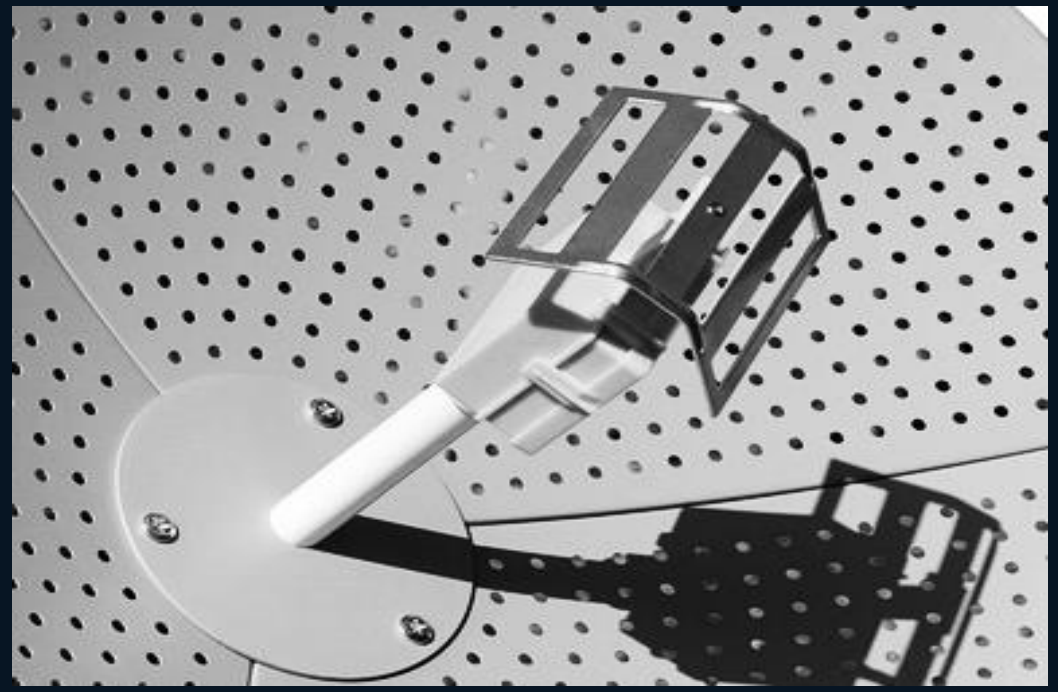
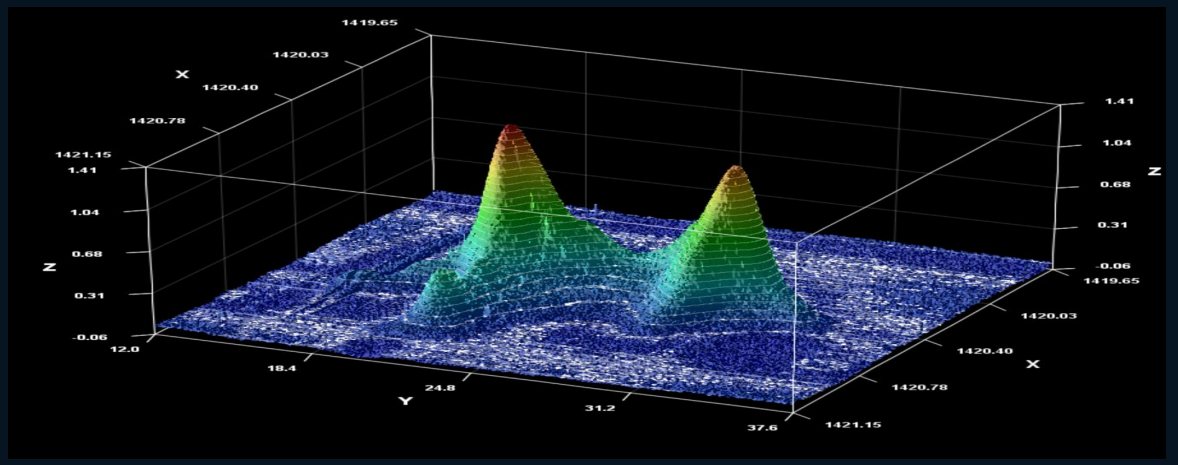
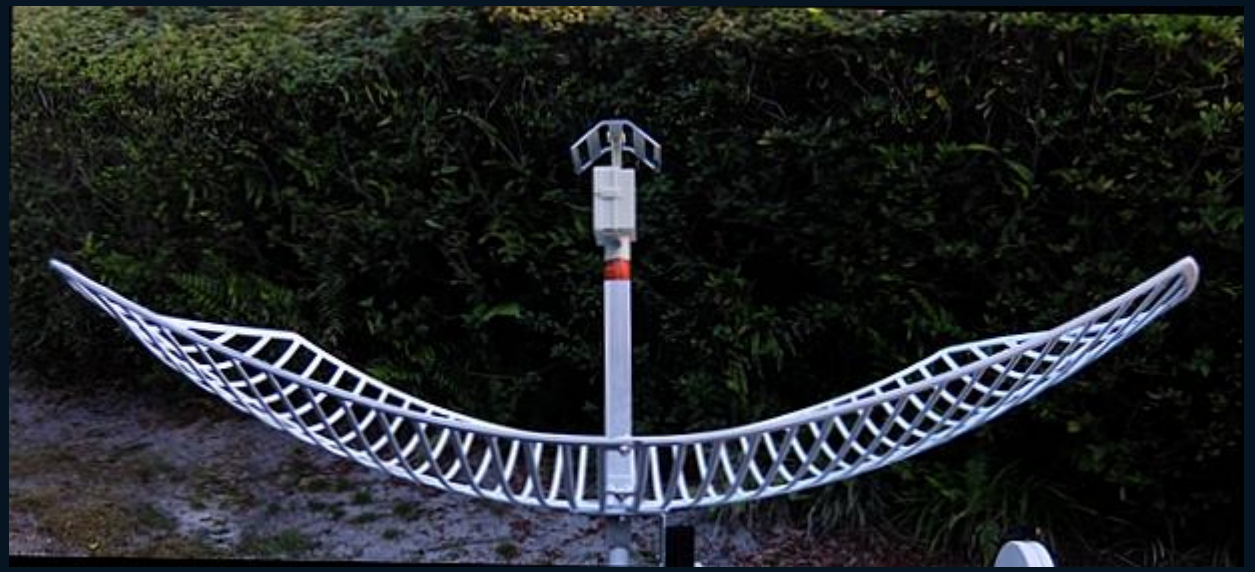
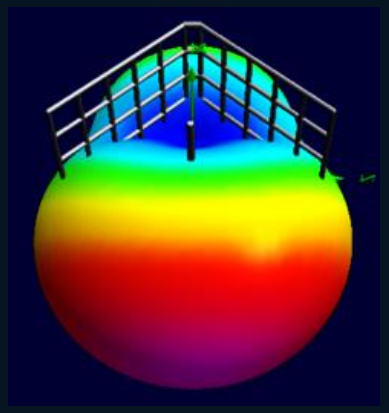
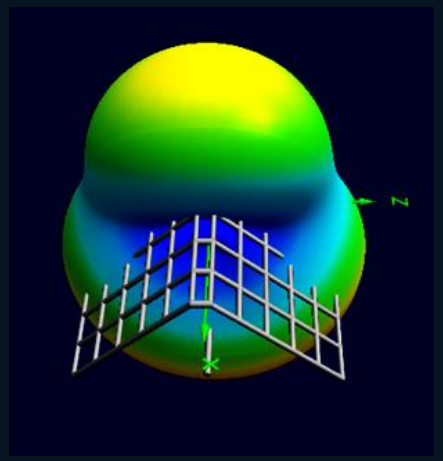
Kraken Discovery Dish 1420 MHz Feed Evaluation
using a 1m WiFi Parabolic Reflector











