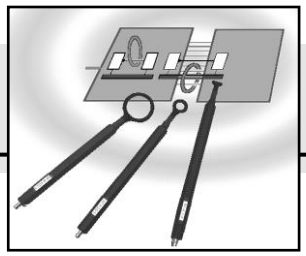

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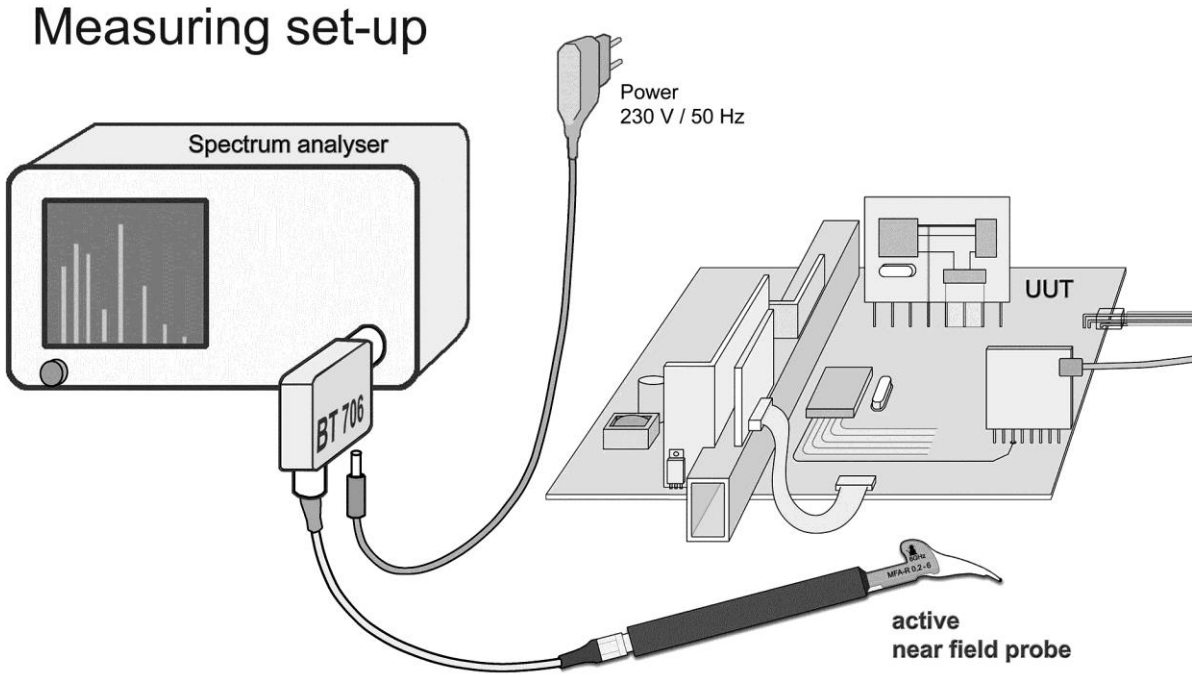
MEASURING SET-UP

NEAR FIELD MEASURING

The measurement of near fields up to <u>10 GHz</u> directly on electronic modules aids in the reduction of disturbance emission.



AVAILABLE PROBES:

Activ MFA probes up to 6 GHz

H-field probe	MFA-R 0.2 – 75,	to 1 GHz
H-field probe	MFA-R 0.2 – 6,	to 6 GHz
H-field probe	MFA-K 0.1 – 12,	to 6 GHz
H-field probe	MFA-K 0.1 – 30,	to 1 GHz

Passiv SX probes to 10 GHz

H-field probe	SX-R 3 – 1,	to 10 GHz
E-field probe	SX-E 03,	to 10 GHz

Passiv XF probes to 6 GHz

H-field probe	XF-R 400 – 1,	to 6 GHz
H-field probe	XF-R 100 – 1,	to 6 GHz
H-field probe	XF-R 3 – 1,	to 6 GHz
H-field probe	XF-B 3 – 1,	to 6 GHz
H-field probe	XF-U 2.5 – 1,	to 6 GHz
E-field probe	XF-E 10,	to 6 GHz
E-field probe	XF-E 04 s,	to 6 GHz
E-field probe	XF-E 09,	to 6 GHz
E-field probe	XF-E 09 s,	to 6 GHz

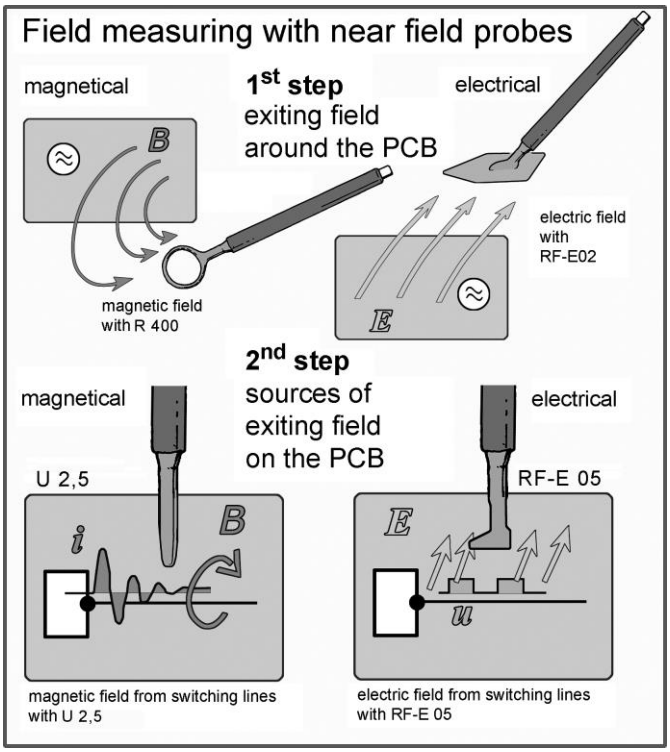
Passiv RF probes up to 3 GHz

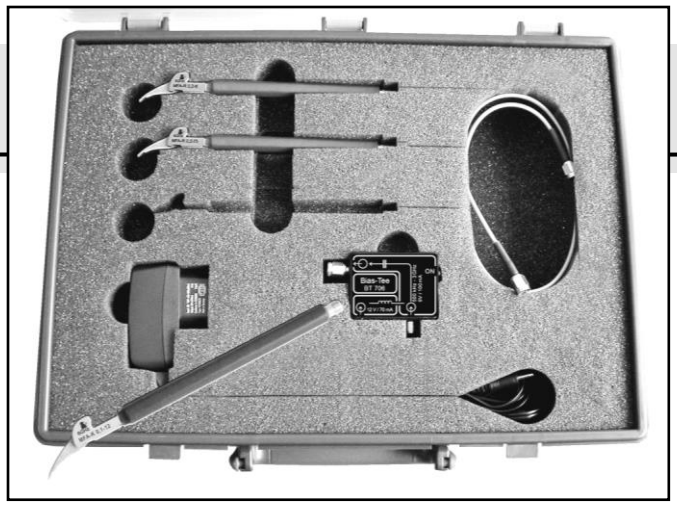
H-field probe	RF-R 400 – 1,	to 3 GHz
H-field probe	RF-R 50 – 1,	to 3 GHz
H-field probe	RF-R 3 – 2,	to 3 GHz
H-field probe	RF-R 0.3 – 3,	to 3 GHz
H-field probe	RF-B 3 – 2,	to 3 GHz
H-field probe	RF-B 0.3 – 3,	to 3 GHz
H-field probe	RF-U 5 – 2,	to 2 GHz
H-field probe	RF-U 2.5 – 2,	to 3 GHz
H-field probe	RF-K 7 – 4,	to 1 GHz
E-field probe	RF-E 02,	to 1.5 GHz
E-field probe	RF-E 05,	to 3 GHz
E-field probe	RF-E 10,	to 3 GHz

