

## E-FIELD PROBE

EF9091

# Measuring electric fields from 100 MHz to 90 GHz

using instruments in the NBM-500 family

- ▲ **General public and occupational field exposure**
- ▲ **Extra wide frequency range with high dynamic**
- ▲ **Isotropic (non-directional) measurement**

The probe contains three orthogonally arranged dipoles with detector diodes. The diode voltages each correspond to the RMS value of the spatial components. The isotropic measurement result is obtained by addition within the probe.

## APPLICATIONS

The probe detects electric fields from 100 MHz up to 90 GHz. This frequency range covers the entire range of high frequency communications, right up to mobile radio and satellite links as well as radar based systems for active cruise control and obstacle recognition. The linearity and sensitivity of the probe ensure its suitability for checking human safety limit values in the occupational and general public environments.

## 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 detector elements are also largely protected against overload, since their destruction limit is well above all the human safety limit values.

## CALIBRATION

The probe is calibrated at several frequencies up to 60 GHz. 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. For frequency above 60 GHz typical correction factors were determined based on samples. These values are also automatically taken into account by the NBM instrument.



## SPECIFICATIONS <sup>a</sup>

Probe EF9091	Electric (E-)Field	
Frequency range	100 MHz to 90 GHz	
Type of frequency response	Flat	
Measurement range	0.7 to 400 V/m (CW) 0.7 to 61.4 V/m (True RMS) from 2 V/m for frequencies > 60 GHz	130 nW/cm <sup>2</sup> to 42 mW/cm <sup>2</sup> (CW) 130 nW/cm <sup>2</sup> to 1 mW/cm <sup>2</sup> (True RMS) from 1 μW/cm <sup>2</sup> for frequencies > 60 GHz
Dynamic range	55 dB	
CW damage level	1600 V/m	700 mW/cm <sup>2</sup>
Peak damage level <sup>(b)</sup>	1900 V/m	1 W/cm <sup>2</sup>
Sensor type	Diode based system	
Directivity	Isotropic (Tri-axial)	
Readout mode / spatial assessment	Combined 3-axis (RSS)	
<b>UNCERTAINTY</b>		
Flatness of frequency response <sup>(c)</sup> Calibration uncertainty not included	+3/-6 dB (100 MHz to 60 GHz) -3/-10dB typ. (60 GHz to 90 GHz) ±3 dB (300 MHz to 40 GHz)	
Calibration uncertainty <sup>(d)</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 to 60 GHz)	
Linearity Referred to 0.2 mW/cm <sup>2</sup> (27.5 V/m)	±3 dB (1 to 2 V/m) ±1 dB (2 to 250 V/m) ±2 dB (250 to 400 V/m)	±3 dB (0.26 to 1 μW/cm <sup>2</sup> ) ±1 dB (1 μW/cm <sup>2</sup> to 16.5 mW/cm <sup>2</sup> ) ±2 dB (16.5 mW/cm <sup>2</sup> to 42 mW/cm <sup>2</sup> )
Isotropic response <sup>(e)</sup>	±1.25 dB (< 10 GHz) ±2 dB (10 GHz to 26.5 GHz) ±2 dB typ. (> 26.5 GHz)	
Temperature response	±0.9 dB (-0.03 dB/K) @ f = 2.45 GHz	
<b>GENERAL SPECIFICATIONS</b>		
Calibration frequencies	100/ 200/ 300/ 500/ 750 MHz 1/ 1.8/ 2.45/ 3/ 4/ 5/ 6/ 8.2/ 10/ 11/ 18/ 26.5/ 40/ 45.5/ 60 GHz	
Recommended calibration interval	24 months	
Temperature range	Operating -10 °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 40 % to 60 %, sinusoidal signal

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

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

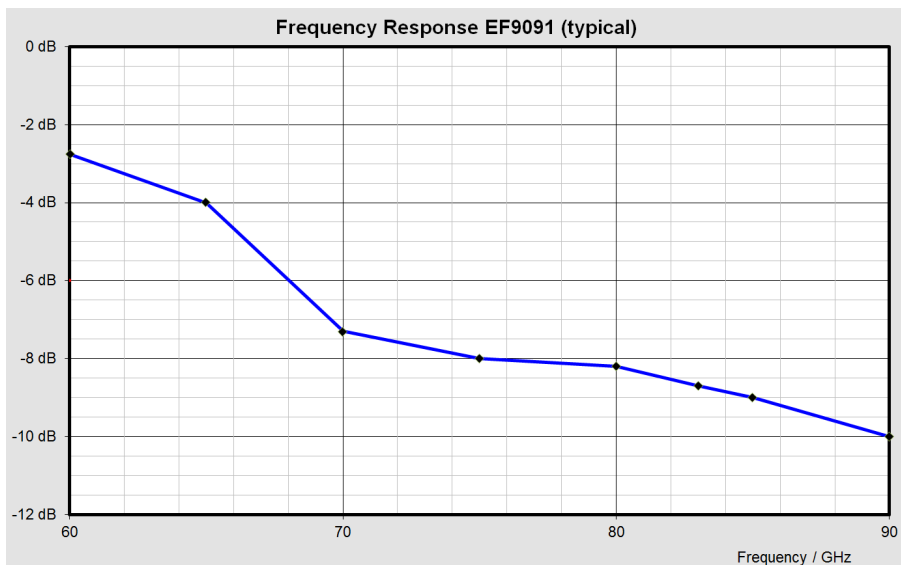
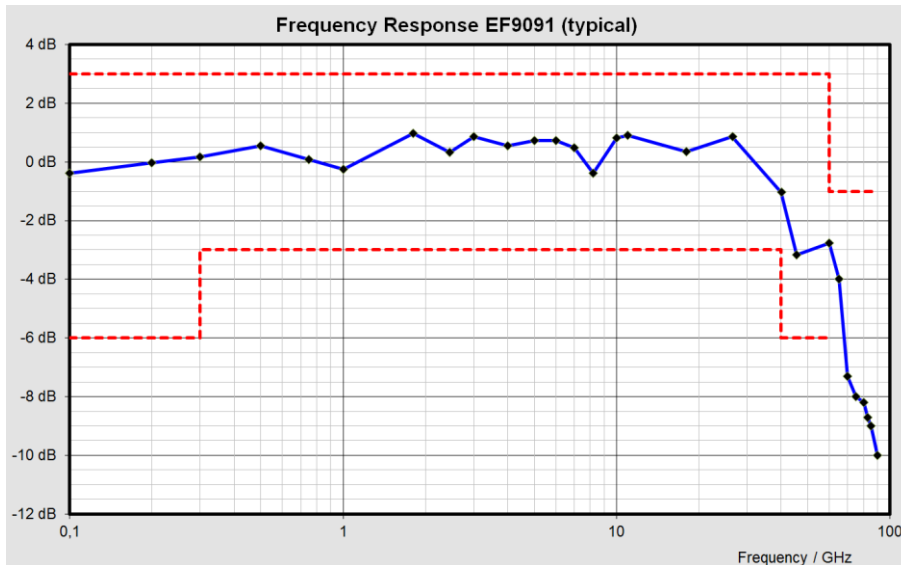
(d) Accuracy of the fields generated to calibrate the probes

(e) 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 EF9091, E-field for NBM, 100 MHz – 90 GHz, isotropic	2402/18B

## CHARACTERISTICS



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