in History display mode

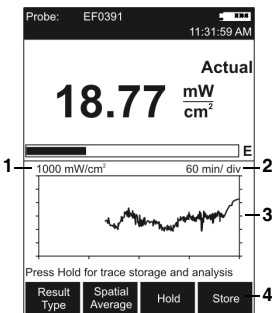
You can display the progress of the measurement versus time in History mode. You can use the cursor to mark individual points on the curve and display the associated values.

Changing to History display mode

- ✓ The display is in measurement mode.
- 1. Press the **OK** key to open the MAIN menu.
- 2. Press the **Display** function key until **Display: History** appears.
- 3. Press the **ESC** key to return to measurement mode.
 - ↳ The curve is shown in the lower half of the display screen.

Note: The progress memory is always active. As a result, a valid curve already appears when changing to History mode. It will be deleted, however, as soon as you change a parameter that affects the measurement result (e.g. correction frequency or time span). The rolling measurement memory deletes all values that date back longer than the set time period.

Display overview



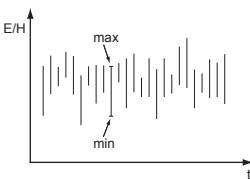
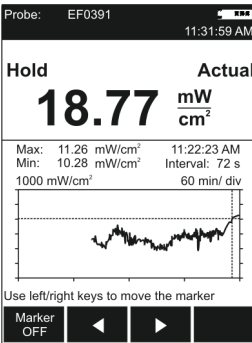
- 1 Defines the Y axis display range as the maximum measurable field strength
- 2 X axis time resolution (time period per line of graduation)
- 3 Graphic display of measurement progress
The record begins at the right hand edge. The latest measurement is always shown at the right hand edge.
- 4 The functions are the same as in Normal display mode (see [“Measuring in Normal display mode”](#) on page 40).

Changing the time period:

1. Open the **History Time Scale** function (MAIN/DATA LOGGER/...).
2. Use the arrow keys ▲/▼ to set the desired time and press the **OK** key to confirm the setting.

Evaluating the curve

1. Press the **Hold** key to freeze the curve.
 - ↪ **Hold** is shown in the display.
 - Recording continues in the background.
2. Press the **Marker ON** function key to show the cursor. Other items will also appear in the display:
 - **Cross-hairs** for selecting the measurement point
 - **MAX** shows the maximum value at the cursor position
 - **MIN** shows the minimum value at the cursor position
 - **Time** shows the time the measurement at the cursor position was made
 - **Interval** shows the display resolution (cursor step size)
3. Press the </> function keys to move the cursor to the left or right.
4. Press the **Marker OFF** function key to switch off the cursor.
5. Press the **Release** function key to unfreeze the display.
 - ↪ The measurement record and curve are updated to show the changes since the **Hold** key was pressed.

**Significance of MAX and MIN values**

Measured values are recorded continuously as the curve is recorded. However, the cursor can only select discrete time points which have to be used to produce the graphic display. The maximum and minimum values measured within the corresponding time window (interval) are displayed for these time points (see figure, left). A maximum of 200 measurement intervals are shown in the progress memory.

Storing the graphical record

The measurement values of the progress memory can be saved.

To save the measurement value recording:

1. Press the **Hold** key to freeze the curve.
2. Press the **Store History** function key.
 - ↳ The measurement value recording is saved. You can add a comment if this function is activated.

5.5 Measuring in XYZ display mode

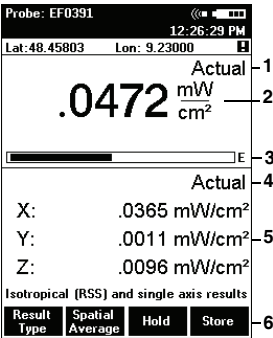
In display mode XYZ, the measurement values of the three spatial axes, as well as the isotropic field strength calculated from them, are displayed in parallel.

Note: XYZ display mode is not available for all probe types. If the probe you are using does not support XYZ mode, it will not be available for selection.

Changing to XYZ display mode

- ✓ The display is in measurement mode.
1. Press the **OK** key to open the MAIN menu.
 2. Press the **Display** function key until **Display: XYZ** appears.
 3. Press the **ESC** key to return to measurement mode.

Display overview



- 1 Result type **Actual** displays the field strength in the upper display area
- 2 Display of the RSS (root sum square) field strength value calculated from the X, Y, and Z values (valid for units V/m and A/m, linear addition for mW/cm² and W/m²):

$$\text{RSS} = \sqrt{X^2 + Y^2 + Z^2}$$
- 3 Graphic display of field strength showing the selected field type (E-field in the example shown here)
- 4 Only the latest measured values for each axis can be shown (result type **Actual**)
- 5 Measured values for the three axes
- 6 The **Result Type** function only applies to the upper display area. The other functions are as for Normal display mode (see “**Measuring in Normal display mode**” on page 40).

Changing the result type

Note: You can only change the result type for the upper display area.

⇒ Press the **Result Type** function key to select a different result type (refer to “**Selecting the result type**” on page 40 for information about result types).

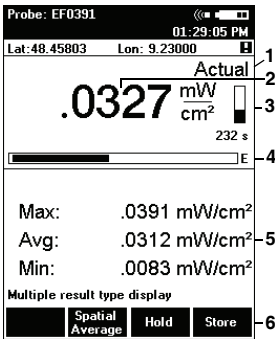
5.6 Measuring in Monitor display mode

Monitor display mode simultaneously shows the maximum, average, and minimum measured values as well as the latest measured value.

Changing to Monitor display mode

- ✓ The display is in measurement mode.
- 1. Press the **OK** key to open the MAIN menu.
- 2. Press the **Display** function key until **Display: Monitor** appears.
- 3. Press the **ESC** key to return to measurement mode.
 - ↳ Measurement and determination of the maximum, average, and minimum values starts immediately.

Display overview



- 1 Field strength result type shown in upper display area
- 2 Display of latest field strength value
- 3 Remaining averaging time
- 4 Graphic display of field strength showing the selected field type (E-field in the example shown here)
- 5 Calculated values since the beginning of measurement:
 - **Max**: Maximum value
 - **Avg**: Average value
 - **Min**: Minimum value
- 6 The **Result Type** function cannot be selected. Other functions are as for Normal display mode (see “[Measuring in Normal display mode](#)” on page 40).

Resetting the values shown in the lower display area:

- ⇒ Press the **ESC (Clear)** key.

5.7 Activating the alarm function

The alarm function allows you to enter a limit value. The instrument outputs an audible signal and the Status LED flashes red when this limit value is exceeded.

This function is useful for checking limit values or for signaling an early warning of dangerous field strengths, for example.

The possible alarm limits are:

- Normal probes

Table 3 Setting ranges of the limit values (in 1 dB steps)


Measuring range	Minimum	Maximum
V/m	100 mV/m	100 kV/m
A/m	250 μ A/m	250 A/m
W/m ²	25 μ W/m ²	25 MW/m ²
mW/cm ²	2,5 nW/cm ²	2,5 kW/cm ²

- Shaped probes: 0.1% – 10,000% (in 1 dB steps)

Defining the alarm limits

1. Open the **Alarm Limit** function (MAIN/MEASUREMENT SETTINGS/...).
2. Use the arrow keys \blacktriangle / \blacktriangledown to change the value and press the **OK** key to confirm the setting.

Activating the alarm function

1. Open the **Alarm Function** function (MAIN/MEASUREMENT SETTINGS/...).
2. Use the arrow keys \blacktriangle / \blacktriangledown to select **On** and press the **OK** key to confirm the setting.
 - ↳ The symbol  is shown in the display when the alarm function is activated (see “[Measurement screen overview](#)” on page 26).

5.8 Audible Indicator (hot spot search)

You can use the **Audible Indicator** function to indicate changes in field strength and determine hot spots (areas of maximum field strength). The audible signal changes according to the way the field changes:

- Continuous tone: Field strength is increasing
- Interrupted tone: Field strength is decreasing
- No tone: Field strength is constant

Activating the function

1. Open the **Audible Indicator** function (MAIN/MEASUREMENT SETTINGS/Next/...).
2. Use the arrow keys ▲/▼ to select **On** and press the **OK** key to confirm the setting.

5.9 Measuring with a test standard

The NBM-550 allows measurement based on test standards in the **NORMAL** display mode. Since the measurement result refers to a single, defined frequency (in contrast with the usual broadband measurements), measuring with a test standard only makes sense if the field you want to measure is dominated by a known frequency.

You can apply a test standard as follows:

- use a shaped probe. The standard is set by the probe and cannot be changed,
- use a flat probe and apply one of the standards stored in the instrument,
- use the NBM-TS PC software to customize your own standard.

Three steps are needed to make a measurement using a test standard:

- **Step 1:** Select a test standard
- **Step 2:** Select the reference frequency
- **Step 3:** Apply the test standard

These steps are described below.

Step 1: Select a test standard

1. Open the **Standard** function
(MAIN/MEASUREMENT SETTINGS/...).
2. Use the arrow keys ▲/▼ to select a standard and press the **OK** key.

Step 2: Select the reference frequency

⇒ Open the **Frequency** function
(MAIN/MEASUREMENT SETTINGS/...).

You can now

- use a calibrated frequency from the memory (the probe is calibrated at these frequencies) or
- enter a frequency value of your choice.

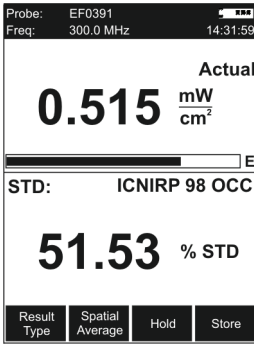
Using a calibrated frequency

1. Press the ▲ or ▼ arrow key
↳ The measuring frequency is set to the next higher or next lower calibrated frequency.
2. Press the **OK** key to confirm the setting and then use the **ESC** key to exit from the menus.

