Version 03.01, July 2024

RPG LNA – Low Noise Amplifier

Specifications

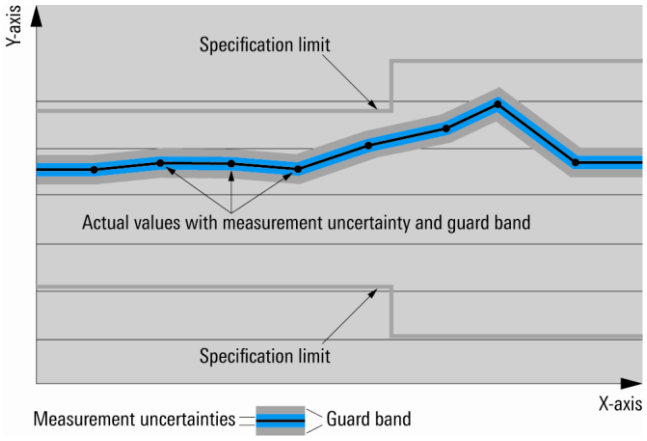
Radiometer Physics
A Rohde & Schwarz Company

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 <, ≤, >, ≥, ±, 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 tea

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
	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	WR-15
	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)
	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	RPG standard waveguide flange (compatible with UG-387/U-M)
	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	
	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	5
	V-LNA 50-75 40 5	5
	E-LNA 60-90 14 5	6
	E-LNA 60-90 25 5	6
	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
	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	19
	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	15
	D-LNA 110-170 30 6	30
	G-LNA 140-220 20 6	20
	LNA 210-260 20 7	20
	H-LNA (WR-3.4)	22
	H-LNA (WR-2.8)	22
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

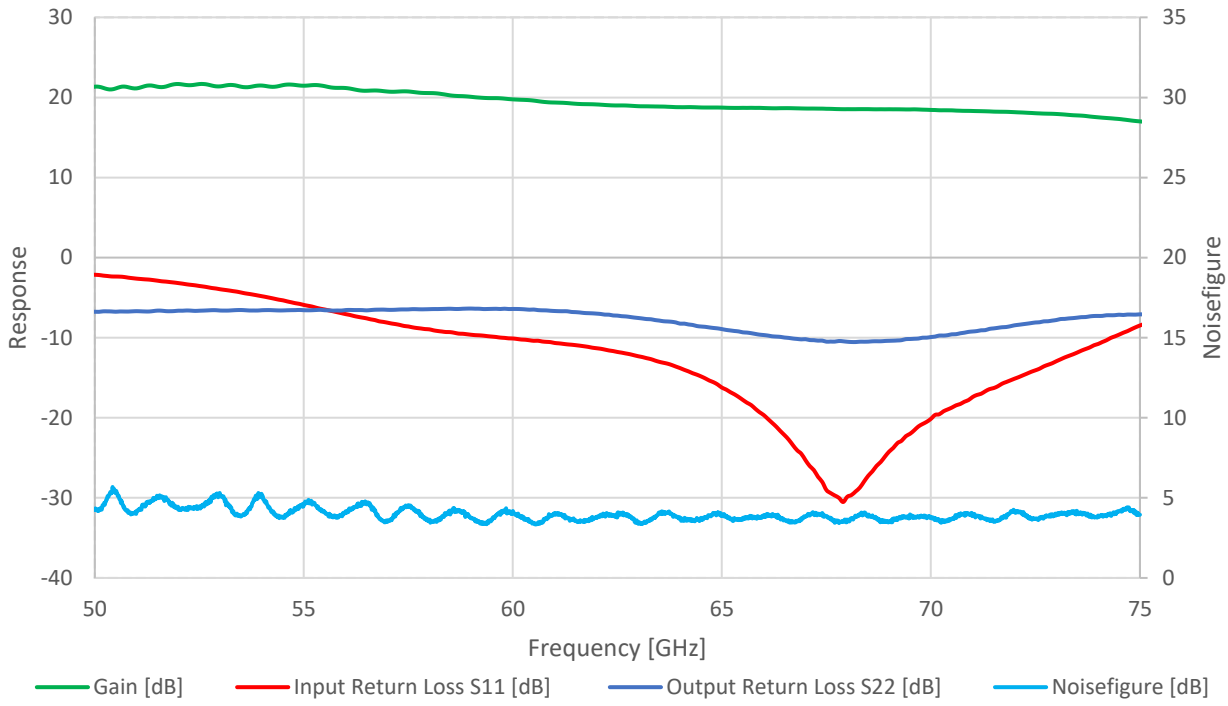
	G-LNA 140-220 20 6	-3
	LNA 210-260 20 7	-3
	H-LNA (WR-3.4)	-10
	H-LNA (WR-2.8)	-10

Power Requirements

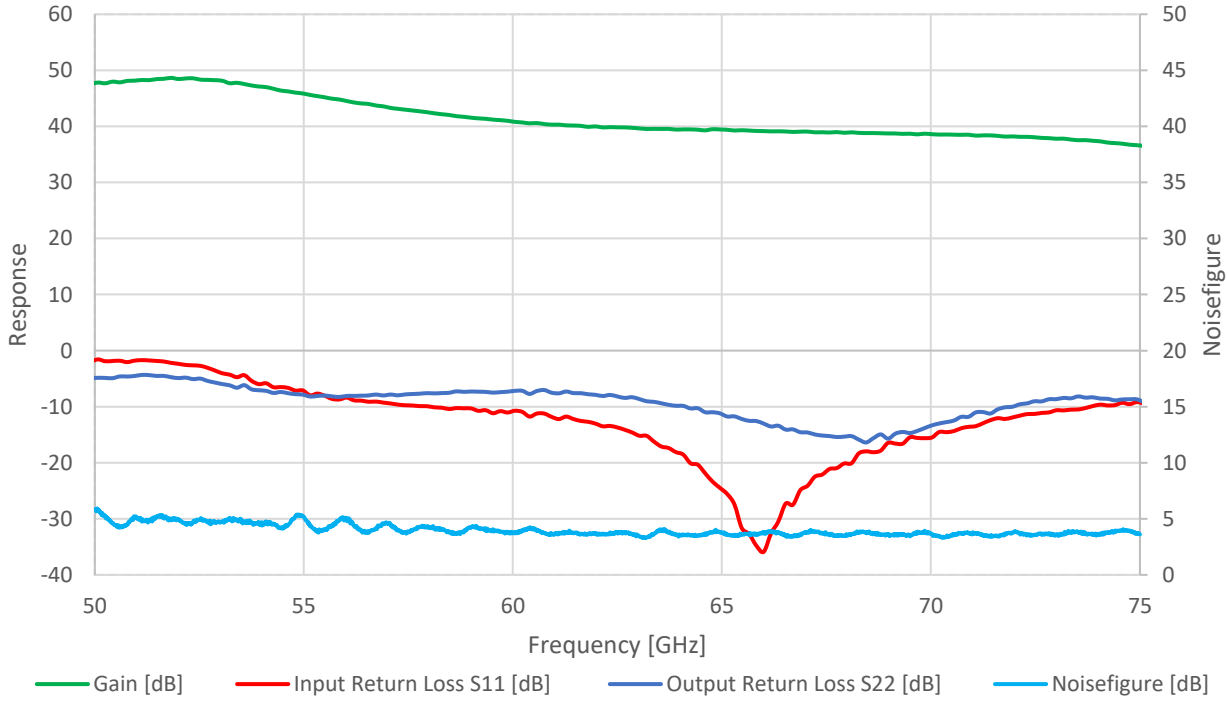
Input voltage [V]	V-LNA 50-75 20 5	5
	V-LNA 50-75 40 5	5
	E-LNA 60-90 14 5	5
	E-LNA 60-90 25 5	5
	W-LNA 75-110 20 3	3
	W-LNA 75-110 40 3	3
	D-LNA 110-170 15 6	3
	D-LNA 110-170 30 6	3
	G-LNA 140-220 20 6	3
	LNA 210-260 20 7	5
	H-LNA (WR-3.4)	5
	H-LNA (WR-2.8)	5
Supply current (typ.) [mA]	V-LNA 50-75 20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

Absolut Maximum Ratings

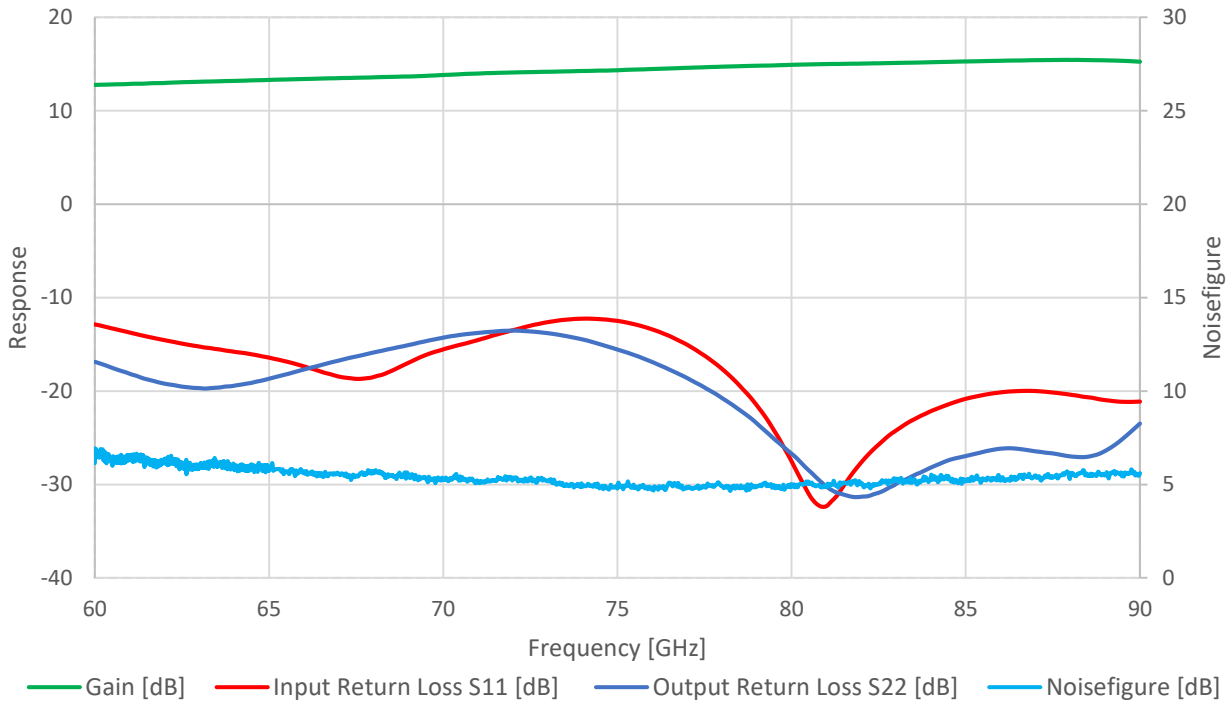
RF-Input power [dBm]	V-LNA 50-75 20 5	-5
	V-LNA 50-75 40 5	-30
	E-LNA 60-90 14 5	15
	E-LNA 60-90 25 5	0
	W-LNA 75-110 20 3	-10
	W-LNA 75-110 40 3	-30
	D-LNA 110-170 15 6	-10
	D-LNA 110-170 30 6	-30
	G-LNA 140-220 20 6	-10
	LNA 210-260 20 7	-10
	H-LNA (WR-3.4)	-10
	H-LNA (WR-2.8)	-10
Input voltage [V]	V-LNA 50-75 20 5	7
	V-LNA 50-75 40 5	7
	E-LNA 60-90 14 5	7
	E-LNA 60-90 25 5	7
	W-LNA 75-110 20 3	5.5
	W-LNA 75-110 40 3	5.5
	D-LNA 110-170 15 6	5.5
	D-LNA 110-170 30 6	5.5
	G-LNA 140-220 20 6	5.5
	LNA 210-260 20 7	7
	H-LNA (WR-3.4)	7
	H-LNA (WR-2.8)	7
Case temperature [°C]	V-LNA 50-75 20 5	+ 45
	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	
	LNA 210-260 20 7	
	H-LNA (WR-3.4)	
	H-LNA (WR-2.8)	



