

Tests with setup for EsHail-2

DD1US, Matthias, updated February 5th 2019, rev5

On January 22nd 2019 between 15:00 and 15:40 UTC I did some experiments receiving signals from 26 degree east.

I used my 1.8m wire-mesh dish (designed for C/KU-band with a mesh thickness of 0.7mm) and the DJ7GP dual-band feed with a modified Octagon LNB (27 MHz crystal was replaced with a 26 MHz TCXO) attached. I used an Airspy mini and SDR# as receiver.

Except for the first measurement (fig.1) all other measurements were done on LNB port 2. Both ports are using the same input with respect to polarization and input stage, however the IF stages are different and they are using separate TCXOs (though of the same type and model).

From my present location the direction of EsHail-2 at 26 degree east is: Azimuth = 155.1, Elevation = 31.9

(for comparison Astra at 19.2 degree east is at: Azimuth = 163.8, Elevation = 33.6)

Here are various beacon frequencies of satellites at 26 degrees east and the corresponding IF frequencies of my modified LNB:

Es'Hail-2	EB1	10706 MHz (ver or RHCP)	LNA-A: 1317,111 MHz	LNA-B: 1317,111 MHz
	EB2	11205 MHz (ver)	LNA-A: 1816,111 MHz	LNA-B: 1816,111 MHz
Es'Hail-1	EB	11199.8 MHz (hor)	LNA-A: 1810,911 MHz	LNA-B: 1810,911 MHz
	EB	11698.6 MHz (hor)	LNA-A: 2309,711 MHz	LNA-B: 2309,711 MHz
BADR-7	EB1	11200.5 MHz (hor or LHCP)	LNA-A: 1811,611MHz	LNA-B: 1811,611 MHz (exp. to be approx. 10dB weaker than Es'Hail-1)

When aligning the dish, one has to be careful as, 10706 and 11205 MHz beacons can be also found in other satellites:

ARABSAT-5A (position 30.5 East)	EB	10706 MHz (hor or ver)	LNA-A: 1317,111 MHz	LNA-B: 1317,111 MHz
Astra 1KR (position 19.2 East)	EB	11205 MHz (ver ?)	LNA-A: 1816,111 MHz	LNA-B: 1816,111 MHz

LNA A and B frequency offset:

Using a test signal in the shack of 10500 MHz, the resulting output frequency should have been 1111,11111111MHz.

However, the actual IF signals were at:

LNA-A: 1111,095800 MHz (i.e. 15,3111 kHz too low)

LNA-B: 1111,103744 MHz (i.e. 7,36711 kHz too low)

In the appendix you will find screenshots of the following signals:

EsHail-1 11199.8 MHz (LNB port 1) (fig. 1)

EsHail-1 11199.8 MHz (LNB port 2) (fig. 2)

BADR-7 11200.5 MHz (LNB port 2) (fig. 3)

EsHail-2 10706 MHz (LNB port 2) (fig. 4)

EsHail-2 11205 MHz (LNB port 2) (fig. 5)

Unknown signal 11199.805 MHz (LNB port 2) (fig. 6)

I appreciate feedback on the measurements. I have not yet much experience with receiving the signals and wonder whether my setup is working ok or has room for improvements.

Many thanks in advance.

Kind regards

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Fig. 1 EsHail-1 11199.8 MHz (LNB port 1)

