VERSION 1.0

15-11-2025

DriverDish.App DriftScan

reviewed by OE2IGL

DRIVERDISH.APP DRIFTSCAN

1. INTRODUCTION

The main purpose of this utility is to accurately characterize the antenna's main radiation beam. Using the **drift scan** technique, the system measures the actual radiation pattern. Based on the data it calculates the **Half Power Beam Width** (HPBW).

The HPBW is the angle at which the radiation power of the main beam drops to half (-3 dB) of its maximum value. Knowing the HPBW is crucial for verifying the performance of the parabolic antenna system.

2. START OF PROCESS AND CONFIGURATION

To begin, go to the main menu of the application and press the **DriftScan** button. This will open the panel settings.

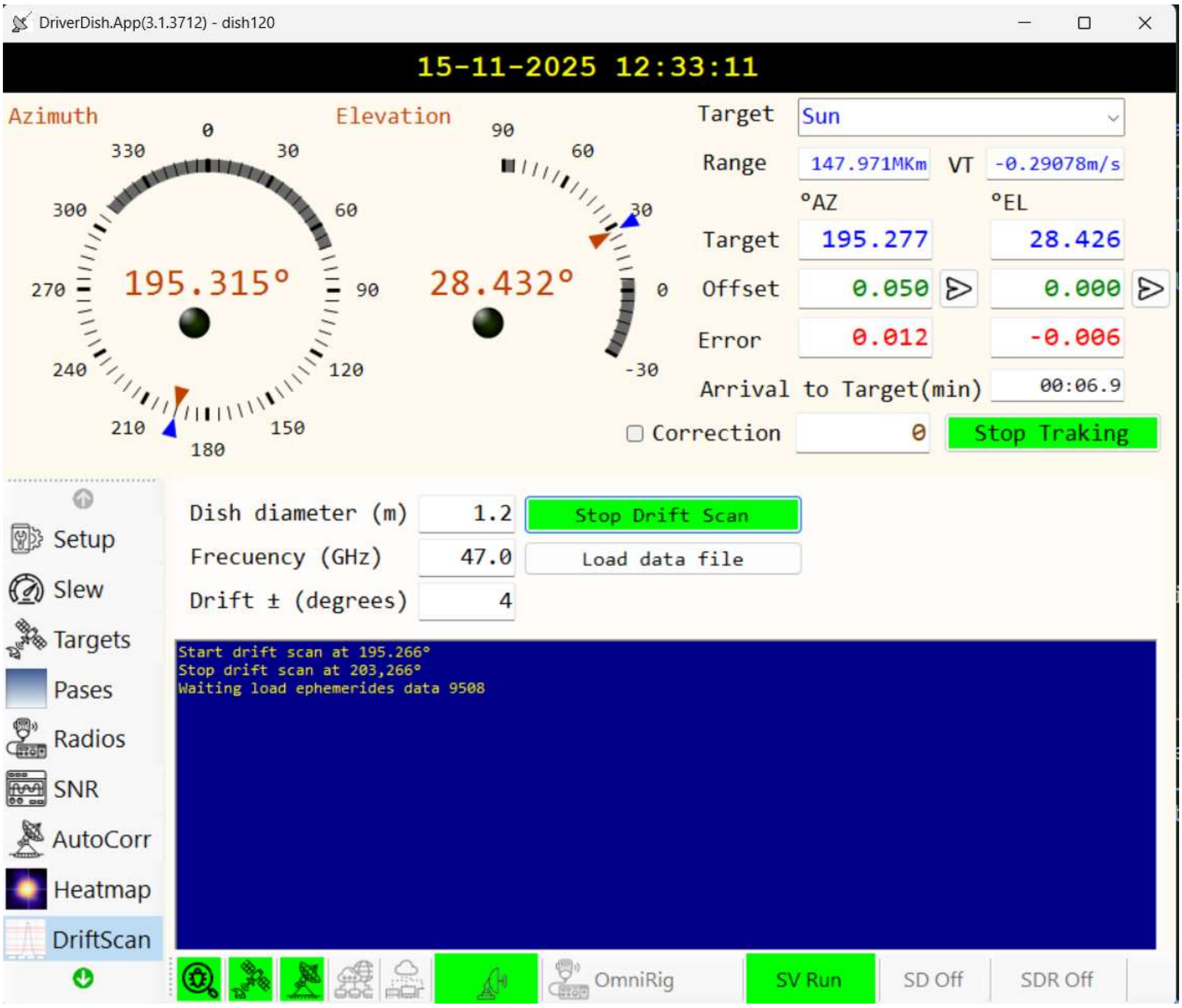
PREREQUISITES:

Before starting the process, it is essential to ensure two key points:

1. **Active Tracking:** The system must be actively tracking the target (sun or moon).
2. **Signal Reception:** Confirm that the **SpectraVue** software receives the signal correctly. You can verify this by observing the **SNR** (Signal-to-Noise Ratio) indicator on the panel.

