

## 10 GHz LNA built from old LNB

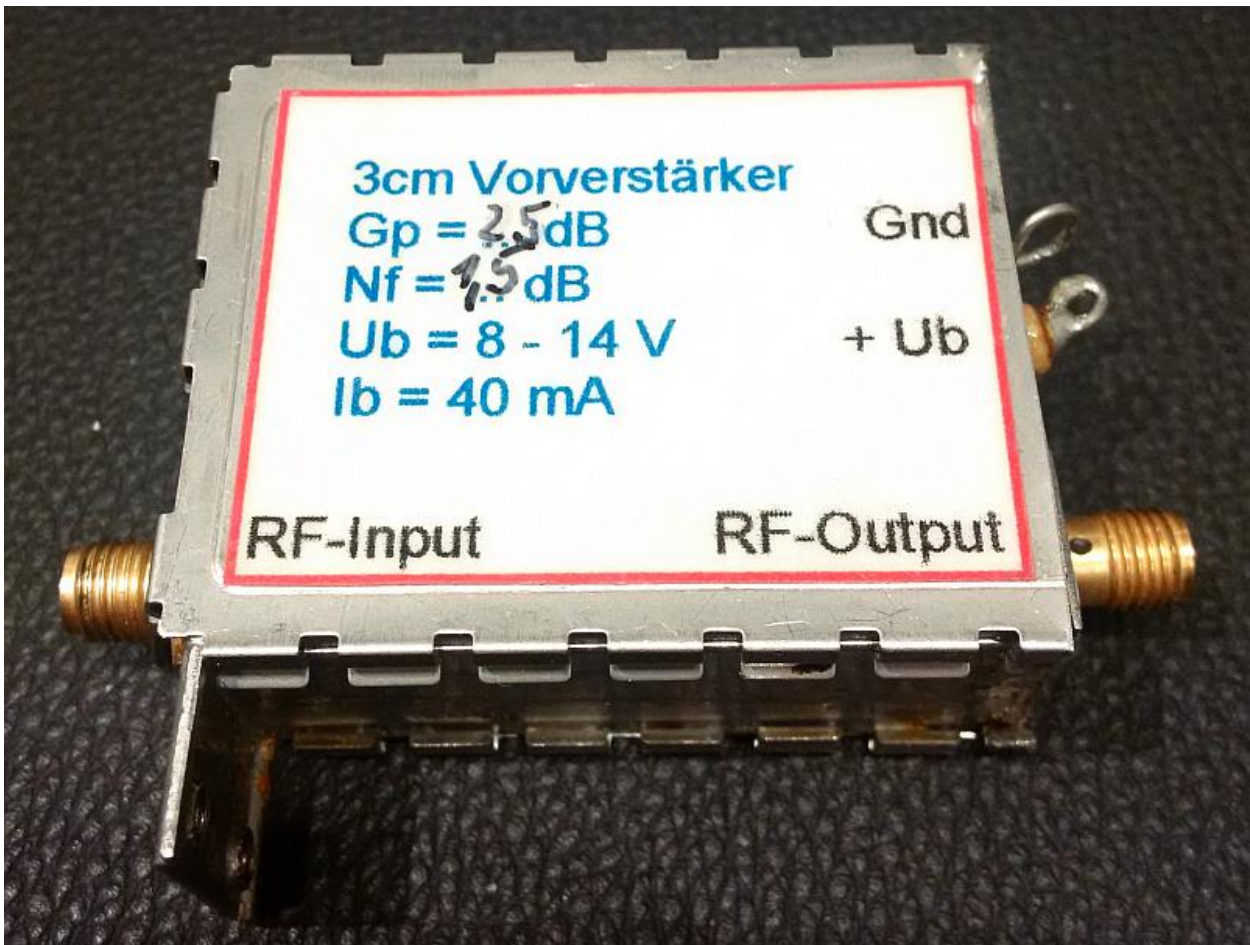
Rev 1.0  
January 24<sup>th</sup> 2019  
Matthias DD1US