Entering a frequency manually

1. Press the **Edit** function key.
2. Select the digit using the </> function keys.
3. Change the value using the arrow keys ▲/▼.
4. Press the **OK** key when you have completed the settings to confirm them and then press the **ESC** key to exit from the menus.

Step 3: Applying the test standard



1. Open the **Apply Standard** function (MAIN/MEASUREMENT SETTINGS/...).
2. Use the arrow keys ▲/▼ to select **On** and press the **OK** key.
 ↳ The test standard is activated, the selected frequency (**Freq**) is shown top left in the display.

Note: When you no longer wish to use a test standard, set **Apply Standard** to **Off** by following the same procedure as above.

Possible displays when using a test standard

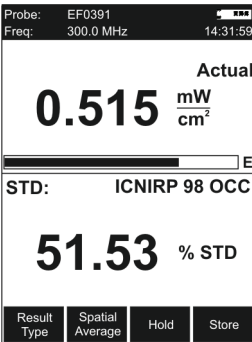
When you apply a test standard (Apply Standard = On), additional information is shown in the lower display area in Normal display mode.

Table 4 Display combinations when using a test standard

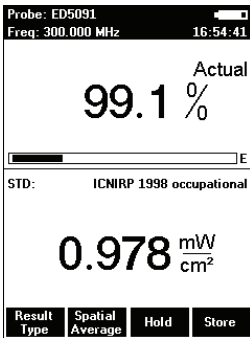
Probe type	E+H Field Units	Display (only in NORMAL mode)	
		Upper area	Lower area
E-field or H-field (flat)	–	Measured value shown with selected units	<ul style="list-style-type: none"> • Selected standard • Value in % calculated according to the standard and frequency
E-field or H-field (shaped)	–	Measured value in %	<ul style="list-style-type: none"> • Probe standard • Value and selected units calculated according to the standard and frequency
Combination probe (flat)	V/m and A/m	Measured value shown with selected S-field units (product of E-field and H-field)	<ul style="list-style-type: none"> • Selected standard • Measured value in V/m and A/m (E-field and H-field) • Value in % calculated according to the standard and frequency
	Selected Unit	Measured value shown with selected S-field units (product of E-field and H-field)	<ul style="list-style-type: none"> • Selected standard • Measured value shown with selected unit (E-field and H-field) • Value in % calculated according to the standard and frequency

Example displays

Probe type: E-field flat probe



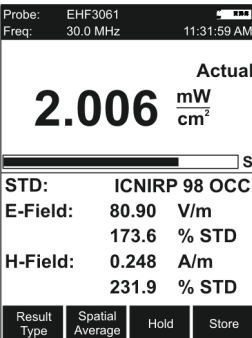
Probe type: E-field shaped probe



Probe type: Combination (E-field and H-field) flat probe

Combi probe uses: V/m, A/m

Note: The S-field is shown in the upper area of the display as the product of the magnitudes of the E-field and H-field.



5.10 Measuring with a correction frequency

All probes are calibrated in our factory to guarantee the traceability of measurements back national standards. This calibration is performed at various frequencies over the entire measurement range of the probe concerned. An average correction factor is then used for normal measurements (broadband measurements over the entire frequency range) to give minimal measurement uncertainty.

If you only want to make a measurement at a specific, known frequency, however, you can use the correction value at the calibrated frequency to enhance the accuracy of the measurement. Ideally, the calibration frequency and the measuring frequency should be identical.

However, any intermediate value (with a resolution of 1 kHz), which is calculated from the bordering calibration frequencies using interpolation, can also be set.

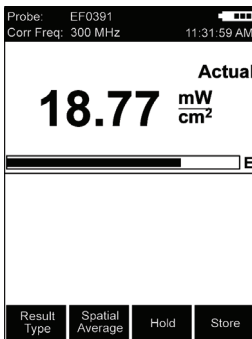
Selecting the correction frequency

⇒ Open the **Frequency** function (MAIN/MEASUREMENT SETTINGS/...).

1. Press the ▲ or ▼ arrow key.
 - ↳ The measuring frequency is set to the next higher or next lower calibrated frequency (intermediate values can be entered after pressing the **Edit** button).
2. Press the **OK** key to confirm the setting.

Applying the correction frequency

1. Open the **Apply Correction Frequency** function (MAIN/MEASUREMENT SETTINGS/...).
2. Select **On** and press the **OK** key to confirm the setting.
 - ↳ The correction frequency (**Corr Freq**) is shown top left in the display.



6

Recording and managing measured values

This chapter describes how to record measurement values automatically (Data Logger) and how to recall and manage the measurement data that you have recorded manually or automatically.

- 6.1 Storage types (page 58)**
- 6.2 Recording measurements by timer control (page 58)**
- 6.3 Recording conditional measurements (optional) (page 60)**
- 6.4 Managing result data (page 62)**

6.1 Storage types

As well as manually storing individual values (see [“Storing a measured value”](#) on page 41), you can also store entire sequences of measurements automatically.

There are two ways to do this:

- You can start storing results at a specified time and stop storing them again after a defined time period has elapsed (see [“Recording measurements by timer control”](#) on page 58).
- You can set the instrument to start storing results depending upon the measured field strength (see [“Recording conditional measurements \(optional\)”](#) on page 60).

6.2 Recording measurements by timer control

For timer controlled recordings, measured values are recorded without interruption within the specified time period and are combined in 3 values per measurement interval (minimum value, maximum value, and average of the measurement interval).

The averages can be very easily converted subsequently to other averaging times with the NBM-TS PC Software (post-average function).

You must take the following steps to record measurements by timer control:

1. Set the recording parameters:
 - enter the starting time (Timer Start),
 - enter the recording time (Timer Duration),
 - enter the recording interval (Timer Interval).
2. Select **Timer Logging** function to start the recording.

These steps are explained below.

Setting the recording parameters

MENU - DATA LOGGER	
History Time Scale	20 min
Timer Start	15:00:00
Timer Duration	01:00:00
Timer Interval	1 min
Store Condition	Upper THRHLd
Store Range	Store all
Upper Threshold	1.00 mW/cm ²
Lower Threshold	100 µW/cm ²
Voice Recorder	Off
Starting time for Timer Logging	
◀	▶
	Current Time

1. Open the DATA LOGGER menu (MAIN/DATA LOGGER).
2. To enter the starting time:
 - open the **Timer Start** function,
 - select a digit using the </> function keys and use the arrow keys ▲/▼ to change the value,
 - press the **OK** key when you have completed the settings to confirm them.

Note: The current time can easily be set with the **Current Time** button.

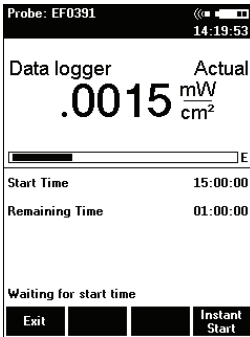
3. To enter the recording time:
 - open the **Timer Duration** function,
 - select a digit using the </> function keys and use the arrow keys ▲/▼ to change the value,
 - press the **OK** key when you have completed the settings to confirm them.
4. To enter the recording interval:
 - open the **Timer Interval** function,
 - select a digit using the </> function keys and use the arrow keys ▲/▼ to change the value,
 - press the **OK** key when you have completed the settings to confirm them.

Started measurement intervals are always carried out to completion. The actual duration is rounded to a multiple of the interval time.

The maximum duration is determined by the selected interval time (see table below), because the number of measurement intervals is limited to 32000.

Interval time (seconds)	Maximum duration (HH:MM:SS)
1	8:53:20
2	17:46:40
3	26:40:00
5	44:26:40
10	88:53:20
> 10	99:59:59

Starting the recording



✓ The DATA LOGGER menu (MAIN/DATA LOGGER) is open.

⇒ Press the **Timer Logging** function key.

↳ The display switches to measurement mode.

The latest measured value is shown in the upper half of the display. The values you entered for the starting time and recording time are shown in the lower half of the display.

Note: If voice recording is activated, a comment can be recorded (optional).

↳ The recording starts at a preset time. The remaining recording time (Remaining Time) is displayed.

↳ The recording is stopped after the preset recording duration (Timer Duration) has elapsed.

Note: The recording starts immediately when **Instant Start** is selected.

The recording can be prematurely stopped at any time with the **Stop** and **Exit** button.

6.3 Recording conditional measurements (optional)

For conditional recording, the measurement is triggered when the predetermined field strength values are exceeded or fallen short of. Up to 32000 events can be recorded.

You must take the following steps to record measurements conditionally:

1. Set the recording parameters:
 - enter the starting condition (Store Condition),
 - enter the store range (Store Range),
 - enter the upper threshold,
 - enter the lower threshold.
2. Start the recording:
 - select the **Condition Logging** function,
 - press **Start**.

These steps are explained below.

Setting the recording parameters

The following parameters are available:

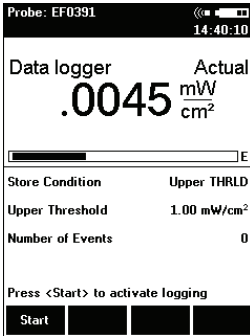
Parameter	Meaning
Store Condition	Specifies the condition for starting recording. <ul style="list-style-type: none"> • Upper THRHLD (upper threshold) The recording starts if the Upper Threshold value is exceeded. • Out of GAP The recording starts if the value is outside the range defined by the Upper Threshold and Lower Threshold.
Store Range	Specifies the range of values to be stored (max. 32000 events). <ul style="list-style-type: none"> • First and Last The first and last values occurring within the time period when the Store Condition is fulfilled are recorded. • Store All All the values occurring within the time period when the Store Condition is fulfilled are recorded.
Upper Threshold	Specifies the upper threshold value
Lower Threshold	Specifies the lower threshold value

MENU - DATA LOGGER	
History Time Scale	20 min
Timer Start	15:00:00
Timer Duration	01:00:00
Timer Interval	1 min
Store Condition	Upper THRHLD
Store Range	Store all
Upper Threshold	1.00 mW/cm ²
Lower Threshold	100 µW/cm ²
Voice Recorder	Off
Start Condition Logging when true	
Unit:	Condition
mW/cm ²	Logging
	Timer
	Logging

Setting the recording parameters

1. Open the DATA LOGGER menu (MAIN/DATA LOGGER).
2. To enter the starting condition:
 - open the **Store Condition** function,
 - use the arrow keys ▲/▼ to select the condition you want to use and press the **OK** key to confirm the setting.
3. To enter the store range:
 - open the **Store Range** function,
 - use the arrow keys ▲/▼ to select the range you want to use and press the **OK** key to confirm the setting.
4. To enter the upper threshold:
 - open the **Upper Threshold** function,
 - select the threshold value with the arrow keys ▲/▼ and press the **OK** button to apply the settings.
5. To enter the lower threshold (only effective at OUT of Gap):
 - open the **Lower Threshold** function,
 - select the threshold value with the arrow keys ▲/▼ (only effective at OUT of Gap) and press the **OK** button to apply the settings.

