# Active Balun/Dipole Work at Bruny Island

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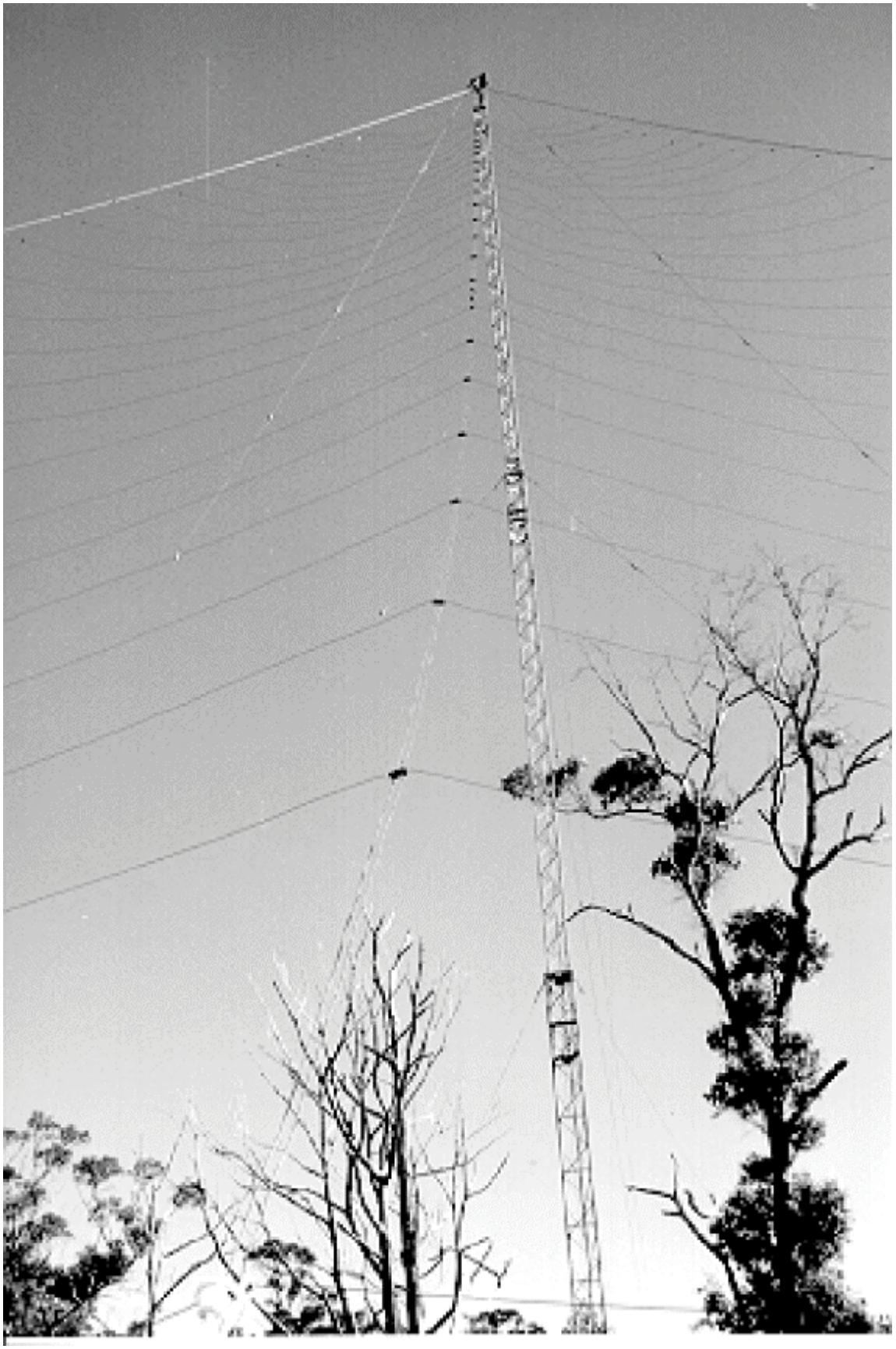