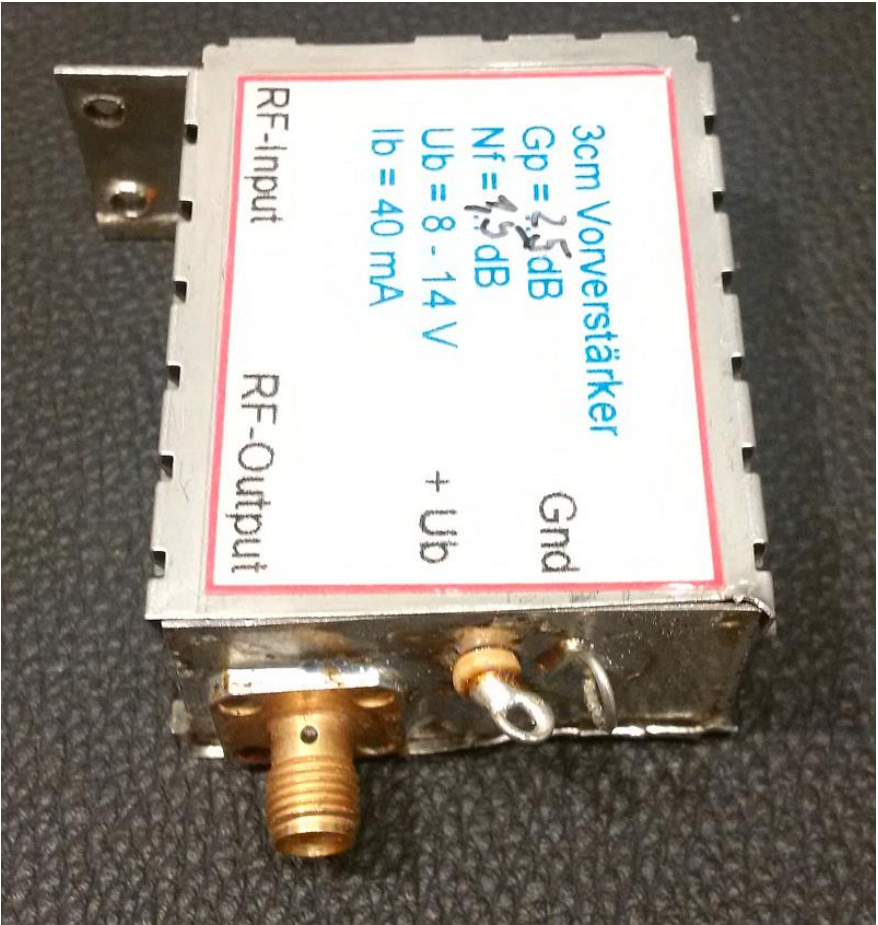
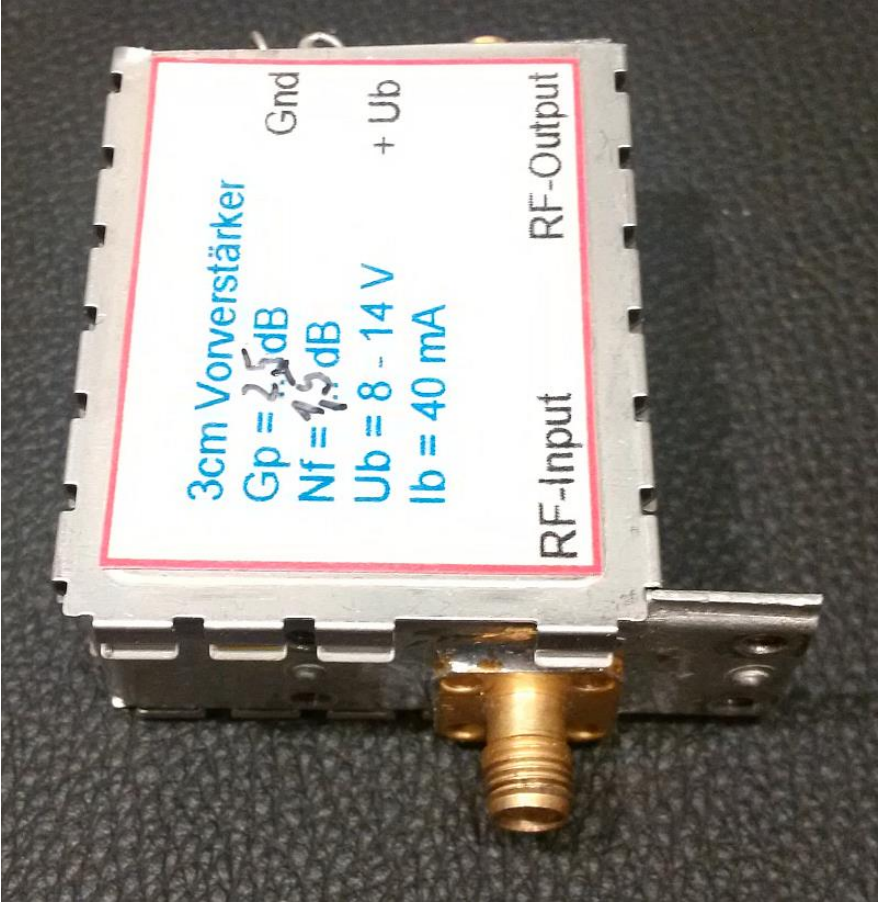
Hello,

