

PARTE D

CARATTERISTICHE TECNICHE DEGLI STRUMENTI E CERTIFICATI DI TARATURA

**AEROPORTO di NAPOLI
“CAPODICHINO”**

Symphonie: il laboratorio acustico completo



FUNZIONI PRINCIPALI

Il sistema **Symphonie** offre moltissime possibilità nel campo dell'acustica e delle vibrazioni

- Trasduttori multipli: microfoni, accelerometri, sonde di intensità sonora, etc.
- Condizionamento di segnale per i trasduttori più diffusi
- Ingressi e uscite digitali, controllo remoto
- Generatore di segnali (rumore bianco e rosa, sinusoidale, loop)
- Analizzatore a due canali FFT e filtri digitali in classe 0 (IEC 1260)
- Calibrazione manuale o remota automatica
- Ingresso tachimetrico

Tra le applicazioni principali che si possono affrontare con Symphonie ed i relativi softwares:

- Misure secondo D.M. 16/03/98
- Misure di acustica architettonica
- Acquisizioni MLS e calcolo della risposta all'impulso per l'analisi dell'acustica degli ambienti
- Monitoraggio acustico e/o di vibrazioni
- Analizzatore in tempo reale in banda di ottava e 1/3 di ottava da 20 Hz (opzione 1Hz) a 20 kHz
- Analizzatore di spettro in tempo reale a banda fine
- Analisi b.p.c. selettiva fino a 1/48 di ottava
- Registratore digitale
- Spettro di intensità sonora e determinazione della potenza sonora secondo la ISO9614

- Analisi dei transienti
- Identificazione degli eventi
- Multitasking con applicazioni esterne (parametri meteo, accesso remoto e controllo via modem, etc.)
- Loudness, PNL, PLNT in tempo reale, EPNL
- Qualità del Suono

Misure secondo il Decreto 16/03/98

SYMPHONIE equipaggiato con il software appositamente sviluppato per il mercato italiano, consente di eseguire tutte le misure previste dal Decreto 16/3/98. Con il sistema è quindi immediata la ricerca delle **componenti impulsive**, la ricerca delle **componenti tonali**, la **correzione** per la presenza di queste, e così via.

Con i pacchetti Symphonie "Decreto" e "Decreto Advanced" i tecnici hanno a disposizione uno strumento pensato e progettato per facilitare e velocizzare al massimo la misura di rumore ambientale, diminuendo i margini di errore e di interpretazione. Mediante il software applicativo Decreto 16/03/98 è possibile calcolare in modo automatico quanto richiesto dal DM16/03/98; il tecnico quindi non deve far altro che acquisire i dati di livello (contemporaneamente nel dominio del tempo e della frequenza), scegliendo una delle configurazioni di misura pre impostate, per poi lasciare al sistema l'onere di sintetizzare quanto richiesto. In pochi secondi, senza la necessità di scaricare dati tra strumento e computer, è possibile produrre la relazione tecnica nel tempo che, con uno strumento tradizionale, talvolta è necessario per il solo trasferimento dei dati sul computer.

Misure di rumore ambientale: dBENV32

SYMPHONIE trasforma il vostro notebook in un intelligente sistema di monitoraggio di rumore e vibrazioni a lungo termine.

Con il software **dBENV32**, si combinano i vantaggi di un data logger, un fonometro integratore, un registratore digitale di segnali e un analizzatore in tempo reale simultaneamente.

I livelli overall possono essere acquisiti simultaneamente agli spettri in 1/3 di ottava per un periodo di tempo lungo.

Il modulo per l'acustica ambientale **dBENV32**, che consiste di **dBTRIG32** e **dBTRAIT32**, associato a **Symphonie** è un potentissimo strumento di indagine che può essere impiegato per un'ampia gamma di applicazioni, come ad esempio l'analisi acustica, l'impatto acustico ambientale, il monitoraggio in area urbana con identificazione e quantificazione delle sorgenti significative.

