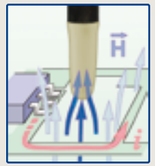
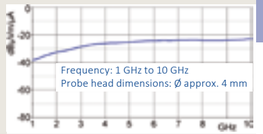
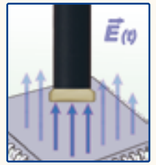


Magnetic field measurement: **SX-B 3-1**

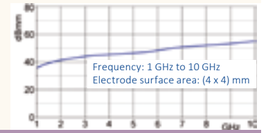
Directly on modules, detection of critical current loops in the layout





E field measurement: **SX-E 03**

Bus structures, larger components and supply areas

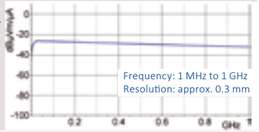


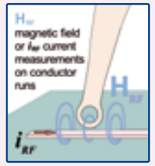
MFA 1 MHz - 6 GHz (active)

Magnetic field measurement: **MFA-R 0.2-75**

On components, e.g. close to IC pins, very fine conducting paths or small SMD components

- Use only with BT 706 bias tee

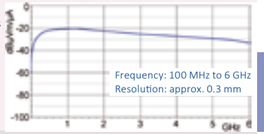


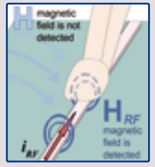


Magnetic field measurement: **MFA-R 0.2-6**

On components, e.g. close to IC pins, very fine conducting paths vor small SMD components

- Use only with BT 706 bias tee

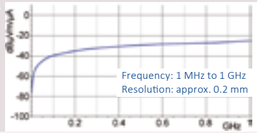


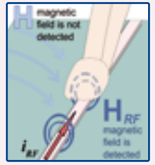


Current measurement: **MFA-K 0.1-30**

Lateral shielding allows measurements at very fine conducting paths and IC pins

- Use only with BT 706 bias tee

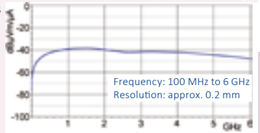




Current measurement: **MFA-K 0.1-12**

Lateral shielding allows measurements at very fine conducting paths and IC pins

- Use only with BT 706 bias tee



Preamplifier

Preamplifier PA 203, PA 303 and PA 306

The preamplifier is used to amplify measurement signals such as weak signals of high-resolution near-field probes. The input and output of the preamplifiers are designed either as a 50 Ω BNC or SMA connector. The PA 303 is also available with N connector.

PA 203

best for LF, RF probes
Amplification: 20 dB
Frequency range: 100 kHz - 3 GHz

PA 306

best for XF probes
Amplification: 30 dB
Frequency range: 100 kHz - 6GHz

PA 303

best for LF, RF probes
Amplification: 30 dB
Frequency range: 100 kHz - 3 GHz

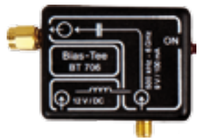
PA 303 N

PA 306 SMA

Bias Tee

BT 706 bias tee

The bias tee supplies the preamplifier with a direct voltage via the signal transfer lines without interfering with the measurement signal which is transferred by an alternating voltage. The bias tee is connected to the 50 Ω input of a spectrum analyser or oscilloscope. The bias tee is supplied by a separate power-supply unit.



BT 706

Note:
All probes and amplifiers are designed and manufactured in Germany.

Probe sets

We have compiled the following probe sets for you

An individual probe set can be compiled according to your specific measurement tasks.

Set LF 1	LF-R 400 H-field LF-B 3 H-field LF-U 2.5 H-field LF-U 5 H-field		
Set RF 1	RF-R 3-2 H-field RF-U 2.5-2 H-field RF-K 7-4 H-field RF-E 10 E-field	**Set RF 2**	RF-R 400-1 H-field RF-R 50-1 H-field RF-B 3-2 H-field RF-U 5-2 H-field
Set RF 3 mini	RF-R 0.3-3 H-field RF-B 0.3-3 H-field	**Set RF 4-E**	RF-E 02 E-field RF-E 05 E-field
Set RF5	RF-R 400-1 H-field RF-R 3-2 H-field RF-U 2.5-2 H-field RF-E 05 E-field	**Set RF6**	RF-R 50-1 H-field RF-B 3-2 H-field RF-E 02 E-field XF-E 10 E-field
Set XF1	XF-R 400-1 H-field XF-R 3-1 H-field XF-B 3-1 H-field XF-U 2.5-1 H-field XF-E 10 E-field		
Set SX1	SX-R 3-1 H-field SX-B 3-1 H-field SX-E 03 E-field		
MFA 01	MFA-K 0.1-12 MFA-R 0.2-6 MFA-R 0.2-75 all H-field (active)	**MFA 02**	MFA-R 0.2-75 MFA-K 0.1-30 all H-field (active)