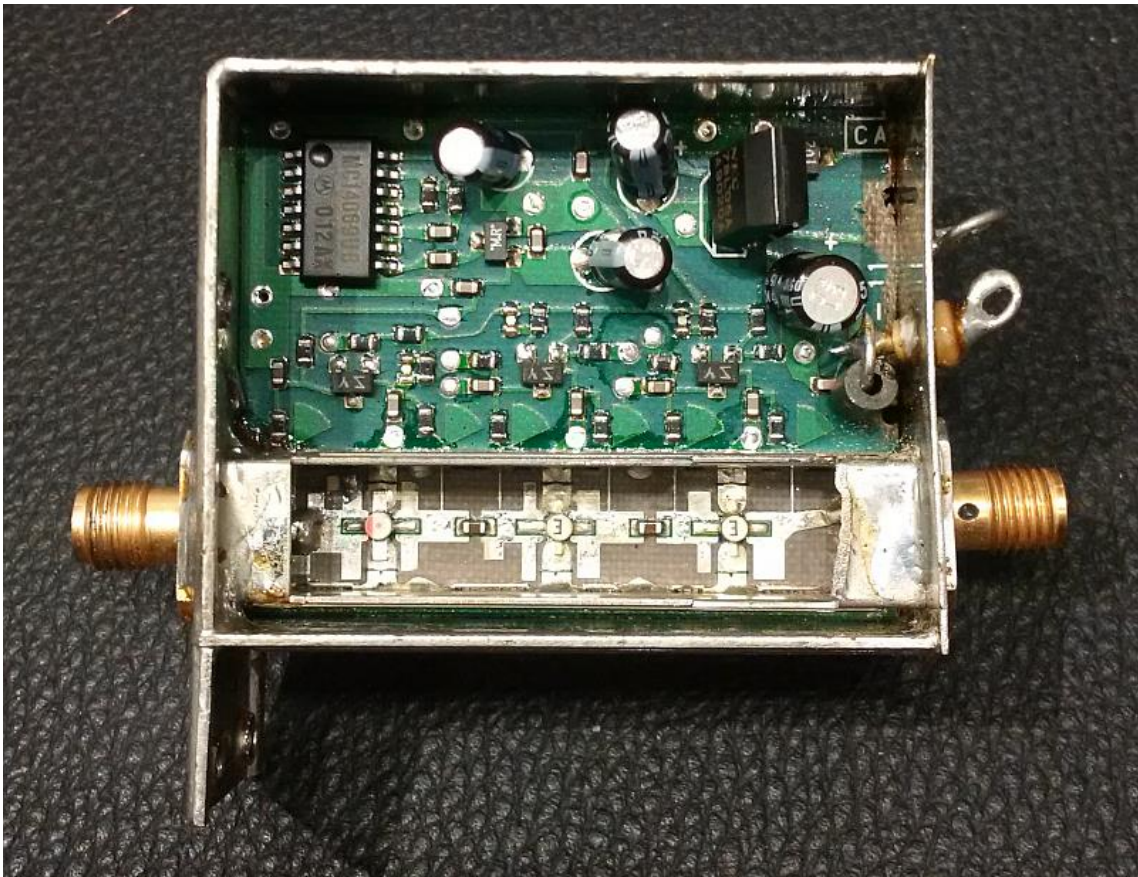
more than 20 years ago I had built an LNA for the 3cm Ham Radio band at 10.5 GHz by isolating it from an old KU-band LNB. At that time, I did not have the equipment to measure the noise figure at 10 GHz. When I found it today in my box of various LNAs I decided to make up leeway.

