



User Manual

- Translation of the original -

PA 3010 set

Preamplifier 10 MHz up to 10 GHz





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1 Declaration of Conformity



Manufacturer:

Langer EMV-Technik GmbH
Nöthnitzer Hang 31
01728 Bannewitz
Germany

Langer EMV-Technik GmbH herewith declares, that the product

PA 3010 set, Preamplifier 10 MHz up to 10 GHz
with PA 3010

agrees with the regulations of EC guidelines:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- Restriction of certain Hazardous Substances 2011/65/EU / EU 2015/863

For the implementation of the requirements from the above mentioned directives, the following applicable standards were used:

- DIN EN 61010-1:2020-03 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1
- DIN EN 61000-6-1:2019-11 EMC - Immunity
- DIN EN 61000-6-3:2011-09 EMC - Emission

Name of the person authorized to compile the technical file:

Gunter Langer
Bannewitz, 01-12-2021

(Signature)

G. Langer, Managing Director

Langer
EMV-Technik GmbH
Nöthnitzer Hang 31
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2 General Information

2.1 Storage of the User Manual

This user manual enables the safe and efficient use of the PA 3010 set. It must be kept close at hand and accessible to the user.

2.2 Reading and Understanding the User Manual

Read the user manual carefully, observe the safety information and follow the instructions given in this manual before putting the device into service.

2.3 Local Safety and Accident Prevention Regulations

The local accident prevention and general safety regulations also apply to ensure that the PA 3010 set is used for its intended purpose.

2.4 Images and Graphics

Figures have been included in this user manual to assist the reader's understanding but may differ from the device's actual design.

2.3 Limitations of Liability

The Langer EMV-Technik GmbH can assume no liability for personal injury or damage to material, if

- the instructions in this user manual were not followed,
- the PA 3010 set was operated by staff not qualified in the field of EMC and who are not fit to work under the influence of disturbance voltages and electric and magnetic fields,
- the PA 3010 set was not used as intended,
- the PA 3010 set was subjected to unauthorized modifications or technical changes,
- spare parts or accessories were used, that were not authorized by Langer EMV-Technik GmbH.

2.4 Errors and Omissions

The information in this user manual has been checked very carefully and found to be correct to the best of our knowledge; however, Langer EMV-Technik GmbH can assume no responsibility for spelling, typographical or proofreading errors.

2.5 Copyright

The content of this user manual is protected by copyright and may only be used in connection with the PA 3010 set. This user manual may not be used for other purposes without the prior consent of Langer EMV-Technik GmbH.



3 Scope of Delivery

Item	Name of article	Type	Qty.
01	Preamplifier 10 MHz to 10 GHz	PA 3010	1
02	Power supply unit	NT FRI EU or NT FRI US	1
03	System case	Case A5	1
04	Quick guide		1
05	User manual		1

The scope of delivery may deviate depending on the respective order.



Figure 1 - System case of PA 3010 set



4 Technical Parameters

PA 3010 preamplifier (25°C, 12 V, 170 mA)	
Frequency range	10 MHz - 10 GHz
Gain	typ. 30 dB
-1 dB compression point (output)	typ. 18 dBm at 5 GHz
Noise figure	typ. 2.5 dB at 5 GHz
Supply voltage	12 V DC
Impedance	50 Ω
Current consumption	170 mA
Max. input power (destruction threshold)	17 dBm
Max. DC component at RF input/output	9 V
Amplitude flatness	± 3 dB
Housing dimensions (height x width x depth)	(50 x 38 x 14) mm
Weight	60 g
Connector - input	SMA, female, jack
Connector - output	SMA, male, plug
Ambient temperature (in operation)	(0 - 40) °C

