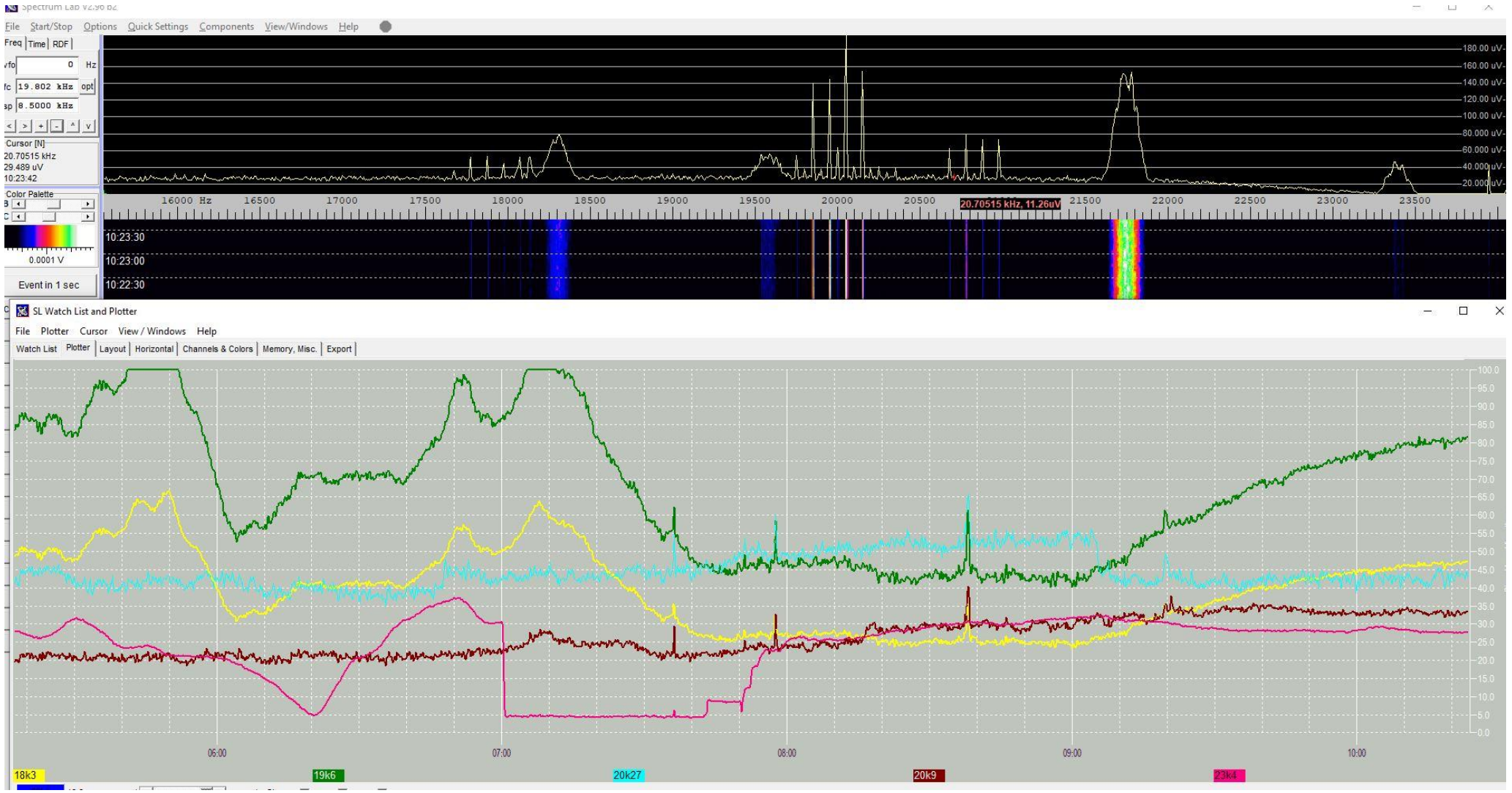
Sudden Ionospheric Disturbance and Detection using Spectrum Lab



John Berman

March 2026

Who is John Berman

Keen Astro-Photographer and then moved to Radio Astronomy

and started with Meteor Detection via Graves and then via the Uk Beacon

Keen website creator

Radio Meteor Detection collaboration project website running since . 2017
https://radiometeordetection.org/

UK Meteor Radar Project Website
https://ukmeteorbeacon.org

Under Development and coming soon

- Website coming fire the VLF Archive
- Website coming for the Muon Project

Sudden Ionospheric Disturbance's (SIDs) and their detection

A **Sudden Ionospheric Disturbance (SID)** is a rapid change in the **Earth's ionosphere** caused mainly by intense radiation from the Sun, especially during **solar flares**. These disturbances can temporarily disrupt radio communications on Earth.