Starting / stopping the recording



✓ The DATA LOGGER menu (MAIN/DATA LOGGER) is open.

1. Press the **Condition Logging** function key.
 - ↳ The display switches to measurement mode.

Note: If voice recording is activated, a comment can be recorded (optional).

- ↳ The latest measured value is shown in the upper half of the display.
 - ↳ The starting condition and the values you entered for the thresholds (depending on the starting condition) are shown in the lower half of the display.
2. Press the **Start** function key.
 - ↳ Recording starts as soon as the condition is fulfilled.
 - ↳ The number of values measured that fulfill the condition is displayed (**Number of Events**).
 3. Press the **Exit** function key to end the recording.

6.4 Managing result data

There are two menus provided for you to display and delete measurement data that you have recorded either manually or automatically:

- **Memory Manager** (MAIN/MEMORY MANAGER)
- **Data Viewer** (MAIN/Data Viewer function key)

The differences between these menus are described in the table below:

Menu	Displays	Deletes	Comment playback
Memory Manager	<ul style="list-style-type: none"> • Overview of the last data set • Display of free storage space in % 	<ul style="list-style-type: none"> • Last data set • All data sets 	Yes
Data Viewer	Overview of all stored data sets and display of the measurement results	Last data set only	Yes

Note: Before final deletion of data sets, a warning notice always appears giving you the option to cancel the deletion process.

Using the Memory Manager

MENU - MEMORY MANAGER				
Index	#	Date	Time	Type
0010	054	12/03/2007	13:05:55	CON ▶
Free Memory:		97 %		
Index of the last stored result (above)				
Delete Latest	Delete All	Play		

- ⇒ Open the MEMORY MANAGER menu (MAIN/...).
 - ↳ The last data set stored is displayed (refer to [Table 5](#) for the meanings of the columns).
- ⇒ Press the **Play** key to play back the comment (if available).
- ⇒ Press the **Delete Latest** key to delete the displayed (= last) entry.
- ⇒ Press the **Delete All** key to delete all the data sets.

Using the Data Viewer

Displaying the stored measurement data

- ⇒ Press the **Data Viewer** function key in the MAIN menu.
 - ↳ The list of all stored data opens.

Table 5 Column meanings

DATA VIEWER				
Index	#	Date	Time	Type
0001	001	11/14/2007	13:42:21	MON
0002	001	11/14/2007	13:43:18	MON ▶
0003	001	11/30/2007	16:39:34	NOR
0004	001	11/30/2007	16:42:15	NOR
0005	192	11/30/2007	17:07:05	HST ▶
0006	001	11/30/2007	17:13:32	XYZ ▶
0007	005	12/03/2007	12:56:30	CON ▶
0008	123	12/03/2007	12:59:10	TIM
0009	003	12/03/2007	13:02:06	SPA
0010	054	12/03/2007	13:05:55	CON ▶
Previous	Delete Latest		Next	

Column	Function
Index	Consecutive number identifying the data se.
#	Number of stored sub data sets within a measurement series (max. 32000); always 1 for manually stored results, since only one data set is stored each time). A maximum of 999 sub data sets can be displayed on the device (intervals or events). The NBM-TS PC software enables complete evaluation of all data.
Date	Date when the data set was stored.
Time	Time when the data set was stored
Type	Storage type: <ul style="list-style-type: none"> • CON: Condition Logging • HST: History mode • MON: Monitor mode • NOR: Normal mode • SPA: Spatial Averaging • TIM: Timer controlled (Timer Logging) • XYZ: XYZ mode
▶	A comment has been added.

Paging through the overview list

⇒ Press the **Previous** or **Next** function key to page back or forward in the list.

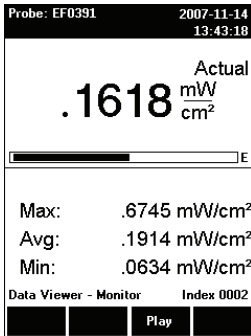
To display saved measurement data:

⇒ Use the arrow keys ▲/▼ to select an entry from the list and press the **OK** key to open the entry.
 ↳ The stored data are displayed.

Note: With the Up/Down arrow keys, you can scroll to the next or previous entries.

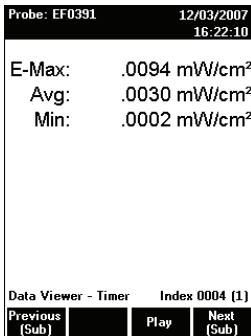
Data Viewer display examples

Some examples of the possible contents of the measurement data memory are shown below. Results are shown in the same format as for the measurement itself.



Example 1: Manual storing

Display	Meaning
Values	Monitor display mode, E-field.
Data Viewer	Display is in Data Viewer mode.
Monitor	Measurement values were saved in the Monitor display mode.
Index 0002	The values were stored at memory position 2.



Example 2: Timer Logging

Display	Meaning
Values	Timer display mode
Data Viewer	Display is in Data Viewer mode
Timer	Values were stored by timer control
Index 0004	The series of values was stored at memory position 4.
(1)	First value in the series

Example 3: Condition Logging

Probe: EF0391		12/03/2007	
		16:32:32	
E-Act: 3.059 mW/cm ² F			
Store Condition		Out of gap	
Store Range		First and Last	
Upper Threshold		1.00 mW/cm ²	
Lower Threshold		250 µW/cm ²	
Data Viewer - Cond		Index 0007 (1)	
Previous (Sub)	Play	Next (Sub)	

Display	Meaning
Values	Conditional display mode Meaning of the status indicators on the First and Last Storage Range: <ul style="list-style-type: none"> • F (First): first measurement value in which the condition is fulfilled • L (Last): last measurement value in which the condition is still fulfilled • -: no change, neither to F nor L (only with combination probes) Meaning of the status indicators Store all on the Storing Range: <ul style="list-style-type: none"> • Y (Yes): measurement value fulfills the condition • N (No): measurement value does not fulfill the condition (only with combination probes)
Settings	Selected settings for starting condition, store range, and upper and lower threshold
Data Viewer	Display is in Data Viewer mode.
Conditional	Measured values were stored conditionally.
Index 0007	The values were stored at memory position 7.
(1)	First value in the series

Paging within a series of measurements

⇒ Use the **Previous (Sub)** or **Next (Sub)** key to page back or forward in the series of measurements.

↳ The value in brackets after the index indicates the sub data set within the measurement series.

Playing back a comment

Note: Measurement data with comments are indicated by a loudspeaker symbol in the overview list.

✓ The earphone must be connected for playback.

⇒ Press the **Play** function key. This function is available from the overview list view and the selected measurement view.

↳ The comment is played back.

Deleting a data set

Note: You can only ever delete the last entry in the memory.

- ✓ The overview list is open.
- ⇒ Press the **Delete Latest** function key.
 - ↳ The last (latest) entry is deleted.

7

Setup and configure

This chapter describes additional functions and settings for the interface, for instrument information and settings, as well as for use of the NBM-550 as a controller and for the activation of new instrument options.

- 7.1 [Configuring the interface \(page 68\)](#)**
- 7.2 [Saving and loading instrument settings \(page 68\)](#)**
- 7.3 [Displaying instrument and probe information \(page 70\)](#)**
- 7.4 [Using the NBM-550 as a controller \(page 71\)](#)**
- 7.5 [Activating instrument options \(page 72\)](#)**

7.1 Configuring the interface

You can use the serial interface via USB or an optical connection.

Configuring the interface

Open the **Serial Interface** function (MAIN/INTERFACE/...).

⇒ Use the arrow keys ▲/▼ to select **USB** or **Optical** and press the **OK** key.

Note: Logging parameters (e.g. the baud rate) are permanently set and cannot be changed (see “**Interfaces**” on page 101).

7.2 Saving and loading instrument settings

You can save your current instrument settings (setups) and recall them when you need them again. Nine memory positions are provided for such settings, so you can save setups for different measurement tasks or for different users, for example.

Note: You can use the NBM-TS PC software to store the setups completely in the database and upload them to the instrument again when they are needed.

Menu overview

⇒ Open the MAIN/SETUP menu.

MENU - SETUP	
Default	User
Setup 1	Factory
Setup 2	User
Setup 3	Factory
Setup 4	Factory
Setup 5	User
Setup 6	User
Setup 7	User
Setup 8	Factory
Select the desired preset configuration	
Power-On Previous	Delete Load Save

Default	These settings will be used when the instrument is switched on as long as Power On = Default.
Setup 1-8	Memory positions
User	Indicates that a user setup is stored at this memory position
Factory	Indicates that the factory default settings apply because a user setup has not been stored

To delete a memory position:

Any saved instrument settings are deleted and the factory default settings are substituted. The memory position is retained.

Note: This function is not available unless **User** is displayed.

⇒ Use the arrow keys ▲/▼ to select the desired memory position and press the **Delete** function key.

↳ The user setup is deleted and **Factory** is displayed.

Restoring a setup

You can restore your own settings (User) or the factory default settings (Factory).

⇒ Use the arrow keys ▲/▼ to select the desired memory position and press the **Load** function key.

