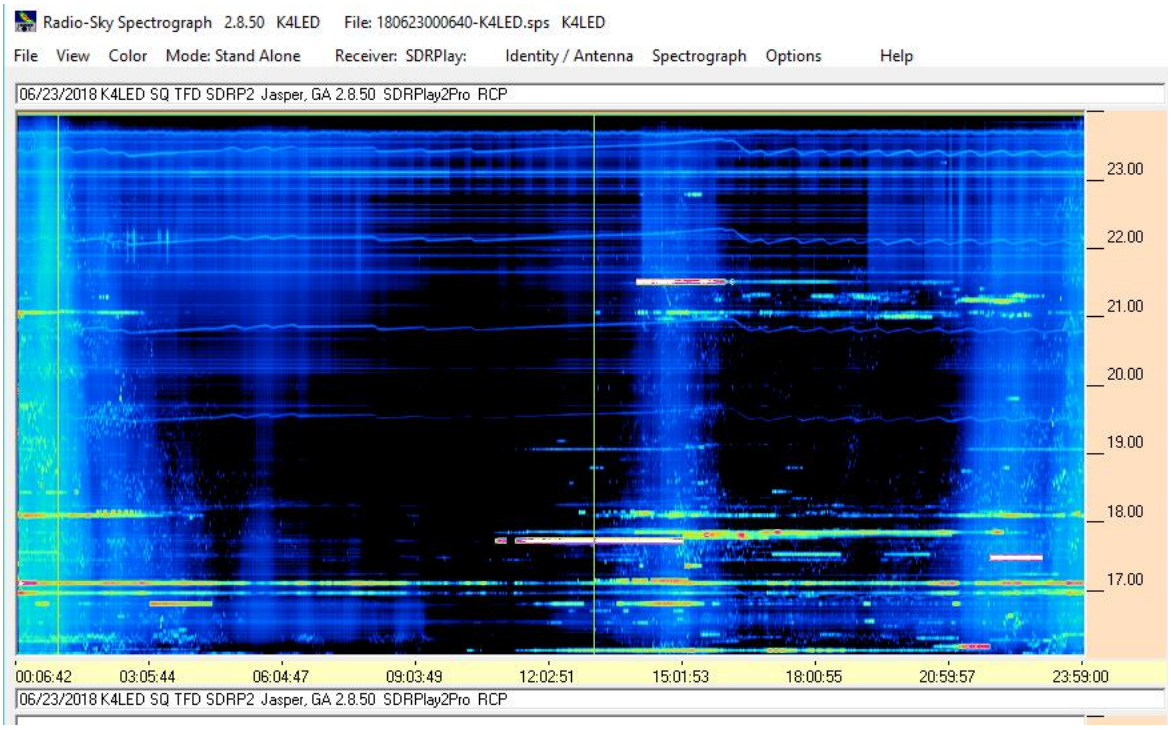
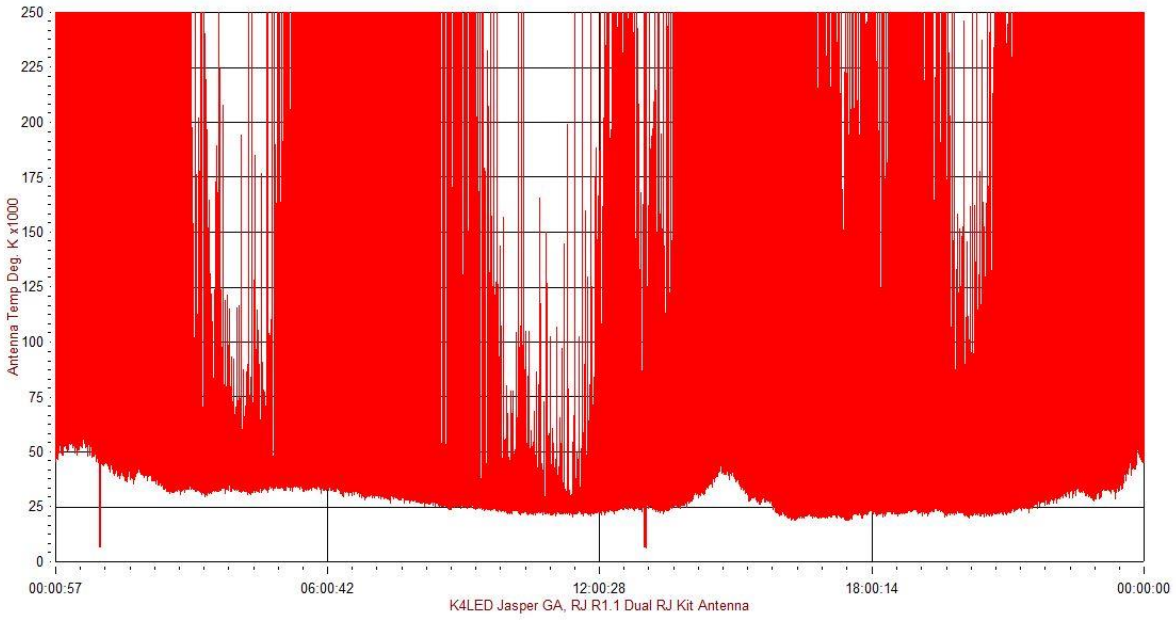
