

An Analysis of LRS
VHF/UHF Contest Antenna
Systems

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GM4DIJ

Current Antennas

- 50 MHz
 - Homebrew 9 element Wide Spaced 15m boom
- 70 MHz
 - Homebrew 11 element Wide Spaced 15m boom
- 144 MHz
 - 4 x M² 19 element
- 432 MHz
 - 2 x M² 38 element
- 23cm
 - 4x 55element Tonna

50MHz



70MHz



144MHz



144MHz later that night



70cm



23cm

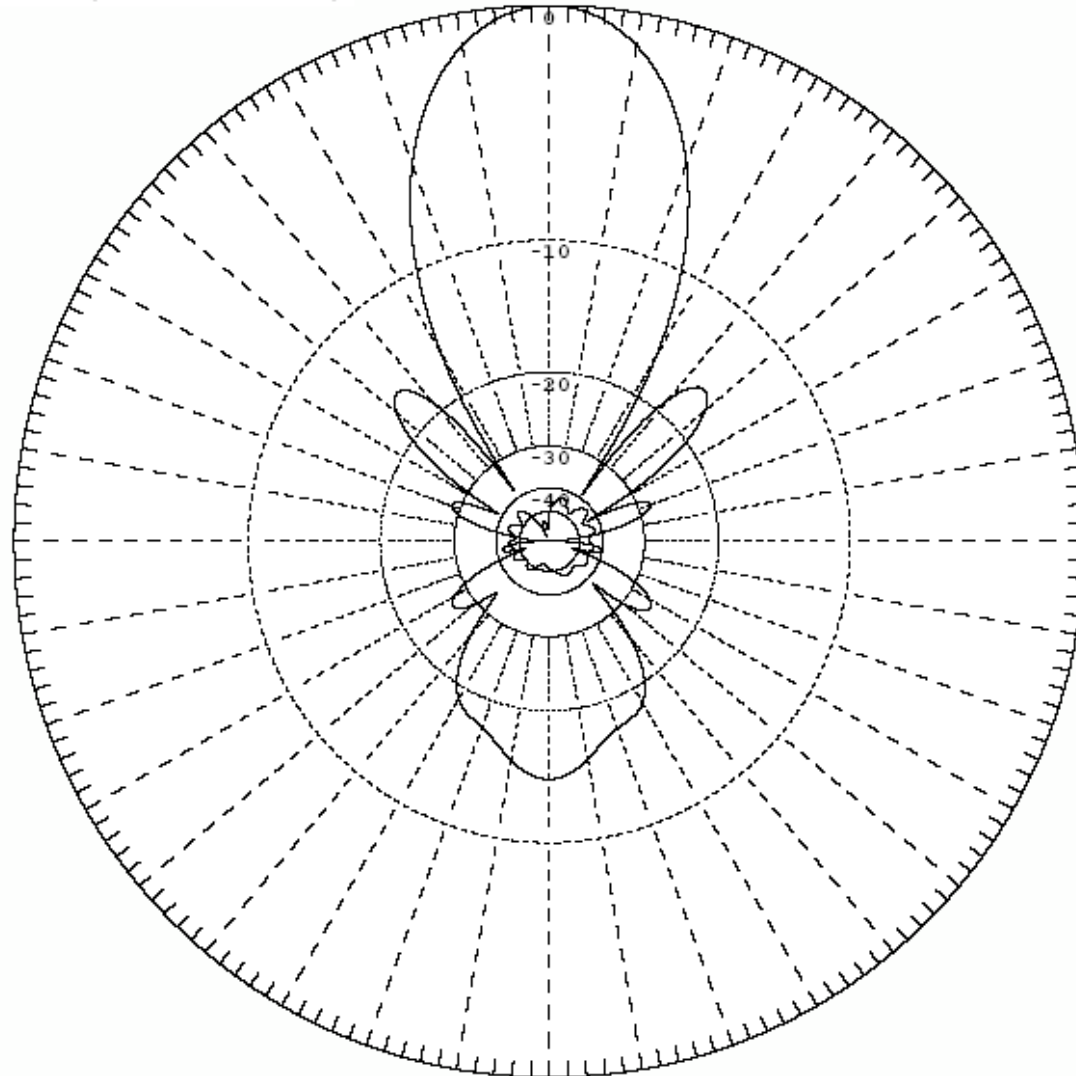


How do they perform ?

- Antenna beam pattern
 - Horizontal – to determine footprint
 - Vertical –including ground effects
- Map pattern to show area coverage
- Show Stations worked form Gatehouse
 - Shadows and preferred beam direction

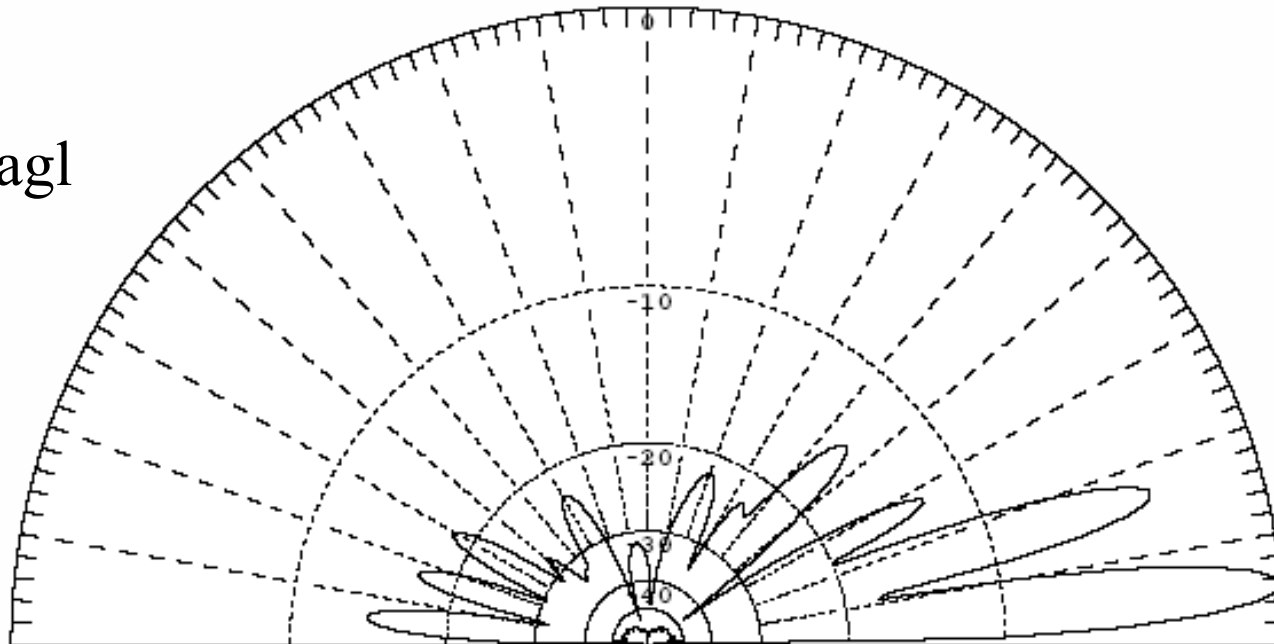
50MHz

9ele YAGI 6m (15m boom)