Passive LF probes 100 kHz-50 MHz

H-field probe	LF-R 400,	to 50 MHz
H-field probe	LF-R 50,	to 50 MHz
H-field probe	LF-R 3,	to 50 MHz
H-field probe	LF-B 3,	to 50 MHz
H-field probe	LF-U 5,	to 50 MHz
H-field probe	LF-U 2.5,	to 50 MHz
H-field probe	LF-K 7,	to 50 MHz

MEASUREMENT WITH NEAR FIELD PROBES





MFA 01 set

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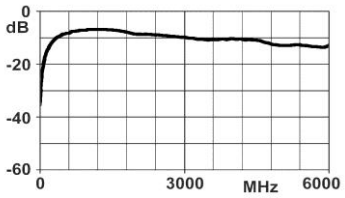
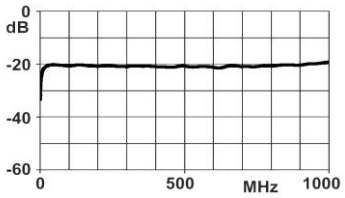
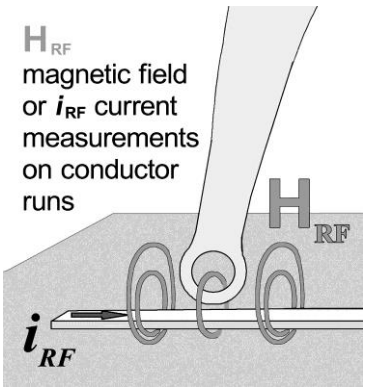
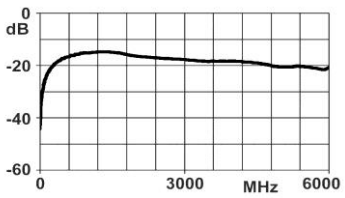
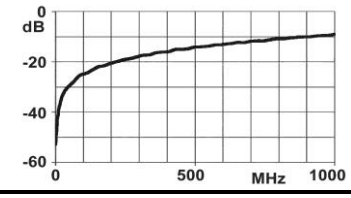
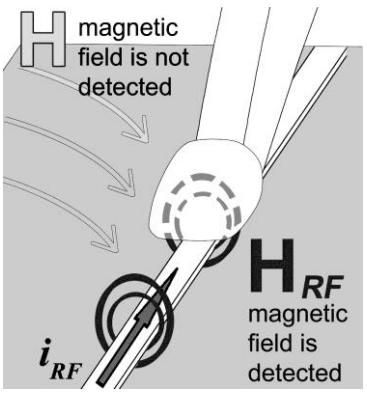
Contents:

H-Field Probe	MFA-R 0.2-75 1 GHz
H-Field Probe	MFA-R 0.2-6 6 GHz
H-Field Probe	MFA-K 0.1-12 6 GHz
Cable	SMA-SMA
Bias Tee	BT 706
Case	335x265x57 mm

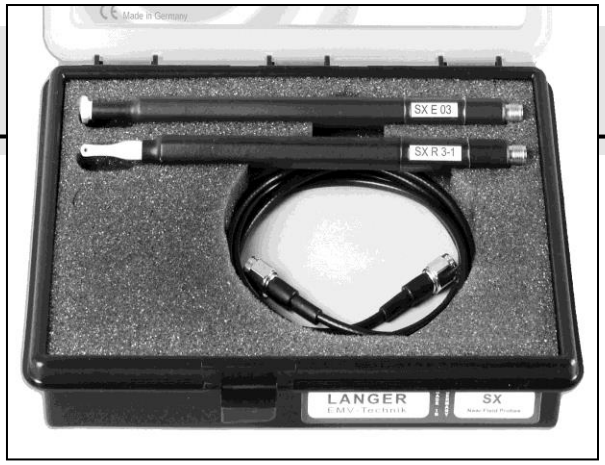
Plug-in power supply unit: 100-240 V~,50-60 Hz
Brief instructions

MICRO NEAR FIELD PROBE SET MFA 01 *1 MHz UP TO 6 GHz*

Characteristic	Description	Type
MFA-R 0.2-6  **MFA-R 0.2-75** 	**MFA-R 0.2-6 / MFA-R 0.2-75** Resolution: 300 µm Use with: BIAS TEE The MFA probes have been developed for measurements on the smallest SMD components (0603-0201) on PCBs. Even very fine conductor runs and SMD or IC pins can be measured. The probe voltage can be converted into the respective magnetic field or the current flowing in the conductor with the correction data. The two MFA-R probes allow measurements in special frequency ranges: **MFA-R 0.2-6: 100 MHz to 6 GHz** **MFA-R 0.2-75: 1 MHz to 1 GHz**	
MFA-K 0.1-12  **MFA-K 0.1-30** 	**MFA-K 0.1-12 / MFA-K 0.1-30 (optional)** Resolution: 200 µm Use with: BIAS TEE The design of the type K MFA probe simulates a current clamp. This probe type is thus able to measure currents on fine conductor runs and IC pins. Other magnetic field components from the vicinity are ignored in detection. The two MFA-K probes allow measurements in special frequency ranges: **MFA-K 0.1-12: 100 MHz to 6 GHz** **Probe optional:** **MFA-K 0.1-30: 1 MHz to 1 GHz**	

Active near field probes with Bias Tee

The probes type MFA have special electrically shielded active micro probe heads which have been designed for detailed magnetic field measurements in the layout, on components and IC pins.
All micro probe heads have an integrated pre-amplifier stage. The bias tee supplies the amplifier stage with 9 V / 100 mA power. It is connected to the 50 Ω input of a spectrum analyser and comes complete with a plug-in power supply unit.