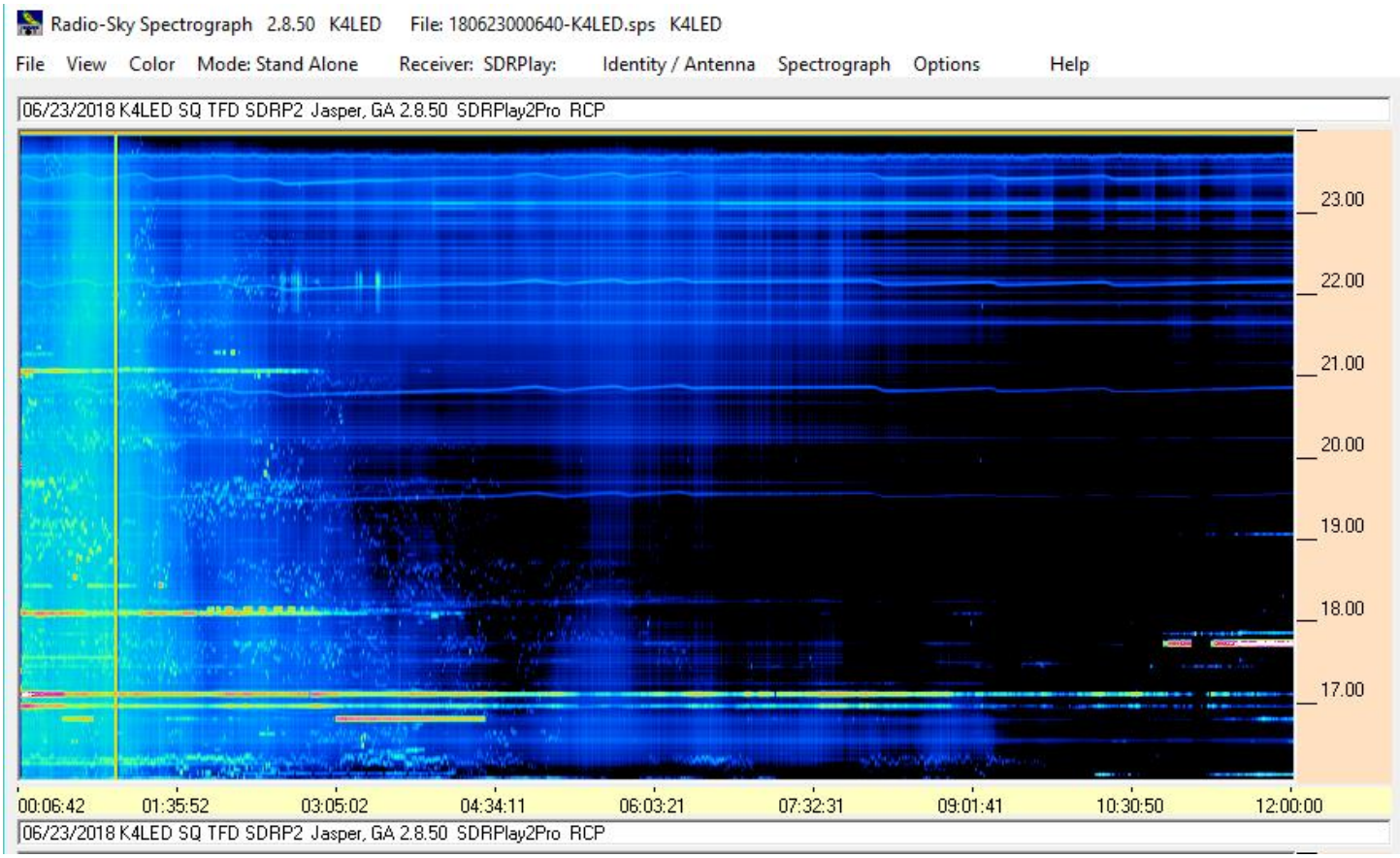
K4LED