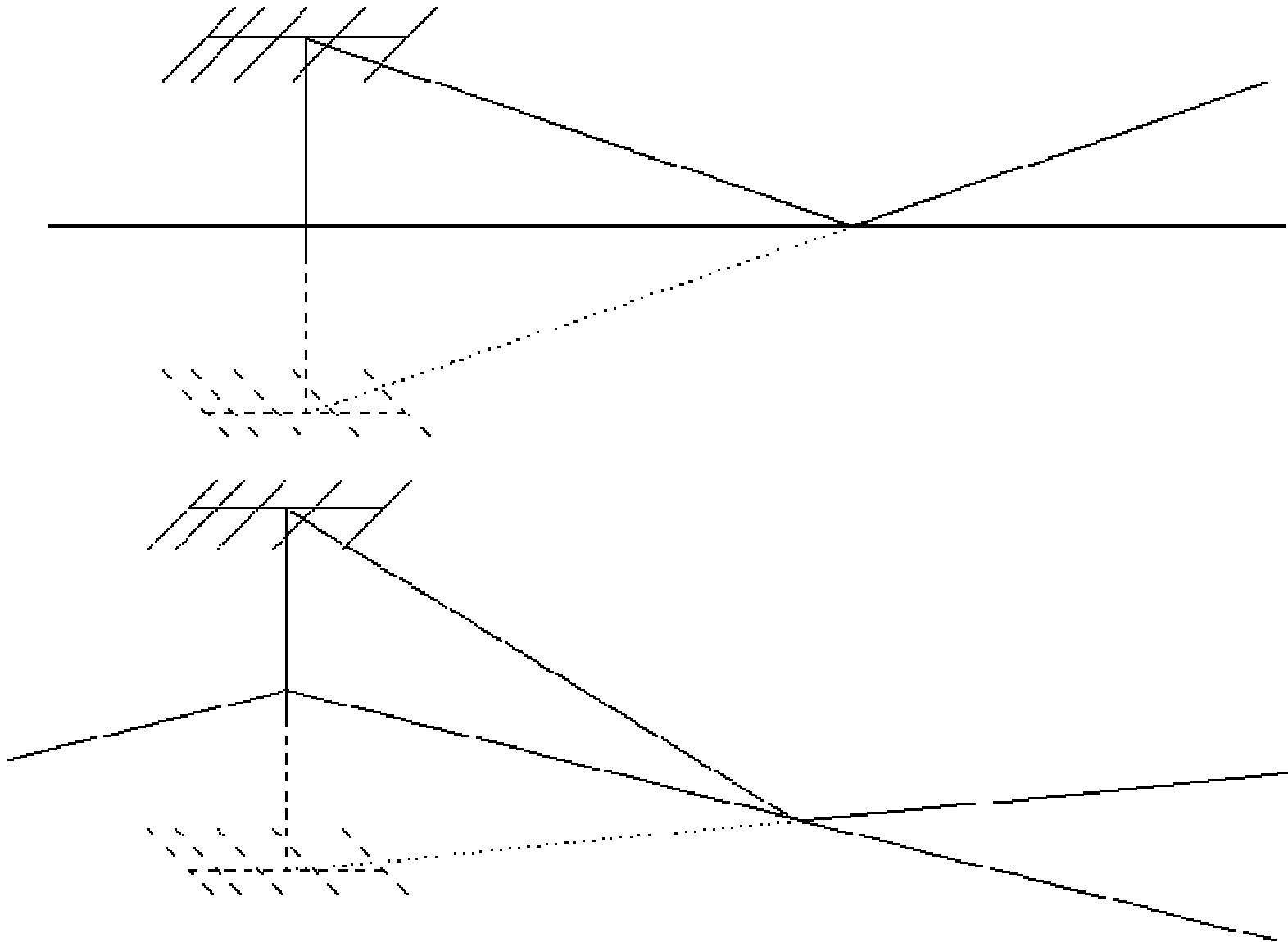
50MHz

15m agl

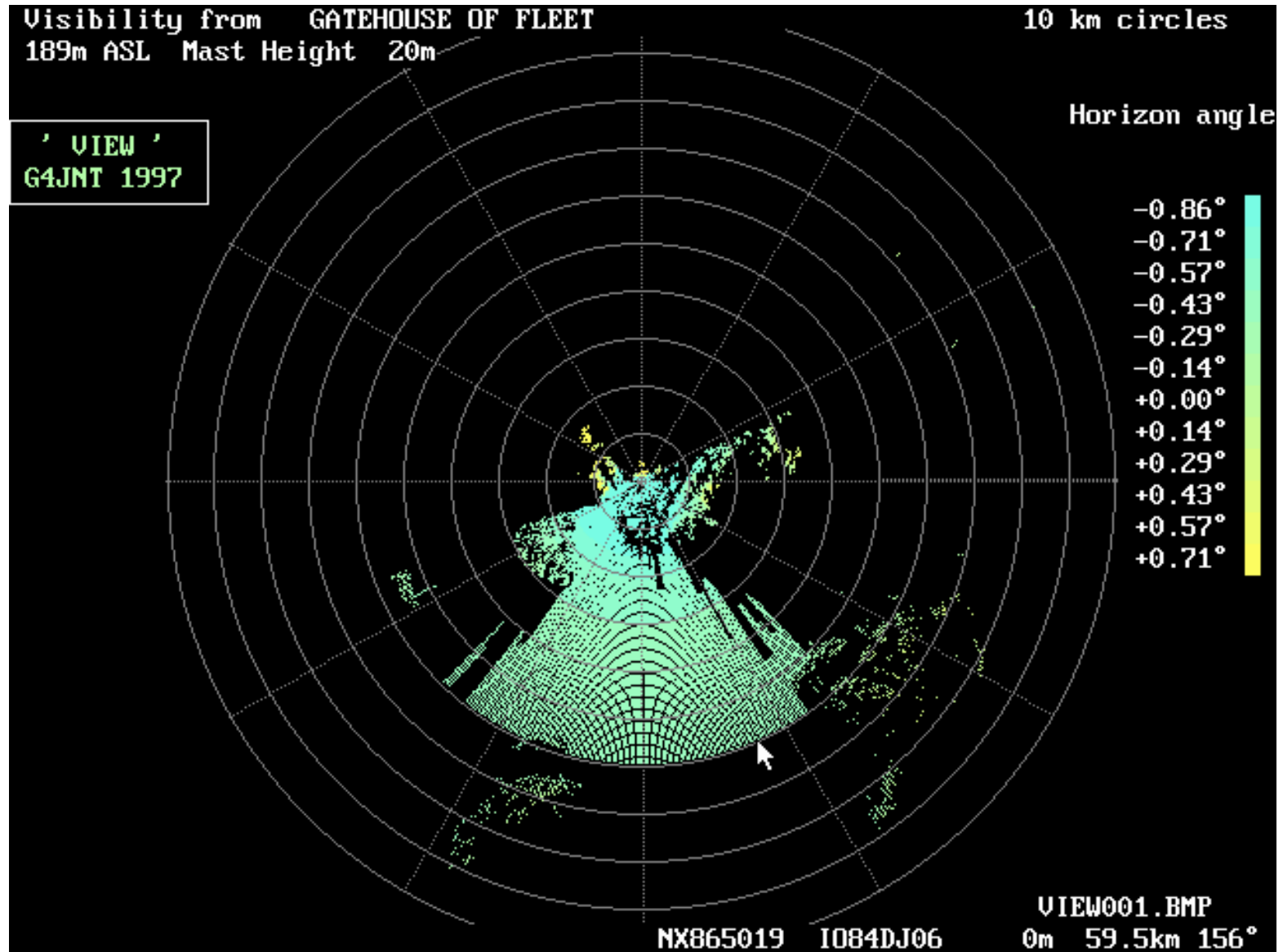


Ga :20.56 (dBi) = 0dB (Hori Pol)
F/B :14.10 (dB) Rear:Az.120 dg El.60dg
Freq:50.200 (MHz)
Z :54.093+j6.798
SWR :1.16 (50.0) 11.09 (6000m)
Elev:5.4dg (Real GND :15.0mH)