SX set

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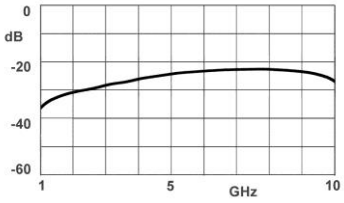
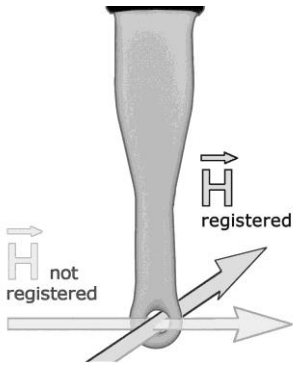
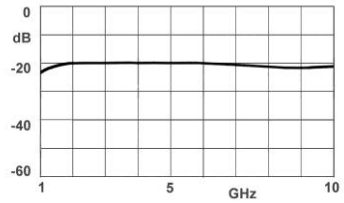
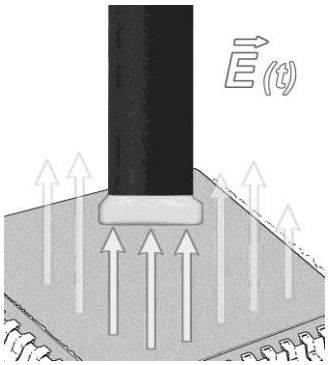
Contents:

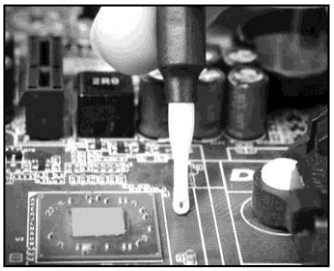
H-Field probe	SX-R 3-1
E-Field probe	SX-E 03
Cable	SMA-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBES TYPE SX *FREQUENCY RANGE 1 GHZ TO 10 GHZ*

Characteristic	Description	Type
	**SX-R 3-1** The near field probe is designed for the detection of HF magnetic fields with a high geometrical resolution. The field orientation and distribution can be detected by moving the probe around conductor runs, bypass capacitors, EMC components and within IC pin and supply system areas. **Frequenzy range: 1 GHz to 10 GHz** **Resolution approx. < 1 mm**	
	**SX-E 03** The near field probe is designed for the analysis of E field coupling out, detection of coupling mechanisms on modules and evaluation of switching edges on signal leads. **Frequenzy range: 1 GHz to 10 GHz** **Electrode surface area:** **approx. 4 x 4 mm**	

Instructions

The near field probes type SX enable the measurement of high-frequency near fields of electronic modules, components and IC pins.
The probes have electrically shielded probe heads which have been developed especially for the upper limit frequencies in the 10 GHz range. These passive probes have no pre-amplifier and are connected to the 50 Ohm input of a spectrum analyser via a cable with a SMA connector.



XF 1 set

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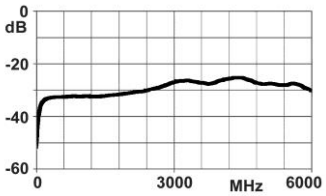
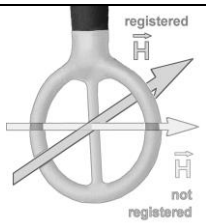
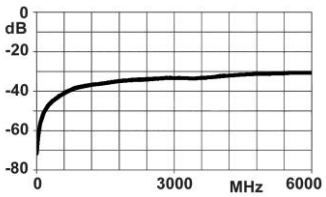
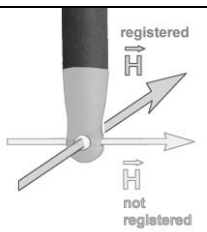
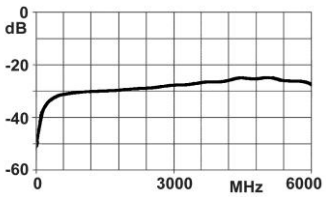
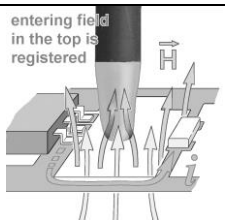
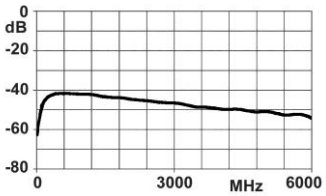
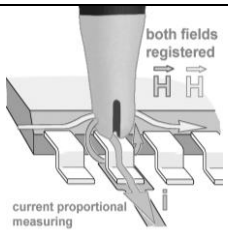
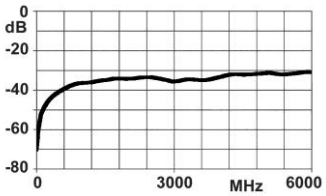
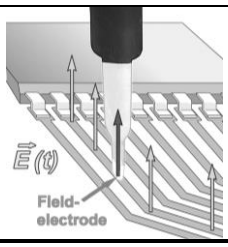
Contents:

H-Field Probe	XF-R 400-1
H-Field Probe	XF-R 3 - 1
H-Field Probe	XF-B 3 - 1
H-Field Probe	XF-U 2.5 - 1
E-Field Probe	XF-E 10
Cable	SMA-SMA
Case	240x185x50 mm
Instructions	

NEAR FIELD PROBE SET XF 1 FREQUENCY RANGE 30 MHZ UP TO 6 GHZ

Characteristic	Description	Type
	**XF-R 400 - 1** On account of its large diameter (25 mm) this magnetic field probe is the most sensitive in our range of products. It can be used at a distance of up to 10 cm from the units. The probe detects the spatial distribution of HF magnetic fields in devices and assemblies and allows the user to draw conclusions with regard to disturbance emissions. **Frequency range 30 MHz to 6 GHz Ø ca. 25 mm**	
	**XF-R 3 - 1** The near field probe is designed for the detection of HF magnetic fields with a high geometrical resolution. The field orientation and distribution can be detected by moving the probe around conductor runs, bypass capacitors, EMC components and within IC pin and supply system areas. **Frequency range 30 MHz to 6 GHz; Resolution approx. 1 mm**	
	**XF-B 3 - 1** The near field probe is designed for the detection of magnetic fields which are emitted vertically from the surface of PCBs and is thus ideal for investigating current loops. The probe allows the measurement in confined board areas (between large controller components, for example). **Frequency range 30 MHz to 6 GHz; Resolution approx. 2 mm**	
	**XF-U 2.5 - 1** The near field probe is designed for the selective detection of RF currents in conductor runs, component connections, capacitors and IC pins. The probe head has a magnetically active curb with a width of approx. 0.5 mm. The probe's curb is positioned on conductor runs, ICs or capacitor connections for a measurement. **Frequency range 30 MHz to 6 GHz; Resolution approx 0,5 mm**	
	**XF-E 10** The near field probe detects electrical fields which are emitted from the surface of clocked leads. The probe head's tip is only 0.5 mm wide. Its integrated shielding prevents neighbouring leads from interfering with the measurement result. A resolution of approx. 0.2 mm is possible so that each individual conductor run can be evaluated in the layout. **Frequency range 30 MHz to 6 GHz; Resolution approx 0,2 mm**	