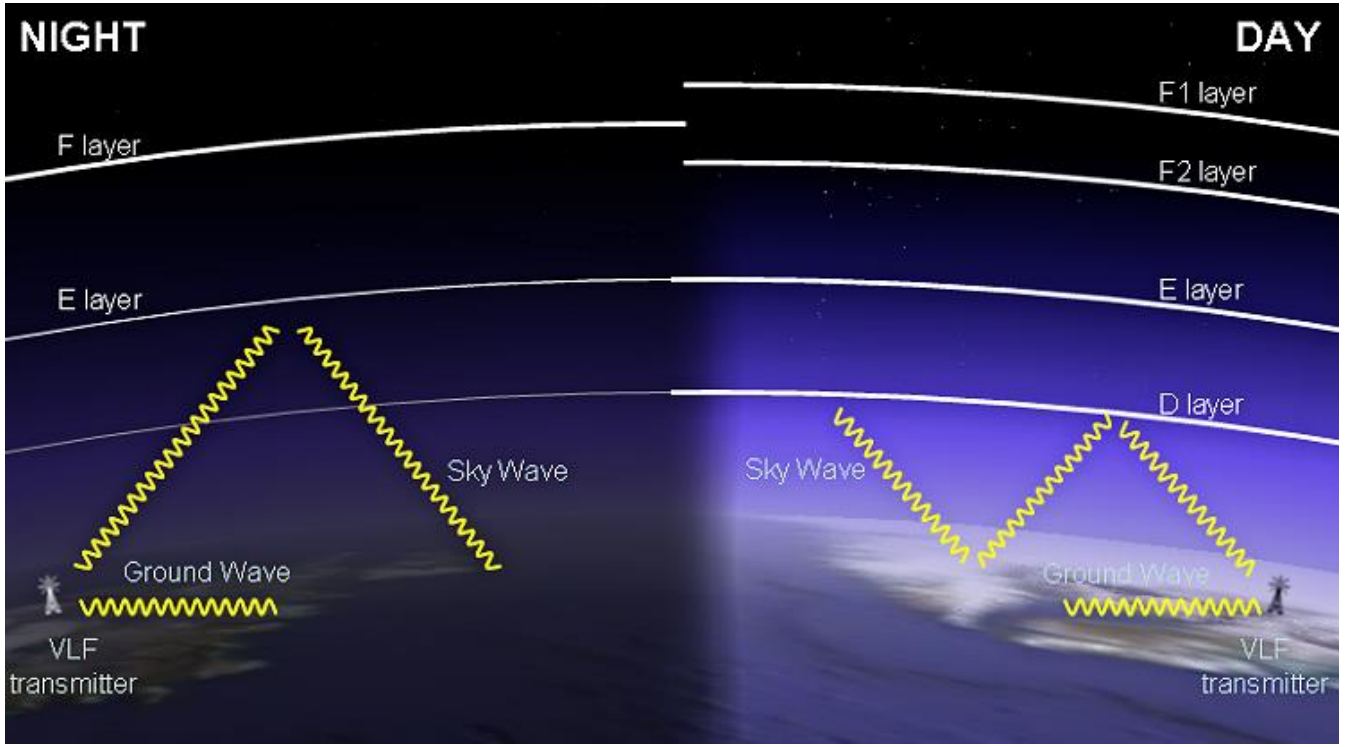
A **SID occurs when a strong solar flare emits intense X-rays and ultraviolet radiation** that reaches Earth in about **8 minutes**.

This radiation:

Suddenly increases ionization in the ionosphere, especially in the **D-layer**.

