

# RPG LNA – Low Noise Amplifier

## Specifications



**Radiometer Physics**  
A Rohde & Schwarz Company

# Definitions

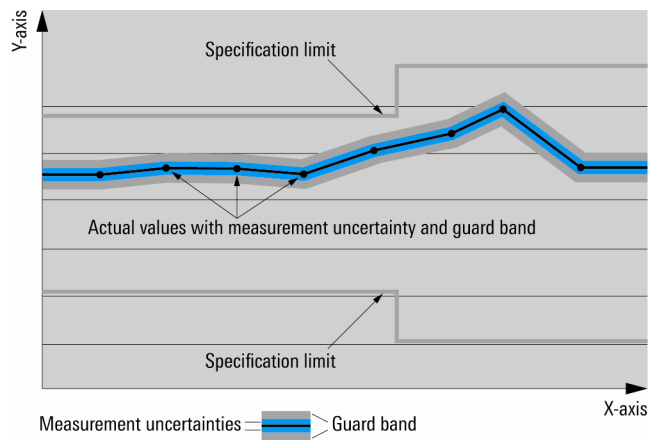
## General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

## Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as  $<$ ,  $\leq$ ,  $>$ ,  $\geq$ ,  $\pm$ , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



## Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Radiometer Physics laboratories.

## Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

## Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with  $<$ ,  $>$  or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

## Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

## Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

## Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are indicated as follows: “parameter: value”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Radiometer Physics.

## General information

The RPG Low Noise Amplifiers (LNA) are available for the frequency bands:

- 50 GHz to 75 GHz (V-LNA)
- 60 GHz to 90 GHz (E-LNA)
- 75 GHz to 110 GHz (W-LNA)
- 110 GHz to 170 GHz (D-LNA)
- 140 GHz to 220 GHz (G-LNA)
- 210 GHz to 260 GHz (LNA 210-260 20 7)
- 250 GHz to 350 GHz (H-LNA)

# Specifications

## Test Port

RF-Frequency range [GHz]	V-LNA 50-75 20 5	50 - 75
	V-LNA 50-75 40 5	50 - 75
	E-LNA 60-90 14 5	60 - 90
	E-LNA 60-90 25 5	60 - 90
	W-LNA 75-110 20 3	75 - 110
	W-LNA 75-110 40 3	75 - 110
	D-LNA 110-170 15 6	110 - 170
	D-LNA 110-170 30 6	110 - 170
	G-LNA 140-220 20 6	140 - 220
	G-LNA 140-210 20 5	140 - 210
	LNA 210-260 20 7	210 - 260
	H-LNA (WR-3.4)	250 - 330
	H-LNA (WR-2.8)	250 - 350
	Waveguide designator	V-LNA 50-75 20 5
V-LNA 50-75 40 5		WR-15
E-LNA 60-90 14 5		WR-12
E-LNA 60-90 25 5		WR-12
W-LNA 75-110 20 3		WM-2540 (WR-10)
W-LNA 75-110 40 3		WM-2540 (WR-10)
D-LNA 110-170 15 6		WM-1651 (WR-6.5)
D-LNA 110-170 30 6		WM-1651 (WR-6.5)
G-LNA 140-220 20 6		WM-1295 (WR-5.1)
G-LNA 140-210 20 5		WM-1295 (WR-5.1)
LNA 210-260 20 7		WM-1092 (WR-4.3)
H-LNA (WR-3.4)		WR-3.4
H-LNA (WR-2.8)		WR-2.8
Connector type (anti cocking flange)		V-LNA 50-75 20 5
	V-LNA 50-75 40 5	
	E-LNA 60-90 14 5	
	E-LNA 60-90 25 5	
	W-LNA 75-110 20 3	
	W-LNA 75-110 40 3	
	D-LNA 110-170 15 6	
	D-LNA 110-170 30 6	
	G-LNA 140-220 20 6	
	G-LNA 140-210 20 5	
	LNA 210-260 20 7	
	H-LNA (WR-3.4)	RPG precision waveguide flange (compatible with UG-387/U-M)
	H-LNA (WR-2.8)	
	Noise figure (typ.) [dB]	V-LNA 50-75 20 5
V-LNA 50-75 40 5		5
E-LNA 60-90 14 5		5
E-LNA 60-90 25 5		5
W-LNA 75-110 20 3		3
W-LNA 75-110 40 3		3
D-LNA 110-170 15 6		6
D-LNA 110-170 30 6		6
G-LNA 140-220 20 6		6
G-LNA 140-210 20 5		5
LNA 210-260 20 7		7
H-LNA (WR-3.4)		12
H-LNA (WR-2.8)		12
Gain (typ.) [dB]		V-LNA 50-75 20 5
	V-LNA 50-75 40 5	40
	E-LNA 60-90 14 5	14
	E-LNA 60-90 25 5	25
	W-LNA 75-110 20 3	19
	W-LNA 75-110 40 3	40
	D-LNA 110-170 15 6	22
	D-LNA 110-170 30 6	30
	G-LNA 140-220 20 6	20
	G-LNA 140-210 20 5	20
	LNA 210-260 20 7	20
	H-LNA (WR-3.4)	20
	H-LNA (WR-2.8)	20

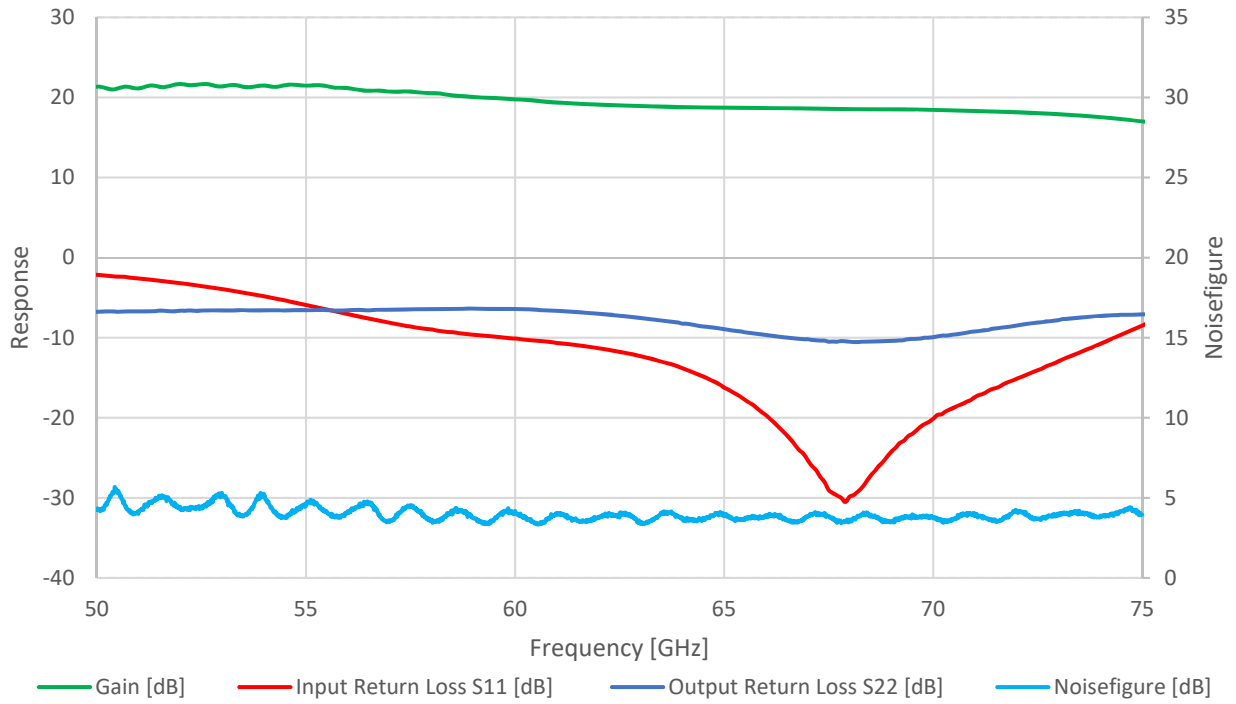
P1dB (typ.) [dBm]	V-LNA 50-75 20 5	+12
	V-LNA 50-75 40 5	+12
	E-LNA 60-90 14 5	+14
	E-LNA 60-90 25 5	+14
	W-LNA 75-110 20 3	-3
	W-LNA 75-110 40 3	-3
	D-LNA 110-170 15 6	-3
	D-LNA 110-170 30 6	-3
	G-LNA 140-220 20 6	-3
	G-LNA 140-210 20 5	-3
	LNA 210-260 20 7	-3
	H-LNA (WR-3.4)	-5
	H-LNA (WR-2.8)	-5

