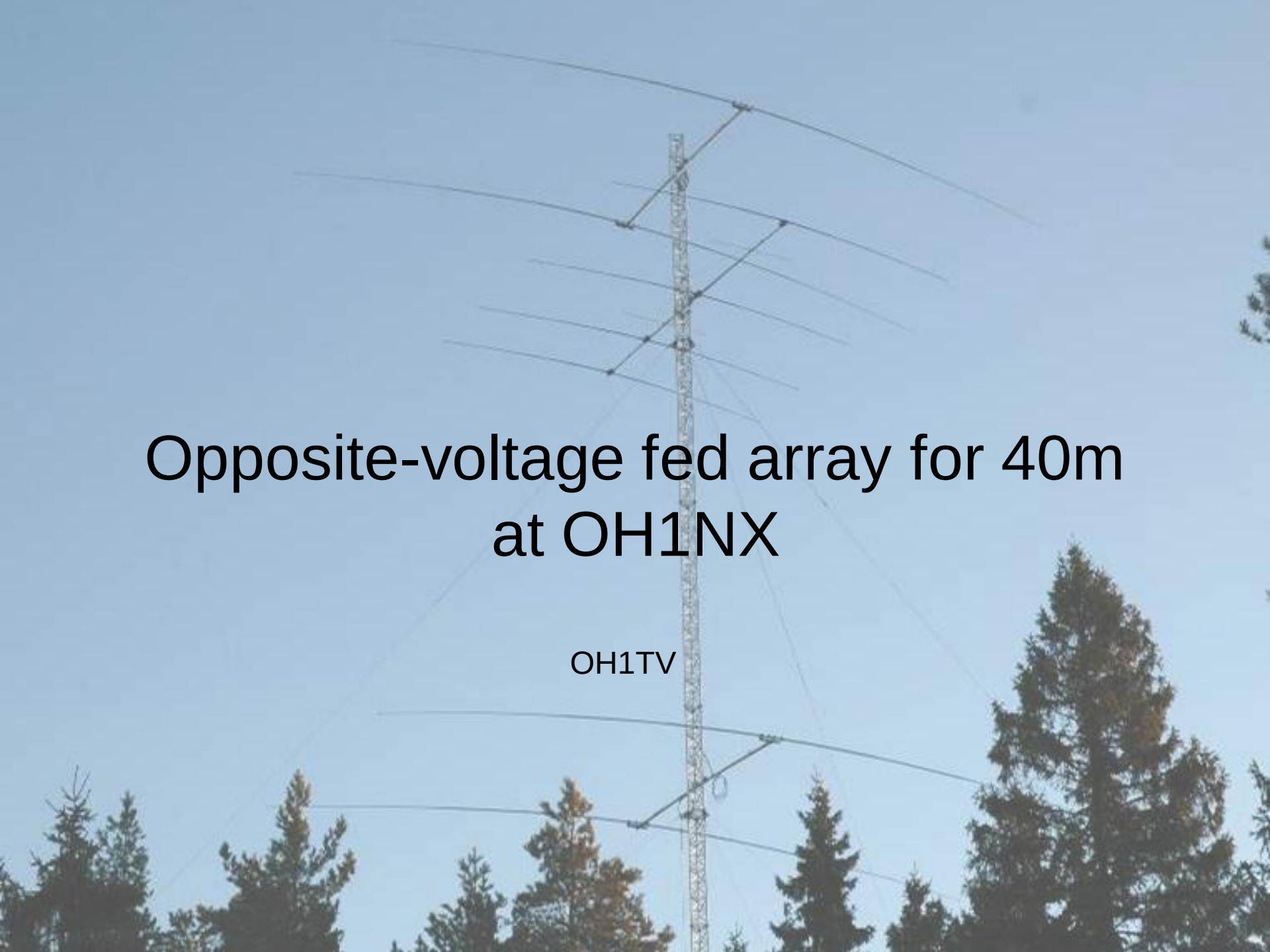