SETTINGS PANEL

DriftScan panel allows you to define the parameters with which the DriftScan process will run.



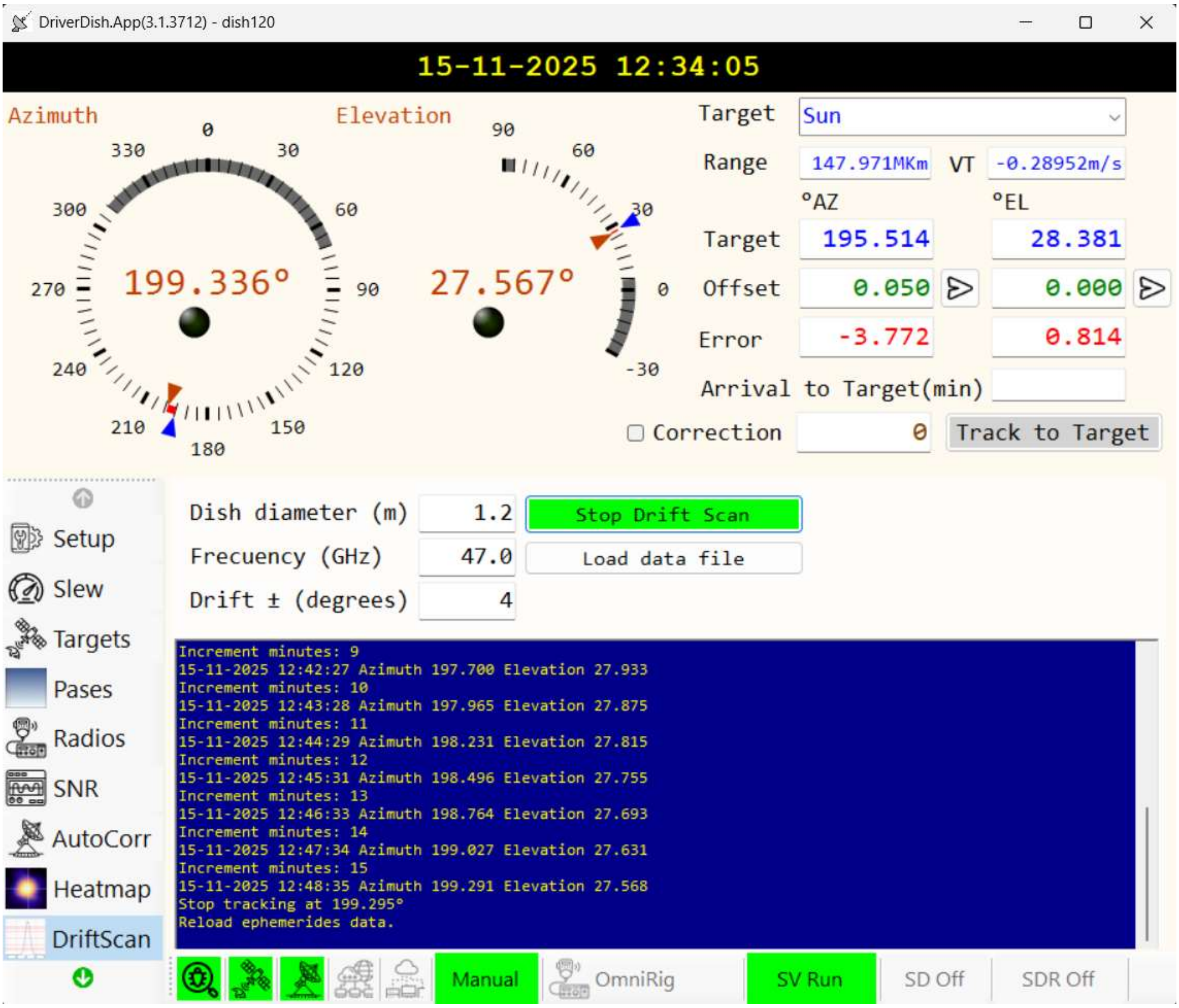
We must enter:

- **Dish Diameter (m)**
- **Frequency (GHz)**

It automatically calculates the **Drift ± (degrees).**

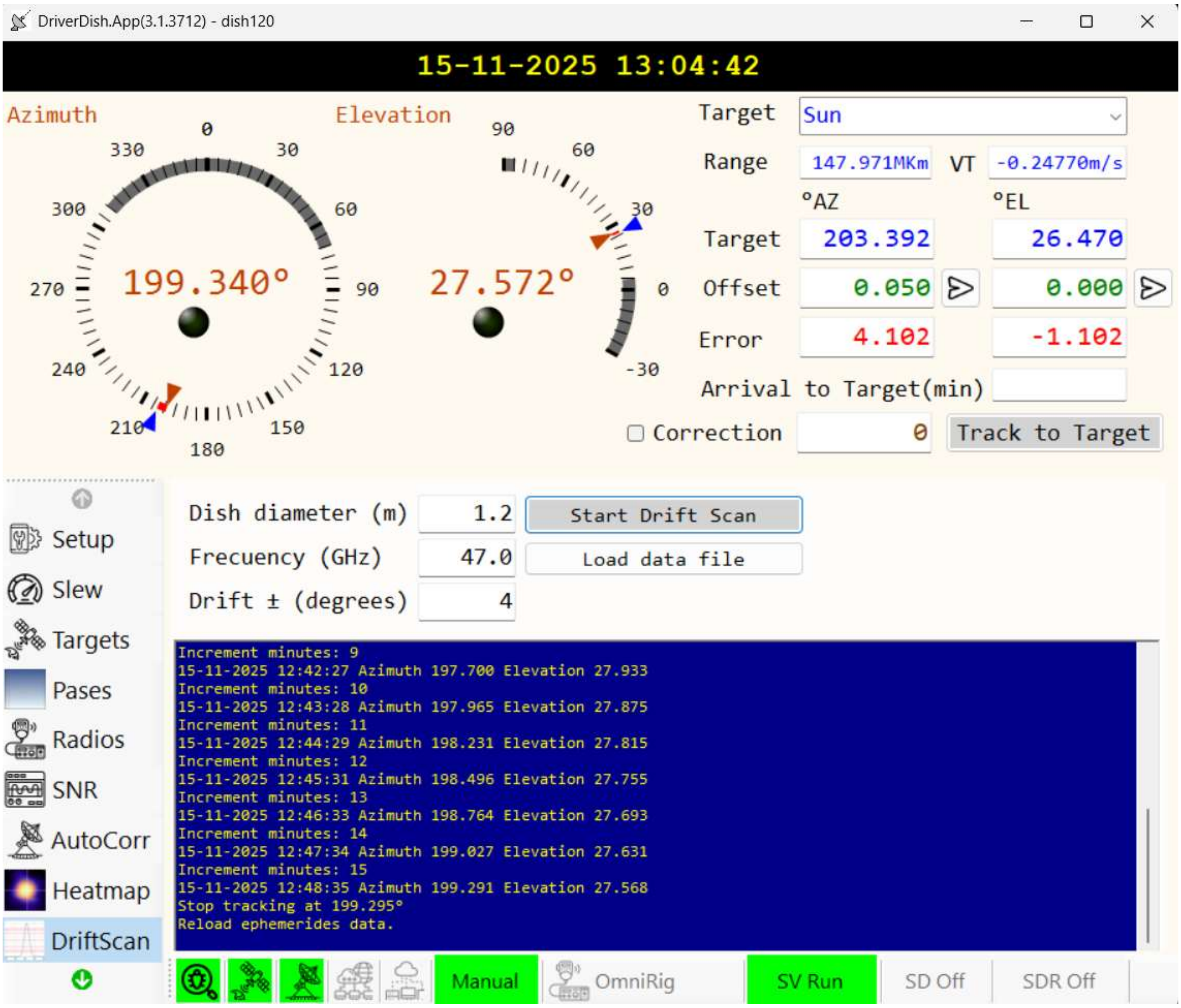
To ensure that the entire main lobe is captured and a stable noise baseline is established before and after the peak, data collection must cover an angular range significantly greater than the theoretical HPBW. A range of at least **10 times the theoretical HPBW** before and after the predicted center position is recommended.

By pressing the **Start Drift Scan** button the software will calculate and move the antenna to the position that meets the prerequisites. To achieve this it analyses the position at times subsequent to the current time in one-minute increments.



Once the antenna is positioned in the desired position for the tracking process the software begins to record time, position and signal level data.

Once the data collection is complete the system returns to real-time operation.



