

# Measuring electric fields from 3 MHz to 18 GHz

using instruments in the NBM-500 family

- ▲ **General public and occupational field exposure from radio broadcasting, telecoms, and radar**
- ▲ **Isotropic (non-directional) measurement**
- ▲ **64 dB dynamic range without changing measurement range**

The probe contains three orthogonally arranged dipoles with detector diodes. The three voltages, corresponding to the spatial components, are available individually at the probe output. The NBM basic unit calculates the resulting isotropic field strength.

## APPLICATIONS

The probe detects electric fields from 3 MHz to 18 GHz, covering the fields generated by broadcasting, telecoms, and radar. The dynamic range from 0.6 V/m up to 1,000 V/m (64 dB) makes the probe ideal for measuring exposure in both the general public and the occupational environment.

## PROPERTIES

The probe is designed with mechanical and electrical properties ideal for field use. The probe head is made of foam material to provide effective protection for the sensors, while having excellent RF characteristics. The electric destruction limit of 1,600 V/m for continuous wave signals is several times higher than any of the human safety limit values.

## CALIBRATION

The probe is calibrated at several frequencies. The correction values are stored in an EPROM in the probe and are automatically taken into account by the NBM instrument. Calibrated accuracy is thus obtained regardless of the combination of probe and instrument.



## SPECIFICATIONS <sup>a</sup>

Probe EF1891		Electric (E-)Field	
Frequency range <sup>(b)</sup>	3 MHz to 18 GHz		
Type of frequency response	Flat		
Measurement range	0.6 to 1000 V/m (CW) 0.6 to 35 V/m (True RMS)	100 nW/cm <sup>2</sup> to 265 mW/cm <sup>2</sup> (CW)	100 nW/cm <sup>2</sup> to 325 μW/cm <sup>2</sup> (True RMS)
Dynamic range	64 dB		
CW damage level	1600 V/m	700 mW/cm <sup>2</sup>	
Peak damage level <sup>(c)</sup>	16 kV/m	70 W/cm <sup>2</sup>	
Sensor type	Diode based system		
Directivity	Isotropic (Tri-axial)		
Readout mode / spatial assessment	3 separate axes		
<b>UNCERTAINTY</b>			
Flatness of frequency response <sup>(d)</sup> Calibration uncertainty not included	±1 dB (10 MHz to 3 GHz) +2/ -1 dB (3 to 7 GHz) +3/ -1 dB (7 to 11 GHz) +3/ -4 dB (11 to 18 GHz)		
Calibration uncertainty <sup>(e)</sup> @ 0.2 mW/cm <sup>2</sup> (27.5 V/m)	0.8 dB (≤ 300 MHz) 1.5 dB (300 MHz to 1.2 GHz) 1.3 dB (≥ 1.2 GHz)		
Linearity Referred to 0.2 mW/cm <sup>2</sup> (27.5 V/m)	±3 dB (0.8 to 1.65 V/m) ±1 dB (1.65 to 3.3 V/m) ±0.5 dB (3.3 to 300 V/m) ±0.8 dB (300 to 1000 V/m)	±3 dB (170 to 720 nW/cm <sup>2</sup> ) ±1 dB (720 nW/cm <sup>2</sup> to 2.9 μW/cm <sup>2</sup> ) ±0.5 dB (2.9 μW/cm <sup>2</sup> to 24 mW/cm <sup>2</sup> ) ±0.8 dB (24 to 265 mW/cm <sup>2</sup> )	
Isotropic response <sup>(f)</sup>	±1 dB (27 MHz to 1 GHz) ±2 dB (1 GHz to 18 GHz)		
Temperature response	+0.2/ -1.5 dB (±0.025 dB/K @ 10 to 50 °C )		
<b>GENERAL SPECIFICATIONS</b>			
Factory calibration frequencies	3/ 10/ 27.12/ 100/ 200/ 300/ 500/ 750 MHz 1/ 1.8/ 2.45/ 3/ 4/ 5/ 6/ 7/ 8.2/ 9.3/ 10/ 11/ 18 GHz		
Recommended calibration interval	24 months		
Temperature range	Operating 0 °C to +50 °C Non-operating (transport) -40 °C to +70 °C		
Humidity	5 to 95 % RH @ ≤28 °C	≤26 g/m <sup>3</sup> absolute humidity	
Size	318 mm x 66 mm Ø		
Weight	90 g		
Compatibility	NBM-500 series meters		
Country of origin	Germany		

(a) Unless otherwise noted specifications apply at reference condition: device in far-field of source, ambient temperature 23±3 °C, relative air humidity 25% to 75%, sinusoidal signal

(b) Cutoff frequency at approx. -3 dB @ 3 MHz/ -4 dB @ 18 GHz

(c) Pulse length 1μsec, duty cycle 1:100

(d) Frequency response can be compensated for by the use of correction factors stored in the probe memory

(e) Expanded measurement uncertainty. Accuracy of the fields generated to calibrate the probes

(f) Uncertainty due to varying polarization (verified by type approval test for meter with probe). Ellipse ratio included and calibrated for each probe

## ORDERING INFORMATION

	Part number
Probe EF1891, E-Field for NBM, 3 MHz – 18 GHz, Isotropic	<b>2402/02B</b>
Probe EF1891, E-Field, ACC - with accredited (DAkkS) calibration, basic unit required	<b>2402/02B/ACC</b>

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