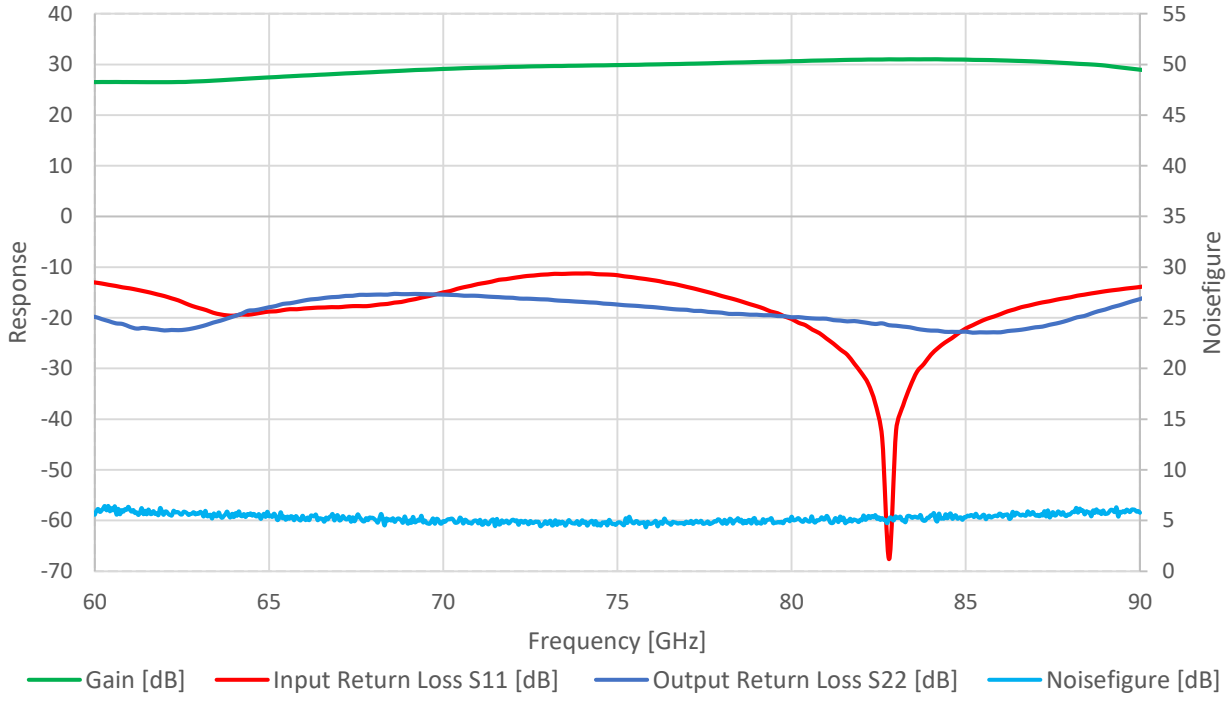
Typ. Figure 1: V-LNA 50-75 20 5



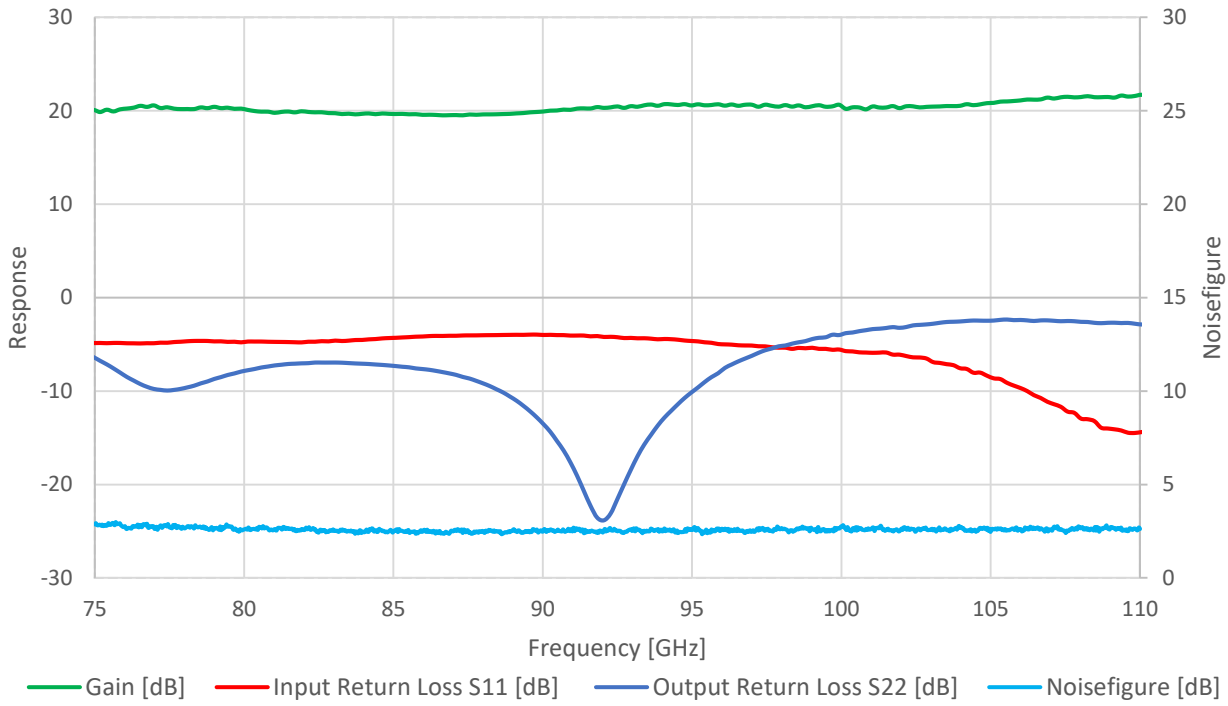
Typ. Figure 2: V-LNA 50-75 40 5



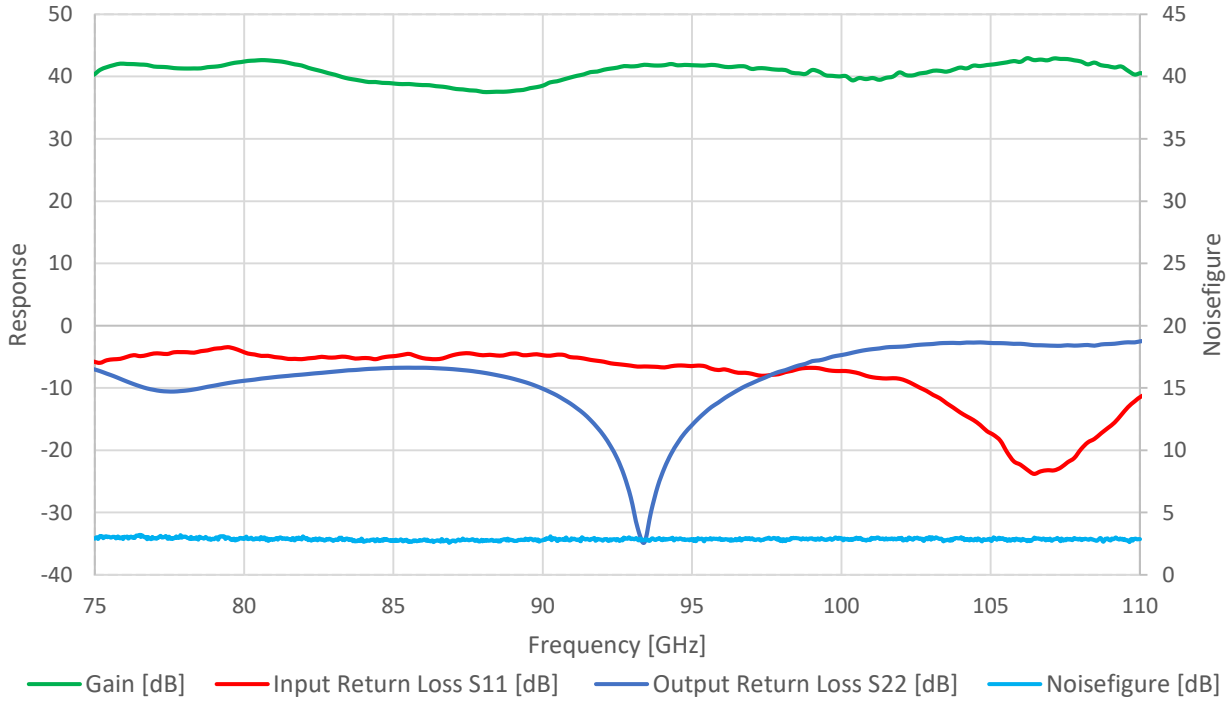
Typ. Figure 3: E-LNA 60-90 14 5



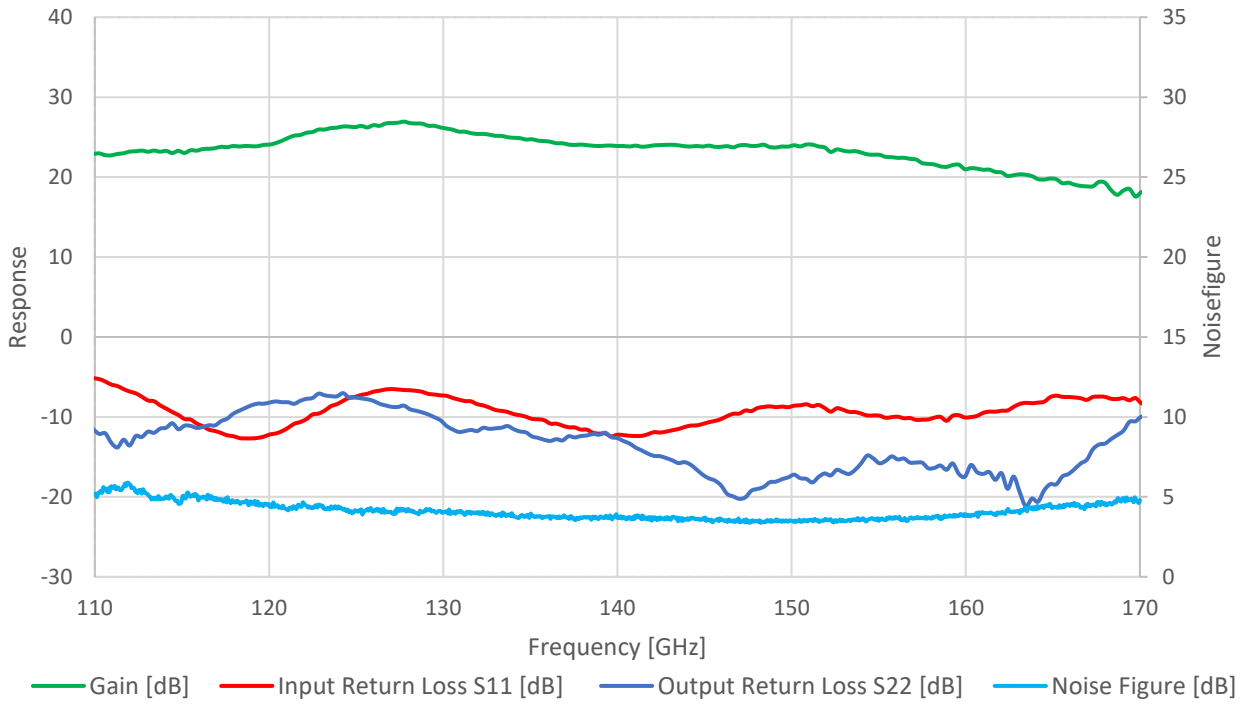