↳ The instrument settings are restored (loaded).

Saving a setup

You can only store your own setups in memory positions that are occupied with the factory default settings (Factory). If you want to store your own settings in a memory position that is occupied with a User setup, you will have to delete this setup first (see “**To delete a memory position:**” on page 69).

⇒ Use the arrow keys ▲/▼ to select the desired memory position and press the **Save** function key.

↳ The instrument settings are saved.

Setting the power on behavior

You can use the **Power On** function to specify the instrument setup that is loaded when you switch on the NBM-550. The following settings are possible:

- **Previous:** The settings in use when the instrument was last switched off are restored.
- **Default:** The settings saved under Default are restored.

⇒ Press the **Power-On** function key to toggle between the two settings.

Note: The selection displayed is active.

7.3 Displaying instrument and probe information

MENU - PROBE INFORMATION	
Product Name	EF5091
Production ID	US0715_10004
Serial Number	10004
Calibration Date	2007-06-21
Calibration Due Date	2008-06-21
Standard	
Shaping	No
Field Type	E
Lower Frequency Limit	300.000 MHz
Upper Frequency Limit	50000.000 MHz

The following information is displayed in the INFORMATION menu:

- **Device Information:** Information about the instrument, including:
 - The last and the next calibration,
 - Option 1, 2,... (options installed)
- **Probe Information:** Information about the probe used
- **Device Diagnostic:** Service information
- **Probe Test:** Checking all 3 channels (Ch1...Ch3) with a test source for proper operation

Displaying the information

⇒ Open the required function in the MAIN/INFORMATION/... menu.

7.4 Using the NBM-550 as a controller

You can use the NBM-550 to control other instruments from Narda Safety Test Solutions such as the NBM-520 or another NBM-550.

This allows you to measure in places that are difficult to reach with convenient operation and reading of results.

Using the NBM-550 as a controller

1. Open the **Controller Function** function (MAIN/INTERFACE/...).
2. Use the arrow keys ▲/▼ to select **On** and press the **OK** key.
 - ↳ The PC interface is set to **USB** regardless of the setting made in **Serial Interface** because the optical interface is reserved for communication between meters.
3. Connect the NBM-550 to the NBM-520 using an optical cable.
 - ↳ You can then use the NBM-520 as an extended probe handle.
 - ↳ All the measurement functions of the NBM-550 are available.

Note: The probe must be connected to the NBM-520. Probes connected to the NBM-550 will be ignored. The display of the used probe type on the controller (NBM-550) changes from **Probe:** to **Remote:** in order to indicate an external probe (for example **Remote: EF0391**).

7.5 Activating instrument options

Instrument options such as the GPS/Voice Recorder/ Conditional Logging option expand the capabilities of the NBM-550.

Options can be subsequently ordered and must then be activated via a provided activation code (Option Key). After activation, the option appears under **Information** (see “**Information**” on page 88).

Activation is conducted using the NBM-TS PC software (see “**PC software**” on page 73).

To activate an option:

1. Establish a connection between the instrument and PC (see “**Working with the PC software**” on page 75).
2. Start the NBM-TS software.
3. Activate the connection in the **Extras** menu via the **Connect** icon.
4. Click on the icon for **activation**.
 - ↳ A window in which all the options are listed opens. Active options are identified with marked check boxes.
5. Click on the desired option.
 - ↳ The **Option Code** field appears.
6. Enter the activation code from the Options Passport Document in the corresponding fields and click on **Activate**.
 - ↳ The option is activated and can be used.



You can find other tips in the PC software's online help.

Note: The activation code of an option is linked to the serial number of the instrument. For this reason, be sure to specify the serial number of the NBM-550 being used when placing subsequent orders.

8

PC software

This chapter gives you some basic information about the NBM-TS PC software. It explains the possible applications of the software, how to connect the NBM-550 to the PC and the settings you need to make on the NBM-550. It also describes how to update the firmware of the NBM-550 via the PC software.

You can find detailed information about the PC software itself in the on-line help for the PC software.

- 8.1 Using the PC software (page 74)**
- 8.2 Connecting the NBM-550 (page 75)**
- 8.3 Working with the PC software (page 75)**
- 8.4 Updating the firmware (page 76)**
- 8.5 Performing a reset (page 77)**

8.1 Using the PC software

The NBM-TS PC software is included with the NBM-550.

The PC software provides a large number of functions:

- Visualization of stored measurement results
- Off-line analysis of stored results
- Remote control of the NBM-550 (including live signals on the PC)
- Straightforward export of measurement data to Microsoft Excel
- Measurement data management in databases
- Direct printout of measurement results
- Screenshots of the displayed windows (copy and paste function)
- Bitmap downloads of NBM-550 displays

The PC software is essential for performing a firmware update and in order to activate subsequent options

Minimum system requirements

The following minimum system requirements must be met:

- Windows 2000 SP4 or Windows XP SP2
- Microsoft .NET Framework 2.0 (installed automatically if needed)
- USB driver (installed with the software)

8.2 Connecting the NBM-550

You can connect the NBM-550 to the PC using the USB interface or the optical interface:

- Use USB to make use of the higher transmission speed
- Use the optical interface for remote control, since the metallic USB cable can affect the measurements

Connecting the NBM-550 to a PC

1. Configure the interface
(see “[Configuring the interface](#)” on page 68).
⇒ Connect the NBM-550 to the PC using a USB cable or an optical cable.
 - ↳ The NBM-550 will be detected as a new device automatically by the PC.

8.3 Working with the PC software

The following conditions must be fulfilled before you can work with the PC software:

- ✓ The PC is ready to use and the PC software has been installed successfully,
- ✓ the NBM-550 is ready to use,
- ✓ NBM-550 and PC are connected together by a USB cable.

Start the PC software and use it to operate the NBM-550. Information on using the PC software is found in the on-line help for the PC software.

8.4 Updating the firmware

You can update the firmware of the NBM-550 in order to make use of new or improved functions.

You can only update the firmware using a PC on which the NBM-TS PC software has been installed.

Note: The NBM-550 must be supplied with power via the mains adapter while updating. This prevents the update from being interrupted due to discharged batteries. The PC software checks whether an adapter is connected, and, if not, displays a warning.

Updating the firmware



1. Save the latest firmware for the NBM-550 on the PC.
The latest firmware is available from the Narda website at <http://www.narda-sts.com>.

The NBM-TS software automatically directs you with a simple mouse click to the corresponding website in order to search for a newer version of both the NBM-550 firmware as well as the NBM-TS software. Always use the most recent NBM-TS version to perform a firmware update.

2. Establish a connection between the instrument and PC (see “**Working with the PC software**” on page 75).
3. Start the NBM-TS software.



4. Change to the **Extras** menu and activate the connection via the **Connect** icon.



5. Click on the **Firmware Update** icon and follow the instructions displayed on the screen
 - ↳ The NBM is initially switched off via remote control and you will be prompted to switch it on.
 - ↳ The firmware transfer is indicated by the flashing status LED.
 - ↳ After a successful transfer, a PC software notice appears.
6. Switch the NBM-550 on again.
 - ↳ The self test with the new firmware starts.

Note: A firmware update takes about 5 minutes. The NBM-550 display remains blank during update.

8.5 Performing a reset

If the instrument no longer responds, you can perform a reset to initialize it.

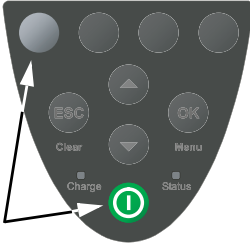
Performing a reset

⇒ Press the **1** function key and the **On/Off** key at the same time.

↳ The instrument restarts.

Note: A reset does not change any instrument parameters, it only restarts the instrument.

Use the Setup menu to reset the instrument to the factory default settings (see [“Saving and loading instrument settings”](#) on page 68).



9

Overview of all menus and functions

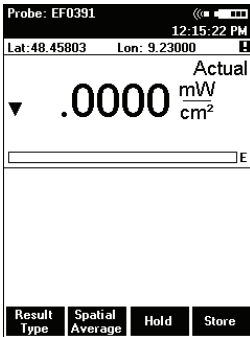
This chapter describes all the menus and functions of the NBM-550.

- 9.1 Measurement menus (page 80)**
- 9.2 Main menu (page 81)**
- 9.3 Measurement Settings (page 82)**
- 9.4 Data Logger (page 84)**
- 9.5 Memory Manager (page 86)**
- 9.6 Interface (page 87)**
- 9.7 Information (page 88)**
- 9.8 Setup (page 89)**
- 9.9 Clock (page 90)**

9.1 Measurement menus

The four function keys in the measurement menus allow you to select various functions.

Note: The function keys have the same functions in all display modes (Normal, XYZ, Monitor, History), with the exception of function key 1 (**Result Type**) which is inactive in **Monitor** display mode.



Function	Meaning
Result Type	Selects the result type: Actual, Max Hold, Average, Max Avg
Spatial Average	Switches to spatial averaging
Hold	Freezes the current (actual) measured value. The function key label changes to Release after you press Hold . Press it to unfreeze the measurement value.
Store	Stores the current (actual) measurement value

9.2 Main menu

⇒ To open the MAIN menu, press the **OK** from any of the measurement menus.

Note: The underlined settings are the factory default settings.

MENU - MAIN			
Measurement Settings			
Data Logger			
Memory Manager			
Interface			
Information			
Setup			
Clock			
Displays device related information			
Unit: mW/cm ²	Display: History	Zero	Data Viewer

Function	Meaning
Sub-menu	
Measurement Settings	<ul style="list-style-type: none"> Set general measurement parameters Select the language
Data Logger	Set the parameters for recording measurement data
Memory Manager	<ul style="list-style-type: none"> Display the free memory space Delete the last stored measured value or delete all measured values.
Interface	Set the interface parameters
Information	Display information about the instrument and the probe.
Setup	Save and recall instrument settings.
Clock	Set the time and date.
Function keys	
Unit:...	Select the measured value units: W/m ² , <u>mW/cm²</u> , V/m, A/m
Display:...	Select the display mode: <ul style="list-style-type: none"> <u>Normal</u>: Measured value (depending on selected result type) XYZ: X, Y, and Z axis results shown separately Monitor: actual, maximum, average, and minimum values History: actual value and graph of value vs. time
Zero	Start a zero adjustment
Data Viewer	<ul style="list-style-type: none"> Display a list of all saved measured values. Display saved measured values. Delete the last measured value saved.