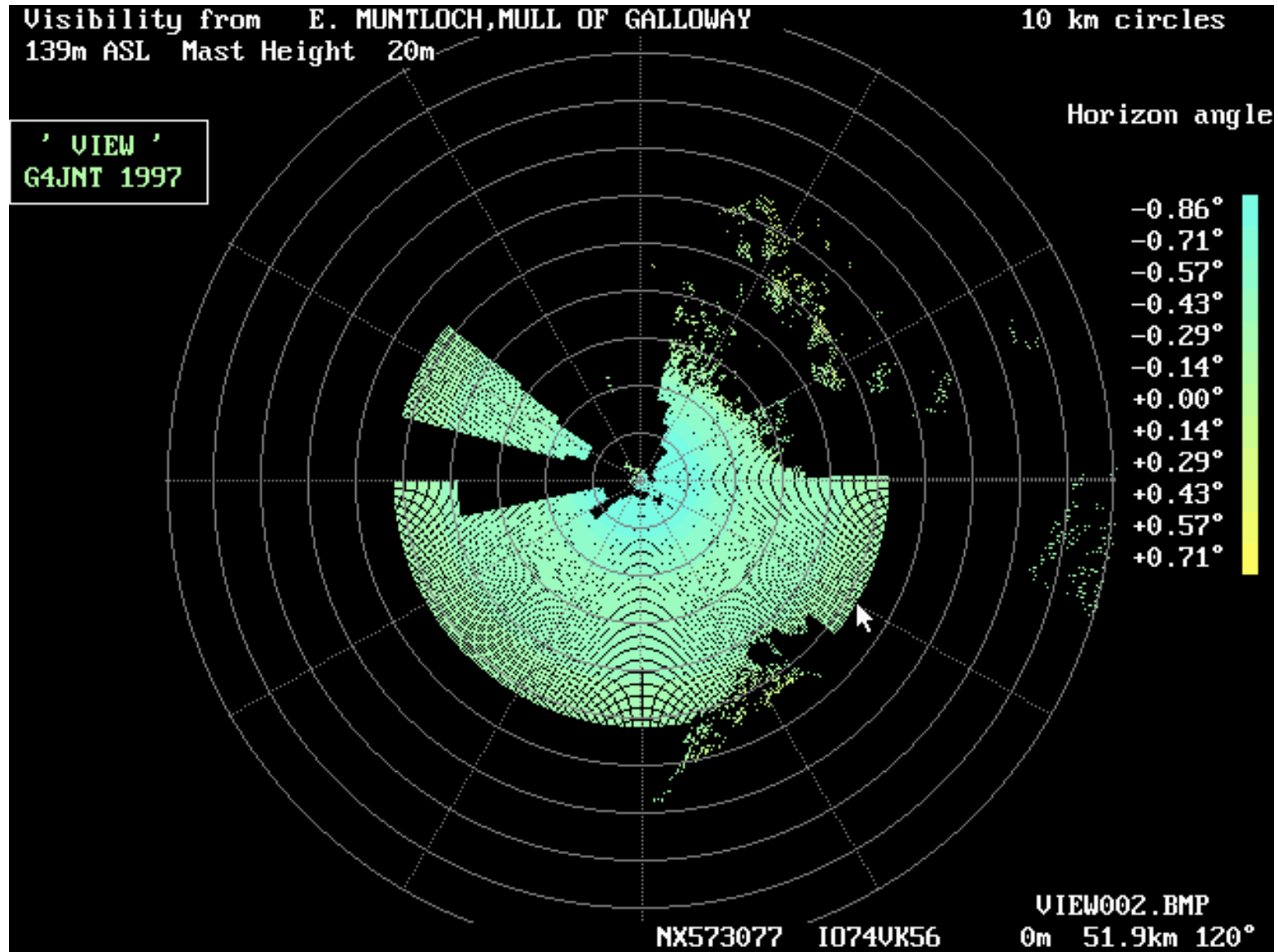
Ground Slope



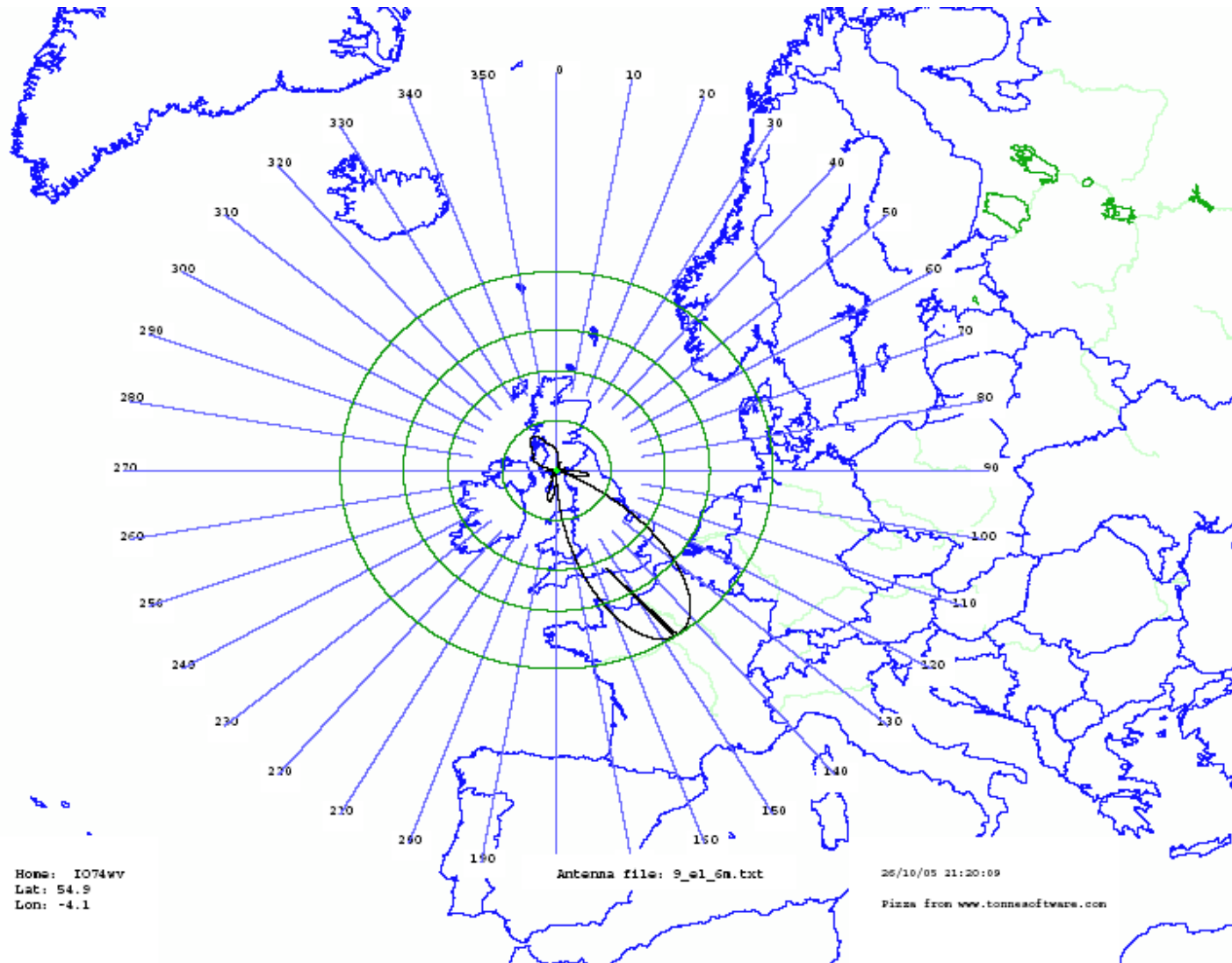
View from Gatehouse



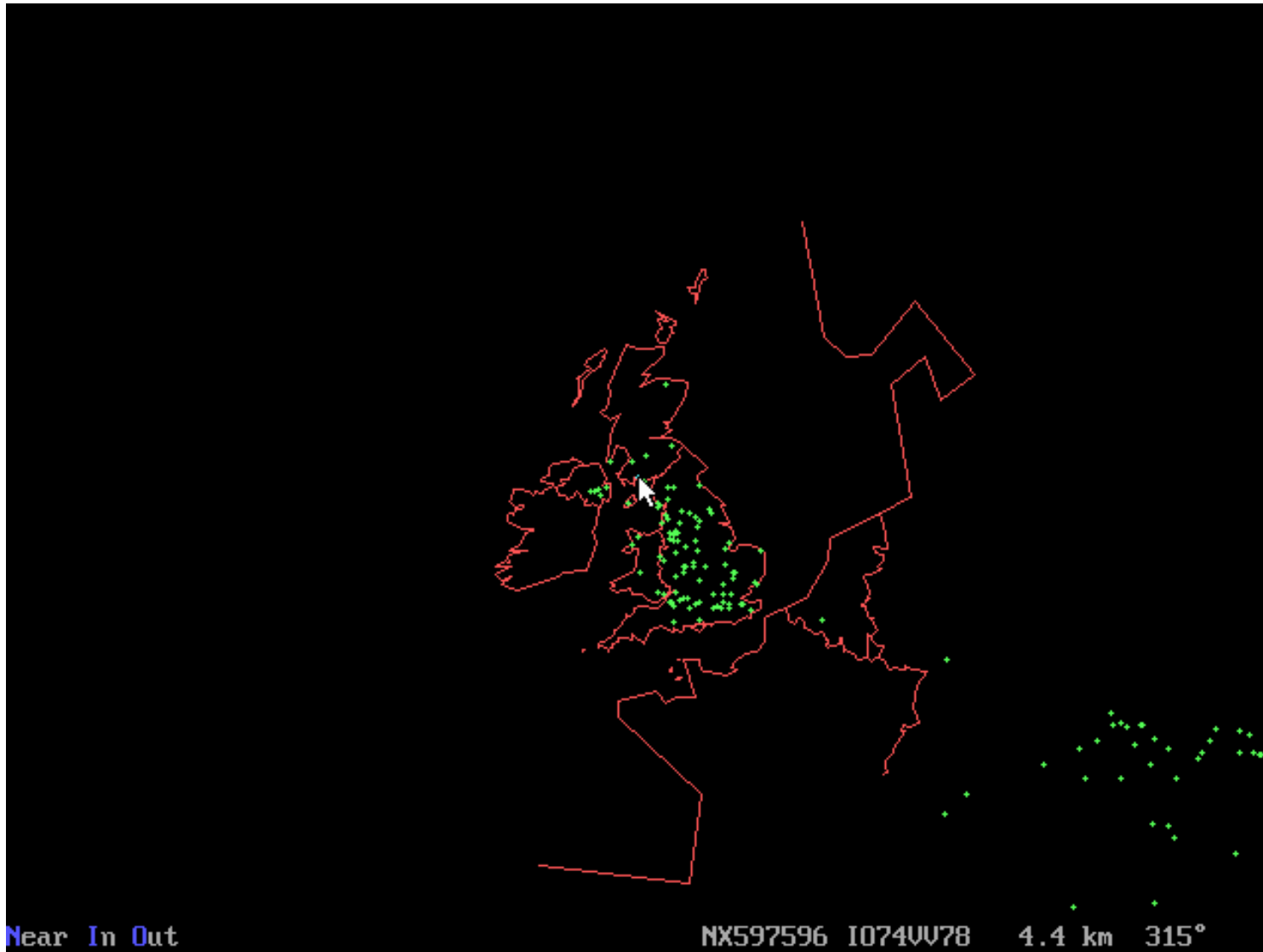
View from Mull of Galloway