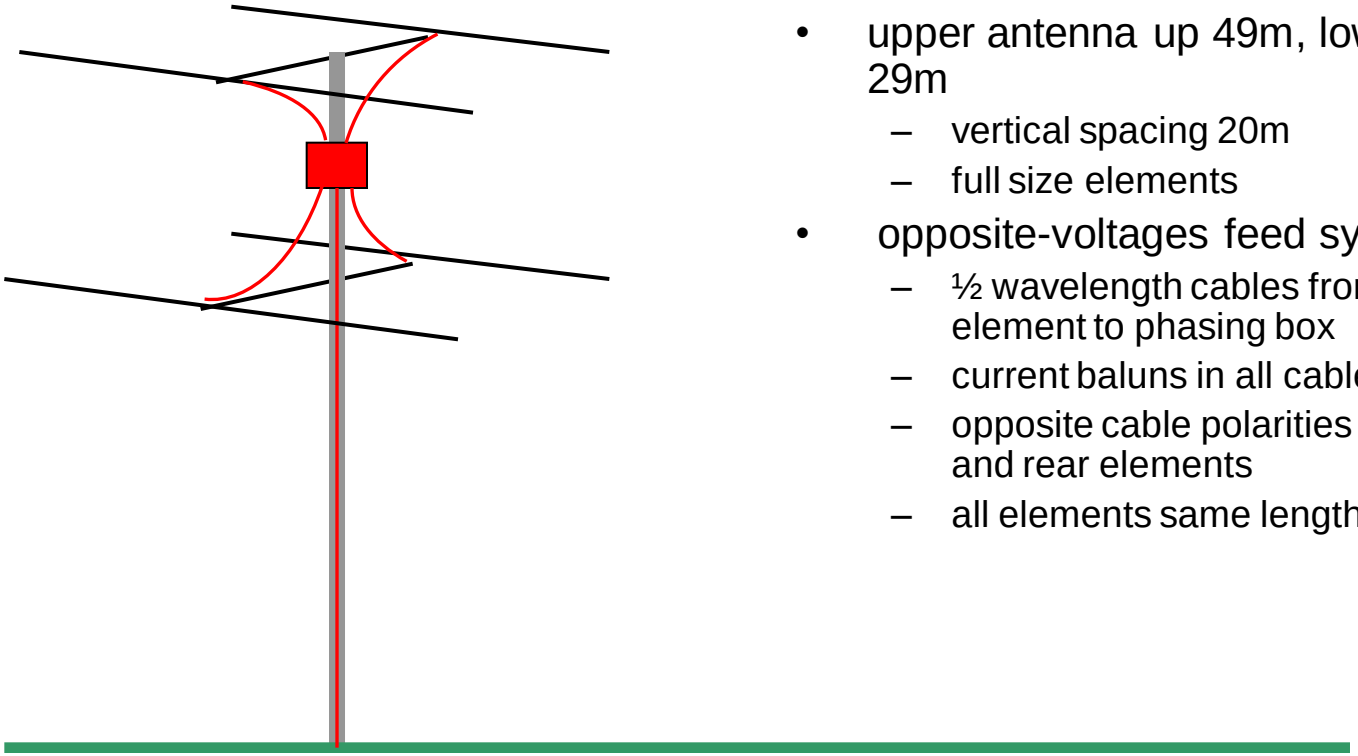