9.3 Measurement Settings

You can change the general measurement parameters in the MEASUREMENT SETTINGS menu.

Page 1

MENU - MEASUREMENT SETTINGS	
Language	English
Averaging Time	06:00
Apply Correction Frequency	Off
Frequency	300.000 MHz
Apply Standard	Off
Standard	ICNIRP 98 OCC
Alarm Function	On
Alarm Limit	2.653 mW/cm ²
Auto-Zero Interval	15 min
Interval for averaged measurements	
Unit: mW/cm ²	Next

Function	Meaning
Menu functions	
Language	Select the language. Default: <u>English</u>
Averaging Time	Set the averaging time: 4 sec. – 30 min.; Default: <u>6 min.</u>
Apply Correction Frequency	Activate the frequency set under Frequency as a correction frequency: On, <u>Off</u>
Frequency	Set the frequency (applies to Apply Correction Frequency and Apply Standard)
Apply Standard	Activates the test standard set under Standard : On, <u>Off</u> The frequency set under Frequency is used as the reference frequency.
Standard	Select a test standard.
Alarm Function	Activate the alarm function: On, <u>Off</u>
Alarm Limit	Set the alarm limit (you can change the displayed units by pressing the Unit function key).
Auto-Zero Interval	Set the interval for the auto zero function: <ul style="list-style-type: none"> Off: Auto zero function disabled 6 min, <u>15 min.</u>, 30 min, 60 min
Function keys	
Unit:...	Select the measured value units: W/m ² , <u>mW/cm²</u> , V/m, A/m
Next	Open page 2 of the menu

Note: The language selection is deliberately at the top of the menu. This makes it easy for you to revert to the original setting if you change the language by mistake.

Page 2

⇒ Press the **Next** function key to open page 2 of the menu.

MENU - MEASUREMENT SETTINGS	
Auto Power-Off	15 min
LCD Backlight	10 s
Audible Indicator	Off
Spatial AVG Mode	Continuous
Combi Probe Use	E and H-Field
E+H Field Units	Selected Unit
Results Format	Fixed Triad
Cal. Date Check	On
Illumination time after last keypress	
Units mW/cm ²	Back

Function	Meaning
Menu functions	
Auto Power-Off	Set time until automatic power off: <ul style="list-style-type: none"> • Off: Auto power off disabled • 6 min, <u>15 min</u>, 30 min, 60 min
LCD Backlight	Set time until backlight switches off: <ul style="list-style-type: none"> • Permanent: Always on • Off: Always off • 5 s, <u>10 s</u>, 30 s, 60 s
Audible Indicator	Switch the signal tone for locating field maxima (hot spots) on or off: On, <u>Off</u>
Spatial AVG Mode	Select the method for spatial averaging: <ul style="list-style-type: none"> • Discrete: Individual measured values • <u>Continuous</u>: Continuous measurement
Combi Probe Use	Select the field type when using a combination probe: <ul style="list-style-type: none"> • E-field only • H-field only • <u>E- and H-field</u>: Both field types active
E+H Field Units	select units for simultaneous display of E-field and H-field (only applies in Normal mode): <ul style="list-style-type: none"> • <u>Selected</u>: Use the units selected using the Unit function key • V/m and A/m: Always use V/m and A/m regardless of the selection made with the Unit function key
Results Format	Select the display format for the unit dimensions: <ul style="list-style-type: none"> • Variable Triads: Unit dimensions are matched to the measurement result • <u>Fixed Triads</u>: Unit dimensions are independent of the measurement result
Cal. Date Check	Check the calibration date when the instrument is switched on: <u>On</u> , Off
Function keys	
Unit:...	Select the measured value units: W/m ² , <u>mW/cm²</u> , V/m, A/m
Back	Open page 1 of the menu

9.4 Data Logger

In the DATA LOGGER menu, you can set the measurement value recording parameters and start a timer controlled or conditional recording.

MENU - DATA LOGGER	
History Time Scale	20 min
Timer Start	15:00:00
Timer Duration	01:00:00
Timer Interval	1 min
Store Condition	Upper THRHLD
Store Range	Store all
Upper Threshold	1.00 mW/cm ²
Lower Threshold	100 µW/cm ²
Voice Recorder	Off
Start Condition Logging when true	
Unit: mW/cm ²	Condition Logging
	Timer Logging

Function	Meaning
Menu functions	
History Time Scale	History window time scale: 2 min., 8 min., <u>20 min.</u> , 1 h, 2 h, 4 h, 8 h
Timer Start	Starting time for timer controlled measured value recording.
Timer Duration	Measurement time for timer controlled measured value recording: 1 sec. – 99 h 59 min. 59 sec., Default: <u>10 min</u> ^{1) 3)}
Timer Interval	Time between storing consecutive measured values for timer controlled measured value recording: 1 s, 2 s, 3 s, 5 s, 10 s, 20 s, 30 s, <u>1 min.</u> , 2 min., 3 min., 6 min.
Store Condition (optional)	Start condition for conditional measured value recording: <ul style="list-style-type: none"> • <u>Upper THRHLD</u>: Recording starts when the threshold defined by Upper Threshold is exceeded. • Out of gap: Recording starts if the value is outside the range defined by Upper Threshold and Lower Threshold.
Store Range (optional)	Range of stored measured values for conditional measured value recording: <ul style="list-style-type: none"> • First and Last: Only the first and last values occurring during the period when the Store Condition was fulfilled are recorded. • <u>Store all</u>: All measured values that fulfill the Store Condition are recorded.^{2) 3)}
Upper Threshold (optional)	Upper threshold for Condition Logging
Lower Threshold (optional)	Lower threshold for Condition Logging (only applies to Out of gap)
Voice Recorder (optional)	Enable voice recording after storing measured values: On, <u>Off</u>

Function	Meaning
Function keys	
Unit:...	Select the measured value units: W/m ² , mW/cm ² , V/m, A/m
Condition Logging	Open the menu for starting conditional recording of measured values.
Timer Logging	Open the menu for starting timer controlled recording of measured values

- 1) The actual duration is limited by the maximum number of 32000 intervals per data set. For dependency of the timer duration on the selected timer interval, see table in "[Setting the recording parameters](#)" on page 59.
- 2) Up to 32000 events can be recorded.
- 3) After a successful recording, the measured values can be viewed with the Data Viewer (see "[Using the Data Viewer](#)" on page 63).
It should be notice that only the first 999 sub data sets (intervals or events) can be displayed on the NBM-550. The NBM-TS PC software enables complete evaluation of all data.

9.5 Memory Manager

You can display information about the last stored set of measured values and delete stored measured values in the MEMORY MANAGER menu.

MENU - MEMORY MANAGER				
Index	#	Date	Time	Type
0010	54	2006-11-25	11:35:36	CON ▶
Free Memory:		84%		
The latest result is displayed above				
Delete Latest	Delete All	Play ▶		

Function	Meaning
Information displayed	
Index	Memory position of saved measurement data set.
#	Number of measurements saved in this measurement data set.
Date	Date measured value was saved.
Time	Time measured value was saved.
Type	Storage type: <ul style="list-style-type: none"> • CON: Condition Logging • HST: History mode • MON: Monitor mode • NOR: Normal mode • SPA: Spatial Averaging • TIM: Timer Logging • XYZ: XYZ mode • ▶: With voice recording (comment)
Free Memory	Free memory space.
Function keys	
Delete Latest	Delete the last saved set of measured values (i.e. the displayed set).
Delete All	Delete all saved sets of measured values.
Play	Replay the voice recording (if one exists).

9.6 Interface

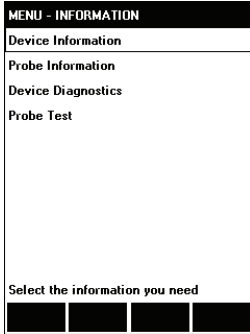
You can configure the interface, change the display of GPS coordinates, and adjust the volume of the audio output signal to the earphone using the INTERFACE menu.

MENU - INTERFACE	
Serial Interface	USB
Controller Function	Off
External Trigger	Off
GPS Position Unit	DegDec
Audio Output Level	50%
Enables the selected interface	

Function	Meaning
Serial Interface	Configures the serial interface for connection with a PC: <ul style="list-style-type: none"> • USB: Connection via USB cable to the multi-function socket • Optical: Connection via optical duplex cable, type RP-02
Controller Function	Use the NBM-550 to control another NBM-5xx instrument: On, <u>Off</u>
External Trigger	Trigger storage externally: On, <u>Off</u>
GPS Position Unit	Changes the display of GPS coordinates: <ul style="list-style-type: none"> • DMS: (d)dd° mm' ss.s" N e.g. Lat: 48° 48' 10.5" N / Lon: 9° 15' 00.0" E • MinDec: (-)(d)dd° mm.mmm' e.g. Lat: 48° 48.175' / Lon: 9° 15.000' • DegDec: (-)(d)dd.dddd° e.g. Lat: 48.29166° / Lon: 9.25000°
Audio Output Level	Sets the volume of the audio output to the earphone (only functions with the Voice Recording option)

9.7 Information

You can display information about the instrument and the probe in the INFORMATION menu.