50MHz

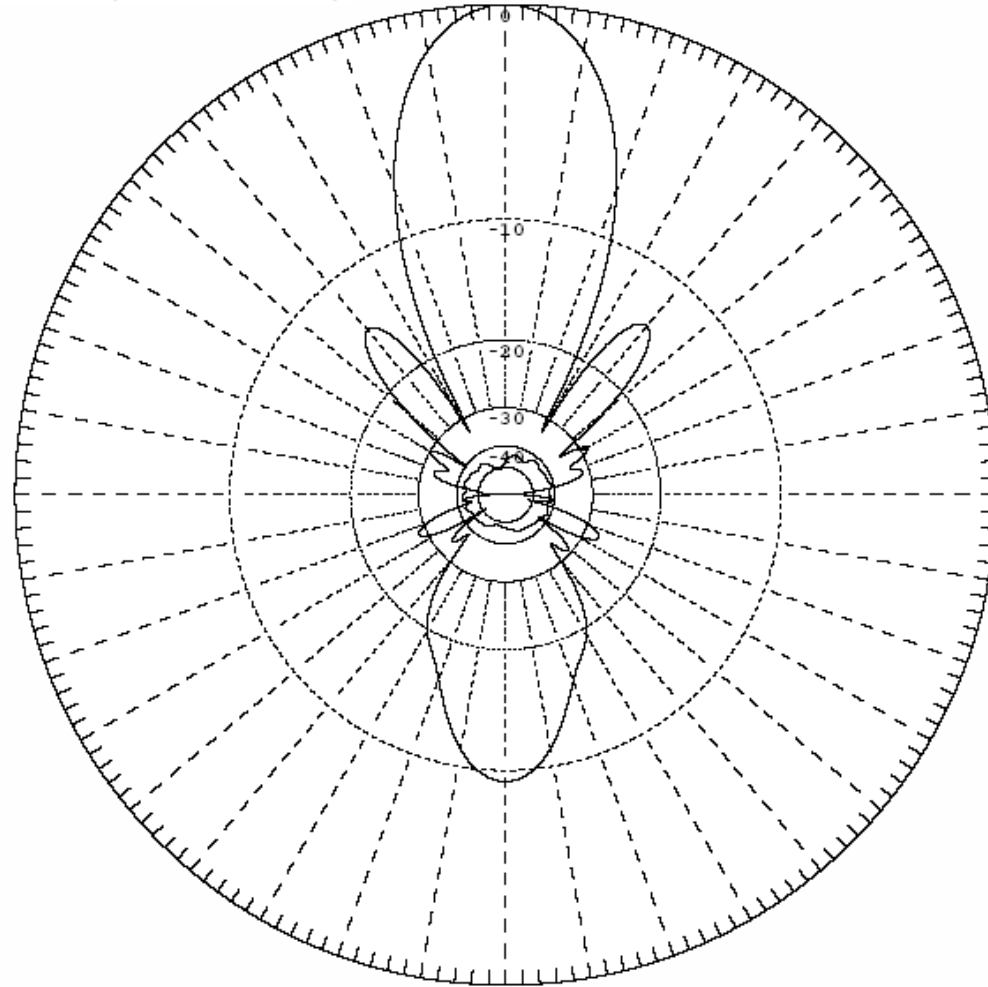


50MHz

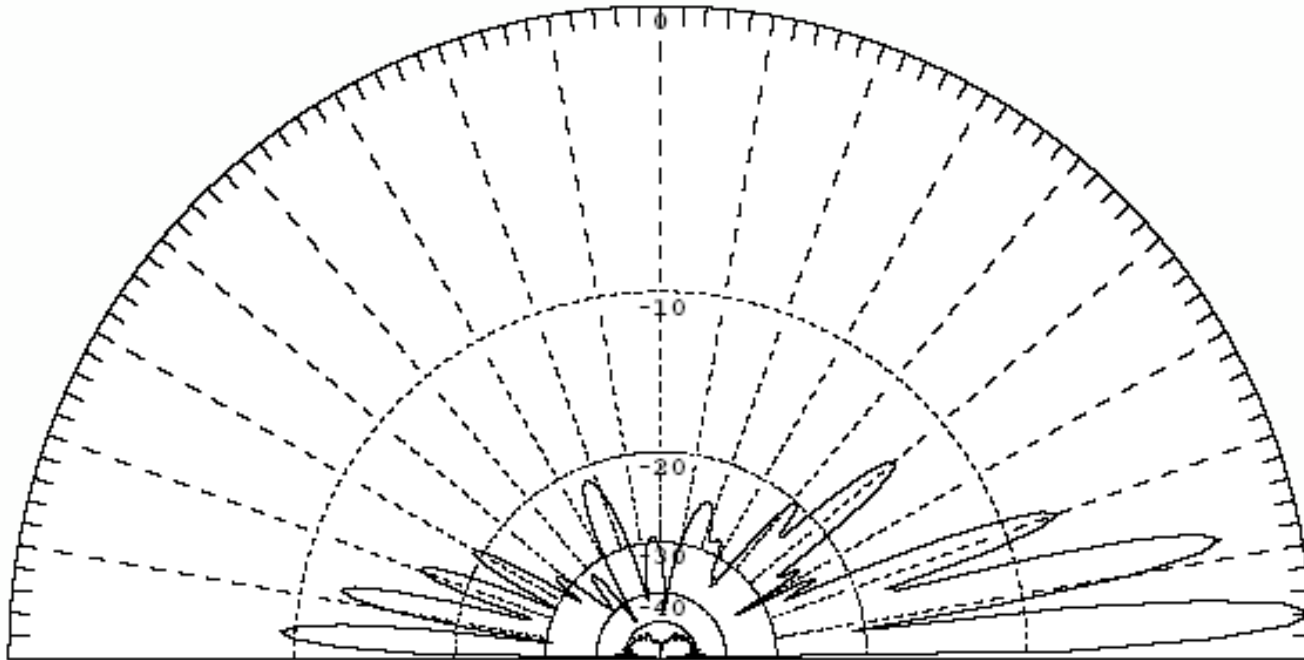


70MHz

11ele YAGI 4m (15m boom)

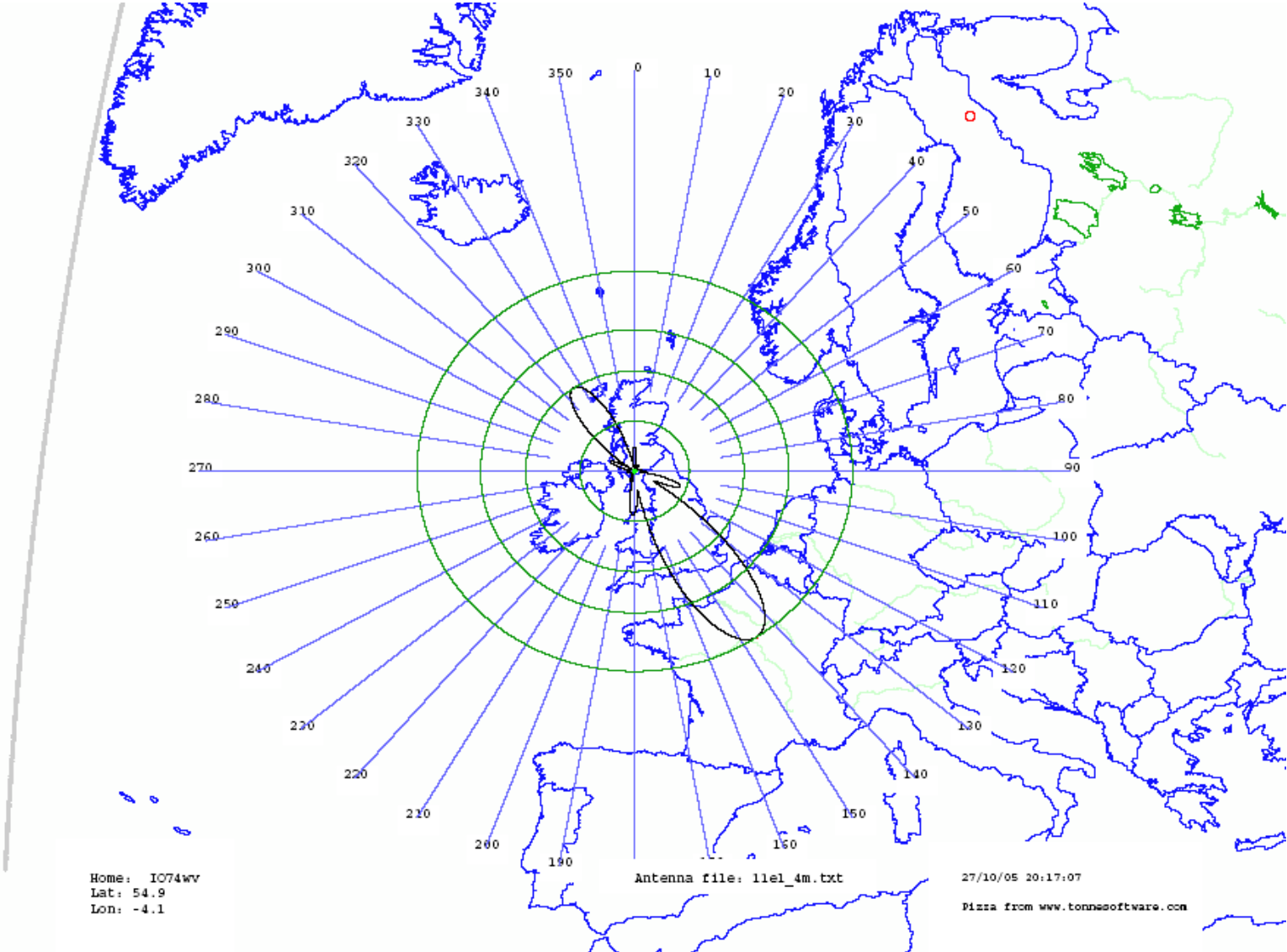


70MHz