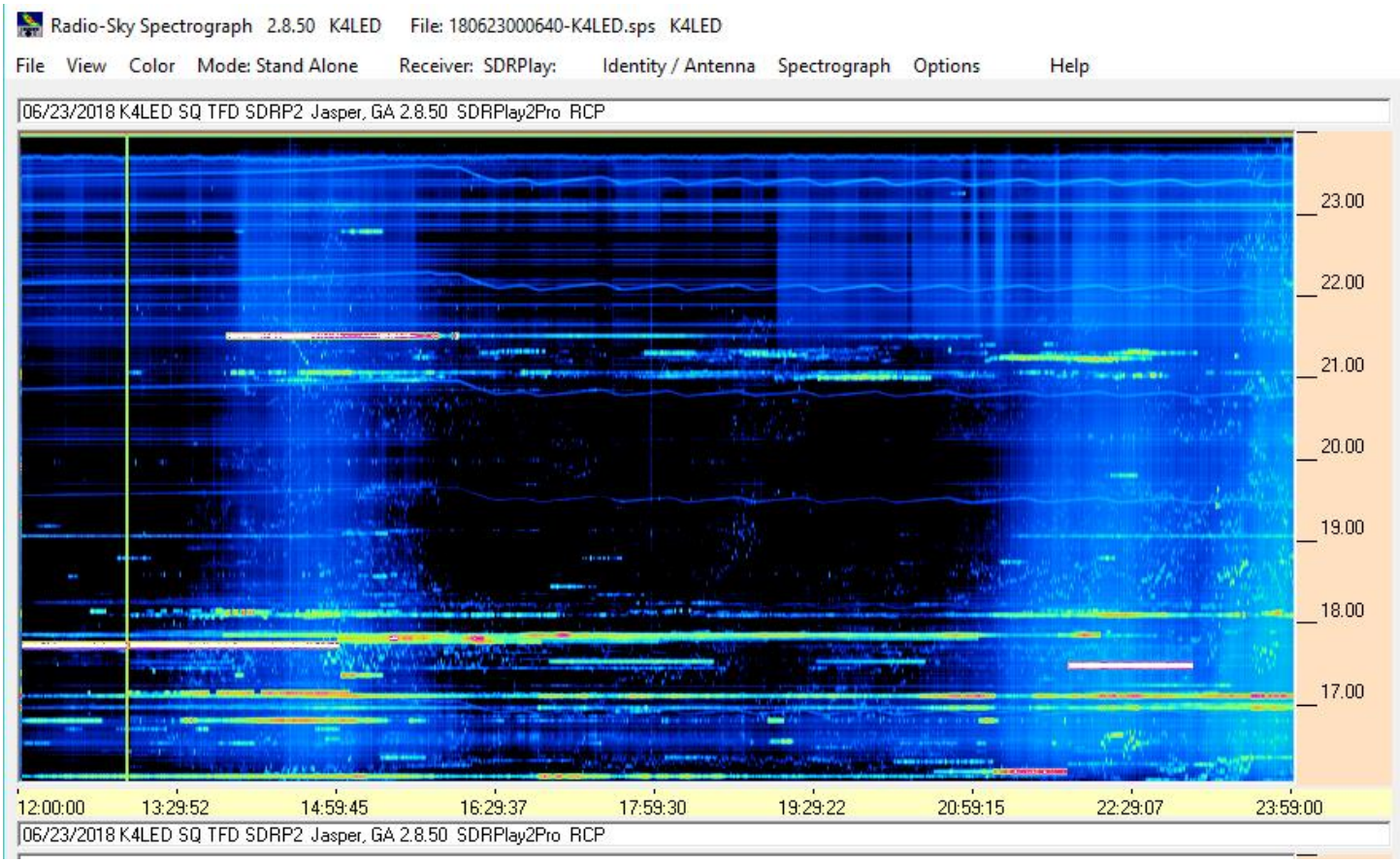
Georgia Amateur Radio Astronomy Observatory