VANTAGGI DELLA SOLUZIONE Symphonie

- Sistema a due canali
- Sistema in classe 1 con dBTRIG (PTB)
- Fonometro, Analizzatore, Registratore digitale
- Dinamica di 115dB

- Tempo reale
- Multi-tasking
- Trasduttori multipli
- Tutti i vantaggi di un sistema basato su PC

I COMPONENTI

TRASDUTTORI	Microfoni, accelerometri con elettronica incorporata, sonde intensimetriche, ingressi digitali
UNITA' DI ACQUISIZIONE	
COMPUTER	(requisiti minimi) Processore Pentium RAM 16 Mbytes Windows 3.1x, 95 o 98 Scheda grafica VGA o superiore Slot PCMCIA Tipo II
PACCHETTI SOFTWARE	dBENV32 (dBTRIG32 and dBTRAIT32) dBFA32 dBBATI32
ACCESSORI	Custodia per il trasporto e per le misure in campo Palla antivento e schermo microfonico 'all weather' Calibratori (per microfoni, accelerometri e sonde intensimetriche) Box per sistemi di monitoraggio alungo termine Cavi di prolunga Adattatore per alimentazione da rete

Il SIT è uno dei firmatari dell'Accordo Multilaterale della European co-operation for the Accreditation (EA) per il mutuo riconoscimento dei certificati di taratura.
SIT is one of the signatories to the Multilateral Agreement of EA for the mutual recognition of calibration certificates.

CENTRO DI TARATURA 76
Calibration Centre

istituito da
established by



GESTIONE IMPIANTI
ASSISTENZA SPECIALISTICA
POLO TERMICO E IDRAULICO - TORINO
V'ia Botticelli, 139 - 10154 TORINO
tel. (011) 778-3809 fax (011) 778-3035

Pagina 1 di 13
Page 1 of 13

CERTIFICATO DI TARATURA N. 46/02
Certificate of Calibration No.

- Data di emissione date of issue	31/01/2002
- destinatario addressee	ELMEC S.r.l. - Roma
- richiesta application	01 dB Italia (Padova)
- in data date	18/12/2001
Si riferisce a referring to	ANALIZZATORE
- oggetto item	01dB
- costruttore manufacturer	SYMPHONIE
- modello model	01321
- matricola serial number	31/01/2002
- data delle misure date of measurements	09/02
- registro di laboratorio laboratory reference	

Il presente certificato di taratura è rilasciato in base all'accreditamento SIT N. 76 concesso dall'Istituto Metrologico Primario competente in attuazione della legge n. 273 1991 che ha istituito il Sistema Nazionale di Taratura (SNT). Tale Istituto, nei campi di misura ed entro le incertezze precisate nell'accreditamento stesso, garantisce:

- il mantenimento della riferibilità degli apparecchi usati dal Centro a campioni nazionali delle unità del Sistema Internazionale delle Unità (SI);
- la correttezza metrologica delle procedure di misura adottate dal Centro.

This certificate of calibration is issued in accordance with the accreditation SIT No. 76 guaranteed by the relevant Primary Metrological Institute in enforcement of the law No. 273 1991 which has established the National Calibration System. The Institute, for the measurement ranges and within the uncertainties stated in the approval, guarantees:

- the maintenance of the traceability of the apparatus used by the Centre to national standards of the International System of Units (SI);
- the metrological correctness of the measurement procedures adopted by the Centre.

I risultati di misura riportati nel presente Certificato sono stati ottenuti applicando le procedure riportate alla pagina seguente insieme ai campioni di prima linea che iniziano la catena di riferibilità e ai rispettivi certificati validi di taratura.
The measurement results reported in this Certificate were obtained following the procedures reported in the following page together with the first line standards which begin the traceability chain and their valid certificates of calibration.

Le incertezze di misura dichiarate in questo documento sono espresse come due volte lo scarto tipo (corrispondente, nel caso di distribuzione normale, a un livello di confidenza di circa 95%).
The measurement uncertainties stated in this document are estimated at the level of twice the standard deviation (corresponding, in the case of normal distribution, to a confidence level of about 95%).