Function	Meaning
Device Information	Displays information about the instrument: <ul style="list-style-type: none"> • Product Name: Instrument name • Production ID: Production number • Serial Number • Firmware Version • Calibration Date: Date of last calibration • Calibration Due Date: Date of next calibration due • Option 1, 2, 3: Installed options
Probe Information	Displays information about the probe that is connected: <ul style="list-style-type: none"> • Product Name: Probe name • Production ID: Production number • Serial Number • Calibration Date: Date of last calibration • Calibration Due Date: Date of next calibration due • Shaping: Yes or No (flat) • Standard: Test standard for shaped probes • Field Type: E or H • Lower Frequency Limit: Smallest frequency that can be measured • Upper Frequency Limit: Greatest frequency that can be measured
Device Diagnostic	Service information <ul style="list-style-type: none"> • Temperature • Battery voltage • Battery capacity
Probe Test	Checking instrument functions (see “Checking instrument functions” on page 96)

9.8 Setup

You can save and recall your instrument setups and specify the power on behavior of the instrument in the SETUP menu.

The following parameters are not changed by the setups:

- Language
- Serial Interface
- Controller Function
- Power On
- Contrast

MENU - SETUP	
Default	User
Setup 1	Factory
Setup 2	User
Setup 3	Factory
Setup 4	Factory
Setup 5	User
Setup 6	User
Setup 7	User
Setup 8	Factory
Select the desired preset configuration	
Power-On Previous	Delete Load Save

Function	Meaning
Default	The instrument setup saved here is used when you switch on the instrument if you have selected the Default setting with the Power-On function key.
Setup 1 – 8	Memory positions for storing instrument setups
User	Indicates that you have stored your own settings at this memory position.
Factory	Indicates that the factory default settings are stored at this memory position, not a user setup.

Function keys

Power-On	Sets the power on behavior: <ul style="list-style-type: none"> • Previous: The settings in use when the instrument was last switched off are reloaded. • Default: The settings in the Default memory position are loaded when the instrument is switched on.
Delete	Deletes the user setup stored in a memory position.
Load	Loads the user setup stored in a memory position.
Save	Saves the current setup to a memory position.

9.9 Clock

You can set the time and date in the CLOCK menu.

MENU - CLOCK	
Time	11:31:59 AM
Time Format	12 h
Date	12/31/2006
Date Format	mm/dd/yyyy
Sets the date of the system clock	

Function	Meaning
Time	Sets the time.
Time Format	Sets the time format: <ul style="list-style-type: none"> • 12 h clock • <u>24</u> h clock
Date	Sets the date.
Date Format	Sets the date format: <ul style="list-style-type: none"> • <u>mm/dd/yyyy</u> • dd.mm.yyyy • yyyy-mm-dd

10

Instrument maintenance

This chapter describes how to clean the instrument and how to replace the batteries.

- 10.1** [Cleaning the instrument \(page 92\)](#)
- 10.2** [Replacing / removing the batteries \(page 93\)](#)
- 10.3** [Disposal \(page 95\)](#)
- 10.4** [Checking instrument functions \(page 96\)](#)

10.1 Cleaning the instrument

NOTICE

Damage to the instrument from liquids

The instrument may be damaged or destroyed if liquids are allowed to get inside the casing.

⇒ Make sure that no liquid gets inside the instrument.

NOTICE

Solvents

Solvents can corrode the surfaces of basic unit, probe and AC Adapter / Charger.

⇒ You must not use solvents to clean the basic unit, probe, and AC Adapter / Charger.

Cleaning the instrument

1. Use a soft cloth to clean the instrument. You can use lukewarm water to which a little detergent solution has been added as a cleansing agent.
2. To prevent streaks and spots, wipe off the instrument with a dry cloth while it is still damp.

10.2 Replacing / removing the batteries

WARNING

Improper replacement of batteries

Overheating, explosion, or ignition of rechargeable batteries/batteries or their surroundings

- ⇒ Only use the NBM-550 with NiMH rechargeable batteries (AA, Mignon).
- ⇒ Do not use dry batteries.
- ⇒ Do not replace individual batteries; always replace the entire set.
- ⇒ Always use identical batteries.

WARNING

Short circuiting the batteries

Overheating, explosion, or ignition of rechargeable batteries or their surroundings

- ⇒ Never touch both poles of the batteries simultaneously with a metal object.
- ⇒ Always close the battery compartment immediately after replacing batteries.
- ⇒ Never use the NBM-550 with the battery compartment open.

WARNING

Reverse charging of rechargeable batteries

NiMH batteries can explode if you charge them with reversed poles

- ⇒ Make sure you insert the batteries correctly as shown on the base of the battery compartment.

The rechargeable batteries have a useful life of about 1000 charge cycles or 3 years (whichever occurs soonest).

Replace the batteries if the operating time is significantly reduced although the batteries are fully charged.

Replacing the batteries

1. Switch off the instrument and disconnect it from all other devices (AC Adapter / Charger, USB).
2. Open the battery compartment on the back of the instrument.
3. Remove the old batteries and dispose of them according to the waste disposal ordinances applicable in your country.
4. Insert the new batteries.
Make sure you insert them the right way round according to the diagram on the base of the battery compartment.
5. Close the battery compartment.
6. Connect the AC Adapter / Charger and charge the batteries (a complete charge cycle takes about 2 hours).

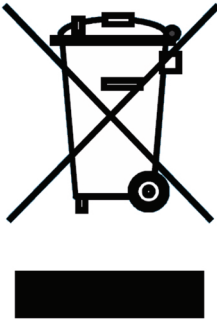


10.3 Disposal

Rechargeable batteries

Do not dispose of the batteries with the normal household waste. You should dispose of old batteries that are no longer required in accordance with the waste disposal ordinances in your country.

Instrument



This product is subject to European Guideline 2002/96/EC governing the disposal of waste electrical and electronic equipment (WEEE).

Do not dispose of this instrument with the normal household waste. You should dispose of it in accordance with the waste disposal ordinances in your country.

Within the European Union, all electronic measuring systems purchased from Narda after 13th August 2005 can be returned when they reach the end of their useful life. The measuring systems that come under this regulation or the documents that accompany them are clearly marked with the symbol of a garbage bin crossed out with black lines.

You can obtain further information from your local Narda Sales Partner or at www.narda-sts.com.

10.4 Checking instrument functions

WARNING

Probe is not operating properly

Possibly present high radiation values are not recognized.

- ⇒ Check probes for proper operation with a signal source before using this measuring instrument. This is especially important for thermocouples because the sensors can be affected by various mechanical and environmental stressors. Narda offers portable sources to accomplish this important step (see “**Accessories**” on page 111).
- ⇒ Before beginning any RF radiation measurement, always advise yourself of the frequencies and field strengths that you could expect to encounter.

Performing a function test:

1. Connect the probe to the instrument (see “**Connecting the probe**” on page 20).
2. Switch the instrument on (see “**Switching on**” on page 24) and wait until the self test is complete.
3. Open the **Probe Test** function (MAIN/INFORMATION/PROBE TEST).
 - ↪ The measured field strength will be displayed separately for all 3 input channels (Probe channel 1...3).
4. Bring an appropriate signal source (see “**Appropriate test sources**” on page 98) near the probe head.
5. Switch the signal source on
 - ↪ The Probe channel 1...3 display increases: **Function test OK.**
Press the **ESC** button three times to change to the measurement mode.
 - ↪ The Probe channel 1...3 display does not increase: **Function test not OK.**
Do not use the probe any more. Contact the responsible service center.

Measures to be taken when function test is erroneous:

⇒ Repeat the test:

- move the signal source around the probe head to generate a signal for each of the 3 spatial axes,
- monitor the display while moving the signal source.

Note: Do not use this function test for measurements. This test is suitable only for checking probes.

All 3 channels must respond to the field source. It is no fault if some channels display identical values. The meaning of the channels varies depending on the type of probe and is irrelevant for this test.

For more details about the probe, refer to the data sheet.

Appropriate test sources

The following table shows appropriate test sources for a function test.

Probe	Test Source: 27 MHz (2244/90.38)	Test Source: 446 MHz PMR Pocket Radio ¹⁾	Test Source: 12 GHz Model 8699 ²⁾
EF0391	✓	✓	–
EF0392	✓	✓	–
EF0691	✓	✓	–
EF1891	✓	✓	✓
EF6091	✓	✓	✓
HF3061	✓	✓	–
HF0191	✓	✓	–
EA5091	–	✓	–
EB5091	–	✓	–
EC5091	–	✓	–
ED5091	–	✓	–
EF5091	–	✓	✓
EF5092	–	✓	✓

1) PMR Pocket Radios are commonly available in electronics stores.

2) Model 8699 only available for North America.

11

Specifications

This chapter lists the specifications of the NBM-550.

- 11.1 Display (page 100)**
- 11.2 Measurement functions (page 100)**
- 11.3 Result memory (page 101)**
- 11.4 Interfaces (page 101)**
- 11.5 Options (page 102)**
- 11.6 General specifications (page 103)**
- 11.8 AC Adapter / Charger (page 104)**
- 11.9 CE Declaration of Conformity (page 105)**
- 11.10 Declaration of origin (page 107)**

11.1 Display

Display type	Transreflective monochrome LCD
Display size	10 cm (4"), 240 x 320 pixels
Backlight	White LEDs, selectable lighting time (OFF, 5 s, 10 s, 30 s, 60 s, PERMANENT)
Display refresh rate	200 ms for bar graph and graphics, 400 ms for numerical result values