Opposite-voltage fed array for 40m at OH1NX

OH1TV

2 over 2 phased array for 40m

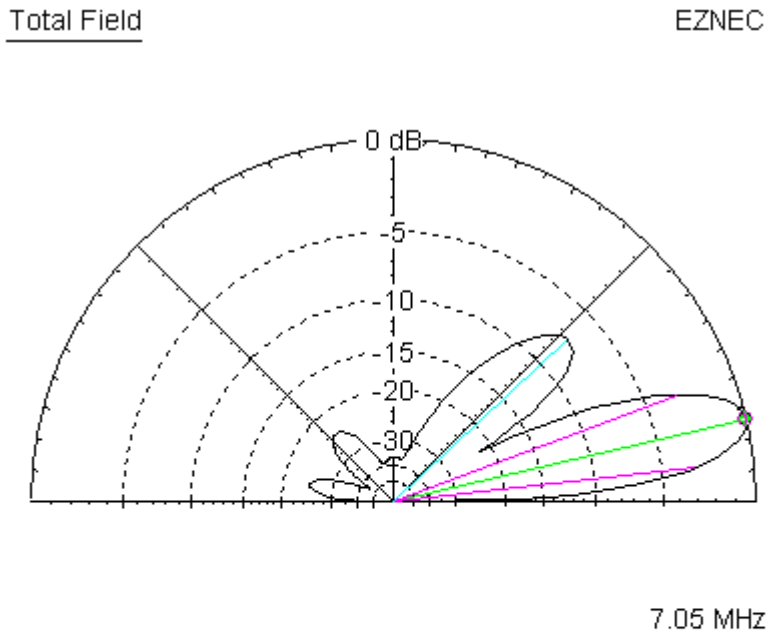


- upper antenna up 49m, lower ant 29m
  - vertical spacing 20m
  - full size elements
- opposite-voltages feed system
  - ½ wavelength cables from each element to phasing box
  - current baluns in all cables
  - opposite cable polarities in front and rear elements
  - all elements same length

Features

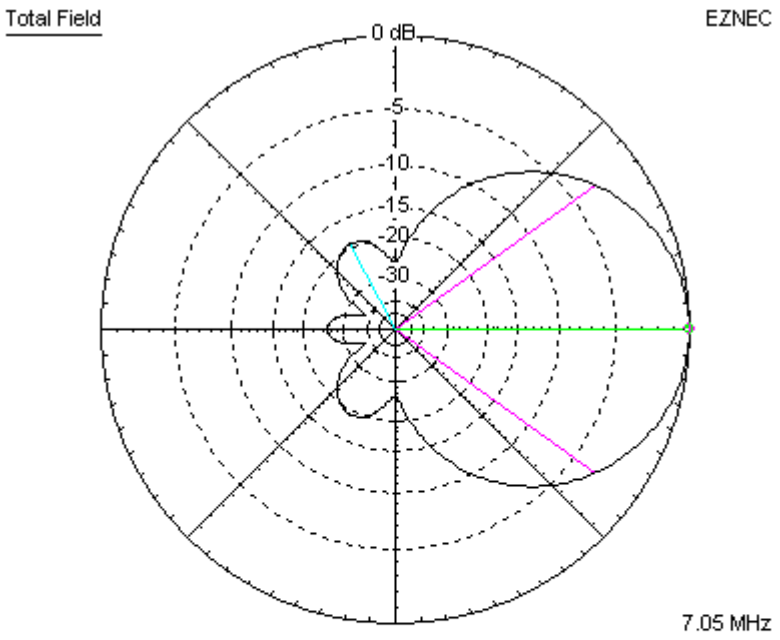
- Good F/B over the whole band
  - Equal current amplitudes in all elements
  - Low vertical side lobes in DX-position because of stacking
  - Two frequency settings, 7000-7100 and 7100-7200kHz
    - Both settings cover the whole 40m band quite well
- Wideband (less so the local position)
- Switchable take-off-angle. DX and Local
- The structure allows instant 180deg direction switching
  - even it was not implemented in the first phase.