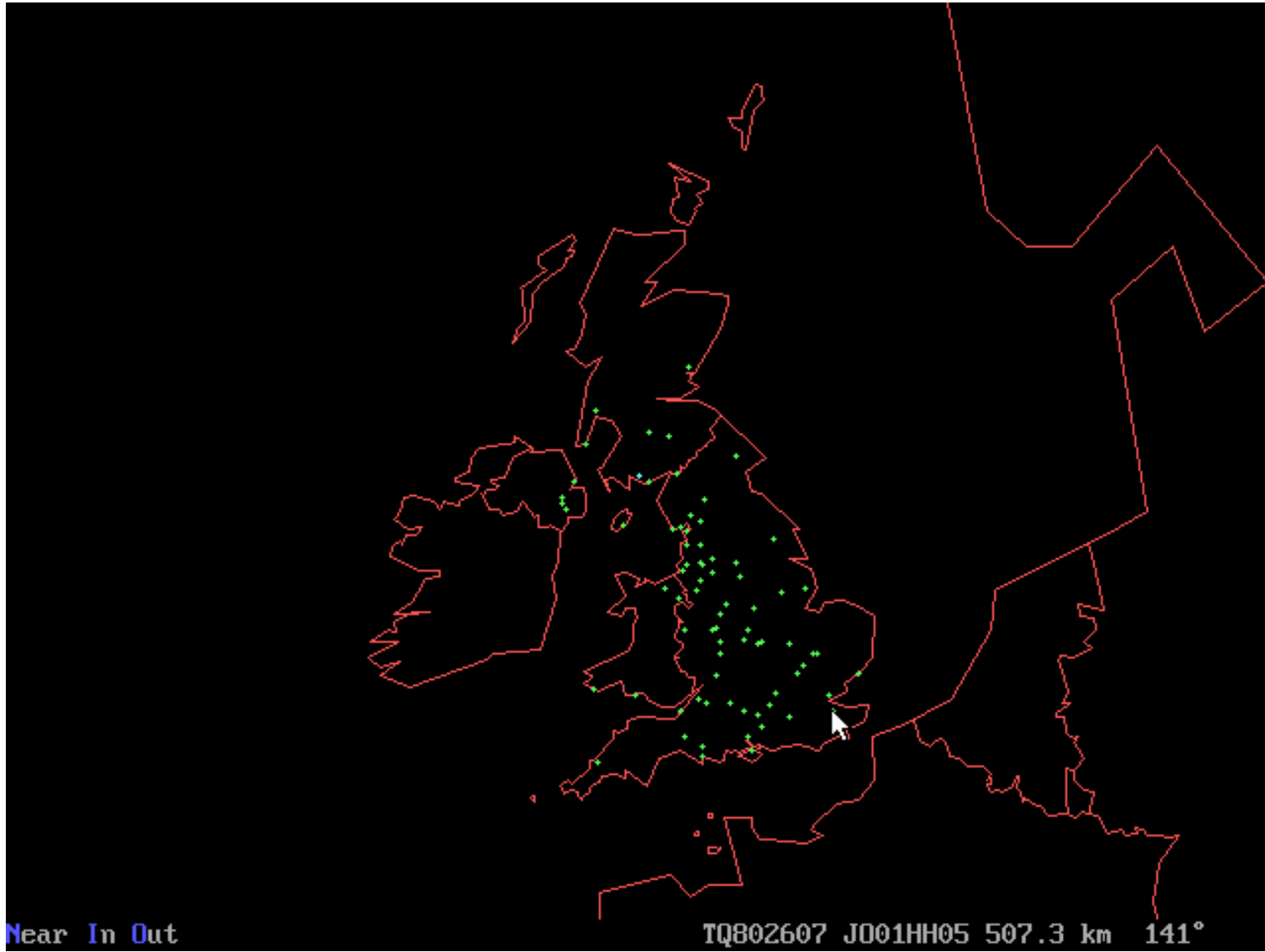


Ga :21.52(dBi) = 0dB (Hori Pol)
F/B :9.31(dB) Rear:Az.120 dg El.60dg
Freq:70.200(MHz)
Z :51.996-j3.490
SWR :1.08 (50.0) 11.54(6000m)
Elev:3.9dg(Real GND :15.0mH)

