

NARDA BROADBAND FIELD METER

NBM-550



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Measuring electric and magnetic fields

ranging from static fields to microwaves

▲ Non-directional measurement using isotropic probes for applications in the frequency range 0 Hz to 90 GHz



- Large, graphic display for easy-to-read results
- Intelligent probe interface with automatic detection of probe parameters for simple operation
- Memory for up to 5000 measurement results
- Automatic storage of position data with GPS interface and plug-in GPS receiver (accessory)
- Voice recording for comments

OPTIONAL

- ▲ Probe for spectral measurements and Weighted Peak from 1 Hz to 400 kHz
- ▲ Magnetometer Probe for magnetic fields from 0 Hz (DC) to 1 kHz



Narda Broadband Field Meter NBM-550



DESCRIPTION

The Narda Broadband Field Meter NBM-550 is part of the NBM-500 device family. It makes extremely accurate measurements of non-ionizing radiation. Equipped with probes for measuring electric and magnetic field strengths, it covers all frequencies from just a few Hz as found in industrial applications through to long wave and on up to microwave radiation. Flat frequency response probes ("flat probes"), as well as so-called shaped probes that evaluate the field strength on the basis of a human safety standard are available. A probe with built-in FFT analysis enables spectral measurements in the low frequency range. These probes are calibrated separately from the field meter, and include a non-volatile memory that contains the probe parameters and calibration data. They can therefore be used with any device in the NBM-500 family without losing any of the calibration accuracy.

APPLICATIONS

The NBM-550 is used to make precision measurements to establish human safety, particularly in workplace environments where high electric or magnetic field strengths are likely to occur. Some examples are:

- Measuring field strengths to comply with general safety regulations, such as the EMF Directive 2013/35/EU
- · Establishing safe zones
- Measuring and monitoring field strengths around broadcasting and radar equipment
- Measuring field strengths of cell phone transmitters and satellite communications systems to demonstrate compliance with human safety standard limit values
- Measuring field strengths in the industrial environment, such as plastics welding equipment, RF heating, tempering, and drying equipment
- Measurements for protecting users of diathermy equipment and other medical devices that generate high-frequency radiation
- Measuring field strength in TEM cells and absorber chambers to demonstrate electromagnetic compatibility (EMC)
- Spectral measurements on LF fields emanating from industrial equipment or overhead power cables
- Measuring static magnetic fields in industry and medicine (eg MRT)



Robust yet light and easy to carry, designed for simple, one-hand operation



Changing the probe is quick and easy, with no need to reconfigure the device



FEATURES with high frequency probes

The Narda Broadband Meter NBM-550 is designed for on-site use. The combined features listed below ensure that it delivers precise results quickly and simply, even under difficult operating conditions.

Display and operation

- Graphical user interface with selectable language.
- Backlit monochrome LCD with selectable illumination time;
 easy to read, even in bright daylight.

Result display and evaluation

- 5 types of result can be displayed in easy-to-read form:
 Momentary RMS value (Actual), minimum RMS value (Min),
 maximum RMS value (Max Hold), average RMS value (Average),
 maximum average RMS value (Max Avg).
- History Mode memory operates continuously in the background.
 This allows you to graphically evaluate and save the results for the previous 8 hours of operation (see upper picture opposite).
- Selectable units:
 V/m, A/m, mW/cm², W/m² when using non-weighted (flat) probes,
 % of limit value when using weighted (shaped) probes.
- Stored limit values for common human safety standards allow direct display of results for flat probes in % of limit value at a known frequency of the field under test (see lower picture opposite).

Automatic adjustment, application of calibration data

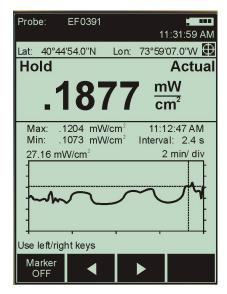
- Intelligent probe interface detects the NBM probe type and automatically recalls and applies the correction values that were recorded during calibration.
- Fully automatic zero point adjustment at programmable time intervals.
- Reminder function lets you know when calibration is due.