11.2 Measurement functions

Result units	mW/cm ² , W/m ² , V/m, A/m, % of standard (% of standard is related to power density)
Display range	0001 to 9999, switchable between variable and permanent triads
Display range, variable triads	0.01 V/m bis 100.0 kV/m 0.01 mA/m bis 265.3 A/m 0.001 mW/m ² bis 26.53 MW/m ² 0.1 nW/cm ² bis 2.653 kW/cm ² 0.0001% bis 9999%
Display range, fixed triads	0.01 bis 9999 V/m 0.0001 bis 265.3 A/m 0.0001 bis 9999 W/m ² 0.0001 bis 9999 mW/cm ² 0.0001% bis 9999%
Result types (isotropic, RSS)	Latest value (Actual), Maximum, Minimum, Average, Maximum Average
Result type (XYZ mode)	Latest values: Actual X, Actual Y, Actual Z (for probes with separate axis connections)
Time averaging	Averaging time selectable from 4 s to 30 min (2 s steps)
Spatial averaging	Individual or continuous sampling
Multi-position spatial averaging	Averaging over up to 24 spatially averaged results, storage of individual position results and of the total value
Progress memory (History mode)	Graphical display of the latest values versus time (time span 2 min to 8 h)
Correction frequency	1 kHz to 100 GHz or OFF (direct frequency selection, interpolation between calibration points)
Hot Spot search	Acoustic indication of increasing or decreasing field strength (Actual or Maximum)
Alarm function	2 kHz warning tone (4 Hz repetition rate), variable threshold
Timer controlled recording (Timer Logging)	Starting time setting: Up to 24 h in advance or record immediately Recording time: up to 100 h Store interval: Every 1 s to 6 min (in 11 steps) Number of store intervals: up to 32000

11.3 Result memory

Physical memory	12 MB non-volatile Flash memory for measurement results and voice comments
Memory capacity	Up to 5000 results (indices with instrument setting, timestamp, and GPS data if included)

11.4 Interfaces

Remote operation	Optional via USB or optical RS-232 interface
• USB	Serial, full duplex, 460800 baud (virtual COM port), multi-function plug connector
• Optical interface	Serial, full duplex, 115200 baud, no parity, 1 start bit, 1 stop bit
Earphone	3.5 mm jack plug, ≥ 16 ohms, mono, only with voice comments option (Voice Recorder)
External triggering (for storing results)	Via multi-function plug connector. Connecting cable with BNC plug available as optional accessory. Triggering by closing a contact.
External GPS receiver	Via multi-function plug connector. The GPS receiver with connection cable is contained in the GPS option.
Probe connection	Plug-and-play with automatic detection, compatible with all NBM-series probes, integration time for measuring input approx. 270 ms, measurement sampling rate 5 Hz (5/50/60 Hz for remote operation)

11.5 Options

Conditional Logging

Conditions Selectable:
 – Upper threshold: Value stored when set threshold exceeded
 – Out of gap: Value stored if outside the range limits
 (upper / lower threshold)

Store range Selectable:
 – Store all (as long as the condition is fulfilled),
 store rate 5 Hz
 – First and last result (for which the condition is fulfilled)

Voice comments (Voice Recorder)

Microphone Built-in microphone on top of instrument close to the Narda logo

Record level Fixed level,
 VU meter display for checking the level during recording

Length of recording Maximum 30 s per voice comment,
 1 comment can be saved for each measurement result

Recording format 8 bit PCM mono, saved as WAV file
 (approx. 240 kB for a 30 s comment)

Replay External earphone (with output volume control)
 or via the NBM-TS PC software

GPS position logging

Receiver type 12 channel satellite tracking, supports DGPS,
 WAAS / EGNOS compatible

Displayed position data Latitude (Lat) and longitude (Lon), selectable units:
 DMS (degrees, minutes, seconds)/ MinDec (decimal minutes)/
 DegDec (decimal degrees)

Geodetic system WGS84 / NAD83

Position accuracy < 3 m (DGPS, WAAS), <15 m (SPS),
 display indication of enhanced accuracy.
 Variations are valid with a probability of 95%.

Refresh rate 1 s

Detection time 2 s (restoration of reception) up to 5 minutes
 (if position completely unknown)

Receiver size / weight Diameter 61 mm, height 19.5 mm,
 weight 62 g (approx. 100 g with fixing bracket)

Receiver mounting Uses the tripod bush on the underside of the instrument,
 fixing set is included

11.6 General specifications

Recommended calibration interval	24 months ¹⁾	
MTBF	>10 years (basic unit with probe)	
Batteries	Standard NiMH rechargeable batteries, 4 x type AA (Mignon), 2500 mAh	
Operating time	20 hours (without backlight or GPS) 12 hours (permanent backlight, without GPS) 10 hours (without backlight, with GPS)	
Charging time	2 h	
Battery status display	100%, 80%, 60%, 40%, 20%, 10%, low battery (<5%)	
Temperature range	Operational: -10 °C to +50 °C Non-operational (transport): -30 °C to +70 °C	
Humidity	5 to 95% relative humidity, no condensation; ≤29 g/m ³ absolute humidity (IEC 60721-3-2 class 7K2)	
Immunity to radiated electromagnetic fields	200 V/m (100 kHz to 60 GHz) Note: The immunity may be less than the specified measurement range of a probe	
Dimensions (H x W x D) basic unit	Series A, B	46 x 98 x 276 mm (without probe and GPS receiver)
	Series C...	46 x 98 x 282 mm (without probe and GPS receiver)
Dimensions (H x W x D) transport case	470 x 545 x 230 mm (outside dimensions)	
Weight basic unit	approx. 550 g (without probe and GPS receiver)	
Weight transport case	4.2 kg (empty)	
Accessories (included)	Hard shell case, AC Adapter / Charger, batteries, shoulder strap, table top tripod, NBM-TS software, operating manual, calibration certificate, USB interface cable	

1) only for basic instrument; probes are specified separately

11.7 Standards compliance

Climatic	Storage	1K3 (IEC 60721-3) extended to -10 °C to +50 °C
	Transport	2K4 (IEC 60721-3) restricted to -30 °C to +70 °C
	Operating	7K2 (IEC 60721-3) for the basic unit extended to -10 °C to +50 °C
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress Protection		IP 42 (IEC 60529)
ESD and EMC		EN 61326:2006
Safety		EN 61010-1:2002
CE (European Union)		Yes

11.8 AC Adapter / Charger

Nominal AC line voltage range	100 V to 240 V AC
Nominal AC line frequency range	50 Hz to 60 Hz
Output voltage	9 V DC
Maximum output current	1.5 A
Temperature range	
• Storage	-40 °C to +70 °C
• Operation	0 °C to +40 °C

11.9 CE Declaration of Conformity



Supplier's Declaration of Conformity

(in accordance with ISO/IEC 17050-1)

SDoC no.: 2008-11

Issuer's name: Narda Safety Test Solutions GmbH (manufacturer)

Issuer's address: Sandwiesenstr. 7, D-72793 Pfullingen, Germany

Object of declaration:

Model No.	Part No.	Designation
NBM-550	2401/01	Broadband Field Meter

This declaration includes the following probes:

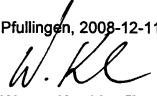
EF0391 (P/N 2402/01)	EC5091 (P/N 2402/09)
EF1891 (P/N 2402/02)	ED5091 (P/N 2402/10)
EF5091 (P/N 2402/03)	EF5092 (P/N 2402/11)
EF6091 (P/N 2402/04)	EF0392 (P/N 2402/12)
HF3061 (P/N 2402/05)	EF0691 (P/N 2402/14)
HF0191 (P/N 2402/06)	
EA5091 (P/N 2402/07)	
EB5091 (P/N 2402/08)	

The object of the declaration described above is in conformity with the requirements of the following documents:

Documents No.	Title
2004/108/EC	Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing 89/336/EEC
EN 61326: 2006	Electrical equipment for measurement, control and laboratory use. EMC requirements
2006/95/EC	Directive of the European Parliament and of the Council on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (repealing Low Voltage Directive 73/23/EEC)
EN 61010-1: 2002	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

Signed for and on behalf of: Narda Safety Test Solutions GmbH

Place and date of issue: Pfullingen, 2008-12-11

Signature: 

Name, function: Werner Kumbier, Technical Director



Annex – EMC

of Supplier's Declaration of Conformity

Relates to: SDoC no. 2008-11

Object: NBM-550 Part No. 2401/01 Broadband Field Meter
with probes Part No. 2402/xx

Conformance of the product with Directive 2004/108/EC (EMC Directive) is given according to the harmonized European standard: EN 61326: 2006

Tests according to EN 61326:

Electromagnetic immunity	Standard	Test level, condition
Immunity to electrostatic discharge	EN 61000-4-2	2 kV / 4 kV (level 1/2)
Immunity to radiated electromagnetic fields	EN 61000-4-3	compliant, verified by EN 61000-4-21 with test levels > 200 V/m
Fast transient common mode immunity (on power supply port)	EN 61000-4-4	2 kV (level 3)
Surge immunity	EN 61000-4-5	0.5 kV / 1 kV (level 1/2)
Immunity to conducted high frequency disturbances	EN 61000-4-6	3 V rms (level 2) 150 kHz – 80 MHz
Immunity to voltage dips, short-time interruptions and voltage fluctuations	EN 61000-4-11	500 ms (70 % supply voltage) 200 ms (40 % supply voltage) 20 ms (0 % supply voltage) 5000 ms short interruption
Electromagnetic emission	Standard	Test level, condition
Radiated emission	EN 55011 (CISPR 11)	Class B
Conducted emission	EN 55011 (CISPR 11)	Class B
Harmonic current emissions	EN 61000-3-2	Class A
Voltage fluctuation and flicker	EN 61000-3-3	10 min observation time

11.10 Declaration of origin

Country of origin:	Germany
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12

Ordering information

This chapter contains the information needed for ordering the NBM-550, together with its probes and accessories.

