



### About this manual

The Skydel Antenna Convertor User Manual explains how to use the antenna models with different hardware setups and operating systems. To download the tool, go to the following link:

[skydel-tools/Skydel Antenna Convertor at main · learn-orolia/skydel-tools \(github.com\)](https://github.com/skydel-tools/Skydel-Antenna-Convertor).

To request technical assistance, ask questions, or provide feedback on how to improve the Skydel Antenna Convertor or this user manual, please contact Orolia at [skydel-support@orolia.com](mailto:skydel-support@orolia.com).

To stay up to date on the latest Skydel news and information, please visit our website:

[www.orolia.com](http://www.orolia.com) 

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## **1. Skydel Antenna Convertor**

### **1.1. What is the Skydel Antenna Convertor**

The Skydel Antenna Convertor is a user tool for viewing and converting Skydel antenna models to the antenna models of the GSG StudioView tool (and the way around).

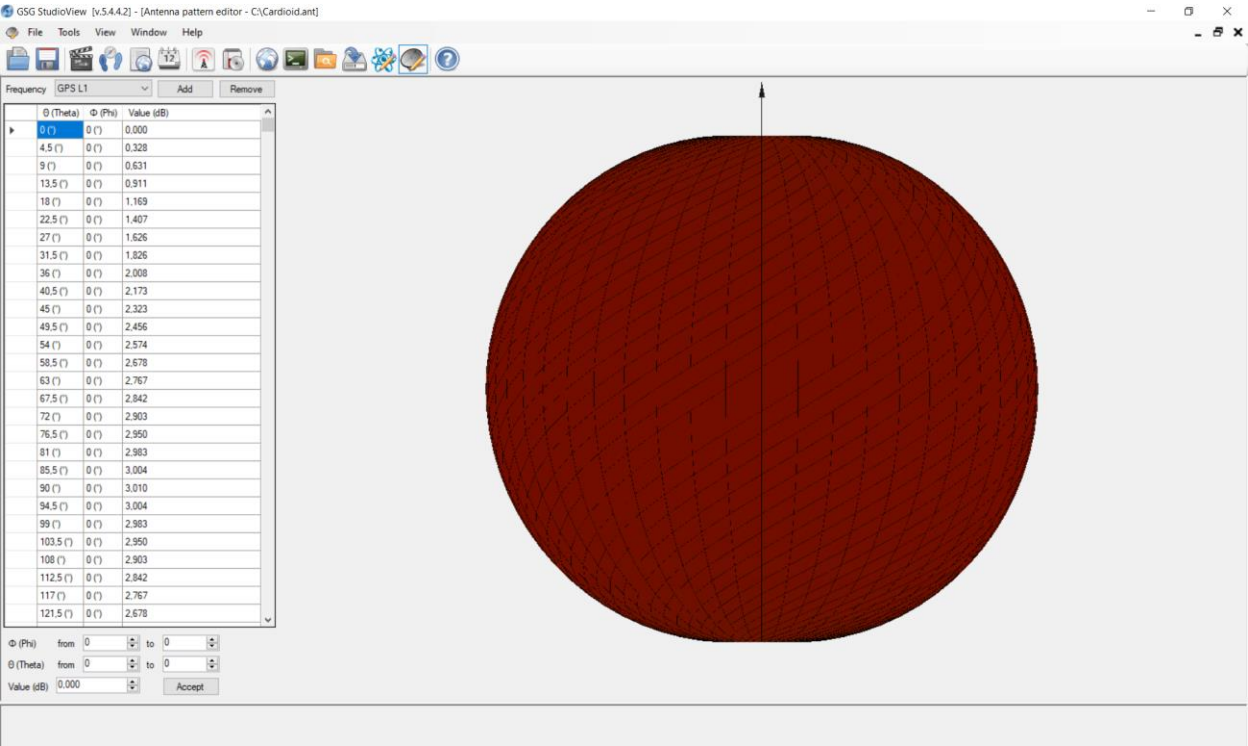
The main idea integrated into the program is to provide the user with the possibility of quickly converting antenna files which can be used under StudioView (ANT) and under Skydel (CSV).

The ANT antenna model file is a simple file that describes the main characteristics of antennas-radiation diagrams, gain, frequency range, name, manufacturer and other data.

#### **1.1.1. GSG StudioView Antenna model (ANT)**

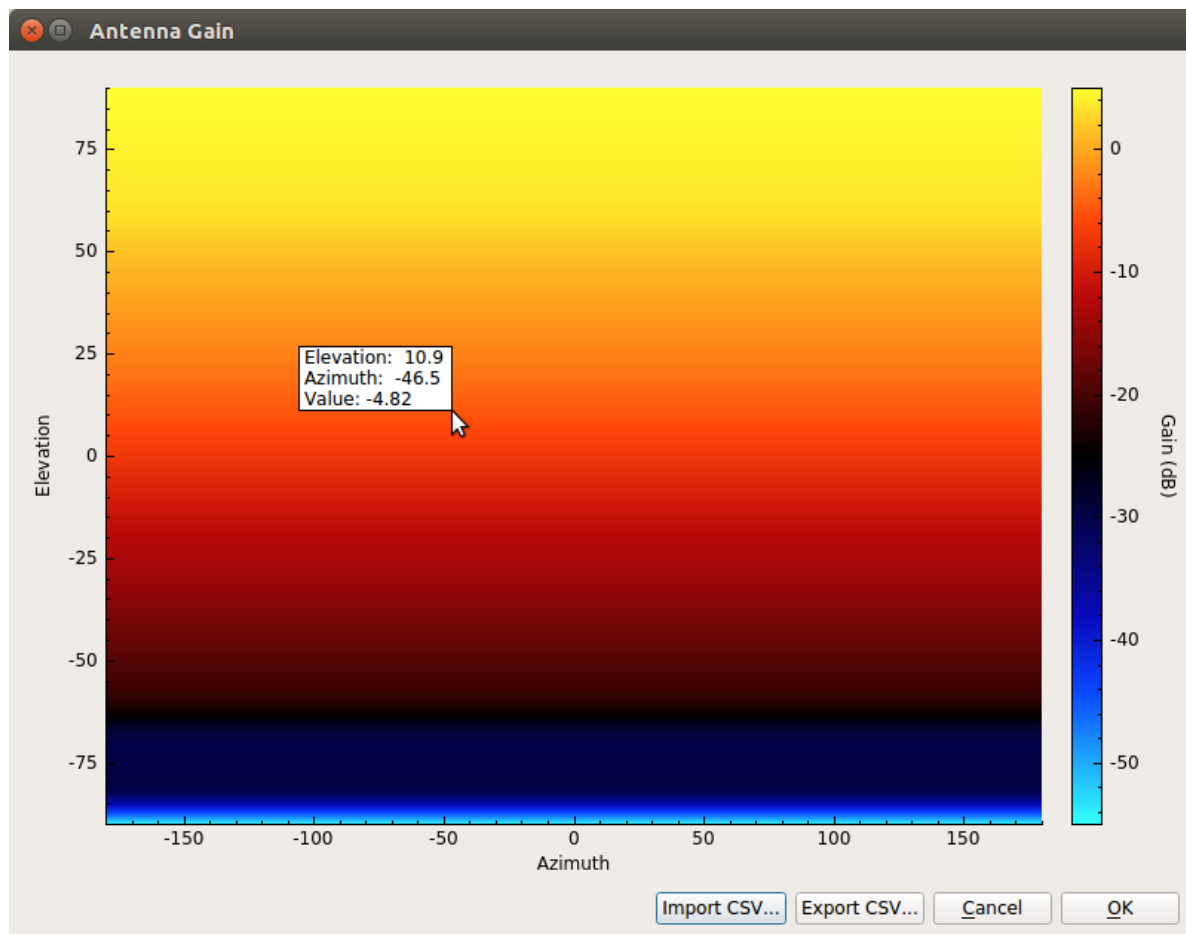
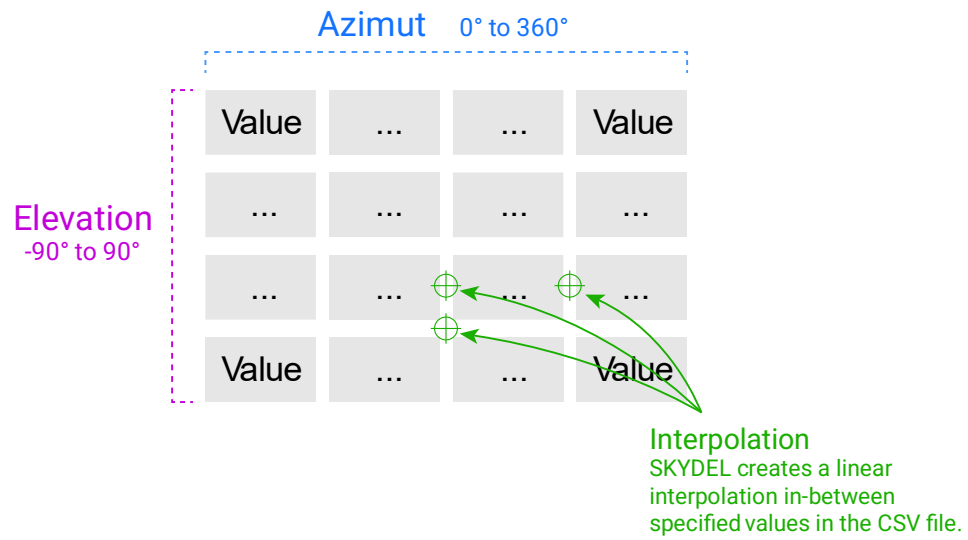
The format used to describe gain patterns in the StudioView antenna model is the FEKO pattern file format version 6.1, Far Field format, File Format 2.0. Gain patterns for various frequencies are to be included in the same file as separate Solution Blocks. The GSG units expect the result type to be either Gain or Directivity, and enforces a maximum value of 50 for the No. of Theta/Phi Samples, with 36 as the recommended choice yielding a 5/10 degree resolution on elevation/azimuth. The first line of the antenna file is expected to define the File Type. The GSG defines phib0 degrees, i.e. the x-axis of phi, to point towards

