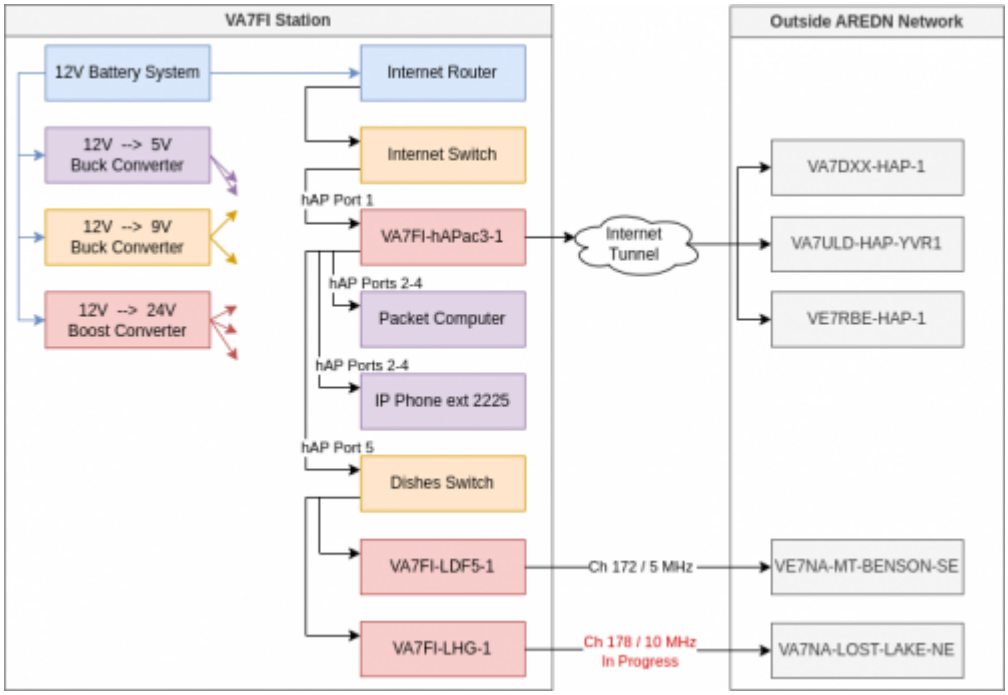
Patrick (VA7FI)

The goal is for my computers and IP phone[1)] to connect to other AREDN nodes. Currently, I achieve this via two different paths:

1. via internet tunnels to VA7DXX, VA7ULD, and VE7RBE (which is not really ham radio), and
2. via the 5.8 GHz band to one of the Mount Benson nodes on Vancouver Island.

My system also runs off of 12 V batteries so it (and my internet connection) continues to work during power outages. To easily connect different equipment in different ways, I created a “patch panel” using ethernet female-female connectors:



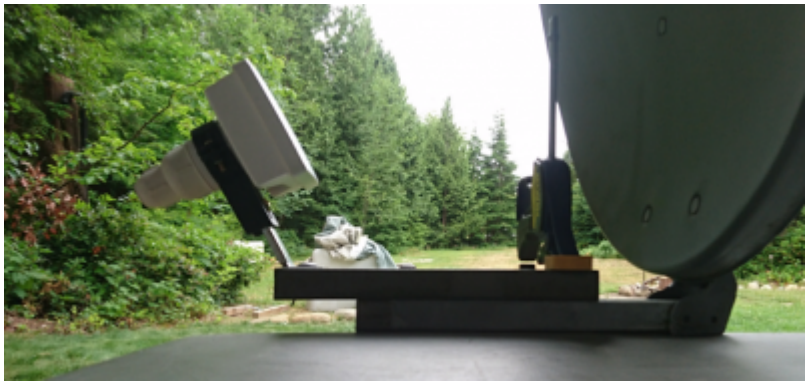
In the default configuration, everything is connected to the hAP. But I can very quickly connect my Winlink computer or the phone directly to the dishes to ensure I'm using RF.

July 1, 2021

I installed a Mikrotik LDF-5 (the n model, not the ac model) on a used TELUS satellite TV dish.

- The first task was to mount the LDF-5 to the dish roughly where the old receiver was. Unfortunately, the arm and the LDF-5 mounting bracket were both a bit too short so the LDF-5 was too close to the dish, and it was too low:

- So I bolted a second arm on top of the first to raise the LDF-5 and move it a bit further away:

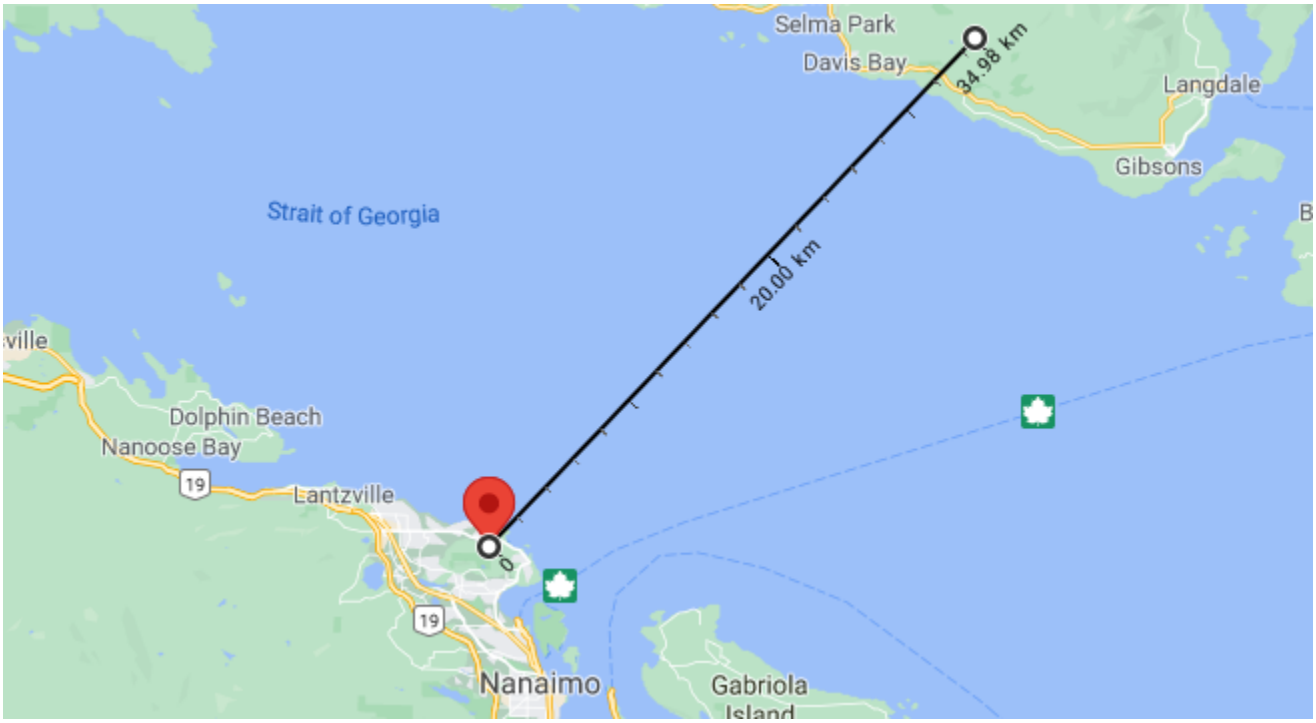


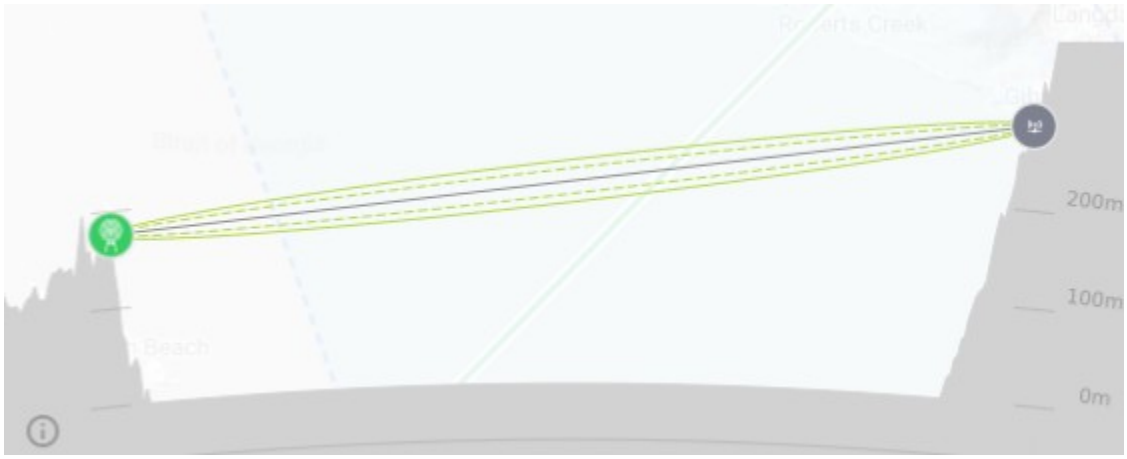
- Initially, the dish was mounted on a post with a 45° angle, but after field testing it, it was found to be a bit much (an angle of 20° would be ideal, but I used a vertical post later).


TELUS

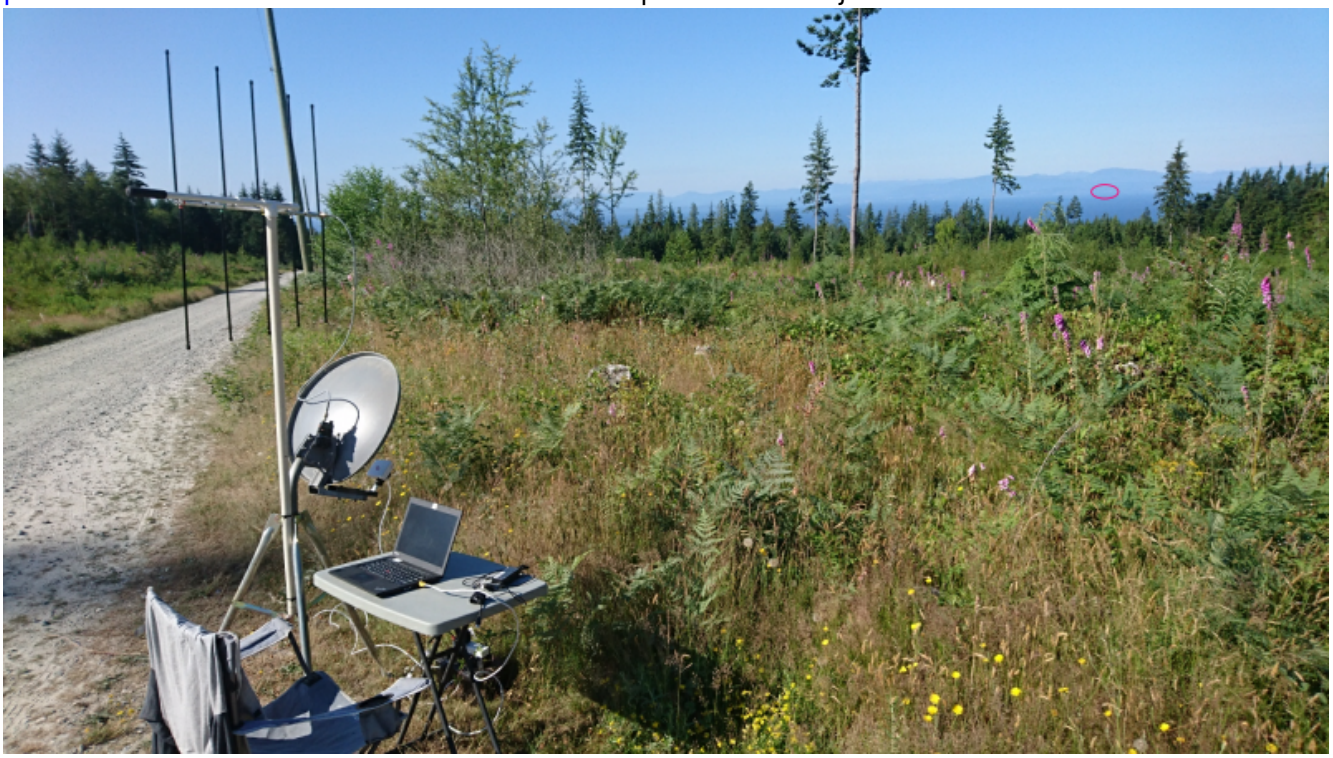
July 4, 2021 Test

A few days later, Chris (VE7TOP) and I made a successful connection on 5.860 GHz (Ch. 172) between Nanaimo (49.227263, -123.975836) and Roberts Creek (49.45465, -123.64199): a distance of 35 km.