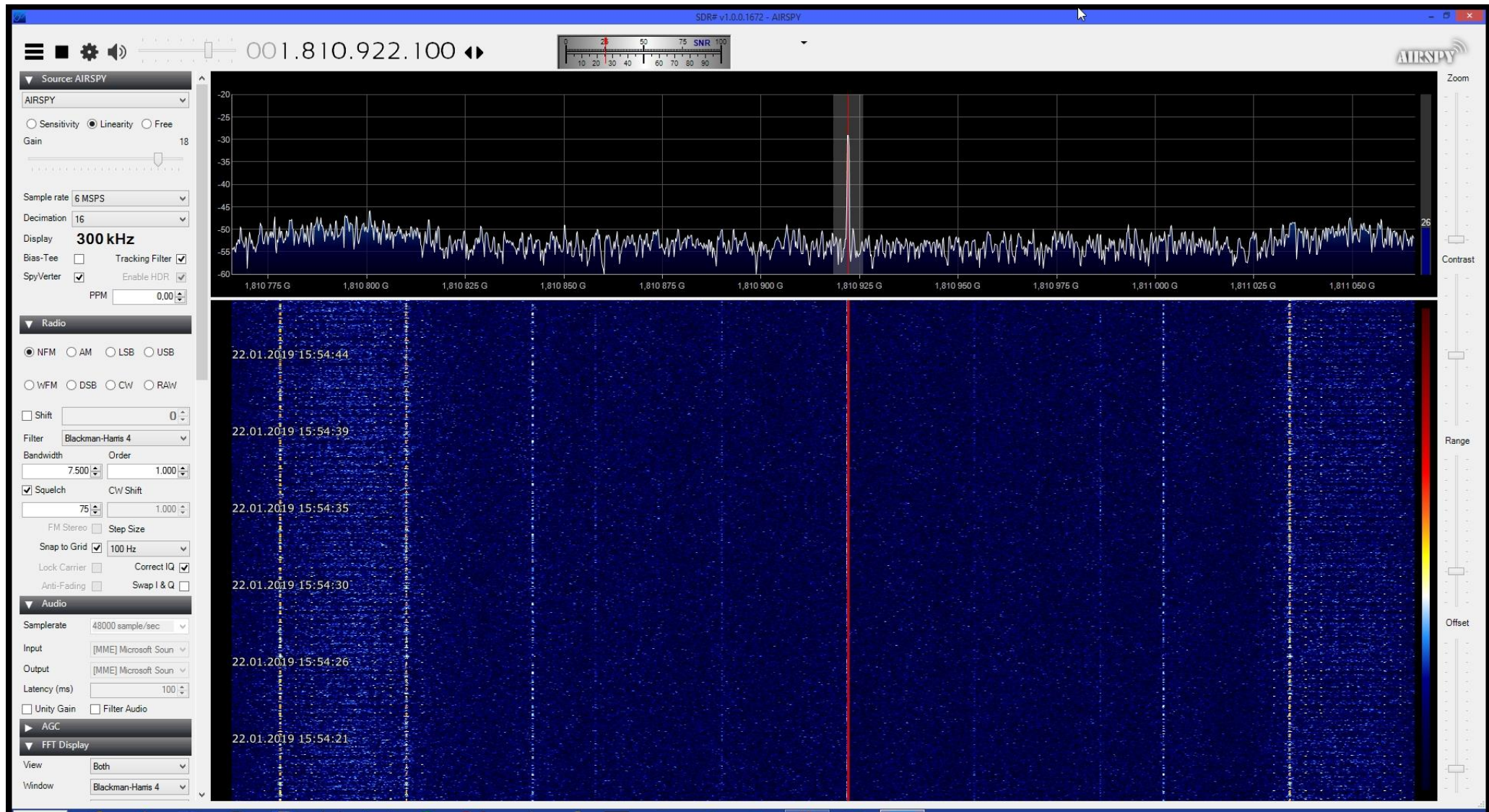


Fig. 2 EsHail-1 11199.8 MHz (LNB port 2)