the north direction.



1.1.2. Skydel Antenna model (CSV)

The Skydel antenna model is a CSV file is matrix of values (either gain or phase offset). The values are dB for gain and radians or degrees for phase offset. The rows represents the elevation range of  $[-90^{\circ}, 90^{\circ}]$  from top to bottom and columns represents azimuth range of  $[0^{\circ}, 360^{\circ}]$  from left to right. The first row always represents an elevation of  $-90^{\circ}$ . The last row always represents an elevation of  $90^{\circ}$ . Every row positioned in-between will partition the elevation pattern. The first column always represents an azimuth of  $0^{\circ}$ . Every additional column will partition the  $360^{\circ}$  azimuth range into smaller range of equal size.



## 1.2. Launching the Skydel Antenna Convertor

1. Python installation:

Make sure you have a python from version 3.8 or download the latest python version from <https://www.python.org/downloads/>.

2. Open a terminal and check your python version:

```
$ python --version
```

3. Save the antenna pattern folder in a folder and open this folder in the terminal.

4. Packages installation:

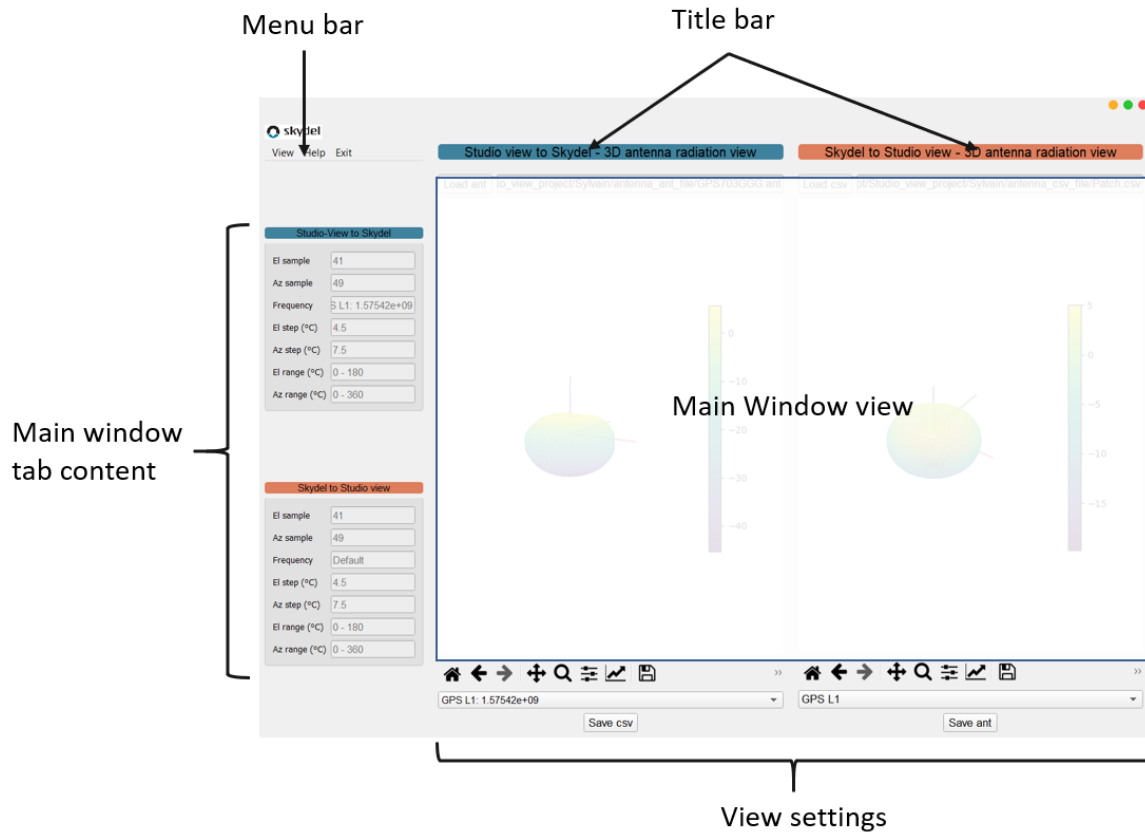
```
$ pip install -r requirements.txt
```

5. Run Antenna Convertor script:

```
$ python main.py
```



## 2. Main window



The Skydel main window contains 5 important areas:

### Title Bar

The title bar displays information about the Skydel to GSG StudioView antenna pattern conversion.

### Menu Bar

The menu lets you select your view, or access to the user manual or exit the UI.

### Main Window view

The Main window allows you to view the antenna patterns in the UI.

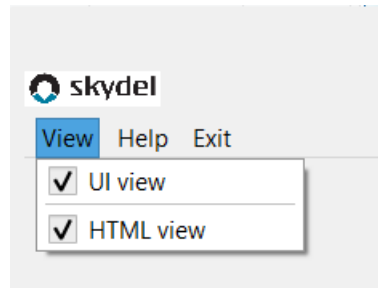
### Main Window Tab Content

The Tab content display the data information of the loaded antenna file.

