

Isotropic measurement of electric fields from 100 kHz to 8 GHz

using the Field Meter FieldMan®

The probe detects electric fields from 100 kHz to 8 GHz, covering applications in broadcasting, telecoms and industrial environments. The extended frequency range enables measurements of modern wireless technologies such as WLAN systems in the 6 GHz band, future mobile communication systems, ultra-wideband (UWB), radar sensors and high-frequency radio links. In the frequency range of mobile phone base stations the probe exceeds the requirements of EN 50492 and IEC 62232.

The probe digitally transmits measurement data to the base unit without influencing the measured values, eliminating the need for meter calibration. Accredited calibration data is stored in the probe and automatically applied during measurement. If the frequency of the predominant field is known, a correction factor can be applied to further improve measurement accuracy.

- › Field exposure from broadcasting, telecoms and industrial equipment
- › Measurements on base stations (EN 50492 and IEC 62232)
- › Isotropic (non-directional) measurement
- › Wide dynamic range without changing range
- › Suitable sensitivity for modern RF wireless applications
- › Digital probe interface – no more meter calibration
- › Self-test of the probe interface with integrated sensor function test
- › Automatic offset correction, no zero adjustment required
- › Temperature compensation of the sensors for minimum drift and wide temperature range down to -20 °C
- › High immunity at 50/60 Hz
- › Accredited calibration included



Specifications ¹

| Product Features | | |
|---|---|--|
| Frequency range ² | 100 kHz to 8 GHz | |
| Type of frequency response | Flat | |
| Measurement range (nom.) | 0.55 to 900 V/m (CW) 0.55 to 17 V/m (True RMS) | 80 nW/cm ² to 215 mW/cm ² (CW) 80 nW/cm ² to 0.077 mW/cm ² (True RMS) |
| Dynamic range (nom.) | 64.3 dB | |
| CW damage level (nom.) | 1500 V/m | 597 mW/cm ² |
| Peak damage level (nom.) ³ | 15 kV/m | 60 W/cm ² |
| Sensor type | Diode based system | |
| Directivity | Isotropic (Tri-axial) | |
| Spatial assessment | 3 separate axes | |
| Sampling rate / integration time (nom.) | 5 Hz / 265 ms | |
| Temperature sensors | Integrated sensors for displaying the ambient temperature, for automatic offset compensation and for compensation of the temperature response | |
| Self-test | Interface function test and sensor test for short circuit and interruption of diodes | |

| Uncertainty | |
|---|---|
| Flatness of frequency response ^{4, 5} Calibration uncertainty not included Referred to 0.2 mW/cm ² (27.5 V/m) | typ. -3 dB @ 100 kHz +1.0 dB/-1.5 dB (0.3 MHz to 1 MHz) ±1.0 dB (>1 MHz to 300 MHz) +1.5 dB/-1.0dB (>300 MHz to 3 GHz) +2.0 dB/-1.5dB (>3 GHz to 8 GHz) |
| Linearity deviation (nom.) Referred to 0.2 mW/cm ² (27.5 V/m @ 1800 MHz) | ±1.0 dB (0.5 V/m to 2 V/m) ±0.5 dB (>2 V/m to 400 V/m) +1/-1.5 dB (>400 V/m to 900 V/m) |
| Isotropic deviation ⁵ Referred to 0.2 mW/cm ² (27.5 V/m) | ±1 dB (0.1 MHz to 4 GHz) ±1.5 dB (> 4 GHz to 8 GHz) |
| Temperature response (nom.) Referred to 0.2 mW/cm ² (27.5 V/m @ 100 MHz) | (-20 °C to +50 °C, related to 23 °C) |

| General Specifications | | |
|----------------------------------|---|--|
| Accredited calibration | DAkKS, ILAC-MRA (DIN EN ISO/IEC 17025, IEEE Std. 1309) For measurands outside the scope, a factory calibration is performed. | |
| Recommended calibration interval | 24 months | |
| Operating temperature | -20 °C to +50 °C | |
| Humidity | < 29 g/m ³ (< 93 % RH at +30 °C), non-condensing | |
| Ingress protection | IP54 (probe screwed on) | |
| Climatic conditions | Storage | 1K5 (IEC 60721-3) -40 °C to +70 °C |
| | Transport | 2K4 (IEC 60721-3) -40 °C to +70 °C |
| | Operating | 7K2 (IEC 60721-3) extended to -20 °C to +50 °C |
| Size | 308 mm x 66 mm Ø | |
| Weight | < 100 g | |
| Country of origin | Germany | |

¹ 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, probe sampling rate 5 Hz.