## Power Requirements

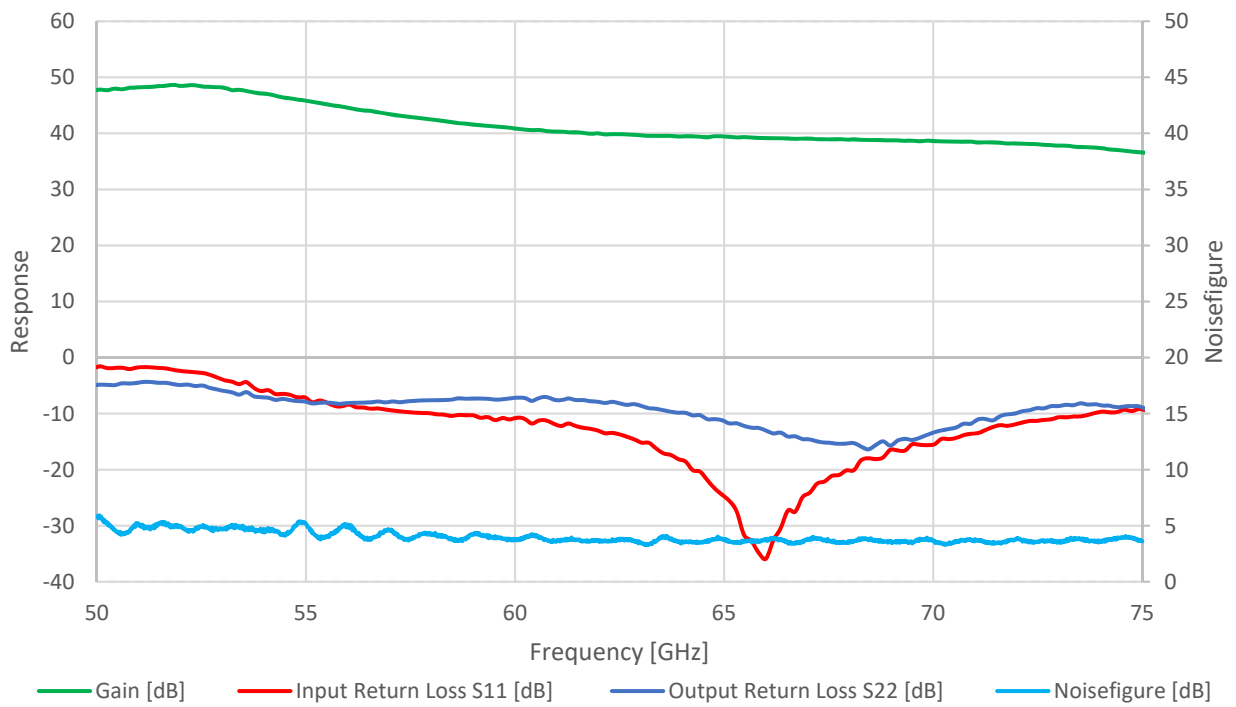
Min. Input voltage [V]	V-LNA 50-75 20 5	+ 3.5
	V-LNA 50-75 40 5	
	E-LNA 60-90 14 5	
	E-LNA 60-90 25 5	
	W-LNA 75-110 20 3	
	W-LNA 75-110 40 3	
	D-LNA 110-170 15 6	
	D-LNA 110-170 30 6	
	G-LNA 140-220 20 6	
	G-LNA 140-210 20 5	
	LNA 210-260 20 7	
	H-LNA (WR-3.4)	
	H-LNA (WR-2.8)	
Supply current (typ.) [mA]	V-LNA 50-75 20 5	80
	V-LNA 50-75 40 5	150
	E-LNA 60-90 14 5	120
	E-LNA 60-90 25 5	240
	W-LNA 75-110 20 3	40
	W-LNA 75-110 40 3	80
	D-LNA 110-170 15 6	40
	D-LNA 110-170 30 6	80
	G-LNA 140-220 20 6	40
	G-LNA 140-210 20 5	40
	LNA 210-260 20 7	40
	H-LNA (WR-3.4)	40
	H-LNA (WR-2.8)	60

## Absolut Maximum Ratings

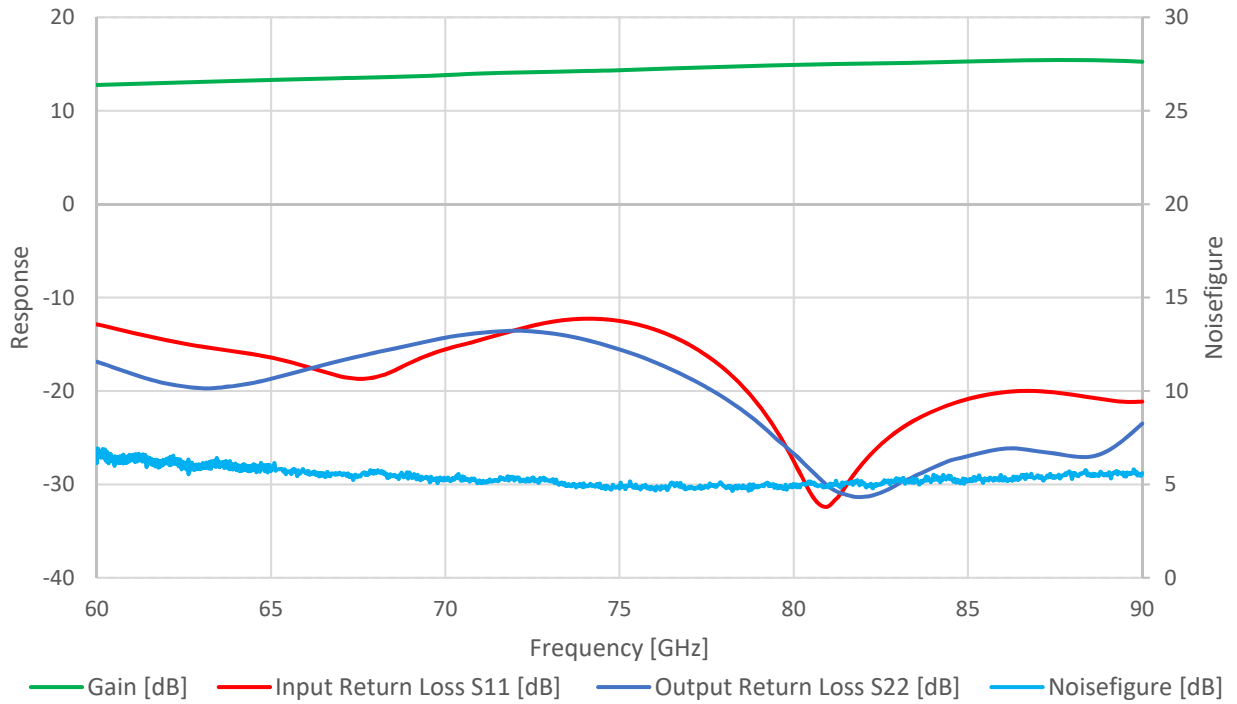
RF-Input power [dBm]	V-LNA 50-75 20 5	-5
	V-LNA 50-75 40 5	-30
	E-LNA 60-90 14 5	15
	E-LNA 60-90 25 5	0
	W-LNA 75-110 20 3	-10
	W-LNA 75-110 40 3	-30
	D-LNA 110-170 15 6	-10
	D-LNA 110-170 30 6	-30
	G-LNA 140-220 20 6	-10
	G-LNA 140-210 20 5	-10
	LNA 210-260 20 7	-10
	H-LNA (WR-3.4)	-10
	H-LNA (WR-2.8)	-10
Input voltage [V]	V-LNA 50-75 20 5	+ 5.5
	V-LNA 50-75 40 5	
	E-LNA 60-90 14 5	
	E-LNA 60-90 25 5	
	W-LNA 75-110 20 3	
	W-LNA 75-110 40 3	
	D-LNA 110-170 15 6	
	D-LNA 110-170 30 6	
	G-LNA 140-220 20 6	
	G-LNA 140-210 20 5	
	LNA 210-260 20 7	
	H-LNA (WR-3.4)	
	H-LNA (WR-2.8)	
Case temperature [°C]	V-LNA 50-75 20 5	+ 60
	V-LNA 50-75 40 5	
	E-LNA 60-90 14 5	
	E-LNA 60-90 25 5	
	W-LNA 75-110 20 3	
	W-LNA 75-110 40 3	
	D-LNA 110-170 15 6	
	D-LNA 110-170 30 6	
	G-LNA 140-220 20 6	
	G-LNA 140-210 20 5	
	LNA 210-260 20 7	
	H-LNA (WR-3.4)	
	H-LNA (WR-2.8)	