### 3. Menubar

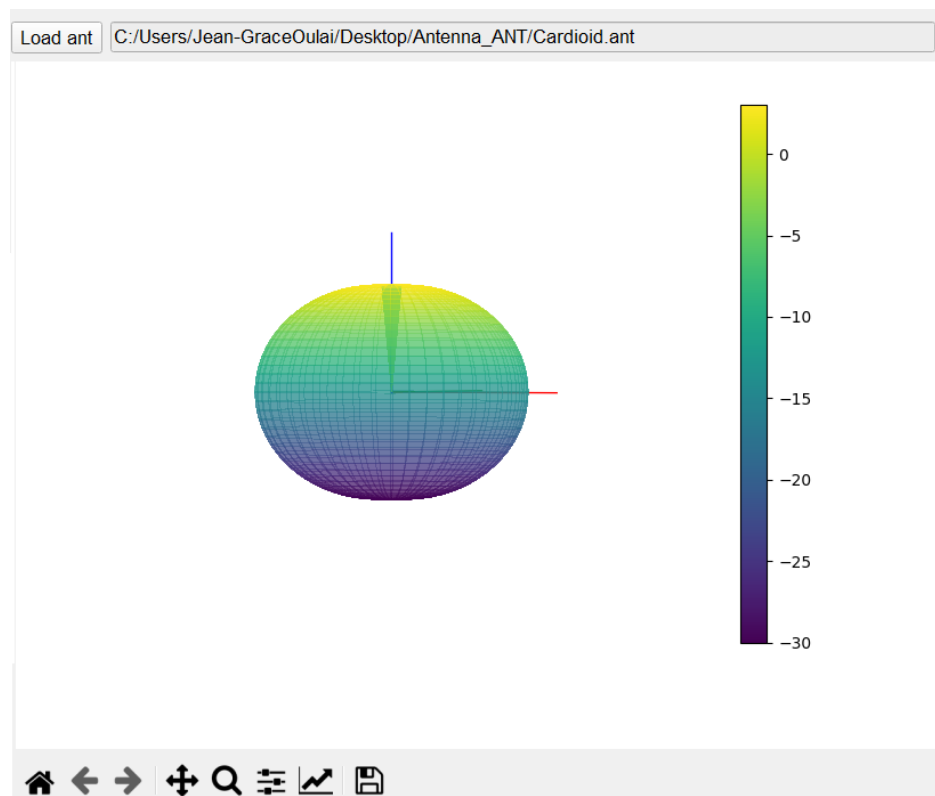
#### 3.1. View

It is possible to view the antenna pattern directly in the UI or on an html page. The "UI view" is always selected by default. To view the pattern in an html page, you must also select "HTML View".



#### 3.1.1. Ui View

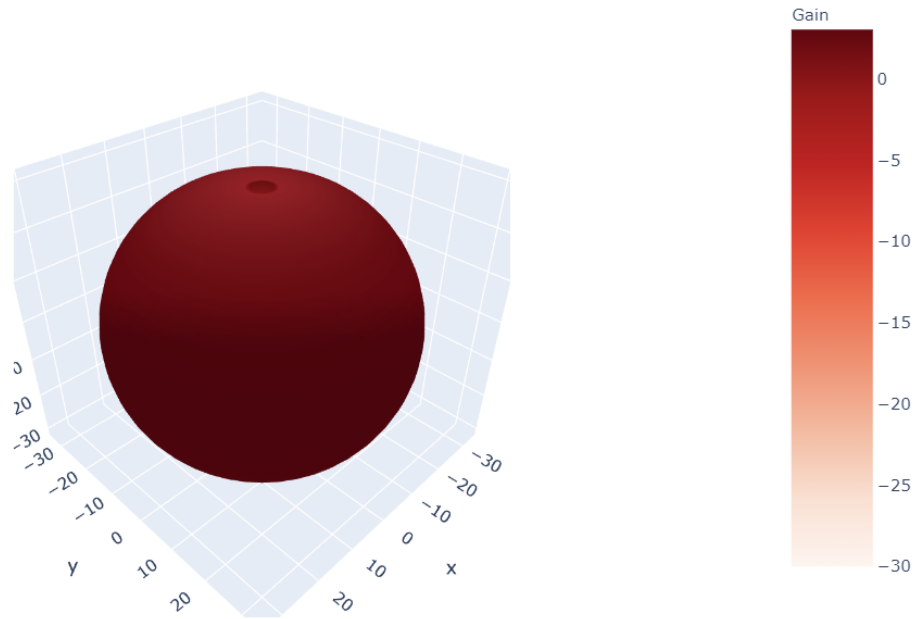
The **UI view** is used to visualize an antenna pattern in the view of the tool.



### 3.1.2. HTML View

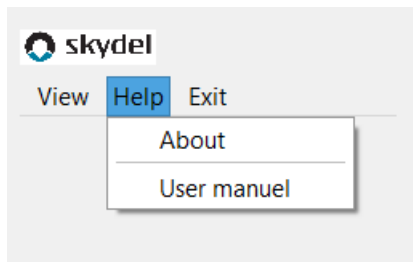
The **HTML view** allows you to view an antenna pattern in an html page.

3D Radiation Antenna Pattern



### 3.2.Help

The **Help menu** allows access to information about the tool and also to access the user manual.



### 3.2.1. About

When you click on "About", this window appears with the following information:

- Antenna Convertor version
- Release data
- Copyright information

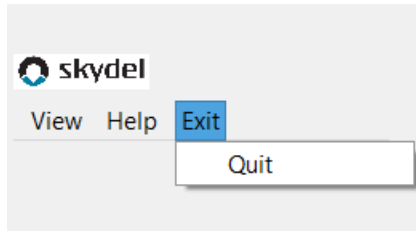


### 3.2.2. User manual

This option allows access to the online user manual.

### 3.3.Exit

This tab is used to quit the application.



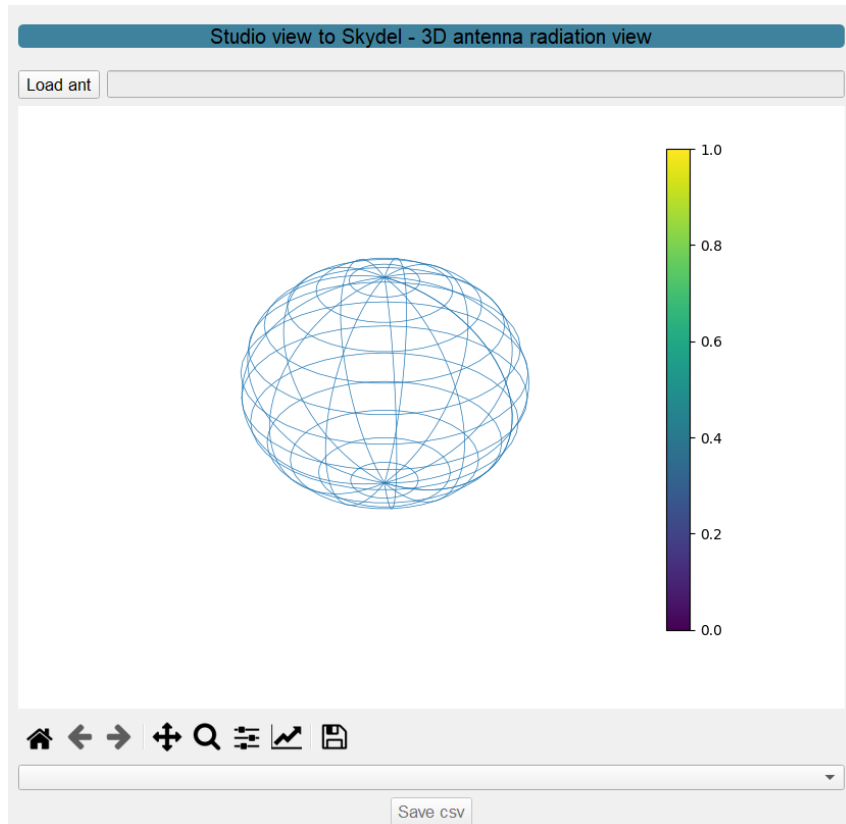
## 4. Main window view

The main window view allows you to view the antenna patterns. It has two main parts:

- GSG StudioView to Skydel
- Skydel to GSG StudioView

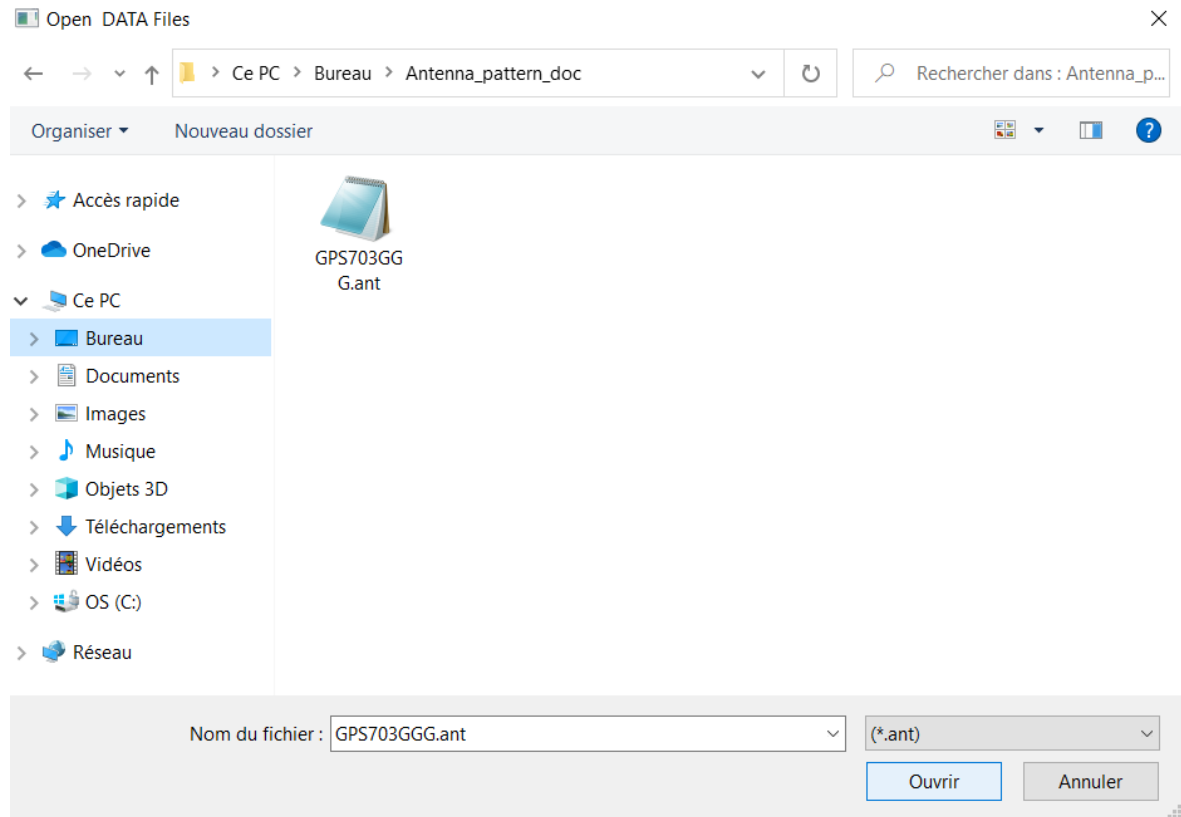
### 4.1. GSG StudioView to Skydel

This part allows you to convert an ANT file into a CSV file and to display the antenna pattern.



#### 4.1.1. Load ant

This button is used to load and open an ANT file in a format readable by the tool (see appendix).

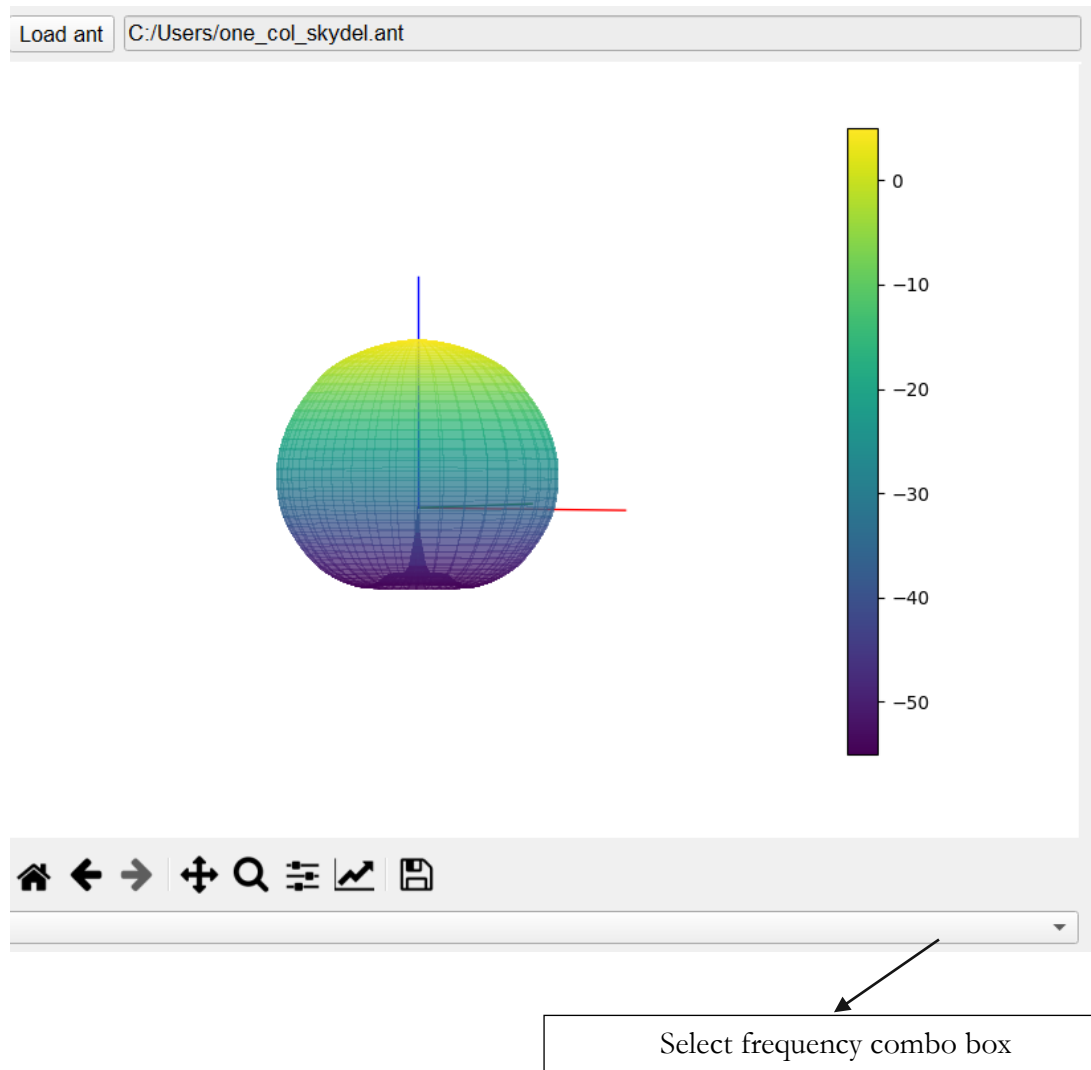


#### 4.1.2. Visualize pattern

After loading the ANT file, it is possible to view the antenna pattern in this window.