Il Responsabile del Centro
Head of the Centre
(Franco Ardito)



REG. NO. 10 572 - 02
Wandel & Goltermann Germany



EMR-200, EMR-300

For isotropic measurements
of electromagnetic fields

- Versatile system for measuring electromagnetic fields
- Mainframe instrument with wide range of accessories
- Interchangeable probes allow optimum matching to application and frequency range
- Non-directional (isotropic) measurement with three-channel measurement probe
- High dynamic range due to three-channel digital results processing
- Optical interface for calibration and result data transfer
- Excellent measurement accuracy with automatic zeroing even during field exposure
- Easy to use
- Shock, dust and water-resistant
- Calibrated

In addition to the Mainframe unit, EMR-200 and EMR-300 also include a carrying bag, PC Transfer Set ETS-1, table-top tripod and rechargeable batteries, together with an appropriate charger unit. To ensure that the instrument is always ready for use, we recommend the rapid charger which provides trickle-charging facilities as well as rapid charging and discharge functions.

At least one probe must be ordered for use with the radiation measuring set. Data specific to the probes ordered is stored in the mainframe before delivery. If further probes are ordered at a later date, the data is supplied on floppy disk and can be permanently loaded into the mainframe using the Transfer Set from a PC operating under Microsoft® Windows™. If you prefer, this can be done by your local Wandel & Goltermann Service Center.

Applications

Precision measurement of electric field strength for personal safety at work where high radiation levels are present, and for applications involving electromagnetic compatibility (EMC), such as:

- Service work on transmitting and radar equipment
- Working with plastic welding machines
- Operating diathermy equipment and other medical instruments producing short-wave radiation
- Drying equipment in the tanning and timber industries
- Field strength measurements in TEM cells and absorber chambers

Fields of application

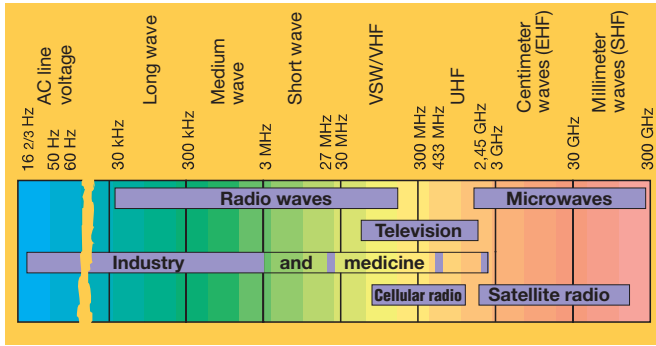
The diagram shows some typical applications where electromagnetic radiation occurs or is utilized. The frequency spectrum is normally divided into two areas:

1: Low frequencies up to about 30 kHz.

This region includes some railway system overhead power supplies running at 16 2/3 Hz, domestic a.c. power at 50/60 Hz and extends up to VDU workstations at 30 kHz (see EFA data sheets).

2: High frequencies above 30 kHz.

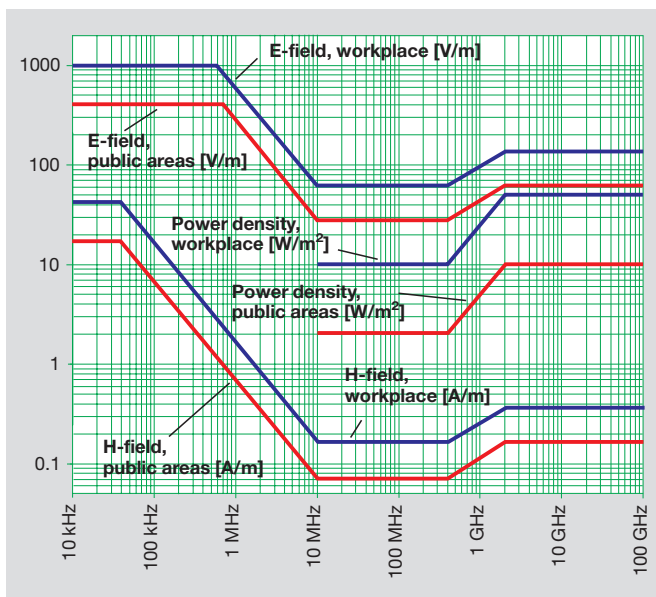
Typical frequencies encountered here are FM radio (88 to 108 MHz), television signals (40 to 900 MHz), mobile radio (400 to 1800 MHz) and satellite communications (up to 18 GHz). Other frequencies which are often used in industry and medicine are 27, 433 and 2450 MHz. Knowledge of the frequency is important when monitoring limit values for electromagnetic fields because these limit values depend on the frequency.