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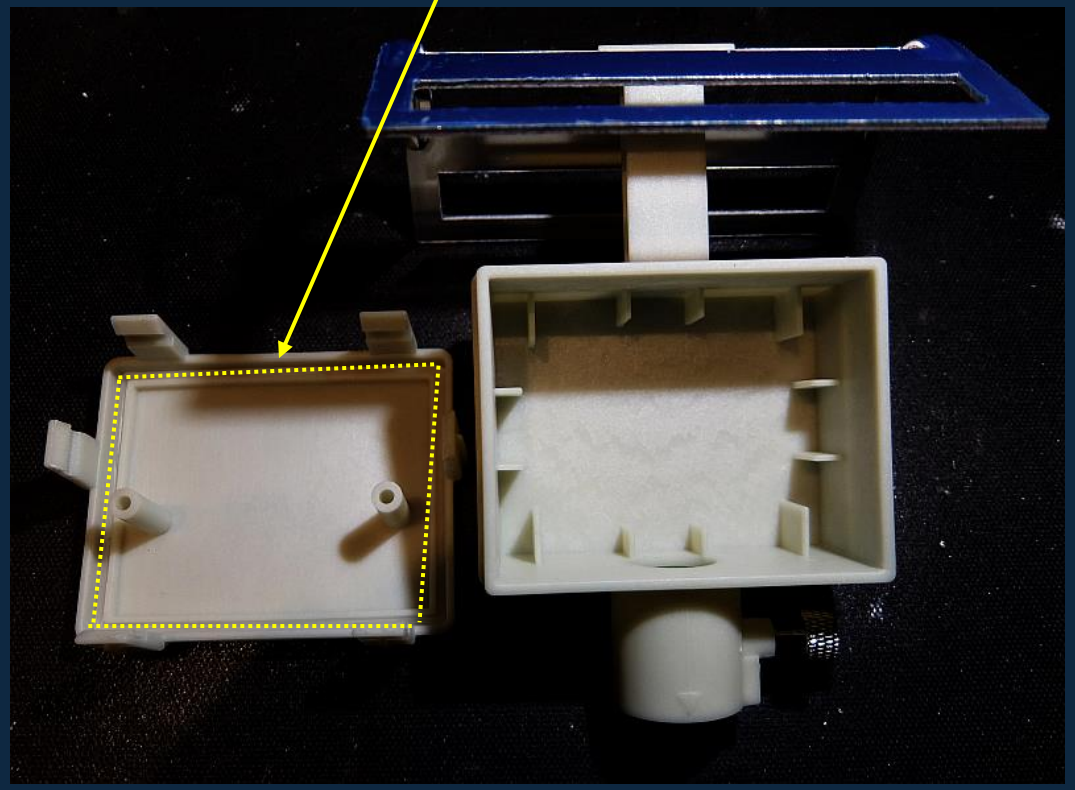
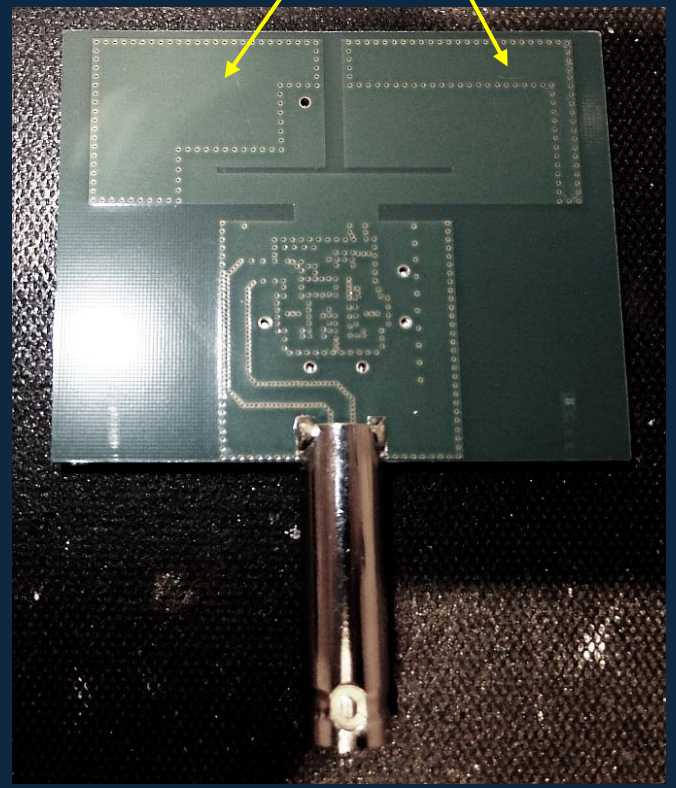
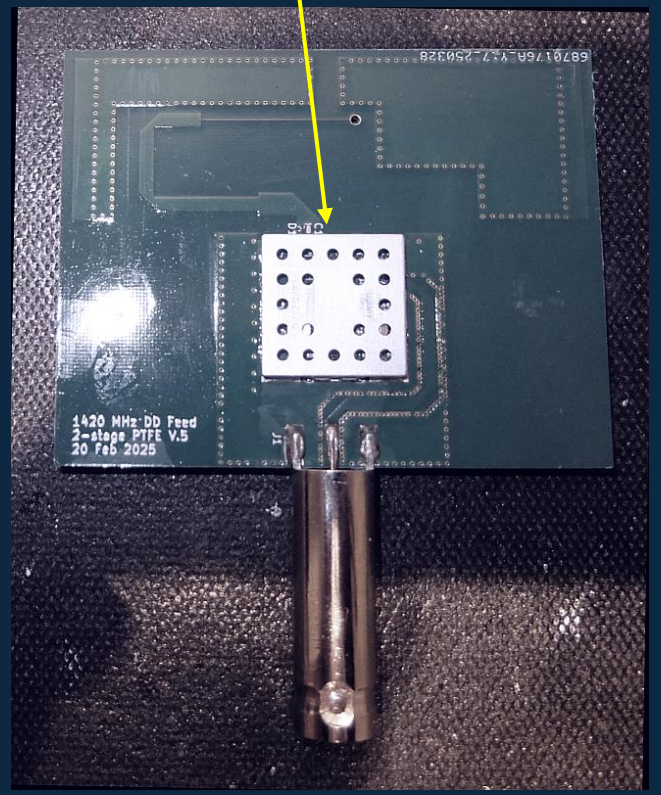
Kraken Discovery Dish 1420 MHz Feed Evaluation Construction

Box has Weather-Seal around perimeter



Antenna is closely coupled to LNA to Minimize Noise Figure (loss)





Kraken Discovery Dish 1420 MHz Feed Evaluation
LNA

qorvo

QPL9547

0.1 ~ 6 GHz Ultra Low-Noise Amplifier

Qorvo Q
optimized for 5G Massive MIMO (Multiple Input Multiple Output) applications. At 1.9GHz, the amplifier typically provides 19.5dB gain, +39dBm OIP3 at a 65mA bias setting, and a noise figure of 0.3dB.