Observation Date: 06-23-2018, 0:00:00 to 23:59:00 UTC
Location: Lat. 34.42322 N, Lon. -84.49413 W (Jasper, GA 30143)
Object: TP, GB, Very Light Solar 19:18:50 (Heavy Thunderstorm)
Observer: Larry E. Dodd
Receivers: FSX11, SDRPlay2PRO, RJ1.1
Software: SkypipeII 2.7.34, Spectrograph 2.8.50
Antennas: Radio Jove Dual Dipole Kit, Typinski Square TFD






Radio-Sky Spectrograph 2.8.50 K4LED File: 180623000640-K4LED.sps K4LED
File View Color Mode: Stand Alone Receiver: SDRPlay: Identity / Antenna Spectrograph Options Help
06/23/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP
23.00
22.00
21.00
20.00
19.00
18.00
17.00
00:06:42
01:35:52
03:05:02
04:34:11
06:03:21
07:32:31
09:01:41
10:30:50
12:00:00
06/23/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP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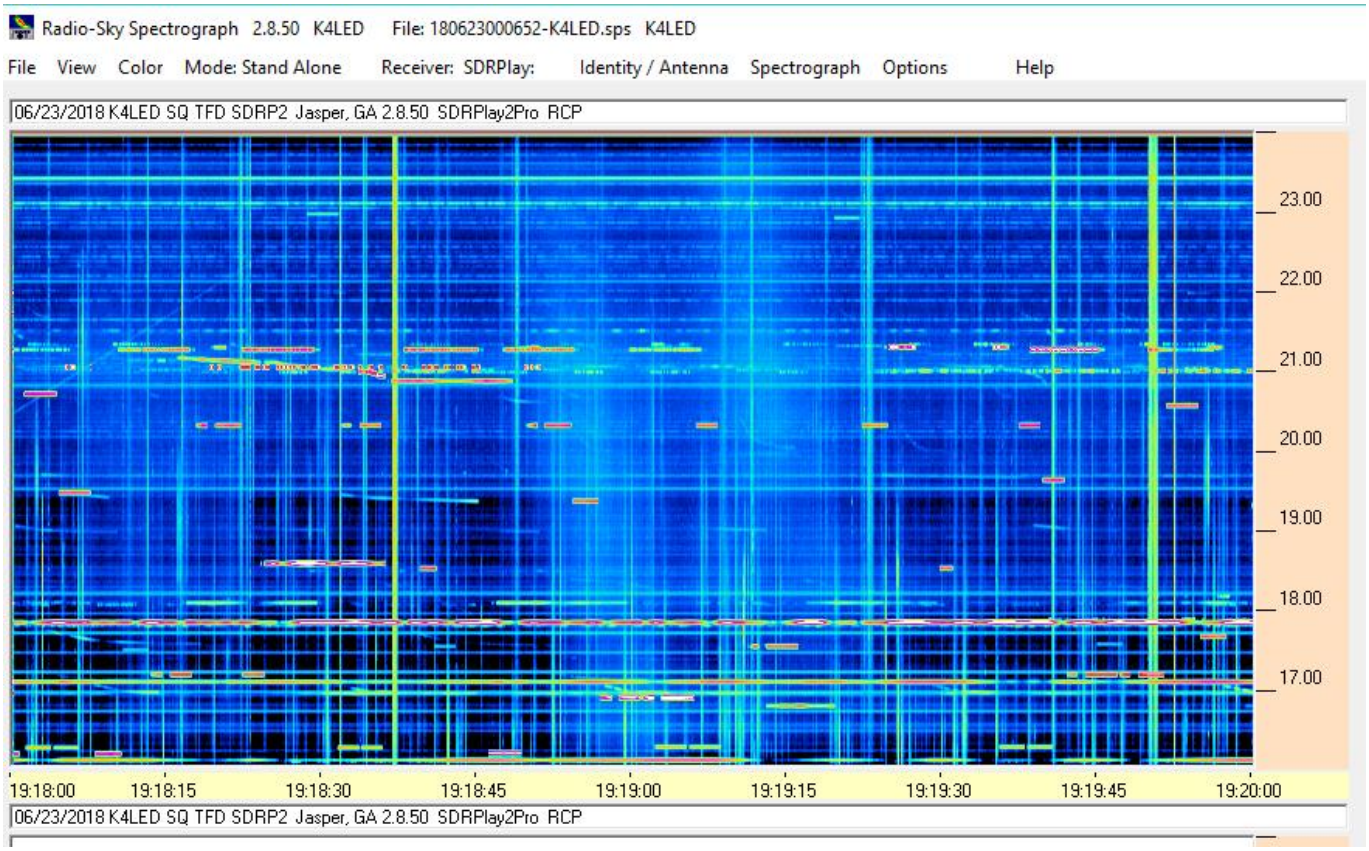
File View Color Mode: Stand Alone Receiver: SDRPlay: Identity / Antenna Spectrograph Options Help
06/23/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP
23.00
22.00
21.00
20.00
19.00
18.00
17.00
12:00:00
13:29:52
14:59:45
16:29:37
17:59:30
19:29:22
20:59:15
22:29:07
23:59:00
06/23/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP


Radio-Sky Spectrograph 2.8.50 K4LED File: 180623000652-K4LED.sps K4LED
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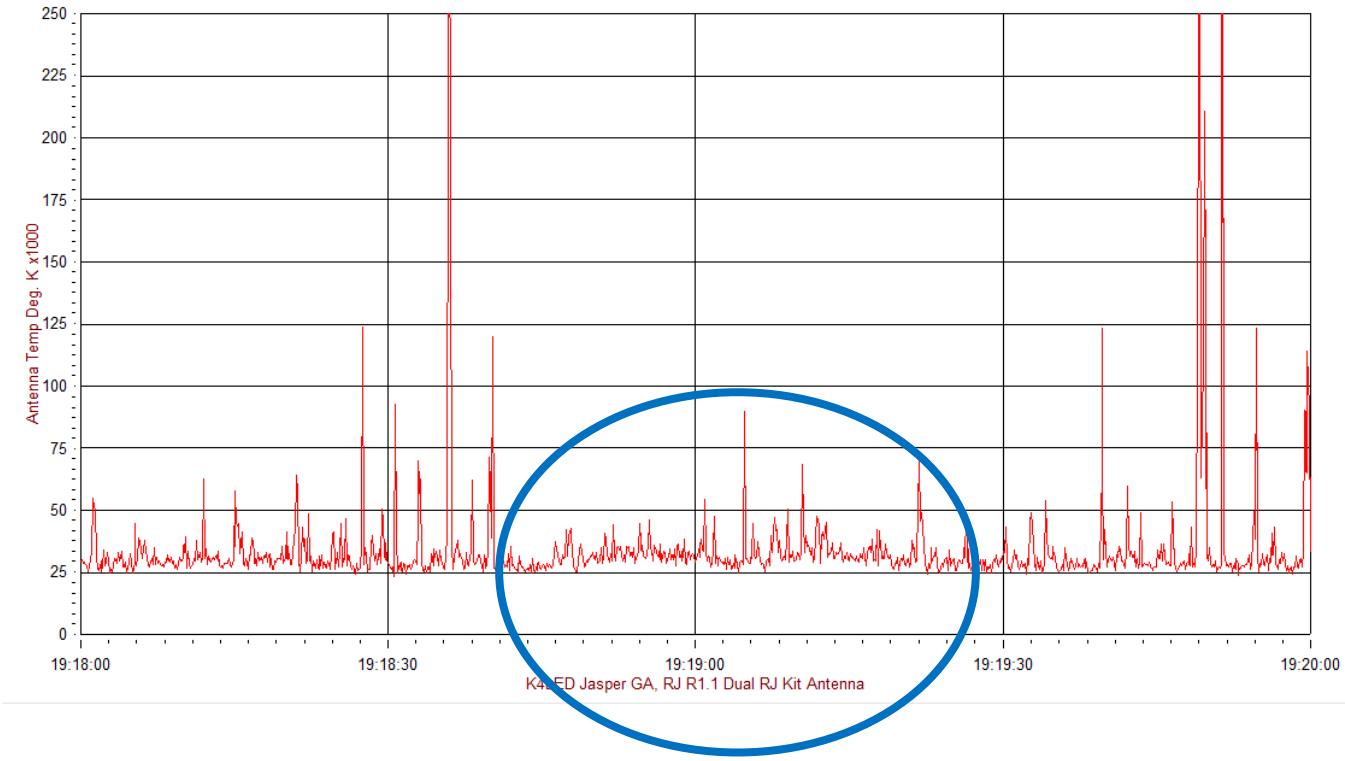
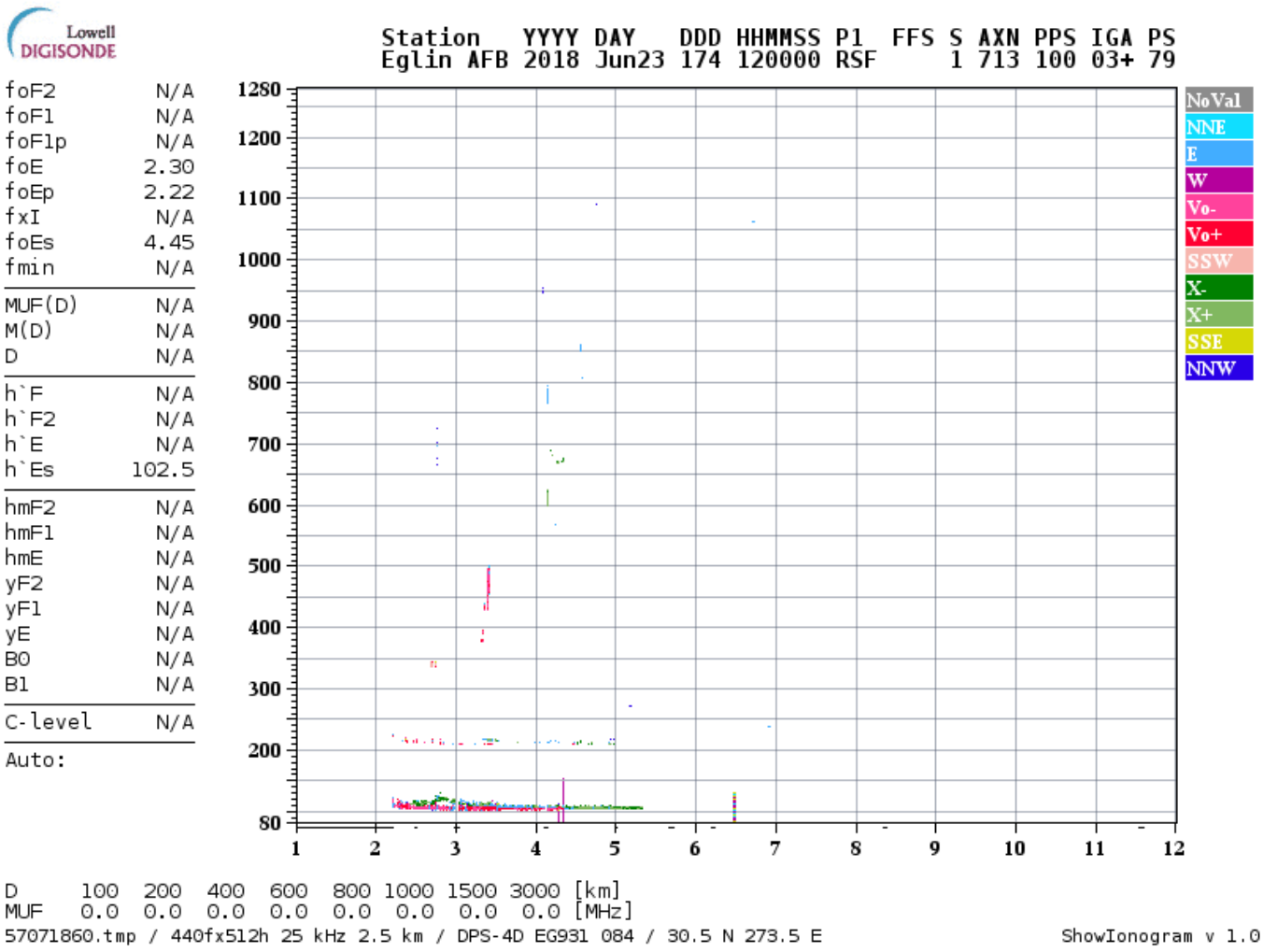
06/23/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP
23.00
22.00
21.00
20.00
19.00
18.00
17.00
19:18:00
19:18:15
19:18:30
19:18:45
19:19:00
19:19:15
19:19:30
19:19:45
19:20:00
06/23/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP


Antenna Temp.Deg. K x1000
250
225
200
175
150
125
100
75
50
25
0
19:18:00
19:18:30
19:19:00
19:19:30
19:20:00
K4LED Jasper GA, RJ R1.1 Dual RJ Kit Antenna



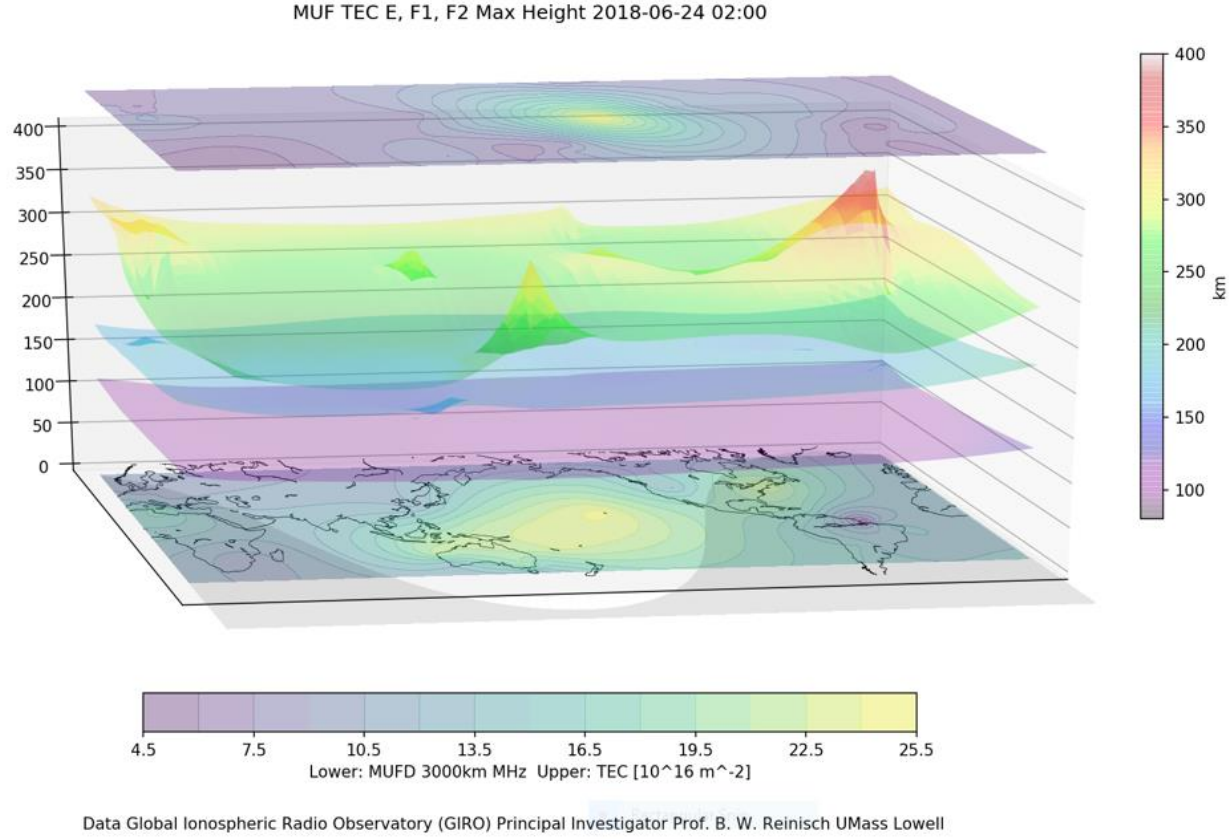
References for Interpreting the Ionogram:

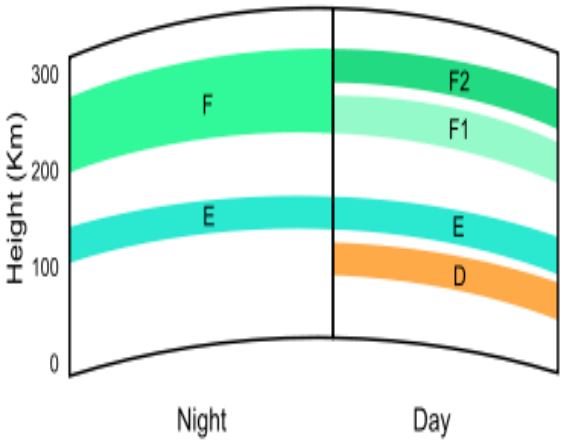
http://www.sws.bom.gov.au/IPSHosted/INAG/uag_23a/UAG_23A_indexed.pdf

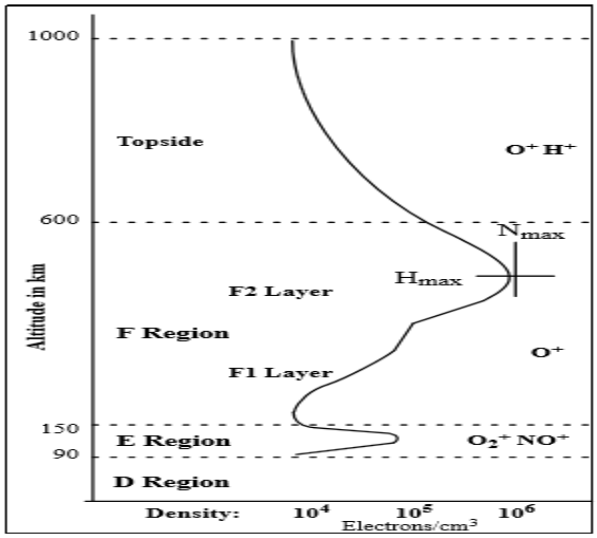
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.404.5517&rep=rep1&type=pdf

https://www.hfunderground.com/wiki/index.php/Ionosonde

Ionosphere Layers, MUF, Total Electron Content







The critical frequency is the limiting frequency at or below which a radio wave is reflected by an ionospheric layer at vertical incidence. If the transmitted frequency is higher than the plasma frequency of the ionosphere, then the electrons cannot respond fast enough, and they are not able to re-radiate the signal. It is calculated as shown below:

$$f_{\text{critical}} = 9 \times \sqrt{N}$$

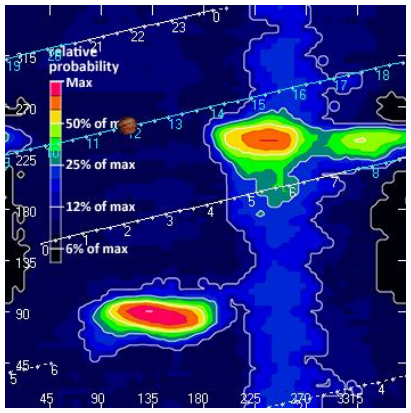
where N = electron density per m^3 and f_{critical} is in Hz.