Frequency ranges of electromagnetic radiation encountered in everyday life.

Limit values

Work on defining legally binding limit values for electromagnetic radiation is currently being done at national and international levels. The limit values specified in the draft CENELEC European standard are quoted here as an example.



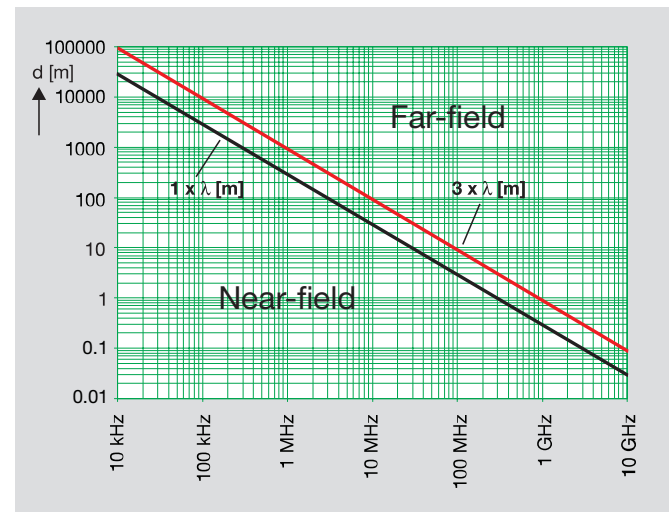
Limit values for electromagnetic radiation. Further details are found in the draft European standard CENELEC 50166-2.

Limit values for common industrial and medical frequencies, derived from the above-mentioned draft standard:

	27 MHz	433 MHz	2.45 GHz
Workplace	61.4 V/m 0.16 A/m 10 W/m ²	63 V/m 0.17 A/m 11 W/m ²	137 V/m 0.36 A/m 50 W/m ²
Public areas	27.5 V/m 0.07 A/m 2 W/m ²	28 V/m 0.08 A/m 2.2 W/m ²	61.4 V/m 0.16 A/m 10 W/m ²

Near-field and far-field

Electromagnetic fields can be split into two components: the electric field E [measured in V/m] and the magnetic field H [measured in A/m]. The E-field and H-field are strongly interdependent for the far-field, i.e. anywhere more than a certain distance from the source (see diagram). If, say, the H-field is measured in this region, the magnitude of the E-field and the power density S [W/m²] can be calculated from it. In contrast, the H-field and E-field must be measured separately in the near-field region.



Near-field and far-field definition. Measurements at a distance d of 1 x wavelength λ (better: 3 x λ) from the source are made under far-field conditions.

Applications and tips

- Induction heaters, RF welding equipment and erosion machines: Electric fields are less important here, the magnetic fields need to be monitored.
- Radio and TV transmitters/antennas: As long as the location is in the far-field region, an E-field probe is preferable due to the large bandwidth. When working close to antennas (near-field) separate checking of the E-field and the H-field is unavoidable.
- Diathermy equipment (RF equipment for medical therapy): Very high field strengths are present at the electrodes and on the connecting leads to the electrodes. The main component is normally the electric field.
- Microwave ovens: The very short wavelength means that exposure is normally in the far-field. E-field measurements are therefore sufficient.

Spatial averaging

The spatial distribution of a field is seldom homogeneous, even within the confines of a low-reflection absorber chamber. Measurements at several points within the area are thus needed. By measuring at different positions, it is also possible to estimate complete body exposure levels. The root mean square of these values is required. The EMR-300 makes light work of this. When set to Spatial Averaging mode, a new measurement is made simply by pressing a key. The squares of these values are summed automatically, providing a display of the average field strength for the area. If the "Spatial" key is held down, the EMR-300 will calculate the average for the time that the key was pressed. All instruments in the EMR range are also equipped with an averaging function for the 6-minute average specified by the relevant standards.