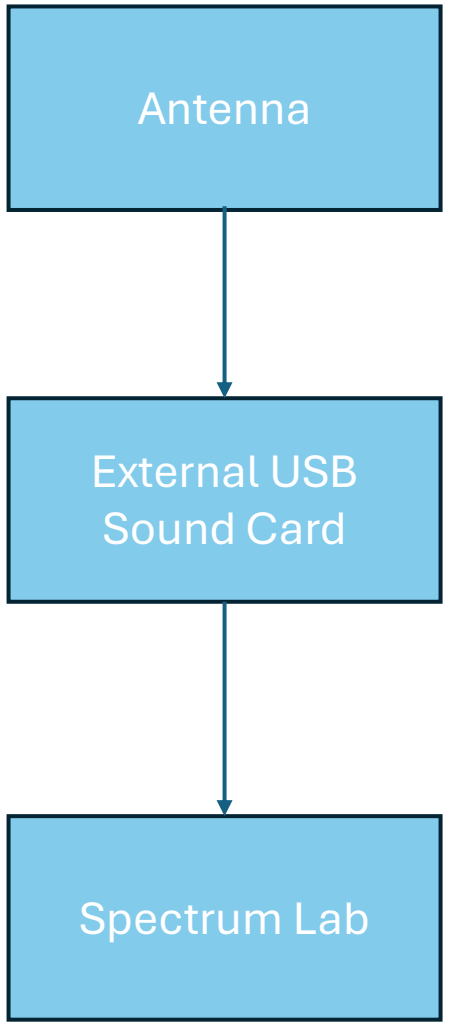
The D-layer becomes much denser than normal.

Instead of reflecting radio waves, it **absorbs them strongly**.



With simple non expensive equipment we can detect SID's

Basic Setup

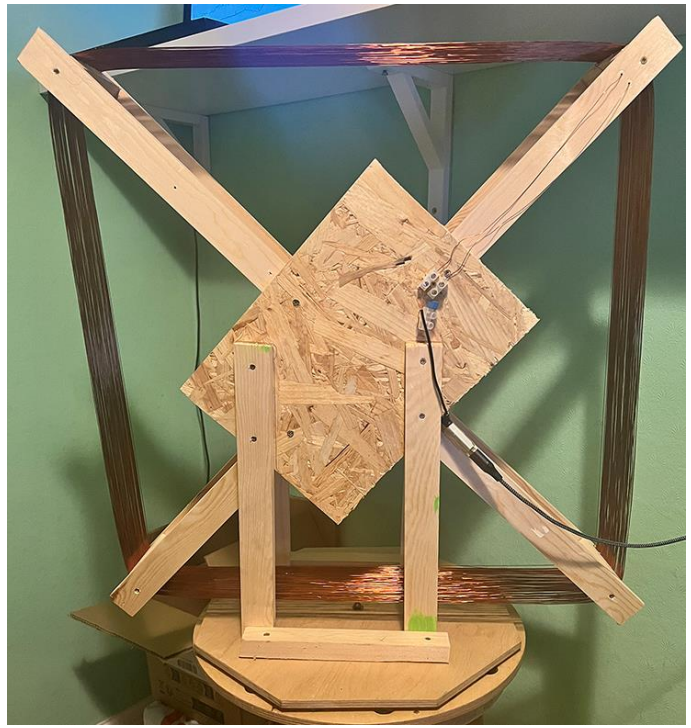


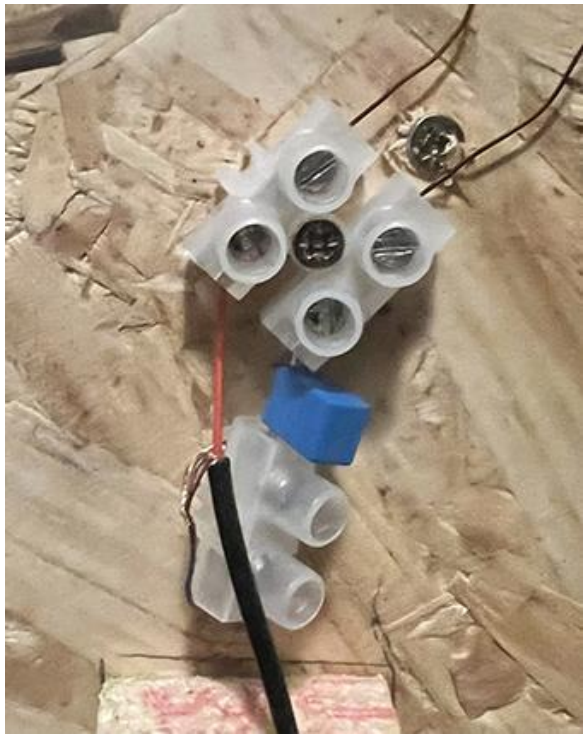
100m of Enamelled Copper wire 22 AWG and wound it round a home-made wooden frame which is 60 cm square

