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 .................................. 3
  Structure of this operating manual .............................. 3
  User interface language ......................................... 4
  Characters and symbols used .................................... 4
  Terminology ..................................................... 7

2 Safety instructions .................................................. 9
  2.1 Using this operating manual .................................. 10
  2.2 Proper use ..................................................... 10
  2.3 Improper use ................................................ 10
  2.4 Dangers from electromagnetic fields ......................... 11
  Strong Fields .................................................. 11
  Measurement Errors ........................................... 11
  Probe is not operating properly .............................. 11
  2.5 Dangers when handling rechargeable batteries ............ 12
  2.6 Dangers from AC Adapter / Charger ........................ 12

3 Preparing the NBM-550 for use .................................. 13
  3.1 Unpacking .................................................... 14
  Packaging ....................................................... 14
  Items included ................................................ 14
  Transport damage .............................................. 14
  Equipping the case ............................................ 15
  After transport and storage ................................... 16
  3.2 Instrument overview ......................................... 17
## Contents

3.3 Using rechargeable batteries and the AC Adapter / Charger .......................................................... 19
   Power supply ................................................................................................................................. 19
   Charge state and power source indicator ...................................................................................... 19
   Operation from rechargeable batteries ......................................................................................... 20
3.4 Connecting the probe. .................................................................................................................. 21
3.5 Fitting the GPS module ............................................................................................................... 22
3.6 Using the table top tripod ........................................................................................................... 23

4 Getting started ............................................................................................................................... 25
   4.1 Switching on. .............................................................................................................................. 26
   Self test ........................................................................................................................................ 26
   Calibration .................................................................................................................................... 26
   GPS reception ............................................................................................................................... 27
   4.2 The NBM-550 operating concept ............................................................................................... 27
   Measurement screen overview ....................................................................................................... 28
   The menu levels ............................................................................................................................. 28
   Navigating in the menus ............................................................................................................... 30
   4.3 Making basic settings. ............................................................................................................... 31
   Selecting the language .................................................................................................................. 31
   Setting the auto zero adjustment .................................................................................................. 31
   Setting the auto off function ......................................................................................................... 32
   Setting the backlight. ................................................................................................................. 33
   Setting the contrast ....................................................................................................................... 33
   Changing the display units ............................................................................................................ 33
   Changing the units format .............................................................................................................. 34
   Setting the date and time ............................................................................................................... 34
   Changing the GPS display ............................................................................................................. 35
   Selecting the field type and units for combination probes ........................................................... 36
   Locking the keypad ......................................................................................................................... 37

5 Measuring with the NBM-550 ........................................................................................................... 39
   5.1 Measuring in Normal display mode ......................................................................................... 40
Contents

Selecting the result type .............................................. 40
Freezing a measured value ............................................ 41
Storing a measured value ............................................ 41
Add voice comments (optional) ..................................... 41
Setting the averaging time ......................................... 43
5.2 Measuring the spatial average ................................ 43
Measuring discrete values ............................................ 44
Measuring values continuously .................................... 45
5.3 Measuring in History display mode ......................... 46
Display overview ....................................................... 47
Evaluating the curve .................................................. 47
Storing the graphical record ....................................... 48
5.4 Measuring in XYZ display mode ............................... 48
Display overview ....................................................... 49
5.5 Measuring in Monitor display mode ......................... 49
Display overview ....................................................... 50
5.6 Activating the alarm function .................................. 50
5.7 Audible Indicator (hot spot search) ......................... 52
5.8 Measuring with a test standard ............................... 52
Possible displays when using a test standard .................. 54
5.9 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 ............................................ 63
Using the Memory Manager ........................................ 63
Contents

Using the Data Viewer ............................................. 64
Data Viewer display examples ................................. 65

7 Setup and configure ........................................... 69
  7.1 Configuring the interface ................................. 70
  7.2 Saving and loading instrument settings .............. 70
      Menu overview .............................................. 70
  7.3 Displaying instrument and probe information ......... 72
  7.4 Using the NBM-550 as a controller ..................... 72
  7.5 Activating instrument options .......................... 73

8 PC software ....................................................... 75
  8.1 Using the PC software .................................... 76
      Minimum system requirements .......................... 76
  8.2 Connecting the NBM-550 ................................. 76
  8.3 Working with the PC software ......................... 77
  8.4 Updating the firmware ................................... 77
  8.5 Performing a reset ........................................ 78

9 Overview of all menus and functions ....................... 81
  9.1 Measurement menus ....................................... 82
  9.2 Main menu .................................................. 82
  9.3 Measurement Settings .................................... 83
      Page 1 ...................................................... 83
      Page 2 ...................................................... 84
  9.4 Data Logger ................................................ 86
  9.5 Memory Manager .......................................... 88
  9.6 Interface ................................................... 89
  9.7 Information ................................................ 90
  9.8 Setup ....................................................... 91
  9.9 Clock ....................................................... 92

10 Instrument maintenance ...................................... 93
10.1 Cleaning the instrument ........................................... 94
10.2 Replacing / removing the batteries .............................. 94
10.3 Disposal .............................................................. 96
   Rechargeable batteries ........................................... 96
   Instrument .......................................................... 97
10.4 Checking instrument functions .................................. 97
   Appropriate test sources ......................................... 99

11 Specifications ......................................................... 101
11.1 Display ............................................................... 102
11.2 Measurement functions .......................................... 102
11.3 Result memory ...................................................... 103
11.4 Interfaces ........................................................... 103
11.5 Options .............................................................. 103
11.6 General specifications ............................................ 105
11.7 AC Adapter / Charger ............................................. 105
11.8 CE Declaration of Conformity .................................... 106
11.9 Declaration of origin .............................................. 108

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 3)
1 Useful information

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 31).