##### 4.1.2.1. Single-frequency antenna file

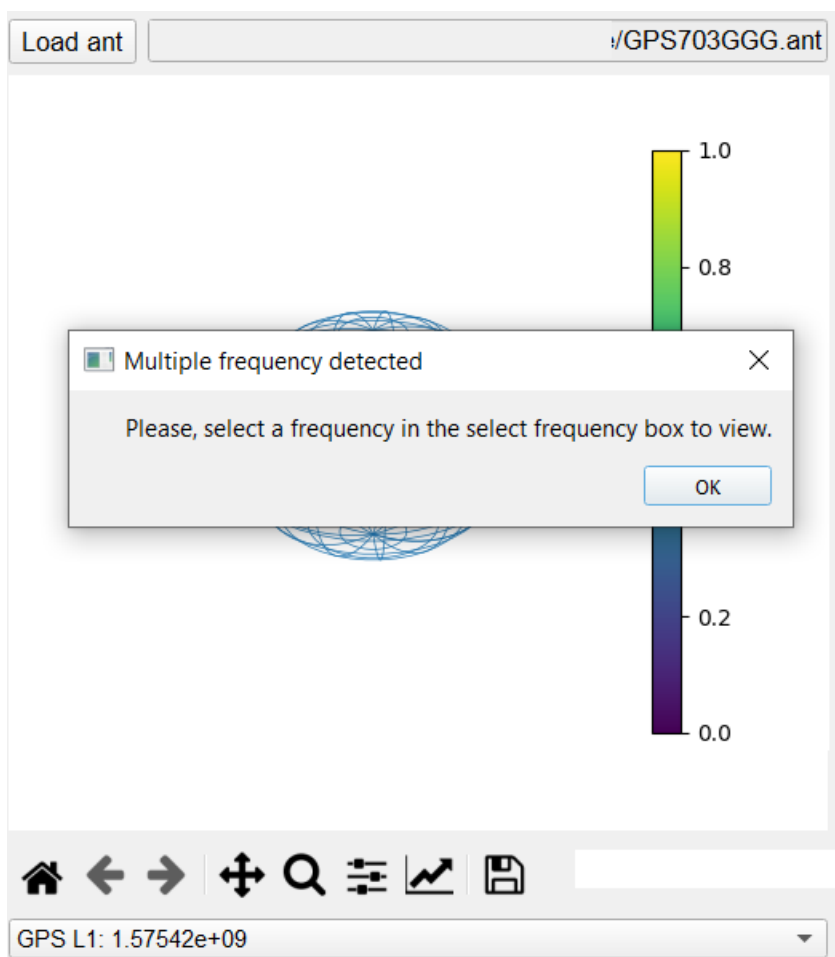
When the ANT file contains only one frequency, the antenna pattern is automatically displayed and the frequency selection combo box remains empty.



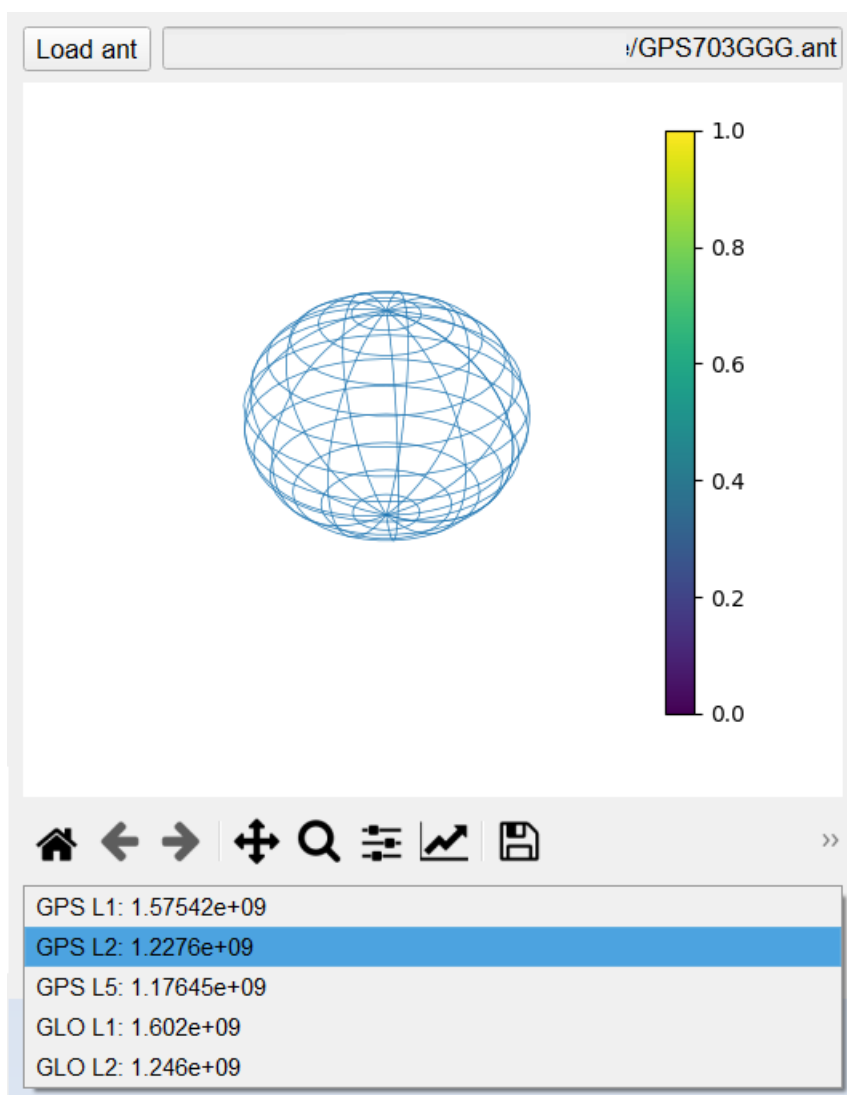
#### 4.1.2.2. Multi-frequency antenna file

When the ANT file contains several frequencies, a pop-up window is displayed to inform the user of the detection of several frequencies.

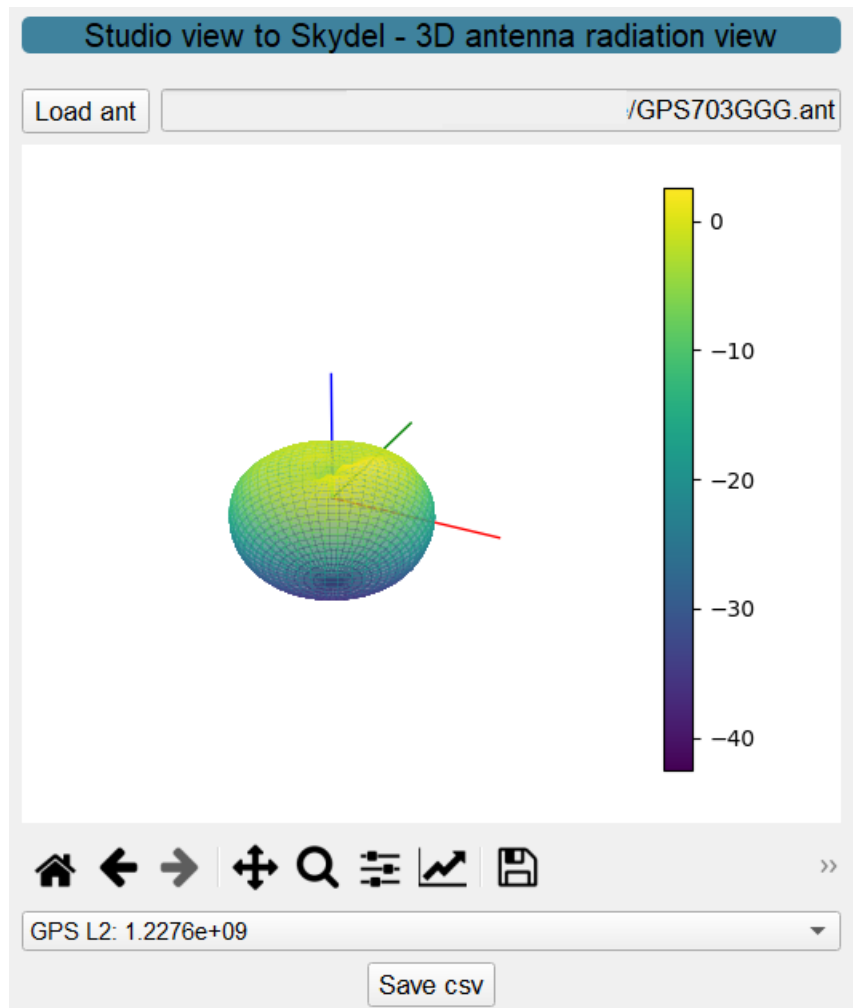




In this case, the user must select a frequency in the frequency combo box to be able to view the antenna pattern.



