

K4LED

Georgia Amateur Radio Astronomy Observatory

Observation Date: 06-25-2018, 0:00:00 to 23:59:00 UTC

Location: Lat. 34.42322 N, Lon. -84.49413 W (Jasper, GA 30143)

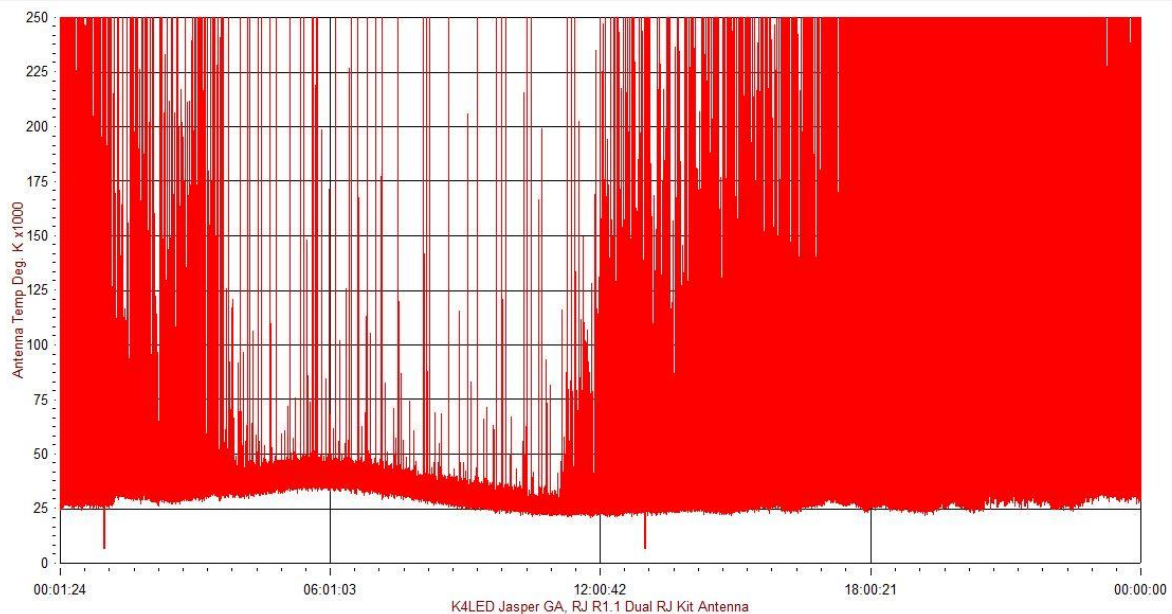
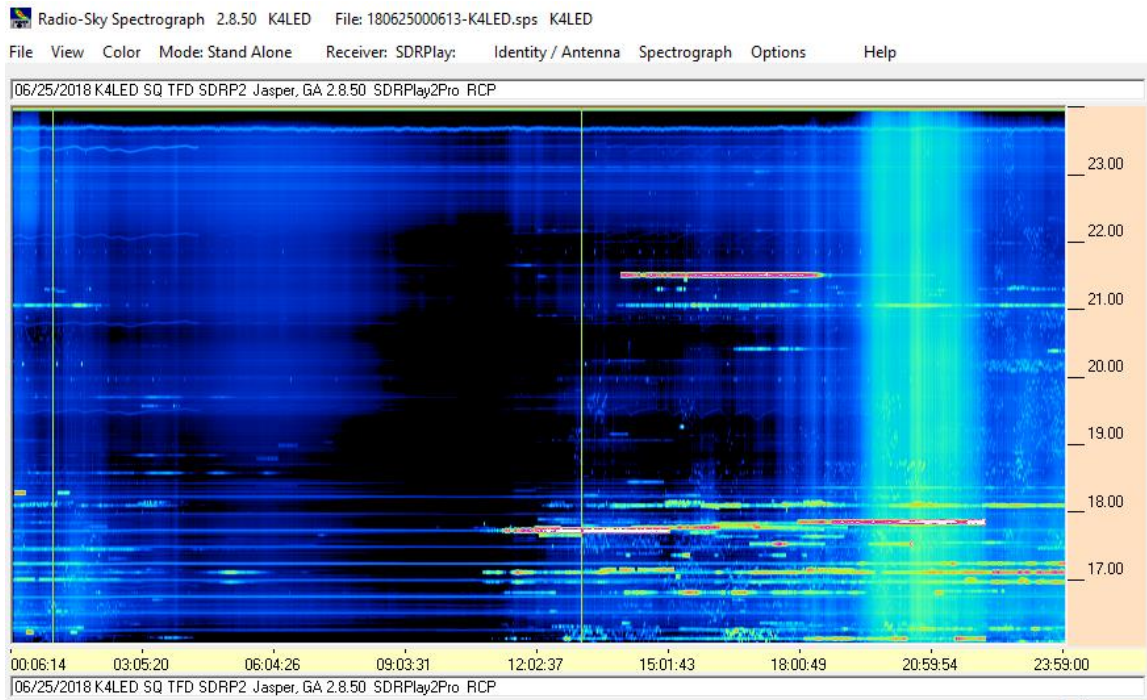
Object: TP, GB, (Heavy Afternoon Thunderstorm)