Special evaluations

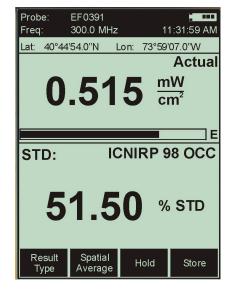
- Time averaging, period settings of up to 30 minutes.
- Spatial averaging, discrete or continuous.
- Multi-position spatial averaging for up to 24 locations.

Warning functions

- Audible warning with programmable alarm threshold.
- Hot spot search function with audible warning.



History Mode shows the variation of field strength versus time as a graph. Numerical values can be read out using the marker.



Apply Standard: You can also display the field strength as a percentage of the limit value of a standard even when using flat probes. Simply select the standard on the NBM-550 (ICNIRP in the example shown) and set the frequency. The evaluation is useful if the main component of the field strength is due to a single source of known frequency. Available standards are listed on page 6.



FEATURES with EHP-50F

The EHP-50F FFT analyzer can be conveniently and easily controlled by the Narda Broadband Meter NBM-550 for spectral measurements on low frequency fields. The measured values for the electric or magnetic field are shown on the display of the NBM-550.

Communication between the EHP-50F and the NBM-550 is via an optical cable to avoid affecting the measured field strength. The NBM-550 automatically detects a connected EHP-50F after it is switched on.

Result display and evaluation

Display modes:

Weighted Peak (WPM) according IEC 61786-2, provides signal weighting in time domain for a selected standard and covers the frequency range from 1 Hz to 400 kHz. Display is in %.

Spectrum mode displays frequency-selective measured RMS values

Standard mode displays the measured RMS values in % referred to the permitted limit value of a selected safety standard

XYZ simultaneously displays the RMS values measured synchronously for the three spatial axes

Monitor for parallel display of the following result types: Momentary RMS value (Actual), minimum RMS (Min), maximum RMS (Max), average RMS (Average)

Measurement ranges and units:

Electric field: 0.0001 to 100 kV/m

0.001 to 1000 V/m

Magnetic field: 0.0001 to 10 mT

0.0001 to $100 \mu T$

Results can also be displayed in Gauss

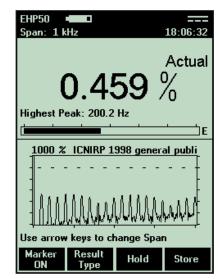
- Frequency range selection in 8 stepsSpan (Fstop) = 100/200/500 Hz, 1/2/10/100/400 kHz
- Numerical display of wideband measurement value or the highest value in the spectrum (Highest Peak)

Special evaluations

- Timer controlled measurement with selectable save intervals (Timer Logging)
- Averaging function for 4 / 8 / 16 / 32 samples
- Marker function for evaluating the spectrum graphics and the graphics for Weighted Peak vs. time

Warning functions

 Audible warning variable thresholds separately settable for electric and magnetic field



Standard mode displays the spectrum of the measured field, evaluated e.g. according to the ICNIRP guidelines. The dotted line represents the limit value (100%).



NBM-550 with EHP-50F: The perfect solution for all industrial applications.



Operation

- User-defined setups make it easy to recall device settings
- Battery saving user-selectable timed auto-off function
- Hold button "freezes" measurement result for easy readout
- Keypad lock prevents inadvertent operation of control keys

Remote control

- NBM-TS PC software enables remote controlled measurements (EHP-TS should be used for remote control of the EHP-50F)
- PC connection via USB or optical interface
- Additional freedom of movement for probes provided by using an extension and optical cable. The NBM-550 controller function enables data communication with the smaller NBM-520 for use as a "probe extension handle". This makes it possible to locate the probe remotely from the NBM-550 control unit without the adverse effects on the measurement that would be caused by metallic connecting cables.



Left:

Probe extension using an optical cable.
The NBM-550 acts as controller and
displays the results. The smaller
NBM-520 acts as the optical probe
interface. Both devices can also be used
separately as measuring devices when
fitted with probes.