Typ. Figure 4: E-LNA 60-90 25 5



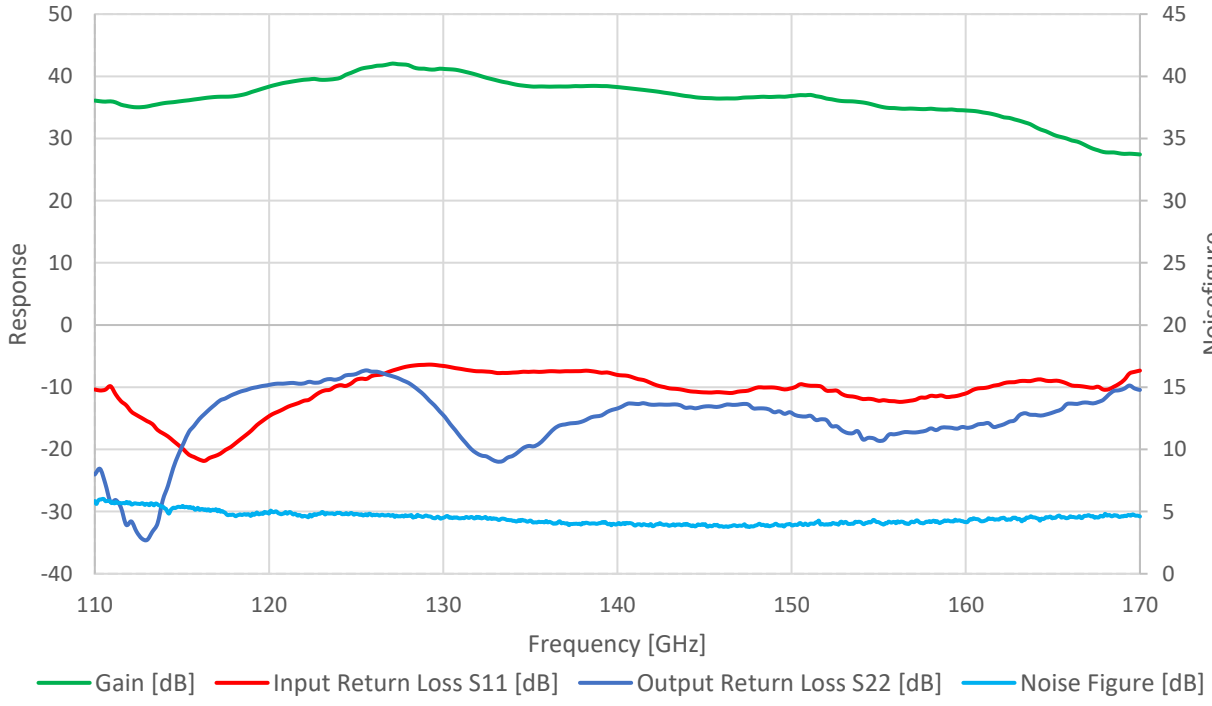
Typ. Figure 5: W-LNA 75-110 20 3



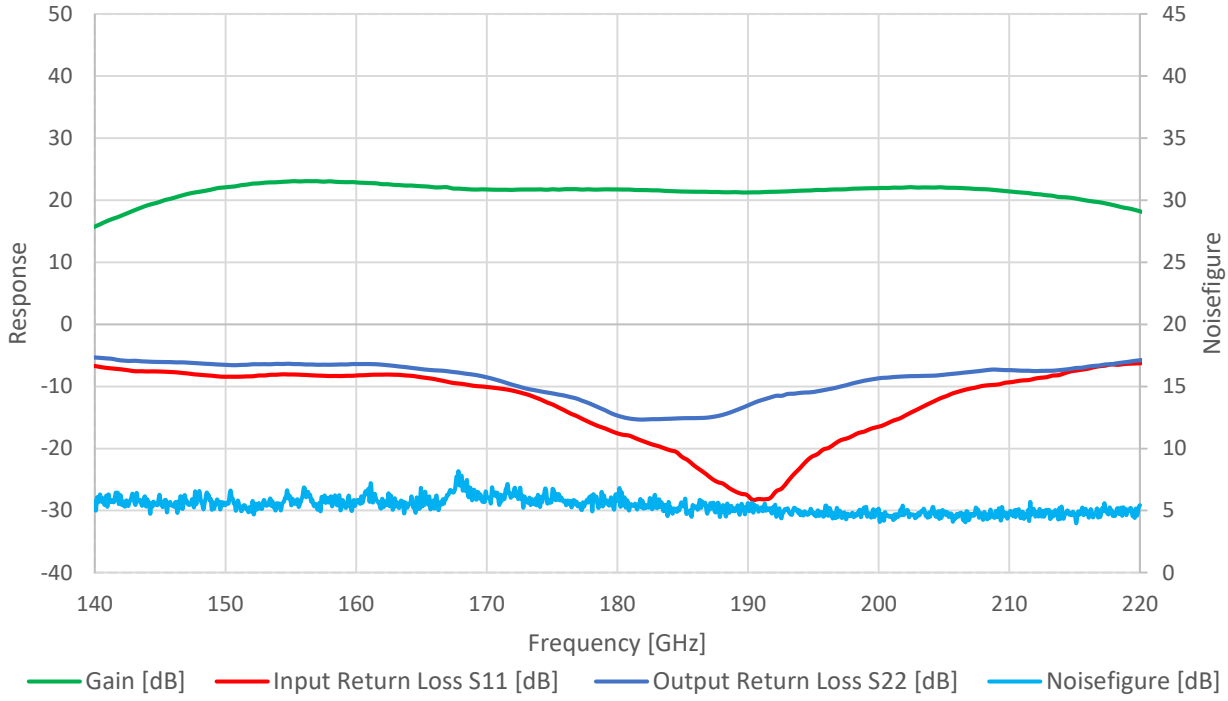
Typ. Figure 6: W-LNA 75-110 40 3



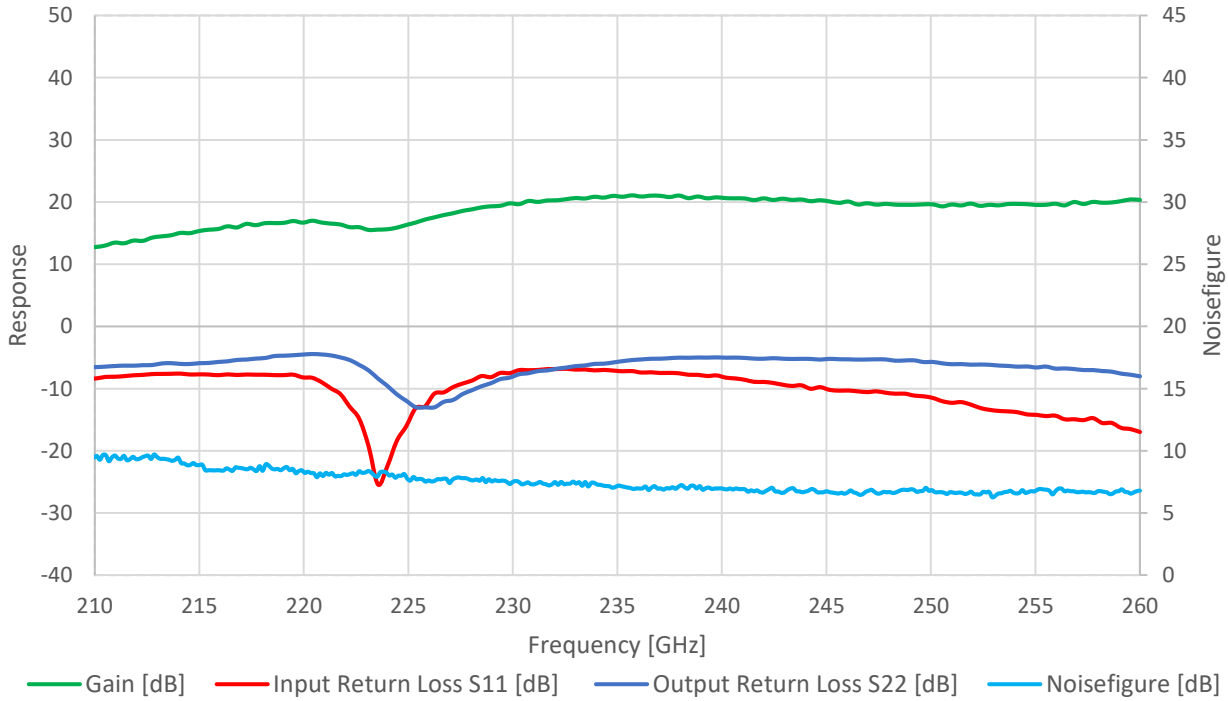
Typ. Figure 7: D-LNA 110-170 15 6



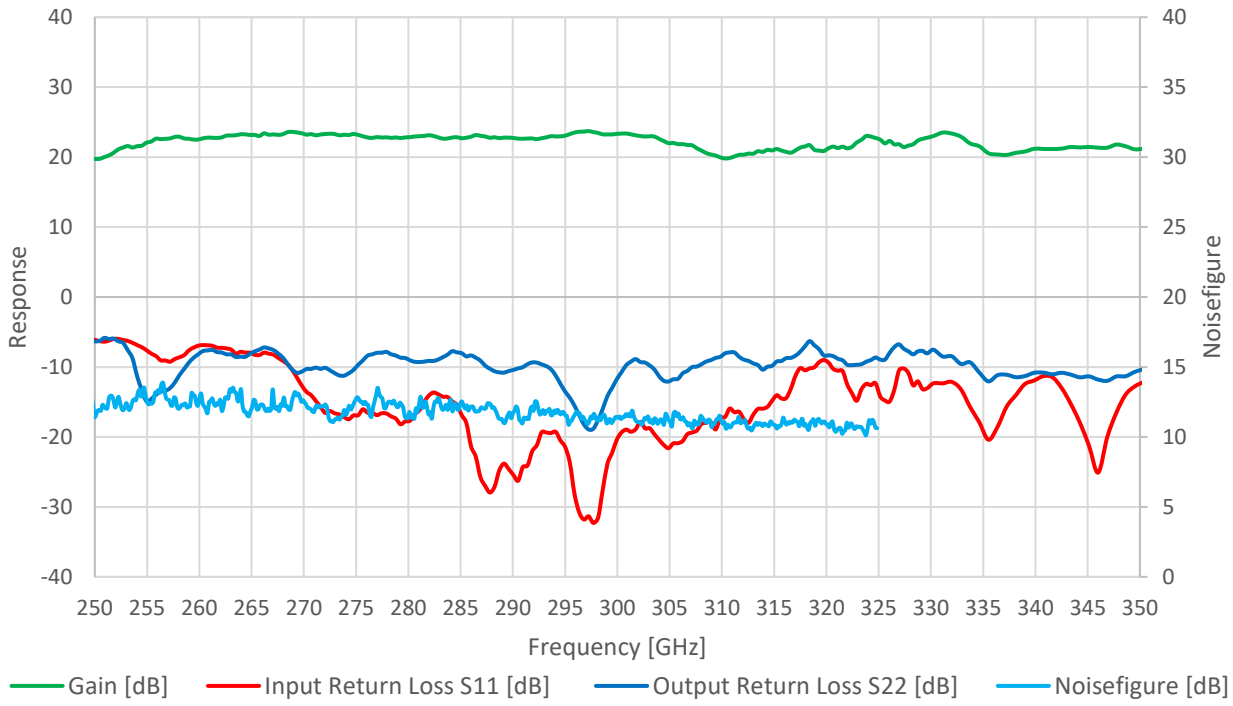