After having selected a frequency, you now have the possibility of visualizing the pattern of the antenna.

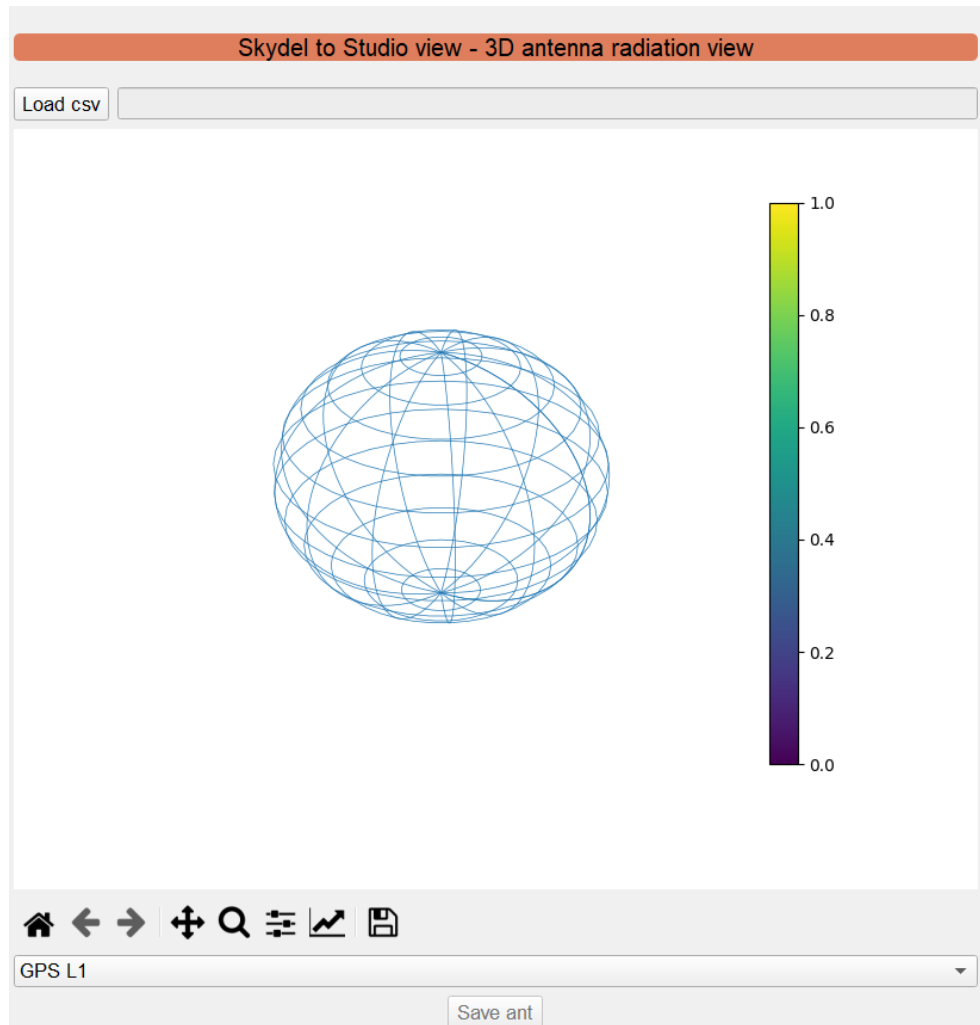


#### 4.1.3. Save csv

After loading the file, it is now possible to save it in a CSV format by clicking on the save csv button.

#### 4.2.Skydel to GSG StudioView

This part allows you to convert a CSV file into an ANT files and to display the antenna pattern.

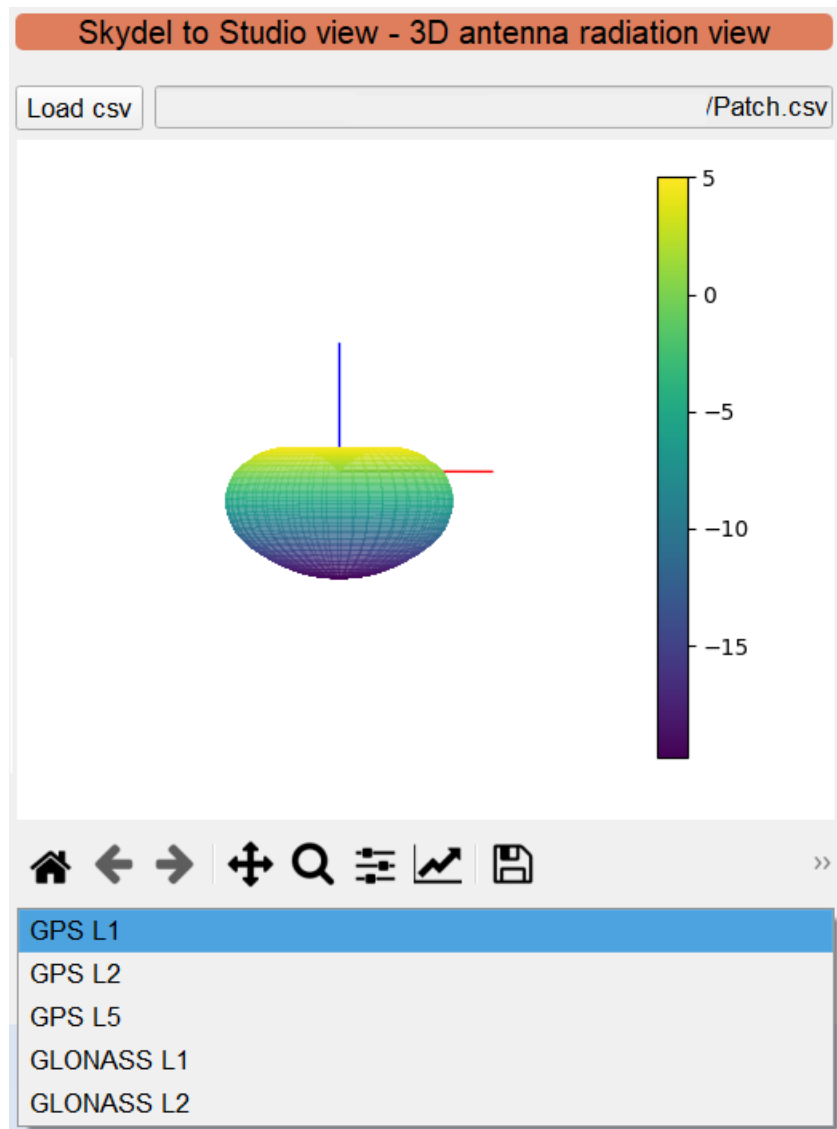


#### 4.2.1. Load and visualize

To load and view the antenna pattern, you can click on the load button.