⇒ 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:

<table>
<thead>
<tr>
<th>SIGNAL WORD</th>
<th>Type and source of danger</th>
<th>Consequences of failure to observe warning</th>
<th>Instructions for preventing danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>![General Danger Symbol]</td>
<td>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.</td>
<td>Indicates a hazardous situation which, if not avoided, could result in serious injury.</td>
<td>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</td>
</tr>
</tbody>
</table>

Structure of warnings

All warnings are structured as follows:
### Symbols and marks used in this document

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>Important instruction</td>
<td>Indicates an instruction that must be followed to avoid danger.</td>
</tr>
<tr>
<td>✓</td>
<td>Requirement</td>
<td>Indicates a requirement that must be met before the next instruction can be carried out, e.g. The instrument is switched off.</td>
</tr>
<tr>
<td>⇒</td>
<td>Instruction</td>
<td>Indicates a single instruction, e.g. Switch the instrument on.</td>
</tr>
<tr>
<td>1. 2. 3.</td>
<td>Sequence of instructions</td>
<td>Indicates a sequence of instructions that must be carried out in the order given.</td>
</tr>
<tr>
<td>‭</td>
<td>Result</td>
<td>Indicates the result of carrying out an instruction, e.g. The instrument starts a self test.</td>
</tr>
<tr>
<td><strong>Bold type</strong></td>
<td>Control element</td>
<td>Indicates a control element on the instrument, e.g. Press the <strong>ENTER</strong> key.</td>
</tr>
<tr>
<td><strong>CAPITALS</strong></td>
<td>Menu name</td>
<td>Indicates a menu name, e.g. Open the <strong>MAIN</strong> menu.</td>
</tr>
<tr>
<td><strong>Blue type</strong></td>
<td>Cross reference (in PDF document only)</td>
<td>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.</td>
</tr>
</tbody>
</table>
## Terminology

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>Rechargeable battery</td>
</tr>
<tr>
<td>Dry battery</td>
<td>Non-rechargeable battery</td>
</tr>
</tbody>
</table>
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 10)
2.2 Proper use (page 10)
2.3 Improper use (page 10)
2.4 Dangers from electromagnetic fields (page 11)
2.5 Dangers when handling rechargeable batteries (page 12)
2.6 Dangers from AC Adapter / Charger (page 12)
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 101.

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 14)
3.2 Instrument overview (page 17)
3.3 Using rechargeable batteries and the AC Adapter / Charger (page 19)
3.4 Connecting the probe (page 21)
3.5 Fitting the GPS module (page 22)
3.6 Using the table top tripod (page 23)
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 (including 4 x NiMH Mignon/AA batteries)
  – 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

Transport damage

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instrument/accessories damaged during transportation</strong></td>
</tr>
<tr>
<td>Using damaged instrument/accessories can lead to subsequent damage.</td>
</tr>
</tbody>
</table>

⇒ 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**

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Test generator</td>
<td>5</td>
<td>RadMan Personal Monitor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Probe</td>
<td>6</td>
<td>Compartment for cables and operating manual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Adapters</td>
<td>4</td>
<td>GPS fitting set</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Case base**

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NBM-550 basic unit</td>
<td>6</td>
<td>Probe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GPS (assembled)</td>
<td>7</td>
<td>NBM-520 basic unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rechargeable batteries</td>
<td>8</td>
<td>Shoulder strap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>AC adapter</td>
<td>9</td>
<td>Earphone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Table top tripod</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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

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

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.

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>
<thead>
<tr>
<th>Table 1</th>
<th>Charge state and power source indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Battery symbol]</td>
<td>Power is supplied by the rechargeable batteries:</td>
</tr>
<tr>
<td>![Continuous display]</td>
<td>• Continuous display: Charge level = 10%</td>
</tr>
<tr>
<td>![Flashing display]</td>
<td>• Flashing display: Charge level ≤ 5%</td>
</tr>
<tr>
<td>![0000 mW/cm²]</td>
<td>If the charge level drops to ≤ 5%, the instrument will switch off automatically within a few minutes.</td>
</tr>
<tr>
<td>![Full charge]</td>
<td>Power is supplied by the rechargeable batteries.</td>
</tr>
<tr>
<td>![Charge level indicated in 20% steps]</td>
<td>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.</td>
</tr>
<tr>
<td>![AC Adapter / Charger]</td>
<td>Power is supplied by the AC Adapter / Charger.</td>
</tr>
<tr>
<td>![Batteries charged at the same time]</td>
<td>The batteries are charged at the same time.</td>
</tr>
</tbody>
</table>
Operation from rechargeable batteries

**Note:** The batteries are supplied pre-charged. You must fully charge them before using them the first time.

### Charging the batteries

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging the batteries with wrong AC Adapter / Charger</td>
</tr>
</tbody>
</table>

- 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.

3.4 Connecting the probe

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](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.

---

### Connecting the probe

✓ The red dot 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.

---

### 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 73). 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.
3  Preparing the NBM-550 for use
This chapter describes how to switch on the NBM-550, the operating concept, and the initial settings.

4.1 Switching on (page 26)
4.2 The NBM-550 operating concept (page 27)
4.3 Making basic settings (page 31)
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.
4.2 The NBM-550 operating concept

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>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lat</td>
<td>Latitude</td>
</tr>
<tr>
<td>Lon</td>
<td>Longitude</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning that the displayed GPS data is not up to date.</td>
</tr>
<tr>
<td>🔥</td>
<td>GPS data is being received with enhanced accuracy (deviation &lt; 3 m). This type of reception is only possible in regions where the corresponding satellite service is available.</td>
</tr>
</tbody>
</table>

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.

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 70).

**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 81.

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.
4.2 The NBM-550 operating concept

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.
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:

<table>
<thead>
<tr>
<th>Function keys</th>
<th>ESC key</th>
<th>OK key</th>
<th>▲/▼ key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select the function shown in the display, which depends on the menu selected</td>
<td>Exits from the menu (with or without making changes)</td>
<td>Opens a menu or a function and confirms a setting</td>
<td>Select a menu or a function and change values</td>
</tr>
</tbody>
</table>
4.3 Making basic settings

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 81.

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 70).

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.
4.3 Making basic settings

**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**

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/m² – mW/cm² – V/m – A/m – W/m² –...
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/cm², W/m², V/m, A/m)

- **Variable Triads**
  Units are adjusted to match the size of the measured value (47.55 μW/cm² 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.
4.3 Making basic settings

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.dddd°
  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.
4.3 Making basic settings

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.
4 Getting started
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 81.

