# GB3MBA evaluation Tests

Reports along the lines described here will be very helpful when it comes to designing the receivers for the proposed network and to develop the maths for calculating the location and trajectory of meteor events. This is a key ambition of this project so we are particularly interested in head echoes as these provide the means to do this.

If you can, I recommend using SDR Console with your SDR Receiver for monitoring the beacon tests and for the first few weeks of operation. There are some set-up guidelines at the end of this document. You will also be able to play a 2 minute recording made on 30th April using a Fun Cube Dongle, a ele beam pointed at BRAMS, a distance of about 425km, and SDR Console. This will give you some idea of the kind of reports I am looking for.
The file is 30-Apr-2022 084819.902 49.971MHz.wav

Method 1, using a conventional SSB receiver.

Tune to 50.407 USB. Demodulated meteor echoes will have a frequency centred on 1KHz Head echoes have rapidly changing Doppler shift. Tail echoes have little or no Doppler shift so will demodulate to about 1KHz. As for this project we are particularly interested in Head Echoes it is best to display and if possible record these on a waterfall display. Taking an audio output from a conventional SSB receiver tuned to 50.407MHz USB and recording with Spectran is ideal. Spectran is free and can be found at https://www.sdradio.eu/weaksignals/code/specpakv2_216.exe
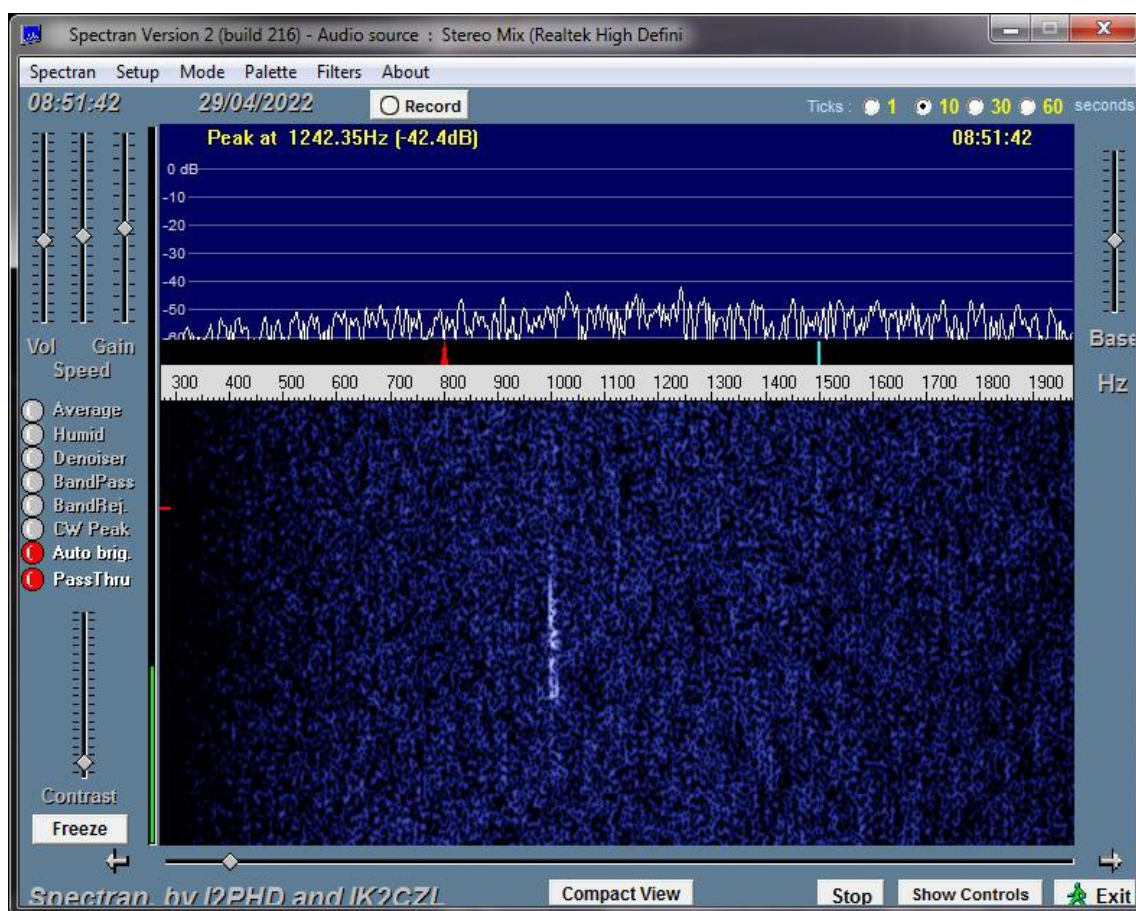
A tail echo received from BRAMS USB 49.969 using Spectran

Method 2 using a Software Defined Radio

In this example the the SDR is a Fun Cube Dongle and the software is SDR Console. Tune to (say) 50.4085 USB and select a bandwidth of 3KHz. With 3KHz bandwidth recordings produce reasonably compact files.

