

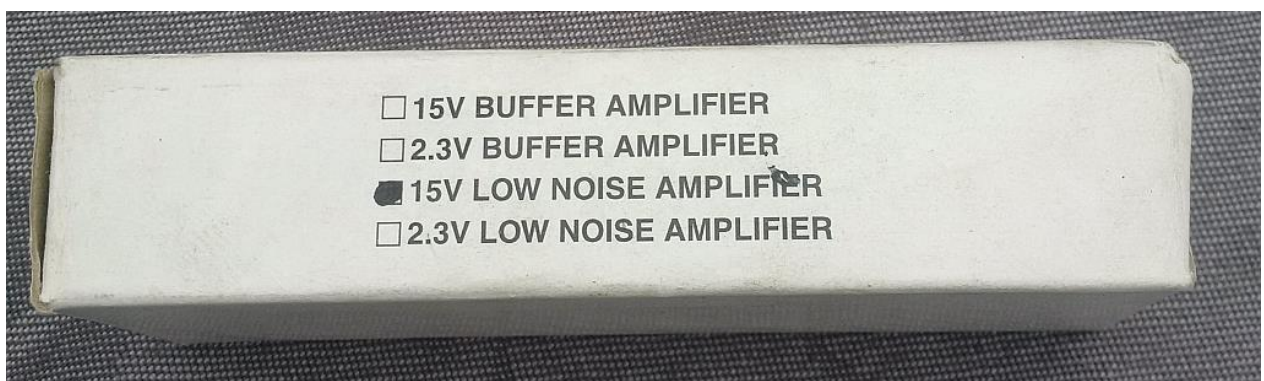
Measurement results of a Worldspace 15V low noise amplifier

Rev 1.0

Hello,

recently I was able to acquire a couple of LNAs which were originally designed to amplify the signals from the Worldspace satellites.

Here are some pictures of the LNA and its package. The input connector is N-type and 50 Ohms, the output connector is F-type and thus possibly 75 Ohm. It is biased through its output port. The nominal supply voltage is 15V. The typical supply current is 60mA.