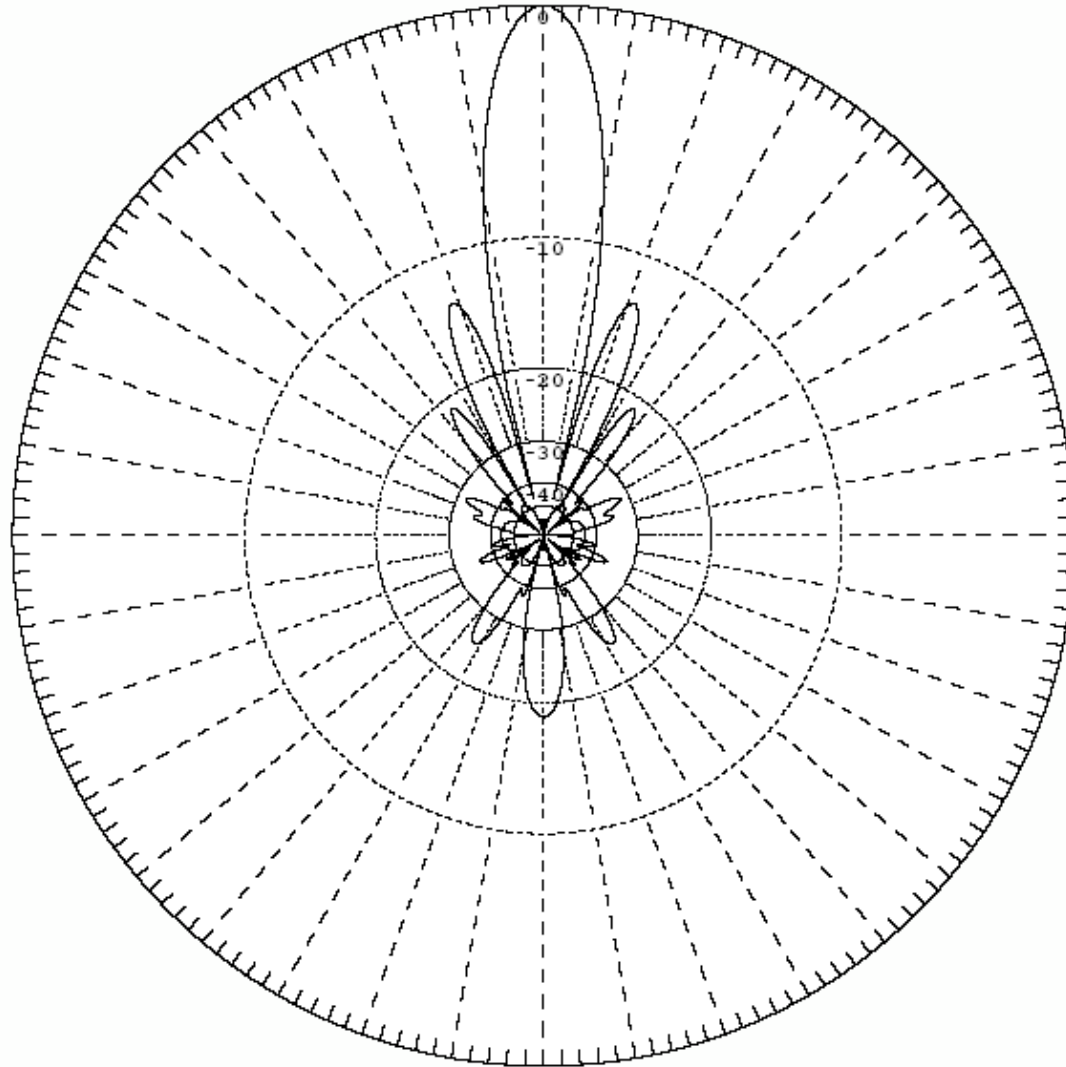
70MHz



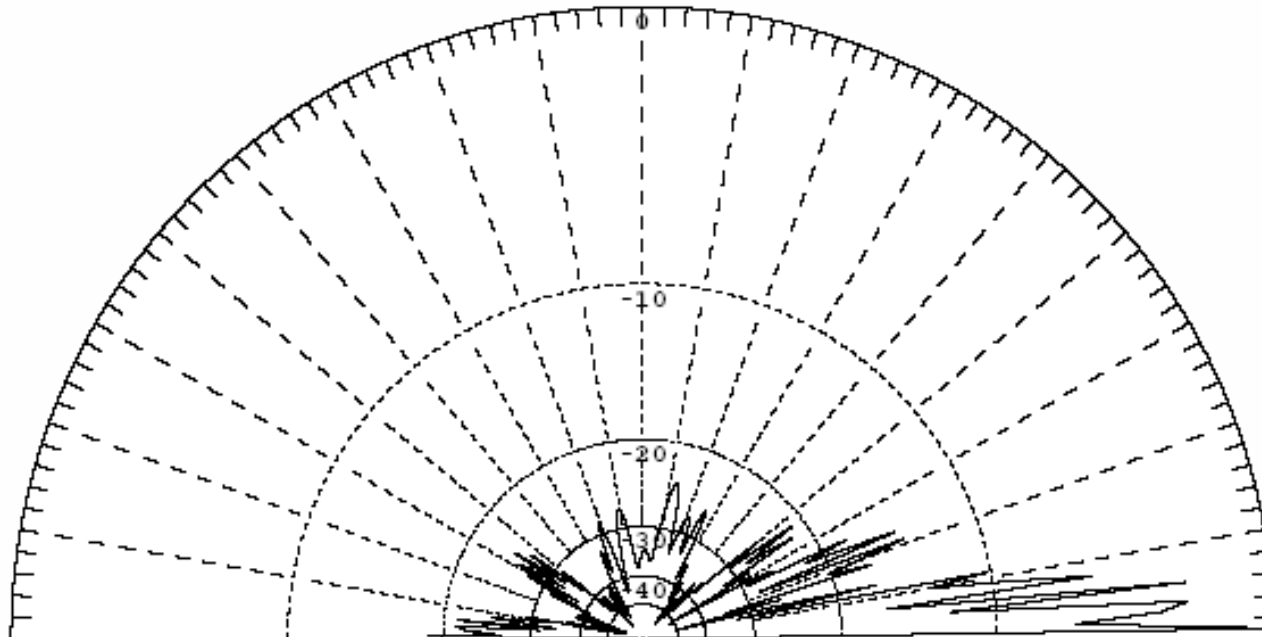
70MHz



144MHz

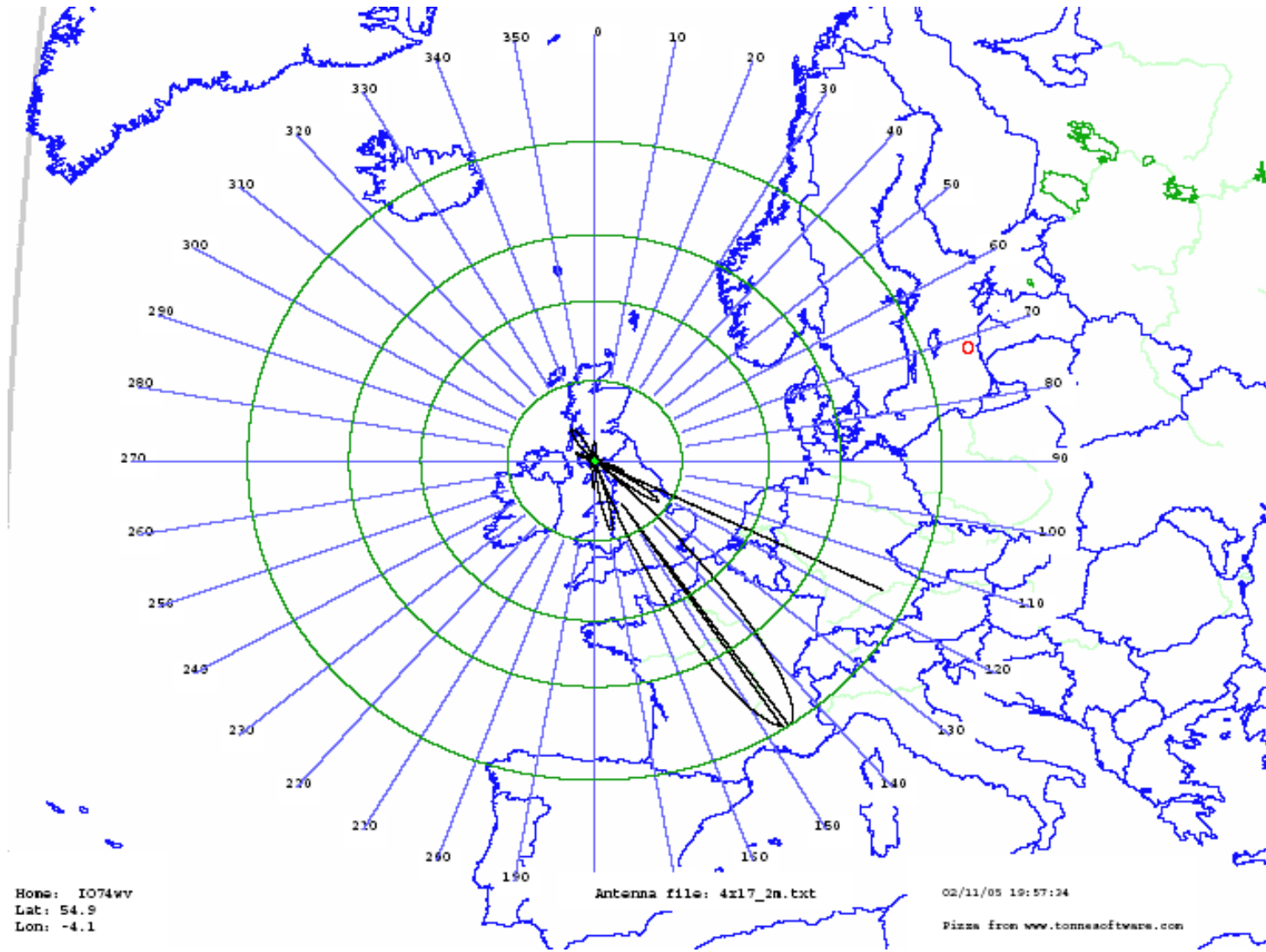


144MHz

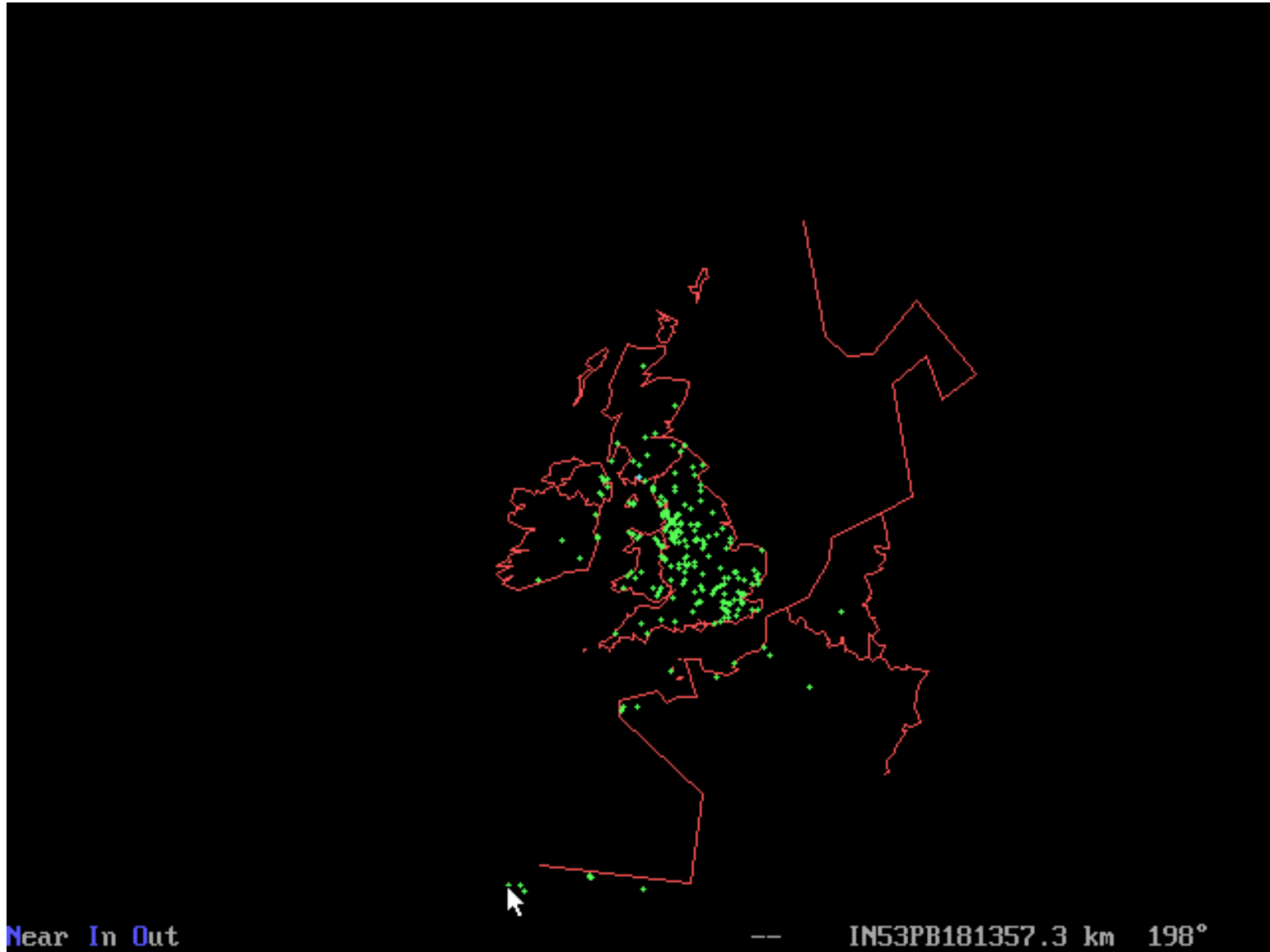


Ga :28.24 (dBi) = 0dB (Hori Pol)
F/B :18.60 (dB) Rear:Az.120 dg El.60dg
Freq:144.100 (MHz)
Z :220.839+j31.933
SWR :1.20 (200.0) 2.73 (6000m)
Elev:1.2dg (Real GND :25.0mH)