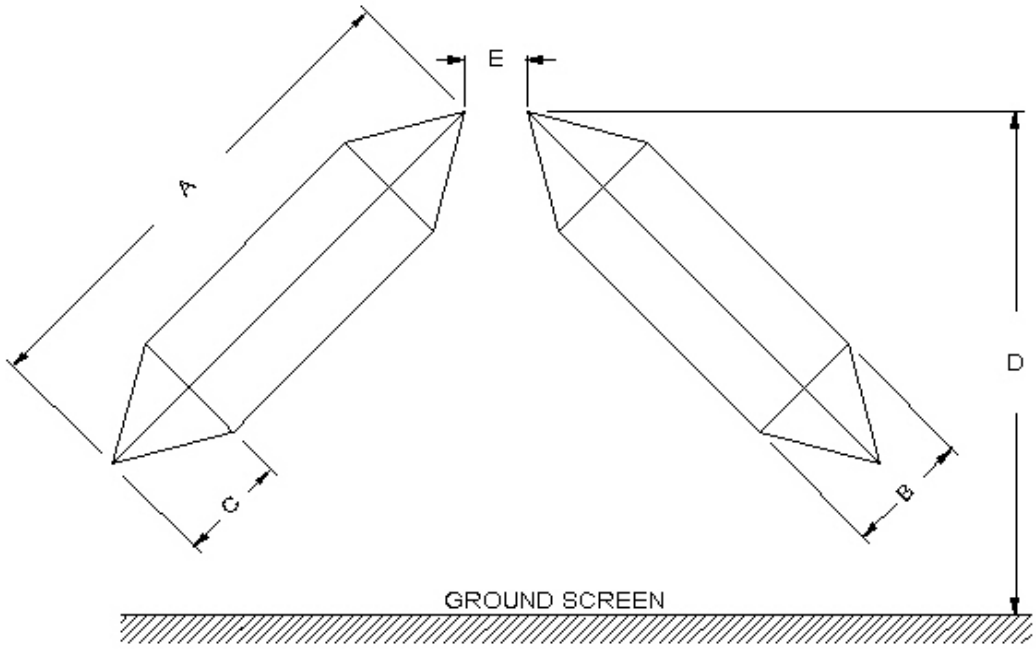



**Figure 1. Drawing of the inverted-V dipole antennas. The angle of the arms is 45° below horizontal.**

**Table 1. Dimensions of the dipoles shown in Figure 1.**

| *Dimensions (m)* | *A* | *B* | *C* | *D* | *E* |
|---|---|---|---|---|---|
| Small dipole | 1.20 | 0.30 | 0.26 | 1.32 | 0.06 |
| Large dipole | 3.24 | 1.00 | 0.87 | 3.48 | 0.06 |