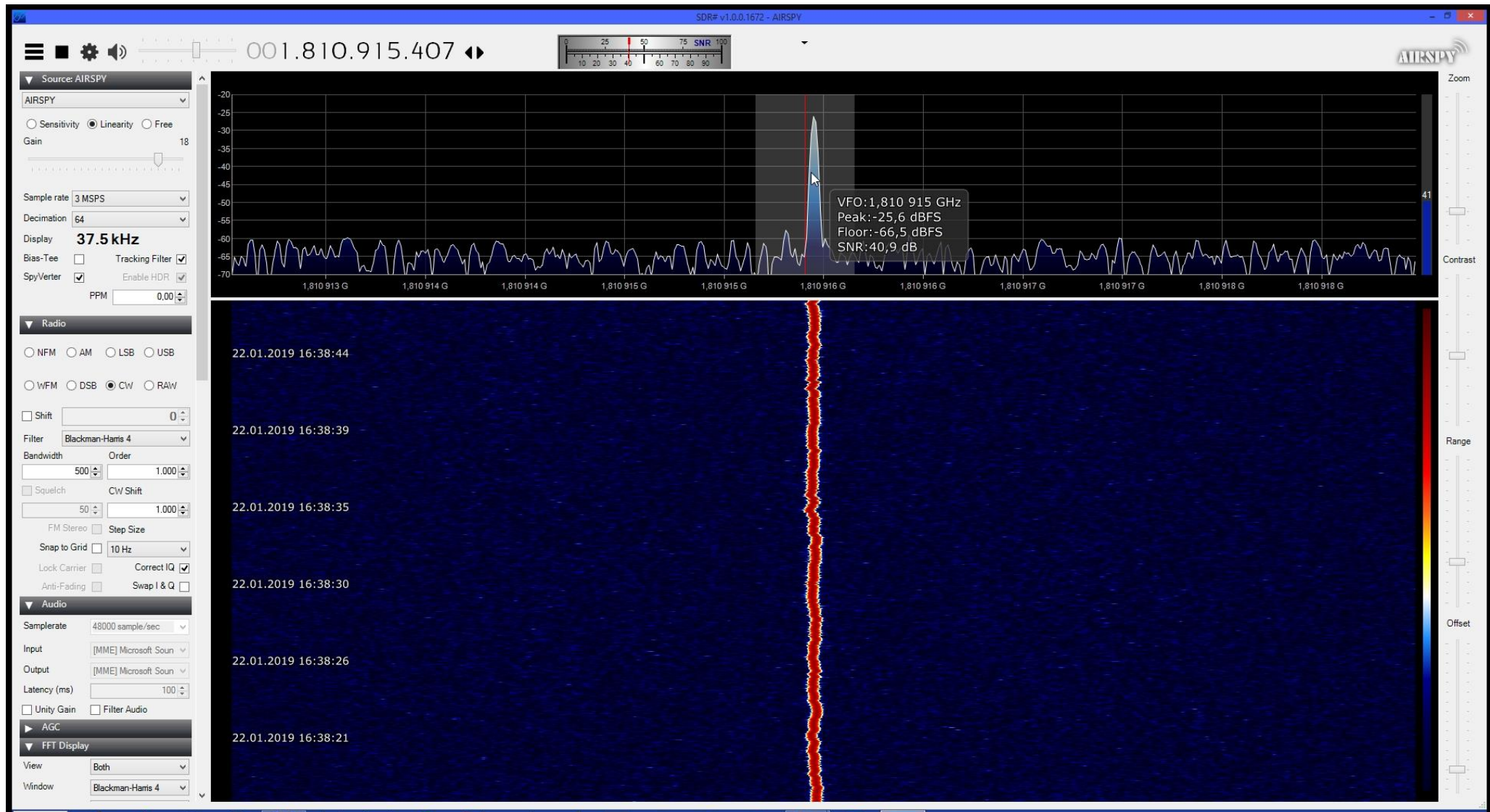


Fig. 3 BADR-7 11200.5 MHz (LNB port 2)