Typ. Figure 8: D-LNA 110-170 30 6



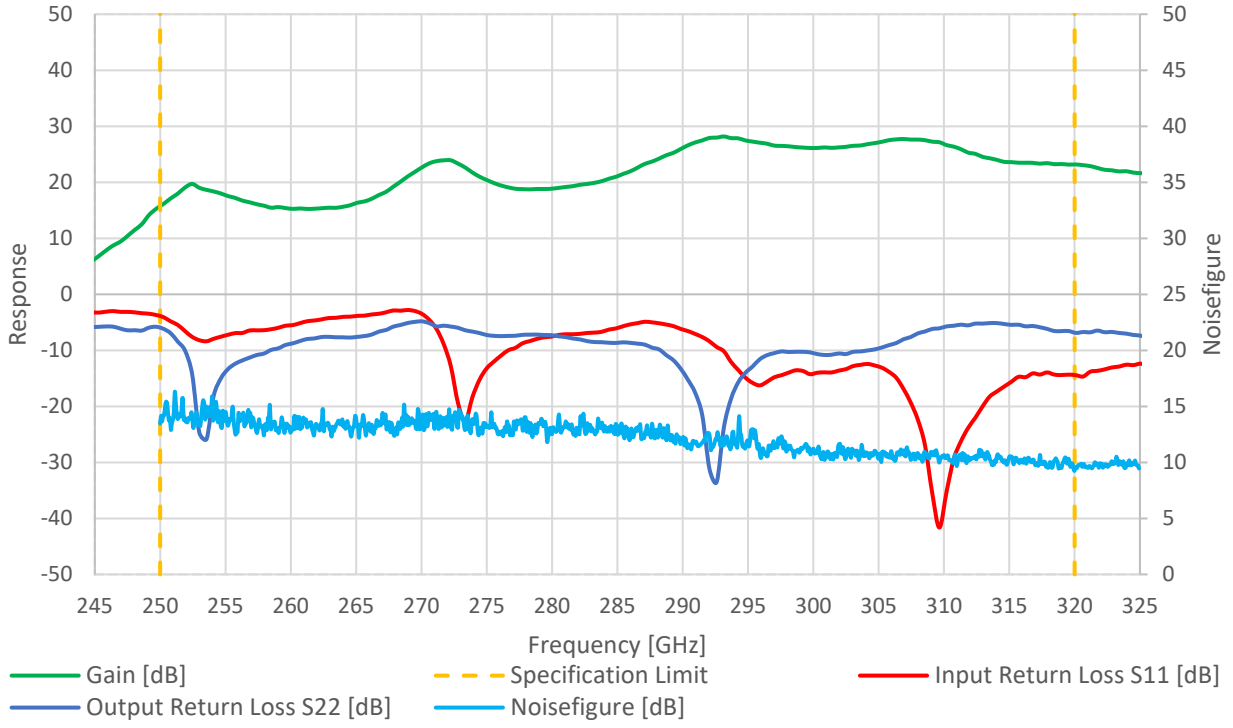
Typ. Figure 9: G-LNA 140-220 20 6



Typ. Figure 10: LNA 210-260 20 7



Typ. Figure 11: H-LNA (WR-2.8)



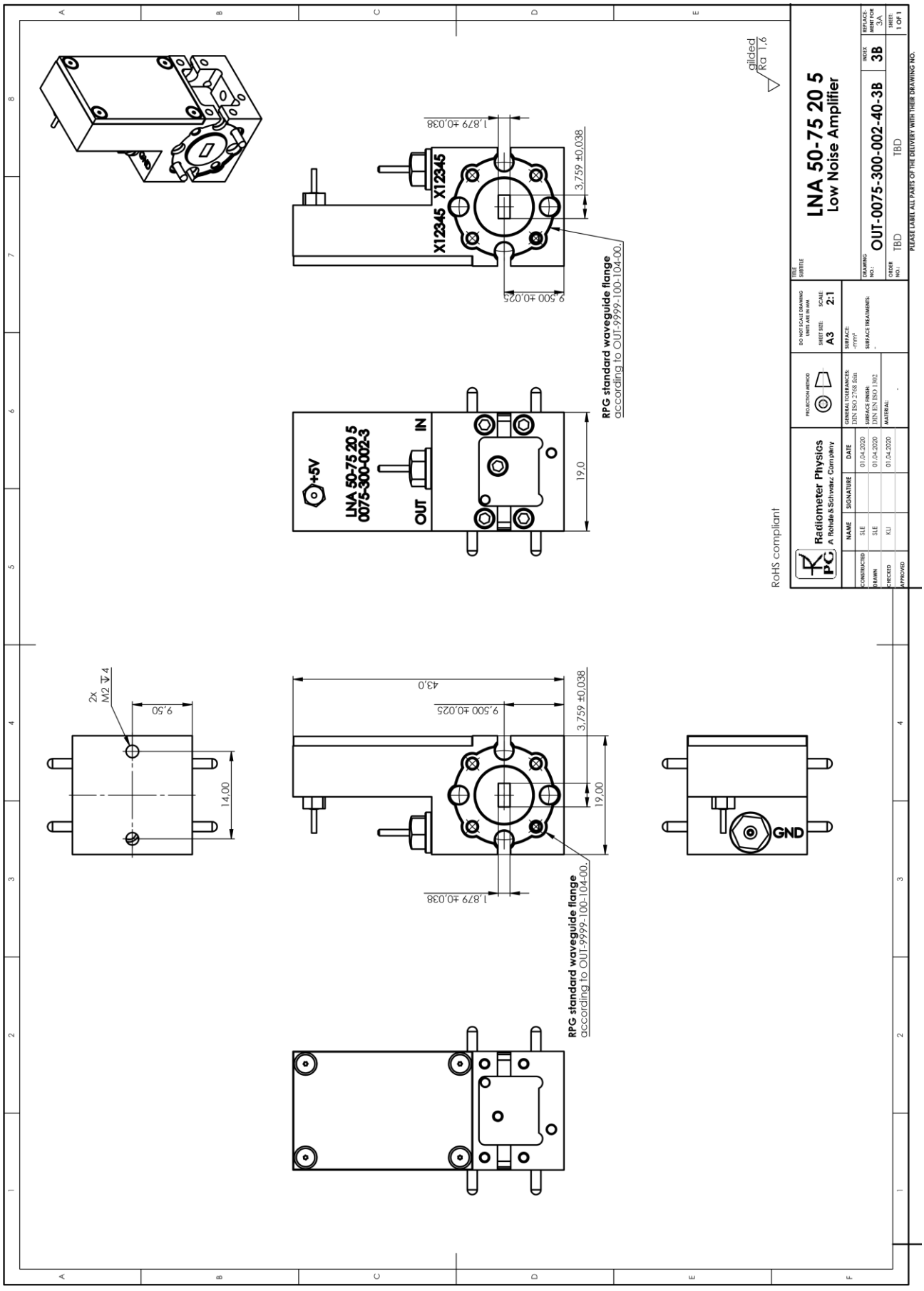
Typ. Figure 12: H-LNA (WR-3.4)