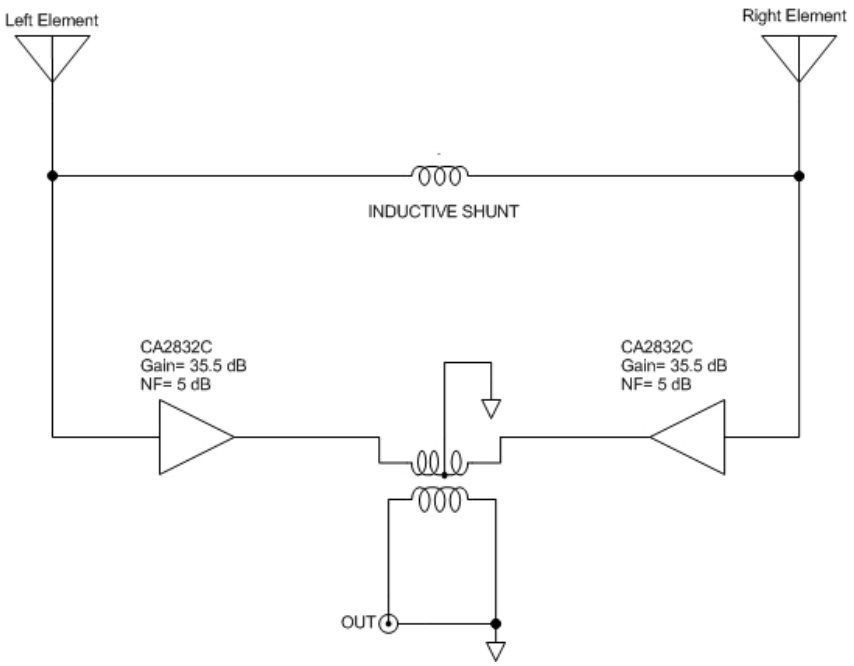
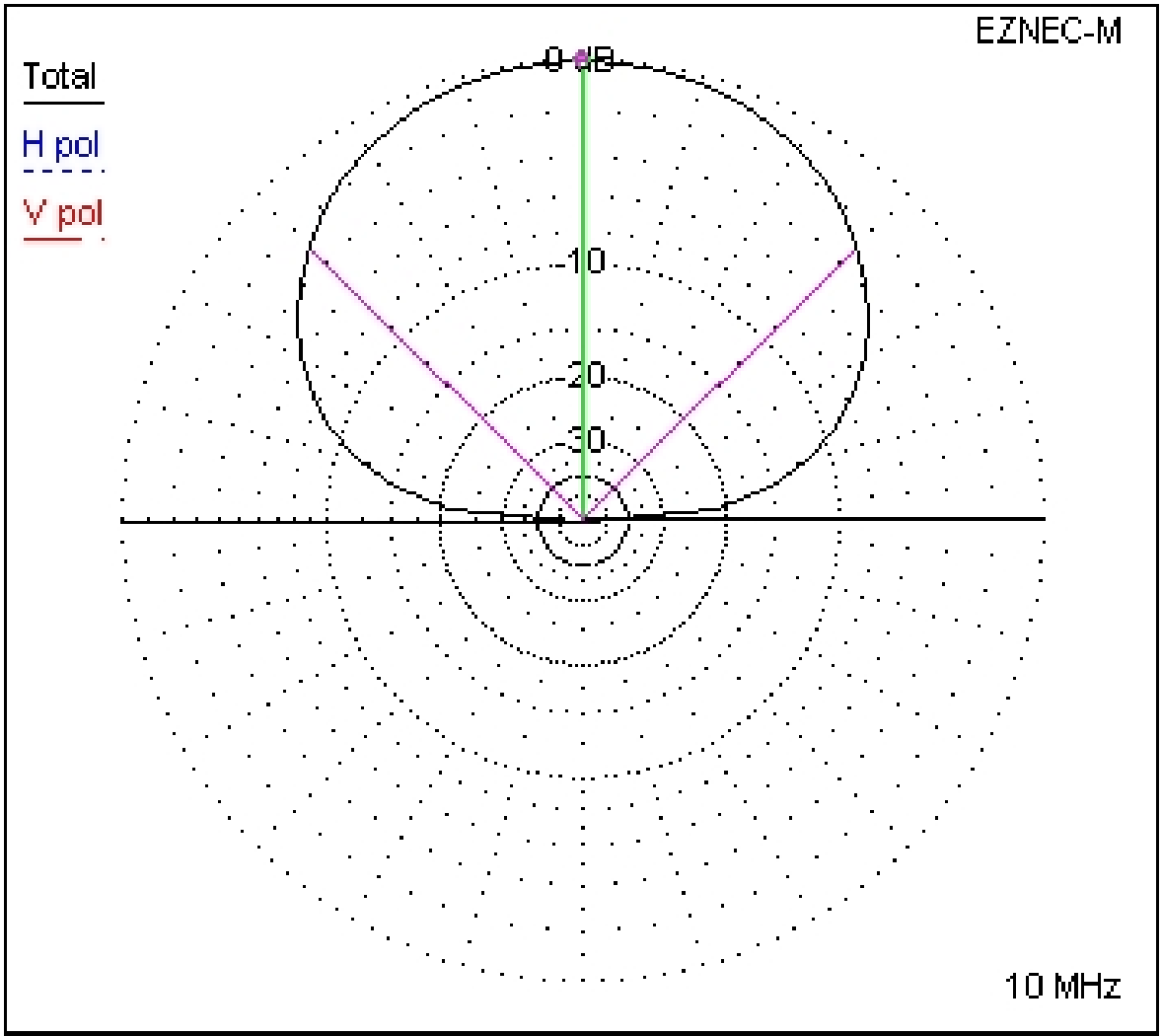