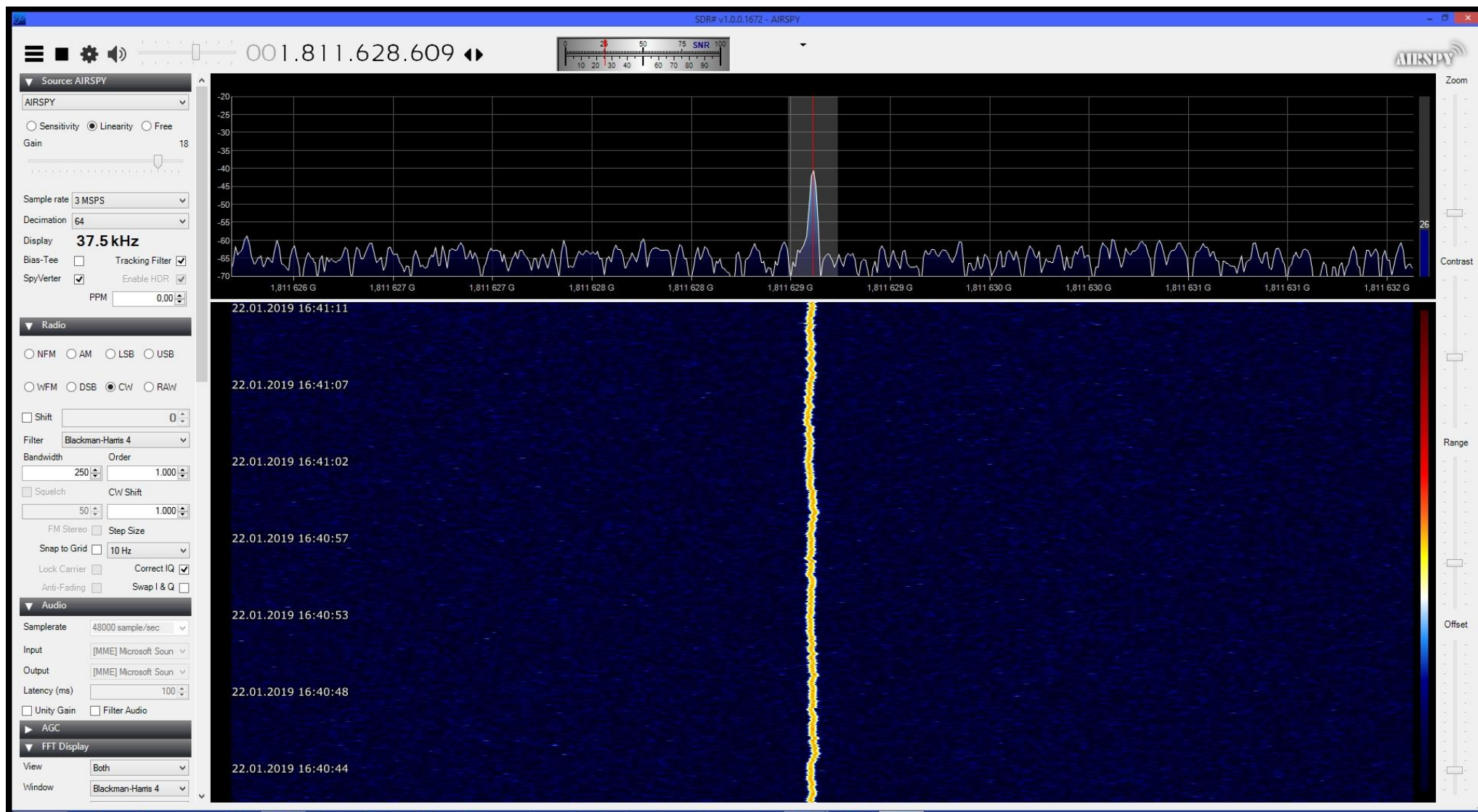


Fig. 4 EsHail-2 10706 MHz (LNB port 2)