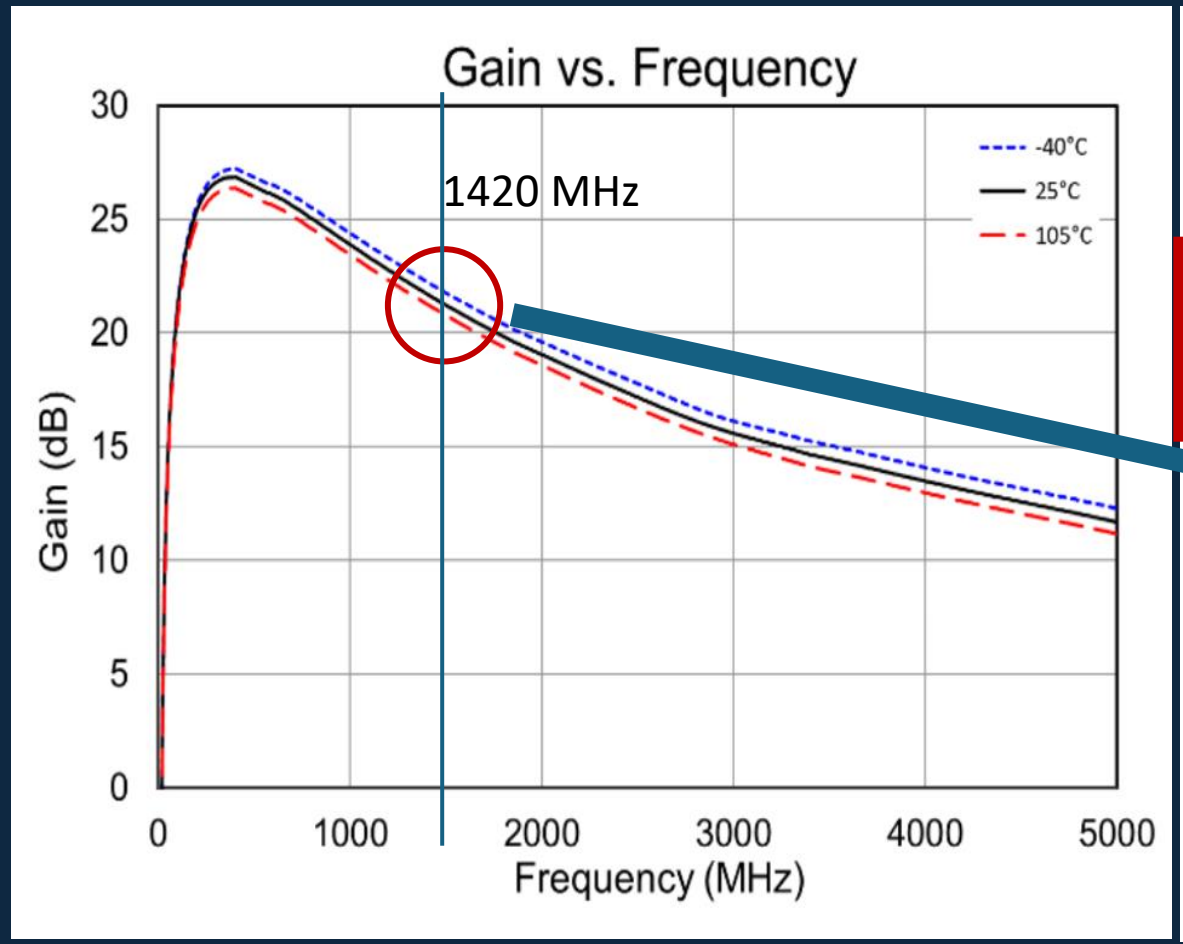
Key Features

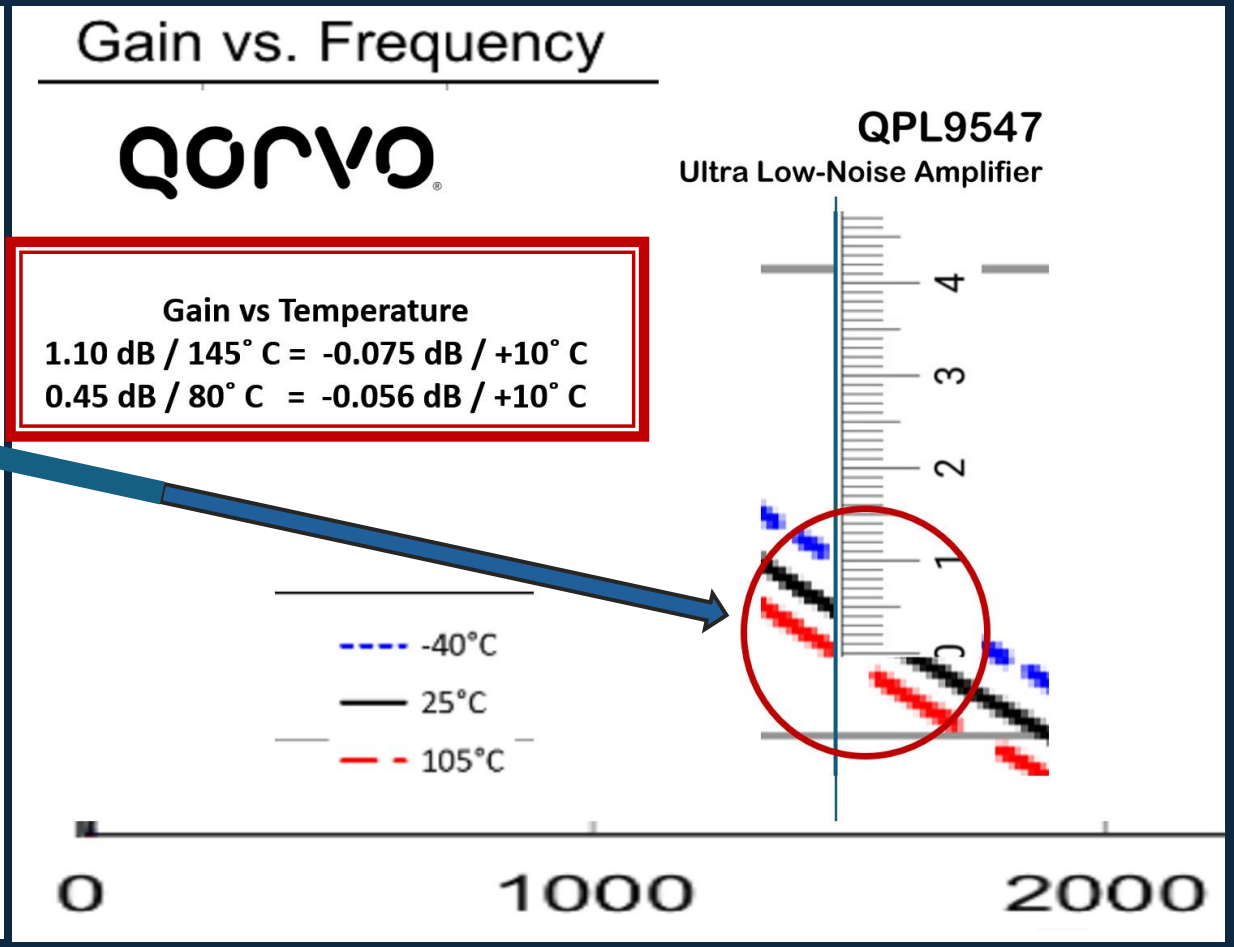
- 0.1-6 GHz Operational Bandwidth
  - **Wide bandwidth: operates from 0.1GHz to 6 GHz**
  - **Ultra-low noise: 0.3 db NF @ 1.9 GHz**
  - **Gain: 19.5 dB typ.**
  - **OIP3: +39 dBm typ.**

Qorvo QPL9547 0.1GHz to 6.0GHz Ultra Low-Noise LNA

Kraken Discovery Dish 1420 MHz Feed Evaluation
LNA

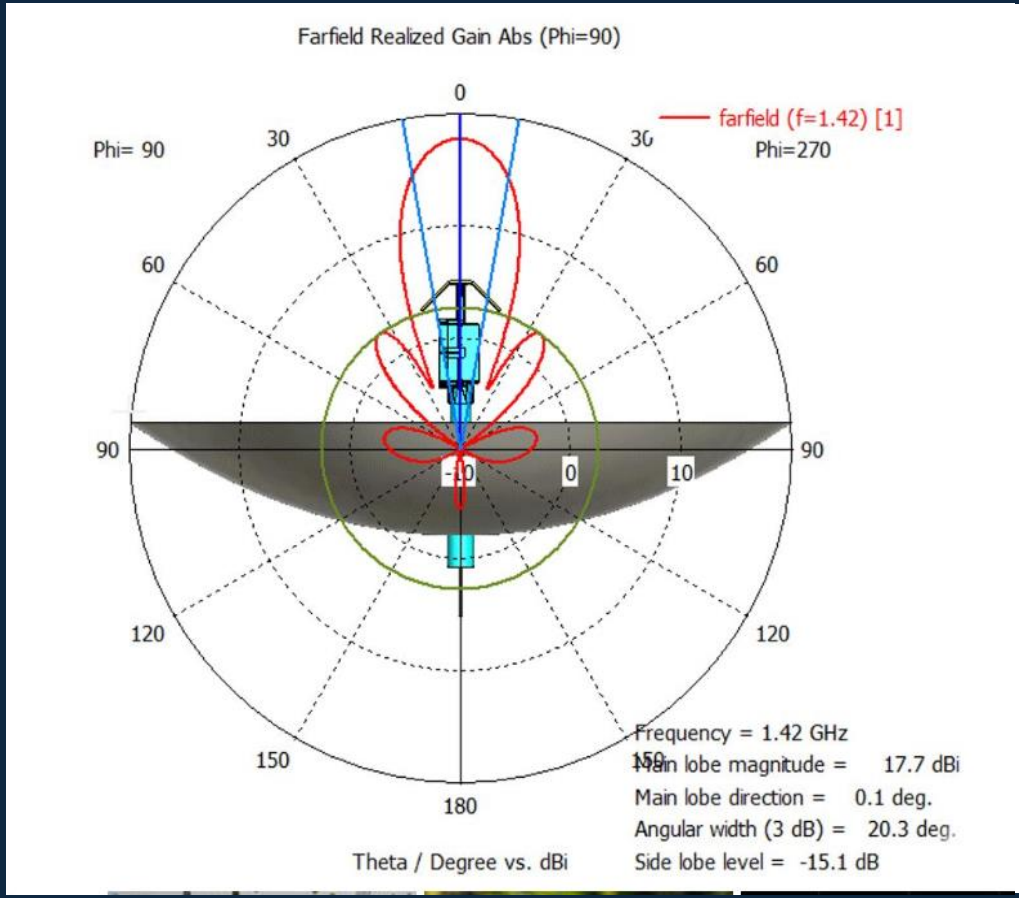
Qorvo QPL 9547 LNA Information
Amplifier Gain vs Temperature Stability *(= Very Stable)*

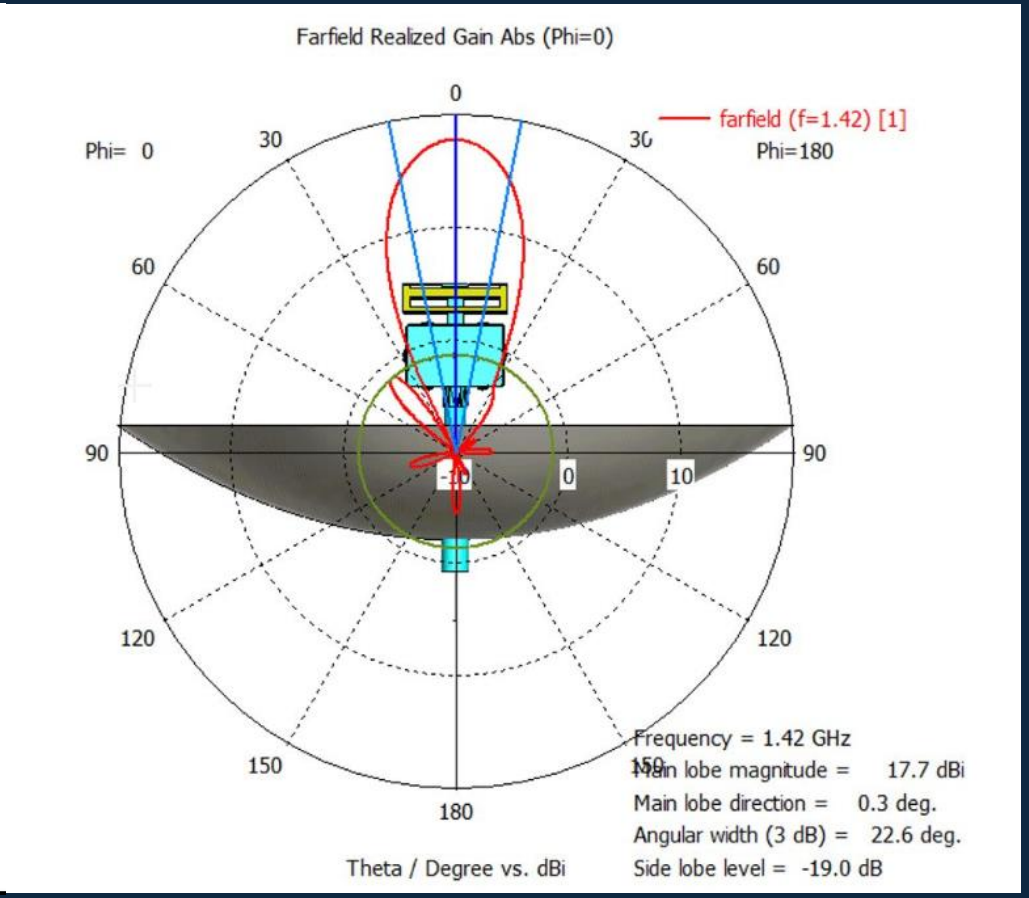




Kraken Discovery Dish 1420 MHz Feed Evaluation

Kraken information : Antenna Beam Patterns



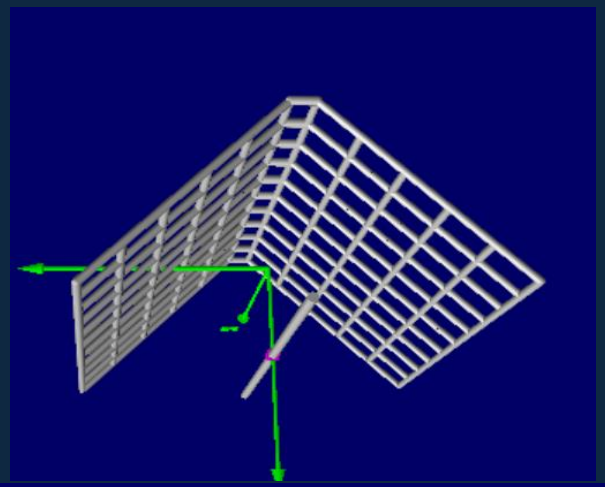


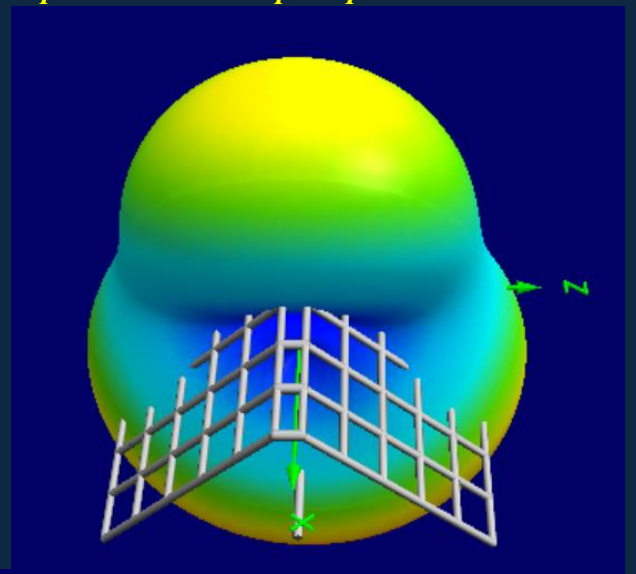
Kraken Discovery Dish 1420 MHz Feed Evaluation