Now we have obtained a file with the data.

The file name is driftScan_<Target Name>_<Diameter>_<Frequency>-<HHmmddMMyyyy>.csv and it is located within the tracking directory.

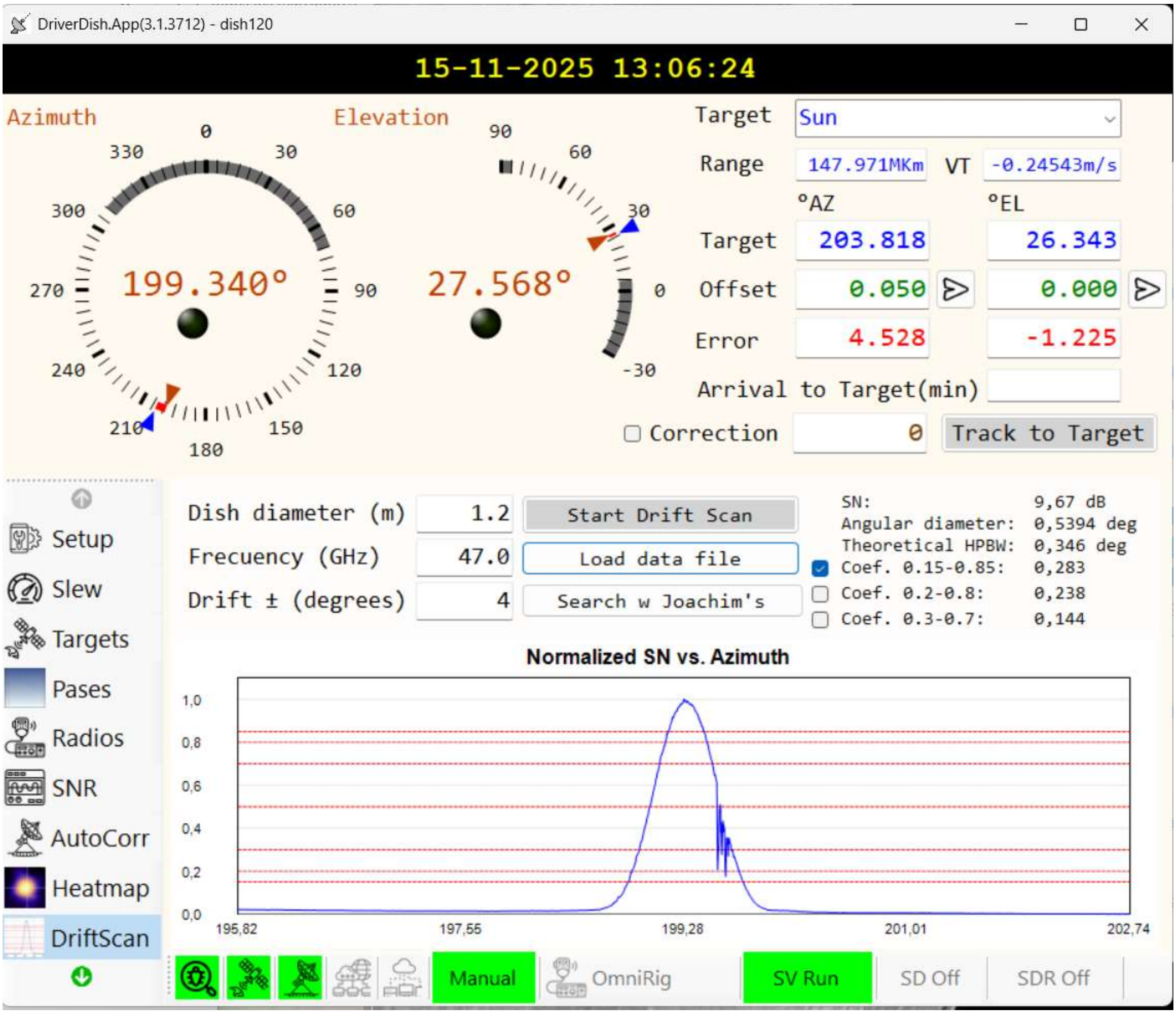
Example: driftScan_Sun_1.2_47.0_123315112025.csv

the format is:

```
;Diameter;Frequency;Astro ID;Astro name
;1.2;47.0;10;Sun
;date time;elevation;azimuth;SN
2025-11-15 12:33:39, -40.87, 195.400, 28.402
2025-11-15  2:33:40, -40.88, 195.402, 28.402
```