4.1 Connections and Dimensions

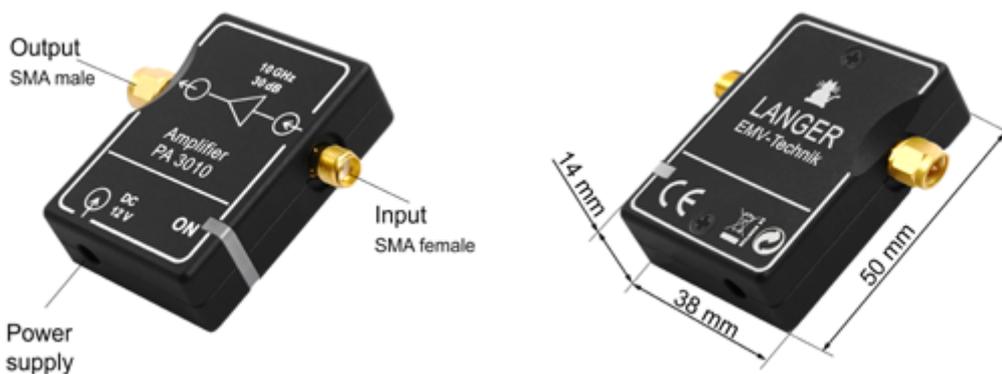


Figure 2a - Designation of connections Figure 2b - Dimensions of PA 3010 preamplifier



4.2 Measurements and Characteristics

Average of 26 measurements (T=25°C, I=170 mA, U=12 V)

Freq[GHz] (Frequency)	S21[dB] (Gain)	S11[dB] (Voltage standing wave ratio)	S22[dB] (Voltage standing wave ratio)	NF[dB] (Noise figure)	OP1dB (-1 dB compression point)
0.01	29	-3 (6.3)	-8 (2.2)	8.4	-
0.1	30	-16 (1.4)	-18 (1.3)	4.0	-
1	30	-15 (1.4)	-20 (1.2)	3.1	19
2	29	-13 (1.6)	-12 (1.7)	2.7	17
3	30	-17 (1.3)	-13 (1.6)	2.1	18
4	30	-13 (1.6)	-11 (1.8)	2.1	18
5	30	-9 (2.2)	-10 (1.9)	2.2	18
6	31	-13 (1.5)	-13 (1.6)	2.4	17
7	31	-16 (1.4)	-13 (1.6)	2.5	17
8	30	-11 (1.8)	-19 (1.3)	2.8	17
9	30	-13 (1.6)	-12 (1.6)	3.2	16
10	27	-14 (1.5)	-7 (2.6)	3.7	14
11	24	-10 (1.9)	-13 (1.6)	6.2	14