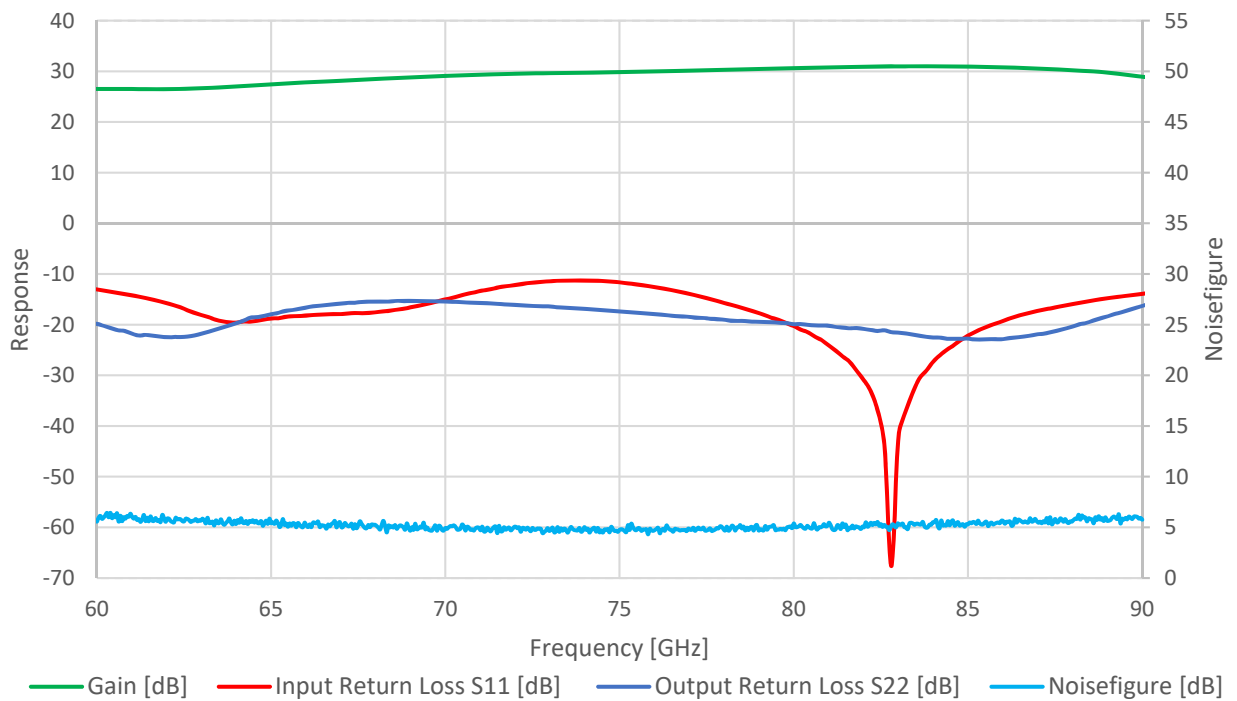
Typ. Figure 1: V-LNA 50-75 20 5



Typ. Figure 2: V-LNA 50-75 40 5

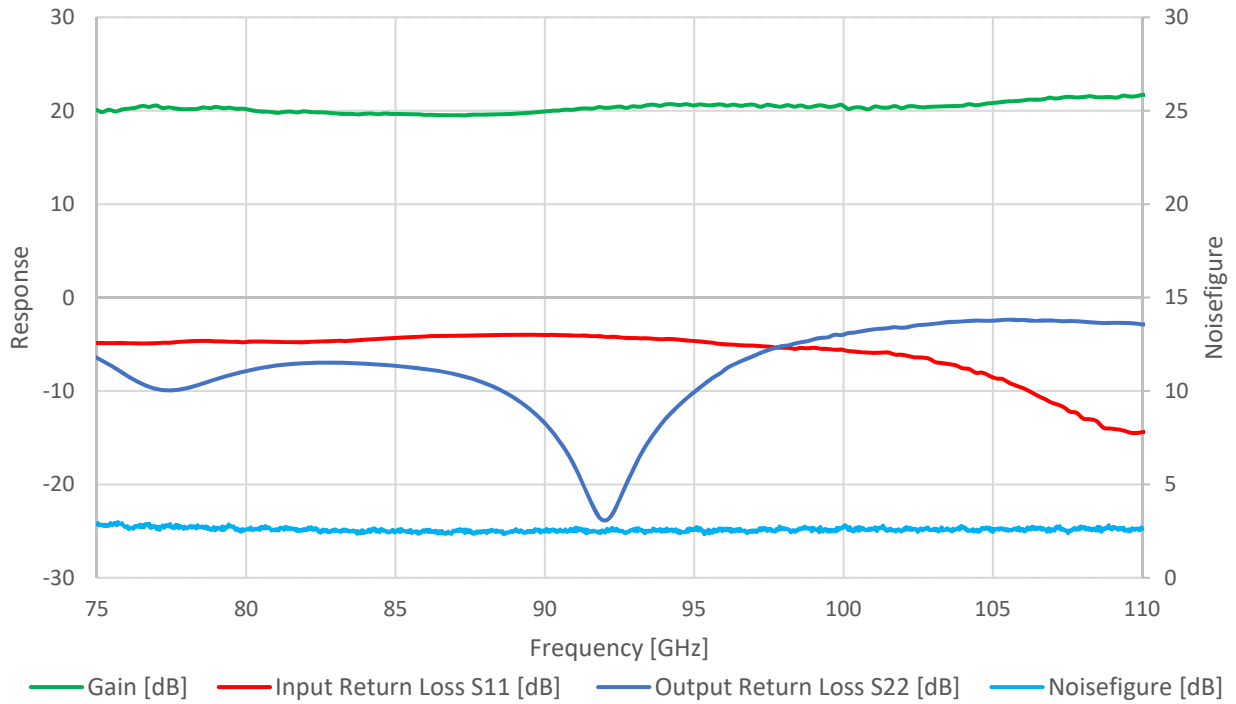


Typ. Figure 3: E-LNA 60-90 14 5

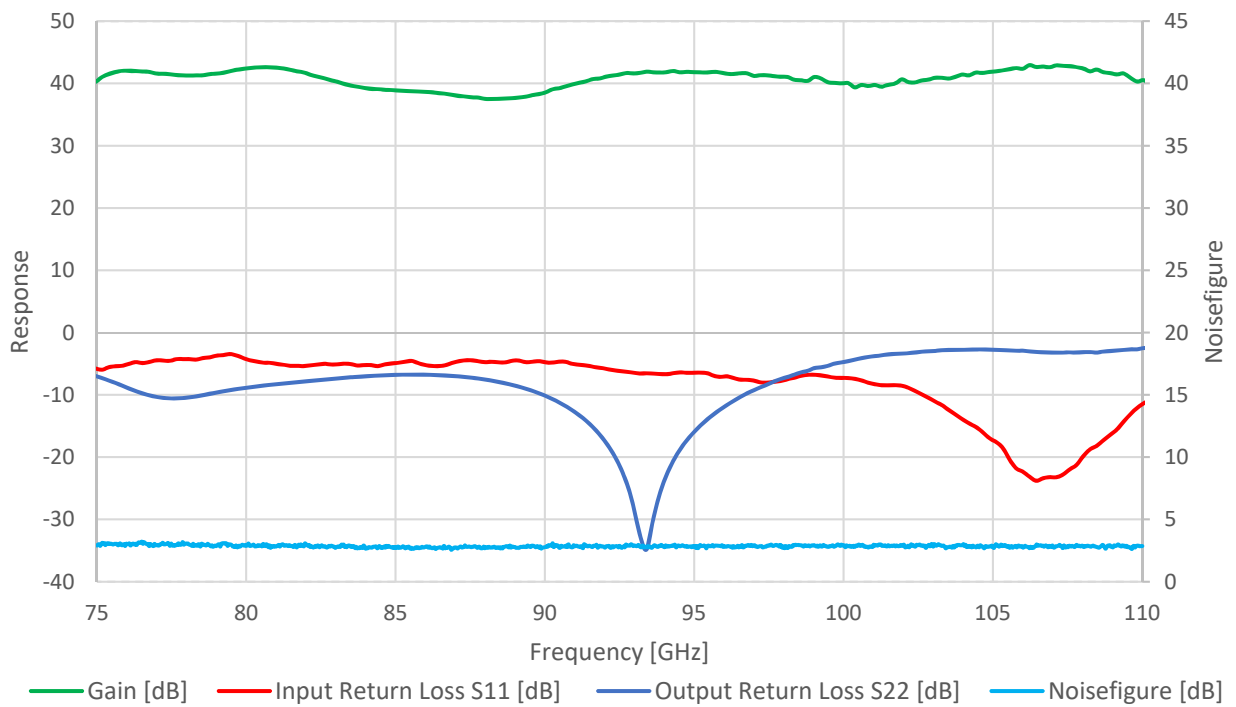


Typ. Figure 4: E-LNA 60-90 25 5

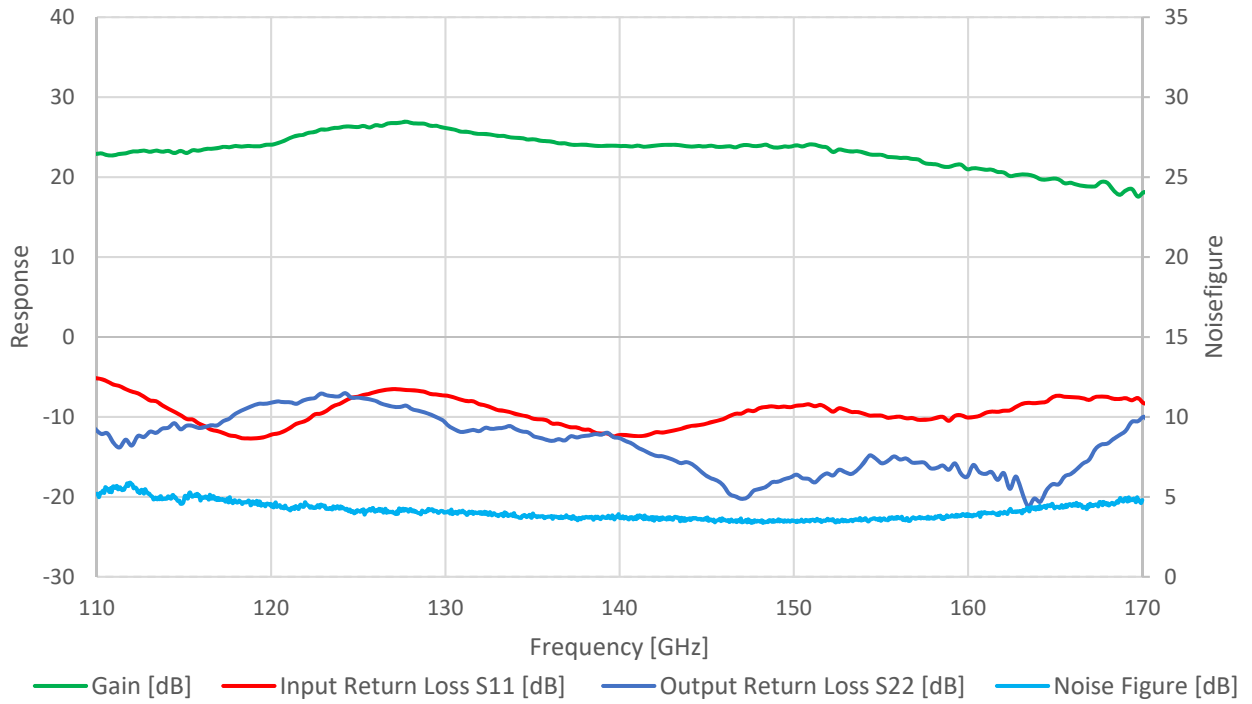




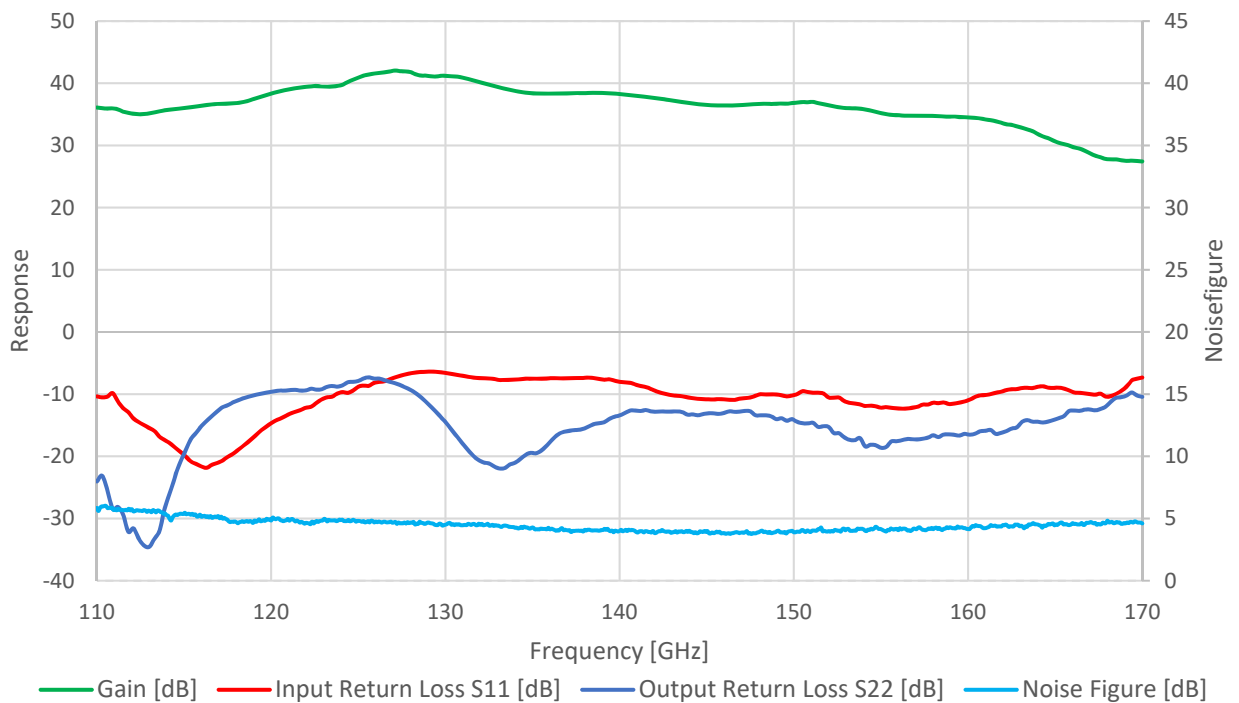
Typ. Figure 5: W-LNA 75-110 20 3



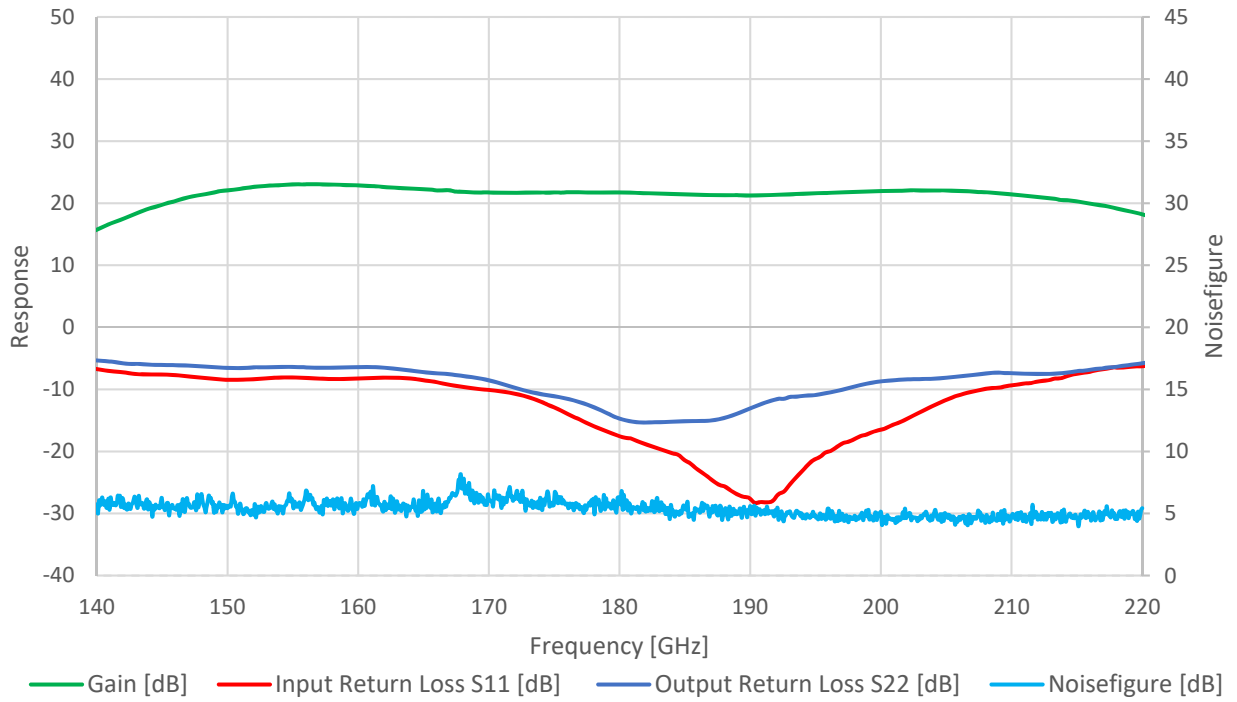
Typ. Figure 6: W-LNA 75-110 40 3



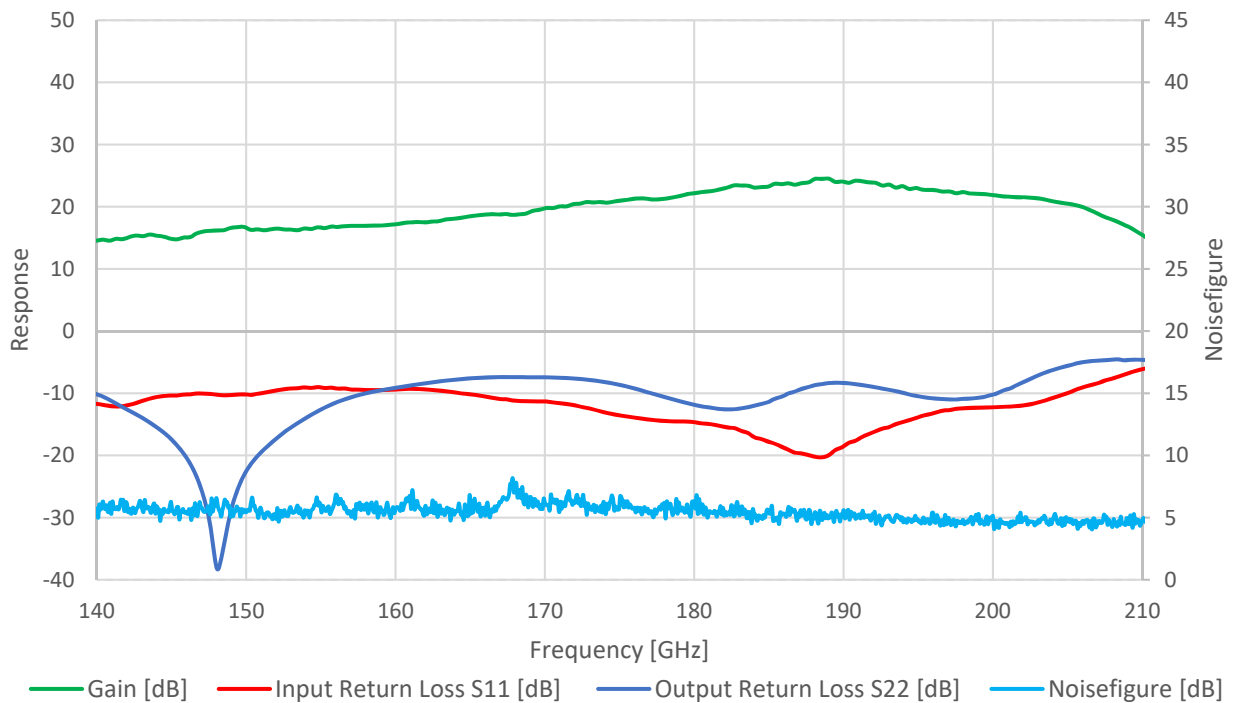
Typ. Figure 7: D-LNA 110-170 15 6



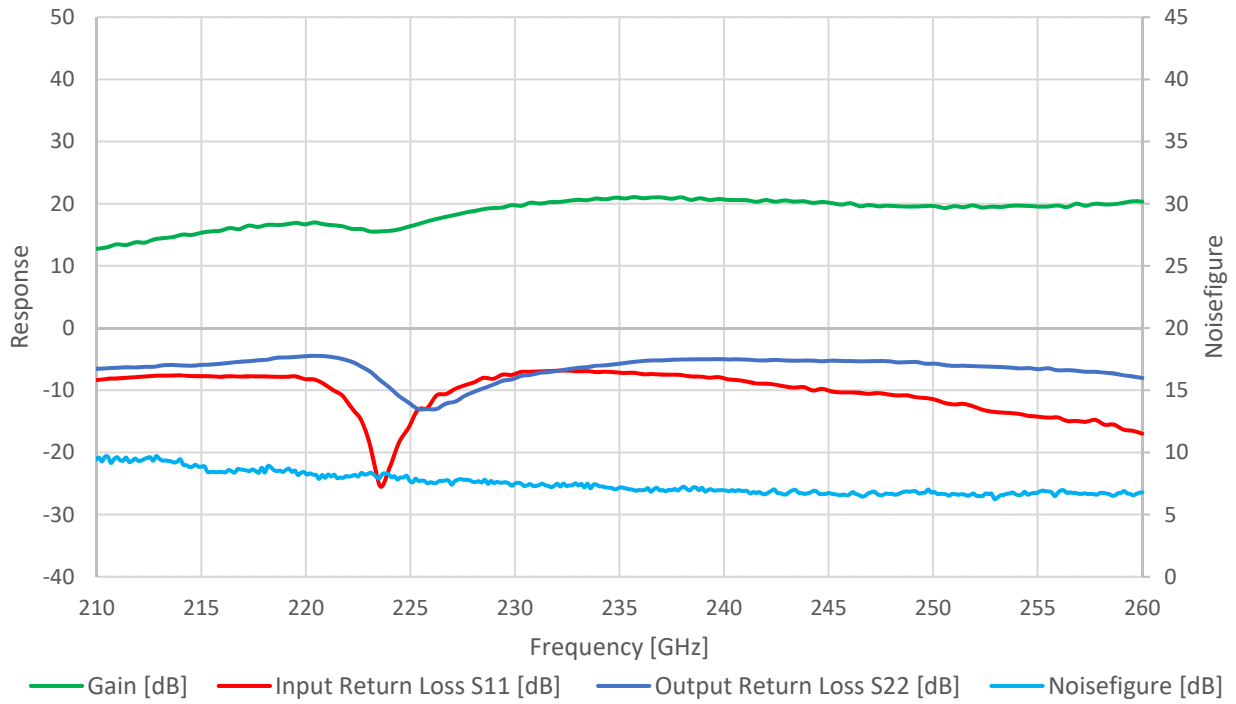
Typ. Figure 8: D-LNA 110-170 30 6



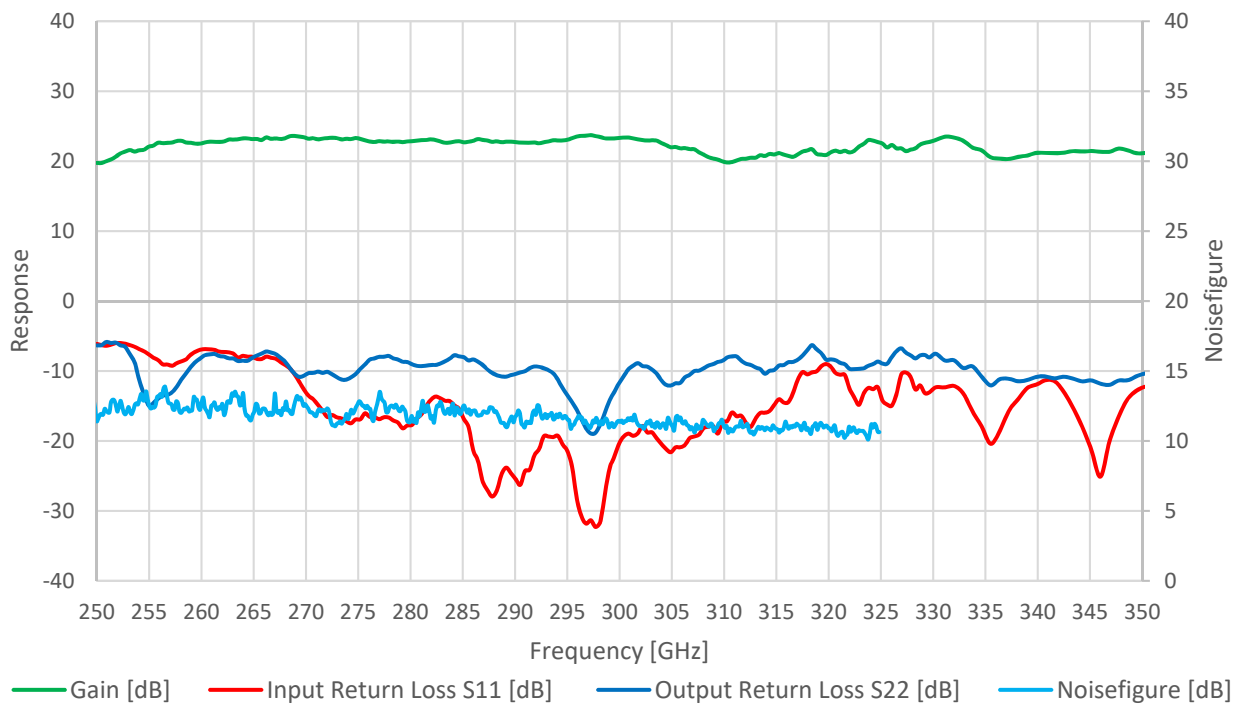
Typ. Figure 9: G-LNA 140-220 20 6



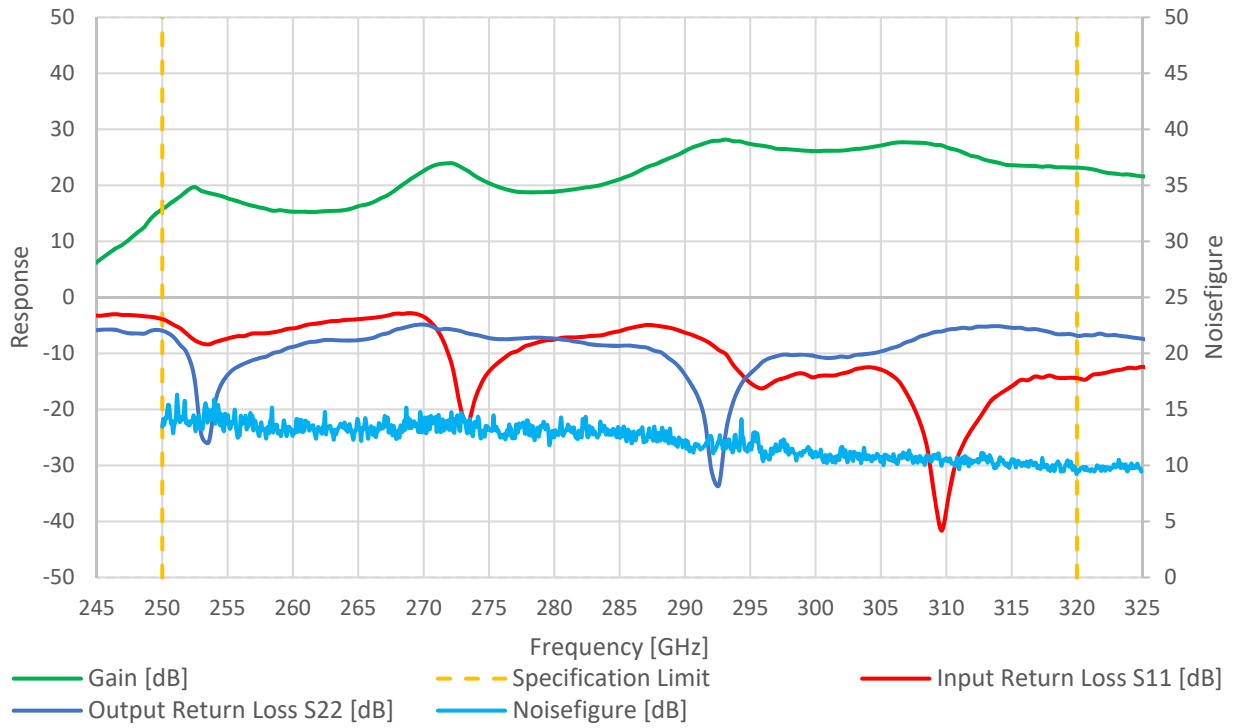
Typ. Figure 10: G-LNA 140-210 20 5