Result storage and evaluation

- Data memory for up to 5000 results
- External trigger input for data storage (e.g. for connecting to an odometer)
- Timer Logging for timer controlled data storage (e.g. for long-term monitoring)
- Conditional Logging: Stores measurement data when a threshold value is exceeded when using a high frequency probe
- Screenshot download as bitmap for simple documentation
- "NBM-TS" PC software for convenient data management, documentation and subsequent evaluations

Other functions

- GPS interface and plug-in GPS receiver (accessory) for automatic storage of position data
- Audio recorder for voice comments, with built in microphone, and earphone output; transfer to PC



Above: The battery compartment is opened easily using a coin. Four replaceable NiMH rechargeable batteries (AA size) are used to power the device.

Below:

Open the protective rubber cover to access the connectors: Charger socket, optical interface, headphone connector and the multi purpose GPS / USB/ external trigger connector.





GPS receiver connected to the NBM-550



PC SOFTWARE

The comprehensive, easy to use "NBM-TS" PC software (free download) provides the following functions:

- Result transfer to a PC
- Result database management
- Result evaluations
- Device configuration management
- Firmware update control
- Remote controlled measurements



STANDARDS

Safety limits are already stored in the NBM-550 for a variety of standards. In addition, users can also create their own standards. This allows direct display of results for flat probes in % of limit value at a known frequency of the field under test.

Safety Standard	Region	Safety Standard	Region
2013/35/EU Limbs	European Union	ICNIRP 1998 Occupational	International
2013/35/EU High ALs	European Union	ICNIRP 1998 General Pub	International
2013/35/EU Low ALs	European Union	ICNIRP 2010 Occupational	International
BGV B11 2h/d	Germany	ICNIRP 2010 General Pub	International
BGV B11 Area 1	Germany	ICNIRP 2020 Occupational	International
BGV B11 Area 2	Germany	ICNIRP 2020 General Pub	International
EMFV 2016 Low ALs	Germany	IEEE C95.1 2019 Restricted	International
FCC 1997 Occupational	USA	IEEE C95.1 2019 Unrestricted	International
FCC 1997 General Pop	USA	Safety Code 6 2015 Controlled	Canada
GB8702-2014	China	Safety Code 6 2015 Uncontrld	Canada

APPLICATIONS - HIGH FREQUENCY PROBES

	300 kHz	27 MHz	100 kHz	100 kHz	3 MHz	40 MHz	300 MHz	100 MHz	100 MHz	300 kHz*
Frequency range	to	to	to	to	to	to	to	to	to	to
	30 MHz	1 GHz	3 GHz	6 GHz	18 GHz	40 GHz	50 GHz	60 GHz	90 GHz	50 GHz
Field type	Н	Н	Е	Е	E	Е	Е	Е	Е	E Shaped
Probe designation	HF3061	HF0191	EF0391 EF0392	EF0691 EF0692	EF1891	EF4091	EF5091	EF6092	EF9091	EA ED5091
Mobile radio / telecommunications	•	•	•	•	•					•
Radio / TV broadcasting	•	•	•	•	•					•
Satellite communications					•	•	•	•	•	0
Radar					0	0	•	0	•	0
Industry: Heating and tempering	•		•	•						
Industry: Plastics welding	•		•	•						
Industry: Semiconductor production	0		•	•						
Medicine: Diathermy, hyperthermy			•	•						0
Leak detection					•	•	•	•	•	0
General public safety	•	0	•	•	•	•	0	•	•	0
Health and safety at work	•	•	•	•	•	•	•	•	•	•