Spatial averaging

Non-directional measurement

Free-space electromagnetic fields are seldom due to a single source, but are generally the result of several transmitters from different directions. To be able to correctly determine the radiation exposure, any measurement must be non-directional, i.e. isotropic. The value measured by an isotropic instrument is also not affected by the position in which the instrument is used. For these reasons, the probes of the EMR-200/EMR-300 are fitted with three sensors which measure the field strength of the X, Y and Z directions separately. The field strength is calculated by the instrument's processor by summing the squares of the three measured values. This method has the advantage over conventional analog summing within the probe that all three sensors can be independently calibrated to achieve very high linearity. It also eliminates dependence on the square-law sensor characteristic which leads to large measurement errors as it no longer holds true at high field strengths. Use of this novel, innovative method means that the EMR-200 and EMR-300 can measure the entire field strength range for the first time using just a single probe. This simplifies measurement and makes the purchase of additional probes unnecessary.

PC Transfer Set

If high field strengths are to be measured or long-term monitoring is required, the measured values can be transferred to a PC or printer using an optical interface and the Transfer Set. All products in the EMR range can also be fully remote-controlled via this interface. The software supplied with the ETS-1 Transfer Set makes it easy to record the results and then process them using programs such as Excel. The EMR-300 can, in fact, store up to 1500 measured values, complete with timestamp and all parameters, so it is capable of monitoring for a whole day without needing to be connected to a PC or printer. The results can be displayed later or read out together with all major parameters by using the ETS-1 Transfer Set.

The Transfer Set allows independent output of the measured values, i.e. spatial field strength and the three measurement axes X, Y and Z.



Zeroing

Normally, an instrument for measuring electromagnetic radiation requires zeroing every time it is switched on or the temperature changes, if accurate measurements are to be obtained. Up till now, the instrument had to be placed in a room where no field was present in order to zero it. More often than not, such a room is not available, and the whole procedure is inconvenient. A new zeroing method is used in the EMR range of products that is fully automatic and which is also valid even in the presence of high field strengths. The measurement errors due to inaccurate zeroing can be excluded as far as the EMR range of instruments is concerned.

Rugged casing

The casing is specially constructed to withstand shocks and impacts, to allow use under difficult conditions, e.g. outdoors or at industrial sites. The basic unit includes anti-slip, impact-resistant shock protection. All mechanical connections such as the test probe are designed to withstand rough handling. Practical details like the tripod bush and built-in stand make the instrument equally suitable for laboratory applications.

Calibration

Every instrument in the EMR range is calibrated for absolute level and linearity vs. level. Typical frequency response values for the probes are provided (CAL factor) together with a calibration certificate. The frequency response of every specially-calibrated probe is measured individually, and a calibration report containing

all the measured values is included. The calibration can also be carried out automatically via the bi-directional optical interface. This allows easy calibration by the user or by recognized national calibration laboratories, resulting in a significant reduction in the cost of regular re-calibration, which is recommended for all field measuring instruments.

Specifications of the Radiation Meters

EMR-200, EMR-300

Display and warning circuits

Display type LCD, instrument specific
 Display refresh rate typically 400 ms
 Visible warning bright red LEDs in the foil keypad
 Audible warning built-in piezoelectric device,
 tone sequence depending on measured value
 Display resolution 0.01 V/m, 0.0001 A/m
 Settling time typically 1 s (0 to 90 % of meas. value)

Measurement functions

Units V/m, A/m, mW/cm², W/m², % of limit value
 Result display current result
 or maximum value since switch-on
 Averaging current result or
 variable between 4 s and 15 min
 Alarm functions variable threshold and on/off
 Calibration data one CAL factor settable per probe

Self tests

Automatic switch-on self test of
 A/D converter, battery, supply voltages, memory and
 zero adjustment.
 Periodical zero adjustment and battery check during
 operation.
 All tests can be performed during exposure to the field.