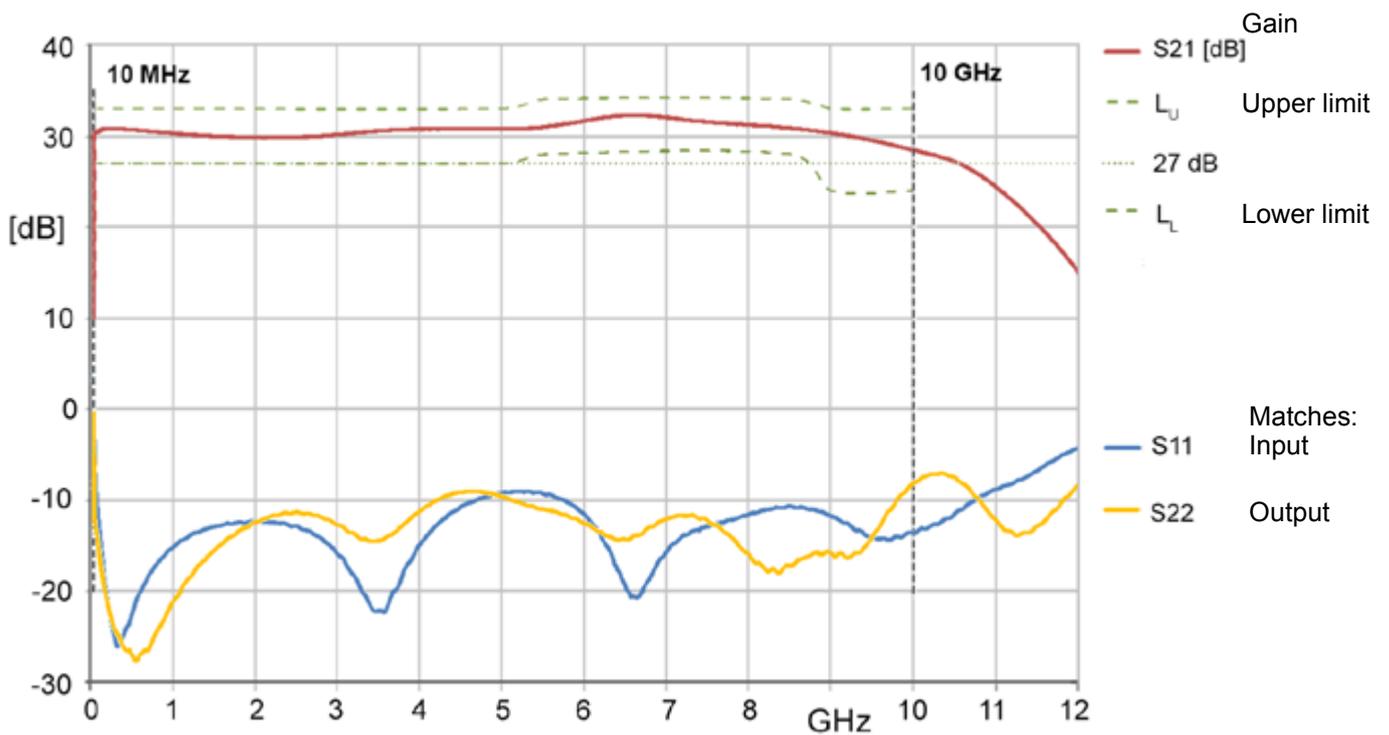


Figure 3 - PA 3010 frequency range

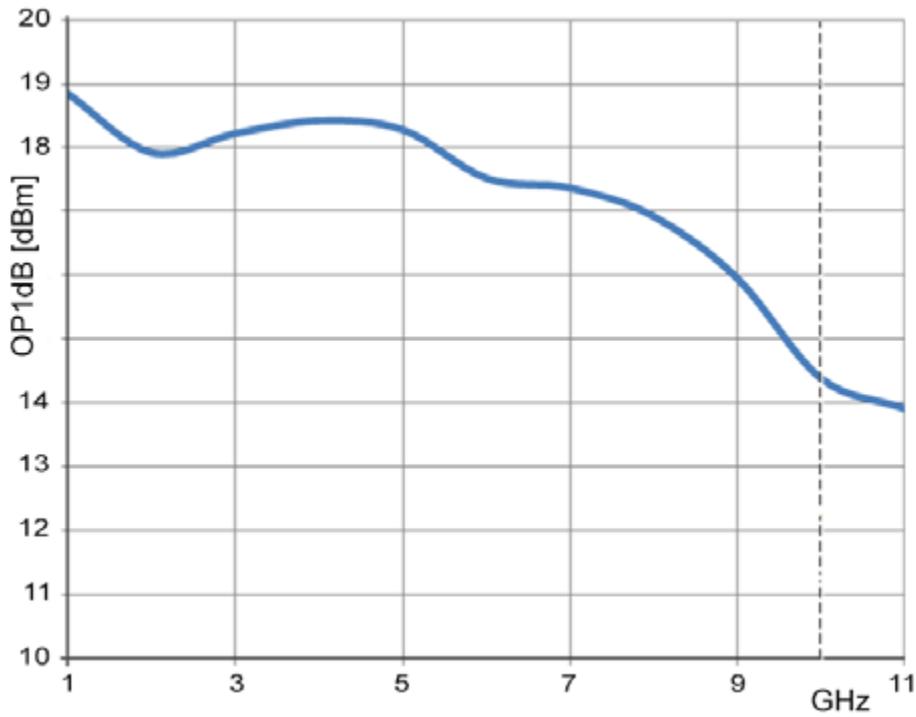


Figure 4 - PA 3010 -1 dB compression point

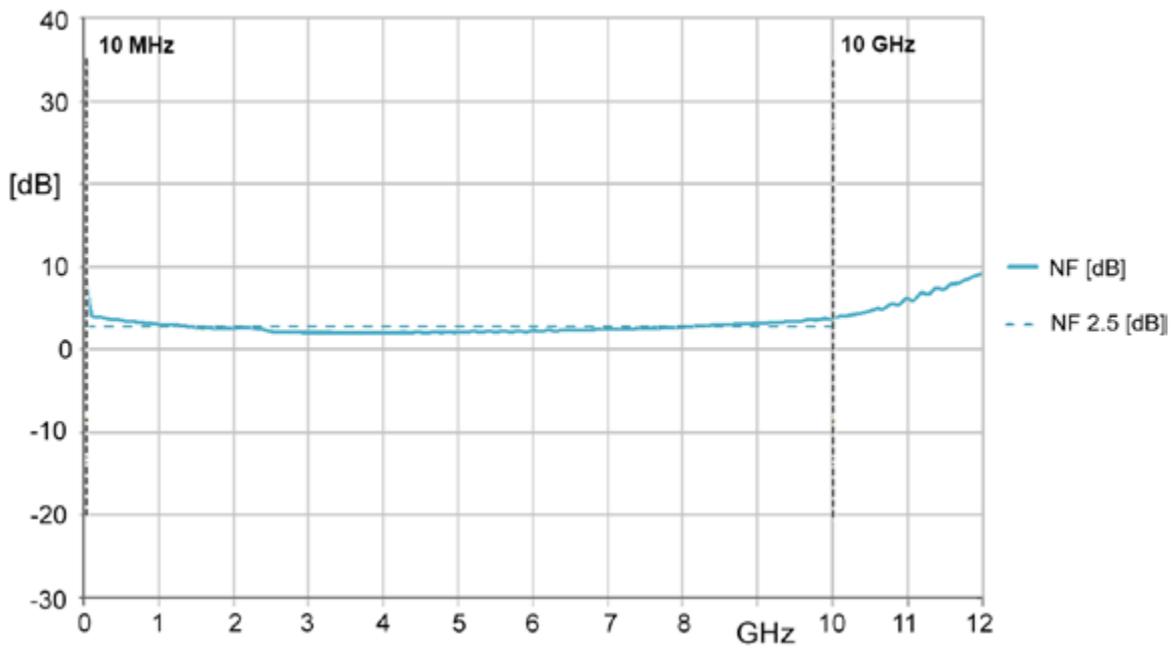


Figure 5 - PA 3010 noise figure



5 Safety

5.1 Intended Use

The PA 3010 is used to amplify (weak) measurement signals from connected near-field probes in the frequency range from 10 MHz to 10 GHz.

A near-field probe is connected to the SMA input of the preamplifier via a suitable coaxial cable with SMA connector (male). The PA 3010 is connected to either a spectrum analyzer or an oscilloscope via the SMA output (male).

The PA 3010 is powered by the provided power supply.

5.2 Reasonably Foreseeable Improper Use

Improper use of the PA 3010 set may put the user at risk, damage the product and/or the technical equipment connected to the product.

Examples of improper use:

- Safety devices are bypassed or rendered ineffective.
- The PA 3010 preamplifier or any connected devices are used in a defective state.
- The PA 3010 set is used outside the specified range of technical parameters.
- The field of application is changed by modifications to the design.

Claims due to the improper use of the PA 3010 set are excluded!

5.3 Staff Requirements

Only persons who are trained and qualified in the field of electromagnetic compatibility (EMC) may operate the PA 3010 set.

The PA 3010 set must not be operated by persons whose reactions are impaired by, for example, alcohol, medication or drugs.

5.4 Safety Instructions

When using a product from Langer EMV-Technik GmbH, please observe the following safety instructions to protect yourself against electric shock or the risk of injury:

- The operating and safety instructions for all devices included in the set-up must be observed.
- Before operating the product, externally inspect all equipment used in the set-up for damage.
- Damaged or defective devices must be replaced.
- All devices are to be connected or disconnected only when the source of interference is switched off.
- The product may only be operated under supervision.
- To avoid excessive heating of the preamplifier, it must not be covered.