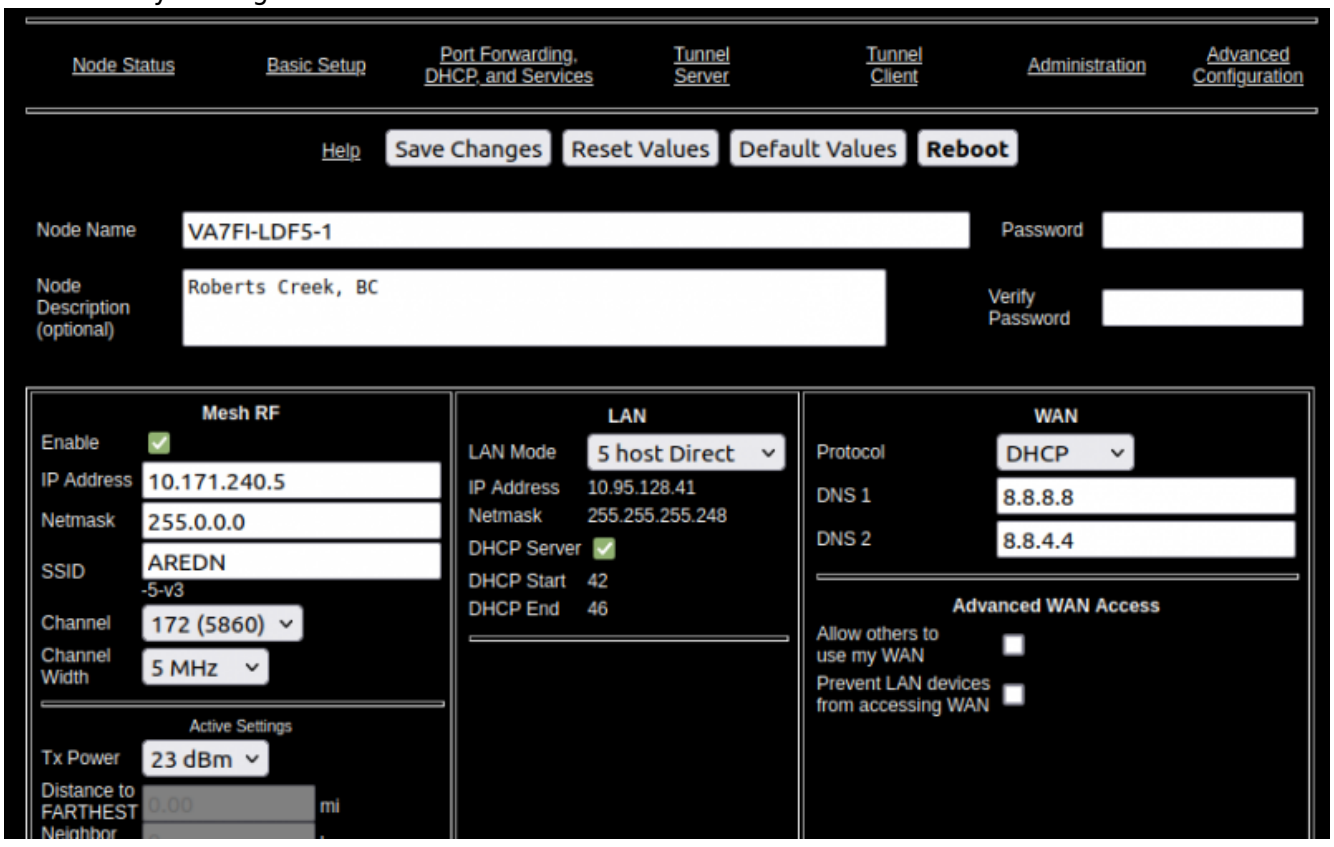




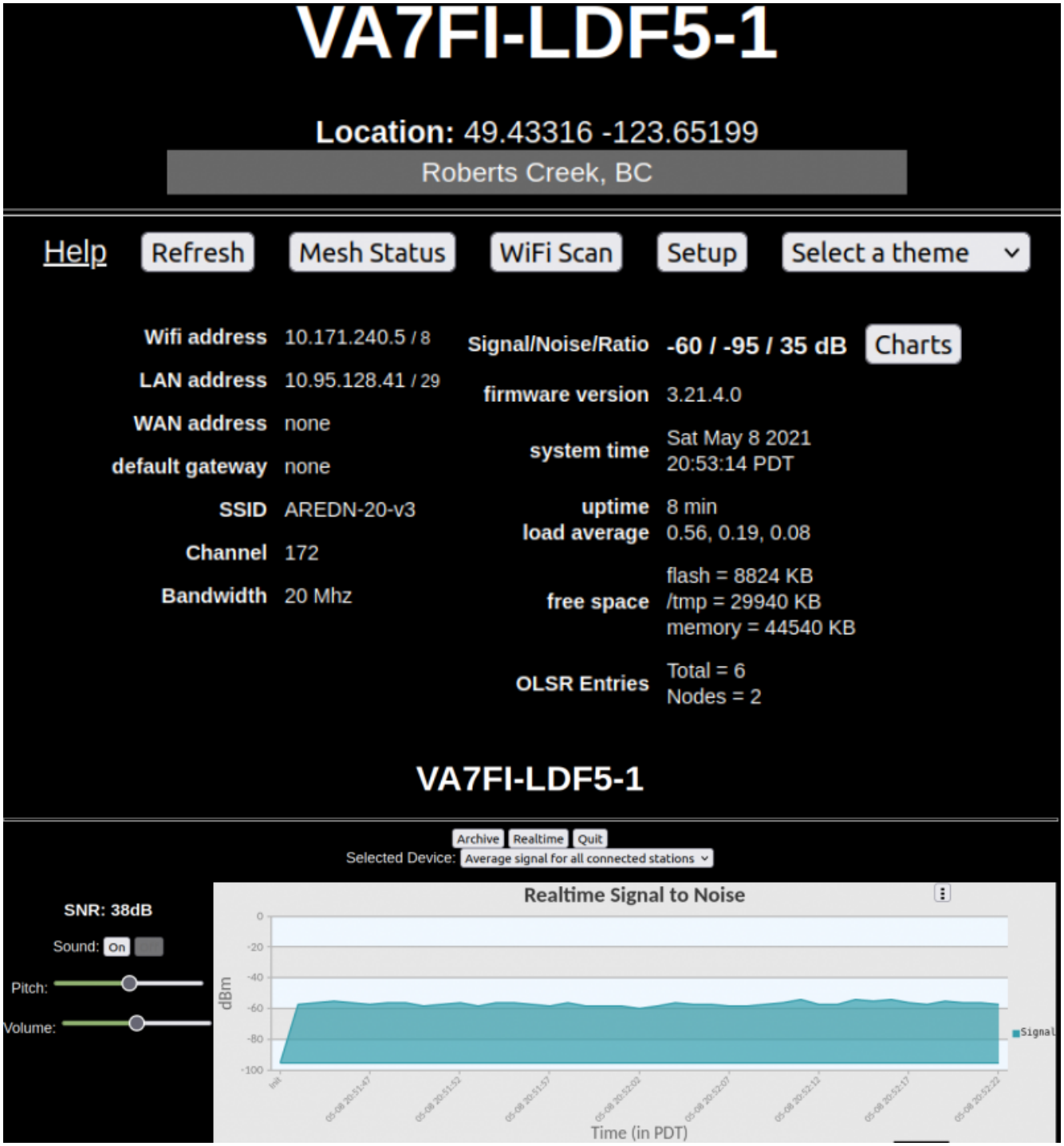
- Here's my setup and the view from the dish. The red circle marks the spot where Chris is. The log periodic was so Chris and I could talk on VHF to perform the adjustments.