Probes XF - optional

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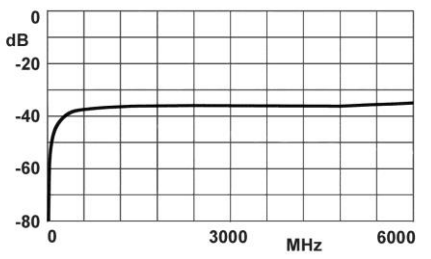
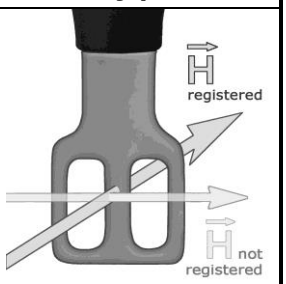
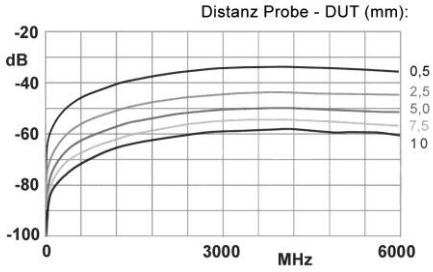
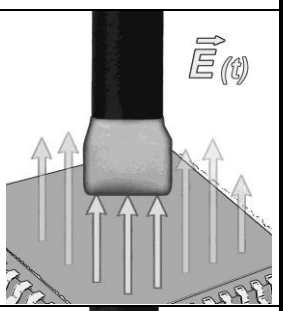
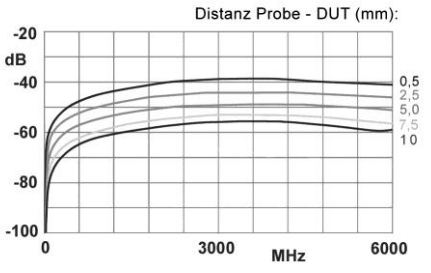
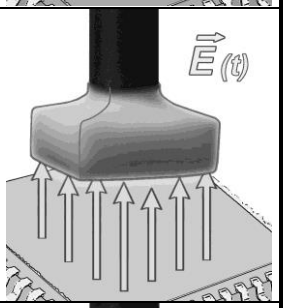
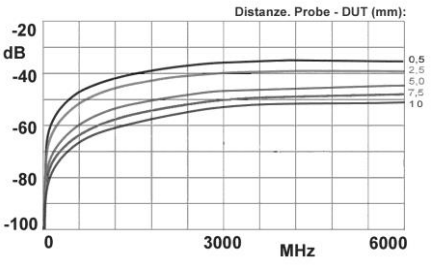
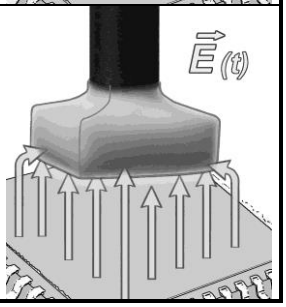
available XF probes:

H-Field probe	XF-R 100
E-Field probe	XF-E 04 s
E-Field probe	XF-E 09 s
E-Field probe	XF-E 09
Cable	SMA-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBES XF-OPTIONAL FREQUENCY RANGE 30 MHZ TO 6 GHZ

Characteristic	Description	Type
	**XF-R 100** **Frequency range: 30 MHz to 6 GHz** **Resolution: Ø approx. 10 mm** The magnetic field probe offers a very high bandwidth and linearity. The probe detects the spatial distribution of HF magnetic fields in devices and assemblies and allows the user to draw conclusions with regard to disturbance emissions.	
	**XF-E 04 s** **Frequency range: 30 MHz to 6 GHz** **Electrode surface area: approx. 5 x 5 mm** Its high resolution makes the E-field probe suitable for measurements in confined spaces such as in the vicinity of components, IC pins and tracks.	
	**XF-E 09 s** **Frequency range: 30 MHz to 6 GHz** **Electrode surface area: approx. 10 x 10 mm** The E-field probe offers a very high bandwidth and linearity. Its flanks are shielded. Lateral E-field lines are not detected.	
	**XF-E 09** **Frequency range: 30 MHz to 6 GHz** **Electrode surface area: approx. 10 x 10 mm** The E-field probe offers a very high bandwidth and linearity. Its flanks are not shielded. Lateral E-field lines are detected.	

RF 1 set

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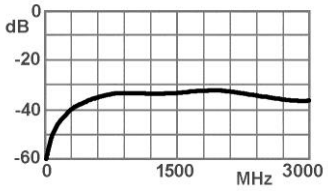
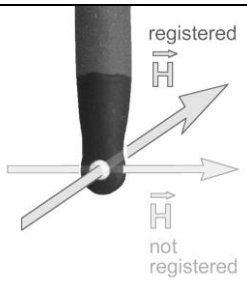
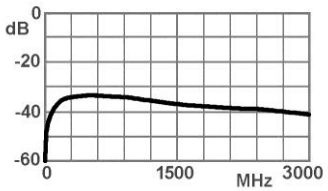
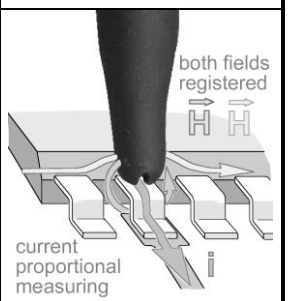
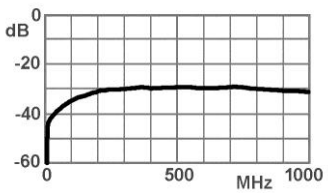
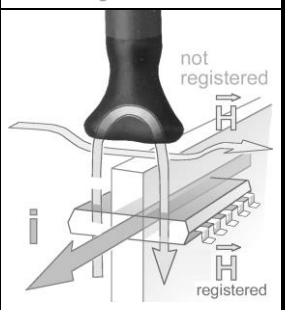
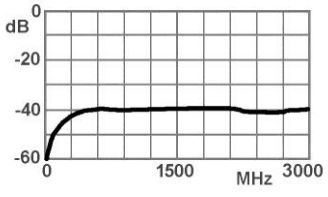
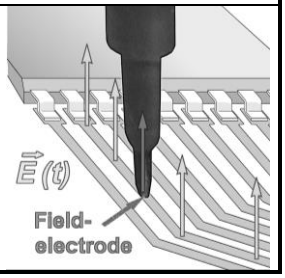
Contents:

H-Field Probe	RF-R 3 - 2
H-Field Probe	RF-U 2.5 - 2
H-Field Probe	RF-K 7 - 4
E-Field Probe	RF-E 10
Cable	SMB-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBE SET RF 1 *FREQUENCY RANGE 30 MHZ UP TO 3 GHZ*

Characteristic	Description	Type
	**RF-R 3 – 2** The near field probe is designed for the detection of HF magnetic fields with a high geometrical resolution. The field orientation and distribution can be detected by moving the probe around conductor runs, bypass capacitors, EMC components and within IC pin and supply system areas.. **Frequency range 30 MHz to 3 GHz; Resolution approx. 1 mm**	
	**RF-U 2.5 – 2** The near field probe is designed for the selective detection of RF currents in conductor runs, component connections, capacitors and IC pins. The probe head has a magnetically active curb with a width of approx. 0.5 mm. The probe‘s curb is positioned on conductor runs, ICs or capacitor connections for a measurement. **Frequency range 30 MHz to 3 GHz; Resolution approx 0,5 mm**	
	**RF-K 7 – 4** The near field probe detects contra-orientated magnetic fields within the two halves of the probe’s head; these can be the circular magnetic fields of larger objects such as IC substrates and wide conducting paths. The effect of homogeneous fields is sufficiently compensated for by the probe’s special head. The probe is especially suitable for detecting the non-homogeneous fringe magnetic field of flat units. **Frequency range 30 MHz to 1 GHz; Resolution approx. 5 mm**	
	**RF-E 10** The near field probe detects electrical fields which are emitted from the surface of clocked leads. The probe head‘s tip is only 0.5 mm wide. Its integrated shielding prevents neighbouring leads from interfering with the measurement result. A resolution of approx. 0.2 mm is possible so that each individual conductor run can be evaluated in the layout. **Frequency range 30 MHz to 3 GHz; Resolution approx 0,2 mm**	