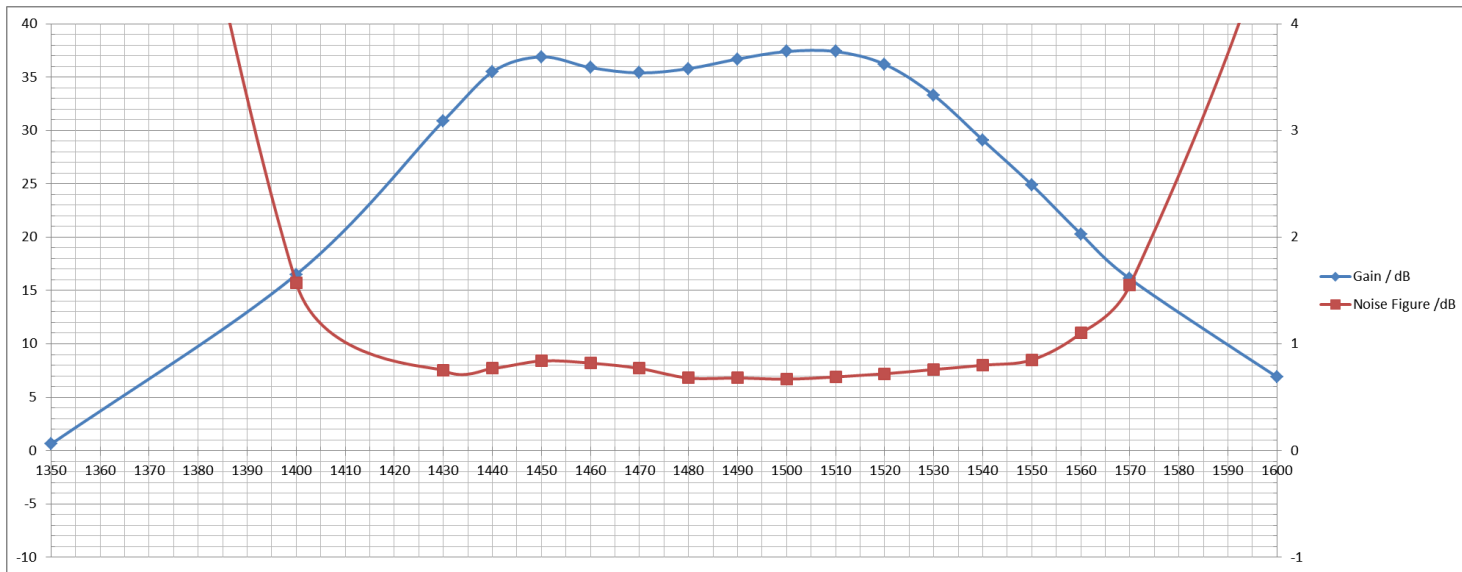




Finally I found the time to measure such an LNA. Its serial number was ZWT000600507.

On the next pages you can find the results of my measurements. Please note that I measured in a 50 Ohm system. Possibly the measurements are slightly off as the LNA has F-connectors at the output port and thus possibly 75 Ohms.

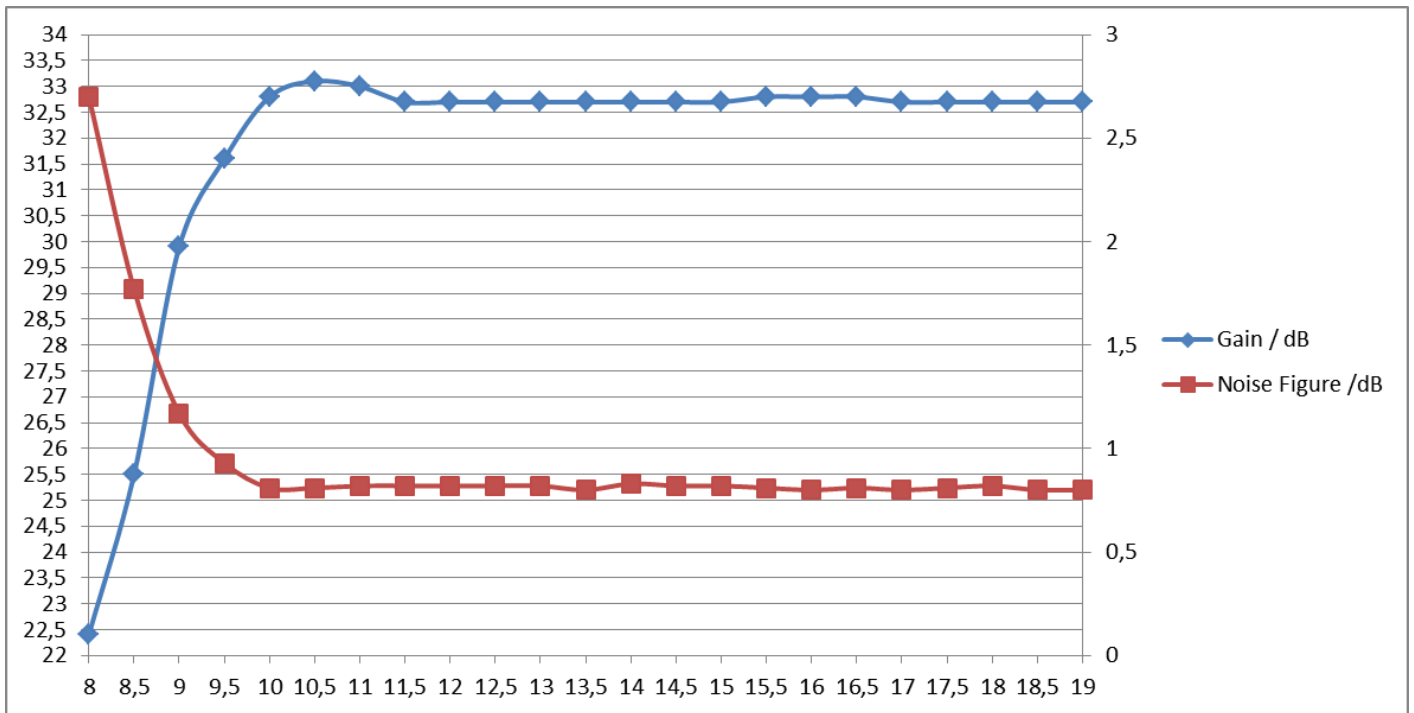
Here is the gain and noise figure versus frequency in the range 1350-1600 MHz. All measurements were done with a supply voltage of 15V.