**Figure 2. Schematic diagram of the active balun. The transformer gives an impedance step-down of 4:1.**

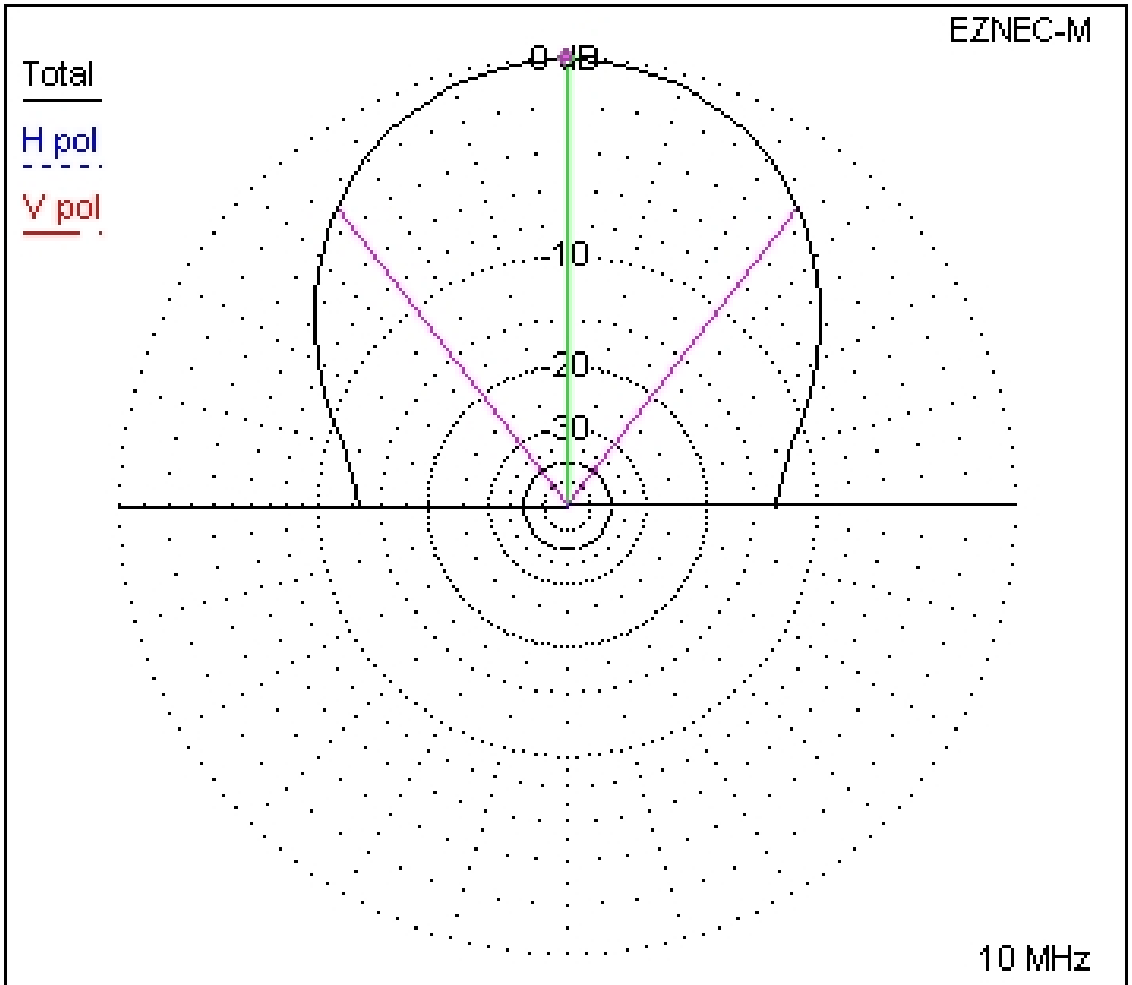
**The active balun/dipole undergoing testing for BIRS. Each arm of the "droopy" fat dipole is 3.2 m long and 1.0 m wide. The 45° slant of the dipole arms provides gain in both the E and H planes of the system and results in a system that is sensitive at all azimuths. With this antenna the Sun can be observed from sunrise to sunset. However, because the dipole's beamwidth is larger than that of the present log-periodic array and beamwidth and gain are inversely related, its maximum gain is necessarily lower.**