I sourced an external USB Sound Card, key point being ideally get a one that can support 96 khz sampling rate, that way it can receive radio signals up to 44 khz. Simply connect the two antenna wires to a Jack and the Jack plugs into the mic socket on the USB Device

You can download Spectrum lab and install, there are some basic settings, and you will need a configuration file (there are plenty available)

Antenna and the Connections

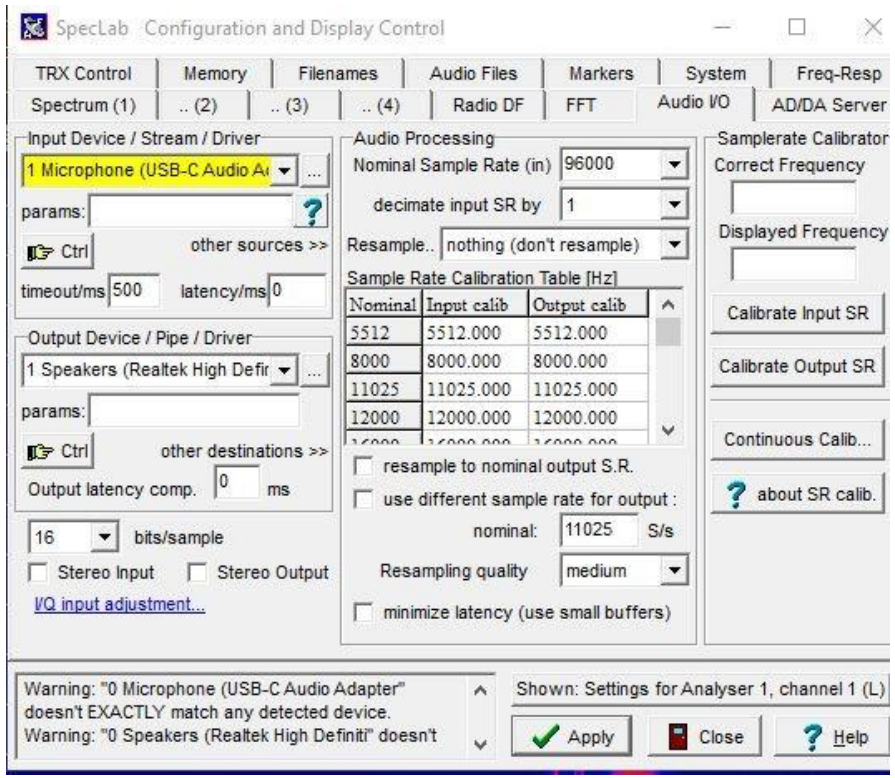




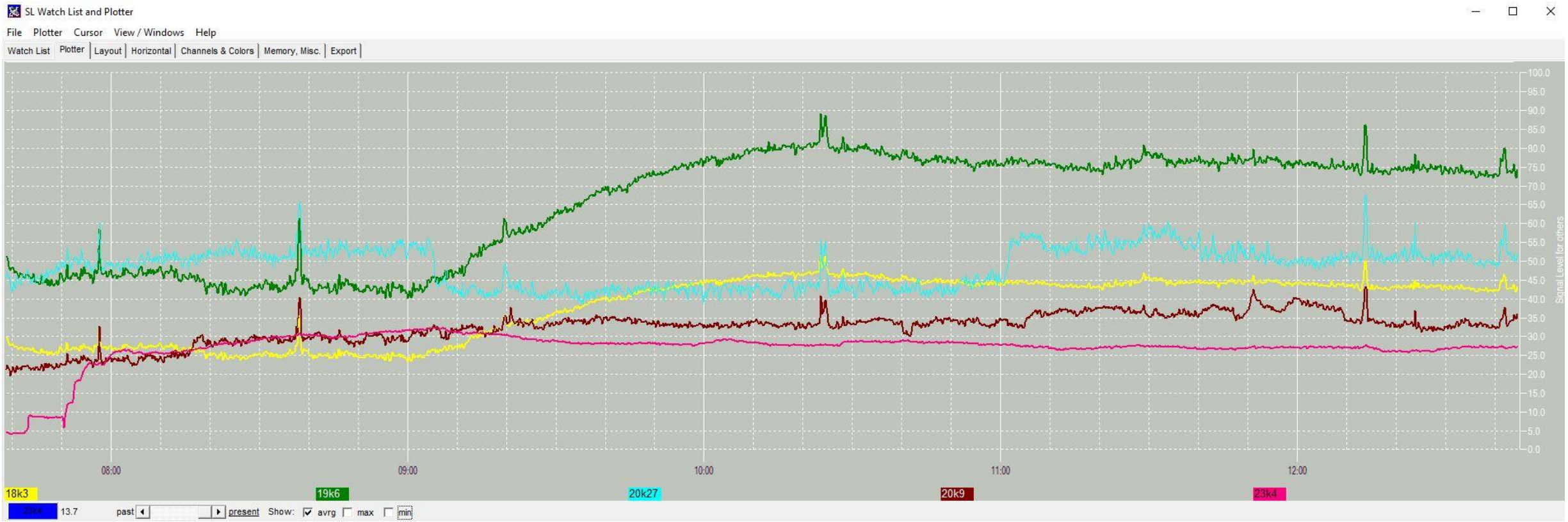