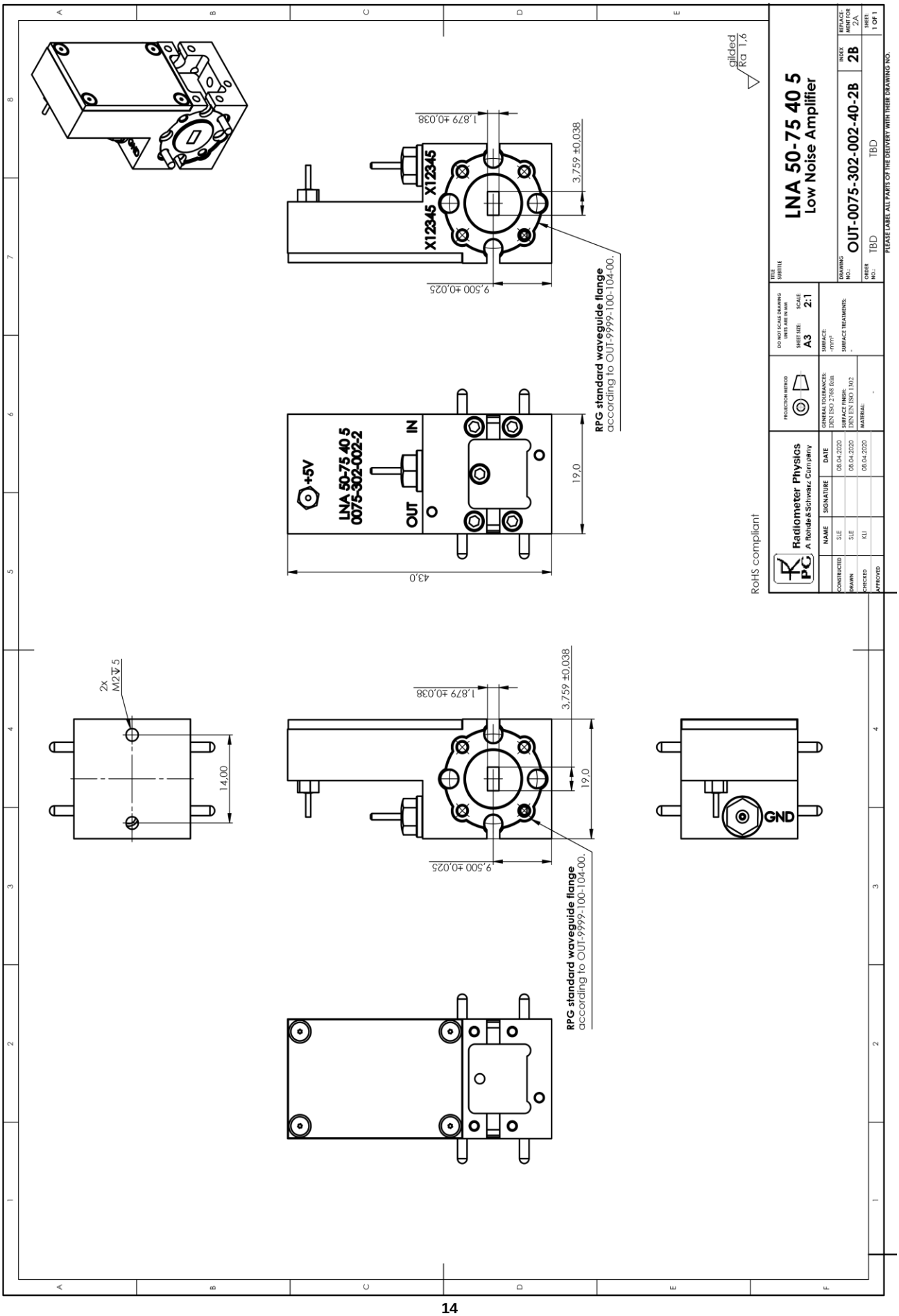
General data

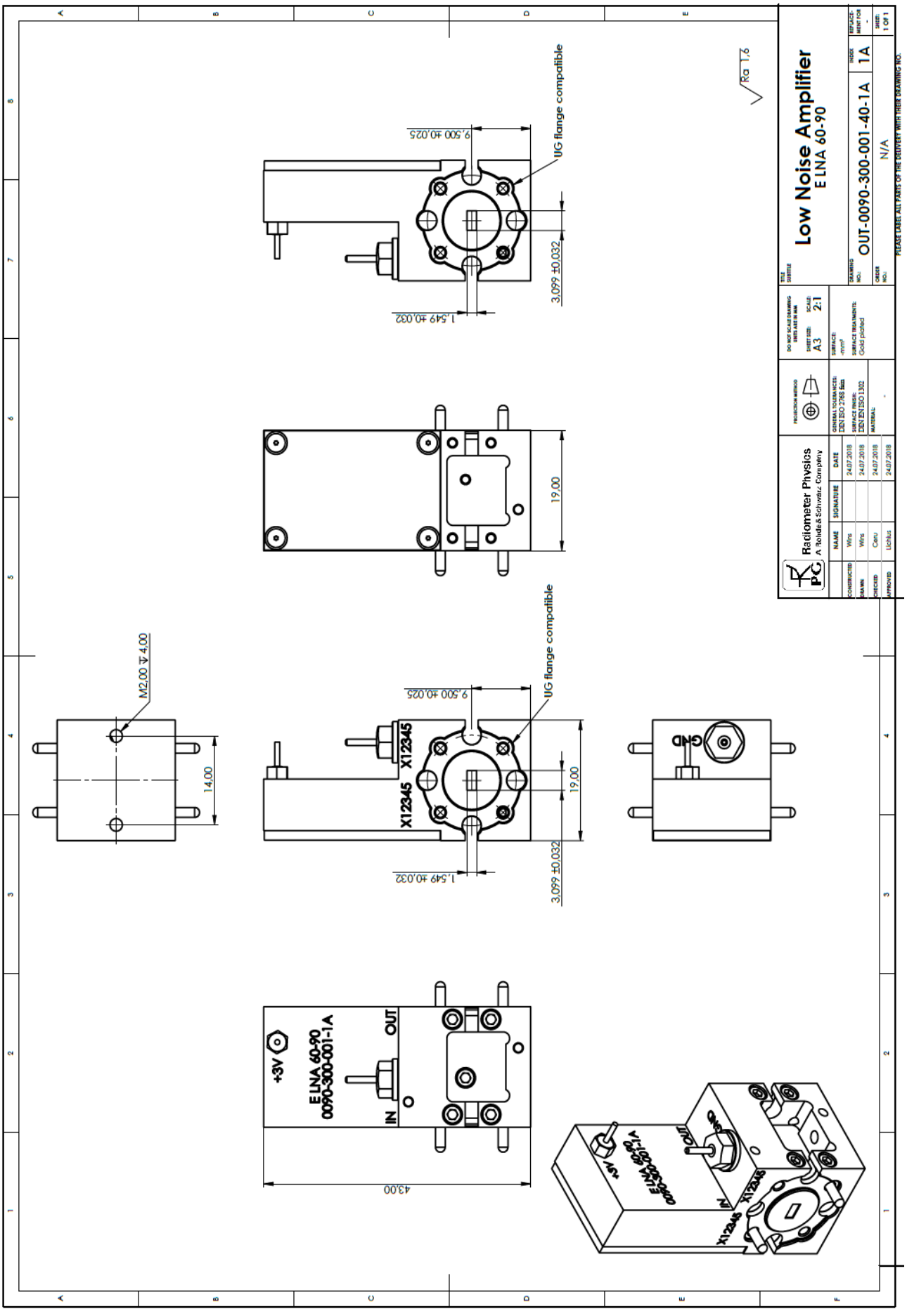
Temperature loading	operating temperature range	+5 °C to +60 °C
	permissible temperature range	+5 °C to +60 °C
	storage temperature range	–40 °C to +70 °C
		in line with IEC 60068-2-1 and IEC 60068-2-2
Damp heat		+40 °C at 80 % rel. humidity, in line with IEC 60068-2-30
Mechanical resistance	vibration, 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)

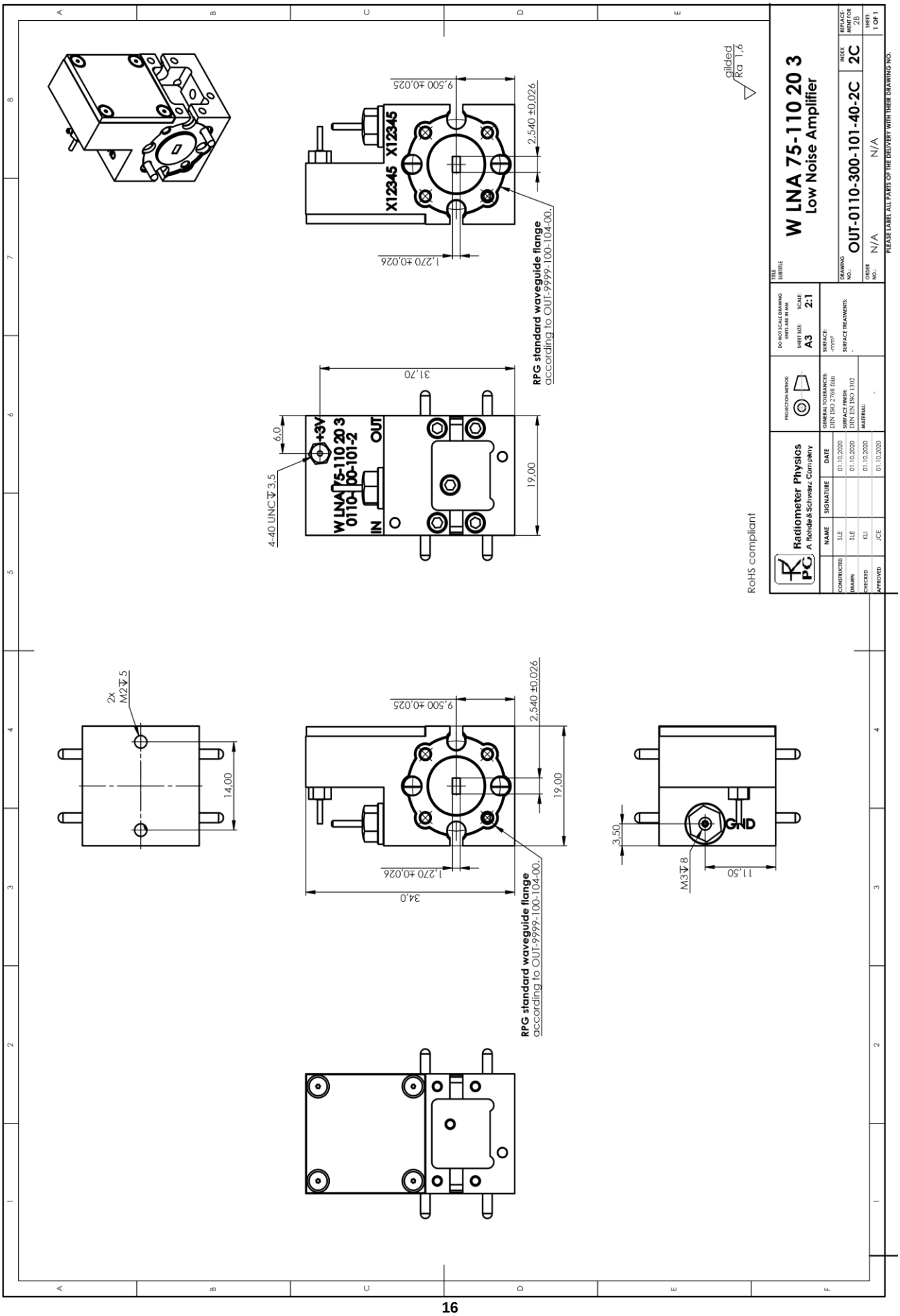
Designation	**Type**	**RPG-Order No.**
Low Noise Amplifier 50-75 GHz	V-LNA 50-75 20 5	**03000023**
Low Noise Amplifier 50-75 GHz	V-LNA 50-75 40 5	**03000022**
Low Noise Amplifier 60-90 GHz	E-LNA 60-90 14 5	**03000051**
Low Noise Amplifier 60-90 GHz	E-LNA 60-90 25 5	**03000059**
Low Noise Amplifier 75-110 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	**03000024**
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 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**