5.1 Measuring in Normal display mode (page 40)
5.2 Measuring the spatial average (page 43)
5.3 Measuring in History display mode (page 46)
5.4 Measuring in XYZ display mode (page 48)
5.5 Measuring in Monitor display mode (page 49)
5.6 Activating the alarm function (page 50)
5.7 Audible Indicator (hot spot search) (page 52)
5.8 Measuring with a test standard (page 52)
5.9 Measuring with a correction frequency (page 56)
5.1 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:

<table>
<thead>
<tr>
<th>Result type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>The latest measured value of field strength is shown numerically and as a bar graph.</td>
</tr>
<tr>
<td>Max Hold</td>
<td>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.</td>
</tr>
<tr>
<td>Average</td>
<td>The average of the current measurement values is determined and displayed. 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).</td>
</tr>
<tr>
<td>Max Avg</td>
<td>The maximum value of the measured average values is displayed. The highest average value determined during the course of the measurement is displayed.</td>
</tr>
</tbody>
</table>

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.

卑 Hold appears in the display.

卑 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.

卑 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.

5.2 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.
5.2 Measuring the spatial average

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.
5.3 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.
5.3 Measuring in History display mode

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.

5.4 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.
5.5 Measuring in Monitor display mode

Display overview

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Result type <strong>Actual</strong> displays the field strength in the upper display area</td>
</tr>
<tr>
<td>2</td>
<td>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):</td>
</tr>
<tr>
<td></td>
<td>( \text{RSS} = \sqrt{X^2 + Y^2 + Z^2} )</td>
</tr>
<tr>
<td>3</td>
<td>Graphic display of field strength showing the selected field type (E-field in the example shown here)</td>
</tr>
<tr>
<td>4</td>
<td>Only the latest measured values for each axis can be shown (result type <strong>Actual</strong>)</td>
</tr>
<tr>
<td>5</td>
<td>Measured values for the three axes</td>
</tr>
<tr>
<td>6</td>
<td>The Result Type function only applies to the upper display area. The other functions are as for Normal display mode (see <strong>Measuring in Normal display mode</strong> on page 40).</td>
</tr>
</tbody>
</table>

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).

5.5 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.

---

Narda NBM-550 49
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.

### 5.6 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>
<thead>
<tr>
<th>Measuring range</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/m</td>
<td>100 mV/m</td>
<td>100 kV/m</td>
</tr>
<tr>
<td>A/m</td>
<td>250 μA/m</td>
<td>250 A/m</td>
</tr>
<tr>
<td>W/m²</td>
<td>25 μW/m²</td>
<td>25 MW/m²</td>
</tr>
<tr>
<td>mW/cm²</td>
<td>2,5 nW/cm²</td>
<td>2,5 kW/cm²</td>
</tr>
</tbody>
</table>

- 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 ▲/▼ 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 ▲/▼ 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 28).
5.7 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.

5.8 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.
5.8 Measuring with a test standard

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>
<thead>
<tr>
<th>Probe type</th>
<th>E+H Field Units</th>
<th>Display (only in NORMAL mode)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Upper area</strong></td>
</tr>
<tr>
<td>E-field or H-field</td>
<td>–</td>
<td>Measured value shown with selected units</td>
</tr>
<tr>
<td>(flat)</td>
<td></td>
<td>• Selected standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Value in % calculated according to the standard and frequency</td>
</tr>
<tr>
<td>E-field or H-field</td>
<td>–</td>
<td>Measured value in %</td>
</tr>
<tr>
<td>(shaped)</td>
<td></td>
<td>• Probe standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Value and selected units calculated according to the standard and frequency</td>
</tr>
<tr>
<td>Combination probe</td>
<td>V/m and A/m</td>
<td>Measured value shown with selected S-field units (product of E-field and H-field)</td>
</tr>
<tr>
<td>(flat)</td>
<td></td>
<td>• Selected standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measured value in V/m and A/m (E-field and H-field)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Value in % calculated according to the standard and frequency</td>
</tr>
<tr>
<td>Selected Unit</td>
<td></td>
<td>Measured value shown with selected S-field units (product of E-field and H-field)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Selected standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Measured value shown with selected unit (E-field and H-field)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Value in % calculated according to the standard and frequency</td>
</tr>
</tbody>
</table>
5.8 Measuring with a test standard

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.
5.9 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.
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 63)
### 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

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.

<table>
<thead>
<tr>
<th>Interval time (seconds)</th>
<th>Maximum duration (HH:MM:SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8:53:20</td>
</tr>
<tr>
<td>2</td>
<td>17:46:40</td>
</tr>
<tr>
<td>3</td>
<td>26:40:00</td>
</tr>
<tr>
<td>5</td>
<td>44:26:40</td>
</tr>
<tr>
<td>10</td>
<td>88:53:20</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>99:59:59</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Store Condition</strong></td>
<td>Specifies the condition for starting recording.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Upper THRHLD</strong> (upper threshold)</td>
</tr>
<tr>
<td></td>
<td>The recording starts if the Upper Threshold value is exceeded.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Out of GAP</strong></td>
</tr>
<tr>
<td></td>
<td>The recording starts if the value is outside the range defined by the Upper Threshold and Lower Threshold.</td>
</tr>
<tr>
<td><strong>Store Range</strong></td>
<td>Specifies the range of values to be stored (max. 32000 events).</td>
</tr>
<tr>
<td></td>
<td>• <strong>First and Last</strong></td>
</tr>
<tr>
<td></td>
<td>The first and last values occurring within the time period when the Store Condition is fulfilled are recorded.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Store All</strong></td>
</tr>
<tr>
<td></td>
<td>All the values occurring within the time period when the Store Condition is fulfilled are recorded.</td>
</tr>
<tr>
<td><strong>Upper Threshold</strong></td>
<td>Specifies the upper threshold value</td>
</tr>
<tr>
<td><strong>Lower Threshold</strong></td>
<td>Specifies the lower threshold value</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Menu</th>
<th>Displays</th>
<th>Deletes</th>
<th>Comment playback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory Manager</td>
<td>• Overview of the last data set</td>
<td>• Last data set</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>• Display of free storage space in %</td>
<td>• All data sets</td>
<td></td>
</tr>
<tr>
<td>Data Viewer</td>
<td>Overview of all stored data sets and display of the measurement results</td>
<td>Last data set only</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**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

⇒ Open the MEMORY MANAGER menu (MAIN/...).