^{*)} EB5091: 3 MHz - 50 GHz

more important

O variable importance



SPECIFICATIONS

NBM-550			
DISPLAY			
Display type	Transflective LCD, monochrome		
Display size	10 cm (4"), 240 x 320 dots		
Backlight	White LEDs, selectable illumination time (OFF, 5s, 10s, 30s, 60s, PERMANENT)		
Refresh rate	200 ms for bar graph and graphics, 400 ms for numerical results		
Operating languages	English, French, German, Italian, Spanish, Simplified Chinese, Turkish, Russian		
MEASUREMENT FUNCTIONS (with high f	requency probes)		
Result units	mW/cm², W/m², V/m, A/m, % (of standard)		
Display range	.0001 to 9999, 4 digits, variable or fixed triads can be selected		
	Variable triads Fixed triads 0.01 V/m to 100.0 kV/m 0.01 to 9999 V/m 0.01 mA/m to 265.3 A/m 0.0001 to 265.3 A/m 0.001 mW/m² to 26.53 MW/m² 0.0001 to 9999 W/m² 0.1 nW/cm² to 2.653 kW/cm² 0.0001 to 9999 mW/cm² 0.0001 % to 9999 % 0.0001 to 9999 %		
Result types (RMS, isotropic)	Actual, Maximum, Minimum, Average, Average Maximum		
Result types (RMS, X-Y-Z mode)	Actual X, Actual Y, Actual Z (requires a probe with separate axes)		
Time averaging	Selectable averaging time, 4 s to 30 min (2 s steps)		
Spatial averaging	Discrete or continuously		
Multi-position spatial averaging	Averages up to 24 spatially averaged results, each position and total is stored		
History Mode	Graphical display of Actual RMS results versus time (span of 2 minutes to 8 hours)		
Correction frequency	1 kHz to 100 GHz or OFF (direct frequency entry, interpolation between calibration points)		
Hot Spot Search	Audible indication of increasing and decreasing field strength (result type Act or Max)		
Alarm function	2 kHz audible signal (4 Hz repetition), adjustable threshold		
Timer Logging	Start time pre-selection: up to 24 h or immediate start Logging duration: up to 100 h Logging interval: 1s to 6 min (in 11 steps)		
RESULT MEMORY			
Physical memory	12 MB non-volatile flash memory for measurement results and voice comments		
Storage capacity	Up to 5000 results (including instrument settings, time stamp and GPS data when available)		
INTERFACES			
Remote control	Via USB or optical RS-232 interface (selectable)		
USB Optical interface	Serial, full duplex, 460800 baud (virtual COM port), multi-pin connector Serial, full duplex, 115200 baud, no parity, 1 start and 1 stop bit		
Earphone	3.5 mm TRS, ≥ 16 ohms (mono), see accessories		
External trigger (for result storage)	Uses the multi-pin connector. Interface cable with BNC connector available as accessory Triggers when contacts short-circuited		
External GPS receiver	Uses the multi-pin connector; GPS receiver with interface cable available as accessory		
Probe interface	Plug-and-play auto detection, compatible with all NBM series probes RMS integration time for measuring input approx. 270 ms		
	Measurement sampling rate 5 Hz (5/ 50/ 60 Hz for remote operation)		