Typ. Figure 11: LNA 210-260 20 7



Typ. Figure 12: H-LNA (WR-2.8)



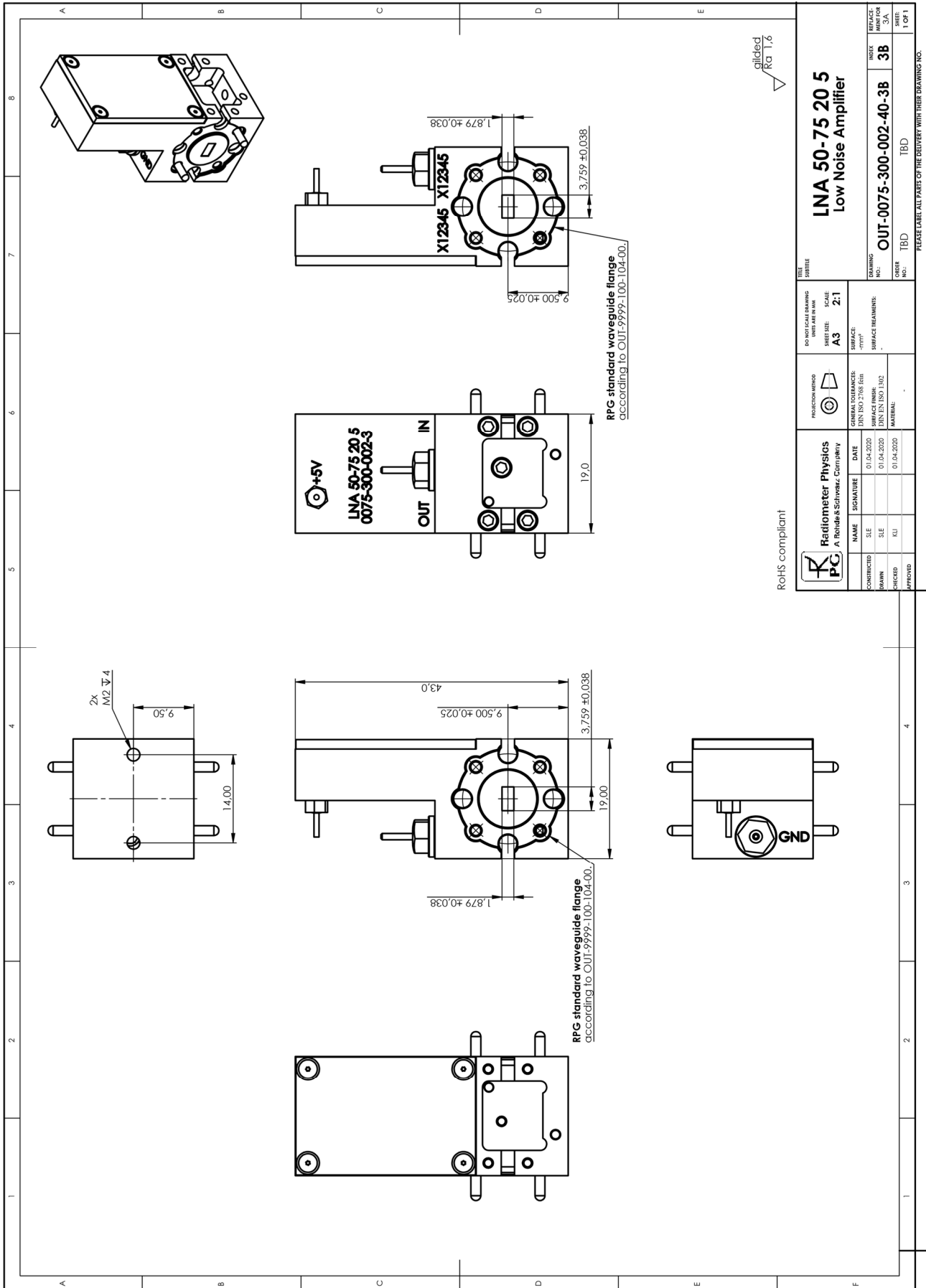
Typ. Figure 13: H-LNA (WR-3.4)

# General data

Temperature loading	operating temperature range	+5 °C to +60 °C
	permissible temperature range	+5 °C to +60 °C
	storage temperature range	-40 °C to +70 °C
Damp heat		in line with IEC 60068-2-1 and IEC 60068-2-2
		+40 °C at 80 % rel. humidity, in line with IEC 60068-2-30
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, in line with IEC 60068-2-6
	vibration, random	10 Hz to 300 Hz, in line with IEC 60068-2-64
	shock	40 g shock spectrum, in line with MIL-STD-810, method 516, procedure I
Operation	permissible altitude	4600 m above sea level
Weight		70 gram (0.15 lb)
Shipping weight		100 gram (0.22 lb)

Designation	Type	RPG-Order No.
Low Noise Amplifier 50-75 GHz	V-LNA 50-75 20 5	03000023
Low Noise Amplifier 50-75 GHz	V-LNA 50-75 40 5	03000022
Low Noise Amplifier 60-90 GHz	E-LNA 60-90 14 5	03000051
Low Noise Amplifier 60-90 GHz	E-LNA 60-90 25 5	03000059
Low Noise Amplifier 75-10 GHz	W-LNA 75-110 20 3	03000026
Low Noise Amplifier 75-110 GHz	W-LNA 75-110 40 3	03000027
Low Noise Amplifier 110-170 GHz	D-LNA 110-170 15 6	03000060
Low Noise Amplifier 110-170 GHz	D-LNA 110-170 30 6	03000025
Low Noise Amplifier 140-220 GHz	G-LNA 140-220 20 6	03000033
Low Noise Amplifier 140-220 GHz	G-LNA 140-210 20 5	03000031
Low Noise Amplifier 210-260 GHz	LNA 210-260 20 7	03000056
Low Noise Amplifier 250-330 GHz	H-LNA (WR-3.4)	03000017
Low Noise Amplifier 250-350 GHz	H-LNA (WR-2.8)	03000038