Observer: Larry E. Dodd

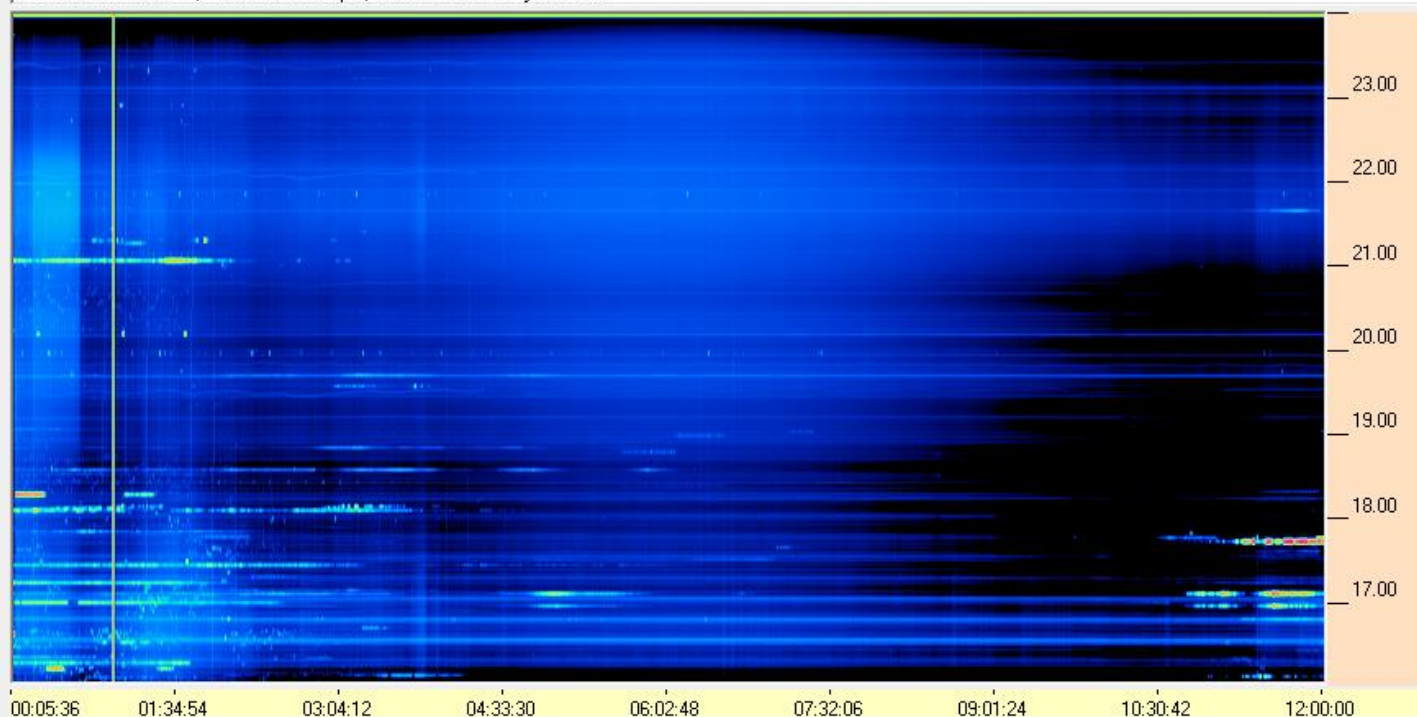
Receivers: FSX11, SDRPlay2PRO, RJ1.1

Software: SkypipeII 2.7.34, Spectrograph 2.8.50

Antennas: Radio Jove Dual Dipole Kit, Typinski Square TFD

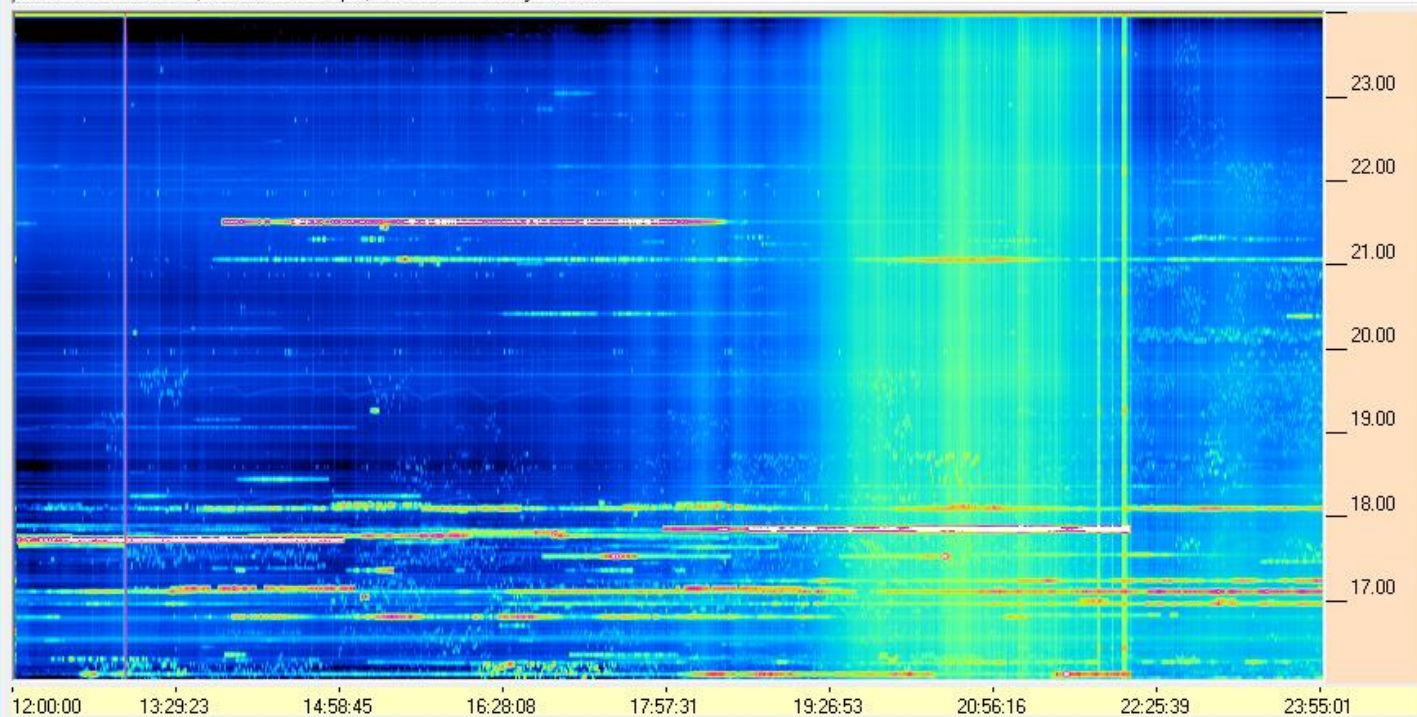


06/25/2018 K4LED SQ TFD SDRP2 Jasper, GA 2.8.50 SDRPlay2Pro RCP



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Station YYYY DAY DDD HHMMSS P1 FFS S AXN PPS IGA PS
Eglin AFB 2018 Jun25 176 204500 RSF 1 713 100 03+ 79