OTHER FUNCTIONS			
Conditional Logging	g conditions	Selectable, - On upper threshold: Results stored when measurements exceed the adjustable threshold - Out of gap: Results stored when measurements are above the upper threshold or below th	
Logging	range	Selectable, - Store all (as long as the condition is true), sampling rate 5 Hz - Store first and last event (when the condition was true)	
Voice Recorder			
Micropho	ne	Built in microphone located at the top of the instrument near the Narda logo	
Recordin	g level	Fixed level, VU meter for level monitoring displayed when recording	
Recordin	g length	30 s max. length per voice comment, 1 voice comment stored with relevant result	
Recordin	g format	8-bit PCM mono, stored as WAV file (approx. 240 kbyte per 30 s)	
Output		External earphone (adjustable output level) or via NBM-TS PC software	
GPS Position Loggi	ng	With attached GPS receiver (GPS Kit available as accessory)	
Receiver		GPS Standard Positioning Service and Differential GPS (DGPS) capability using real-time WAAS/EGNOS correction	
Displaye	d position data	Latitude (Lat) and longitude (Long), selectable units: DMS (degrees, minutes, seconds)/ MinDec (decimal minutes)/ DegDec (decimal degrees)	
Geodetic	system	WGS84/ NAD83	
Position	accuracy	< 3 m (Differential GPS), <15 m (Standard GPS), high precision mode indicated on the NBM 550. Accuracy specified for 95 % probability	
Update ra	Update rate 1 s		
Receiver	size/ weight	61 mm diameter x 19.5 mm high / 62 g (approx. 100 g with mounting plate)	
Receiver	mounting	Uses the tripod thread on underside of device, mounting plate included	
GENERAL SPECIFIC	CATIONS		
Recommended calib	ration interval	24 months (basic unit only, probes are specified separately)	
Battery		NiMH rechargeable batteries, 4 x AA size (Mignon), 2700 mAh, included	
Operation time		20 hours (backlight off, no GPS) 12 hours (permanent backlight, no GPS) 10 hours (GPS receiver connected, no backlight)	
Charging time		2 hours	
Battery level display		100%, 80%, 60%, 40%, 20%, 10%, low level (< 5%)	
Temperature range Operatin Non-ope	g rating (transport)	-10 °C to +50 °C -30 °C to +70°C	
Humidity		5 to 95%, non condensing ≤29 g/m³ absolute humidity (IEC 60721-3-2 class 7K2)	
Immunity to radiated electromagnetic fields		200 V/m (100 kHz to 60 GHz) Note: The immunity may be less than the specified measurement range of a probe	
Operation in static magnetic fields ≤ 30		≤ 30 mT (to avoid high force on the device)	
Size (h x w x d)		45 x 98 x 280 mm (without probe and GPS receiver)	
Weight		550 g (without probe and GPS receiver).	
Accessories (include	d)	Hard case, power supply, rechargeable batteries, shoulder strap, tripod (bench top), USB interface cable, operating manual, certificate of calibration, NBM-TS software (free download	
Country of origin		Germany	



This product is protected by the following patents:
China Design Patent
China Design Patent
ZL 2006 3 0190679.1

European Design Patent
U.S. Desi

U.S. Patent No. 5,877,619 German Patent DE19536948A1

ORDERING INFORMATION

NBM-550	Part Number (P/N)
NBM-500 Set 1, Narda Broadband Field Meter Set includes: - NBM-550 Basic Unit (2401/01B) - Hard case for NBM-500 Series, holds meter and up to 5 probes (2400/90.06) - Power Supply 9VDC, 100V-240VAC (2259/92.06) - Battery, Rechargeable AA-Size, NiMH (4 pcs. 1001-0000-471) - Shoulder Strap, 1m (2244/90.49) - Tripod, bench top, 0.16m (2244/90.32) - Cable, USB Interface for NBM-550, 2 m (2400/90.05) - Operating Manual NBM-550 - Calibration Certificate - Software, NBM-TS, PC Transfer (free download)	2400/101B
NBM-500 Set 13, 1Hz-6GHz with EHP-50F, NBM-550, EF0691 Set includes: - all parts from NBM-500 Set 1 (2400/101B) - all parts from EHP-50F E&H Field Analyzer Set, 1Hz-400kHz (2404/103) - Probe EF 0691, E-Field,100kHz-6GHz (2402/14B) - Tripod, Non-Conductive, 1.65m, with Carrying Bag (2244/90.31)	2400/113
NBM-500 Set 15, 1Hz-3GHz with EHP-50F, NBM-550, EF0391 Set includes: - all parts from NBM-500 Set 1 (2400/101B) - all parts from EHP-50F E&H Field Analyzer Set, 1Hz-400kHz (2404/103) - Probe EF 0391, E-Field,100kHz-3GHz (2402/01B) - Tripod, Non-Conductive, 1.65m, with Carrying Bag (2244/90.31)	2400/115
GPS Kit	See Accessories
HIGH FREQUENCY PROBES *	
Probe HF 3061, H-Field, for NBM, 300kHz-30MHz	2402/05B
Probe HF 0191, H-Field, for NBM, 27MHz-1GHz	2402/06B
Probe EF 0391, E-Field, for NBM, 100kHz-3GHz	2402/01B
Probe EF 0392, E-Field, HiPow, for NBM, 100kHz-3GHz	2402/12B
Probe EF 0691, E-Field, for NBM, 100kHz-6GHz	2402/14B
Probe EF 0692, E-Field, for NBM, 600MHz-6GHz	2402/20B
Probe EF 1891, E-Field, for NBM, 3MHz-18GHz	2402/02B
Probe EF 4091, E-Field, for NBM, 40MHz-40GHz	2402/19B
Probe EF 5091, E-Field, for NBM, 300MHz-50GHz, Thermo.	2402/03D
Probe EF 6092, E-Field, for NBM, 100MHz-60GHz	2402/17B
Probe EF 9091, E-Field, for NBM, 100MHz-90GHz	2402/18B
Probe EA 5091, FCC 1997 Controlled Shaped for NBM, 300 kHz - 50 GHz, E-Field	2402/07D
Probe EB 5091, IEEE 2019 Restricted Shaped for NBM, 3 MHz - 50 GHz, E-Field	2402/21B
Probe EC 5091, SC 6 2015 Controlled Shaped for NBM, 300 kHz - 50 GHz, E-Field	2402/16D
Probe ED 5091, ICNIRP 1998 Occ Shaped for NBM, 300 kHz - 50 GHz, E-Field (compliant with ICNIRP 2020 above 30 MHz)	2402/10D