RF 2 set

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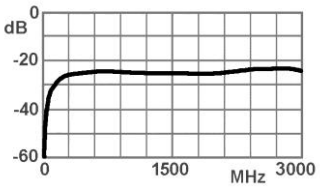
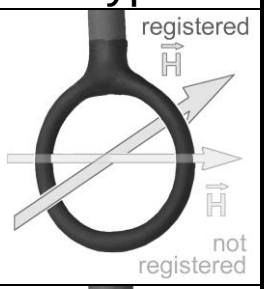
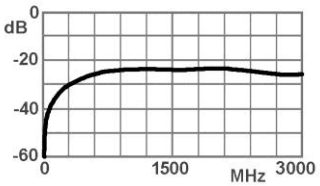
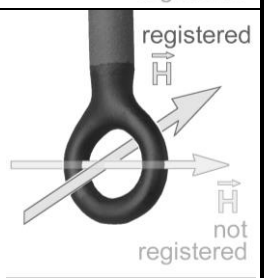
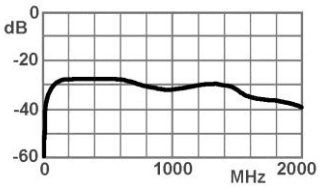
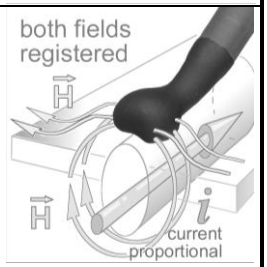
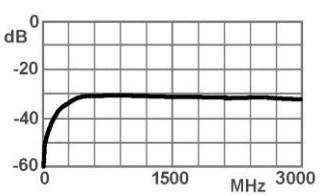
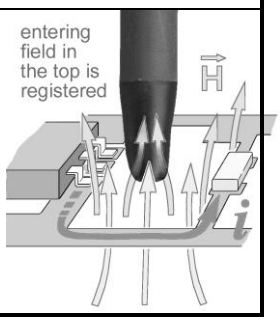
Contents:

H-Field Probe	RF-R 400 - 1
H-Field Probe	RF-R 50 - 1
H-Field Probe	RF-U 5 - 2
H-Field Probe	RF-B 3 - 2
Cable	SMB-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBE SET RF 2 *FREQUENCY RANGE 30 MHZ UP TO 3 GHZ*

Characteristic	Description	Type
	**RF-R 400 - 1** On account of its large diameter (25 mm) this magnetic field probe is the most sensitive in our range of products. It can be used at a distance of up to 10 cm from the units. The probe detects the spatial distribution of HF magnetic fields in devices and assemblies and allows the user to draw conclusions with regard to disturbance emissions. **Frequency range 30 MHz to 3 GHz; Ø approx. 25 mm**	
	**RF-R 50 - 1** The near field probe has a higher resolution and a lower sensitivity than the R 400-1. It is suitable for measurements up to 3 cm. Interference sources can be localised by detecting the distribution and orientation of the field, therefore enabling a more exact use of higher resolution probes. **Frequency range 30 MHz to 3 GHz; Ø approx. 10 mm**	
	**RF-U 5 - 2** The near-field probe acts like a current clamp. It detects the current which generates the field via the magnetic field circulating around a single conductor or conductor bundle. It is used for very wide conductor runs. Thanks to the respective correction factors it is possible to deduce the current flowing in the conductor from the measured probe voltage. No conversion is necessary for comparative measurements. **Frequency range 30 MHz to 2 GHz;** **Resolution approx. 5 mm**	
	**RF-B 3 - 2** The near field probe is designed for the detection of magnetic fields which are emitted vertically from the surface of PCBs and is thus ideal for investigating current loops. The probe allows the measurement in confined board areas (between large controller components, for example). **Frequency range 30 MHz to 3 GHz** **Resolution approx. 2 mm**	

RF 3mini set

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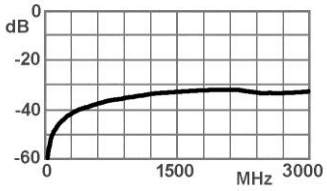
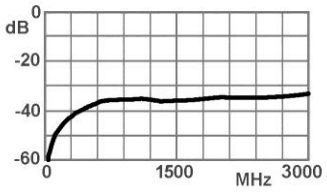
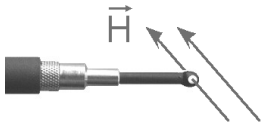
Contents:

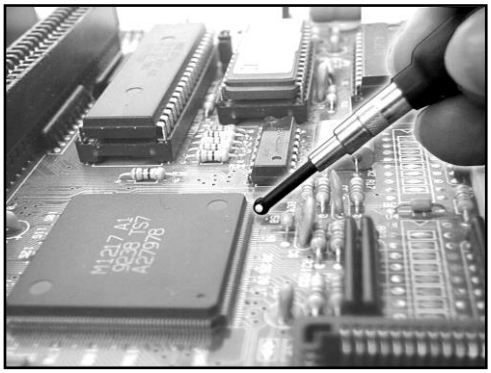
H-Field Probe	RF-B 0.3 - 3
H-Field Probe	RF-R 0.3 - 3
Cable	SMB-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBE SET RF 3mini FREQUENCY RANGE 30 MHZ TO 3 GHZ

Characteristic	Description	Type
	**RF-B 0.3 - 3** detects a magnetic field, which enters the probe point vertically. It is therefore suitable for pin-point detection of RF magnetic fields, which are emitted by surfaces. For this, the probe point is applied to the surface in question. Due to its very small construction, magnetic field distributions of under 1 millimeter can be resolved on IC housings and PCB surfaces, for example. The probe enables measurement in hard-to-reach places, such as between components. **Frequency range 30 MHz to 3 GHz**	 Resolution < 1 mm
	**RF-R 0.3 - 3** serves the high-resolution detection of spatial RF magnetic fields. The loop opening, which is marked by a white dot, is manually turned for the recognition of field orientation and intensity. If the loop opening is orthogonally permeated by the field, a maximum can be determined. The minimum can be determined by pivoting the loop opening 90°. This allows the detection of H field distribution (orientation and intensity) by guiding the probe in the vicinity of components, between and over track runs, in the pin area of ICs, on block capacitors, EMC components, etc. **Frequency range 30 MHz to 3 GHz**	 Resolution < 1 mm

Instructions

The probes of the RF 3mini set have special electrically screened miniature heads which are designed for detailed magnetic field measurements in the layout and component range. Magnetic fields can be measured with a resolution of under 1 millimeter for comparison purposes. The passive probes are connected to the 50 Ω input of a spectrum analyser and facilitate comparison measurements of magnetic fields and disturbance currents in the frequency range from 30 MHz to 3 GHz. With weak fields, it is recommended to use the passive probes with the 20 dB or 30 dB pre-amplifier. All probes have an excellent sheath current damping and are electrically screened. The probe head is joined to the grip by a plug-connector.