Position 7050kHz DX, 13deg TOA



Elevation Plot		Cursor Elev	13.0 deg.
Azimuth Angle	0.0 deg.	Gain	14.06 dBi
Outer Ring	14.06 dBi		0.0 dBmax

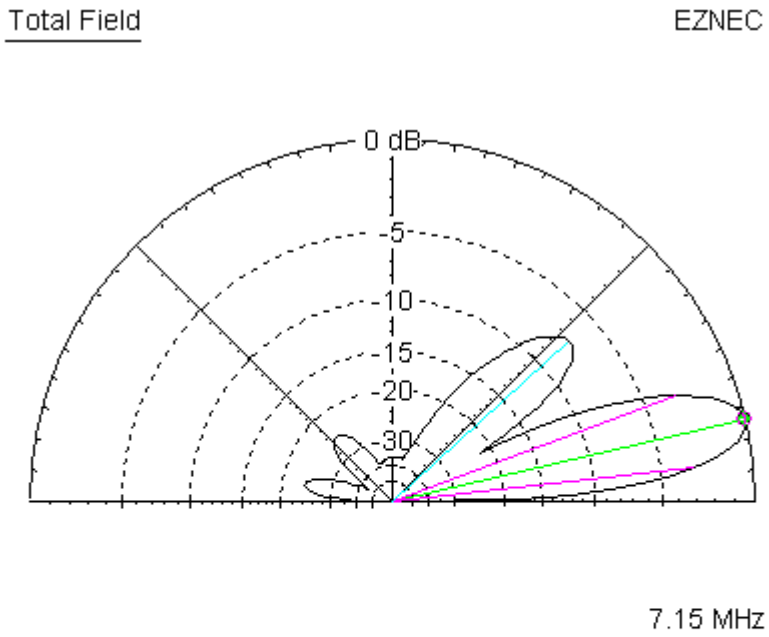
Slice Max Gain	14.06 dBi @ Elev Angle = 13.0 deg.
Beamwidth	14.1 deg.; -3dB @ 6.5, 20.6 deg.
Sidelobe Gain	6.83 dBi @ Elev Angle = 43.0 deg.
Front/Sidelobe	7.22 dB



Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	13.0 deg.	Gain	14.06 dBi
Outer Ring	14.06 dBi		0.0 dBmax

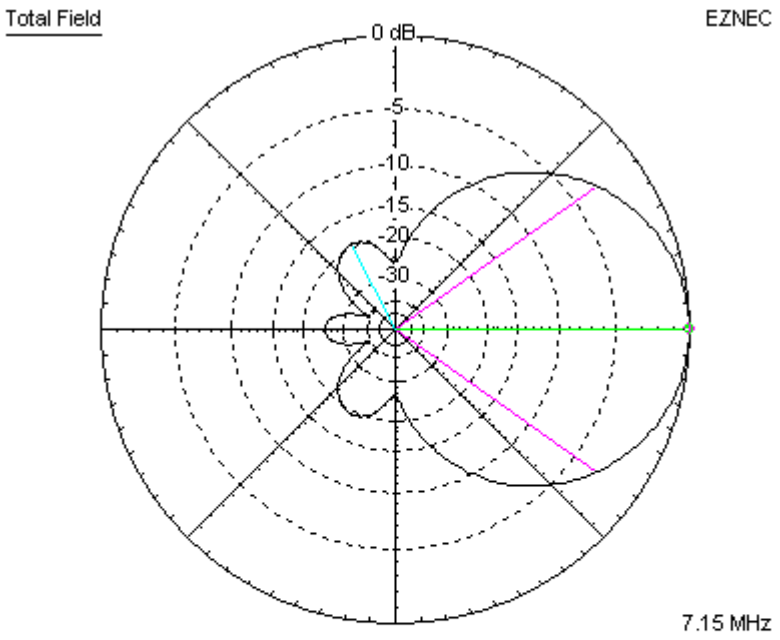
Slice Max Gain	14.06 dBi @ Az Angle = 0.0 deg.
Front/Back	25.08 dB
Beamwidth	71.0 deg.; -3dB @ 324.5, 35.5 deg.
Sidelobe Gain	-5.08 dBi @ Az Angle = 118.0 deg.
Front/Sidelobe	19.13 dB