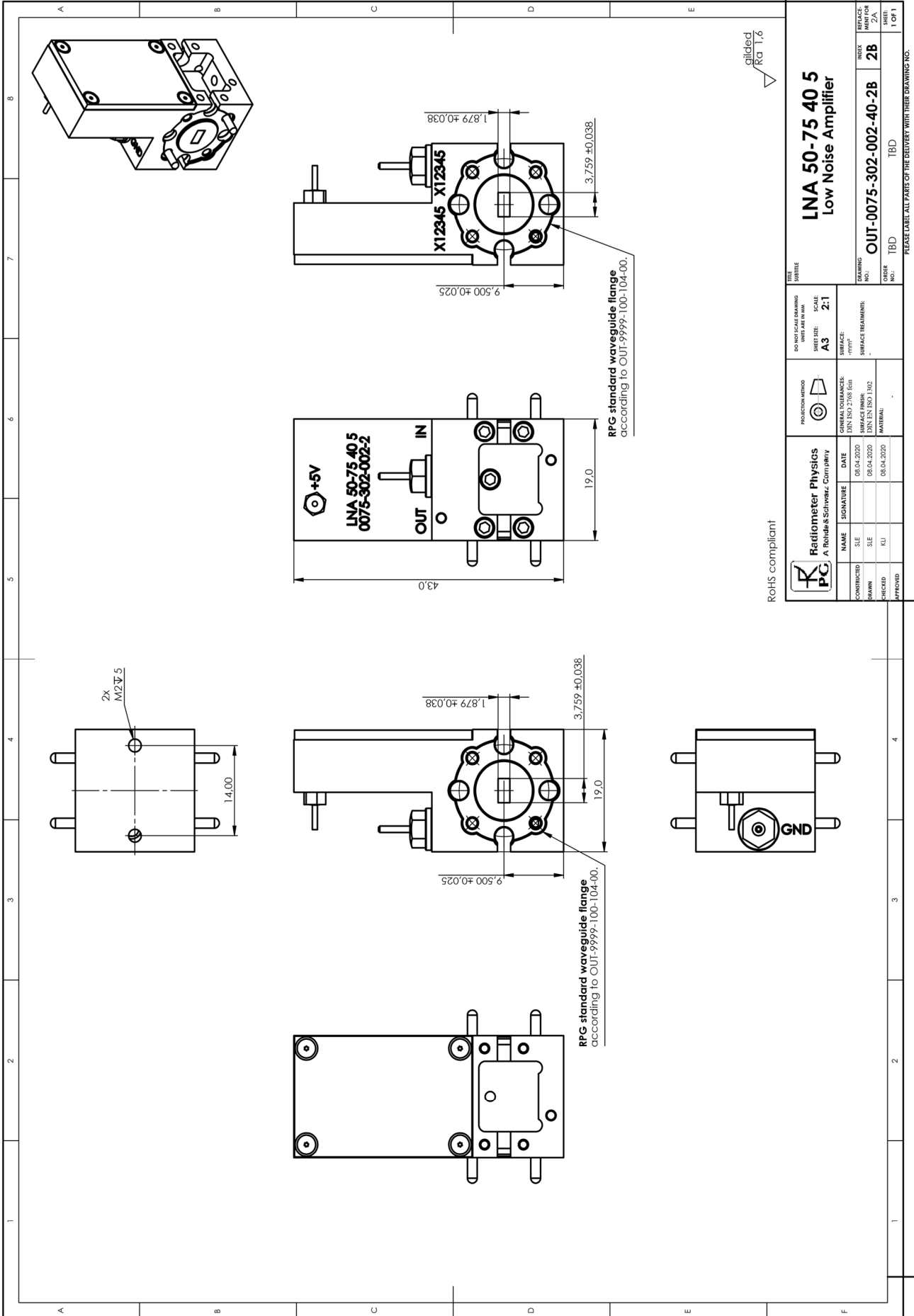
Outline Drawing



RohS compliant

		<b>Radiometer Physics</b> A. Rohde & Schwarz, Germany		PRODUCTION METHOD 		DRAWING NO. <b>OUT-0075-300-002-40-3B</b> INDEX <b>3B</b>	
NAME SLE SLE KLI	SIGNATURE SLE SLE KLI	DATE 01.04.2020 01.04.2020 01.04.2020	GENERAL STANDARDS DIN ISO 2768 MS DIN EN ISO 1302 MATERIAL	SURFACE Ra 1,6	SCALE 2:1	SHEET SIDE A3	REFLECT. INDEX 1 OF 1
CONSTRUCTED DRAWN CHECKED APPROVED		SURFACE TREATMENT -		SURFACE FINISH Ra 1,6		CRISTE NO. TBD	

PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THEIR DRAWING NO.



alided  
Rc 1,6

**LNA 50-75 40 5**  
**Low Noise Amplifier**

DRAWING NO.: **OUT-0075-302-002-40-2B**  
INDEX: **2B**

ORDER NO.: TBD  
INDEX: TBD

DATE: 08.04.2020  
DATE: 08.04.2020  
DATE: 08.04.2020

NAME: SLE  
NAME: SLE  
NAME: KU

CONTRIBUTOR: SLE  
DRAWN: SLE  
CHECKED: KU

APPROVED: \_\_\_\_\_

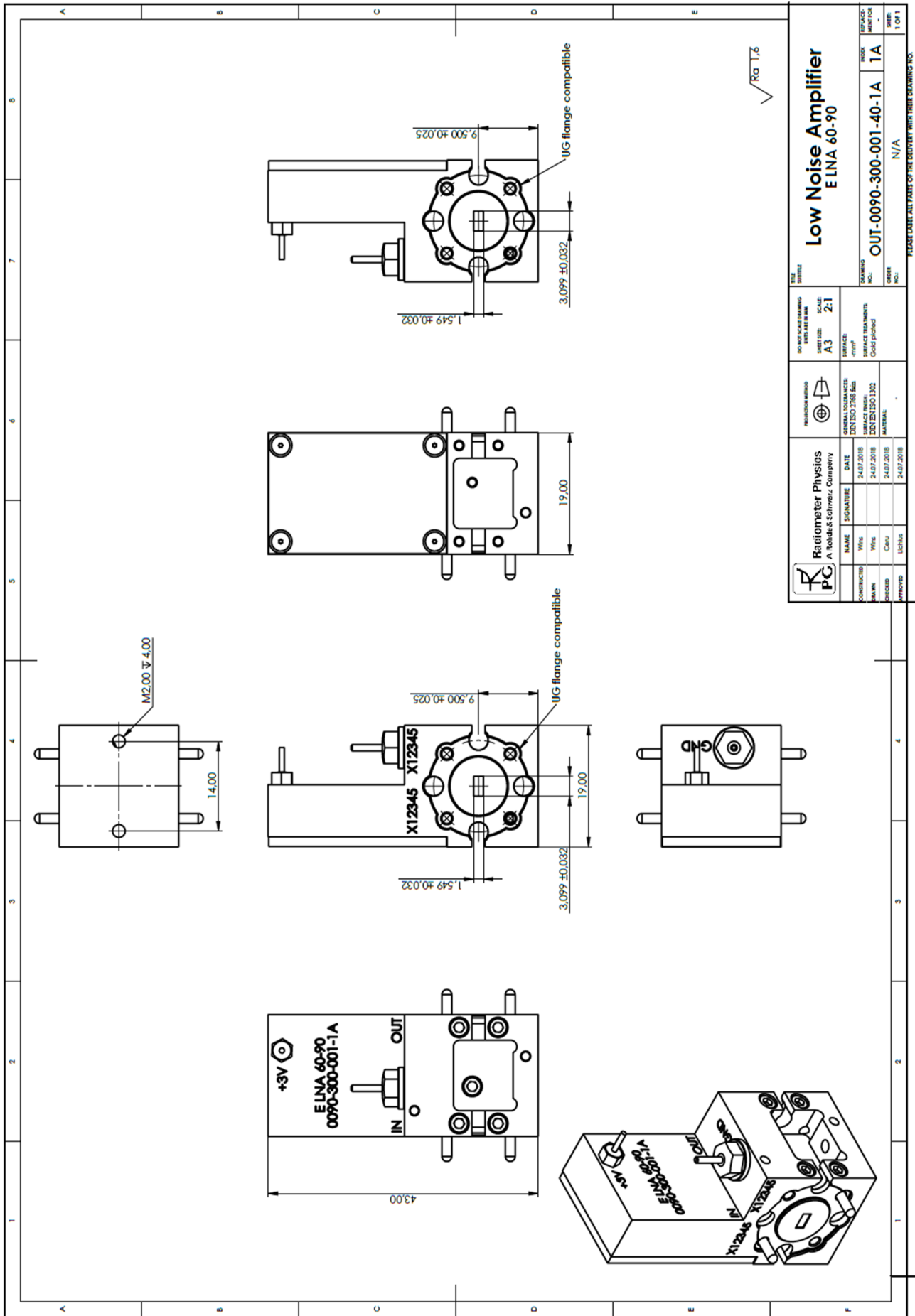
DATE: 08.04.2020  
DATE: 08.04.2020  
DATE: 08.04.2020

PRODUCTION METHOD: A Rohde & Schwarz Community  
SCALE: 2:1  
SHEET SIZE: A3  
SURFACE TREATMENT: -