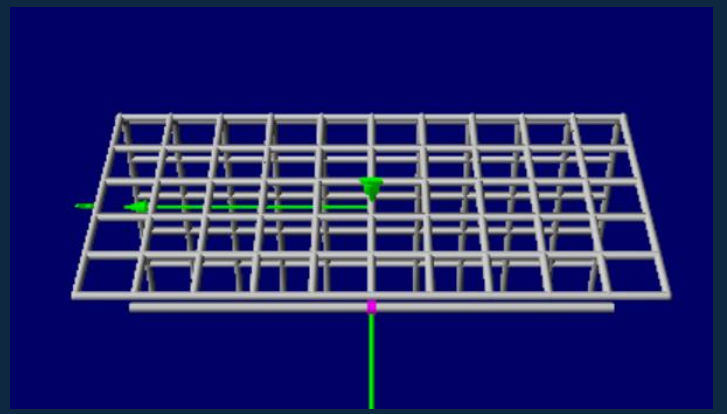
4NEC2 Numerical Electromagnetics Code Dipole/Reflector Analysis

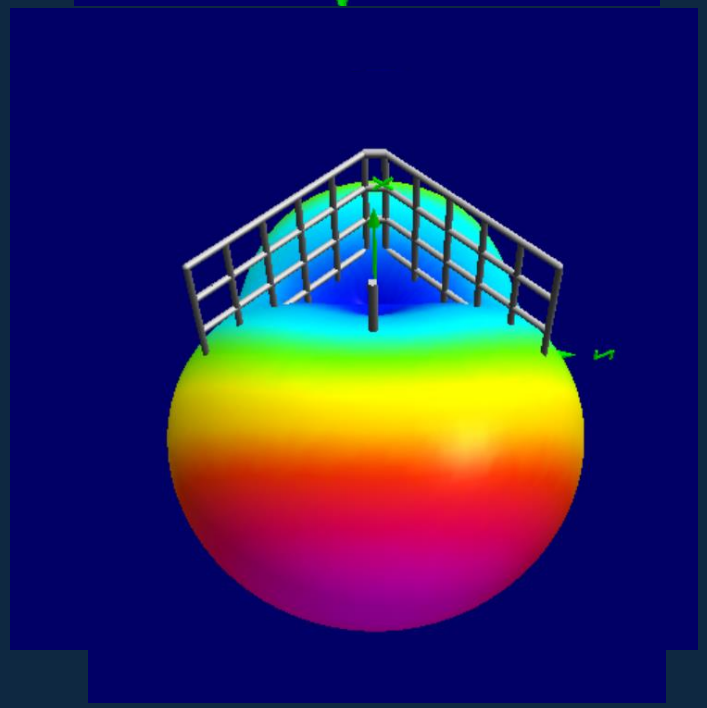
by alex pettit

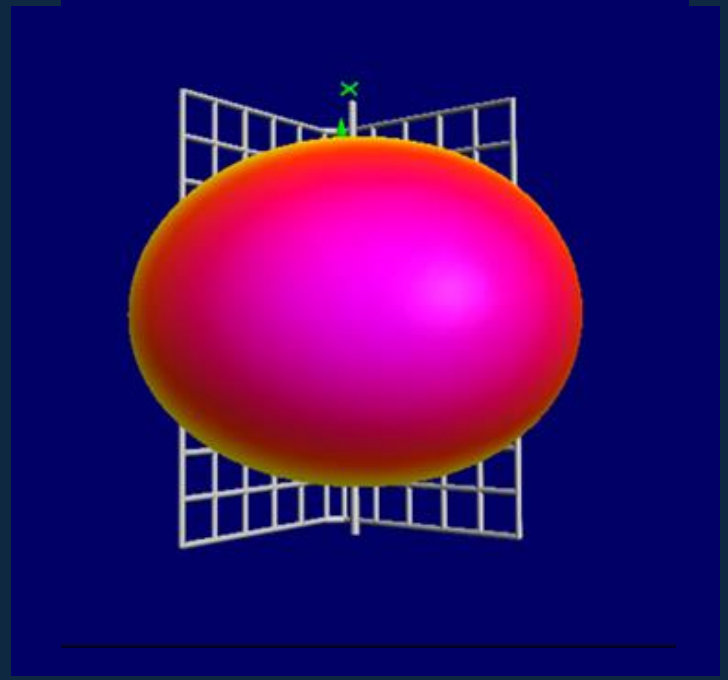
The actual antenna is more complex than this simple dipole .

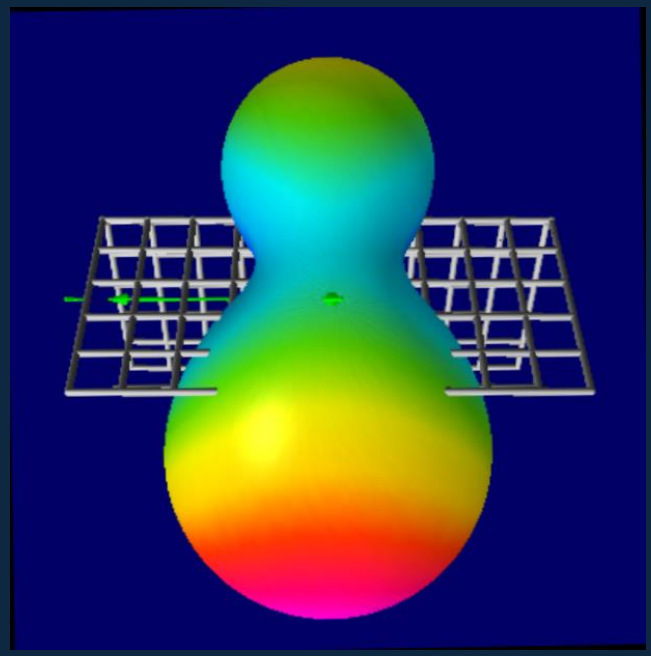












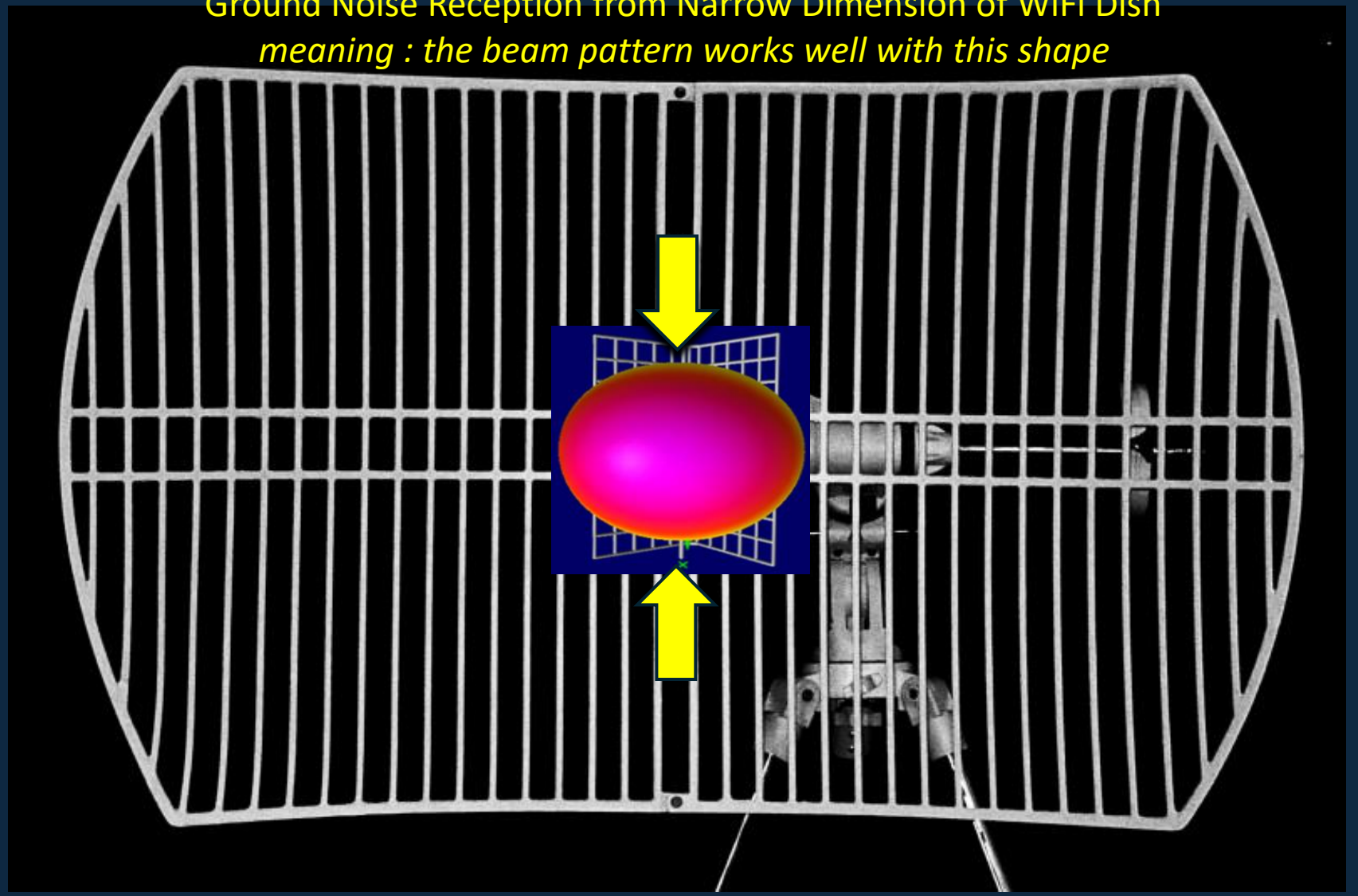
Kraken Discovery Dish 1420 MHz Feed Evaluation

4NEC2 Numerical Electromagnetics Code Dipole/Reflector Analysis

The actual antenna is more complex than this simple dipole .