RF 4-E set

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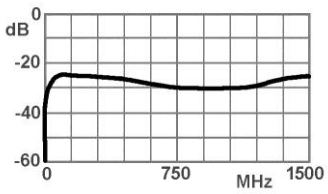
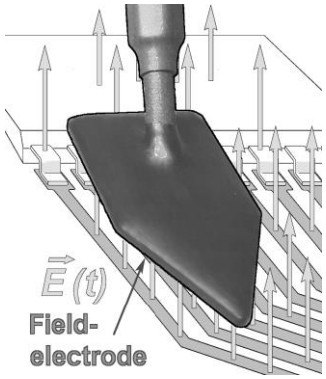
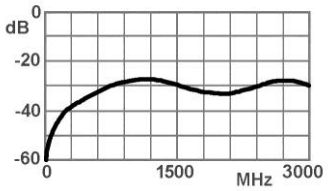
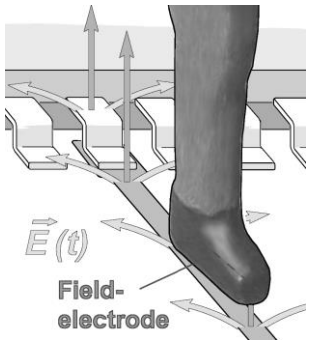
Contents:

E-Field Probe	RF-E 02
E-Field Probe	RF-E 05
Cable	SMB-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBE SET RF 4-E FREQUENCY RANGE 30 MHZ UP TO 3 GHZ

Characteristic	Description	Type
	**RF-E 02** Bus structures, larger components respectively supply areas couple out electrical fields by their surfaces. These electrical fields may be involved electromagnetic emission. The probe RF-E 02 detect these fields by the probe bottom on an area of 2 cm x 5 cm approximately. Higher resolutions can be obtained if the probe tip is inclined at an angle of 45° when approaching the source. For measuring the probe bottom is approached respectively putted on the Unit Under Test. **Frequency range: 30 MHz to 1.5 GHz**	
	**RF-E 05** By this probe you are able to register selectively electrical fields on layout and component area of flat units. The breadth of the field electrode is about 1 mm to exist on the bottom side. Therefore you can locate electrical fields very exactly. These electrical fields are caused by clocked lines, IC pins and small components. **Frequency range: 30 MHz to 3 GHz**	

Instructions

The RF 4-E probe set contains two screened E field probes. Electrical fields can be measured in the frequency range from 30 MHz up to 3 GHz for comparison purposes. The probes are designed for the analysis of E field distributions, detection of coupling mechanisms on modules and evaluation of switching edges on signal leads and RF voltages of the supply system. The passive probes are connected to a spectrum analyser or oscilloscope via a 50 Ω BNC plug socket. The top site of probe are shielded. The probe has a sheat current damping.

RF-E optional set

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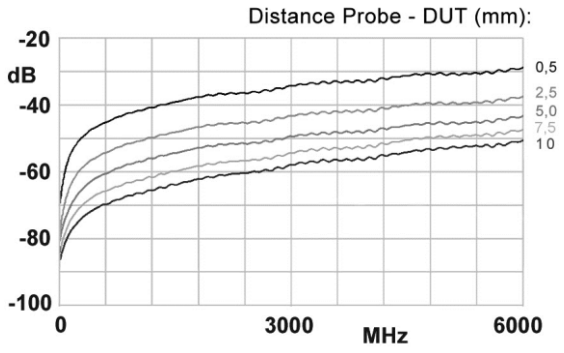
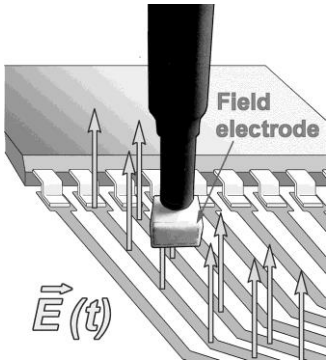
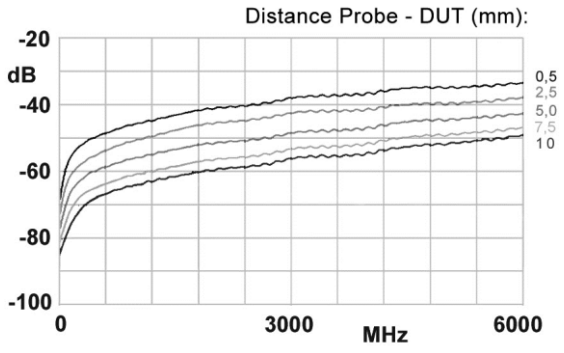
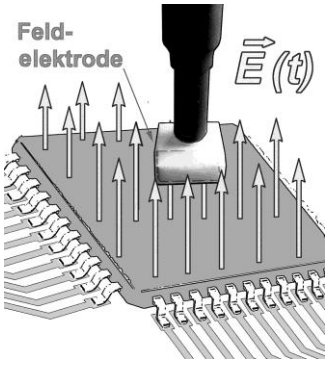
Contents:

E-Field Probe	RF-E 04
E-Field Probe	RF-E 09
Cable	SMB-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBE SET RF-E OPTIONAL FREQUENCY RANGE 30 MHZ -3 GHZ

Characteristic	Description	Type
	**RF-E 04** **Frequency range** **30 MHz to 3 GHz** **Electrode surface area:** **approx. 5 x 5 mm** **Connection: SMB**	
	**RF-E 09** **Frequency range** **30 MHz to 3 GHz** **Electrode surface area:** **approx. 10 x 10 mm** **Connection: SMB**	

Instructions

The RF-E optional probe set contains two E field probes. Electrical fields can be measured in the frequency range from 30 MHz to 3 GHz for comparison purposes. The probes are designed for the analysis of E field coupling out, detection of coupling mechanisms on modules and evaluation of switching edges on signal leads. The passive probes are connected to a spectrum analyser or oscilloscope via a 50 Ω BNC plug socket.

EMC - scanner probes

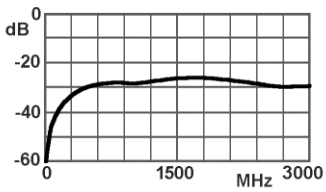
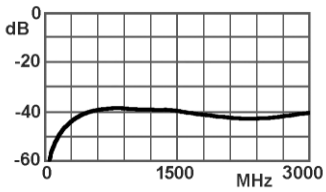
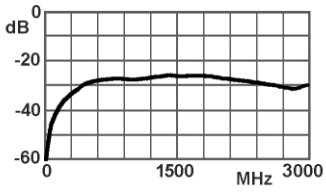
Fields of application:

- to detect modules, layout areas featuring critical frequencies
- to locate and evaluate magnetic and electric fields as vector quantities
- to determine emission sources, coupling mechanisms and functional chains
- to document, compare and evaluate module modifications
- to check the quality in the production process

Type of construction:

- electrically and/or magnetically shielded passive probe heads
- the active probe is possible to use with 30 dB preamplifier
- probe body output with SMA-connector system on RG 174 cable basis