RoHS compliant

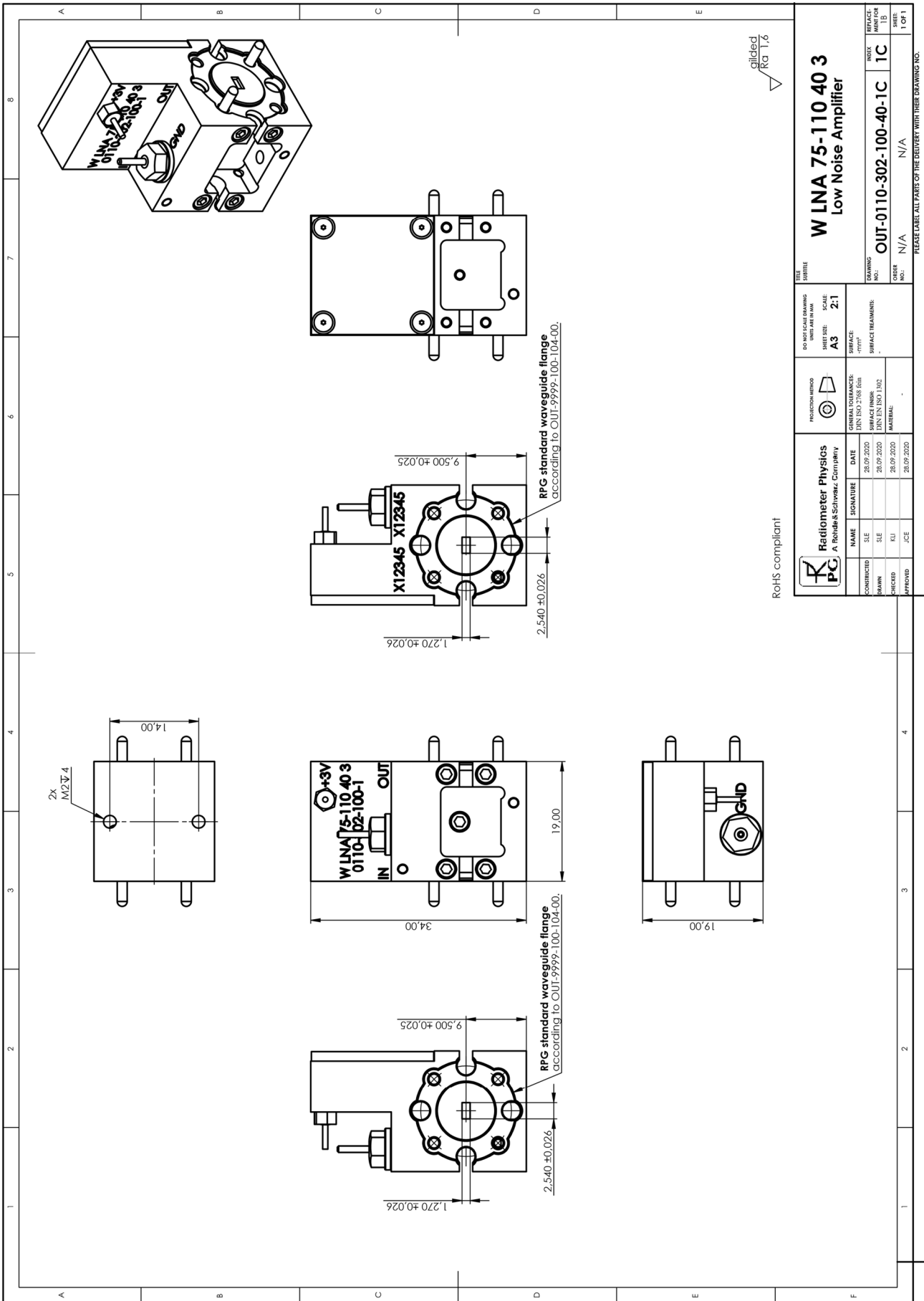
PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THEIR DRAWING NO.





PLEASE CHECK ALL PARTS OF THE DELIVERY WITH THIS DRAWING INC.

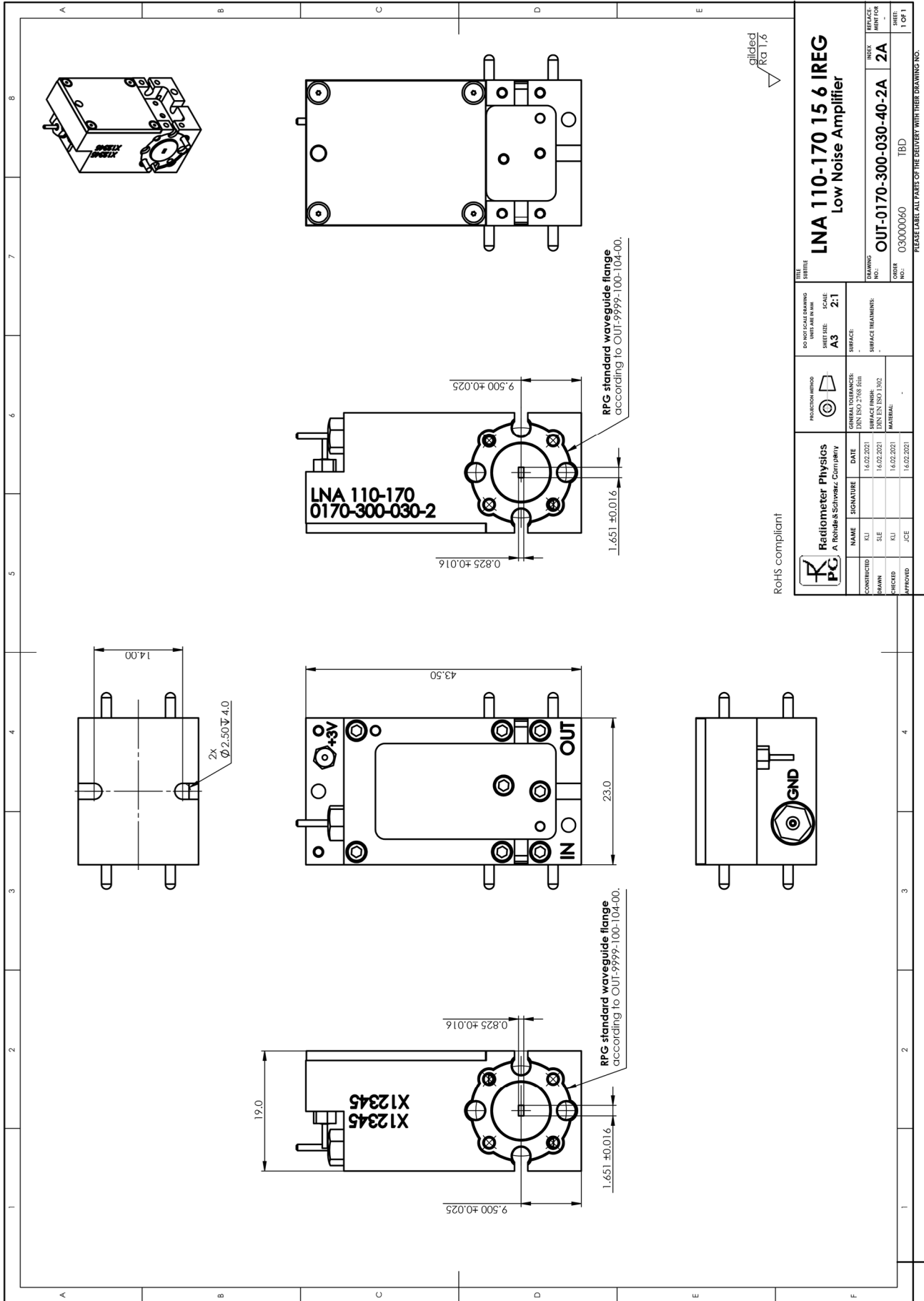




RoHS compliant

		<b>Ratometer Physics</b> A. Roedel & Schwarz, Germany		TITLE: W LNA 75-110 40 3 Low Noise Amplifier	
CONSTRUCTED	DATE	PROJECTION METHOD	SCALE	DRAWING NO.	INDEX
DRAWN	28.09.2020	1st angle	2:1	OUT-0110-302-100-40-1C	1C
CHECKED	28.09.2020	CONFORMANCES	SURFACE	CHECK NO.	1 OF 1
APPROVED	28.09.2020	DIN EN ISO 2768 SMT	100µm	N/A	N/A
		SURFACE FINISH	SURFACE TREATMENTS		
		DIN EN ISO 1302			
		MATERIAL			

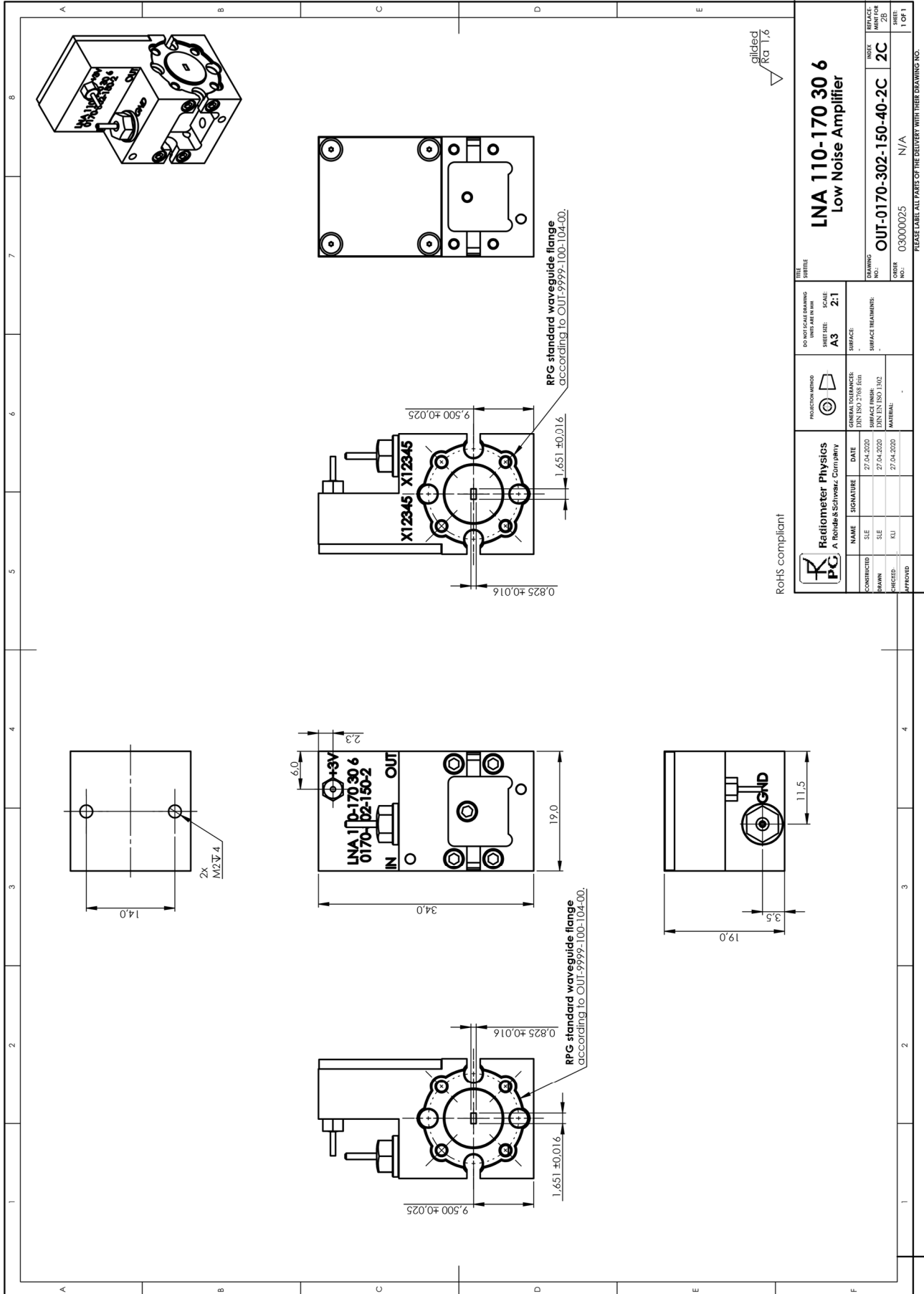
PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THIS DRAWING NO.