⇒ The last data set stored is displayed (refer to Table 5 on page 64 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

<table>
<thead>
<tr>
<th>Column</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>Consecutive number identifying the data set.</td>
</tr>
<tr>
<td>#</td>
<td>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.</td>
</tr>
<tr>
<td>Date</td>
<td>Date when the data set was stored.</td>
</tr>
<tr>
<td>Time</td>
<td>Time when the data set was stored.</td>
</tr>
<tr>
<td>Type</td>
<td>Storage type:</td>
</tr>
<tr>
<td></td>
<td>• CON: Condition Logging</td>
</tr>
<tr>
<td></td>
<td>• HST: History mode</td>
</tr>
<tr>
<td></td>
<td>• MON: Monitor mode</td>
</tr>
<tr>
<td></td>
<td>• NOR: Normal mode</td>
</tr>
<tr>
<td></td>
<td>• SPA: Spatial Averaging</td>
</tr>
<tr>
<td></td>
<td>• TIM: Timer controlled (Timer Logging)</td>
</tr>
<tr>
<td></td>
<td>• XYZ: XYZ mode</td>
</tr>
<tr>
<td></td>
<td>A comment has been added.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>Monitor display mode, E-field.</td>
</tr>
<tr>
<td>Data Viewer</td>
<td>Display is in Data Viewer mode.</td>
</tr>
<tr>
<td>Index 0002</td>
<td>The values were stored at memory position 2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max:</td>
<td>.6745 mW/cm²</td>
</tr>
<tr>
<td>Avg:</td>
<td>.1914 mW/cm²</td>
</tr>
<tr>
<td>Min:</td>
<td>.0634 mW/cm²</td>
</tr>
</tbody>
</table>

Example 2: Timer Logging

<table>
<thead>
<tr>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>Timer display mode</td>
</tr>
<tr>
<td>Data Viewer</td>
<td>Display is in Data Viewer mode</td>
</tr>
<tr>
<td>Timer</td>
<td>Values were stored by timer control</td>
</tr>
<tr>
<td>Index 0004</td>
<td>The series of values was stored at memory position 4.</td>
</tr>
<tr>
<td>(1)</td>
<td>First value in the series</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max:</td>
<td>.0094 mW/cm²</td>
</tr>
<tr>
<td>Avg:</td>
<td>.0030 mW/cm²</td>
</tr>
<tr>
<td>Min:</td>
<td>.0002 mW/cm²</td>
</tr>
</tbody>
</table>
Example 3: Condition Logging

<table>
<thead>
<tr>
<th>Display Values</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Act: 3.059 mW/cm² F</td>
<td>Conditional display mode</td>
</tr>
</tbody>
</table>

Meaning of the status indicators on the First and Last Storage Range:
- 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:
- 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.
6  Recording and managing measured values
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 70)
7.2 Saving and loading instrument settings (page 70)
7.3 Displaying instrument and probe information (page 72)
7.4 Using the NBM-550 as a controller (page 72)
7.5 Activating instrument options (page 73)
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 103).

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.

| 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 71).

⇒ 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

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 90).

Activation is conducted using the NBM-TS PC software (see **PC software** on page 75).

**To activate an option:**

1. Establish a connection between the instrument and PC (see **Working with the PC software** on page 77).
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.
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 76)
8.2 Connecting the NBM-550 (page 76)
8.3 Working with the PC software (page 77)
8.4 Updating the firmware (page 77)
8.5 Performing a reset (page 78)
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 70).

⇒ 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](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 77).

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 70).
8 PC software
9 Overview of all menus and functions

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

9.1 Measurement menus (page 82)
9.2 Main menu (page 82)
9.3 Measurement Settings (page 83)
9.4 Data Logger (page 86)
9.5 Memory Manager (page 88)
9.6 Interface (page 89)
9.7 Information (page 90)
9.8 Setup (page 91)
9.9 Clock (page 92)
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.

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

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.

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Settings</td>
<td>• Set general measurement parameters</td>
</tr>
<tr>
<td></td>
<td>• Select the language</td>
</tr>
<tr>
<td>Data Logger</td>
<td>Set the parameters for recording measurement data</td>
</tr>
<tr>
<td>Memory Manager</td>
<td>• Display the free memory space</td>
</tr>
<tr>
<td></td>
<td>• Delete the last stored measured value or delete all measured values.</td>
</tr>
<tr>
<td>Interface</td>
<td>Set the interface parameters</td>
</tr>
</tbody>
</table>
You can change the general measurement parameters in the MEASUREMENT SETTINGS menu.

### Page 1

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Menu functions</strong></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>Select the language. Default: English</td>
</tr>
<tr>
<td>Averaging Time</td>
<td>Set the averaging time: 4 sec. – 30 min.; Default: 6 min.</td>
</tr>
<tr>
<td>Apply Correction Frequency</td>
<td>Activate the frequency set under Frequency as a correction frequency: On, Off</td>
</tr>
</tbody>
</table>

### Measurement Settings

You can change the general measurement parameters in the MEASUREMENT SETTINGS menu.
### Function | Meaning
---|---
**Frequency** | Set the frequency (applies to **Apply Correction Frequency** and **Apply Standard**)
**Apply Standard** | Activates the test standard set under **Standard**: On, Off
The frequency set under **Frequency** is used as the reference frequency.
**Standard** | Select a test standard.
**Alarm Function** | Activate the alarm function: On, Off
**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:
- Off: Auto zero function disabled
- 6 min, 15 min, 30 min, 60 min

### Function keys

| Unit:... | Select the measured value units:
| W/m², mW/cm², 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 functions

| Function | Meaning |
---|---|
**Auto Power-Off** | Set time until automatic power off:
- Off: Auto power off disabled
- 6 min, 15 min, 30 min, 60 min
**LCD Backlight** | Set time until backlight switches off:
- Permanent: Always on
- Off: Always off
- 5 s, 10 s, 30 s, 60 s
## 9.3 Measurement Settings

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audible Indicator</td>
<td>Switch the signal tone for locating field maxima (hot spots) on or off: On, Off</td>
</tr>
</tbody>
</table>
| Spatial AVG Mode  | Select the method for spatial averaging:  
  - Discrete: Individual measured values  
  - Continuous: Continuous measurement                                                                                                                                                                                                                                          |
| Combi Probe Use   | Select the field type when using a combination probe:  
  - E-field only  
  - H-field only  
  - E- and H-field: Both field types active                                                                                                                                                                                                                                     |
| E+H Field Units   | Select units for simultaneous display of E-field and H-field (only applies in **Normal** mode):  
  - Selected: 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:  
  - Variable Triads: Unit dimensions are matched to the measurement result  
  - Fixed Triads: Unit dimensions are independent of the measurement result                                                                                                                                                                                                  |
| Cal. Date Check   | Check the calibration date when the instrument is switched on: On, Off                                                                                                                                                                                                                                                                  |

### Function keys

| Unit:... | Select the measured value units: W/m², mW/cm², 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.