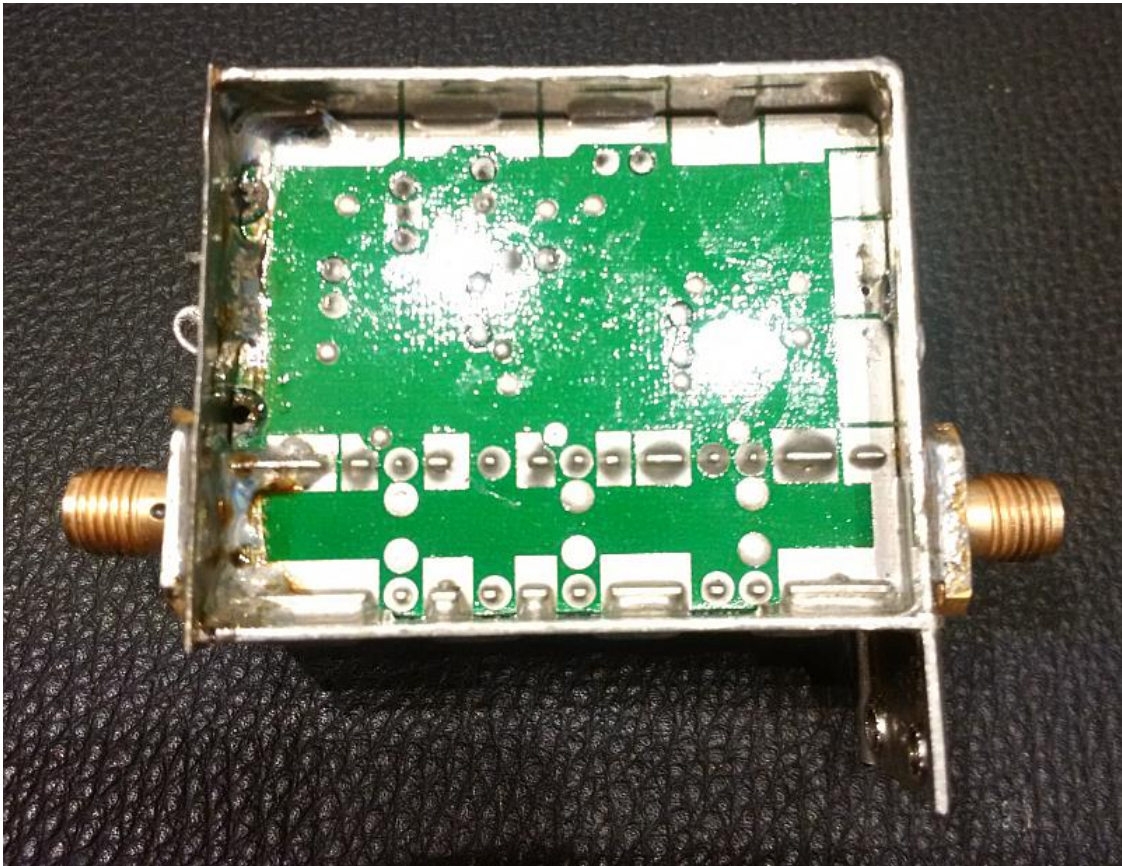
I am not 100% sure but if I remember right the LNB was from a Kathrein TV satellite setup.