RoHS compliant

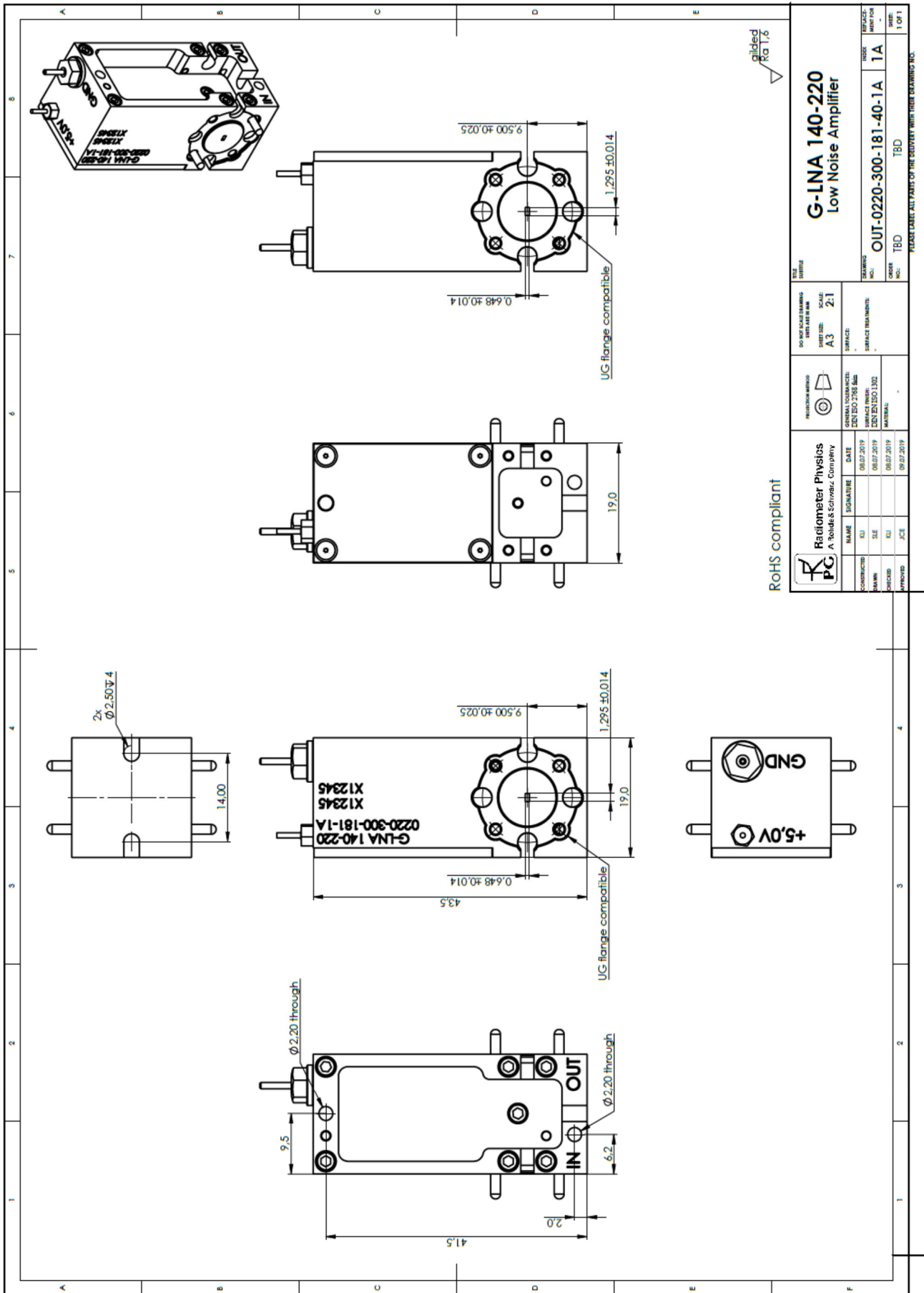
<b>Radlometer Physics</b> A Rohde & Schwarz Company		PRODUCTION METHOD 	PROJECTION METHOD 	TITLE <b>LNA 110-170 15 6 IREG</b> Low Noise Amplifier	
NAME KLI SLE KLI JCE	SIGNATURE    	DATE 16.02.2021 16.02.2021 16.02.2021 16.02.2021	SURFACE TREATMENT DIN EN ISO 2768-MS SURFACE FINISH DIN EN ISO 1302 MATERIAL	DRAWING NO. <b>OUT-0170-300-030-40-2A</b>	INDEX <b>2A</b>
CONSTRUCTED DRAWN CHECKED APPROVED	DATE 16.02.2021 16.02.2021 16.02.2021 16.02.2021	SCALE <b>2:1</b>	SHEET SIZE <b>A3</b>	DRAWING NO. <b>OUT-0170-300-030-40-2A</b>	INDEX <b>2A</b>
APPROVED	DATE 16.02.2021	SURFACE TREATMENT DIN EN ISO 2768-MS	SHEET NO. <b>03000060</b>	DRAWING NO. <b>OUT-0170-300-030-40-2A</b>	INDEX <b>2A</b>
APPROVED	DATE 16.02.2021	SURFACE TREATMENT DIN EN ISO 1302	SHEET NO. <b>1 OF 1</b>	DRAWING NO. <b>OUT-0170-300-030-40-2A</b>	INDEX <b>2A</b>

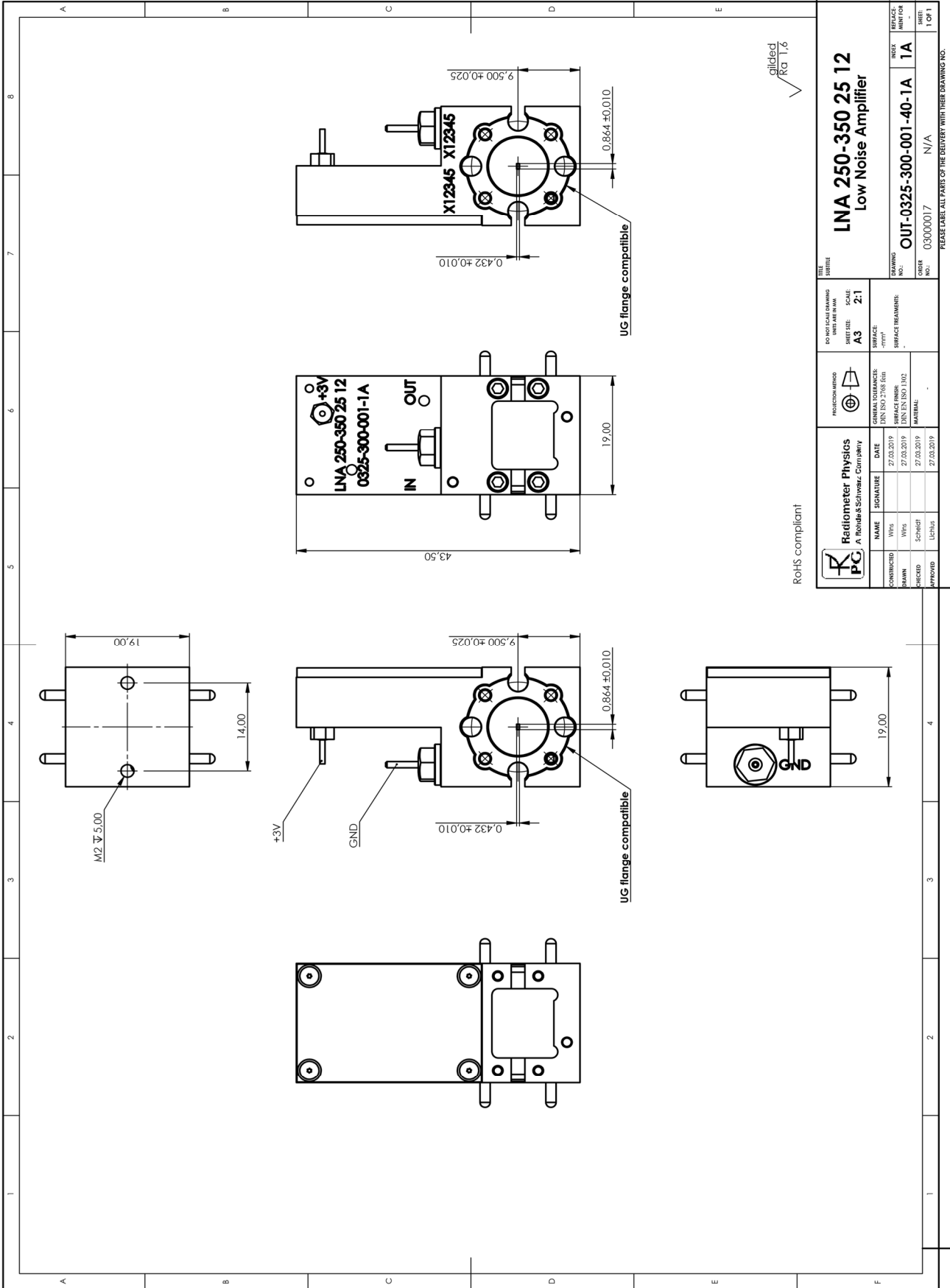
PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THEIR DRAWING NO.



RoHS compliant

		<b>Radimeter Physics</b> A. Rohde & Schwarz Company		TITLE SUBTITLE <b>LNA 110-170 30 6</b> Low Noise Amplifier	
CONSTRUCTED DRAWN CHECKED APPROVED	NAME SLE SLE KLI APPROVED	SIGNATURE SLE SLE KLI	DATE 27.04.2020 27.04.2020 27.04.2020	PROJECTION METHOD FIRST ANGLE	SCALE 2:1
DRAWING NO.: <b>OUT-0170-302-150-40-2C</b>		INDEX <b>2C</b>		INDEX <b>2C</b>	
DRAWING NO.: <b>03000025</b>		N/A		PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THEIR DRAWING NO.	





Outline H-LNA (WR-3.4)

