

NARDA BROADBAND FIELD METER

NBM-550



Measuring electric and magnetic fields

ranging from low frequency
to microwaves

- ▲ **Non-directional measurement using isotropic probes for applications in the frequency range 1 Hz to 60 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**

OPTIONAL

- ▲ **Automatic storage of position data with GPS interface and plug-in GPS receiver**
- ▲ **Voice recording for comments**
- ▲ **Probe for spectral measurements and Weighted Peak from 1 Hz to 400 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**
- **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**



*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

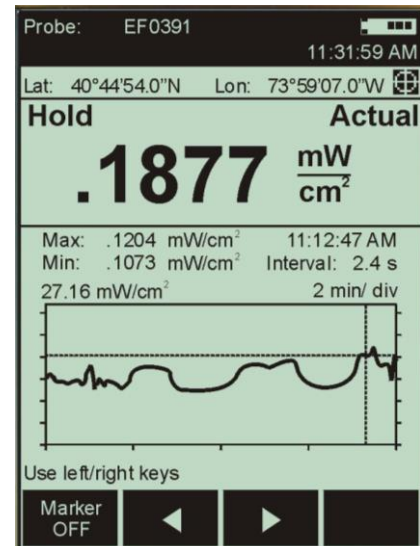
- Intelligent probe interface detects the NBM probe type and automatically recalls and applies the correction values that were recorded during calibration.
- Fully automatic zero point adjustment at programmable time intervals.
- Reminder function lets you know when calibration is due.

Special evaluations

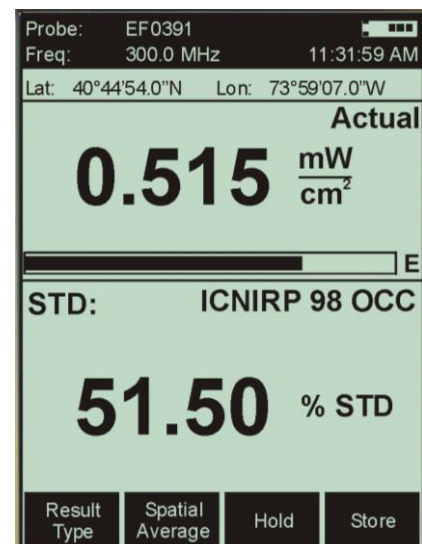
- Time averaging, period settings of up to 30 minutes.
- Spatial averaging, discrete or continuous.
- Multi-position spatial averaging for up to 24 locations.

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:

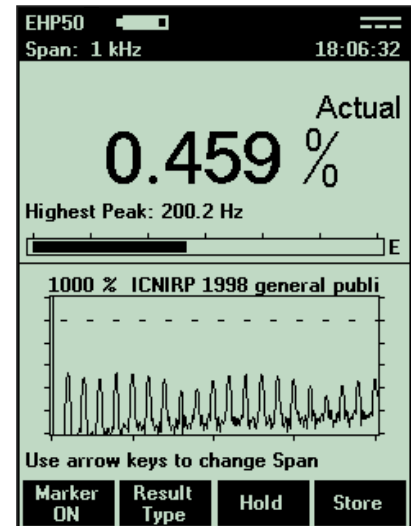
Electric field:	0.0001 to 100 kV/m
	0.001 to 1000 V/m
Magnetic field:	0.0001 to 10 mT
	0.0001 to 100 μ T
	Results can also be displayed in Gauss
- Frequency range selection in 8 steps
Span (Fstop) = 100/200/500 Hz, 1/2/10/100/400 kHz
- Numerical display of wideband measurement value or the highest value 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)
- Screenshot download as bitmap for simple documentation
- “NBM-TS” PC software for convenient data management, documentation and subsequent evaluations

OPTIONS

- GPS interface and plug-in GPS receiver for automatic storage of position data
- Conditional Logging: Stores measurement data when a threshold value is exceeded when using a high frequency probe
- 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.