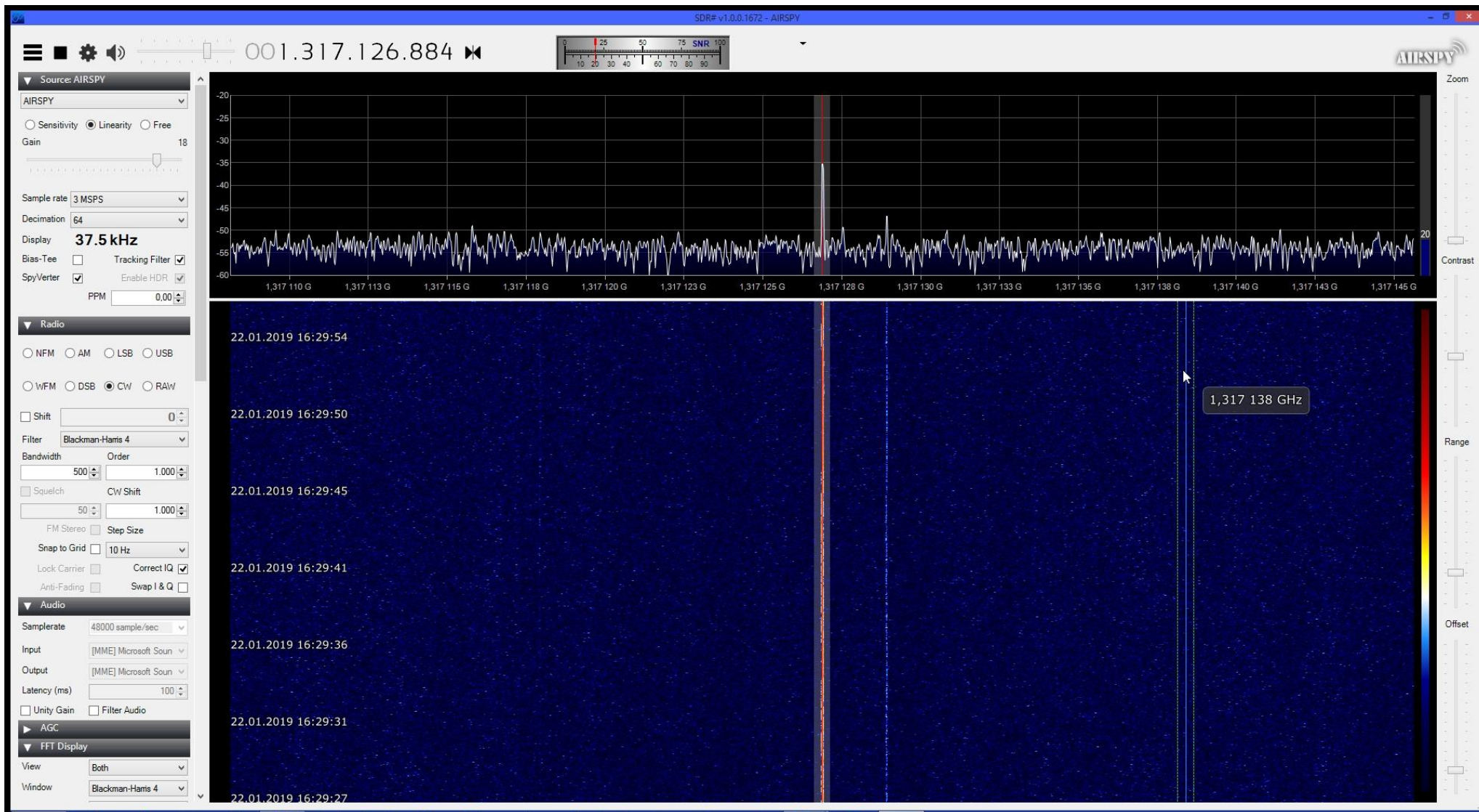


Fig. 5 EsHail-2 11205 MHz (LNB port 2)