Here are some pictures of the LNA:

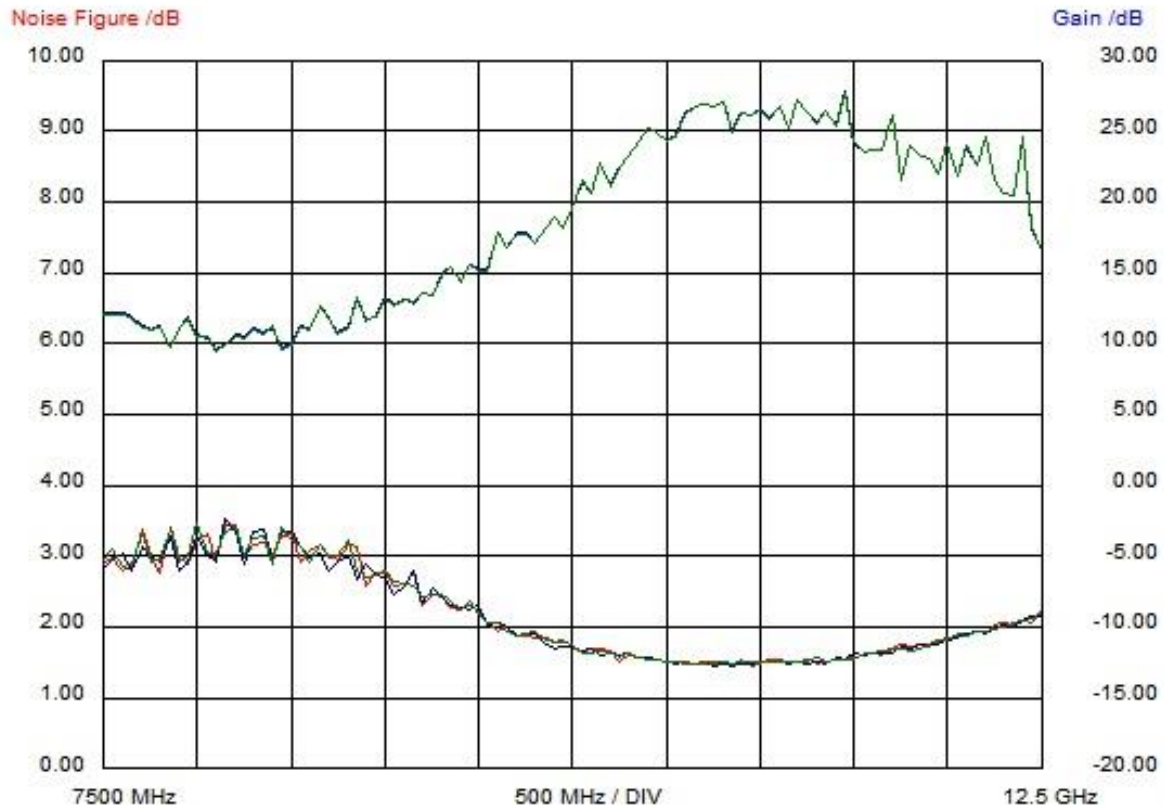








I measured gain and noise figure in the frequency range 7500 ... 12500 MHz as a function of the supply voltage. The amplifier was tested at 9V, 12V and 14V. As to be expected the resulting curves are essentially identical as the amplifier has an internal 5V voltage regulator.