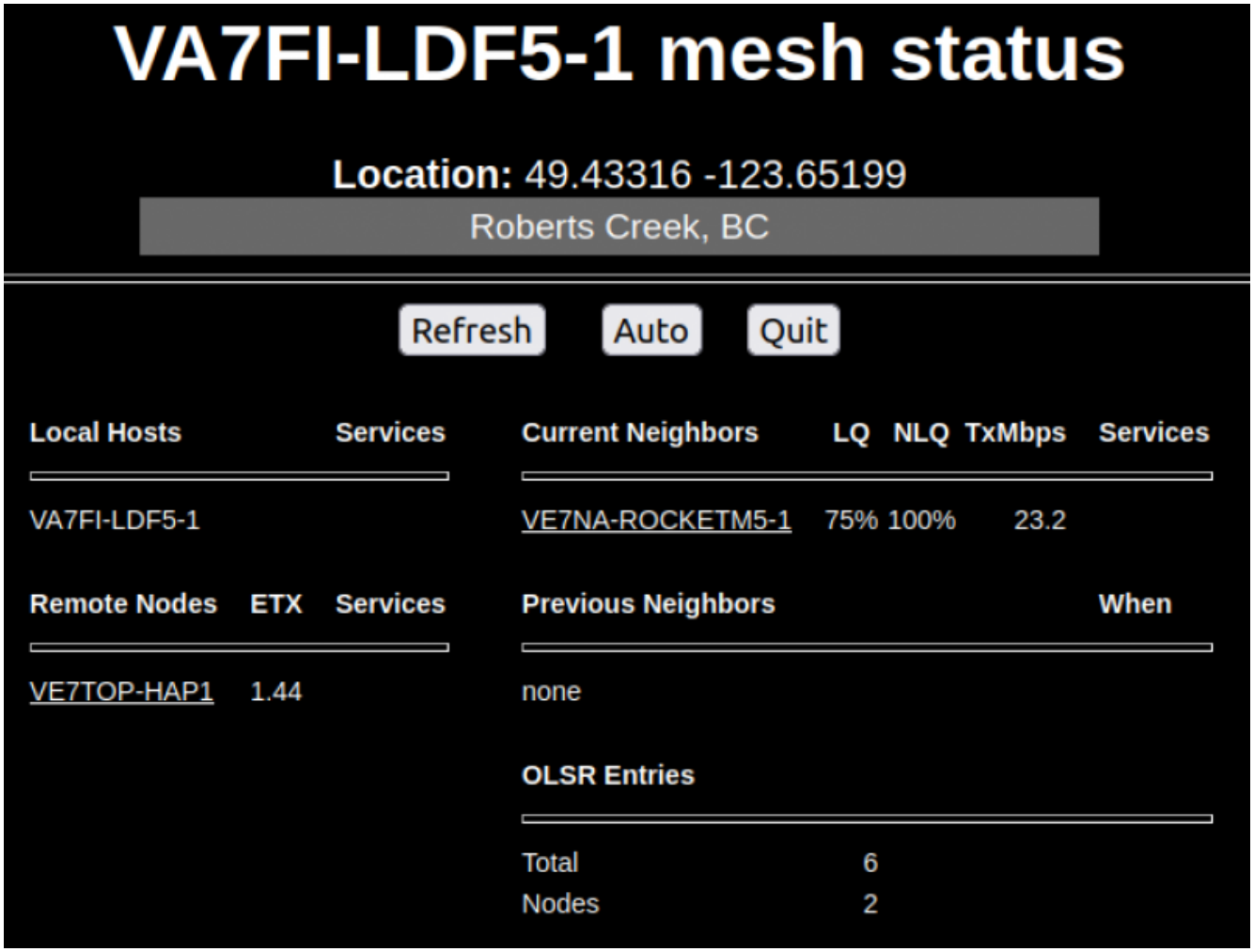


- Here are my settings:

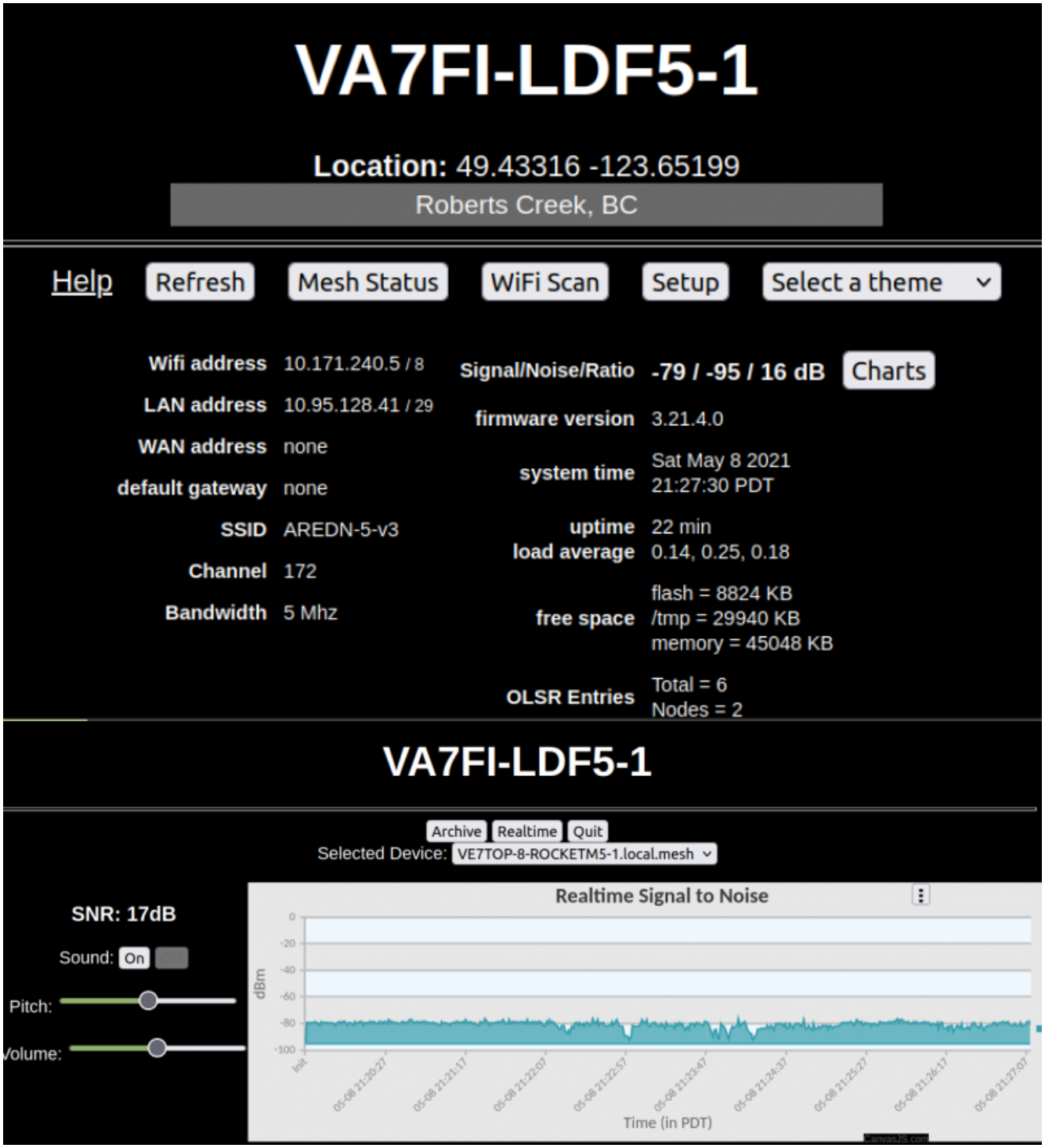


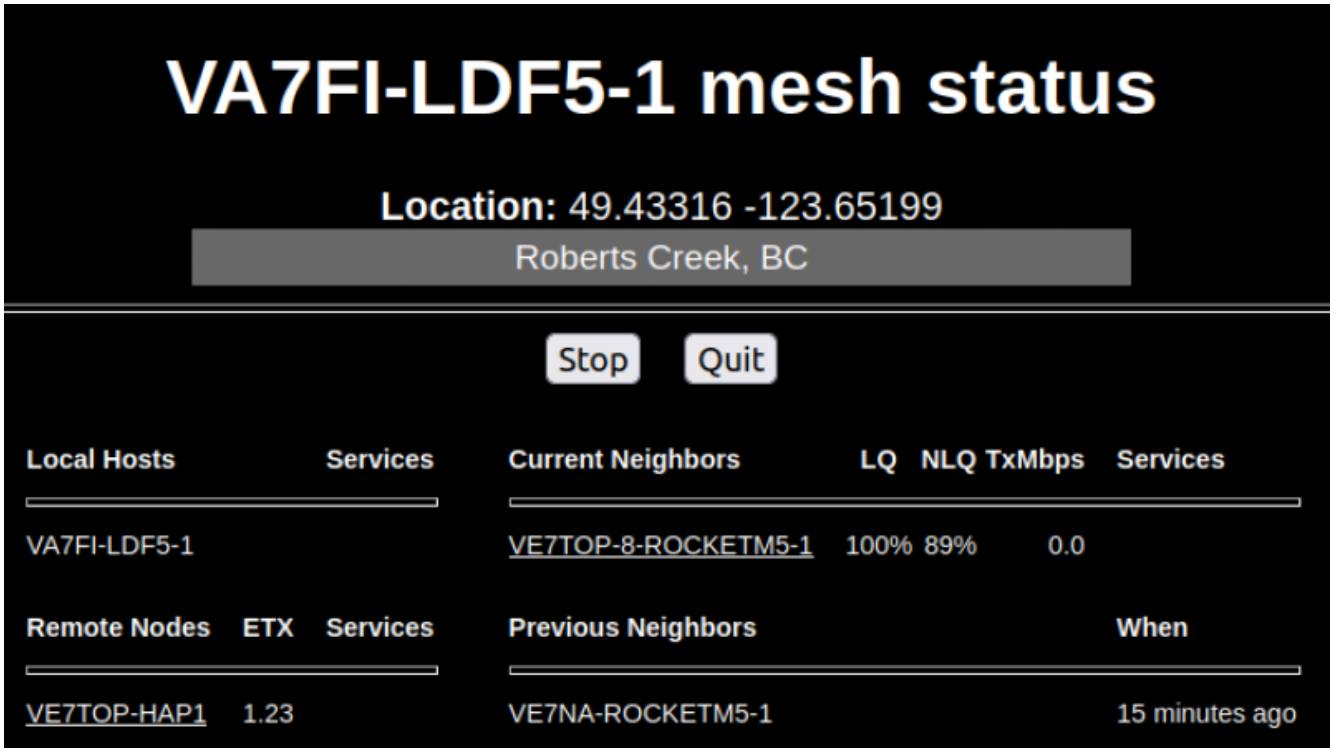
- For the first test, Chris used a dish (Fix Me!: add details). After adjusting the dish's directions and elevations, the best signal strength I received was above -60dBm (which is pretty impressive!) with an SNR of over 35dB:


VA7FI-LDF5-1
Location: 49.43316 -123.65199
Roberts Creek, BC
Help
Refresh
Mesh Status
WiFi Scan
Setup
Select a theme
Wifi address 10.171.240.5 / 8
LAN address 10.95.128.41 / 29
WAN address none
default gateway none
SSID AREDN-20-v3
Channel 172
Bandwidth 20 Mhz
Signal/Noise/Ratio -60 / -95 / 35 dB
Charts
firmware version 3.21.4.0
system time Sat May 8 2021 20:53:14 PDT
uptime 8 min
load average 0.56, 0.19, 0.08
free space flash = 8824 KB /tmp = 29940 KB memory = 44540 KB
OLSR Entries Total = 6 Nodes = 2
VA7FI-LDF5-1
Archive
Realtime
Quit
Selected Device:
Average signal for all connected stations
SNR: 38dB
Sound:
On
Pitch:
Volume:
Realtime Signal to Noise
dBm
Time (in PDT)
Signal

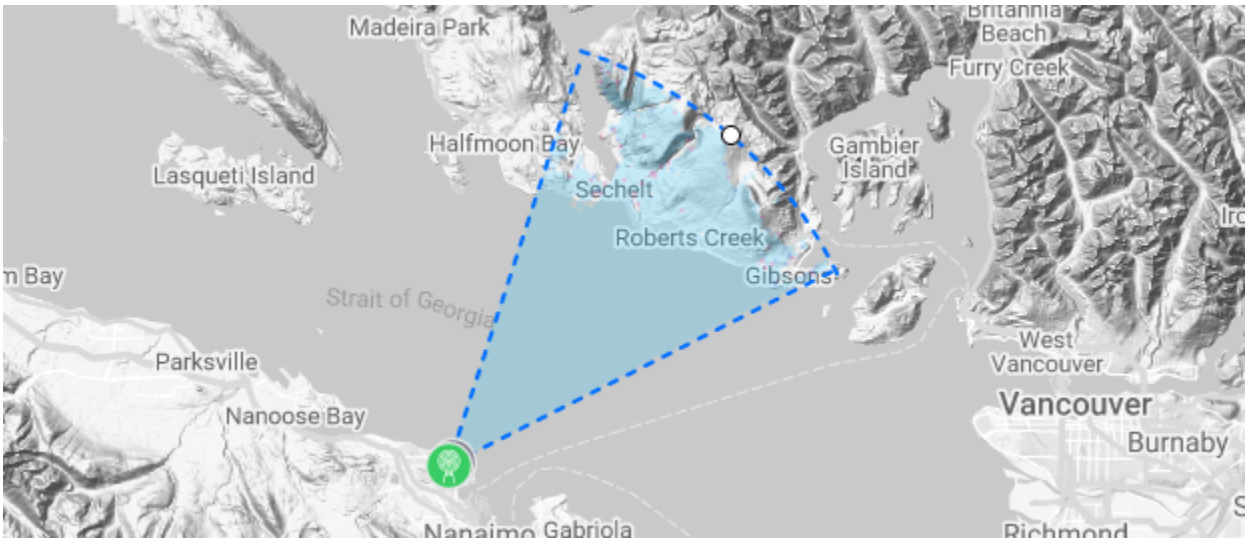


- For the second test, Chris switched to a 120° sector antenna (Fix Me!: add details). Here, the best signal strength I received was a bit above 80dBm with with an SNR of about 17dB:


VA7FI-LDF5-1
Location: 49.43316 -123.65199
Roberts Creek, BC
Help
Refresh
Mesh Status
WiFi Scan
Setup
Select a theme
Wifi address 10.171.240.5 / 8
LAN address 10.95.128.41 / 29
WAN address none
default gateway none
SSID AREDN-5-v3
Channel 172
Bandwidth 5 Mhz
Signal/Noise/Ratio -79 / -95 / 16 dB
Charts
firmware version 3.21.4.0
system time Sat May 8 2021 21:27:30 PDT
uptime 22 min
load average 0.14, 0.25, 0.18
free space flash = 8824 KB /tmp = 29940 KB memory = 45048 KB
OLSR Entries Total = 6 Nodes = 2
VA7FI-LDF5-1
Archive
Realtime
Quit
Selected Device: VE7TOP-8-ROCKETM5-1.local.mesh
SNR: 17dB
Sound: On
Pitch:
Volume:
Realtime Signal to Noise
dBm
Time (in PDT)



These two tests show that it is possible to establish a connection between Nanaimo and the Sunshine Coast. The 120° sector antenna might be pushing it a little bit, but a 60° sector antenna would be enough to cover Gibsons through Halfmoon Bay and would offer an additional 4dB of gain over the 120° sector antenna.



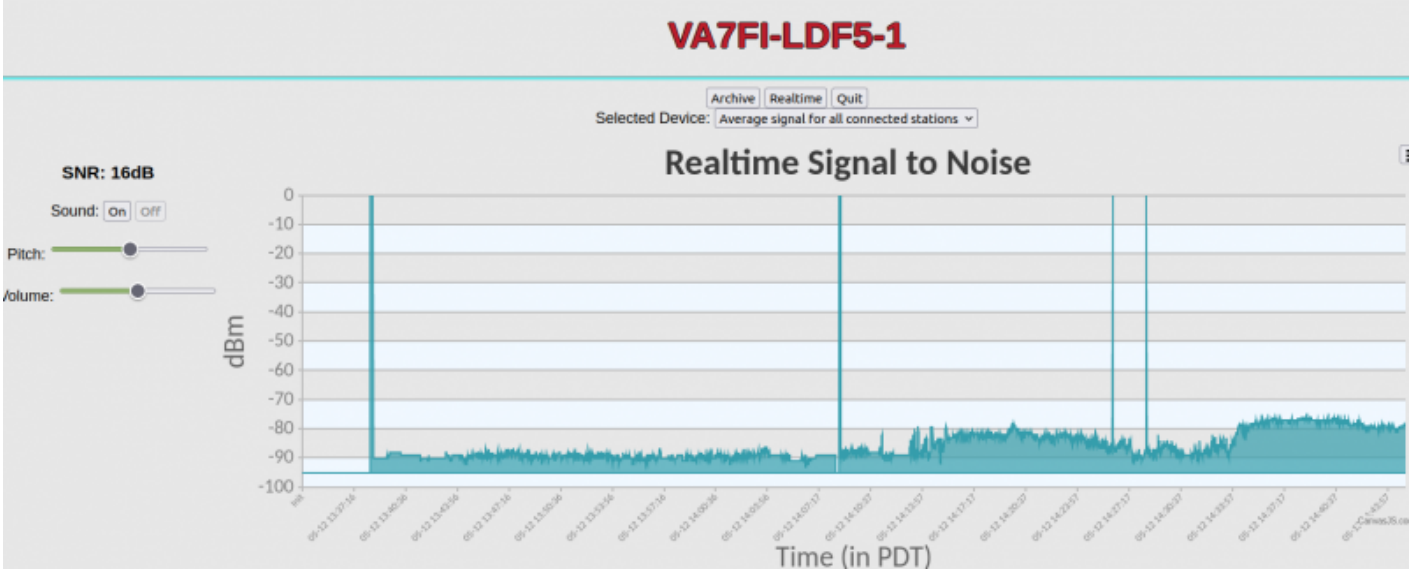
Aug 1, 2021

Today, I managed to install my AREDN dish up the tree, run the CAT5 to the house, and connect it to the hAP. I started working at 7:45 this morning and finished around 5pm (after climbing up and down three times).

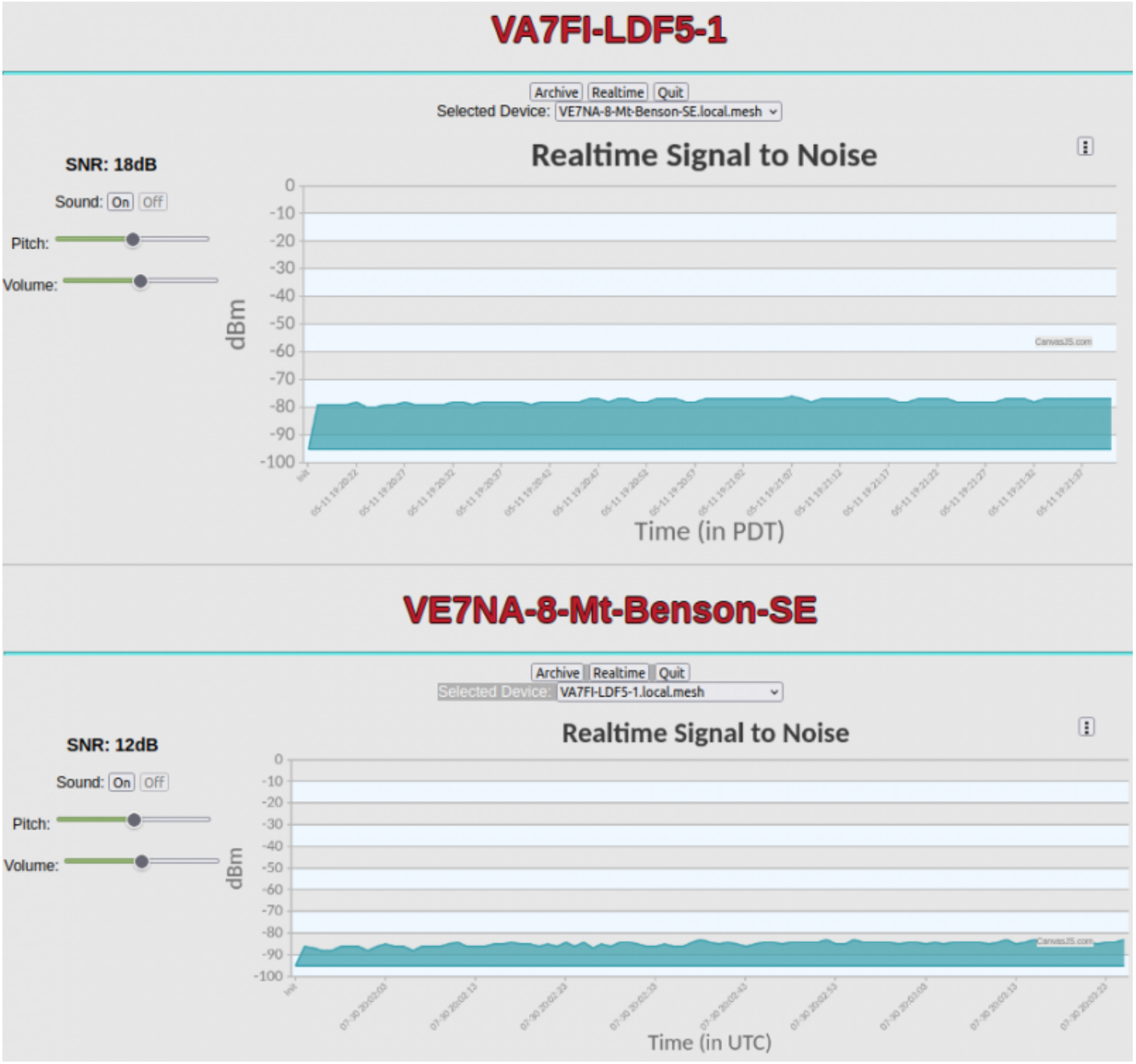
I aimed the dish roughly towards Mount Benson (222°), but unfortunately, I didn't manage to make a connection to the node there.