AVAILABLE SCANNER PROBE HEADS

Characteristic	Description	Type
	**RFS-R 50** The near field probe is suitable for measuring high-frequency fields of 30 MHz to 3 GHz at a short distance from the unit under test of up to approx. 3 cm. **Frequency: 30 MHz to 3 GHz** **Overall length: approx. 55 mm** **Diameter: approx. 10 mm**	
	**RFS-B 3** The near field probe is used to detect H-fields that emerge vertically from the surface of PCBs. It allows measurements in confined spaces such as between large components of switching controllers. **Frequency: 30 MHz to 3 GHz** **Overall length: approx. 55 mm** **Diameter: approx. 2 mm**	
	**RFS-E 3** Design structures, larger components and supply areas couple out E-fields via their surfaces. Such E-fields can be detected with the 6 x 6 mm underside of the near field probe. **Frequency: 30 MHz to 3 GHz** **Overall length: approx. 55 mm** **Electrode surface: approx.4 x 4 mm**	

LF 1 set

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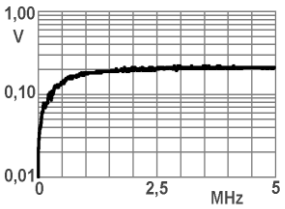
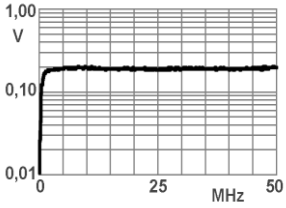
Contents:

H-Field Probe	LF-R 400
H-Field Probe	LF-B 3
H-Field Probe	LF-U 5
H-Field Probe	LF-U 2.5
Cable	SMB-BNC
Case	175x140x32 mm
Instructions	

NEAR FIELD PROBE SET LF 1 FREQUENCY RANGE 100 KHZ TO 50 MHZ

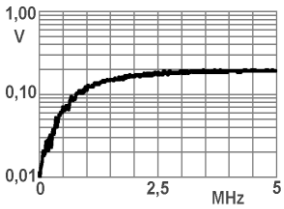
Characteristic curves: output voltage of the probes at 50 Ω for 1 A measured RF current:

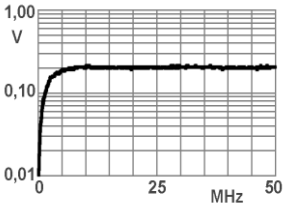




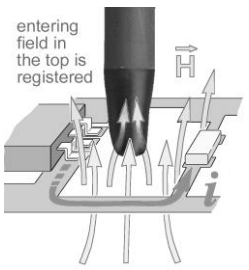
LF-R 400 On account of its large diameter (25 mm) this magnetic field probe is the most sensitive in our range of products. It can be used at a distance of up to 10 cm from the units. The probe detects the spatial distribution of HF magnetic fields in devices and assemblies and allows the user to draw conclusions with regard to disturbance emissions.

Ø approx. 25 mm

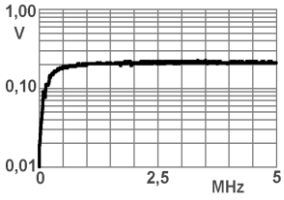


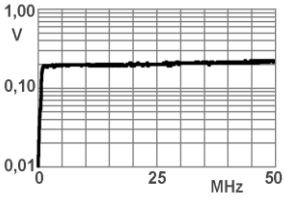


LF-B 3 The near field probe is designed for the detection of magnetic fields which are emitted vertically from the surface of PCBs and is thus ideal for investigating current loops. The probe allows the measurement in confined board areas (between large controller components, for example).

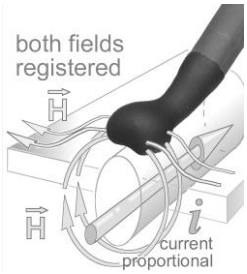


Resolution approx. 2 mm

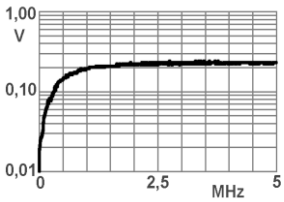


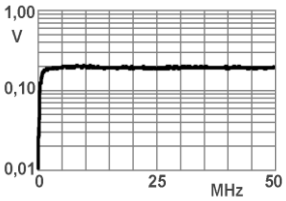


LF-U 5 The near field probe is designed for detecting surface and circular magnetic fields on very wide conducting paths, metallized surfaces, plug-and-socket connectors, electronic components, cables and component connections. The probe functions like a coupling clamp.

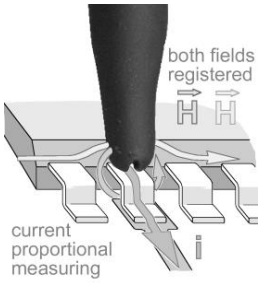


Resolution approx. 5 mm





LF-U 2.5 The near field probe is designed for the selective detection of RF currents in conductor runs, component connections, capacitors and IC pins. The probe head has a magnetically active curb with a width of approx. 0.5 mm. The probe's curb is positioned on conductor runs, ICs or capacitor connections for a measurement..

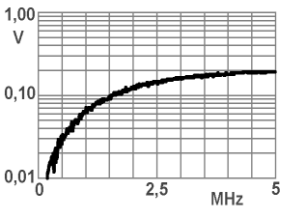


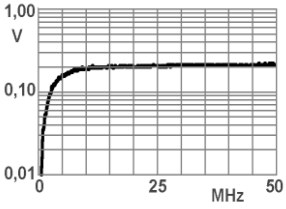
Resolution approx. 0,5 mm

In supplement to the LF1 set, other probes and a 20 dB preamplifier are available:

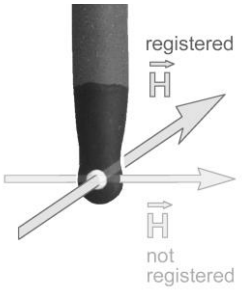
OPTIONAL PROBES *FREQUENCY RANGE 100 KHZ TO 50 MHZ*

Characteristic curves: output voltage of the probes at 50 Ω for 1 A measured RF current*:*

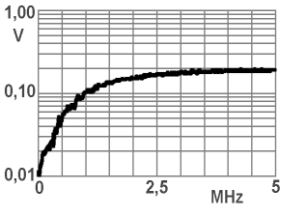


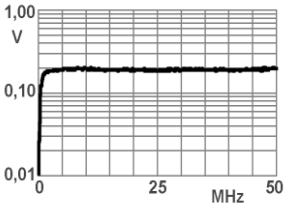


LF-R 3 The near field probe is designed for the detection of HF magnetic fields with a high geometrical resolution. The field orientation and distribution can be detected by moving the probe around conductor runs, bypass capacitors, EMC components and within IC pin and supply system areas.

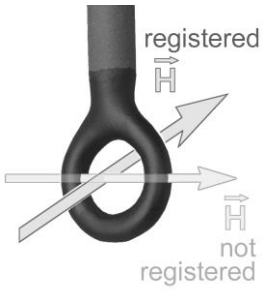


Resolution approx. 1 mm

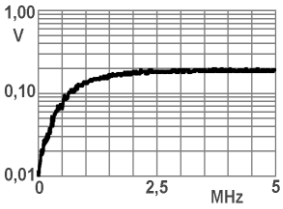


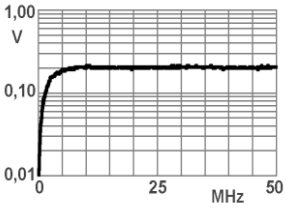


LF-R 50 The near field probe has a higher resolution and a lower sensitivity than the R 400-1. It is suitable for measurements up to 3 cm. Interference sources can be localised by detecting the distribution and orientation of the field, therefore enabling a more exact use of higher resolution probes.