foF2 5.425
foF1 3.94
foF1p 4.33
foE 3.11
foEp 3.16
fxI 6.05
foEs 3.28
fmin 1.00

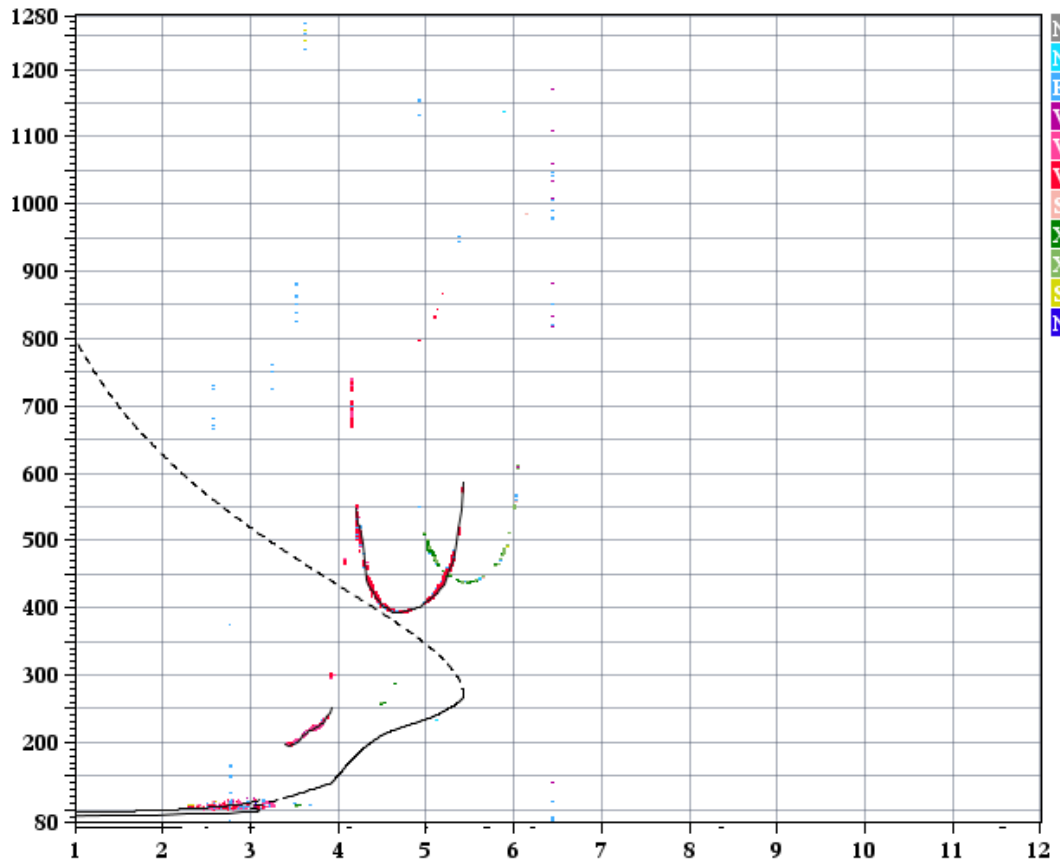
MUF(D) 16.30
M(D) 3.00
D N/A

h⁺F 195.0
h⁺F2 392.5
h⁺E 96.0
h⁺Es 102.5

hmF2 269.2
hmF1 141.4
hmE 99.2
yF2 90.6
yF1 35.4
yE 9.0
B0 219.3
B1 1.00

C-level 11

Auto:
Artist5
500200



D 100 200 400 600 800 1000 1500 3000 [km]
MUF 6.0 6.1 6.3 6.7 7.2 8.1 10.4 16.3 [MHz]
49278373.tmp / 440fx512h 25 kHz 2.5 km / DPS-4D EG931 084 / 30.5 N 273.5 E

ShowIonogram v 1.0

References for Interpreting the Ionogram:

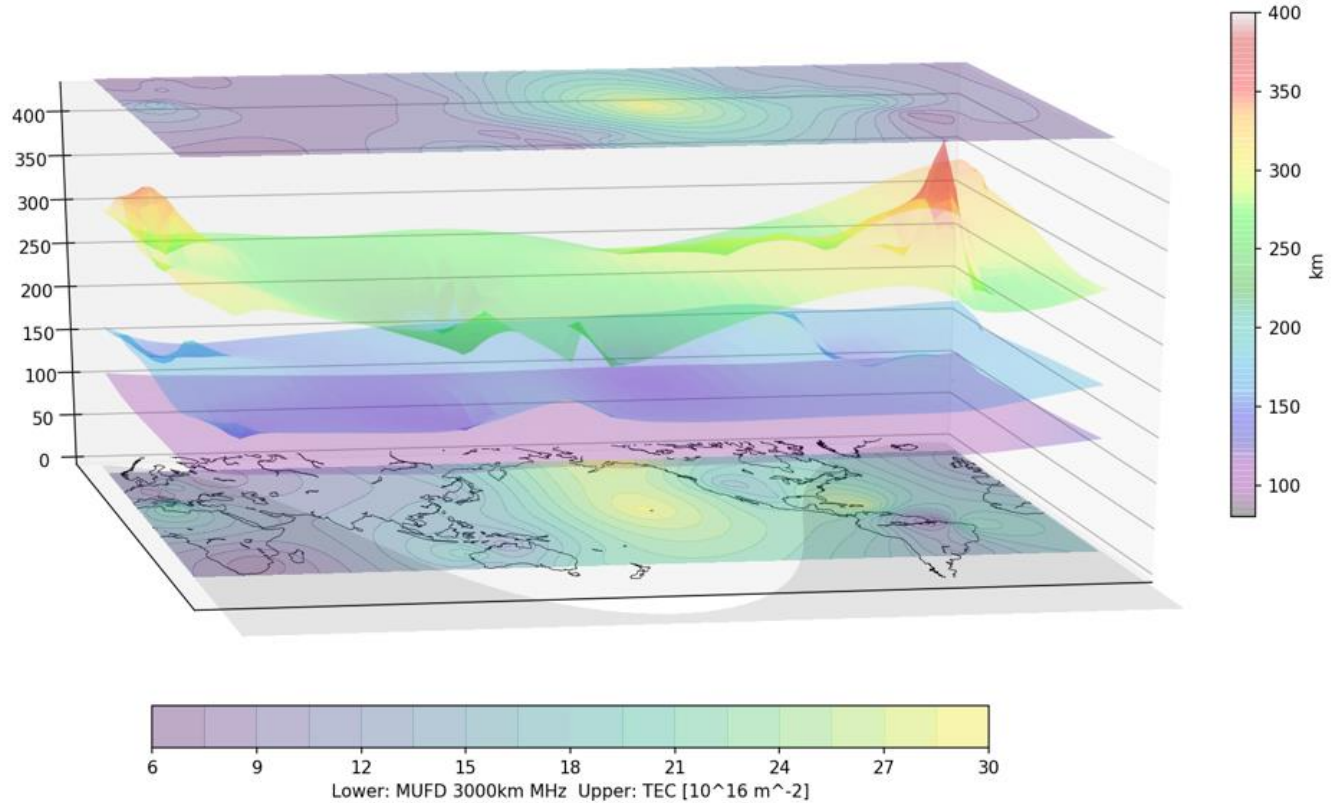
http://www.sws.bom.gov.au/IPSHosted/INAG/uag_23a/UAG_23A_indexed.pdf

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

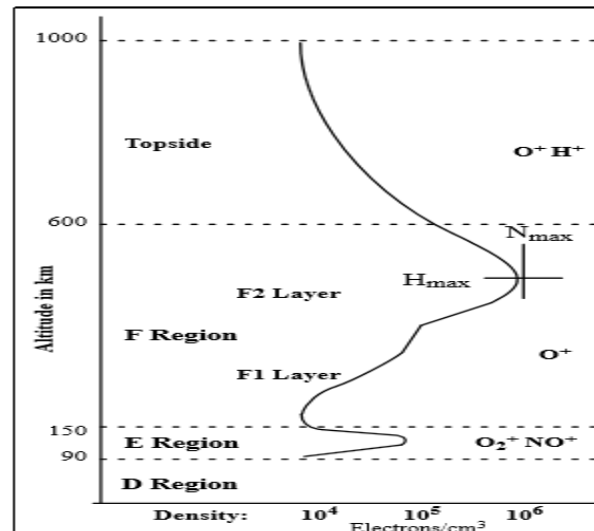
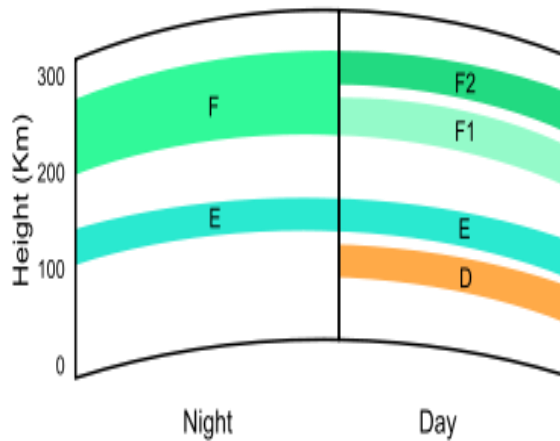
<https://www.hfunderground.com/wiki/index.php/Ionosonde>