Position 7150kHz DX, 13deg TOA



Elevation Plot		Cursor Elev	13.0 deg.
Azimuth Angle	0.0 deg.	Gain	14.15 dBi
Outer Ring	14.15 dBi		0.0 dBmax

Slice Max Gain	14.15 dBi @ Elev Angle = 13.0 deg.
Beamwidth	13.9 deg.; -3dB @ 6.4, 20.3 deg.
Sidelobe Gain	6.96 dBi @ Elev Angle = 42.0 deg.
Front/Sidelobe	7.19 dB



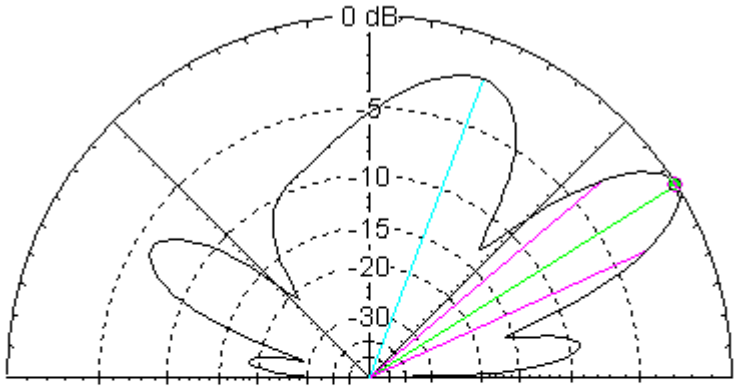
Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	13.0 deg.	Gain	14.15 dBi
Outer Ring	14.15 dBi		0.0 dBmax

Slice Max Gain	14.15 dBi @ Az Angle = 0.0 deg.
Front/Back	24.4 dB
Beamwidth	70.8 deg.; -3dB @ 324.6, 35.4 deg.
Sidelobe Gain	-5.14 dBi @ Az Angle = 118.0 deg.
Front/Sidelobe	19.29 dB

Position Local, 32deg TOA

7050kHz

Total Field EZNEC



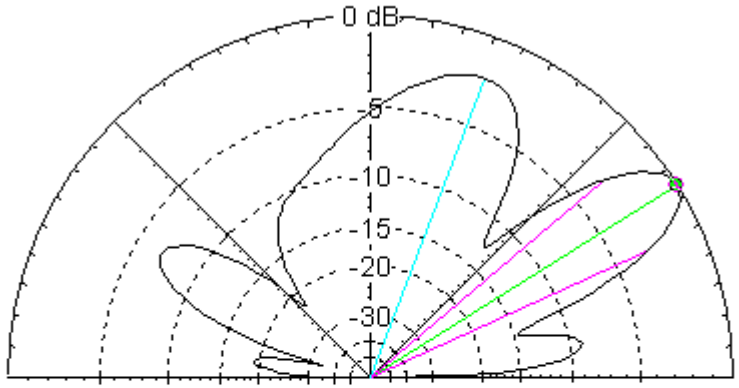
7.05 MHz

Elevation Plot		Cursor Elev	32.0 deg.
Azimuth Angle	0.0 deg.	Gain	11.13 dBi
Outer Ring	11.13 dBi		0.0 dBmax

Slice Max Gain	11.13 dBi @ Elev Angle = 32.0 deg.
Beamwidth	15.7 deg.; -3dB @ 24.6, 40.3 deg.
Sidelobe Gain	8.97 dBi @ Elev Angle = 69.0 deg.
Front/Sidelobe	2.17 dB