Here is table of the measured values:

Frequency	Gain	Nf	Temp
7500 MHz	12.08 dB	2.89 dB	274.5 K
7550 MHz	12.11 dB	2.98 dB	286.4 K
7600 MHz	12.15 dB	2.80 dB	262.3 K
7650 MHz	11.85 dB	2.86 dB	269.8 K
7700 MHz	11.07 dB	3.37 dB	340 K
7750 MHz	10.92 dB	3.01 dB	290.3 K
7800 MHz	11.21 dB	2.76 dB	257.8 K
7850 MHz	9.72 dB	3.41 dB	346.2 K
7900 MHz	11.03 dB	2.96 dB	283.4 K
7950 MHz	11.83 dB	2.88 dB	273.5 K
8000 MHz	10.63 dB	3.22 dB	319.2 K
8050 MHz	10.33 dB	3.30 dB	330.5 K
8100 MHz	9.53 dB	2.91 dB	276.6 K
8150 MHz	9.84 dB	3.44 dB	350.4 K
8200 MHz	10.57 dB	3.45 dB	351.3 K
8250 MHz	10.47 dB	2.98 dB	286.2 K
8300 MHz	11.10 dB	3.15 dB	308.8 K
8350 MHz	10.76 dB	3.18 dB	312.5 K
8400 MHz	11.15 dB	3.01 dB	289.6 K
8450 MHz	9.68 dB	3.27 dB	326 K
8500 MHz	9.97 dB	3.31 dB	331.1 K
8550 MHz	11.25 dB	2.92 dB	277.5 K
8600 MHz	10.95 dB	3.07 dB	297.9 K
8650 MHz	12.58 dB	3.16 dB	310.9 K
8700 MHz	11.79 dB	3.02 dB	291.3 K
8750 MHz	10.74 dB	2.93 dB	279.8 K
8800 MHz	11.22 dB	3.15 dB	308.4 K
8850 MHz	13.09 dB	3.14 dB	308.2 K
8900 MHz	11.71 dB	2.59 dB	236.7 K
8950 MHz	11.94 dB	2.77 dB	258.8 K
9000 MHz	13.13 dB	2.78 dB	260 K