**An active balun or dipole system is one in which the variation of the dipole impedance with frequency is buffered by placing an amplifier, whose noise and gain are independent of input impedance, directly at the dipole terminals. The active balun is in the metal box on the pole near the top of the photo. A 6 m by 12 m ground screen is laid in the grass below the dipole.**




| | | | |
|---|---|---|---|
| Elevation Plot | | Cursor Elev | 90.0 deg. |
| Azimuth Angle | 0.0 deg. | Gain | 5.88 dBi |
| Outer Ring | 5.88dBi | | 0.0 dBmax |

| | |
|---|---|
| 3D Max Gain | 5.88 dBi |
| Slice Max Gain | 5.88 dBi @ Elev Angle = 90.0 deg. |
| Beamwidth | 90.4 deg.; -3dB @ 44.8, 135.2 deg. |
| Sidelobe Gain | < -100 dBi |
| Front/Sidelobe | > 100 dB |




| | | | |
|---|---|---|---|
| Elevation Plot | | Cursor Elev | 90.0 deg. |
| Azimuth Angle | 90.0 deg. | Gain | 5.88 dBi |
| Outer Ring | 5.88dBi | | 0.0 dBmax |

| | |
|---|---|
| 3D Max Gain | 5.88 dBi |
| Slice Max Gain | 5.88 dBi @ Elev Angle = 90.0 deg. |
| Beamwidth | 75.6 deg.; -3dB @ 52.2, 127.8 deg. |
| Sidelobe Gain | < -100 dBi |
| Front/Sidelobe | > 100 dB |

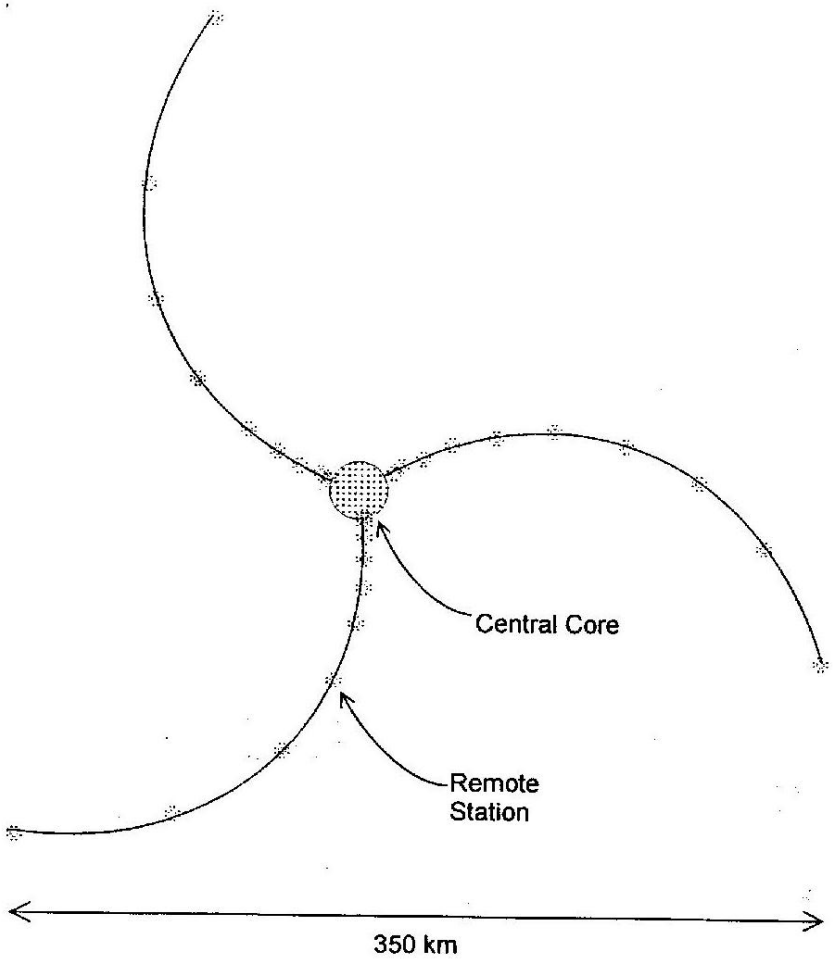



**Figure 2** *LOFAR Geometry showing the log-spiral distribution of the remote stations and the large Virtual Core in the centre, containing 25% of the collecting area.*