LF, RF, XF and **SX probe** sets are supplied with:

- Measurement cable
- Quick guide
- Case

MFA probe sets are supplied with:

- Measurement cable
- Quick guide
- Case
- Bias Tee
- Power supply

Measurement method

The probes can be used

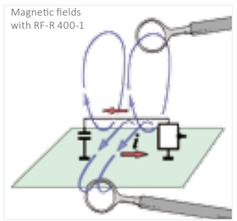
- to examine the nature, direction and size of near-fields on electronic modules
- to identify structural parts or components as sources of interference
- to verify the measures taken to improve the EMC of an electronic module

Field measurement with near-field probes

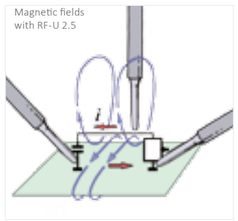
Near-field probes are guided over the module by hand. The developer can turn and rotate them to get an idea of the spatial distribution of the near-fields. Special field densification at components, traces or structural parts indicates emission sources. Selected EMC countermeasures can be derived from these important findings to improve the module's EMC in terms of its emissions.

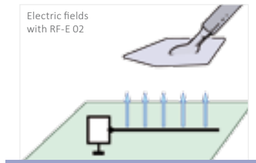
The probes are ideal for two basic tasks

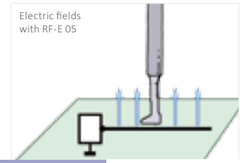
To measure fields that may excite emissions



To locate the source of emissions on the module







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www.langer-emv.com

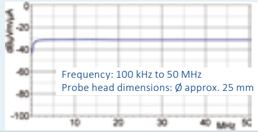
LANGER EMV-Technik

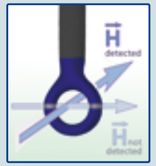
Near-field probes
Overview

EMC emissions

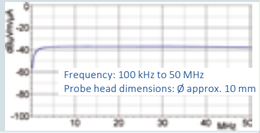
LF 100 kHz - 50 MHz

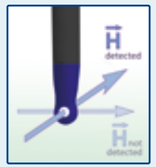
Magnetic field measurement: LF-R 400
Up to a distance of 10 cm around assemblies and devices



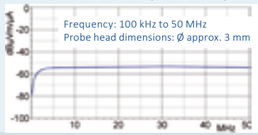


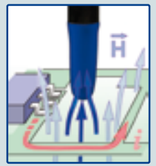
Magnetic field measurement: LF-R 50
At assemblies, devices or cables up to a distance of 3 cm, larger components as potential weak points



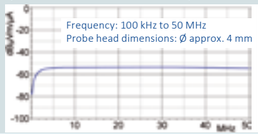


Magnetic field measurement: LF-R 3
On assemblies, e.g. near IC pins and IC housings, conducting paths, decoupling capacitors and EMC components



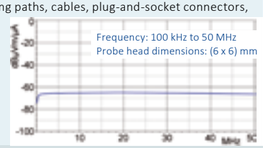


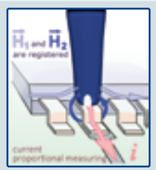
Magnetic field measurement: LF-B 3
Directly on modules, detection of critical current loops in the layout



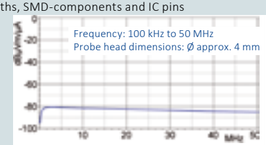
RF current measurement: LF-U 5
At wide conducting paths, cables, plug-and-socket connectors, electronic components, cables and their connectors

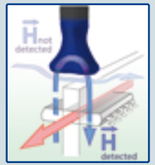
- Works like a coupling clamp





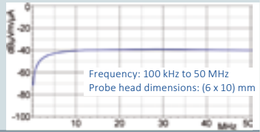
RF current measurement: LF-U 2.5
In conducting paths, SMD-components and IC pins





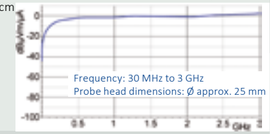
Magnetic field measurement: LF-K 7
At lines, rod-shaped structural parts, at cable connectors and along the edges of planar structural parts

- Works like a coupling clamp

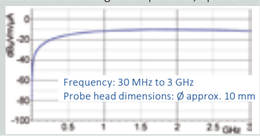


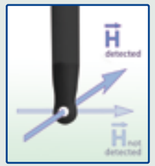
RF 30 MHz - 3 GHz

Magnetic field measurement: RF-R 400-1
At the edge and in the vicinity of modules and housings, up to a distance of 10 cm

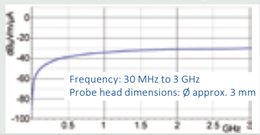


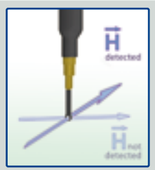
Magnetic field measurement: RF-R 50-1
In the vicinity of modules and on larger components, up to a distance of 3 cm