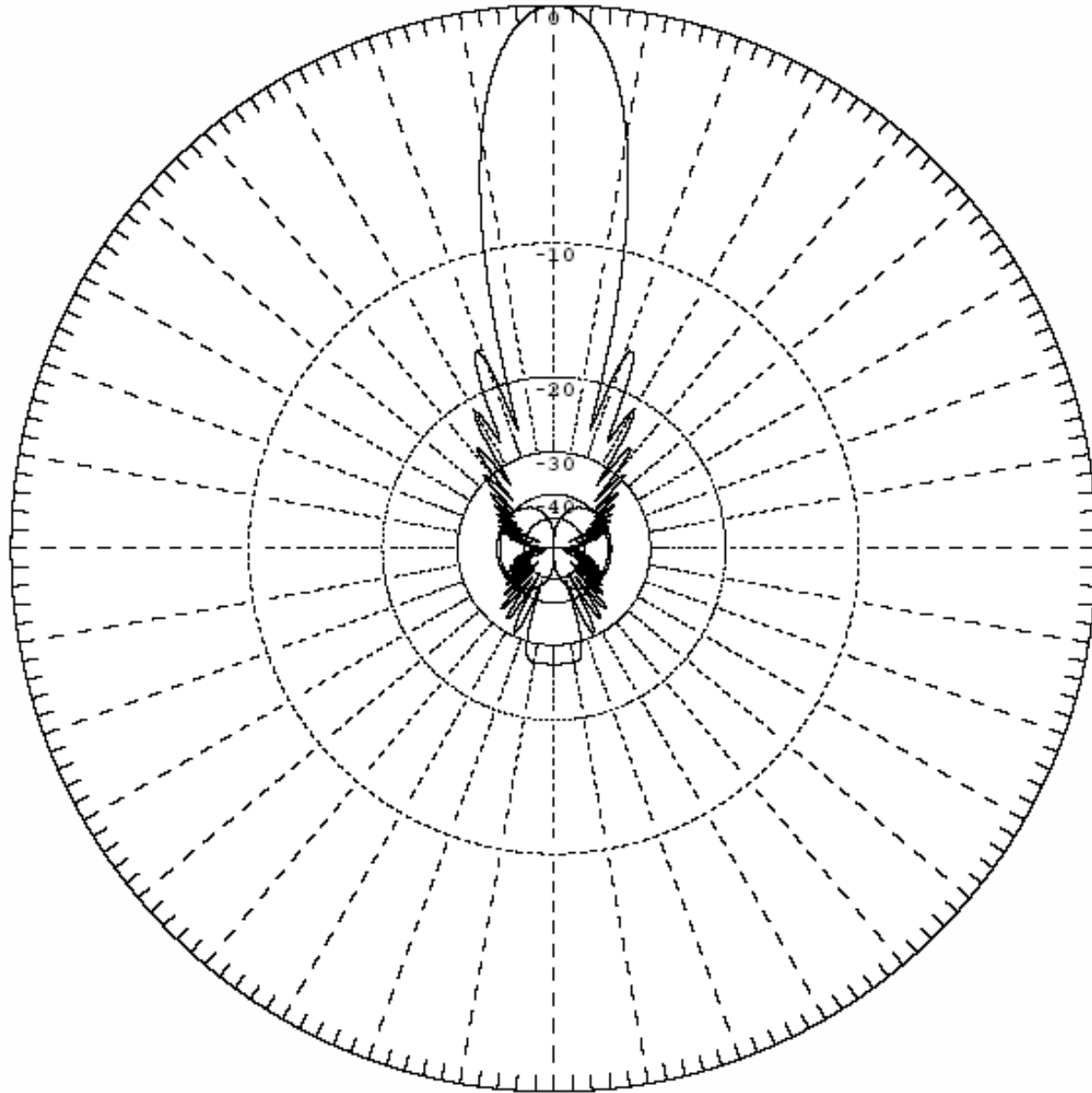
144MHz



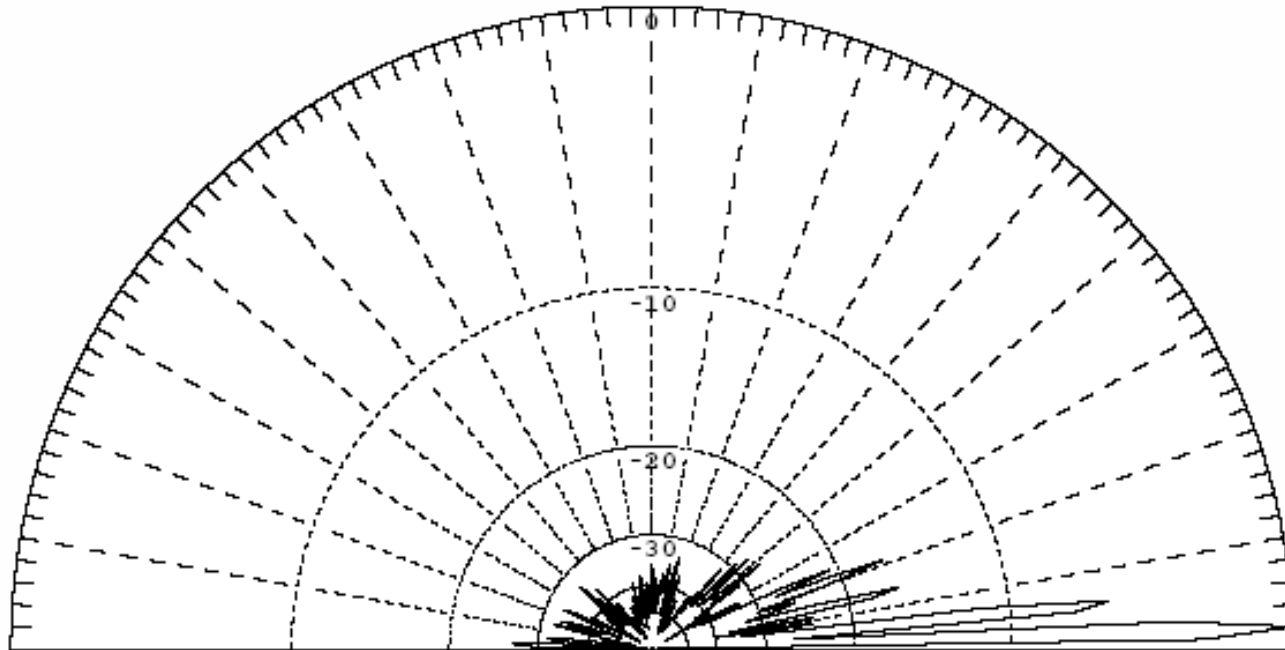
144MHz



70cm

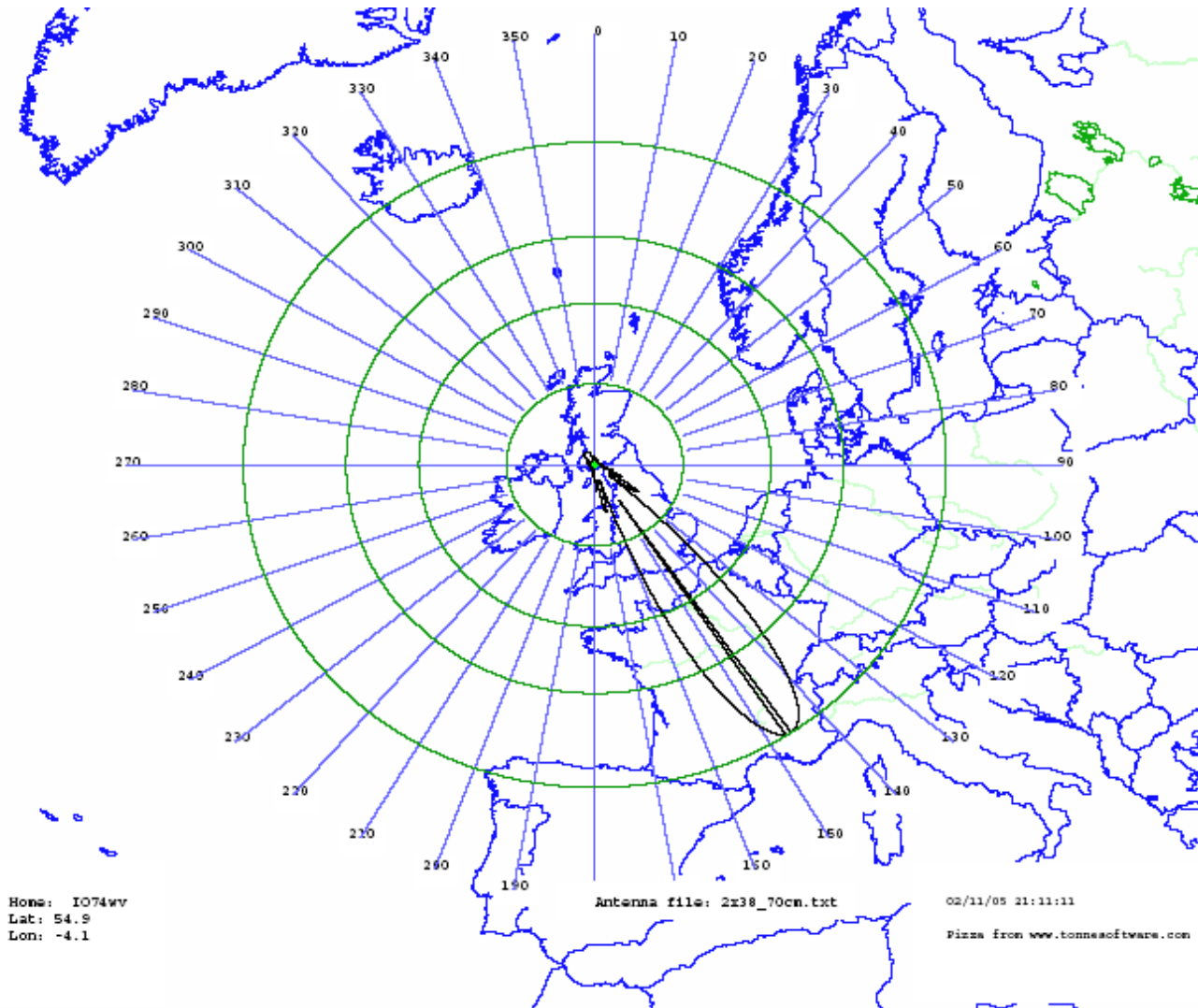


70cm

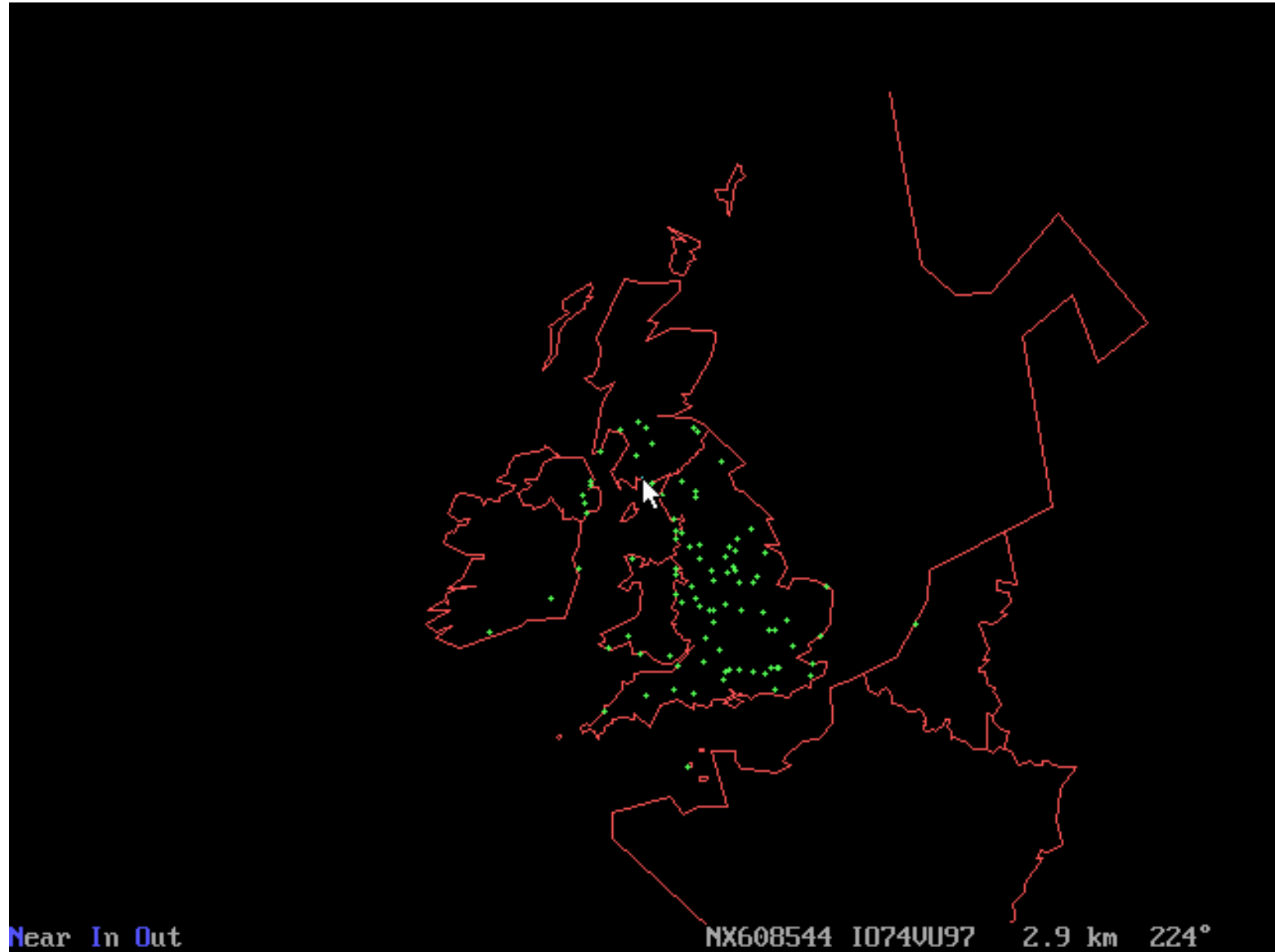


Ga : 28.98 (dBi) = 0dB (Hori Pol)
F/B : 26.66 (dB) Rear: Az. 120 dg El. 60dg
Freq: 432.200 (MHz)
Z : 198.338 + j17.362
SWR : 1.09 (200.0) 3.03 (600Om)
Elev: 2.0dg (Real GND : 15.0mH)