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Menu functions</strong></td>
<td></td>
</tr>
<tr>
<td>History Time Scale</td>
<td>History window time scale: 2 min., 8 min., 20 min., 1 h, 2 h, 4 h, 8 h</td>
</tr>
<tr>
<td>Timer Start</td>
<td>Starting time for timer controlled measured value recording.</td>
</tr>
<tr>
<td>Timer Duration</td>
<td>Measurement time for timer controlled measured value recording: 1 sec. – 99 h 59 min. 59 sec., Default: 10 min ¹ ³</td>
</tr>
<tr>
<td>Timer Interval</td>
<td>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, 1 min., 2 min., 3 min., 6 min.</td>
</tr>
<tr>
<td>Store Condition (optional)</td>
<td>Start condition for conditional measured value recording:  ¹ ³</td>
</tr>
<tr>
<td>Store Range (optional)</td>
<td>Range of stored measured values for conditional measured value recording:  ¹ ³</td>
</tr>
<tr>
<td>Upper Threshold (optional)</td>
<td>Upper threshold for Condition Logging  ¹ ³</td>
</tr>
<tr>
<td>Lower Threshold (optional)</td>
<td>Lower threshold for Condition Logging (only applies to Out of gap)  ³</td>
</tr>
<tr>
<td>Voice Recorder (optional)</td>
<td>Enable voice recording after storing measured values: On, Off  ³</td>
</tr>
</tbody>
</table>

---

¹ ³ For recording duration and interval, maximum values are 99 h 59 min. 59 sec.  ³ For recording interval, maximum values are 6 min.
### Function keys

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit:...</td>
<td>Select the measured value units: W/m², mW/cm², V/m, A/m</td>
</tr>
<tr>
<td>Condition Logging</td>
<td>Open the menu for starting conditional recording of measured values.</td>
</tr>
<tr>
<td>Timer Logging</td>
<td>Open the menu for starting timer controlled recording of measured values</td>
</tr>
</tbody>
</table>

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 64).

It should be noted 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.

### Information displayed

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>Memory position of saved measurement data set.</td>
</tr>
<tr>
<td>#</td>
<td>Number of measurements saved in this measurement data set.</td>
</tr>
<tr>
<td>Date</td>
<td>Date measured value was saved.</td>
</tr>
<tr>
<td>Time</td>
<td>Time measured value was saved.</td>
</tr>
</tbody>
</table>
| Type     | Storage type:  
  - 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

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete Latest</td>
<td>Delete the last saved set of measured values (i.e. the displayed set).</td>
</tr>
<tr>
<td>Delete All</td>
<td>Delete all saved sets of measured values.</td>
</tr>
<tr>
<td>Play</td>
<td>Replay the voice recording (if one exists).</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Interface</td>
<td>Configures the serial interface for connection with a PC:</td>
</tr>
<tr>
<td></td>
<td>• USB: Connection via USB cable to the multi-function socket</td>
</tr>
<tr>
<td></td>
<td>• Optical: Connection via optical duplex cable, type RP-02</td>
</tr>
<tr>
<td>Controller Function</td>
<td>Use the NBM-550 to control another NBM-5xx instrument: On, Off</td>
</tr>
<tr>
<td>External Trigger</td>
<td>Trigger storage externally: On, Off</td>
</tr>
<tr>
<td>GPS Position Unit</td>
<td>Changes the display of GPS coordinates:</td>
</tr>
<tr>
<td></td>
<td>• <strong>DMS:</strong> (d)dd° mm' ss.s'' N</td>
</tr>
<tr>
<td></td>
<td>e.g. Lat: 48° 48' 10.5'' N / Lon: 9° 15' 00.0'' E</td>
</tr>
<tr>
<td></td>
<td>• <strong>MinDec:</strong> -(d)dd° mm.mmm'</td>
</tr>
<tr>
<td></td>
<td>e.g. Lat: 48° 48.175' / Lon: 9° 15.000'</td>
</tr>
<tr>
<td></td>
<td>• <strong>DegDec:</strong> -(d)dd.ddddd°</td>
</tr>
<tr>
<td></td>
<td>e.g. Lat: 48.29166° / Lon: 9.25000°</td>
</tr>
<tr>
<td>Audio Output Level</td>
<td>Sets the volume of the audio output to the earphone</td>
</tr>
<tr>
<td></td>
<td>(only functions with the Voice Recording option)</td>
</tr>
</tbody>
</table>
9.7 Information

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

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Information</td>
<td>Displays information about the instrument:</td>
</tr>
<tr>
<td></td>
<td>• Product Name: Instrument name</td>
</tr>
<tr>
<td></td>
<td>• Production ID: Production number</td>
</tr>
<tr>
<td></td>
<td>• Serial Number</td>
</tr>
<tr>
<td></td>
<td>• Firmware Version</td>
</tr>
<tr>
<td></td>
<td>• Calibration Date: Date of last calibration</td>
</tr>
<tr>
<td></td>
<td>• Calibration Due Date: Date of next calibration due</td>
</tr>
<tr>
<td></td>
<td>• Option 1, 2, 3: Installed options</td>
</tr>
<tr>
<td>Probe Information</td>
<td>Displays information about the probe that is connected:</td>
</tr>
<tr>
<td></td>
<td>• Product Name: Probe name</td>
</tr>
<tr>
<td></td>
<td>• Production ID: Production number</td>
</tr>
<tr>
<td></td>
<td>• Serial Number</td>
</tr>
<tr>
<td></td>
<td>• Calibration Date: Date of last calibration</td>
</tr>
<tr>
<td></td>
<td>• Calibration Due Date: Date of next calibration due</td>
</tr>
<tr>
<td></td>
<td>• Shaping: Yes or No (flat)</td>
</tr>
<tr>
<td></td>
<td>• Standard: Test standard for shaped probes</td>
</tr>
<tr>
<td></td>
<td>• Field Type: E or H</td>
</tr>
<tr>
<td></td>
<td>• Lower Frequency Limit: Smallest frequency that can be measured</td>
</tr>
<tr>
<td></td>
<td>• Upper Frequency Limit: Greatest frequency that can be measured</td>
</tr>
<tr>
<td>Device Diagnostic</td>
<td>Service information</td>
</tr>
<tr>
<td></td>
<td>• Temperature</td>
</tr>
<tr>
<td></td>
<td>• Battery voltage</td>
</tr>
<tr>
<td></td>
<td>• Battery capacity</td>
</tr>
<tr>
<td>Probe Test</td>
<td>Checking instrument functions (see Checking instrument functions on page 97)</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>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.</td>
</tr>
<tr>
<td>Setup 1 – 8</td>
<td>Memory positions for storing instrument setups</td>
</tr>
<tr>
<td>User</td>
<td>Indicates that you have stored your own settings at this memory position.</td>
</tr>
<tr>
<td>Factory</td>
<td>Indicates that the factory default settings are stored at this memory position, not a user setup.</td>
</tr>
</tbody>
</table>