Calibration

Calibrated base unit
 Recommended confirmation interval 24 months

Interfaces

Serial interface for results transfer, remote operation
 and calibration V.24 (RS232) optical/bidirectional

Additional functions EMR-300

Result storage 1500 values
 Real-time clock
 Spatial averaging within a time period or over measurement
 points.

General specifications

Power supply
 Rechargeable batteries 2 × Mignon (AA) 1.2 V
 Dry batteries 2 × Mignon (AA) 1.5 V
 Operating time
 rechargeable / dry batteries typ. 8 h / > 15 h
 Recharging using NT-20 Charger Unit supplied
 Ambient temperature
 Operating range -10 to +55 °C
 Dimensions (w × h × d) in mm approx. 96 × 64 × 465
 (incl. sensor and impact protection)
 Weight (incl. batteries) approx. 450 g

Overall measurement uncertainty

To ensure that the measurement results are meaningful, the specifications indicate all quantities that can influence the measurement. These physical quantities should be taken into account in accordance with the Guidelines for the Expression of the Uncertainty of Measurement in Calibrations WECC Doc. 19-1990. Careful selection of the ambient conditions can eliminate or partly eliminate some influence quantities; the tolerances are typically closer than the values quoted.

Ordering information

EMR-200 Radiation Meter	BN 2244/21	Probes (see separate data sheets)	BN 2244/90.2x
Basic instrument without probe		At least one necessary for operation	
EMR-300 Radiation Meter	BN 2244/31		
Basic instrument without probe		Accessories:	
Nato Stock No.	NSN 6625-66-142-8284	Tripod, non-metallic	BN 2244/90.31
Supplied with:		NiCd/NiMH Rapid Charger Unit	
Support, non-metallic		(European version)	BN 2237/90.03
ETS-1 PC Transfer Set (O/E converter, fiber cable, floppy disk)		27 MHz Test Generator	BN 2244/90.38
Storage case, aluminium-lined	BN 2244/62	Sensor extension, 1.2 m, flexible	BN 2244/90.35
(Picture see front page)		Nato Stock No.	NSN 5985-66-142-8286
Nato Stock No.	NS 6625-66-142-8285	"Electromagnetic Radiation" warning labels	
"Electromagnetic Radiation" warning labels, small, 10 pieces		Large, 2 pieces	BN 2244/90.36
NiCd cells, Mignon (AA) size		Small, 10 pieces	BN 2244/90.34
NT-20 Charger Unit (please specify type)			
Euro version	BN 2238/90.02		
UK version	BN 2238/90.03		
US version	BN 2238/90.04		
Australian version	BN 2238/90.05		



Kalibrierschein Calibration Certificate



Geräteart Kind of equipment	Strahlungsmeßgerät EM Radiation Meter
Typ Type	EMR-300
BN	2244/31
Seriennummer Serial number	AC-0090
Hersteller Manufacturer	Narda Safety Test Solutions
Kunde Customer	
Kalibrierdatum Calibration date	12. Mrz 2001
Bestätigungsintervall Confirmation interval	24 Monate * 24 Months *
Umgebungstemperatur/rel. Luftfeuchte Ambient temperature/rel. humidity	(23 ± 3) °C/ (40 ... 60) %
Kalibrierergebnisse abgelegt unter Calibration results filed under	22443100AC00900111

Die Ergebnisse der Kalibrierung sind auf Nationale Normale, die den Empfehlungen der Generalkonferenz für Maß und Gewicht (CGPM) entsprechen oder auf Normale rückführbar, die von Naturkonstanten abgeleitet sind oder deren Kalibrierung auf Verhältnismessungen mit Selbstkalibriertechnik beruhen.

Die Kalibrierung entspricht den Vorgaben eines Qualitätsmanagementsystems nach ISO 9001. Das Bestätigungssystem für Meßmittel entspricht ISO 10012-1.

Das angegebene Bestätigungsintervall ist eine Empfehlung. Die eigentliche Festlegung des Bestätigungsintervalls soll durch den Benutzer erfolgen. Dabei sollen die Art der Benutzung und die Umgebungsbedingungen berücksichtigt werden.