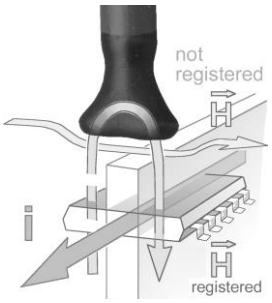


Ø approx. 10 mm

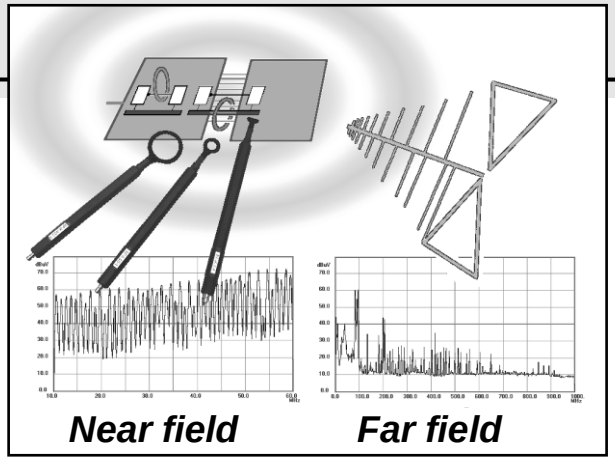




LF-K 7 The near field probe detects contra-orientated magnetic fields within the two halves of the probe's head; these can be the circular magnetic fields of larger objects such as IC substrates and wide conducting paths. The effect of homogeneous fields is sufficiently compensated for by the probe's special head. The probe is especially suitable for detecting the non-homogeneous fringe magnetic field of flat units.



Resolution approx. 5 mm



TECHNICAL DETAIL FOR PROBES

Probe connector	50 Ω- SMB/SMA-plug connector
Cable connector	50 Ω- BNC/SMA-plug connector
Frequency range	100 kHz to 10 GHz

PURPOSE NEAR FIELD MEASURING ?

Near field measurements provide the developer of components and devices with important data on disturbance emission causes. Based on this data, specific measures can be taken to reduce these emissions.

OFF-LIMIT CONDITIONS in connection with the EN 55011/ EN 55022 emissions standard are mostly the starting point for the developer to make near field measurements. The developer knows about frequencies which are critical to his module from standard tests or pre-compliance measurements carried out with an antenna. A practical way to reduce the emissions is to analyse the near fields, find the sources and derive suitable counter-measures.

FAR FIELD LIMIT VIOLATIONS on the module are caused by switching and charging currents in electronic circuits. Depending on the module's specific resonance characteristics, these currents have a negative effect at particular frequencies in the far field by causing off-limit conditions, i.e. the sources feed the resonant conductor systems and construction components which act as "antennas" via galvanic or field-bound coupling mechanisms.

AT THE BEGINNING of a near field analysis, it is necessary to get a general idea of the magnetic field distribution. The magnetic field probes type-R 400 and R 50 as well as the types R 3 / 0.3 and MFA-R 0.2 for smallest areas are particularly suitable for this purpose.

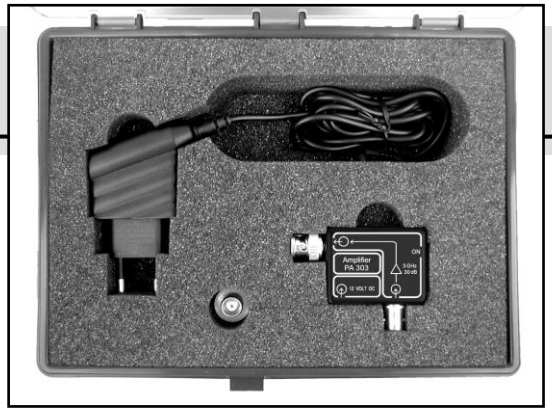
They make it possible

- to identify radiating components, structural parts and/or design structures featuring critical frequencies measured in mains simulation applications
- to determine the orientation and intensity of magnetic fields over components and layout areas,
- to detect the magnetic coupling of modules to adjoining displays and plug-connectors,
- to measure magnetic fields in the vicinity of the module.

To track down the sources, it is necessary to locate the current paths featuring the disturbing frequencies on the module and to follow them, if necessary, up to the pin of an IC. The probe types U 2.5 and U 5 facilitate this indirect measurement of individual lines.

The probes can be used:

- to locate leads and pins featuring steep edges such as clock lines and bus drivers,
- to evaluate bypass capacitors of the IC such as terminal inductors,
- to evaluate filtering measures on leads such as bus lines.



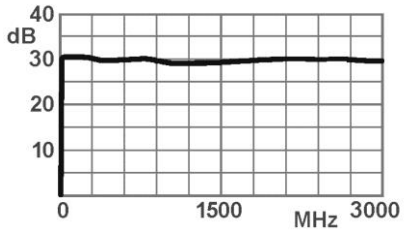
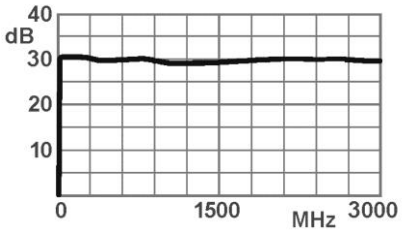
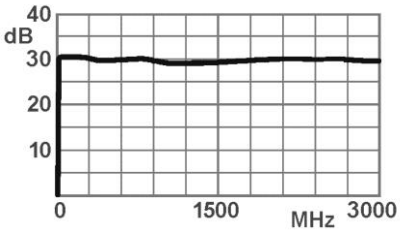
Preamplifier PA

LANGER
EMV-Technik

included in delivery:

Preamplifier	PA 303 connector alternatively
Plug-in power supply unit	alternatively EU, US, JP, CN
Short instructions	
Case	240x185x50 mm

PREAMPLIFIER PA *FREQUENCY RANGE 100 KHZ TO 3 GHZ*

PA 303 **SMA - SMA**	**PA 303** **BNC - BNC**	**PA 303** **N - N**
 50x38x13 mm	 50x38x13 mm	 57x47x26 mm
Frequency response **30 dB – 3 GHz** 	**Frequency response** **30 dB – 3 GHz** 	**Frequency response** **30 dB – 3 GHz** 

Use with Near Field Probes

The measurement of high-frequency near fields directly on electronic modules aids in the reduction of disturbance emission. A preamplifier makes measurement with very small near field probes possible, while at the same time maintaining high sensitivity. Very weak fields, such as in the automobile area, can be measured with high spatial resolution.

Technical data

Operating voltage	7.5...18 V
Max. input power	+13 dBm
Noise figure	4.5 dB

Input and output of PA 303 are designed alternatively with 50 Ω BNC / SMA-connectors. The PA 303 N are constructed with N-connectors. So that it can be operated with any spectrum analyzer or oscillograph.

Caution:
Please note the <u>maximal</u> input direct voltage of <u>25 V DC</u> !

Disregarding this Warning may void the warranty!