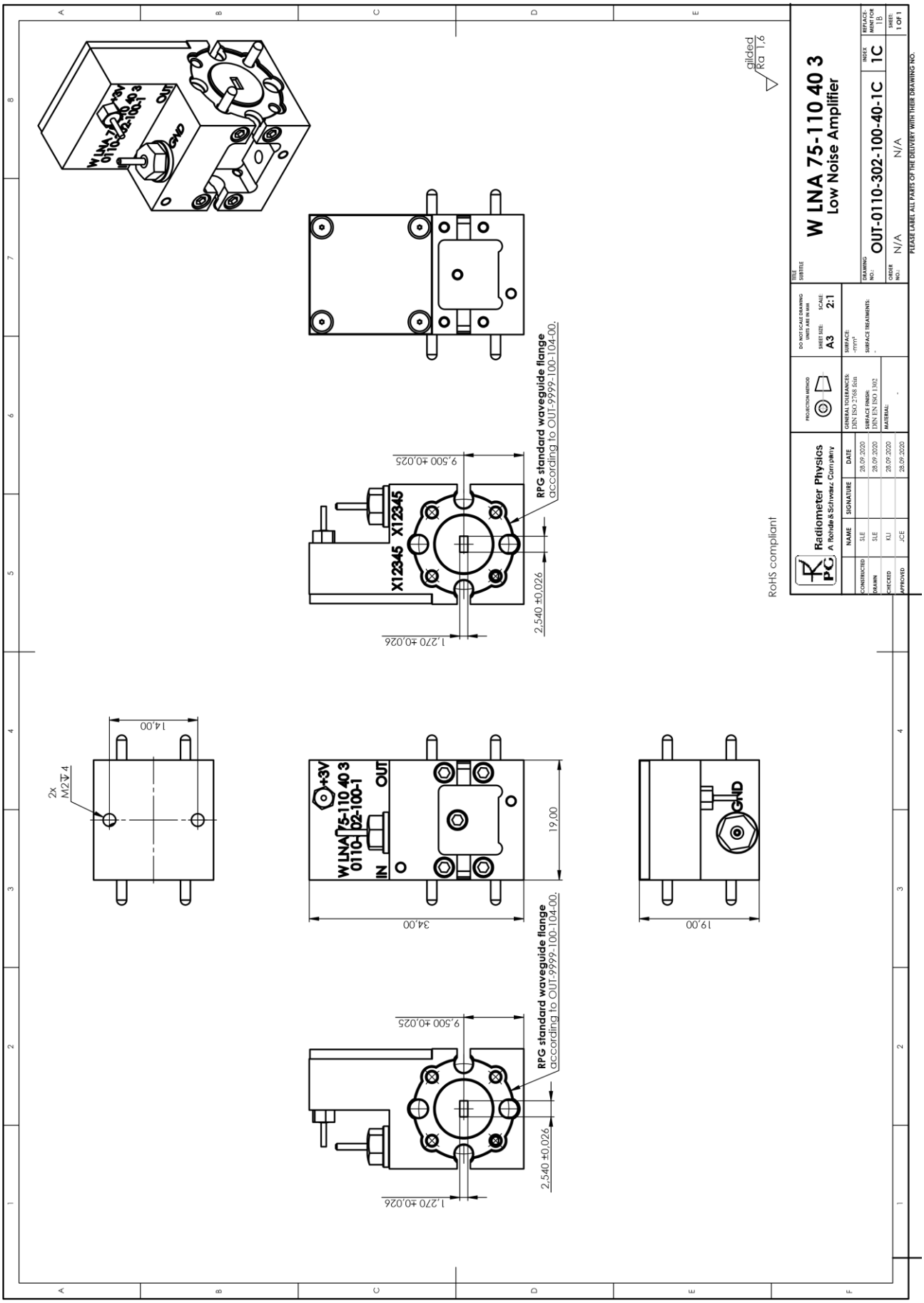
Outline Drawing

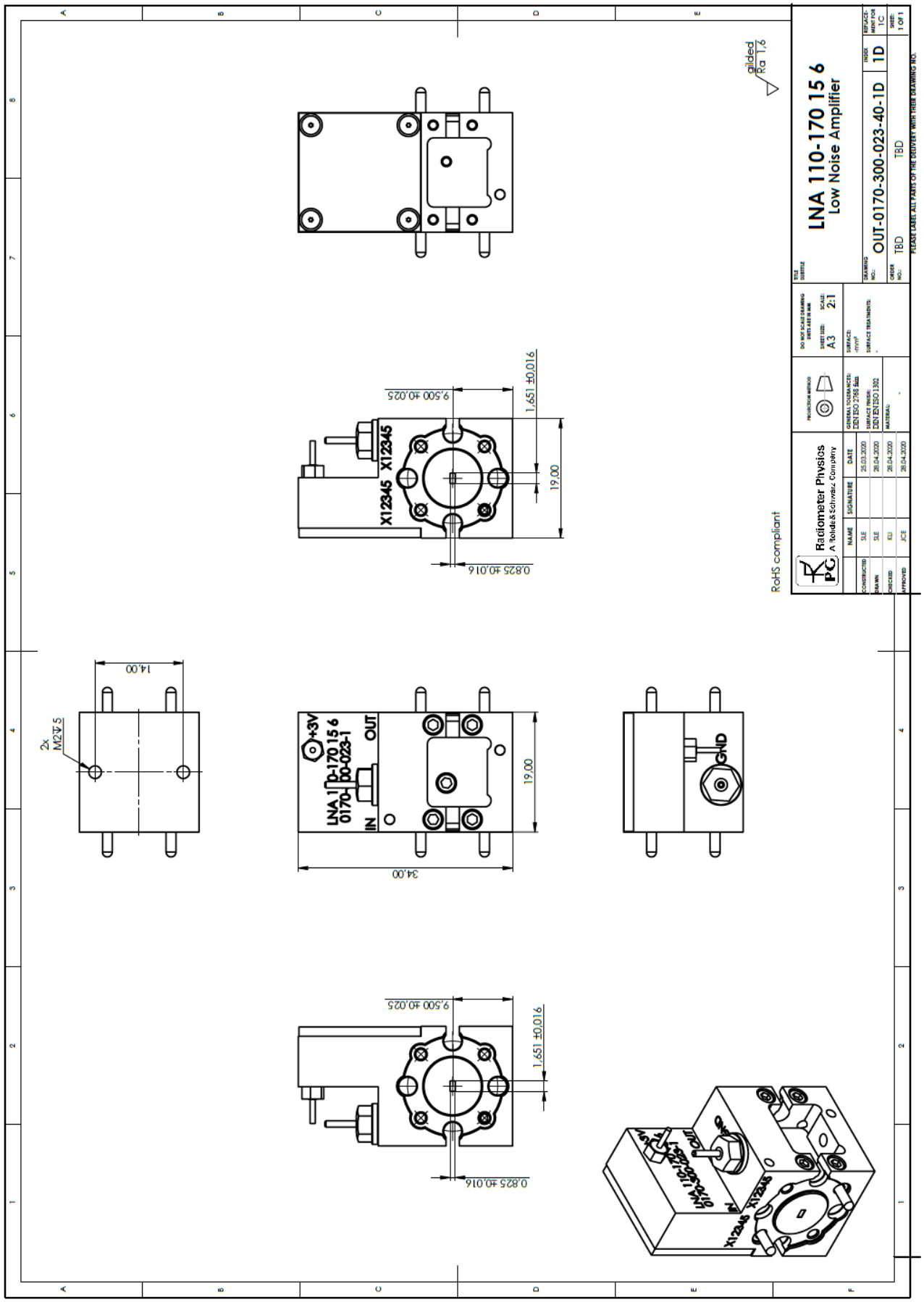


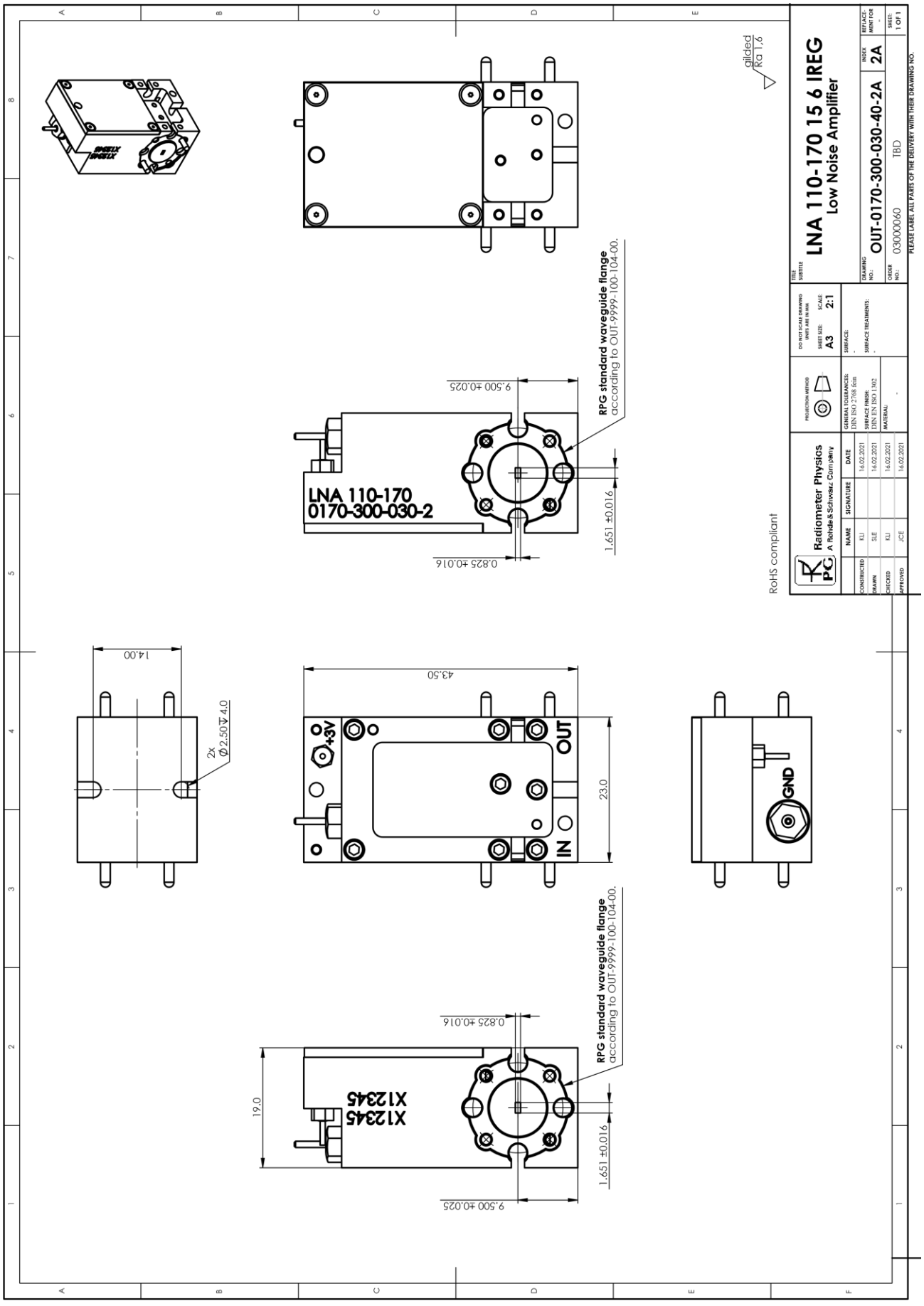

LNA 50-75 40 5
Low Noise Amplifier
OUT-0075-302-002-40-2B
2B
Radiometer Physics
A Rohde & Schwarz Company
RoHS compliant
glided
Ra 1,6
X12345
1,879 ±0,038
3,759 ±0,038
9,500 ±0,025
RPG standard waveguide flange
according to OUT-9999-100-104-00.
+5V
LNA 50-75 40 5
0075-302-002-2
IN
OUT
19,0
43,0
2x
M2
5
14,00
GND

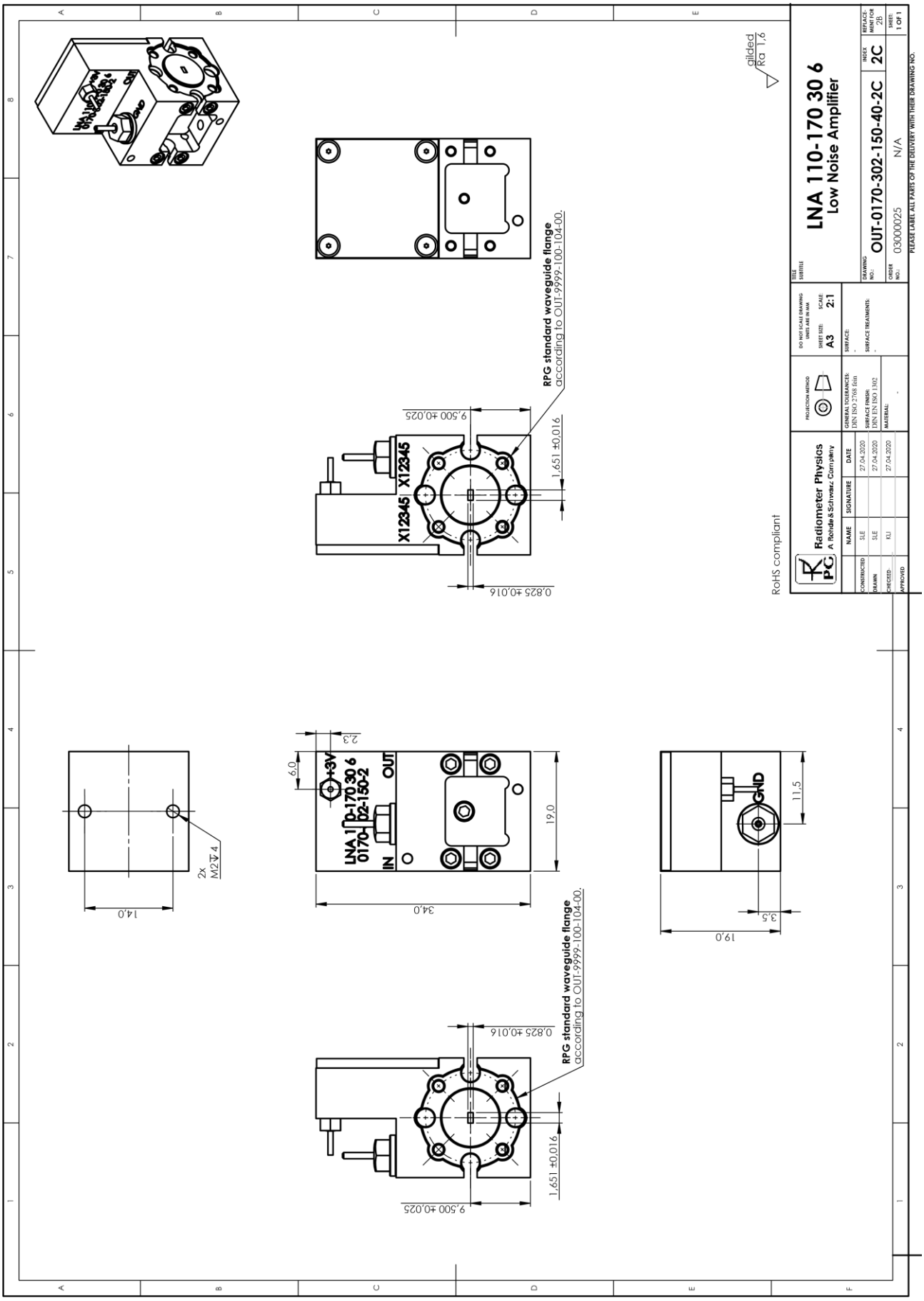

Low Noise Amplifier
E LNA 60-90