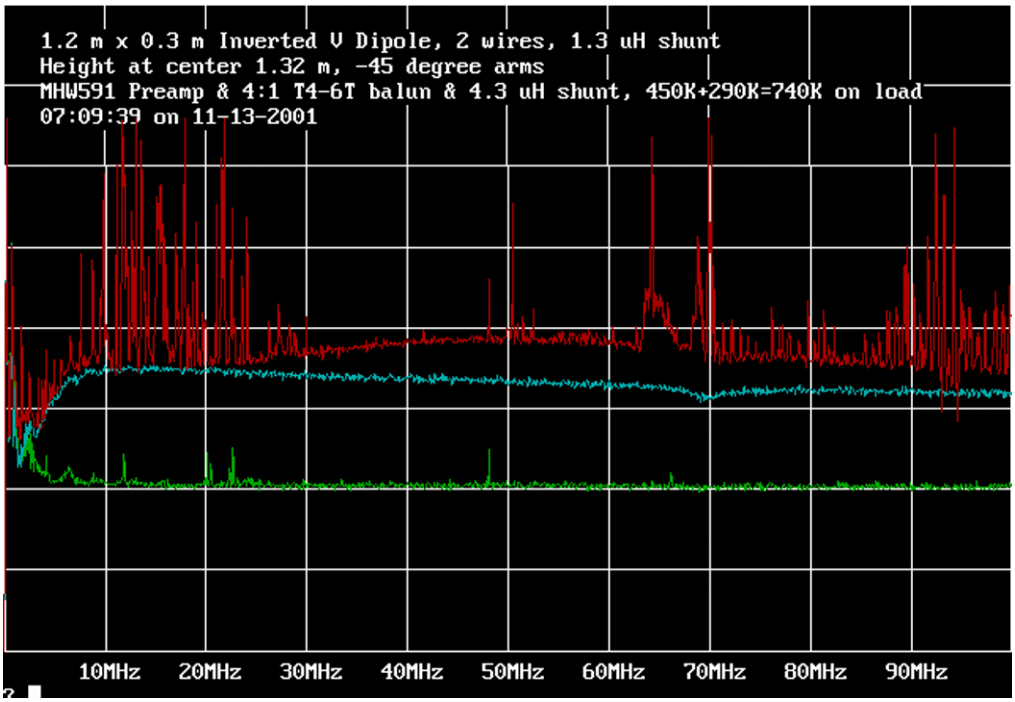



**Figure 3. Small dipole spectrum. The curves are, from bottom to top, system noise, dummy load, and sky observations. The vertical axis is the signal strength; each division equals 10 dB.**