- 12.1 NBM-550 (page 110)**
- 12.2 Probes (page 110)**
- 12.3 Accessories (page 111)**

12.1 NBM-550

NBM-500 Set 1 Narda Broadband Field Meter contains:	2400/101
<ul style="list-style-type: none"> • NBM-550 Basic Unit (including 4 x NiMH batteries, AA/Mignon) (2401/01) • Hard case, holds meter and up to 4 probes (2400/90.06) • Power supply 9 VDC, 100 V-240 VAC (2259/92.06) • Shoulder strap, 1 m (2244/90.49) • Tripod, benchtop, 0.16 m, non-conductive (2244/90.32) • Cable, USB interface for NBM-550, 2 m (2400/90.05) • Software, NBM-TS, PC transfer (2400/93.01) • Operating manual NBM-550 • Certificate of calibration 	
Option set for NBM-550: GPS, Voice Recorder, Conditional Logging contains:	2401/40
<ul style="list-style-type: none"> • GPS receiver • GPS mounting set • Earphone • Option key 	
Probes are not included	

12.2 Probes

Probe EF0391, E-field for NBM, 100 kHz – 3 GHz, isotropic	2402/01
Probe EF1891, E-field for NBM, 3 MHz – 18 GHz, isotropic	2402/02
Probe EF5091, E-field for NBM, thermocouple, 300 MHz – 50 GHz, isotropic	2402/03
Probe EF6091, E-field for NBM, 100 MHz – 60 GHz, isotropic	2402/04
Probe HF3061, H-field for NBM, 300 kHz – 30 MHz, isotropic	2402/05
Probe HF0191, H-field for NBM, 27 MHz – 1 GHz, isotropic	2402/06
Probe EA5091, Shaped E-field, FCC for NBM, 300 kHz – 50 GHz, isotropic	2402/07
Probe EB5091, Shaped E-field, IEEE for NBM, 3 MHz – 50 GHz, isotropic	2402/08
Probe EC5091, Shaped E-field, SC6 Canada for NBM, 300 kHz – 50 GHz, isotropic	2402/09
Probe ED5091, Shaped E-field, ICNIRP for NBM, 300 kHz – 50 GHz, isotropic	2402/10
Probe EF5092, E-field for NBM, thermocouple, 300 MHz - 50 GHz, high power, isotropic	2402/11
Probe EF0392, E-field for NBM, 100 kHz – 3 GHz, high power, isotropic	2402/12
Probe EF0691, E-field for NBM, 100 kHz – 6 GHz, isotropic	2402/14

12.3 Accessories

Test generator 27 MHz	2244/90.38
Test generator, 12 GHz	Model 8699 (for North America only)
Tripod (non-conducting), 1.65 m, with carrying bag	2244/90.31
Tripod extension (non-conducting), 0.50 m (for 2244/90.31)	2244/90.45
Extension handle (non-conducting), 0.42 m	2250/92.02
Cable, coaxial, multi-pin to BNC for NBM-550, external triggering, 2 m	2400/90.04
Cable, optical fiber, duplex (1000 μ m) RP-02, 2 m	2260/91.02
Cable, optical fiber, duplex (1000 μ m) RP-02, 20 m	2260/91.03
Cable, optical fiber, duplex, F-SMA to RP-02, 0.3 m	2260/91.01
O/E converter RS232, RP-02/DB9	2260/90.06
O/E converter USB, RP-02/USB	2260/90.07
Cable, adapter, USB 2.0 - RS232, 0.8 m	2260/90.53
Carrying Strap for Hardcase SRM/NBM	3001/90.04
Protective pouch for NBM-550	2401/90.01
Protective pouch for NBM probe (compatible with all NBM probes except 2402/05)	2402/90.01

13

Glossary

This chapter explains some important terms that are used in this operating manual.

Average The average (mean) value formed from a range of numerical values or measurements. For high frequency electromagnetic fields, RMS (root mean square) averaging is used for determining field strength values (V/m, A/m) and linear averaging for power density values (W/m^2 , mW/cm^2).

DGPS Differential GPS

Method of improving the accuracy of GPS navigation by transmitting correction data (orbit and time system).

E-field Electric field

Electric fields emanate from electrical charges or are caused by induction in changing magnetic fields. Electric field strength is expressed in volts per meter: $E = [V/m]$.

EGNOS European Geostationary Navigation Overlay Service

European system comparable with DGPS for improving the position accuracy of GPS from 10 to 20 meters to 1 to 3 meters. It also warns users when the positioning systems are transmitting incorrect data or if the integrity of the GPS data is restricted for some other reason. EGNOS is fully compatible with the American WAAS system.

EMC Electromagnetic compatibility

Electromagnetic compatibility (EMC) describes the technical and legal aspects of electrical engineering covering the interactions between electrical equipment due to the electromagnetic fields that they generate.

GPS Global Positioning System

The Global Positioning System is a satellite supported navigation system belonging to the US Defense Ministry that is used for determining the position of any location in the world.

H-field Magnetic field

Magnetic fields are generated by moving electrical charges. Magnetic field strength H is expressed in Amperes per meter: $H = [A/m]$.

Isotropy From the Greek: isos = same; tropos = turning, direction. Signifies the degree to which a characteristic is independent of its direction. An antenna that measures isotropically is therefore an ideal antenna that would yield the same result in all spatial directions regardless of its orientation.

NAD83 North American Datum of 1983

NAD83 is an earthbound reference point based on the Geodetic Reference System of 1980. This has determined the size and shape of the earth to an accuracy of 2 meters using satellites and electronic measuring systems.

RMS Root mean square: This term describes an average (mean) obtained by taking the square root of the average of the squares of the measured values; this method is used when measuring high-frequency electromagnetic field strengths. The averaging corresponds to a linear average of power density values.

RSS Root Sum Square

Formula used to calculate the total field strength from the three spatial components X, Y, and Z:

$$RSS = \sqrt{X^2 + Y^2 + Z^2}$$

SPS The standard positioning service works with the C/A Code (Coarse/Acquisition Code) and is available for general, civilian use.

S-field Product of E-field and H-field, expressed as power density or electromagnetic power flux density. The power density S is expressed in Watts per unit area: $S = [W/m^2]$ (or $[mW/cm^2]$ or $[\mu W/cm^2]$)

TEM cell Transverse Electromagnetic Cell

TEM cells are used to perform RF supported noise immunity investigations or emission measurements. They are much smaller than an EMC cabin (maybe just large enough to hold a PC), and are basically a coaxial conductor expanded into rectangular form for generating transverse electric fields. If the frequency range is extended upwards into the gigahertz range, the cells are called GTEM cells (Gigahertz Transverse Electromagnetic Cell).

USB Universal Serial Bus

USB is a bus system used to connect a computer to peripheral devices. Equipment fitted with USB can be connected and disconnected while running (hot plugging). The connected devices and their properties are detected automatically.

WAAS Wide Area Augmentation System

WAAS is part of the SBAS (Satellite-Based Augmentation System) for improving the existing US \rightarrow GPS. WAAS signals are transmitted by separate satellites on the same frequencies as GPS and serve to improve the relatively inaccurate GPS position information.

WAV The WAV file format is a container format for digitally storing audio data, which can contain compressed audio data in addition to the usual uncompressed PCM raw data. It has become the de-facto standard for storing digital audio data on MS Windows-based PC systems.

WGS84 World Geodetic System 1984

WGS84 is a system used for surveying the earth, which was introduced by the Americans in 1984 along with the triumph of satellite navigation. WGS84 includes both the reference point as well as the ellipsoid and is the geodetic basis for \rightarrow GPS.

Index

A

- AC adapter/charger, dangers from 10
- Activating instrument options 72
- Activating voice recording 42
- Add voice comments 42
- After transport and storage 14
- Alarm function activation 51
- Appropriate test sources 98
- Audible Indicator 52
- Auto off function 30
- Auto zero 29

B

- Backlight 31
- Batteries
 - Disposal 95
 - Replacing / removing 93
- Battery operation 17

C

- Calibration 24
- Case 14
- CE Declaration of Conformity 105
- Changing the result type 49
- Changing the units 31
- Changing the units format 32
- Charge state indicator 19
- Checking instrument functions 96
- Cleaning 92
- Clock 90
- Combination probes
 - Select field type and units 34
- Connecting the probe 20
- Continuous spatial measurement 45
- Contrast 31
- Controller operation 71
- Correction frequency, measuring with 56

D

- Data list
 - see Data Viewer
- Data Logger 84
- Data recording, see Data Logger
- Data Viewer 63
- Date and time, see Clock
- Declaration of origin 107
- DGPS 114
- Discrete spatial measurement 44
- Display mode
 - History 46
 - Monitor 50
 - Normal 40
 - XYZ 48
- Displaying instrument and probe information 70
- Displaying probe and instrument information 70
- Disposal 95

E

- E-field 114
- EGNOS 114
- EMV 114
- Error message 24
- Evaluating the curve 47
- External Trigger 41

F

- Function test 96

G

- GPS 114
 - Changing the display 33
 - Fitting the module 22
 - Reception 25
- GTEM cell 116

H

H-field 115
History mode 46
Hot spot search 52

I

Improper use 8
Information menu 88
Instrument functions, checking 96
Instrument overview 15
Interface configuration 68
Interface menu 87
Isotropy 115
Items included 12

L

Locking the keypad 35

M

Main menu 81
Managing result data 62
Measured values
 Freezing 41
 Storing 41
Measurement menus 80
Measurement Settings 82
Measurements
 Conditional recording 60
 Recording by timer control 58
Measuring discrete values 44
Measuring values continuously 45
Memory Manager 63, 86
Monitor mode 50

N

NAD83 115
Normal mode 40

O

Operating concept 26
Options, activating 72
Ordering information 109
Overview

Clock 90
Data Logger 84
Information 88
Interface 87
Main menu 81
Measurement menus 80
Measurement Settings 82
Memory Manager 86
Setup 89

P

Packaging 12
PC software, using the 74
Probe test 96
Proper use 8

R

Rechargeable batteries
 Proper handling 19
Reset 77
Result data management 62
Result type selection 40
RSS 115

S

Safety
 Dangers from electromagnetic fields 9
 Proper handling of rechargeable batteries 19
Save / Load instrument settings 68
Selecting the language 29
Setting the date and time 32
Setup menu 89
S-field 115
Specifications 99
SPS 102, 115
Storing graphical records 48
Switching on 24

T

TEM cell 116
Terminology 6

Test sources, appropriate 98
Test standard, measuring with a 52
Time and date setting 32
Transport and storage 14
Transport case 14
Transport damage 13
Trigger cable 41
Tripod, using the 22

U

Unpacking 12
Updating the firmware 76
USB 116

W

WAAS 116
WAV 116
WGS84 116

X

XYZ mode 48

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