OUT-0090-300-001-40-1A
1A
N/A
Radiometer Physics
A Teledis & Schwarz Company
UG flange compatible
9,500 ±0,025
1,549 ±0,032
3,099 ±0,032
19,00
14,00
M2,00 ↧4,00
43,00
+3V
E LNA 60-90
0090-300-001-1A
OUT
IN
X12345
GND
Ra 1,6

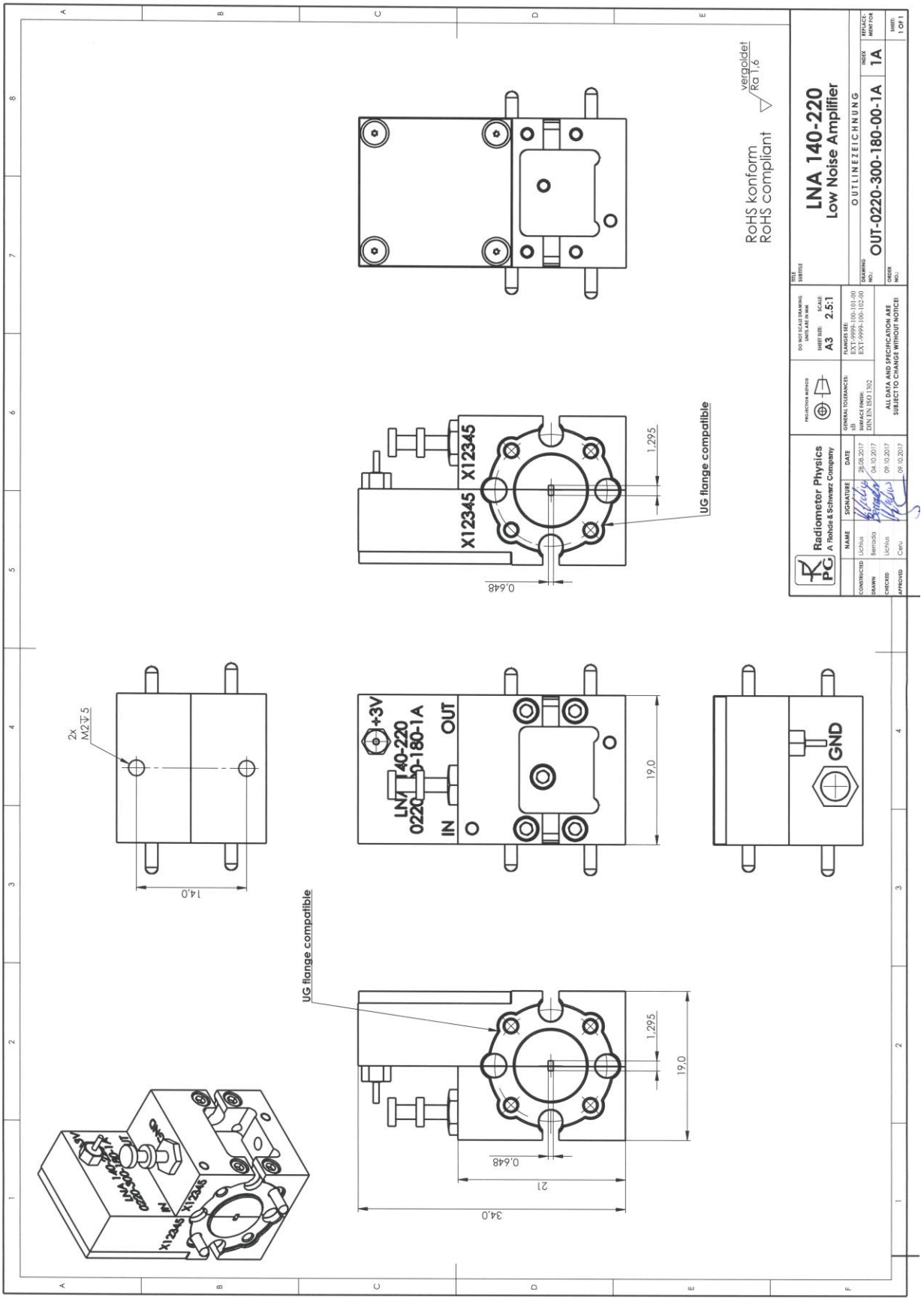

W LNA 75-110 20 3
Low Noise Amplifier
OUT-0110-300-101-40-2C
2C
Radiometer Physics
A Rohde&Schwarz Company
RPG standard waveguide flange
according to OUT-9999-100-104-00.
W LNA 75-110 20 3
0110 00-101-2
+3V
OUT
IN
GND
4-40 UNC ↧3.5
2X M2↧5
M3↧8
gilded
Ra 1,6
RoHS compliant