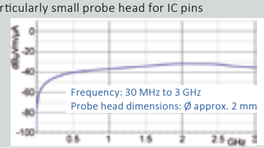


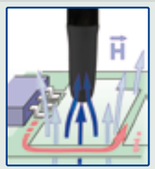
Magnetic field measurement: RF-R 3-2
On modules, determination of the direction of the magnetic surface field



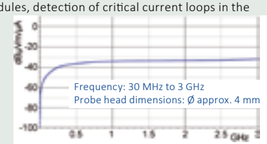


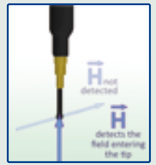
Magnetic field measurement: RF-R 0.3-3
On modules, particularly small probe head for IC pins



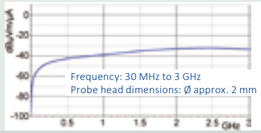


Magnetic field measurement: RF-B 3-2
Directly on modules, detection of critical current loops in the layout



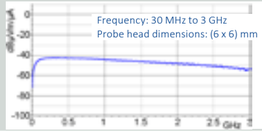


Magnetic field measurement: RF-B 0.3-3
Directly on modules, particularly small probe head for IC pins

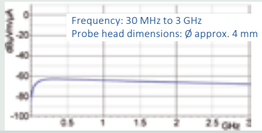


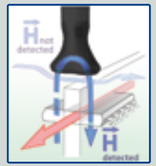
RF current measurement: RF-U 5-2
At wide conducting paths, cables, connectors, electronic components and their connections

- Works like a coupling clamp



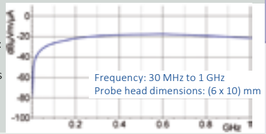
RF current measurement: RF-U 2.5-2
On modules, directly on IC pins, SMD components and individual conducting paths

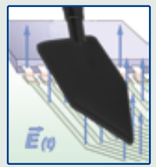




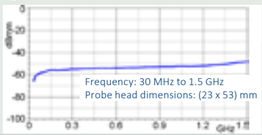
Magnetic field measurement: RF-K 7-4
Circular fields at metal edges, large components, wide conducting paths

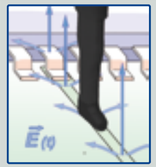
- Special feature: a homogenous magnetic field is compensated



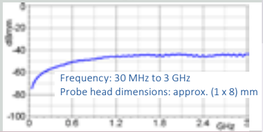


E field measurement: RF-E 02
Bus structures, larger components or supply surfaces at a distance of 1 cm - 2 cm from the component

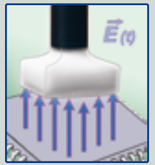




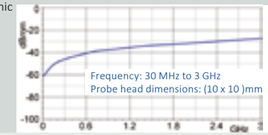
E field measurement: RF-E 05
Directly on modules or wide conducting paths

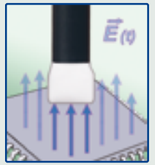


Note:
Determine the direction of the magnetic field by rotating the probe and deduce the path of the current causing the magnetic field.

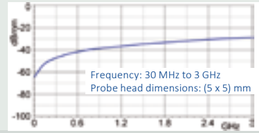


E field measurement: RF-E 09
At a distance of 0.5 mm to 10 mm on the surface of multi-pin ICs and electronic modules





E field measurement: RF-E 04
Surface measurement on clocked lines and smaller ICs



E field measurement: RF-E 10
Lateral shielding allows individual evaluation of conducting paths with a width of 0.1 mm or single IC pins at multi-pin ICs

XF 30 MHz - 6 GHz

Magnetic field measurement: XF-R 400-1
At the edge and in the vicinity of modules and housings up to a distance of 10 cm

Magnetic field measurement: XF-R 100-1
Around assemblies, devices or cables up to a distance of approx. 3 cm

Magnetic field measurement: XF-R 3-1
On assemblies, e.g. around pins and IC housings, conducting paths, decoupling capacitors and EMC components

Magnetic field measurement: XF-B 3-1
Directly on modules, detection of critical current loops, e.g. between large components of switching controllers

RF current measurement: XF-U 2.5-1
In conductor runs, component connections, capacitors and IC pins

E field measurement: XF-E 09s
At a distance of 0.5 mm to 10 mm on the surface of multi-pin ICs and electronic modules

E field measurement: XF-E 04s
Surface measurement on clocked lines and smaller ICs

E field measurement: XF-E 10
Conducting paths with a width of 0.1 mm, single IC pins on multi-pin ICs

SX 1 GHz - 10 GHz

Magnetic field measurement: SX-R 3-1
On assemblies, e.g. around the pins and IC housings, conducting paths, decoupling capacitors and EMC components