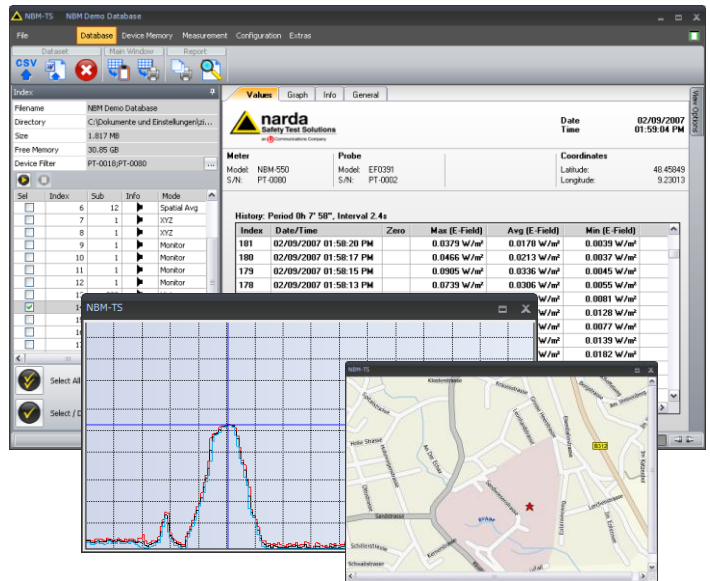


GPS receiver connected to the NBM-550

PC SOFTWARE

The comprehensive, easy to use “NBM-TS” PC software (included) 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	IEEE C95.1 Upper Tier	International
BGV B11 Area 2	Germany	IEEE C95.1 General Pub	International
FCC 1997 Occupational	USA	Safety Code 6 1999 RF Work	Canada
FCC 1997 General Pop	USA	Safety Code 6 1999 Gen Pub	Canada
GB8702-2014	China	Safety Code 6 2015 Controlled	Canada
		Safety Code 6 2015 Uncontrl'd	Canada

APPLICATIONS - HIGH FREQUENCY PROBES

Frequency range	100 kHz to 3 GHz	100 kHz to 6 GHz	3 MHz to 18 GHz	300 MHz to 50 GHz	100 MHz to 60 GHz	300 kHz to 30 MHz	27 MHz to 1 GHz	300 kHz* to 50 GHz
Field type	E	E	E	E	E	H	H	E Shaped
Probe designation	EF0391 EF0392	EF0691	EF1891	EF5091 EF5092	EF6092	HF3061	HF0191	EA ... ED5091
Mobile radio / telecommunications	●	●	●			●	●	●
Radio / TV broadcasting	●	●	●			●	●	●
Satellite communications			●	●	●			○
Radar			○	●	○			○
Industry: Heating and tempering	●	●				●		
Industry: Plastics welding	●	●				●		
Industry: Semiconductor production	●	●				○		
Medicine: Diathermy, hyperthermy	●	●						○
Leak detection			●	●	●			○
General public safety	●	●	●	○	●	●	○	○
Health and safety at work	●	●	●	●	●	●	●	●