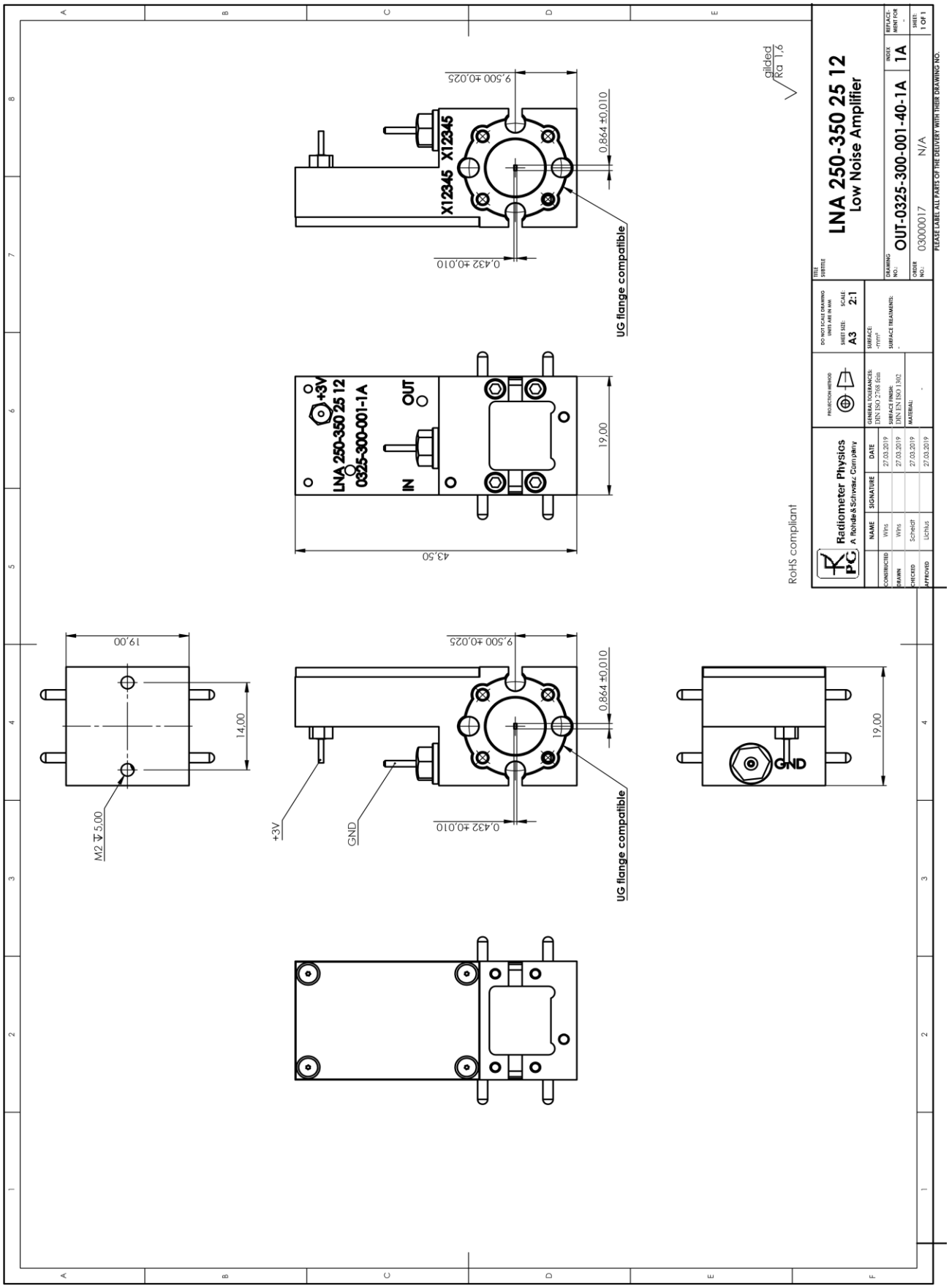

W LNA 75-110 40 3
Low Noise Amplifier
OUT-0110-302-100-40-1C
1C
N/A
N/A
PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THEIR DRAWING NO.
Radiometer Physics
A Rohde & Schwarz Company
RoHS compliant
glided
Ra 1,6
RPG standard waveguide flange
according to OUT-9999-100-104-00.
9,500 ±0,025
2,540 ±0,026
1,270 ±0,026
X12345
+3V
OUT
IN
GND
19,00
34,00
14,00
2x
M2 ↧ 4


glided
Ra 1,6
LNA 110-170 15 6
Low Noise Amplifier
OUT-0170-300-023-40-1D
1D
TBD
TBD
PLEASE LABEL ALL PARTS OF THE DELIVERY WITH THEIR DRAWING NO.
Radiometer Physics
A Rohde&Schwarz Company
RoHS compliant
9,500 ±0,025
1,651 ±0,016
19,00
0,825 ±0,016
X12345
14,00
2x
M2x0,5
+3V
OUT
IN
LNA 110
0170-
34,00
GND

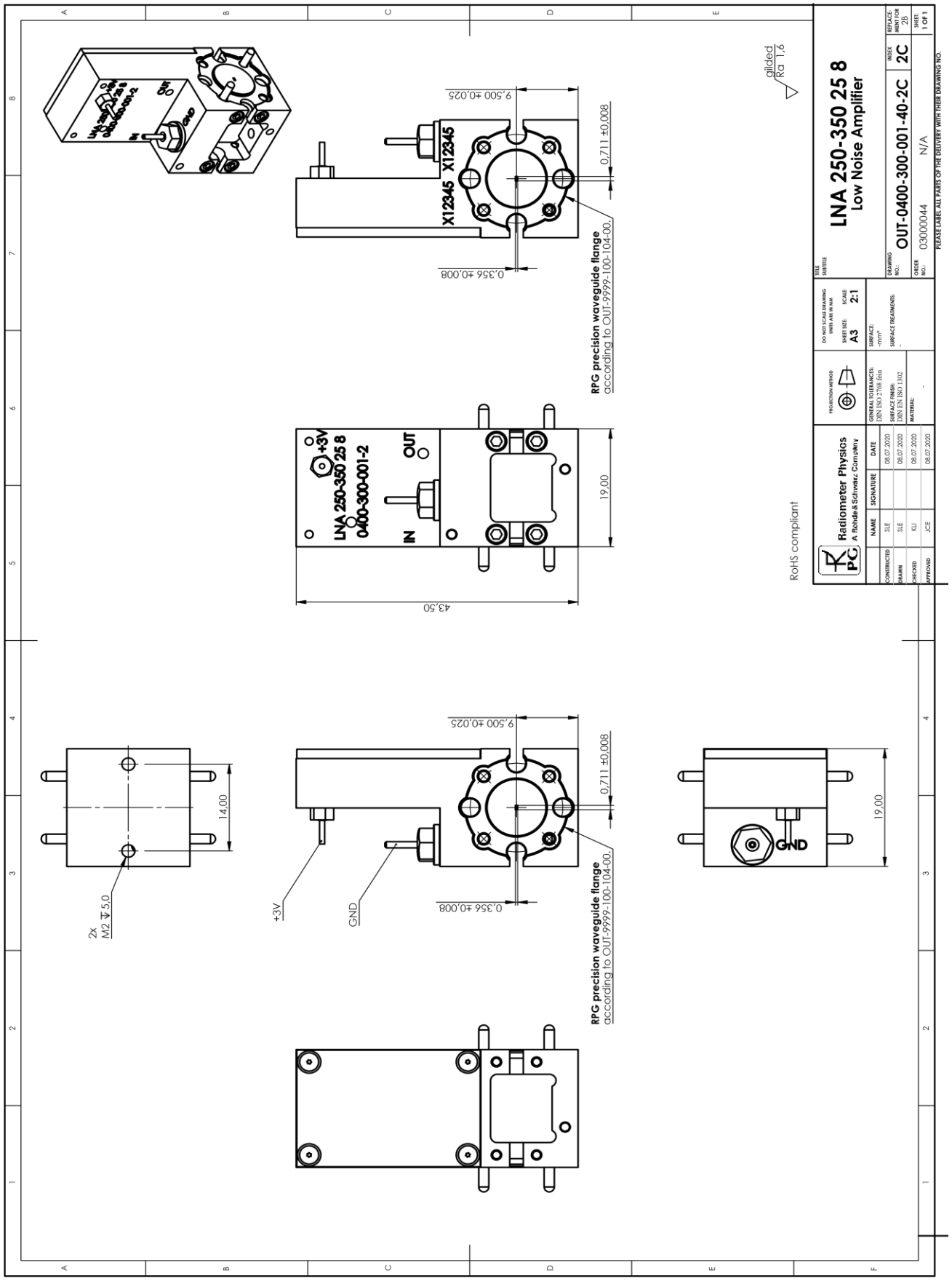

LNA 110-170 15 6 IREG
Low Noise Amplifier
OUT-0170-300-030-40-2A
2A
03000060
TBD
1 OF 1
Radiometer Physics
A Rohde&Schwarz Company
RoHS compliant
gilded
Ra 1,6
LNA 110-170
0170-300-030-2
RPG standard waveguide flange
according to OUT-9999-100-104-00.
9.500 ±0.025
0.825 ±0.016
1.651 ±0.016
43.50
23.0
14.00
2x
Ø2.50▽4.0
+3V
OUT
IN
GND
19.0
X12345


LNA 110-170 30 6
Low Noise Amplifier
OUT-0170-302-150-40-2C
2C
03000025
N/A
Radiometer Physics
A Rohde&Schwarz Company
RoHS compliant
glided
Ra 1,6
RPG standard waveguide flange
according to OUT-9999-100-104-00.
9,500 ±0,025
1,651 ±0,016
0,825 ±0,016
X12345
LNA 110-170 30 6
0170-302-150-2
+3V
OUT
IN
GND
2,3
6,0
19,0
34,0
11,5
3,5
19,0
14,0
2x M2 ↧4


LNA 140-220
Low Noise Amplifier
OUTLINEZEICHNUNG
OUT-0220-300-180-00-1A
1A
Radiometer Physics
A Rohde & Schwarz Company
RoHS konform
RoHS compliant
vergoldet
Ra 1.6
UG flange compatible
X12345
+3V
OUT
IN
GND
LNA 140-220
0220-300-180-1A
2x M2
14.0
19.0
1.295
0.648
21
34.0
ALL DATA AND SPECIFICATION ARE SUBJECT TO CHANGE WITHOUT NOTICE!



Outline H-LNA (WR-3.4)



Outline H-LNA (WR-2.8)