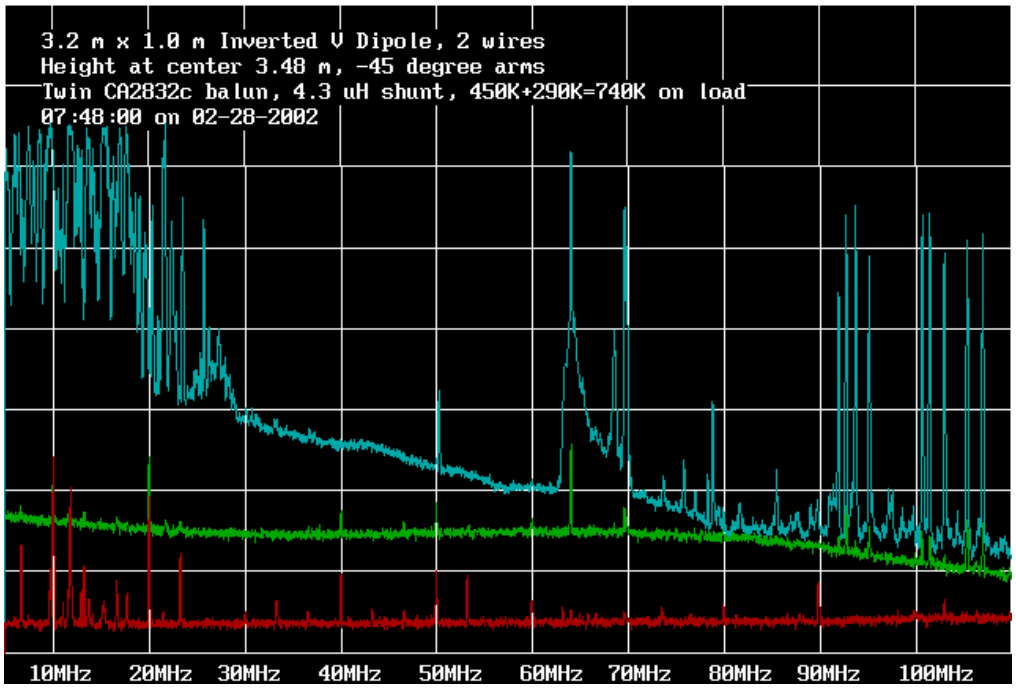



**Figure 4. Large dipole spectrum. The three traces correspond to those in Figure 3.**

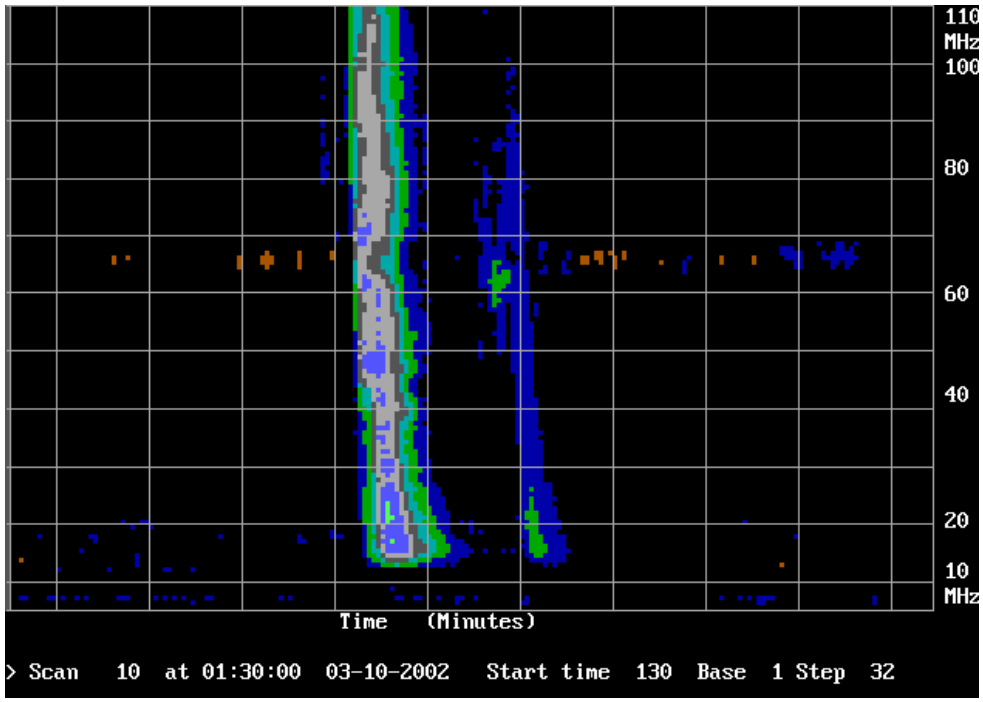



**Figure 5. A spectrum of two solar bursts observed with the large dipole.**

Calculated

| f (MHz) | R (? ) | X (? ) |
|---|---|---|
| 5 | 0.05637 | -661.5 |
| 10 | 0.8172 | -275.7 |
| 15 | 4.526 | -114.2 |
| 19.1 | 13.9 | -15.27 |
| 19.75 | 16.43 | 0.01663 |
| 20 | 17.52 | 5.925 |
| 30 | 247.5 | 283.4 |
| 34.97 | 599 | 0.3303 |
| 40 | 299.7 | -248.9 |
| 50 | 86.29 | -100.2 |
| 57.51 | 61.96 | 0.005255 |
| 60 | 61.44 | 31.8 |
| 70 | 107.1 | 185.2 |

Measured

| f (MHz) | R (? ) | X (? ) |
|---|---|---|
| 5 | 0.1 | -554 |
| 10 | 1 | -211 |
| 15 | 15 | -87 |
| 19.1 | 24 | 0 |
| 20 | 29 | 24 |
| 30 | 294 | 273 |
| 40 | 86 | -227 |
| 50 | 45 | -77 |
| 57.5 | 77 | 0 |
| 60 | 123 | 23 |
| 70 | 221 | 212 |