^{*} See separate data sheets for probe specifications



LOW FREQUENCY PROBE *

EHP-50F E&H Field Analyzer Set, 1Hz-400kHz, for NBM-550 Set Includes:

- EHP-50F Basic Unit (2404/03)
- AC/DC Battery Charger, for EHP-50 (2259/92.08)
- Cable, FO Duplex, RP-02, 10m (2260/91.07)
- Optical Bridge Connector RP-02 (2260/91.08)
- EHP-TS PC Software (2404/93.01)
- O/E Converter USB, RP-02/USB (2260/90.07)
- Tripod Extension, 0.50m, Non-Conductive (2244/90.45)
- Foam Inserts for EHP-50, for Hardcase 2400/90.06 (2404/90.01)

2404/103

DC MAGNETOMETER PROBE *

HP-01 Magnetometer Set DC-1kHz

Includes:

- HP-01 Basic Unit
- Zero Gauss Chamber
- AC/DC Battery Charger
- Cable, FO Duplex (1000 μm) RP-02, 10 m
- Cable, FO Duplex (1000 μm) RP-02, 25 cm
- O/E Converter USB, RP-02/USB
- Conical Tripod Support
- HP-01 / NBM Adapter
- Software CDROM including User's Manual
- Certificate of Calibration
- Carrying Case



2405/101

ACCESSORIES	
GPS Kit for NBM-550, Receiver and Mounting Set	2400/90.10
Earphone, 3.5mm Plug	2400/90.03
Test-Generator 27 MHz	2244/90.38
Tripod, Non-Conductive, 1.65m, with Carrying Bag	2244/90.31
Tripod Extension, 0.50m, Non-Conductive (for 2244/90.31)	2244/90.45
Handle, Non-Conductive, 0.42m	2250/92.02
Cable, Coaxial Multi-pin/ BNC, for NBM-550, Ext. Trigger, 2m	2400/90.04
Cable, FO Duplex (1000 μm) RP-02, 2 m	2260/91.02
Cable, FO Duplex (1000 μm) RP-02, 5 m	2260/91.09
Cable, FO Duplex (1000 μm) RP-02, 10 m	2260/91.07
Cable, FO Duplex (1000 μm) RP-02, 20 m	2260/91.03
Cable, FO Duplex (1000 μm) RP-02, 50 m	2260/91.04
Cable, FO Duplex, F-SMA to RP-02, 0.3 m	2260/91.01
O/E Converter RS232, RP-02/DB9	2260/90.06
O/E Converter USB, RP-02/USB	2260/90.07
Cable, Adapter USB 2.0 - RS232, 0.8 m	2260/90.53

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