**Function keys**

- **Power-On**
  - Sets the power on behavior:
    - 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.

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Sets the time.</td>
</tr>
<tr>
<td>Time Format</td>
<td>Sets the time format:</td>
</tr>
<tr>
<td></td>
<td>• 12 h clock</td>
</tr>
<tr>
<td></td>
<td>• 24 h clock</td>
</tr>
<tr>
<td>Date</td>
<td>Sets the date.</td>
</tr>
<tr>
<td>Date Format</td>
<td>Sets the date format:</td>
</tr>
<tr>
<td></td>
<td>• mm/dd/yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd.mm.yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy-mm-dd</td>
</tr>
</tbody>
</table>
10 Instrument maintenance

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

10.1 Cleaning the instrument (page 94)
10.2 Replacing / removing the batteries (page 94)
10.3 Disposal (page 96)
10.4 Checking instrument functions (page 97)
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

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.

⚠️ **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.
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.
10.4 Checking instrument functions

**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](http://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 21).
2. Switch the instrument on (see Switching on on page 26) 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 99) 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.

<table>
<thead>
<tr>
<th>Probe</th>
<th>Test Source: 27 MHz (2244/90.38)</th>
<th>Test Source: 446 MHz PMR Pocket Radio</th>
<th>Test Source: 12 GHz Model 8699</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF0391</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>EF0392</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>EF1891</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EF6091</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HF3061</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>HF0191</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>EA5091</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>EB5091</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>EC5091</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>ED5091</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>EF5091</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EF5092</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

1) PMR Pocket Radios are commonly available in electronics stores.
2) Model 8699 only available for North America.
Instrument maintenance
11 Specifications

This chapter lists the specifications of the NBM-550.

11.1 Display (page 102)
11.2 Measurement functions (page 102)
11.3 Result memory (page 103)
11.4 Interfaces (page 103)
11.5 Options (page 103)
11.6 General specifications (page 105)
11.7 AC Adapter / Charger (page 105)
11.8 CE Declaration of Conformity (page 106)
11.9 Declaration of origin (page 108)
11.1 Display

<table>
<thead>
<tr>
<th>Display type</th>
<th>Transreflective monochrome LCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display size</td>
<td>10 cm (4”), 240 x 320 pixels</td>
</tr>
<tr>
<td>Backlight</td>
<td>White LEDs, selectable lighting time (OFF, 5 s, 10 s, 30 s, 60 s, PERMANENT)</td>
</tr>
<tr>
<td>Display refresh rate</td>
<td>200 ms for bar graph and graphics, 400 ms for numerical result values</td>
</tr>
</tbody>
</table>

11.2 Measurement functions

<table>
<thead>
<tr>
<th>Result units</th>
<th>mW/cm², W/m², V/m, A/m, % of standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display range</td>
<td>0001 to 9999, switchable between variable and permanent triads</td>
</tr>
</tbody>
</table>
| 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/m² bis 26.53 MW/m²  
0.1 nW/cm² bis 2.653 kW/cm²  
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/m²  
0.0001 bis 9999 mW/cm²  
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    | 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

<table>
<thead>
<tr>
<th>Physical memory</th>
<th>12 MB non-volatile Flash memory for measurement results and voice comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory capacity</td>
<td>Up to 5000 results (indices with instrument setting, timestamp, and GPS data if included)</td>
</tr>
</tbody>
</table>

11.4 Interfaces

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

11.5 Options

Conditional Logging

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Selectable:</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Upper threshold: Value stored when set threshold exceeded</td>
<td></td>
</tr>
<tr>
<td>– Out of gap: Value stored if outside the range limits (upper / lower threshold)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Store range</th>
<th>Selectable:</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Store all (as long as the condition is fulfilled), store rate 5 Hz</td>
<td></td>
</tr>
<tr>
<td>– First and last result (for which the condition is fulfilled)</td>
<td></td>
</tr>
</tbody>
</table>

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 |
### 11 Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length of recording</strong></td>
<td>Maximum 30 s per voice comment, 1 comment can be saved for each measurement result</td>
</tr>
<tr>
<td><strong>Recording format</strong></td>
<td>8 bit PCM mono, saved as WAV file (approx. 240 kB for a 30 s comment)</td>
</tr>
<tr>
<td><strong>Replay</strong></td>
<td>External earphone (with output volume control) or via the NBM-TS PC software</td>
</tr>
<tr>
<td><strong>GPS position logging</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receiver type</strong></td>
<td>12 channel satellite tracking, supports DGPS, WAAS / EGNOS compatible</td>
</tr>
<tr>
<td><strong>Displayed position data</strong></td>
<td>Latitude (Lat) and longitude (Lon), selectable units: DMS (degrees, minutes, seconds)/ MinDec (decimal minutes)/ DegDec (decimal degrees)</td>
</tr>
<tr>
<td><strong>Geodetic system</strong></td>
<td>WGS84 / NAD83</td>
</tr>
<tr>
<td><strong>Position accuracy</strong></td>
<td>&lt; 3 m (DGPS, WAAS), &lt;15 m (SPS), display indication of enhanced accuracy. Variations are valid with a probability of 95%</td>
</tr>
<tr>
<td><strong>Refresh rate</strong></td>
<td>1 s</td>
</tr>
<tr>
<td><strong>Detection time</strong></td>
<td>2 s (restoration of reception) up to 5 minutes (if position completely unknown)</td>
</tr>
<tr>
<td><strong>Receiver size / weight</strong></td>
<td>Diameter 61 mm, height 19.5 mm, weight 62 g (approx. 100 g with fixing bracket)</td>
</tr>
<tr>
<td><strong>Receiver mounting</strong></td>
<td>Uses the tripod bush on the underside of the instrument, fixing set is included</td>
</tr>
</tbody>
</table>
11.6 General specifications