Spectrum Lab

Spectrum Lab is a mature product there is link in the Reference Slide

There are lots of setting, but all controlled by a configuration file - there is a link to mine in the reference slide, mine is not perfect but it will get you going – a key setting will be to choose the input device – Shown here in yellow

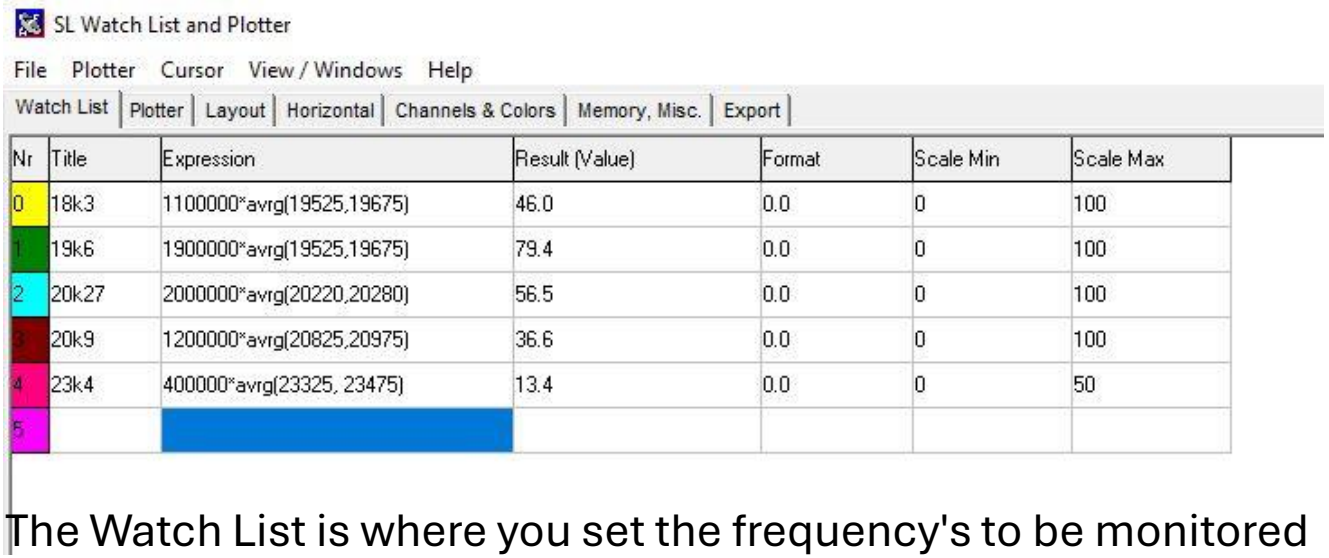


Plot Window



This is what my plot window looks like – Spectrum Lab can monito more than 1 frequency, it’s a good idea to at least monitor 2 or more frequency's