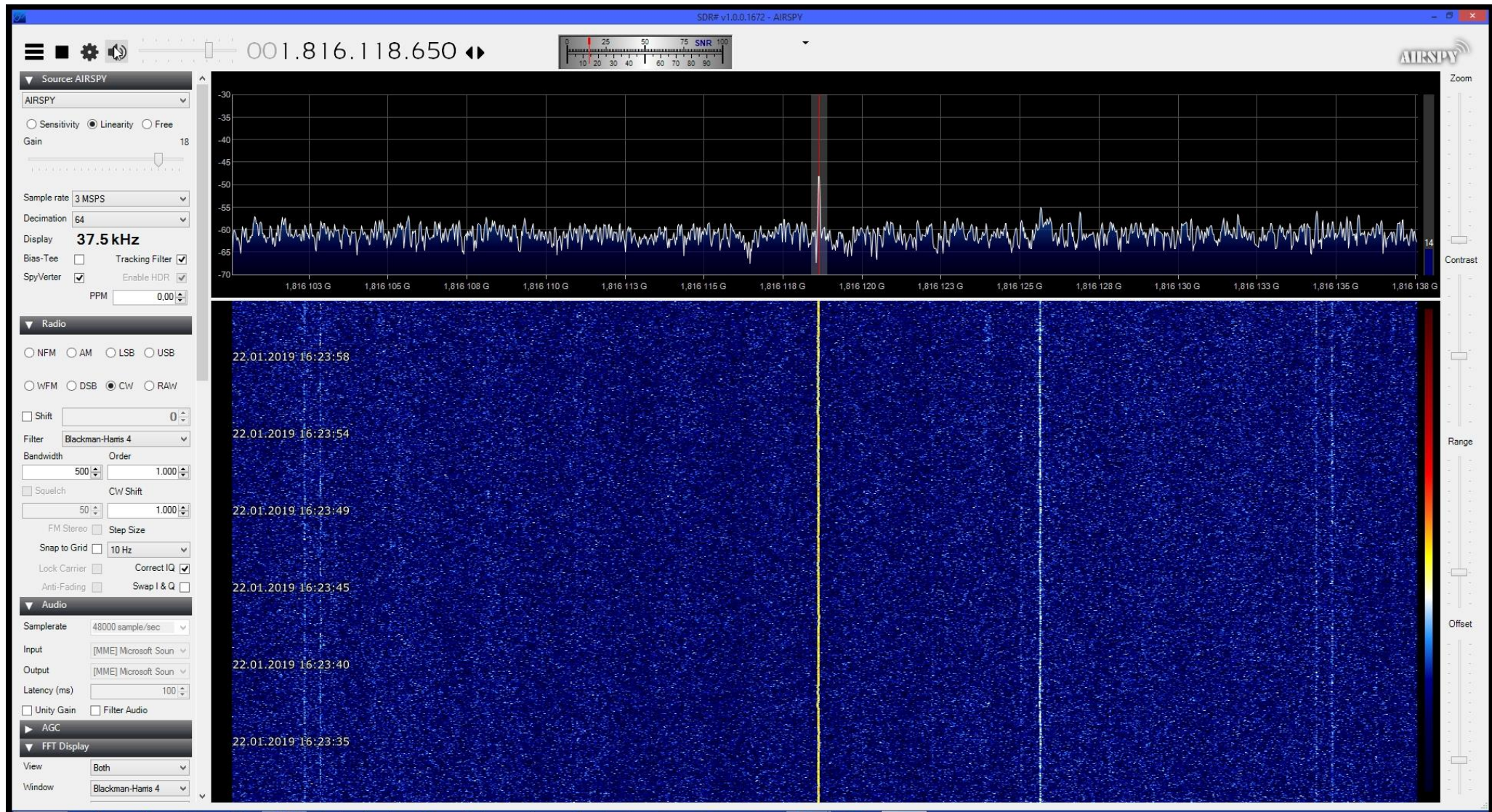


Fig. 5 EsHail-1 11199.805 MHz (LNB port 2)