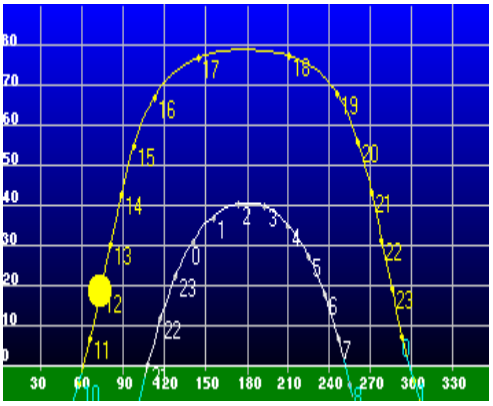
The Maximum Usable Frequency (MUF) is defined as the upper frequency limit that can be used for transmission between two points at a specified time.

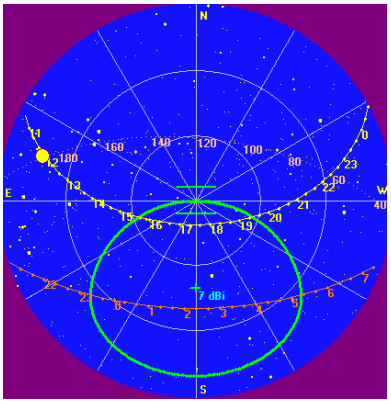
$$f_{\text{muf}} = \frac{f_{\text{critical}}}{\sin \alpha}$$

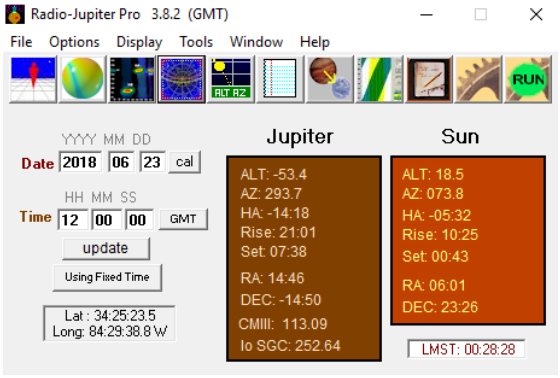
where α = angle of attack, the angle of the wave relative to the horizon, and sin is the sine function.

Reference: https://en.wikipedia.org/wiki/Ionosphere



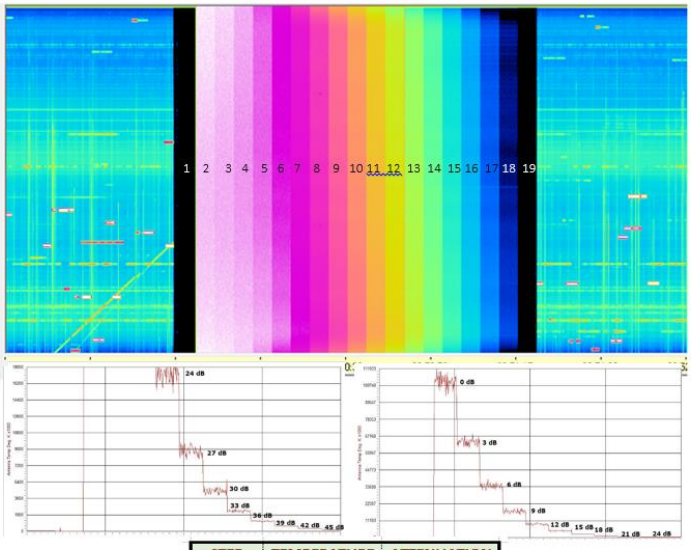






AUTOMATED CALIBRATION COLOR BAR TEST PATTERN AND DATA

ACTUAL MEASURED DATA



STEP	TEMPERATURE	ATTENUATION
1	>1 kK	101 dB
2	104.0 MK	0 dB
3	66.9 MK	3 dB
4	36.3 MK	6 dB
5	19.1 MK	9 dB
6	9.6 MK	12 dB
7	4.5 MK	15 dB
8	2.3 MK	18 dB
9	1.2 MK	21 dB
10	602.0 kK	24 dB
11	296.6 kK	27 dB
12	133.0 kK	30 dB
13	92.2 kK	33 dB
14	51.6 kK	36 dB
15	32 .0 kK	39 dB
16	22.6 kK	42 dB
17	17.9 kK	45 dB
18	12.0 kK	48 dB
19	>1 kK	101 dB

Larry

End of Report