The calibration results are traceable to National Standards which are consistent with the recommendations of the General Conference on Weights and Measures (CGPM), or to standards derived from natural constants, or to standards relying on ratio measurements with self-calibrating technique for their calibration.

The calibration has been carried out in accordance to a quality management system conforming to ISO 9001. The metrological confirmation system of measuring equipment complies with ISO 10012-1.

The stated confirmation interval shall be regarded as a recommendation. The real definition of the confirmation interval should be made by the user. The type of application and the environmental conditions should be taken into account.

* Das Bestätigungsintervall wird ausschließlich durch den Gebrauch bestimmt (mechan. und klimatische Belastung). Daher empfehlen wir eine Rekalibrierung 24 Monate nach Auslieferung.

The confirmation interval is solely determined by the operation time of the instrument (mechanical and climatical stress). Therefore we recommend a recalibration 24 months after delivery.

Dieser Kalibrierschein bestätigt, daß alle Meßgrößen innerhalb der Grenzwerte der produktspezifischen Kalibriervorschrift liegen.

This calibration certificate confirms that all measurands lie within the limit values stated in the product-specific calibration procedure.

12. Mrz 2001

Narda Safety Test Solutions GmbH
Sandwiesenstr. 7 D-72793 Pfullingen
phone +49 7121 9732 0, fax +49 7121 9732 90
www.narda-sts.de

Datum / Stamp
Date / Stamp

i.v. m. Ruf
Qualitätsmanagement
Quality Management

Jürgen
Prüfer
Tester

E-Field Probe Type 18



E-Field Probe Type 18

100 kHz to 3 GHz

NEW!

Highly sensitive
E-field probe
(from 0.2 V/m)



- Excellent measurement sensitivity beginning at 0.2 V/m
- Isotropic (three-dimensional) measurement
- 64 dB dynamic range
- Compatible with all EMR-200 and EMR-300 mainframes

Applications and features

“Extremely high sensitivity” is the catchphrase for probe type 18. The wide frequency range for E-field measurements is covering the most typical frequencies in telecommunications and industrial applications. The specified measurement range starts at an extremely low value of 0.2 V/m. Excellent measurement accuracy of low limit values found in national and international standards for exposure of the general public is achieved. Within its frequency range, the probe has very good linearity and can be used as a reference receiver. The isotropic properties allow measurements independent of the polarization and direction of the incident wave, which greatly simplifies correct usage of the probe. With a dynamic range of 64 dB (or a measurement range from typ. 0.2 to 320 V/m), all of the familiar limits can be verified. The combination of the EMR-300 mainframe, the H-Field Probe Type 14 and this new E-Field Probe Type 18 is a package that is unique in the world for measuring very low-level EMF in the RF/microwave range.

Calibration

A calibration interval of two years is recommended. The calibration data is traceable to national or international standards and is confirmed with a calibration certificate.

Basic functional concept

The probe uses three separate sensors. Three dipoles with detector diodes for measuring signals in all spatial directions (x, y, z) are used as sensor elements for the electric field. The detected signals are lead separately to the mainframe device. There, the signals are combined through digital signal processing to calculate the equivalent field strength in compliance with the relevant standard(s). The extremely high sensitivity is a product of the unique design of the diode sensor.

Rugged design

In both mechanical and electrical terms, the probe is designed for use in the field. For instance, it is possible to carry the device on the probe head. For pulsed and CW signals, the electrical destruction limits are a multiple of the personal safety limits.