Narrow Out-of-Axis Beam Pattern Minimizes
Ground Noise Reception from Narrow Dimension of WiFi Dish

meaning : the beam pattern works well with this shape



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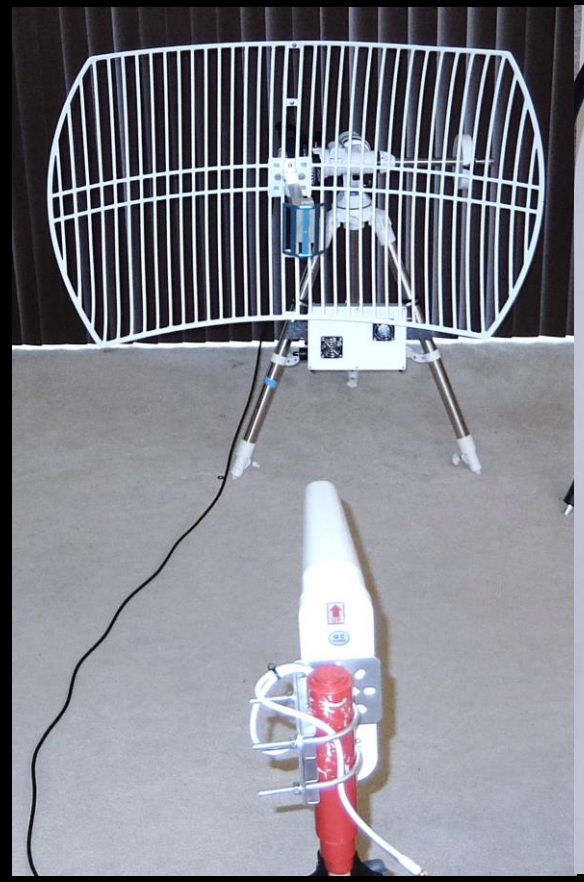
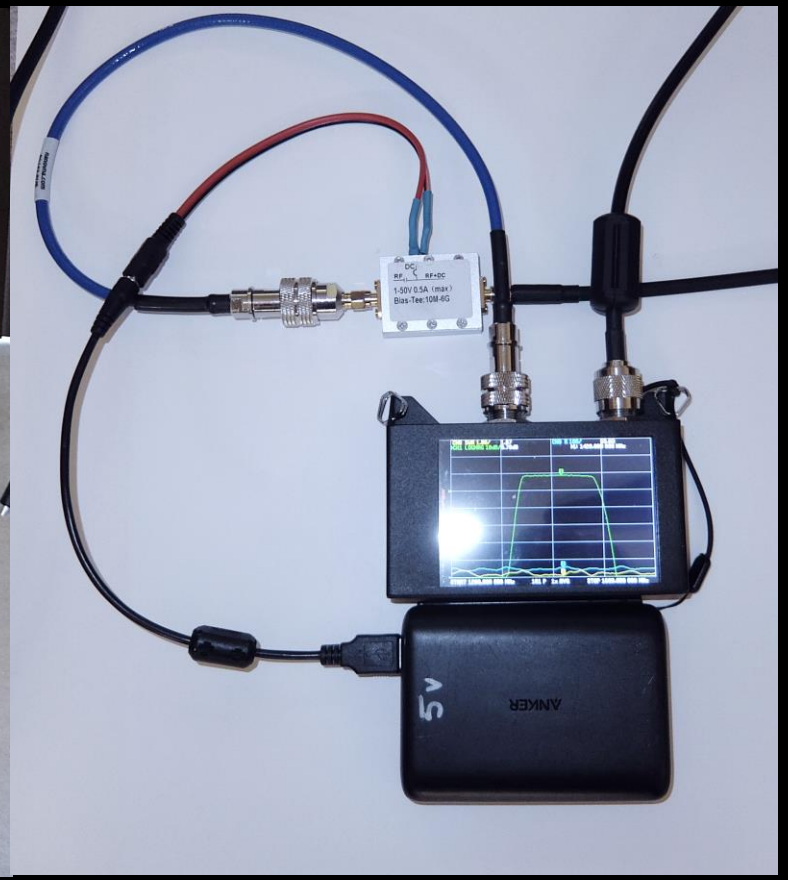
Kraken Discovery Dish 1420 MHz Feed Evaluation
Band Pass Filter Characteristics : 1380 – 1490 MHz





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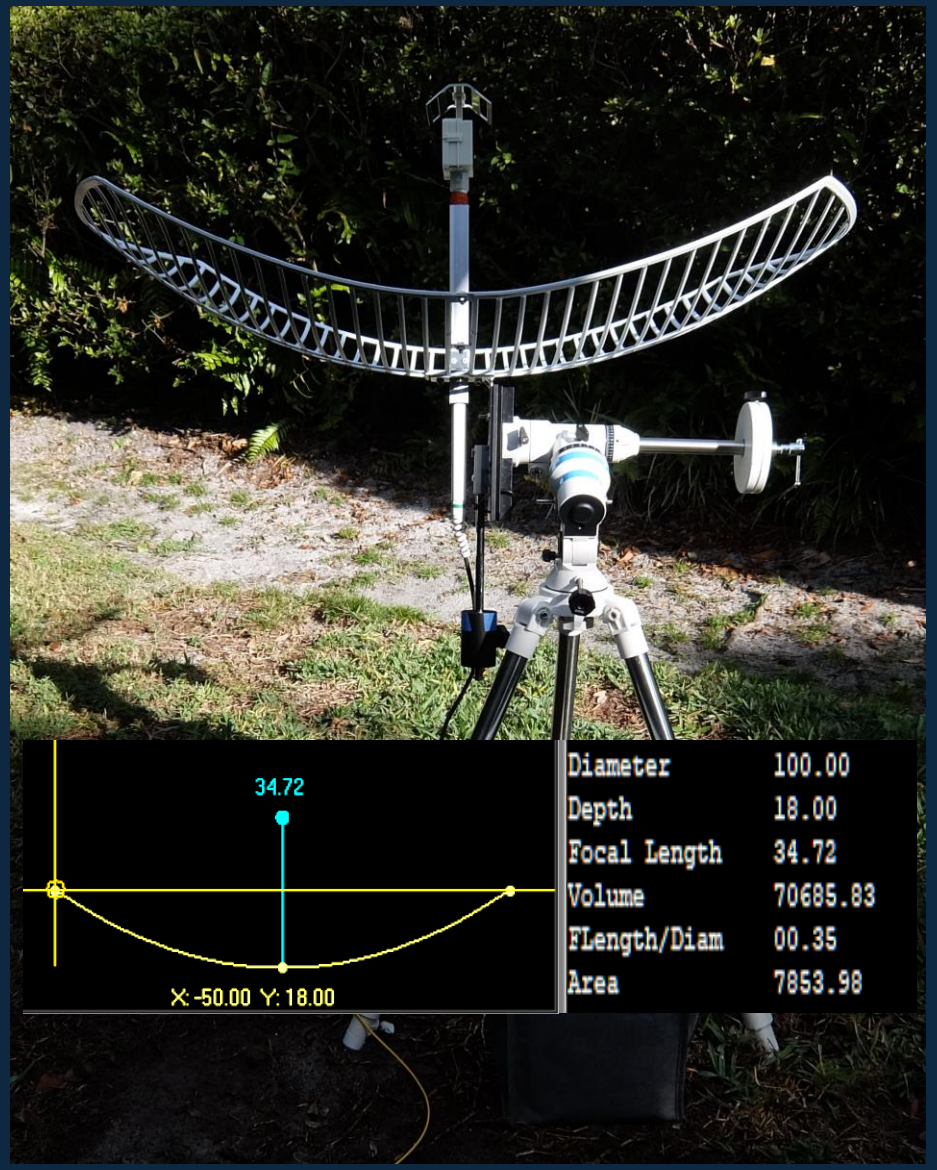
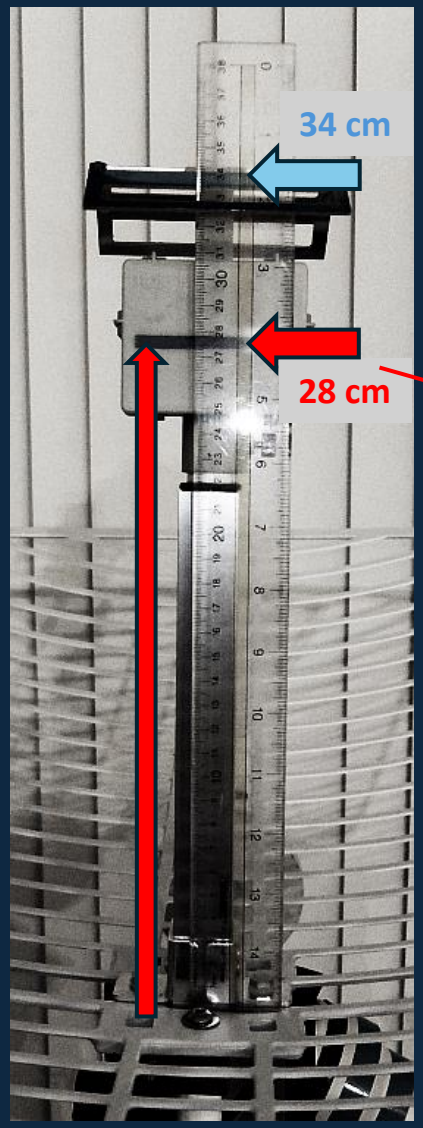
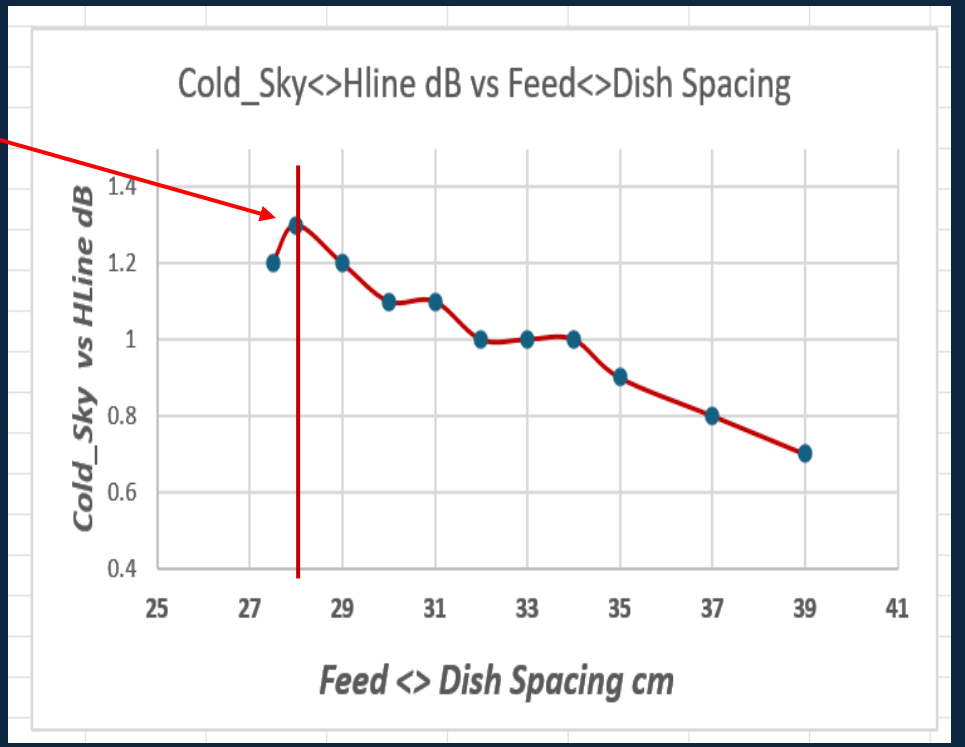
Kraken Discovery Dish 1420 MHz Feed Evaluation
WiFi Dish<>Feed Spacing Optimization