<table>
<thead>
<tr>
<th>Recommended calibration interval</th>
<th>24 months ¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries</td>
<td>Standard NiMH rechargeable batteries, 4 x type AA (Mignon), 2500 mAh</td>
</tr>
<tr>
<td>Operating time</td>
<td>20 hours (without backlight or GPS) 12 hours (permanent backlight, without GPS) 10 hours (without backlight, with GPS)</td>
</tr>
<tr>
<td>Charging time</td>
<td>2 h</td>
</tr>
<tr>
<td>Battery status display</td>
<td>100%, 80%, 60%, 40%, 20%, 10%, low battery (&lt;5%)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Operational: -10 °C to +50 °C Non-operational (transport): -30 °C to +70 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>5 to 95% relative humidity, no condensation; ≤29 g/m³ absolute humidity (IEC 60721-3-2 class 7K2)</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>45 x 98 x 280 mm (without probe or GPS receiver)</td>
</tr>
<tr>
<td>Weight</td>
<td>550 g (without probe or GPS receiver)</td>
</tr>
<tr>
<td>Accessories (included)</td>
<td>Hard shell case, AC Adapter / Charger, batteries, shoulder strap, table top tripod, NBM-TS software, operating manual, calibration certificate, USB interface cable</td>
</tr>
</tbody>
</table>

¹) only for basic instrument; probes are specified separately

11.7 AC Adapter / Charger

| Nominal AC line voltage range             | 100 – 240 V AC |
| Nominal AC line frequency range          | 50 – 60 Hz |
| Output voltage                            | 9 V DC |
| Maximum output current                   | 1.5 A |
| Temperature range                         | -40 °C – 70 °C |
| • Storage                                  | 0 – 40 °C |
| • Operation                                |              |
# 11.8 CE Declaration of Conformity

---

<table>
<thead>
<tr>
<th>Supplier's Declaration of Conformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in accordance with ISO/IEC 17050-1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SDoC no.:</th>
<th>2008-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuer's name:</td>
<td>Narda Safety Test Solutions GmbH (manufacturer)</td>
</tr>
<tr>
<td>Issuer's address:</td>
<td>Sandwiesenstr. 7, D-72793 Pfullingen, Germany</td>
</tr>
<tr>
<td>Object of declaration:</td>
<td>Model No.</td>
</tr>
<tr>
<td></td>
<td>NBM-550</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Documents No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61326: 2006</td>
<td>Electrical equipment for measurement, control and laboratory use. EMC requirements</td>
</tr>
<tr>
<td>EN 61010-1: 2002</td>
<td>Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements</td>
</tr>
</tbody>
</table>

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

Place and date of issue: Pfullingen, 2008-04-22

Signature: [Signature]

Name, function: Werner Kumbier, Technical Director
### Annex – EMC

**of Supplier's Declaration of Conformity**

**SDoc no.:** 2008-01  
**Device:** Broadband Field Meter  
**Model no.:** NBM-550

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:

<table>
<thead>
<tr>
<th>Electromagnetic immunity</th>
<th>Standard</th>
<th>Test level, condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunity to electrostatic discharge</td>
<td>EN 61000-4-2</td>
<td>2 kV / 4 kV (level 1/2)</td>
</tr>
<tr>
<td>Immunity to radiated electromagnetic fields</td>
<td>EN 61000-4-3</td>
<td>compliant, verified by EN 61000-4-21 with test levels &gt; 200 V/m</td>
</tr>
<tr>
<td>Fast transient common mode immunity (on power supply port)</td>
<td>EN 61000-4-4</td>
<td>2 kV (level 3)</td>
</tr>
<tr>
<td>Surge immunity</td>
<td>EN 61000-4-5</td>
<td>0.5 kV / 1 kV (level 1/2)</td>
</tr>
<tr>
<td>Immunity to conducted high frequency disturbances</td>
<td>EN 61000-4-6</td>
<td>3 V rms (level 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>150 kHz – 80 MHz</td>
</tr>
<tr>
<td>Immunity to voltage dips, short-time interruptions and voltage fluctuations</td>
<td>EN 61000-4-11</td>
<td>500 ms (70 % supply voltage)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 ms (40 % supply voltage)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 ms (0 % supply voltage)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5000 ms short interruption</td>
</tr>
</tbody>
</table>

Electromagnetic emission Standard Test level, condition

<table>
<thead>
<tr>
<th>Radiated emission</th>
<th>EN 55011 (CISPR 11)</th>
<th>Class B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted emission</td>
<td>EN 55011 (CISPR 11)</td>
<td>Class B</td>
</tr>
<tr>
<td>Harmonic current emissions</td>
<td>EN 61000-3-2</td>
<td>Class A</td>
</tr>
<tr>
<td>Voltage fluctuation and flicker</td>
<td>EN 61000-3-3</td>
<td>10 min observation time</td>
</tr>
</tbody>
</table>
## 11.9 Declaration of origin

| Country of origin: | Germany |


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 Ordering information

12.1 NBM-550

NBM-500 Set 1 Narda Broadband Field Meter contains: 2400/101

- 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 2401/40
contains:
- GPS receiver
- GPS mounting set
- Earphone
- Option key