Frequency	Gain	Nf	Temp
9050 MHz	12.70 dB	2.58 dB	235.8 K
9100 MHz	13.08 dB	2.60 dB	237.7 K
9150 MHz	12.88 dB	2.76 dB	257.7 K
9200 MHz	13.59 dB	2.31 dB	203.9 K
9250 MHz	13.45 dB	2.46 dB	220.9 K
9300 MHz	14.87 dB	2.43 dB	217.5 K
9350 MHz	15.46 dB	2.28 dB	200.4 K
9400 MHz	14.37 dB	2.25 dB	197.1 K
9450 MHz	15.56 dB	2.30 dB	202 K
9500 MHz	15.18 dB	2.20 dB	191 K
9550 MHz	15.17 dB	2.06 dB	176.3 K
9600 MHz	17.91 dB	1.95 dB	164.4 K
9650 MHz	16.80 dB	1.99 dB	168.5 K
9700 MHz	17.78 dB	1.87 dB	156.5 K
9750 MHz	17.78 dB	1.86 dB	155.2 K
9800 MHz	17.07 dB	1.85 dB	154.2 K
9850 MHz	18.11 dB	1.83 dB	151.8 K
9900 MHz	18.88 dB	1.78 dB	147 K
9950 MHz	18.18 dB	1.81 dB	150.4 K
10 GHz	19.60 dB	1.72 dB	140.5 K
10.05 GHz	21.45 dB	1.64 dB	133.1 K
10.1 GHz	20.67 dB	1.69 dB	137.9 K
10.15 GHz	22.77 dB	1.68 dB	136.9 K
10.2 GHz	21.17 dB	1.66 dB	135.4 K
10.25 GHz	22.46 dB	1.52 dB	121.9 K
10.3 GHz	23.19 dB	1.61 dB	129.9 K
10.35 GHz	24.36 dB	1.56 dB	125.7 K
10.4 GHz	25.19 dB	1.54 dB	123.4 K
10.45 GHz	24.92 dB	1.55 dB	124.3 K
10.5 GHz	24.29 dB	1.50 dB	119.9 K
10.55 GHz	24.70 dB	1.52 dB	121.1 K
10.6 GHz	26.21 dB	1.47 dB	116.8 K
10.65 GHz	26.74 dB	1.47 dB	116.5 K
10.7 GHz	26.86 dB	1.47 dB	117.1 K
10.75 GHz	26.73 dB	1.50 dB	120 K
10.8 GHz	27.06 dB	1.50 dB	119.6 K
10.85 GHz	25.00 dB	1.45 dB	115.4 K
10.9 GHz	26.20 dB	1.54 dB	123.5 K
10.95 GHz	26.11 dB	1.46 dB	115.8 K
11 GHz	26.52 dB	1.48 dB	117.8 K
11.05 GHz	25.89 dB	1.54 dB	123.1 K
11.1 GHz	26.68 dB	1.53 dB	122.8 K
11.15 GHz	25.27 dB	1.49 dB	118.6 K
11.2 GHz	27.25 dB	1.49 dB	118.7 K
11.25 GHz	26.32 dB	1.53 dB	122.1 K
11.3 GHz	25.60 dB	1.47 dB	117 K
11.35 GHz	26.49 dB	1.51 dB	120.5 K
11.4 GHz	25.37 dB	1.53 dB	122.1 K
11.45 GHz	27.76 dB	1.54 dB	123.8 K
11.5 GHz	24.25 dB	1.56 dB	124.9 K
11.55 GHz	23.47 dB	1.61 dB	130 K
11.6 GHz	23.67 dB	1.64 dB	133.3 K
11.65 GHz	23.69 dB	1.61 dB	130 K
11.7 GHz	26.12 dB	1.69 dB	137.8 K
11.75 GHz	21.52 dB	1.76 dB	144.7 K
11.8 GHz	23.99 dB	1.71 dB	139.6 K
11.85 GHz	23.19 dB	1.75 dB	144.3 K
11.9 GHz	23.02 dB	1.73 dB	141.8 K
11.95 GHz	22.08 dB	1.77 dB	145.8 K
12 GHz	24.09 dB	1.83 dB	152.4 K
12.05 GHz	21.83 dB	1.87 dB	156.4 K
12.1 GHz	23.94 dB	1.87 dB	155.8 K
12.15 GHz	22.60 dB	1.93 dB	161.9 K
12.2 GHz	24.66 dB	1.90 dB	159.6 K
12.25 GHz	21.51 dB	2.04 dB	174 K
12.3 GHz	20.68 dB	2.05 dB	174.7 K
12.35 GHz	20.44 dB	2.04 dB	173.9 K
12.4 GHz	24.55 dB	2.09 dB	179.5 K
12.45 GHz	18.28 dB	2.11 dB	181.3 K
12.5 GHz	16.49 dB	2.19 dB	190.2 K

The gain and the noise figure at 10.5 GHz, which is the downlink frequency range of the new geostationary satellite Es'Hail-2, are approx. 24 dB and 1.5 dB respectively.

Given the age of the device this is quite acceptable even though today's LNBs certainly feature lower noise figures.

So if you find an old LNB in your junk-box you may also give it a try!

I always appreciate feedback. Please send it to the Email address given below.

Best regards

Matthias DD1US

Email: [DD1US@AMSAT.ORG](mailto:DD1US@AMSAT.ORG)

Homepage: <http://www.dd1us.de>