Kraken Discovery Feed 1420 MHz Dipole
Kraken Discovery Feed H1 Internal LNA
Nooelec 1m WiFi Grid Dish







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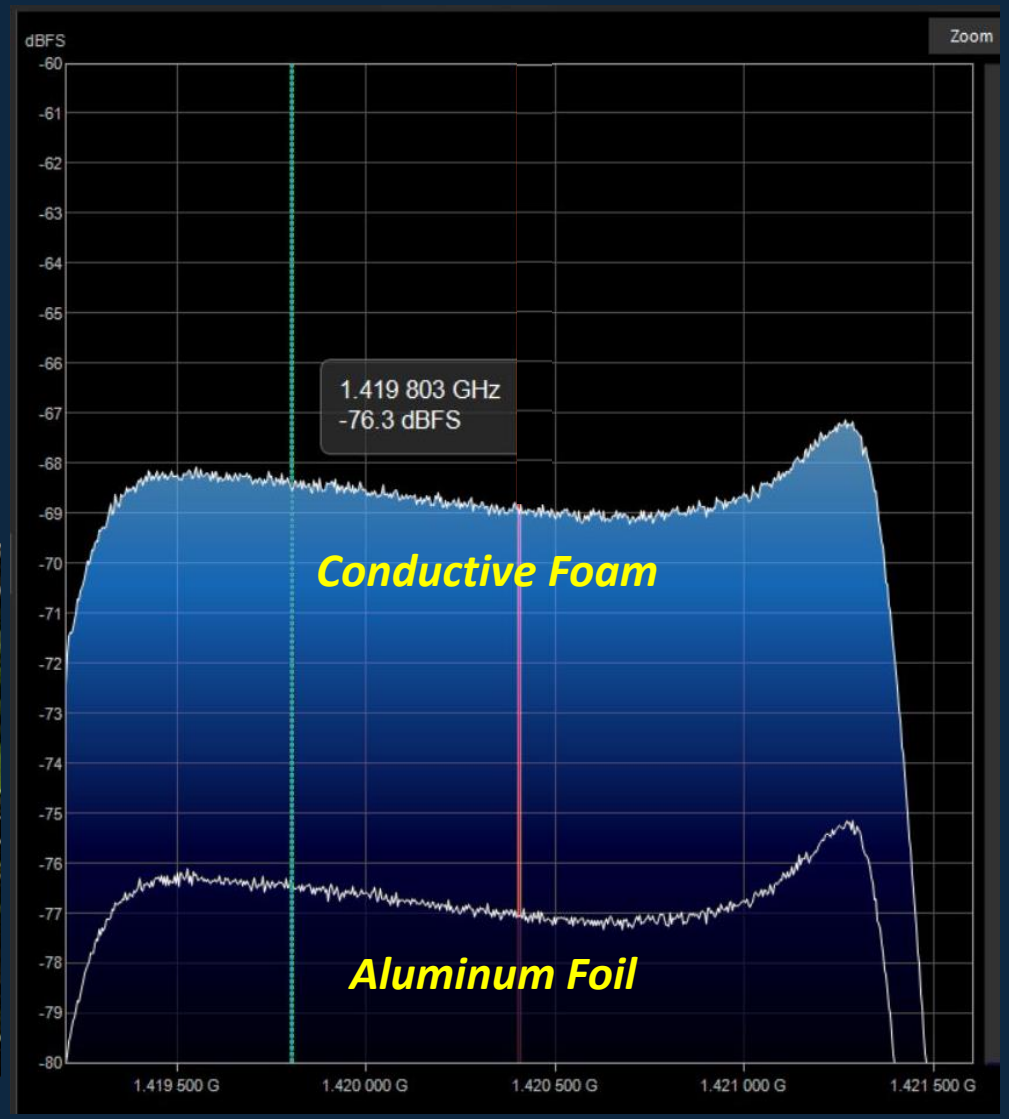
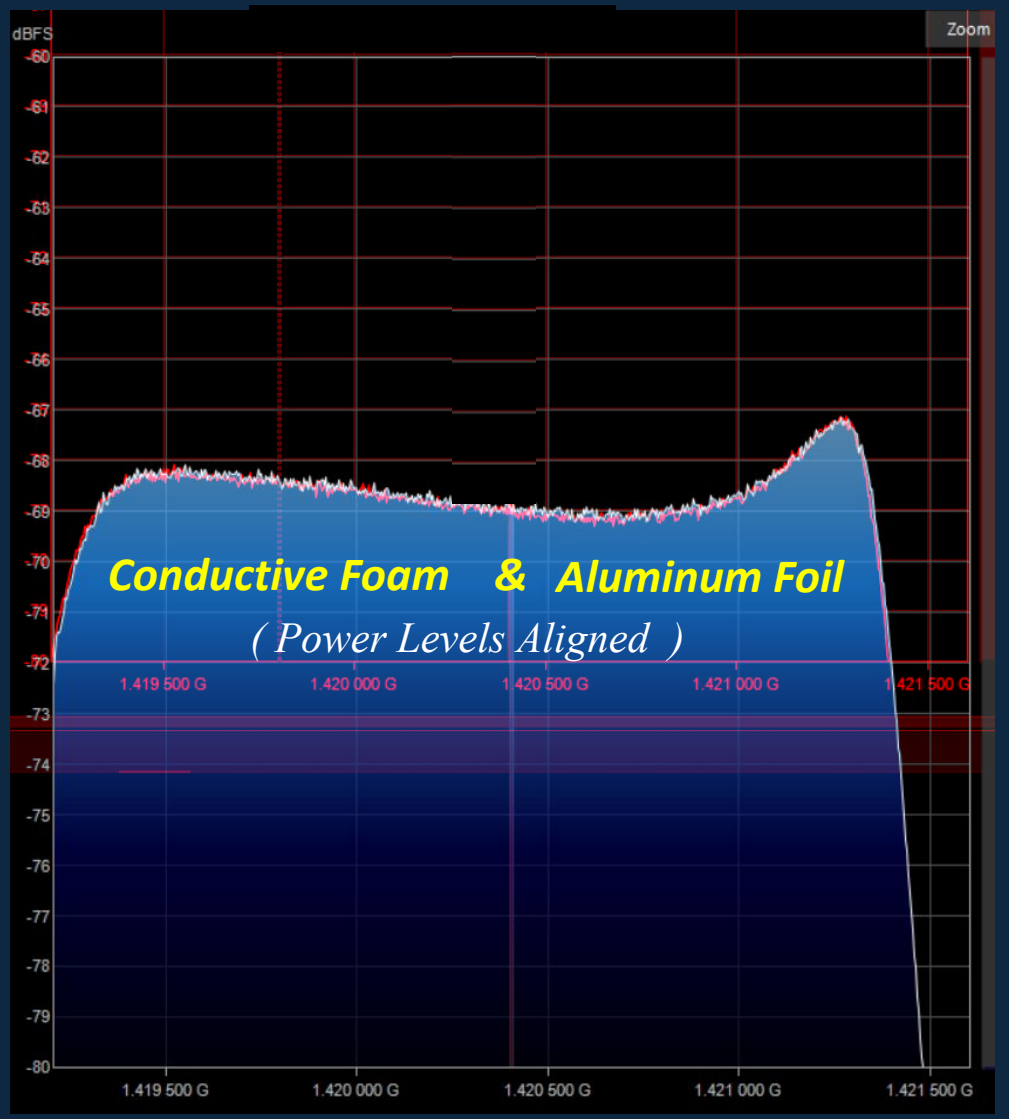
Kraken Discovery Dish 1420 MHz Feed Evaluation
IF_avg Background Correction
Materials Evaluation : *Aluminum Foil works for this application (Conductive Foam Box has a bit less noise)*