Plot Window



Nr	Title	Expression	Result (Value)	Format	Scale Min	Scale Max
0	18k3	1100000*avrg(19525,19675)	46.0	0.0	0	100
1	19k6	1900000*avrg(19525,19675)	79.4	0.0	0	100
2	20k27	2000000*avrg(20220,20280)	56.5	0.0	0	100
3	20k9	1200000*avrg(20825,20975)	36.6	0.0	0	100
4	23k4	400000*avrg(23325, 23475)	13.4	0.0	0	50
5						

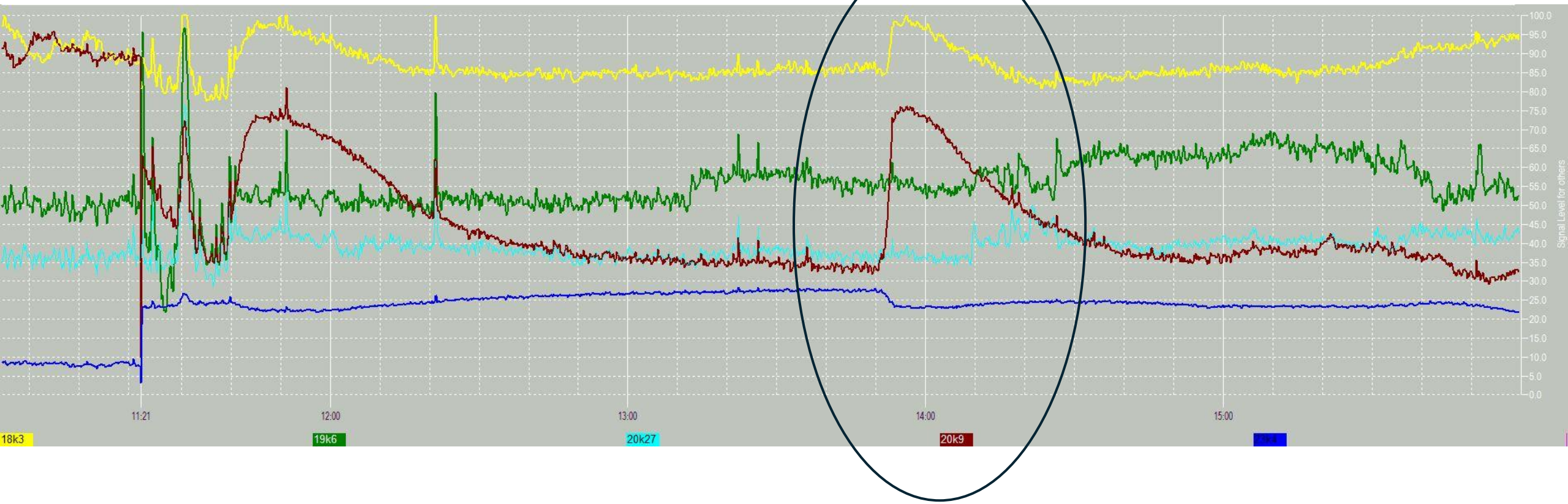
The Watch List is where you set the frequency's to be monitored

It’s a good idea to monitor more than one frequency

18.3khz - French Navy Rosnay, France
19.6khz Royal Navy, Anthorn, UK
20.27khz NATO / Italian Navy, Isola di Tavolara, Italy
20.9khz French Navy St. Assise, France
22.2khz French Navy Rosnay, France
23.4khz NATO / Ramsloh, Germany

This is my first SID Capture

08 February 2026 @14:00 GMT



My SID Site

As I have an interest in websites, I have created a site and the plots from Spectrum Lab are uploaded to my site and added to a MySql Database, this is done using a Python Script (developed using AI)

So, on my site I have a plot archive and a page which shows the latest plot.

I'm currently experimenting using AI to look at the plots and highlight any potential SIDS.

Useful Sites

These instructions were written by Paul Hyde and whilst they were written a few years ago they work just fine

Monitoring SIDs using Spectrum Lab and USB Sound Cards

A very compressive SID site created by Lionel Loudet and a good reference to check against

https://sidstation.loudet.org/home-en.xhtml

My Website

https://sid.radiometeordetection.org/

My Web site also has additional information on my setup