6 Application

6.1 Application Notes

When the PA 3010 is supplied with voltage, the LED lights up red continuously.

During normal operation, the PA 3010 heats up. This does not represent a malfunction. The housing reaches a temperature approx. 15 °C above room temperature.

For reproducible measurement results, it is recommended to let the preamplifier preheat for approx. 20 minutes.

To avoid damage to the PA 3010 preamplifier, coaxial cables must be discharged shortly before they are connected to the preamplifier (due to its function, the input of the PA 3010 preamplifier is not secured against ESD). For this we recommend to establish a low impedance connection between the inner and outer conductor of the coaxial cable.

6.2 General Measurement Set-up

The PA 3010 is connected via the SMA output (male) to either the 50 Ω connector of a spectrum analyzer or an oscilloscope.

A near-field probe is connected to the SMA input (female) of the preamplifier via a coaxial cable with the SMA male connector (plug).

The provided power supply unit is connected to the DC 12 V (power supply) connection.

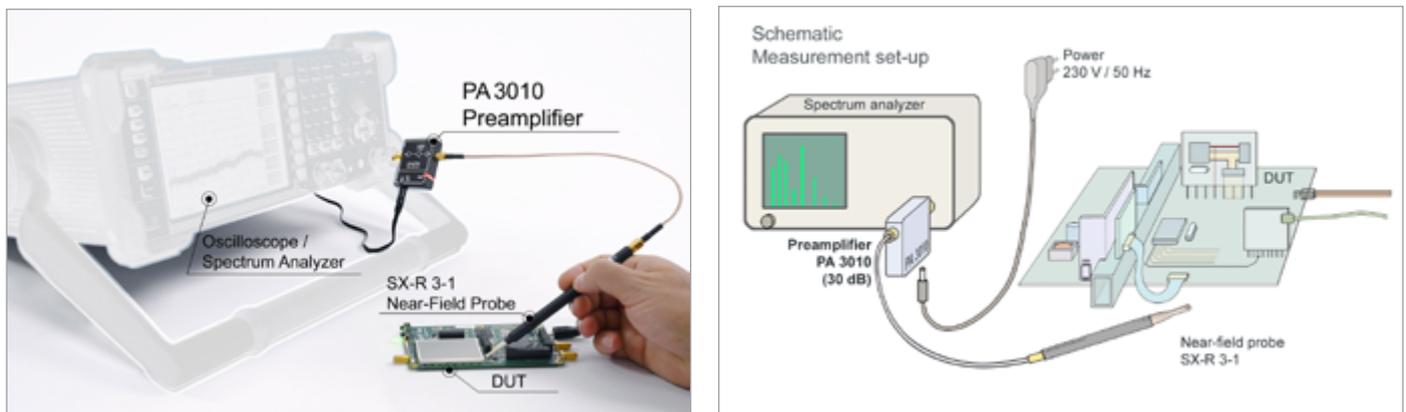


Figure 6 - Measurement set-up with PA 3010, spectrum analyzer, near-field probe and DUT



7 Information on Recycling and Disposal



In accordance with the WEEE Directive 2012/19/EU (Waste of Electrical and Electronic Equipment), the following must be observed:

At the end of its service life, this product should be taken to a suitable disposal facility for recycling and disposal. Do not dispose of with household waste.



8 Customer Service

Please contact us if you have any questions, comments or suggestions.

Contact us at:

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Germany

Internet: <https://www.langer-emv.com>

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You can reach us: Monday - Friday 8:00 am to 4:00 pm (CET)

Phone: +49 (0) 351-430093-0

Fax: +49 (0) 351-430093-22

9 Warranty

Langer EMV-Technik GmbH will remedy any fault due to defective material or defective manufacture during the statutory warranty period either by repair or by delivery of spare parts.

This warranty is only granted on condition that:

- the information and instructions in the user manual have been observed.

The warranty will be forfeited if:

- an unauthorized repair is performed on the product,
- the product is modified,
- the product is not used for its intended purpose,
- the product is opened.

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