70cm

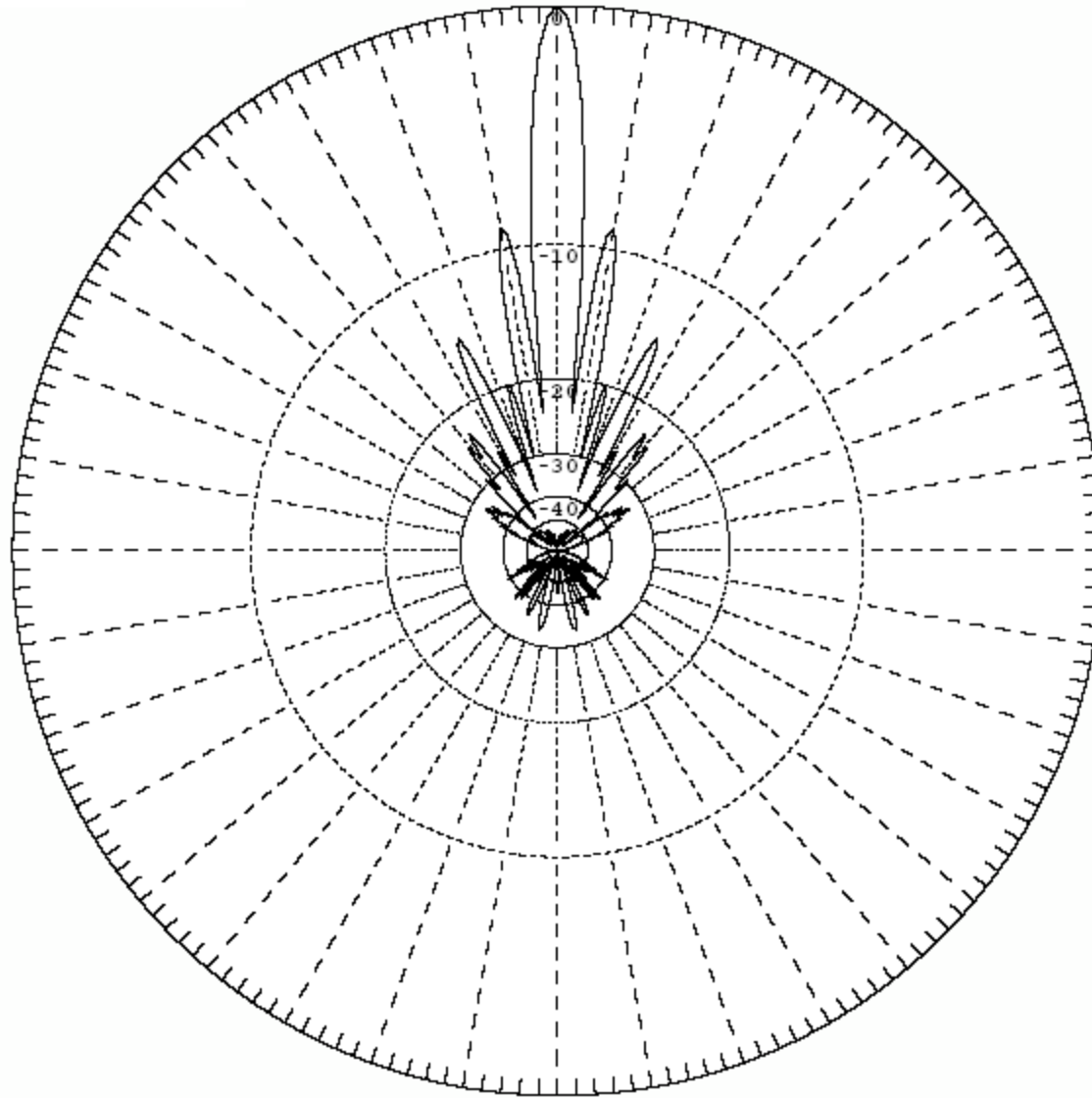


70cm

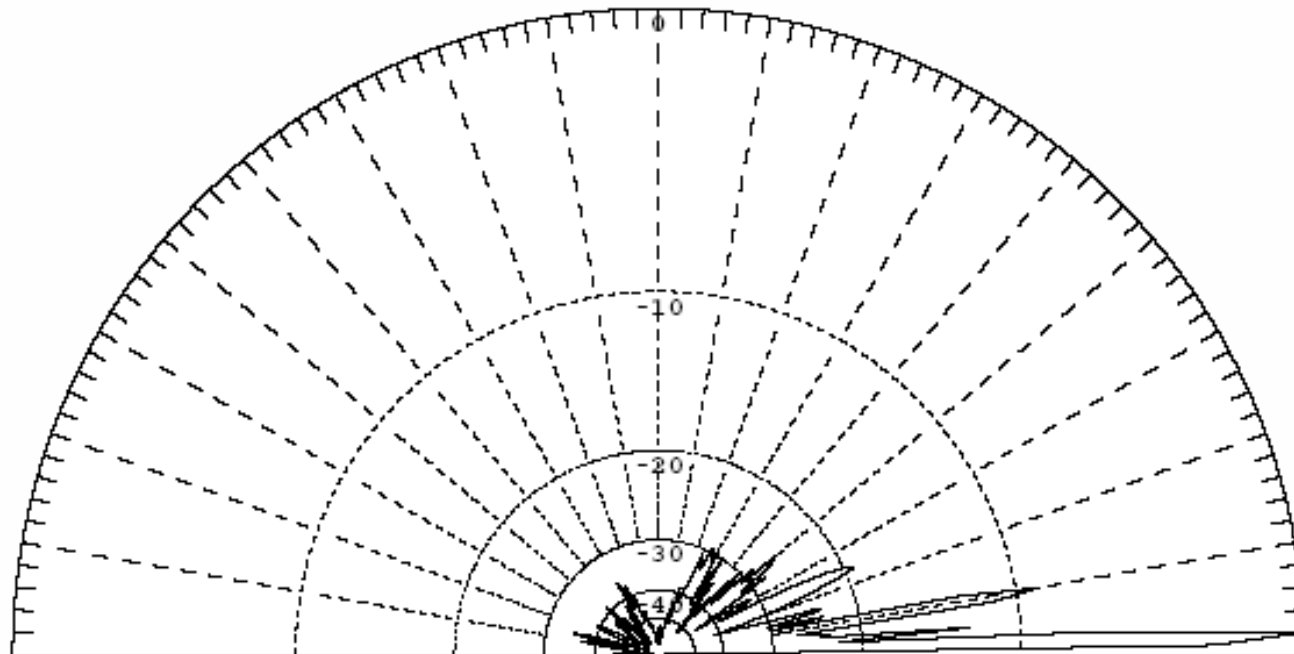


23cm

F9FT 55 e1 1296 MHz

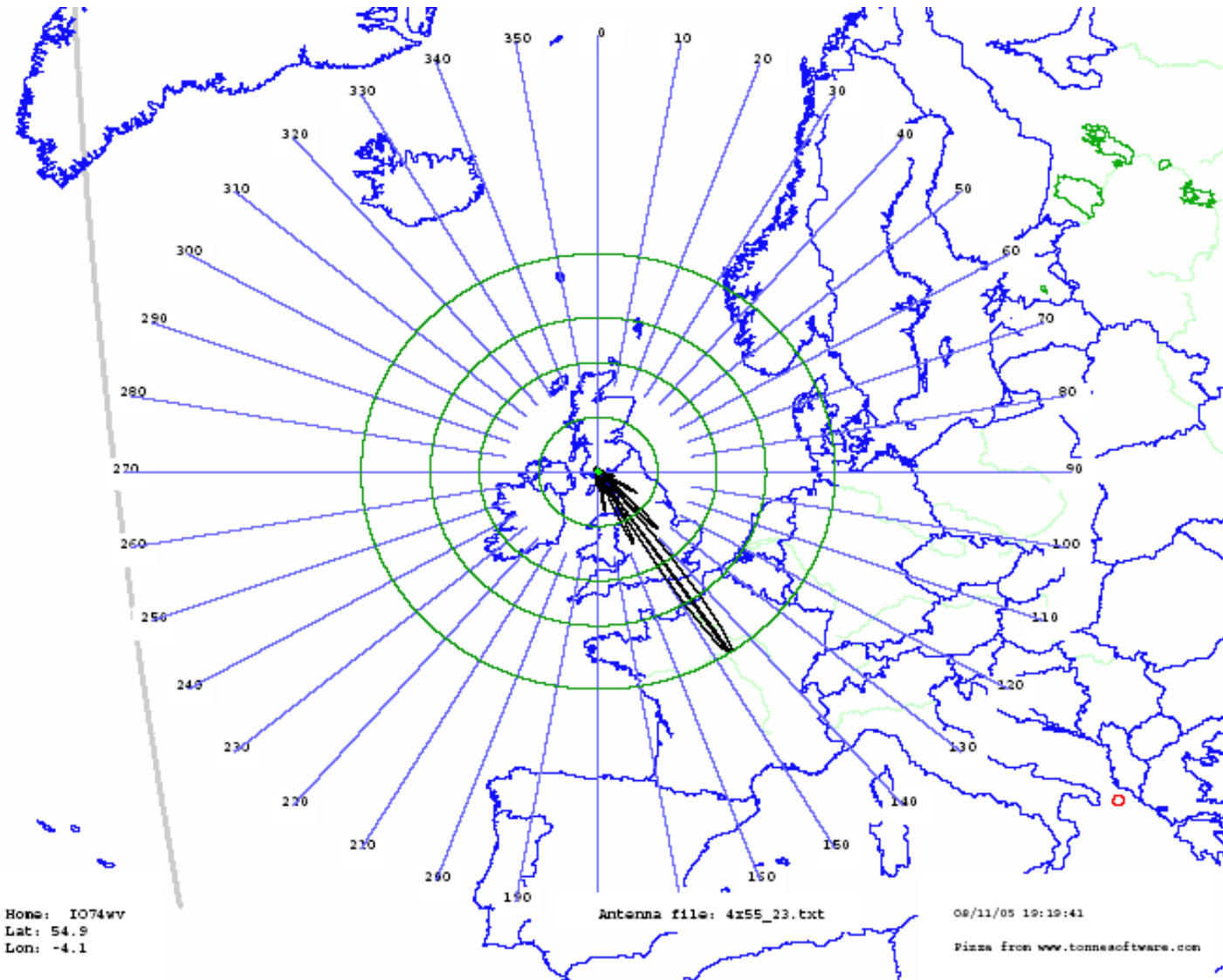


23cm



Ga : 33.38 (dBi) = 0dB (Hori Pol)
F/B : 33.14 (dB) Rear: Az. 120 dg El. 60dg
Freq: 1296.20 (MHz)
Z : 65.787 - j1.384
SWR : 1.32 (50.0) 9.12 (6000m)
Elev: 1.1dg (Real GND : 15.0mH)

23cm



Summary

Free space

Band	Antenna	gain dBi	BW H deg	BW V deg	F/B dB
50MHz	9 element Yagi	15.22	32	34	13.98
70MHz	11 element Yagi	15.98	24.5	30	9.2
144MHz	4 x 17 element Yagi	22.37	13.6	13.6	18.45
432MHz	2 x 38 element Yagi	23.7	17	9	26.6
1296MHz	4 x 55 element Yagi	27.83	6	6	31.78

Real ground (experimenting with tilt might improve performance)

Band	Antenna	gain dBi	Lobe deg
50MHz	9 element Yagi	20.56	5.4
70MHz	11 element Yagi	21.52	3.8
144MHz	4 x 17 element Yagi	28.24	1.2
432MHz	2 x 38 element Yagi	28.98	2
1296MHz	4 x 55 element Yagi	33.38	1.1

Summary

- 6m beam
 - Can be parked at 145 deg +/- 10 most of time for UK
 - Has to be turned if Es encountered
- 4m beam
 - Can be parked at 145 +/- 10 deg most of time for UK
 - Has to be turned if Es encountered (rare)

Summary

- 2m beam
 - Has to be frequently turned in between 120deg and 190 deg for UK in ~ 5 deg steps, 80 deg – 120deg for Mainland Europe
- 70cm beam
 - Has to be frequently turned in between 120deg and 190 deg for UK in ~ 8 deg steps, 80 deg – 120deg for Mainland Europe

Summary

- 23cm
 - Has to be frequently turned in between 120deg and 190 deg for UK in ~ 3 deg steps ,80 deg – 120deg for Mainland Europe
 - THIS ANTENNA IS SHARP