Specifications¹⁾ for E-Field Probe Type 18

Sensor type	electric field (E)	Isotropy deviation	
Frequency range	100 kHz to 3 GHz	Field probe only	typ. ± 0.5 dB for $f > 1$ MHz
Directional characteristic	isotropic, three-dimensional	Probe and EMR-200/-300 meas. unit	typ. ± 1.0 dB
Temperature range	0 to +50 °C	Overload limit, CW	800 V/m (175 mW/cm ²)
Meas. range	0.2 to 320 V/m 0.00001 to 27 mW/cm ²	Pulse	8000 V/m (17.5 W/cm ²)
Dynamic range	typ. 64 dB	H-field suppression	typ. > 20 dB
Absolute error at 27.5 V/m and 27.12 MHz	± 1.0 dB	Temperature response	(0 to +50 °C) $+0.2/-1.5$ dB (± 0.025 dB/K)
Linearity at 27.12 MHz referred to 27.5 V/m		Dimensions	diameter 75 mm, length 310 mm
1.2 to 200 V/m	± 0.5 dB	Calibration	
200 to 320 V/m	± 0.7 dB	Recommended calibration interval	24 months
Frequency response referred to 27.12 MHz			
at 80 kHz	typ. -3 dB		
300 kHz to 1.2 GHz	typ. ± 1 dB		
1.2 GHz to 2.5 GHz	typ. ± 1.5 dB		
at 3 GHz	typ. -3 dB		

1) Unless otherwise noted, all of the specifications hold under the following conditions: Sinusoidal signals; device in far-field of a source; ambient temperature +23 °C ± 3 K; relative humidity 25% to 75%.

Ordering Information

E-Field Probe Type 18	BN 2244/90.72
------------------------------	----------------------

Subject to change without notice EM/EN/D083/0301/AE Printed in Germany

Kalibrierschein Calibration Certificate



Geräteart Kind of equipment	E-Feld Sonde 100kHz..3GHz E-Field Sensor 100kHz..3GHz
Typ Type	TYP-18
BN	2244/90.72
Seriennummer Serial number	A-0069
Hersteller Manufacturer	Narda Safety Test Solutions
Kunde Customer	
Kalibrierdatum Calibration date	9. Mrz 2001
Bestätigungsintervall Confirmation interval	24 Monate * 24 Months *
Umgebungstemperatur/rel. Luftfeuchte Ambient temperature/rel. humidity	(23 ± 3) °C/ (40 ... 60) %
Kalibrierergebnisse abgelegt unter Calibration results filed under	22449072-A00690110

Die Ergebnisse der Kalibrierung sind auf Nationale Normale, die den Empfehlungen der Generalkonferenz für Maß und Gewicht (CGPM) entsprechen oder auf Normale rückführbar, die von Naturkonstanten abgeleitet sind oder deren Kalibrierung auf Verhältnismessungen mit Selbstkalibriertechnik beruhen.

Die Kalibrierung entspricht den Vorgaben eines Qualitätsmanagementsystems nach ISO 9001. Das Bestätigungssystem für Meßmittel entspricht ISO 10012-1. Das angegebene Bestätigungsintervall ist eine Empfehlung. Die eigentliche Festlegung des Bestätigungsintervalls soll durch den Benutzer erfolgen. Dabei sollen die Art der Benutzung und die Umgebungsbedingungen berücksichtigt werden.

The calibration results are traceable to National Standards which are consistent with the recommendations of the General Conference on Weights and Measures (CGPM), or to standards derived from natural constants, or to standards relying on ratio measurements with self-calibrating technique for their calibration.

The calibration has been carried out in accordance to a quality management system conforming to ISO 9001. The metrological confirmation system of measuring equipment complies with ISO 10012-1.

The stated confirmation interval shall be regarded as a recommendation. The real definition of the confirmation interval should be made by the user. The type of application and the environmental conditions should be taken into account.

* Das Bestätigungsintervall wird ausschließlich durch den Gebrauch bestimmt (mechan. und klimatische Belastung). Daher empfehlen wir eine Rekalibrierung 24 Monate nach Auslieferung.

The confirmation interval is solely determined by the operation time of the instrument (mechanical and climatical stress). Therefore we recommend a recalibration 24 months after delivery.

Dieser Kalibrierschein bestätigt, daß alle Meßgrößen innerhalb der Grenzwerte der produktspezifischen Kalibriervorschrift liegen.

This calibration certificate confirms that all measurands lie within the limit values stated in the product-specific calibration procedure.

12. Mrz 2001

Narda Safety Test Solutions GmbH
Sandwiesenstr. 7 D-72793 Pfullingen
phone +49 7121 9732 0 · fax +49 7121 9732 90
www.narda-sts.de

i.v. M. Ruf
Qualitätsmanagement
Quality Management

J. J. J.
Prüfer
Tester