7150kHz

Total Field EZNEC

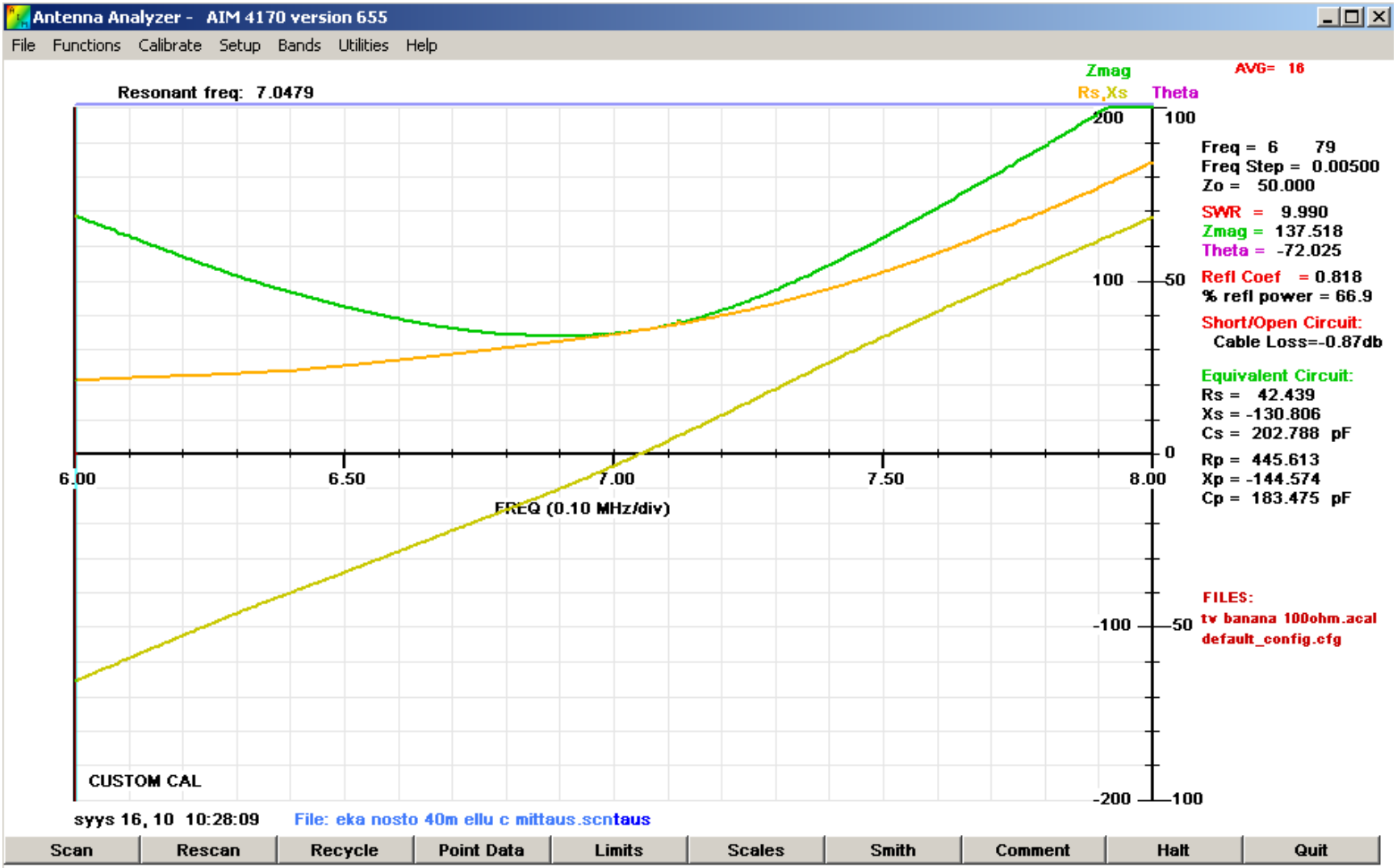


7.05 MHz

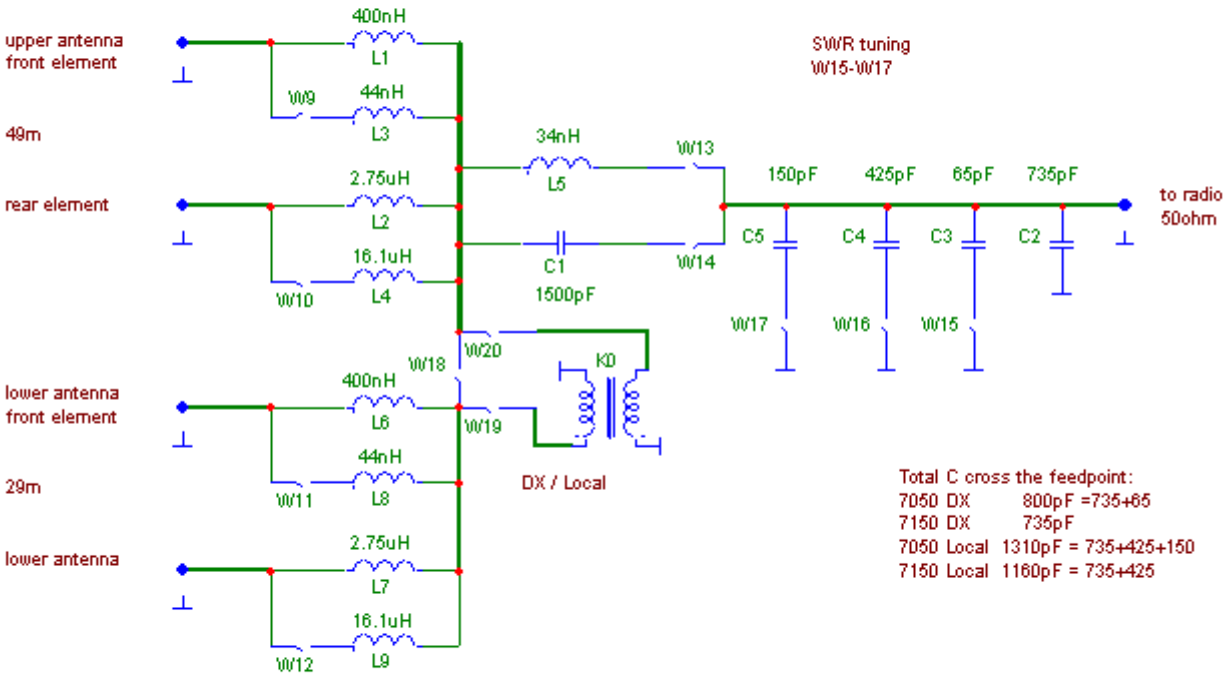
Elevation Plot		Cursor Elev	32.0 deg.
Azimuth Angle	0.0 deg.	Gain	11.19 dBi
Outer Ring	11.19 dBi		0.0 dBmax

Slice Max Gain	11.19 dBi @ Elev Angle = 32.0 deg.
Beamwidth	15.8 deg.; -3dB @ 24.5, 40.3 deg.
Sidelobe Gain	9.11 dBi @ Elev Angle = 69.0 deg.
Front/Sidelobe	2.08 dB

Measured feedpoint impedance of an element alone



Phasing and switching box
- 40m 2over2 at OH1NX
- all elements tuned to resonate at 7050kHz when alone
- feedcables from box to elements are 21.28m electrical length (measured), corresponds lamda/2 on 7046.6kHz



V4c
2.1.2011
OH1TV

The team

OH1TV, OH1ND, OH1TX, OH1MA, OH7RM

Happy Owner
Timo OH1NX

Some comments

- Aligning the phasing unit was a bit difficult because some phasing inductances required were so small. Low inductance requirement was a result from choosing 7050kHz for the element resonance. The circuit wirering and relays easily generates 100nH inductances. In the next similar project element resonance shall be 7100kHz. This increases the required inductance values and gives more flexibility to wire the phasing box.
- 80cm long pigtail cables were used to connect coaxial cables to the box. This allowed to keep stray inductances low as cable could continue to the point.
- Vector analyzer like AIM is a must when aligning the box