*) EB5091: 3 MHz – 50 GHz

● more important

○ 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 frequency probes)													
Result units	mW/cm ² , W/m ² , V/m, A/m, % (of standard)												
Display range	.0001 to 9999, 4 digits, variable or fixed triads can be selected <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><u>Variable triads</u></td> <td style="width: 50%;"><u>Fixed triads</u></td> </tr> <tr> <td>0.01 V/m to 100.0 kV/m</td> <td>0.01 to 9999 V/m</td> </tr> <tr> <td>0.01 mA/m to 265.3 A/m</td> <td>0.0001 to 265.3 A/m</td> </tr> <tr> <td>0.001 mW/m² to 26.53 MW/m²</td> <td>0.0001 to 9999 W/m²</td> </tr> <tr> <td>0.1 nW/cm² to 2.653 kW/cm²</td> <td>0.0001 to 9999 mW/cm²</td> </tr> <tr> <td>0.0001 % to 9999 %</td> <td>0.0001 to 9999 %</td> </tr> </table>	<u>Variable triads</u>	<u>Fixed triads</u>	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/m ² to 26.53 MW/m ²	0.0001 to 9999 W/m ²	0.1 nW/cm ² to 2.653 kW/cm ²	0.0001 to 9999 mW/cm ²	0.0001 % to 9999 %	0.0001 to 9999 %
<u>Variable triads</u>	<u>Fixed triads</u>												
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0.1 nW/cm ² to 2.653 kW/cm ²	0.0001 to 9999 mW/cm ²												
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	Serial, full duplex, 460800 baud (virtual COM port), multi-pin connector												
- Optical interface	Serial, full duplex, 115200 baud, no parity, 1 start and 1 stop bit												
Earphone	3.5 mm TRS, ≥ 16 ohms (mono), for voice recorder option only												
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 an option												
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)												

OPTIONS	
Conditional Logging	
Logging 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 the lower threshold
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	
Microphone	Built in microphone located at the top of the instrument near the Narda logo
Recording level	Fixed level, VU meter for level monitoring displayed when recording
Recording length	30 s max. length per voice comment, 1 voice comment stored with relevant result
Recording 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 Logging	
Receiver type	GPS Standard Positioning Service and Differential GPS (DGPS) capability using real-time WAAS/EGNOS correction
Displayed 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 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 SPECIFICATIONS	
Recommended calibration interval	24 months (basic unit only, probes are specified separately)
Battery	NiMH rechargeable batteries, 4 x AA size (Mignon), 2500 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	Operating -10 °C to +50 °C Non-operating (transport) -30 °C to +70 °C
Humidity	5 to 95%, non condensing ≤29 g/m ³ absolute humidity (IEC 60721-3-2 class 7K2)
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 (included)	Hard case, power supply, rechargeable batteries, shoulder strap, tripod (bench top), NBM-TS software, operating manual, certificate of calibration, USB cable interface
Country of origin	Germany

This product is protected by the following patents:
 China Design Patent ZL 2006 3 0303322.X
 China Design Patent ZL 2006 3 0190679.1
 European Design Patent 000594254-001
 European Design Patent 000597836-0001
 U.S. Design Patent No. US D570,235 S

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 - Probes are not included - 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, NiMH (2x 2259/92.07) - 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) - Software, NBM-TS, PC Transfer (2400/93.01) - Operating Manual NBM-550 - Calibration Certificate	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
Options Set for NBM-550: GPS, Voice Recorder, Conditional Logging Includes: GPS Receiver for NBM-550, GPS Mounting Set, Earphone, 3.5mm Plug, Option Key, GPS/Voice/Condit.	2401/40
HIGH FREQUENCY PROBES *	
Probe EF 0391, E-Field, for NBM, 100kHz-3GHz	2402/01B
Probe EF 1891, E-Field, for NBM, 3MHz-18GHz	2402/02B
Probe EF 5091, E-Field, for NBM, 300MHz-50GHz, Thermo.	2402/03B
Probe HF 3061, H-Field, for NBM, 300kHz-30MHz	2402/05B
Probe HF 0191, H-Field, for NBM, 27MHz-1GHz	2402/06B
Probe EA 5091, FCC Shaped, for NBM, 300kHz-50GHz, E-Field	2402/07B
Probe EB 5091, IEEE Shaped, for NBM, 3MHz-50GHz, E-Field	2402/08B
Probe ED 5091, ICNIRP Shaped, for NBM, 300kHz-50GHz, E-Field	2402/10B
Probe EF 5092, E-Field, HiPow, for NBM, 300MHz-50GHz, Thermo.	2402/11B
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 6092, E-Field, for NBM, 100MHz-60GHz	2402/17B
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

* See separate data sheets for probe specifications

ACCESSORIES	
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
Carrying Strap Hardcase, for SRM/NBM-500	3001/90.04
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
Shielding Pouch for NBM-550	2401/90.02

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