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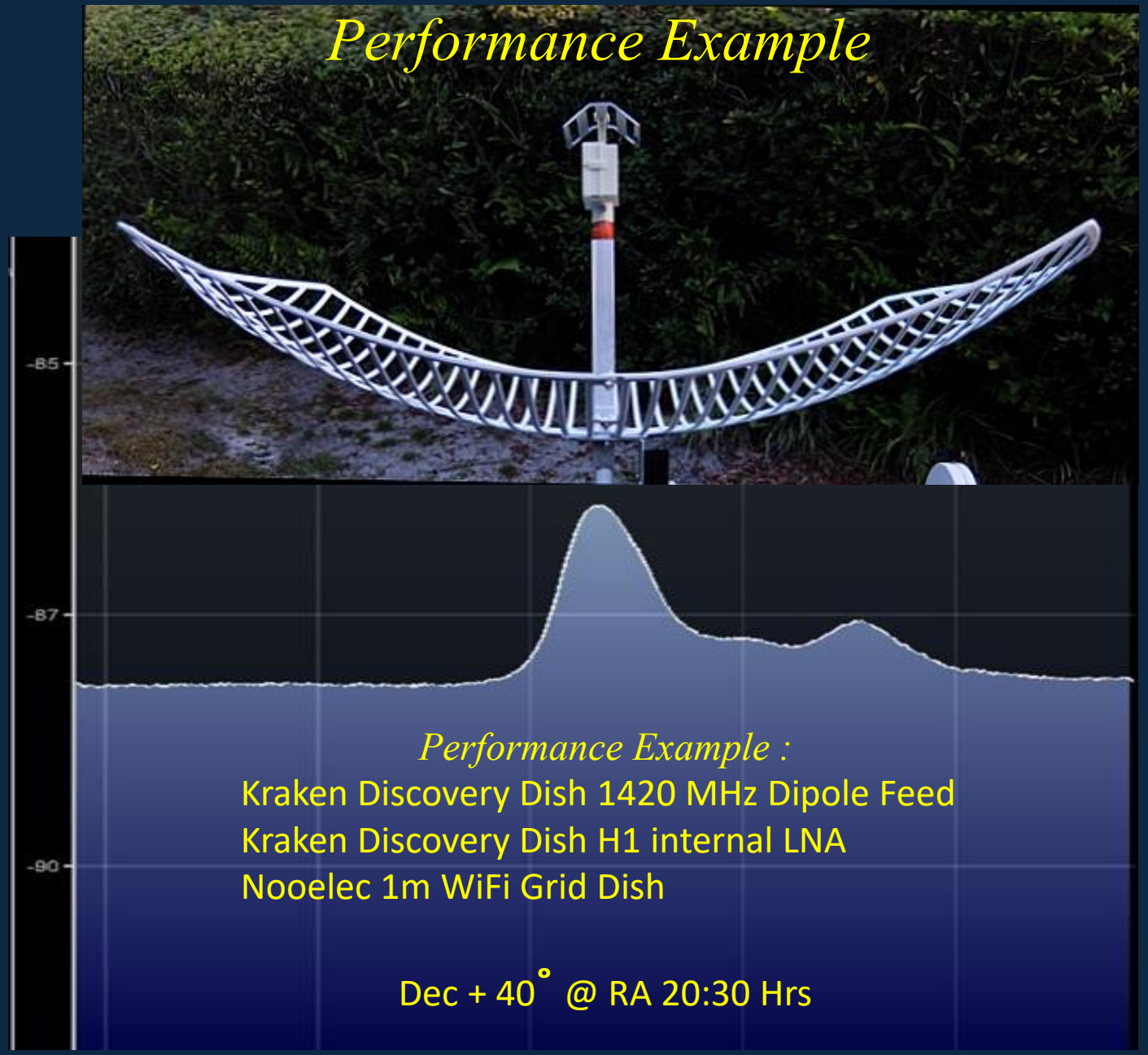
Performance Example



Performance Example :

Kraken Discovery Dish 1420 MHz Dipole Feed

Kraken Discovery Dish H1 internal LNA

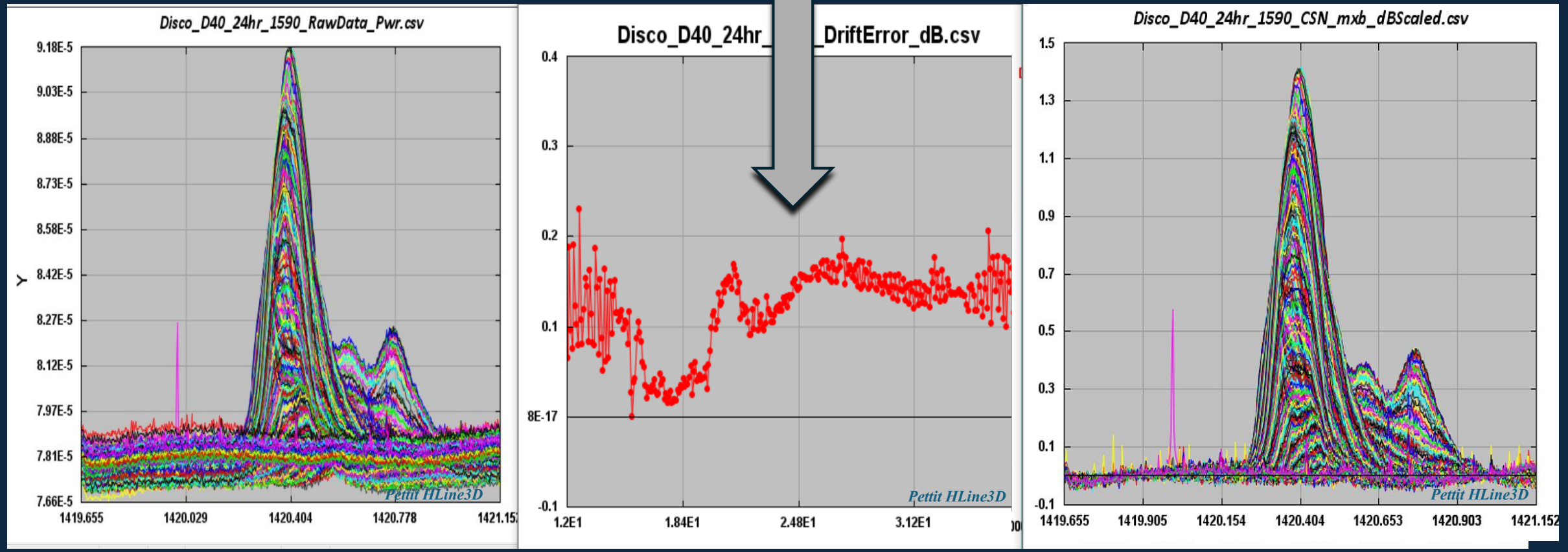
Nooelec 1m WiFi Grid Dish

Dec + 40° @ RA 20:30 Hrs

Kraken Discovery Dish 1420 MHz Dipole Feed
Kraken Discovery Dish H1 internal LNA
Nooelec 1m WiFi Grid Dish
Dec + 40° @ 24 hour Drift Scan

Good Combination : High Quality Data & Low Frame-Frame Drift Error

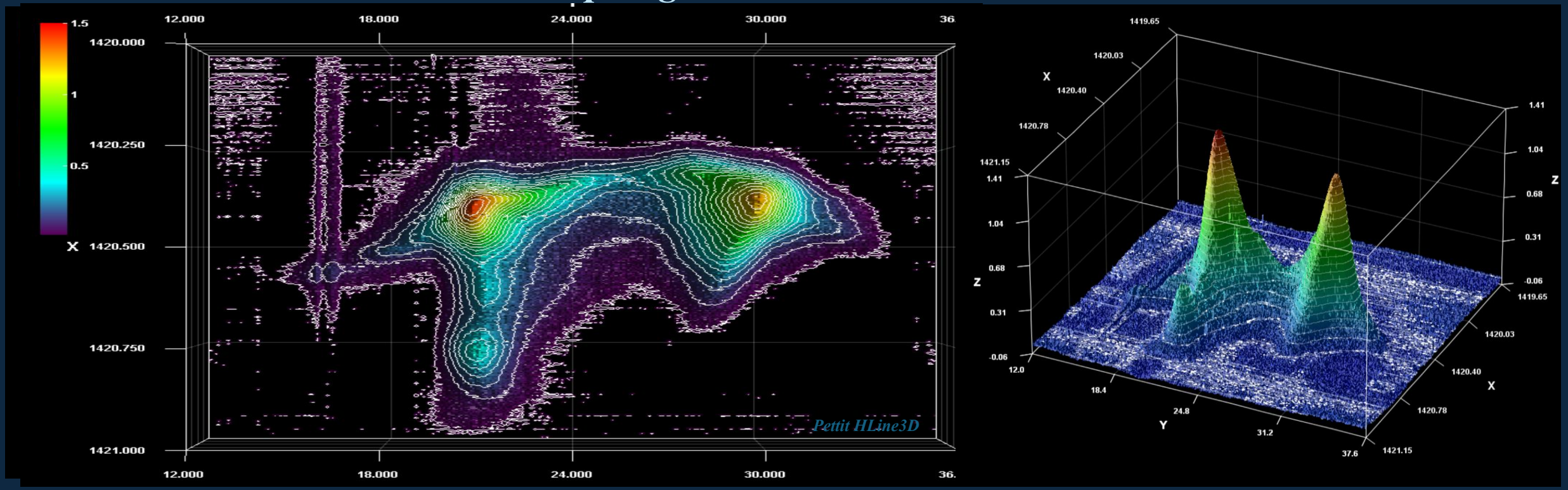
(This data shows exceptionally low Drift Error)



Kraken Discovery Dish 1420 MHz Dipole Feed
Kraken Discovery Dish H1 internal LNA
Nooelec 1m WiFi Grid Dish
Dec + 40° 24 hour Drift Scan

Excellent **HIGH SIGNAL** / **LOW NOISE** Performance

Radio Telescope Performance Evaluated Using :
AirSpy SDR# Studio > ***Kaminski IF_average*** > ***Pettit HLine3D*** > ***Rinearn Graphics***
https://github.com/AP-HLine-3D/HLine3D