² Cutoff frequency at typ. -3 dB.

³ Pulse length 1µsec, duty cycle 1:100.

⁴ Frequency response can be compensated for by the use of correction factors stored in the probe memory.

⁵ Results are calculated from the maximum and minimum response obtained during the full revolution about the stem of the probe, oriented 54.7° to the electric field vector.

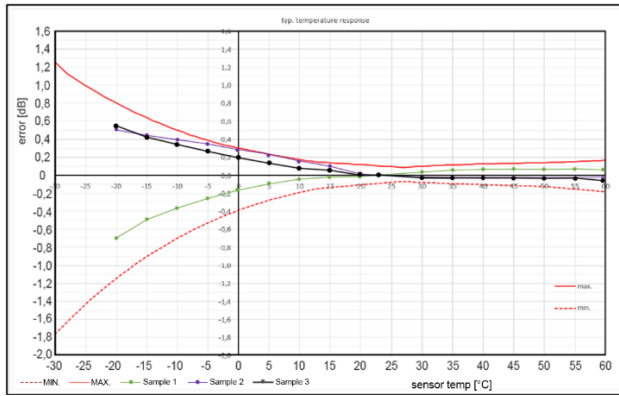


Fig. 1. typical temperature response EFD-0891

Definitions and Conditions

Conditions

Unless otherwise noted, specifications apply after 30 minutes warm-up time within the specified environmental conditions. The product is within the recommended calibration cycle.

Specifications with limits

These describe product performance for the given parameter covered by warranty. Specifications with limits (shown as <, ≤, ≥, ±, max., min.) apply under the given conditions for the product and are tested during production, considering measurement uncertainty.

Specifications without limits

These describe product performance for the given parameter covered by warranty. Specifications without limits represent values with negligible deviations, which are ensured by design (e.g. dimensions or resolution of a setting parameter).

Typical values (typ.)

These characterize product performance for the given parameter that is not covered by warranty. When stated as a range or as a limit (shown as <, ≤, ≥, ±, max., min.), they represent the performance met by approximately 80% of the instruments. Otherwise, they represent the mean value. The measurement uncertainty is not taken into account.

Nominal values (nom.)

These characterize expected product performance for the given parameter that is not covered by warranty. Nominal values are verified during product development but are not tested during production.

Uncertainties

These characterize the dispersion of the values attributed to the measurands with an estimated confidence level of approximately 95%. Uncertainty is stated as the standard uncertainty multiplied by the coverage factor k=2 based on the normal distribution. The evaluation has been carried out in accordance with the rules of the "Guide to the Expression of Uncertainty in Measurement" (GUM).

Ordering Information

| Digital Broadband Probe | Part number |
|---|-------------|
| Probe EFD-0891, E-Field, 100 kHz–8 GHz | 2462/24B |
| Optional Accessories | Part number |
| Cable, Digital Probe Extension, 2m ⁶ | 2460/90.02 |

⁶ The device specifications apply without an extension cable.

Narda Safety Test Solutions GmbH
Sandwiesenstrasse 7
72793 Pfullingen, Germany
Phone +49 7121 97 32 0
info@narda-sts.com

Narda Safety Test Solutions
North America Sales Office
435 Moreland Road
Hauppauge, NY11788, USA
Phone +1 631 231 1700
info@narda-sts.com

Narda Safety Test Solutions S.r.l.
Via Benessea 29/B
17035 Cisano sul Neva, Italy
Phone +39 0182 58641
nardait.support@narda-sts.it

www.narda-sts.com

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