Three events. The middle one showing a head echo
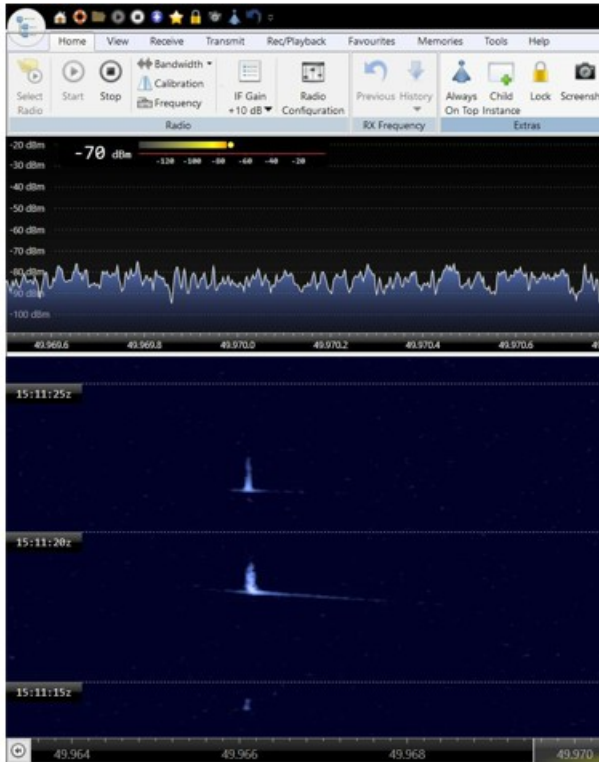
Vertical waterfall is more helpful for assessing the head echo.

My setup for SDR Console
Select Radio ….FCD 2.0
Bandwidth 44.10KHz

Press start.

Set frequency to __50.409 MHz to avoid the centre "hole". (for SDRs 50.408 MHz)
Set Span to __.__150 ie +/- 1.5KHz other
Press ..OK

Adjust gain settings to taste and check the background noise level with the antenna connected vs a 50 Ohm Load. If the increase is much more than about 10dB your location is noisy so you may have problems hearing the weaker echoes. Please report your noise level to me so I can get some idea as to how big this problem is.
Note that SDR Play turn OFF their pre amp above 30MHz in their current firmware so you may need an LNA with this SDR I understand that they are changing the firmware to overcome this in the future.

From the SDR Home menu you can take screenshots of event that are of interest.

You can record your observations as follows:-

Select the rec/playback Tab. Press the Record button(Red dot).
Select a directory for your recording.
Click on "Range" in the record dialogue panel .

Select Bandwidth 3KHz (Display) and press OK. This will keep the file compact.
Press start.

To see what I am hoping you might see, try replaying this file:-
30-Apr-2022 084819.902 49.971MHz.wav

It is a two minute long real time recording of BRAMS with many meteor events.
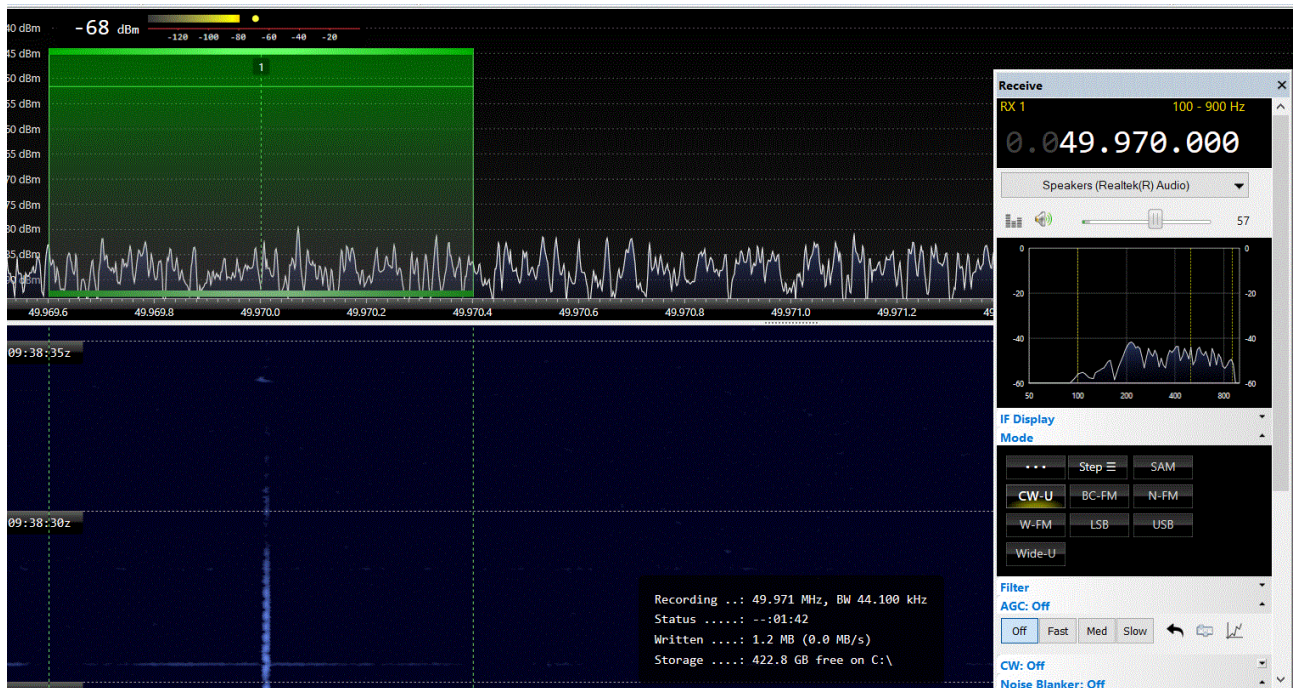
I am asking for a bit of a culture change from seasoned radio meteor observers because I am very interested in Head echoes.

Also, I contend that tail echoes probably tell us more about the region of the ionosphere through which the meteor has passed than they do about the meteor itself.

I realise that in Radio Astronomy circles this is heresy !