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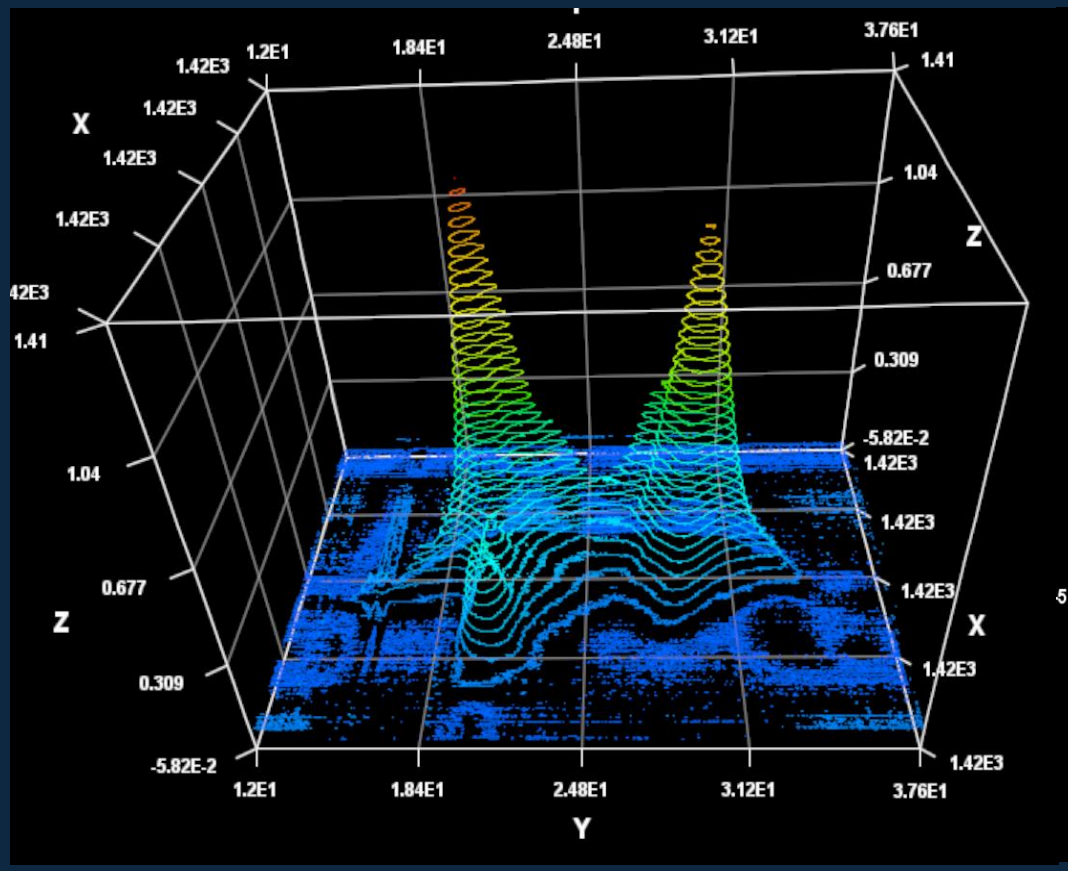
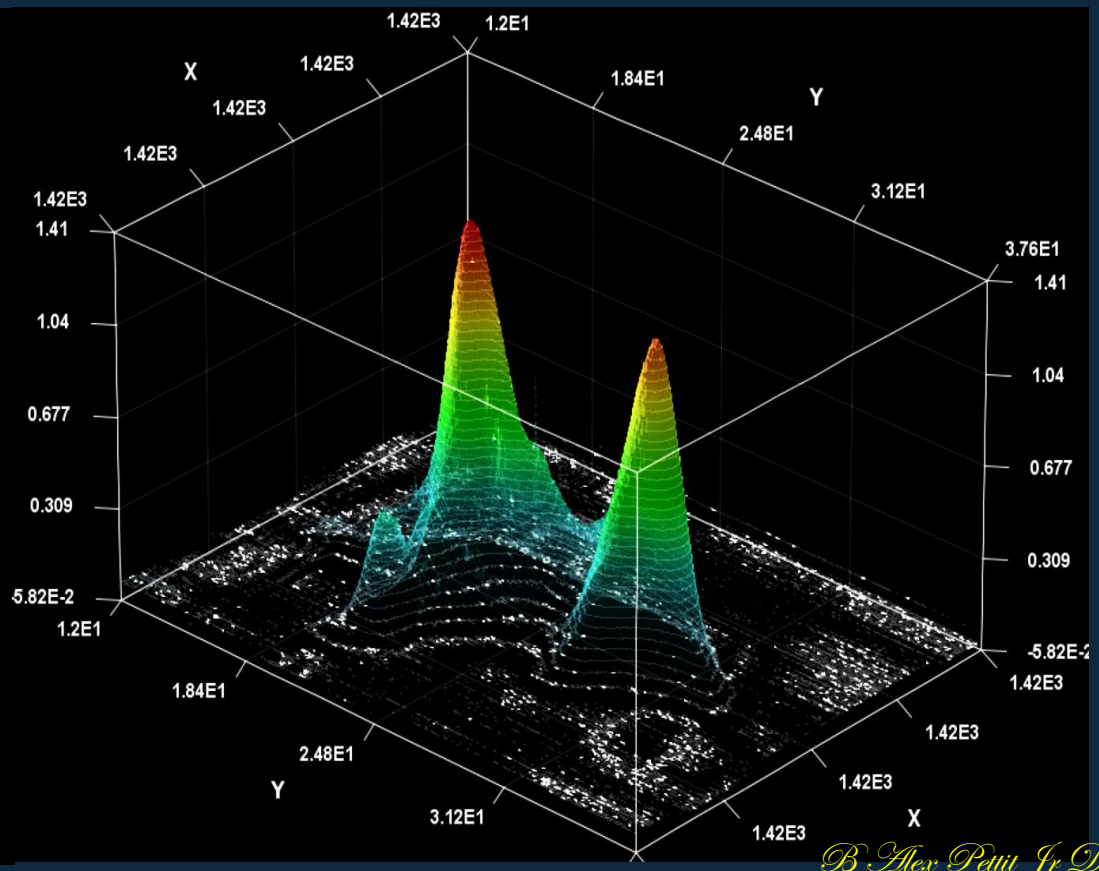
Kraken Discovery Dish 1420 MHz Dipole Feed
Kraken Discovery Dish H1 internal LNA
Nooelec 1m WiFi Grid Dish

EXEC SUMMARY : This is a " Near Off The Shelf "
Hydrogen Line Radio Telescope with Outstanding Performance





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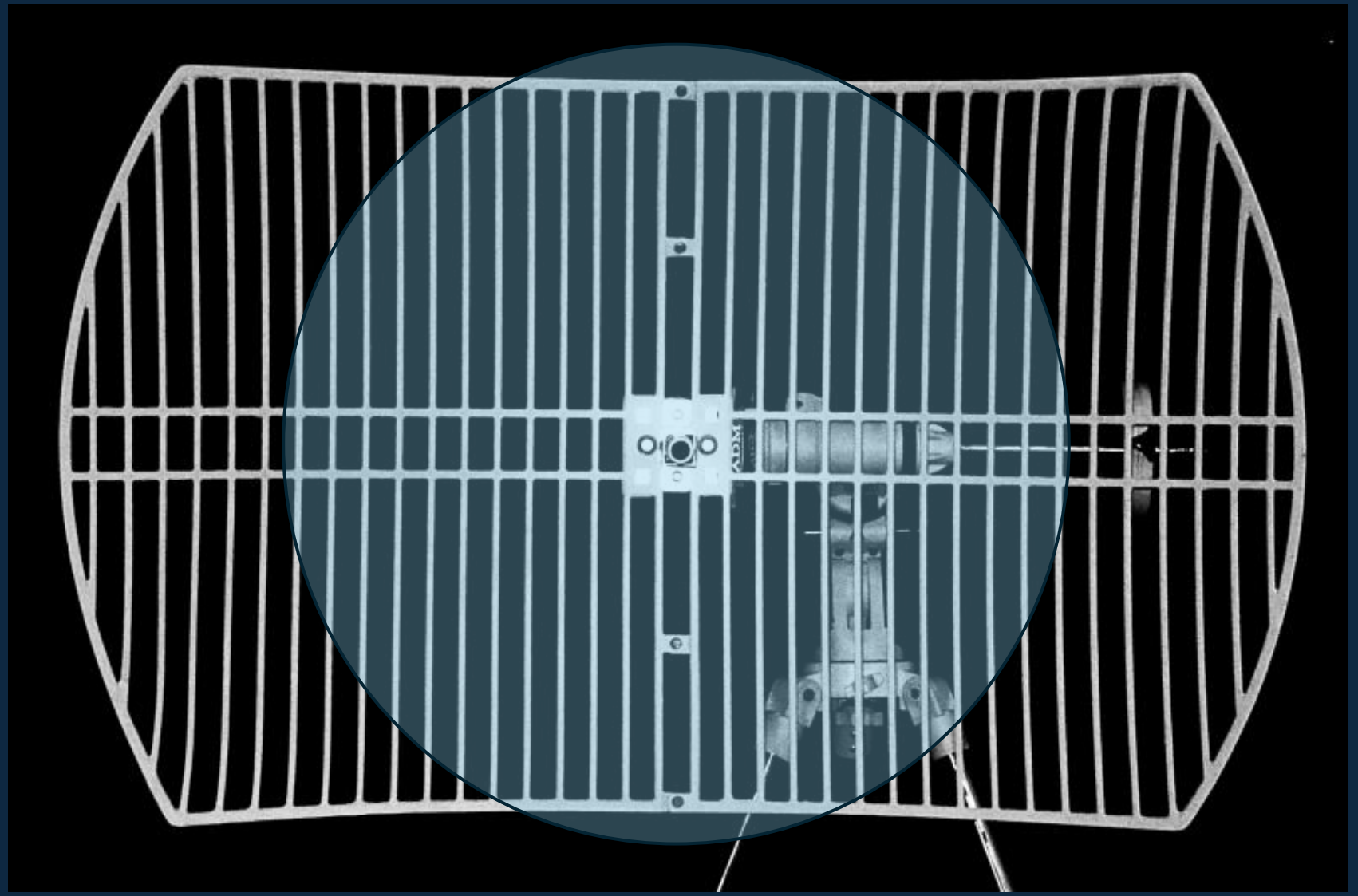
Kraken Discovery Feed 1420 MHz Dish Options

1m x 0.6m WiFi Dish used for This evaluation

0.65m Kraken Discovery Dish will be eval'd in the future

(relative area comparison)



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