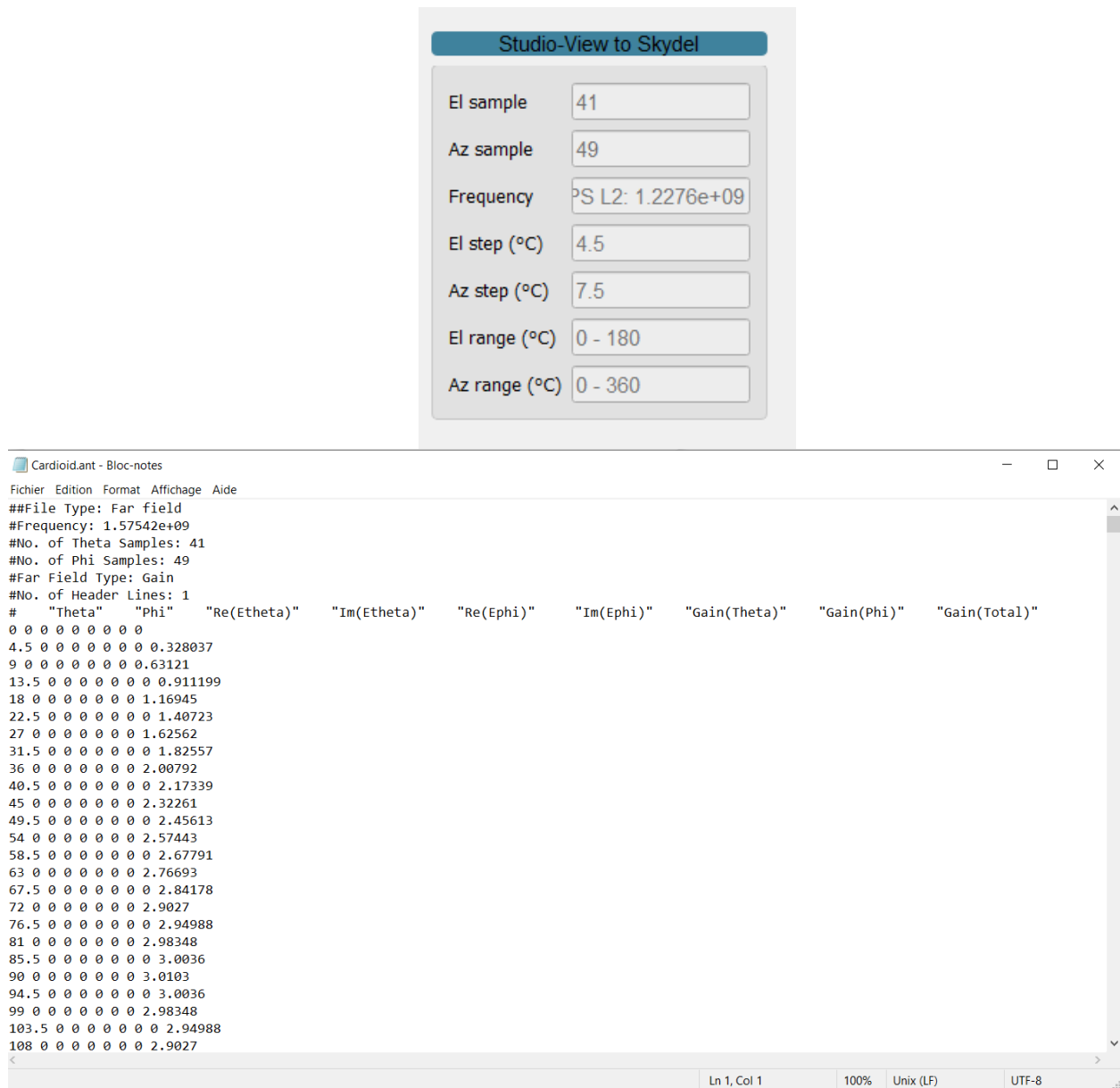
#### 4.2.2. Save

To save the CSV file loaded as an ANT file, select one of the frequencies in the combo box and you also have the possibility to select a folder and a name for your ANT file.



## 5. Main window tab content

### 5.1. GSG StudioView to Skydel



El Sample: The number of elevation samples contained in the ANT file.

Az Sample: The number of azimuth samples contained in the ANT file.

Frequency: The frequency contained in the ANT file.

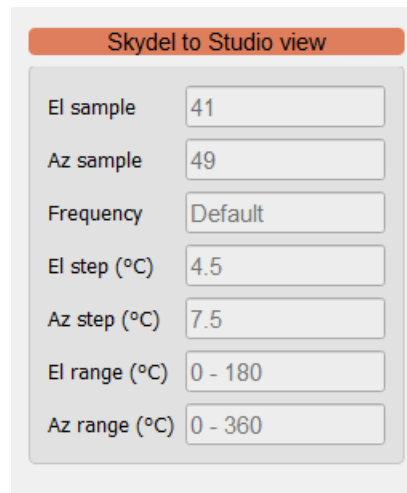
El Step: The step of contained in the ANT file.

Az Step: The azimuth step contained in the ANT file.

El Range: The range of elevation samples contained in the ANT file.

Az range: The range of azimuth samples contained in the ANT file.

## 5.2. Skydel to StudioView



Skydel to Studio view	
El sample	41
Az sample	49
Frequency	Default
El step (°C)	4.5
Az step (°C)	7.5
El range (°C)	0 - 180
Az range (°C)	0 - 360

El Sample: The number of elevation samples contained in the ANT file.

Az Sample: The number of azimuth samples contained in the ANT file.

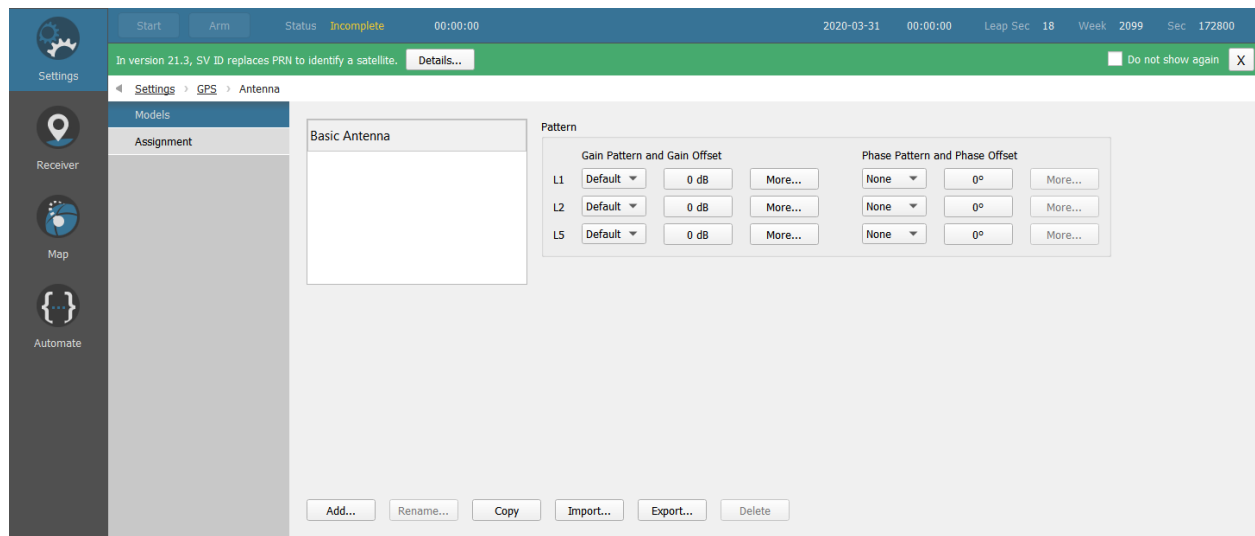
Frequency: The frequency contained in the ANT file.

El Step: The step of contained in the ANT file.

Az Step: The azimuth step contained in the ANT file.

El Range: The range of elevation samples contained in the ANT file.

Az range: The range of azimuth samples contained in the ANT file.