Probes are not included

12.2 Probes

<table>
<thead>
<tr>
<th>Probe Code</th>
<th>Description</th>
<th>Kit Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2402/01</td>
<td>Probe EF0391, E-field for NBM, 100 kHz – 3 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/02</td>
<td>Probe EF1891, E-field for NBM, 3 MHz – 18 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/03</td>
<td>Probe EF5091, E-field for NBM, thermocouple, 300 MHz – 50 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/04</td>
<td>Probe EF6091, E-field for NBM, 100 MHz – 60 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/05</td>
<td>Probe HF3061, H-field for NBM, 300 kHz – 30 MHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/06</td>
<td>Probe HF0191, H-field for NBM, 27 MHz – 1 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/07</td>
<td>Probe EA5091, Shaped E-field, FCC for NBM, 300 kHz – 50 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/08</td>
<td>Probe EB5091, Shaped E-field, IEEE for NBM, 3 MHz – 50 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/09</td>
<td>Probe EC5091, Shaped E-field, SC6 Canada for NBM, 300 kHz – 50 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/10</td>
<td>Probe ED5091, Shaped E-field, ICNIRP for NBM, 300 kHz – 50 GHz, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/11</td>
<td>Probe EF5092, E-field for NBM, thermocouple, 300 MHz - 50 GHz, high power, isotropic</td>
<td></td>
</tr>
<tr>
<td>2402/12</td>
<td>Probe EF0392, E-field for NBM, 100 kHz – 3 GHz, high power, isotropic</td>
<td></td>
</tr>
</tbody>
</table>
## 12.3 Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test generator 27 MHz</td>
<td>2244/90.38</td>
</tr>
<tr>
<td>Test generator, 12 GHz</td>
<td>Model 8699</td>
</tr>
<tr>
<td>(for North America only)</td>
<td></td>
</tr>
<tr>
<td>Tripod (non-conducting), 1.65 m, with carrying bag</td>
<td>2244/90.31</td>
</tr>
<tr>
<td>Tripod extension (non-conducting), 0.50 m (for 2244/90.31)</td>
<td>2244/90.45</td>
</tr>
<tr>
<td>Extension handle (non-conducting), 0.42 m</td>
<td>2250/92.02</td>
</tr>
<tr>
<td>Cable, coaxial, multi-pin to BNC for NBM-550, external triggering, 2 m</td>
<td>2400/90.04</td>
</tr>
<tr>
<td>Cable, optical fiber, duplex (1000 μm) RP-02, 2 m</td>
<td>2260/91.02</td>
</tr>
<tr>
<td>Cable, optical fiber, duplex (1000 μm) RP-02, 20 m</td>
<td>2260/91.03</td>
</tr>
<tr>
<td>Cable, optical fiber, duplex, F-SMA to RP-02, 0.3 m</td>
<td>2260/91.01</td>
</tr>
<tr>
<td>O/E converter RS232, RP-02/DB9</td>
<td>2260/90.06</td>
</tr>
<tr>
<td>O/E converter USB, RP-02/USB</td>
<td>2260/90.07</td>
</tr>
<tr>
<td>Cable, adapter, USB 2.0 - RS232, 0.8 m</td>
<td>2260/90.53</td>
</tr>
</tbody>
</table>
This chapter explains some important terms that are used in this operating manual.
**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.

**RSS Root Sum Square**  
Formula used to calculate the total field strength from the three spatial components X, Y, and Z:

\[
\text{RSS} = \sqrt{X^2 + Y^2 + Z^2}
\]

**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: \( S = [\text{W/m}^2] \) (or \([\text{mW/cm}^2]\) or \([\mu\text{W/cm}^2]\))

**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 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**
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 GPS.
Index

A
AC adapter/charger, dangers from 12
Activating instrument options 73
Activating voice recording 42
Add voice comments 41
After transport and storage 16
Alarm function activation 50
Appropriate test sources 99
Audible Indicator 52
Auto off function 32
Auto zero 31

B
Backlight 33
Batteries
Disposal 96
Replacing / removing 94
Battery operation 20

C
Calibration 26
Case 15
CE Declaration of Conformity 106
Changing the result type 49
Changing the units 33
Changing the units format 34
Charge state indicator 19
Checking instrument functions 97
Cleaning 94
Clock 92
Combination probes
Select field type and units 36
Connecting the probe 21
Continuous spatial measurement 45
Contrast 33
Controller operation 72
Correction frequency, measuring with 56

D
Data list
see Data Viewer
Data Logger 86
Data recording, see Data Logger
Data Viewer 64
Date and time, see Clock
Declaration of origin 108
DGPS 114
Discrete spatial measurement 44
Display mode
History 46
Monitor 49
Normal 40
XYZ 48
Displaying instrument and probe information 72
Displaying probe and instrument information 72
Disposal 96

E
E-field 114
EGNOS 114
EMV 114
Error message 26
Evaluating the curve 47
External Trigger 41

F
Function test 97

G
GPS 114
Changing the display 35
Fitting the module 22
Reception 27
GTEM cell 115
Index

H
H-field 114
History mode 46
Hot spot search 52

I
Improper use 10
Information menu 90
Instrument functions, checking 97
Instrument overview 17
Interface configuration 70
Interface menu 89
Isotropy 115
Items included 14

L
Locking the keypad 37

M
Main menu 82
Managing result data 63
Measured values
   Freezing 41
   Storing 41
Measurement menus 82
Measurement Settings 83
Measurements
   Conditional recording 60
   Recording by timer control 58
Measuring discrete values 44
Measuring values continuously 45
Memory Manager 63, 88
Monitor mode 49

N
NAD83 115
Normal mode 40

O
Operating concept 27
Options, activating 73
Ordering information 109
Overview

Clock 92
Data Logger 86
Information 90
Interface 89
Main menu 82
Measurement menus 82
Measurement Settings 83
Memory Manager 88
Setup 91

P
Packaging 14
PC software, using the 76
Probe test 97
Proper use 10

R
Rechargeable batteries
   Proper handling 21
Reset 78
Result data management 63
Result type selection 40
RSS 115

S
Safety
   Dangers from electromagnetic fields 11
   Proper handling of rechargeable batteries 21
Save / Load instrument settings 70
Selecting the language 31
Setting the date and time 34
Setup menu 91
S-field 115
Specifications 101
SPS 104, 115
Storing graphical records 48
Switching on 26

T
TEM cell 115
Terminology 7
Index

Test sources, appropriate 99
Test standard, measuring with a 52
Time and date setting 34
Transport and storage 16
Transport case 15
Transport damage 14
Trigger cable 41
Tripod, using the 23

U
Unpacking 14
Updating the firmware 77
USB 116

W
WAAS 116
WAV 116
WGS84 116

X
XYZ mode 48