The corresponding values are in the following table:

Frequency /MHz	Gain /dB	Noise Figure /dB	Vs /V
1300	-15	27,7	15
1350	0,61	12,6	15
1400	16,5	1,57	15
1430	30,9	0,75	15
1440	35,5	0,77	15
1450	36,9	0,84	15
1460	35,9	0,82	15
1470	35,4	0,77	15
1480	35,8	0,68	15
1490	36,7	0,68	15
1500	37,4	0,67	15
1510	37,4	0,69	15
1520	36,2	0,72	15
1530	33,3	0,76	15
1540	29,1	0,8	15
1550	24,9	0,85	15
1560	20,3	1,1	15
1570	16,1	1,55	15
1600	6,9	5,1	15
1620	1,1	9,7	15
1650	-7,8	17,3	15
1700	-26	30	15

Next I checked gain and noise figure as a function of the supply voltage. All measurements were done at a frequency of 1530 MHz.



The corresponding values are in the following table:

Vs/V	Gain /dB	Noise Figure /dB	Is /mA	Frequency /MHz
8	22,4	2,7	40	1530
8,5	25,5	1,77	40	1530
9	29,9	1,17	40	1530
9,5	31,6	0,93	50	1530
10	32,8	0,81	50	1530
10,5	33,1	0,81	50	1530
11	33	0,82	60	1530
11,5	32,7	0,82	60	1530
12	32,7	0,82	60	1530
12,5	32,7	0,82	60	1530
13	32,7	0,82	60	1530
13,5	32,7	0,8	60	1530
14	32,7	0,83	60	1530
14,5	32,7	0,82	60	1530
15	32,7	0,82	60	1530
15,5	32,8	0,81	60	1530
16	32,8	0,8	60	1530
16,5	32,8	0,81	60	1530
17	32,7	0,8	60	1530
17,5	32,7	0,81	60	1530
18	32,7	0,82	60	1530
18,5	32,7	0,8	60	1530
19	32,7	0,8	60	1530

Another sample of such an LNA with the serial number ZWT00400684 showed very similar results. Actually the minimum noise figure at 1500 MHz was 0.53dB and thus even better. The corresponding gain at 1500 MHz was 38.1dB.

Below please find a summary table showing for which satellite signals such an LNA can be used:

Service	Region	Frequency /MHz	Gp /dB	NF /dB	Polarization
Worldspace	worldwide	1452-1492	35,4	0,77	LHCP @ 1.8-2.4V, RHCP @ 2.8-3.3V
Inmarsat	worldwide	1520-1550	33	0,78	RHCP
Outernet	Europe (Alphasat)	1545,94	28	0,82	RHCP
Outernet	USA	1539,8725	29,1	0,8	RHCP
Outernet	APAC	1.546	28	0,82	RHCP
GPS	worldwide	1575,42	14	2	RHCP
Iridium	worldwide	1616-1626.5	n.a.	n.a.	RHCP

If you have any comments or further information then please send them to the Email address given below. Many thanks in advance for your feedback.

Best regards

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