## 6. Use case: Load an antenna file converted in csv in Skydel

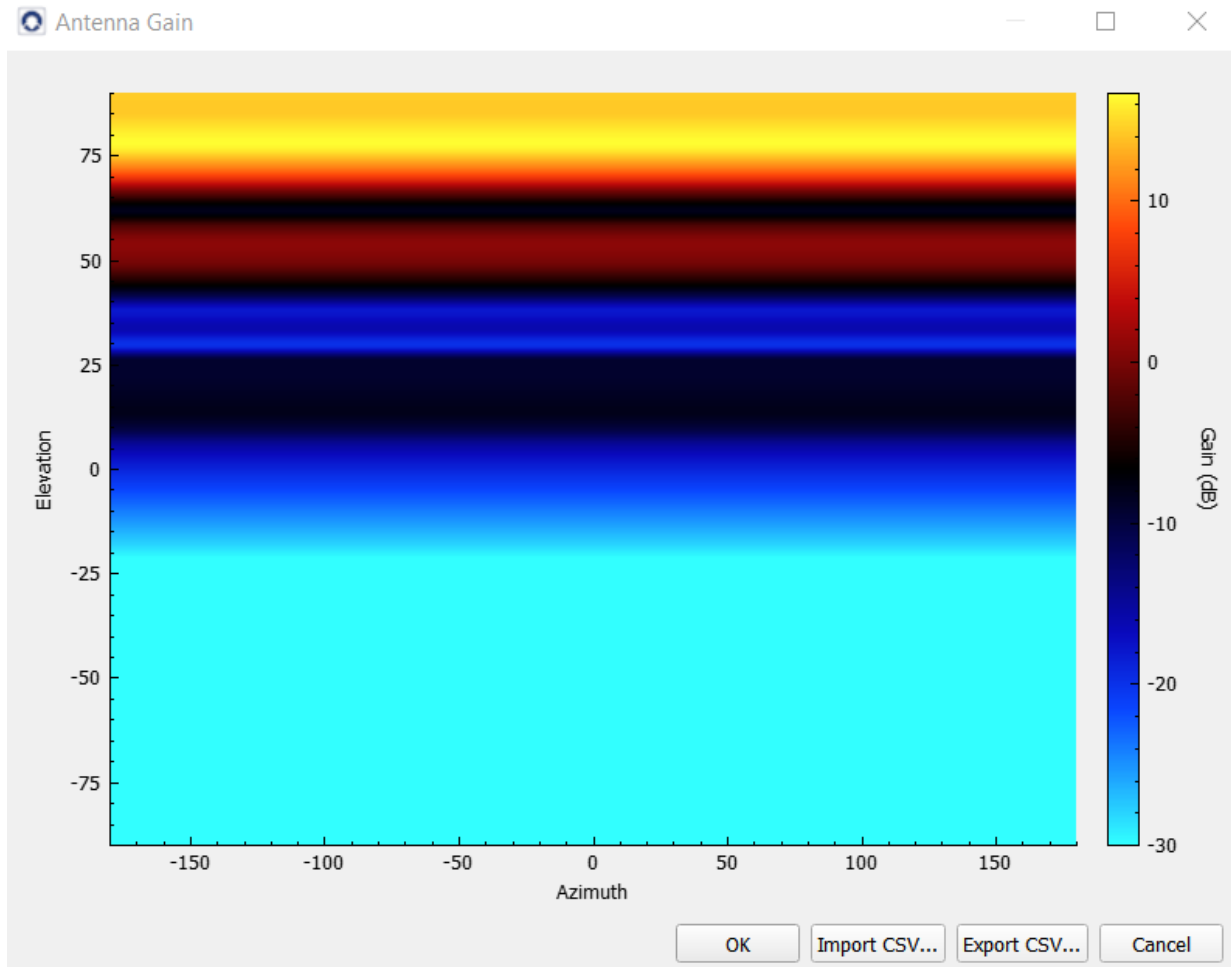
Open your Skydel configuration and go to the menu Settings → GPS → Antenna.

To import a new model from a CSV file, click on the "More" button.





You will then see this window appear.



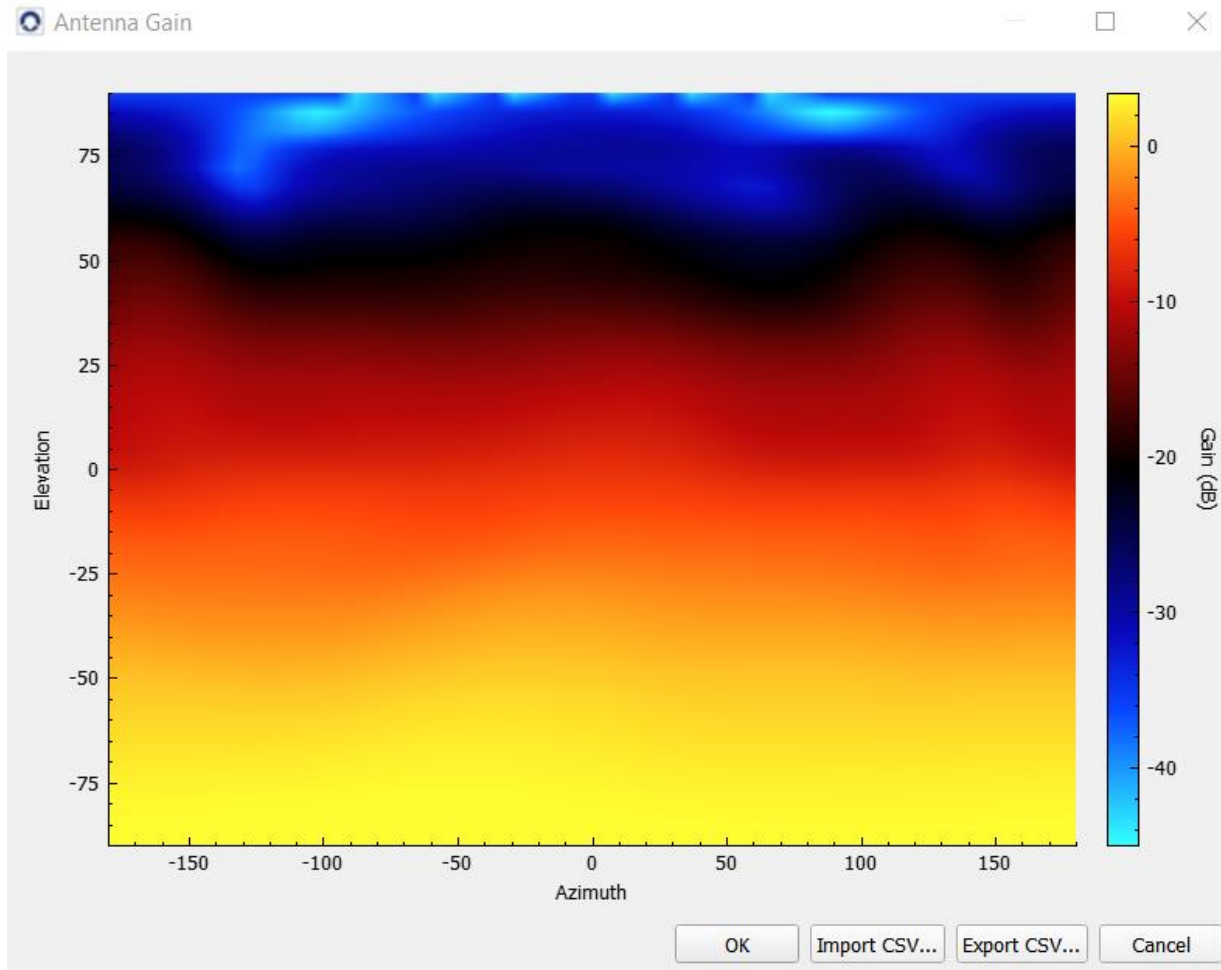




Click on the Import CSV button to import your antenna pattern and select your antenna pattern:

-  Cardioid.csv
-  GPS703GGG.csv
-  Helix.csv
-  Patch.csv

The 3D antenna model is illustrated in two dimensions using a graph displaying the gain values with a color gradient, and their position in 3D space using the polar coordinate system. The graph axis represent the azimuth (x axis, from  $-180^{\circ}$  to  $180^{\circ}$ ) and the elevation (y axis:  $-90^{\circ}$  to  $90^{\circ}$ ).



Click ok to finish.

## References

[GSG-5/6 Series GNSS Simulator User Manual \(orolia.com\)](http://orolia.com)

[Orolia Skydel User Manual \(spectracom.com\)](http://spectracom.com)

Skydel Antenna convertor <sup>TM</sup> Version 21.4

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