Oct 31, 2021

Yesterday, the folks on the Island went back to Mount Benson and adjusted the tilt on their antennas. After the adjustment, I started getting an intermittent signal. So today, I went back up the tree and used that signal to fine-tune the adjustment of my dish and managed to squeeze an extra 5-10 dB! Here's a graph of the signal before, during, and after the adjustment:



Unfortunately, it looks like I can hear the Mount Benson node 6-7 dB more strongly than it can hear me. I'm transmitting at 25 dBm. The equipment on mount Benson can transmit at 27 dBm.[2)]



Here's the status report pages for both nodes. It looks like I might be able to reach 1.6 Mbps, which is pretty impressive compared to VHF packet, but still pretty slow compared to the other stations.

VA7FI-LDF5-1 mesh status

Location: 49.43316 -123.65199
Roberts Creek, BC

Refresh Auto Quit

Local Hosts	Services
VA7FI-LDF5-1	

Remote Nodes	ETX	Services
VE7NA-3-Mt-Benson-NE	2.62	

Current Neighbors	LQ	NLQ	TxMbps	Services
VA7FI-HAP-1 (dtd)	100%	100%		
VE7NA-8-Mt-Benson-SE	100%	40%	1.6	

Previous Neighbors	When

VE7NA-8-Mt-Benson-SE mesh status

Location: 49.149815 -124.050796
Mount Benson 120 Degree Sector South East BW 5 Mhz CH 172

Stop Quit

Local Hosts	Services
VE7NA-8-Mt-Benson-SE	

Remote Nodes	ETX	Services
VE7GDE-HAP-1	1.10	

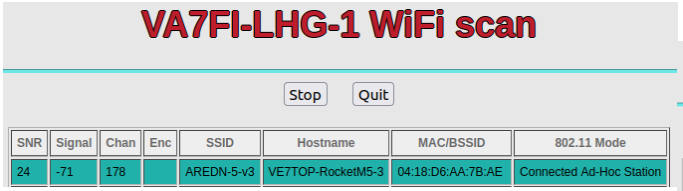
Current Neighbors	LQ	NLQ	TxMbps	Services
VA7DXX-BENSON-LINK	92%	100%	19.5	
VA7FI-LDF5-1	56%	100%	6.5	
VE7GDE-BENSON-LINK	100%	100%	22.0	
VE7NA-3-Mt-Benson-NE (dtd)	100%	100%		
VE7ODG-BENSON-LINK	63%	100%	4.9	

Sept 29, 2022

This afternoon, Chris (VE7TOP), Devan (VE7LSE) and ran a few tests with a 60° sector antenna in Nanaimo and an LHG dish in Roberts Creek:

The results were very promising:

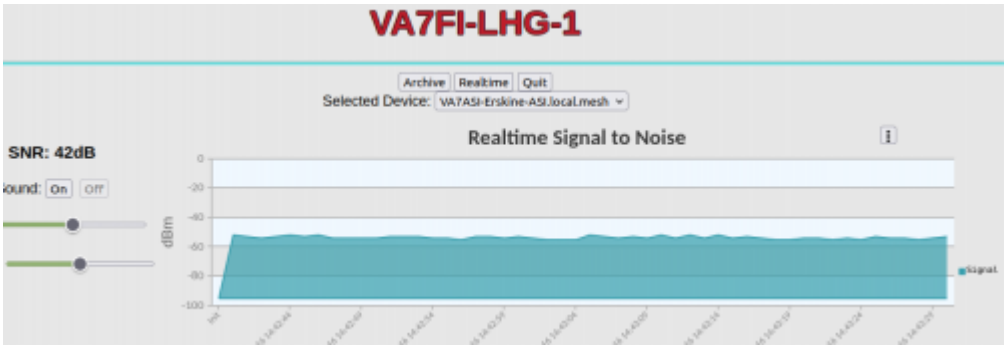
The sector antenna was at 24 dB SNR:



While point-to-point with another dish was 38 dB SNR:

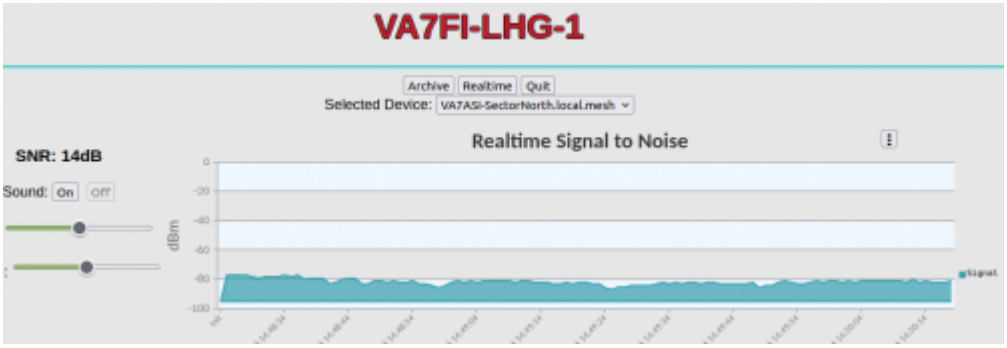
While I was there, I scanned the portion of the Island that I could see for other signals and was incredibly surprised that I could connect to a few other stations. From south to north:

VA7ASI-Erskine-ASI



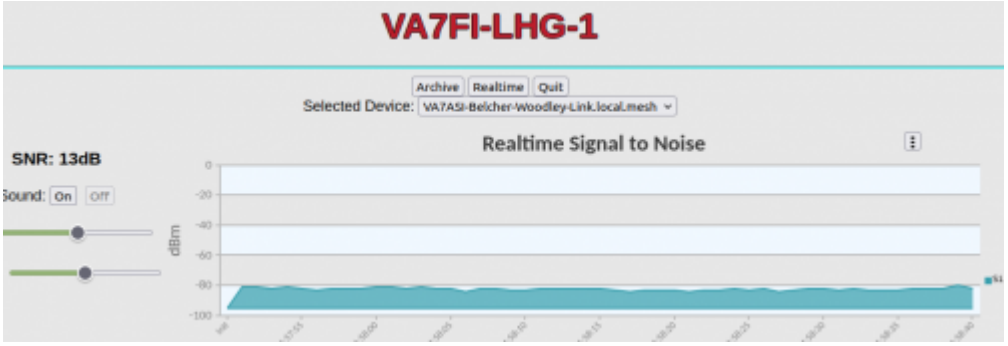
- Ch: 140
- Bearing: 217°
- SNR: 42 dB 😮❗❗

VA7ASI-SectorNorth



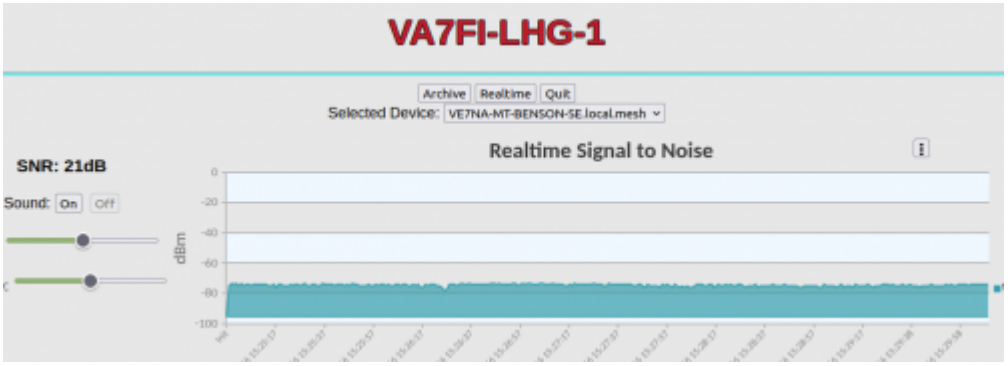
- Ch: 133
- Bearing: 219°
- SNR: 14 dB

VA7ASI-Belcher-Woodley-Link



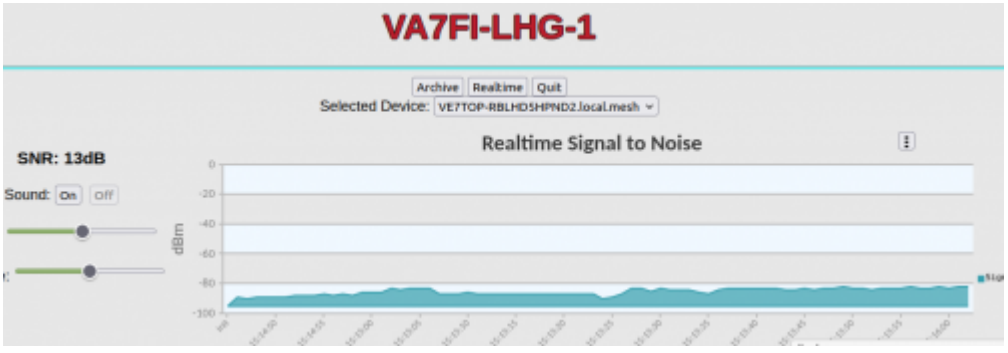
- Ch: 135
- Bearing: 219°
- SNR: 13 dB

VE7NA-MT-BENSON-SE



- Ch: 172
- Bearing: 238°
- SNR: 21 dB

VE7TOP-RBLHD5HPND2



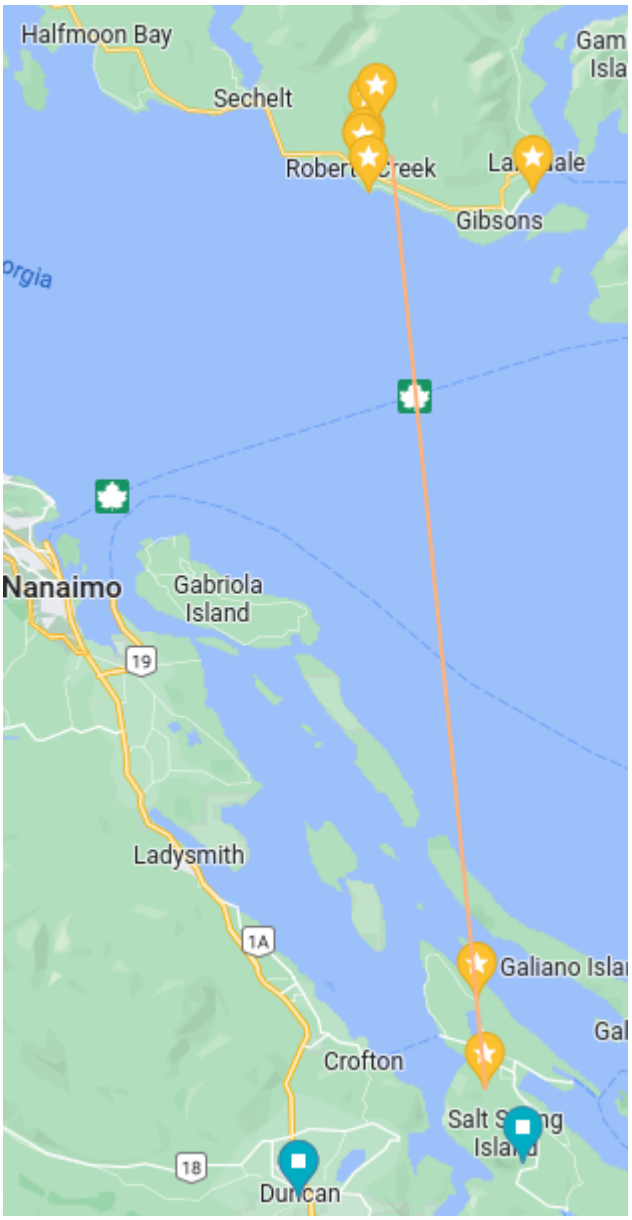
- Ch: 133
- Bearing: 243°
- SNR: 12 dB

Big thanks to Chris and Devan for their time and patience! 😃

Next test will be when the sector antenna is installed at Lost Lake. To be continued…

Footnote

Using the coordinates for VA7ASI-Erskine-ASI and VA7ASI-Fernwood-Erskine, I can now see why I got such a good signal from the dish that's pointed north.



1)

One of these computers is a cheap laptop that I use as a Linux Server to host different services on AREDN.

2)

25 dBm = $10^{2.5}$ mW ≈ 320 mW
27 dBm = $10^{2.7}$ mW ≈ 500 mW