3. ANALYSIS OF RESULTS

We select the generated file by pressing the **Load data file** button and the software displays the following information:



- **SN:** 9.67 dB. This corresponds to the maximum signal-to-noise ratio, measured at the peak of the main beam.
- **Angular diameter :** 0.5394 deg. This is the angular diameter of the sun at the time of measurement. Necessary for calculating the actual HPBW.
- **Theoretical HPBW:** 0.346 deg. This is the Half Power Beam Width that the software has calculated theoretically, based on the diameter of 1.2 m and the frequency of 47 GHz that were entered.
- **Coefficients (actual beamwidth measurements):** The software has calculated the beam width at different power levels for more detailed analysis. For example:
    - **Coef . 0.15-0.85: 0.283** : This is the beam width measured between the points that have 15% and 85% of the maximum power.
    - **Coef . 0.2-0.8: 0.238** : Beam width measured between points at 20% and 80% of power.
    - **Coef . 0.3-0.7: 0.144** : Beam width measured between points at 30% and 70% of power.

4. CALCULATION OF REAL HPBW USING J.KOEPPEN 'S DECONVOLUTION TOOL

This method allows us to determine the HPBW of the antenna with great precision. Instead of a simple mathematical subtraction, the tool simulates the transit of the sun and moon (with its known diameter) across the antenna beam. It compares the width of the simulated beam width with the measured one to find the antenna HPBW that best fits reality.

INPUT DATA

- **frequency [GHz]:** 47.0
- **angular diameter [°]:** 0.5394
- **measured coefficients (rim levels):**
  - Coefficient 0.15-0.85: **0.283**
  - Coefficient 0.2-0.8: **0.238**
  - Coefficient 0.3-0.7: **0.144**

PROCEDURE IN THE WEB TOOL

We will perform the process for one of the coefficients. Let's use the **coefficient 0.15-0.85** as the main one.

By pressing the **search button in Joachim's tool** the browser will open the page:

https://portia.astrophysik.uni-kiel.de/~koeppen/JS/LunarDriftScans.html

The program will enter the obtained values and performs iterations until it finds the value that is closest to our measurement.

The value of left rim width that comes closest to the measurement of **0.283** is 0.370.

Antenna HPBW that corresponds to that result is **0.37°**.

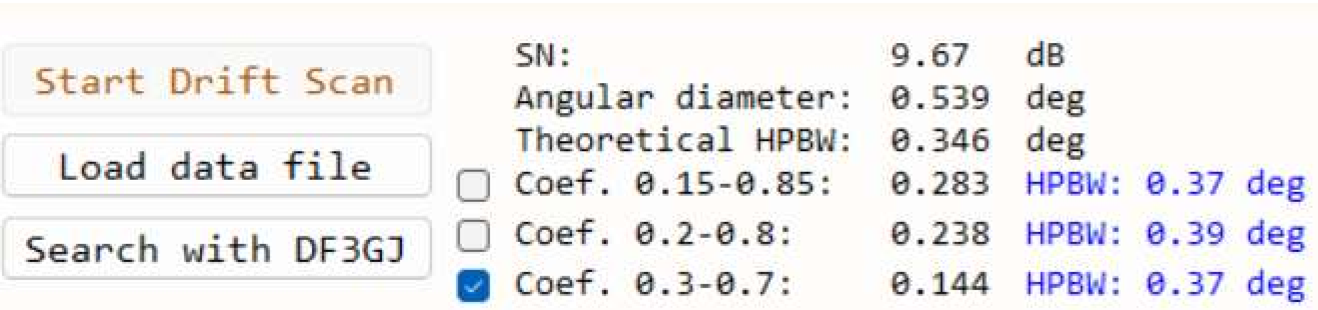
Therefore the HPBW of your antenna as determined by this method is **approximately 0.37°** .

VERIFICATION WITH OTHER COEFFICIENTS

To confirm the result, you can repeat the process with the other measured coefficients:

- **For the coefficient 0.2-0.8: 0.39°** is obtained.
- **For the coefficient 0.3-0.7: 0.37°** is obtained.

The result is displayed to the right of the index used.



FINAL CONCLUSION

This iterative method confirms the result obtained with the previous mathematical approximation. Both methods place the **HPBW of your antenna in the range of 0.37° to 0.39°** .

This excellent agreement between the theoretical value (0.346°), the corrected measured value (~0.344°) and the value obtained by iterative deconvolution (~0.37-0.39°) demonstrates high precision in your measurement system and confirms that the performance of the parabolic antenna is identical to the theoretically expected.