Ionosphere Layers, MUF, Total Electron Content

MUF TEC E, F1, F2 Max Height 2018-06-26 00:50



Data Global Ionospheric Radio Observatory (GIRO) Principal Investigator Prof. B. W. Reinisch UMass Lowell



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:

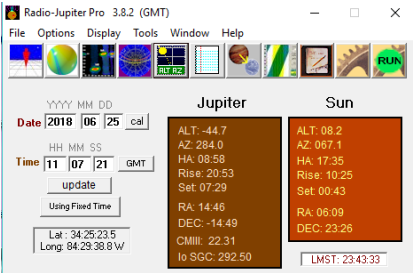
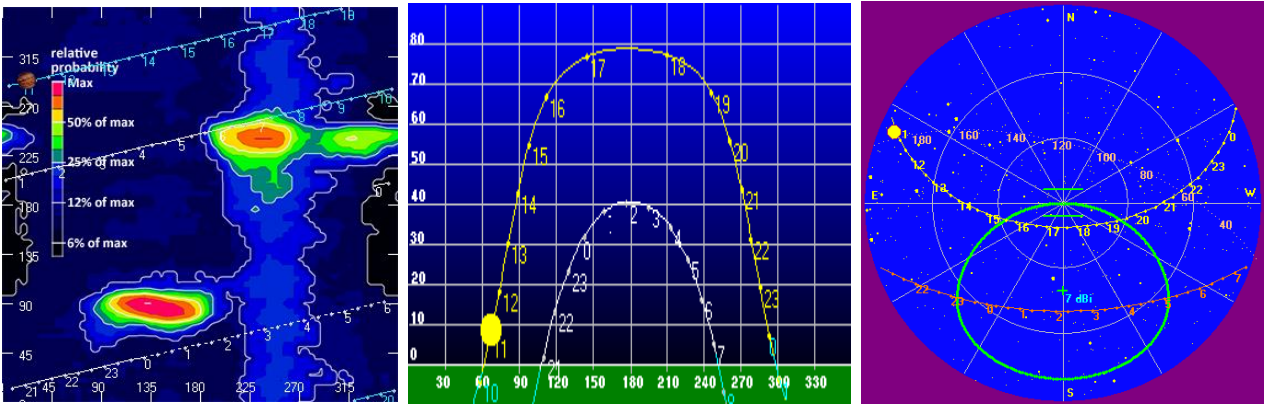
$$f_{\text{critical}} = 9 \times \sqrt{N}$$

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

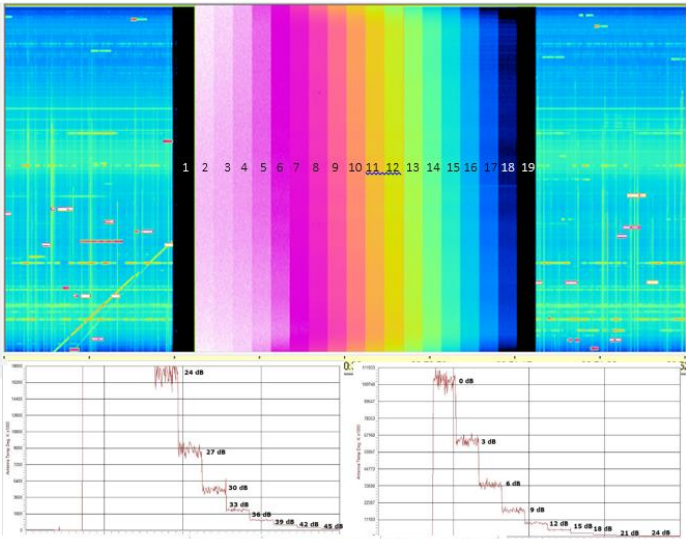
The Maximum Usable Frequency (MUF) is defined as the upper frequency limit that can be used for transmission between two points at a specified time.

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

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



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

Rectangular Snip