

Radiation Patterns of 2-el. Active Receiving Phased Array for Loop and Dipole Mode

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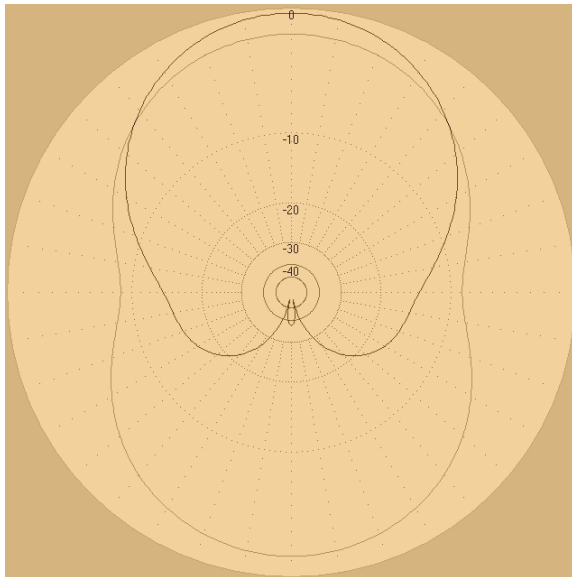
These are the expected radiation patterns using active antennas AAA-1 and VDLite kits combined in dual mode (dipole/loop) 2-element phased array. The gain of the patterns is not meaningful, just the shape.

The bold curves are for subtractive processing, the light – for additive processing. The delay line is fixed to $T = 0.9T_{opt}$ in both modes and processing schemes. The distance between elements is D , wavelength is wl .

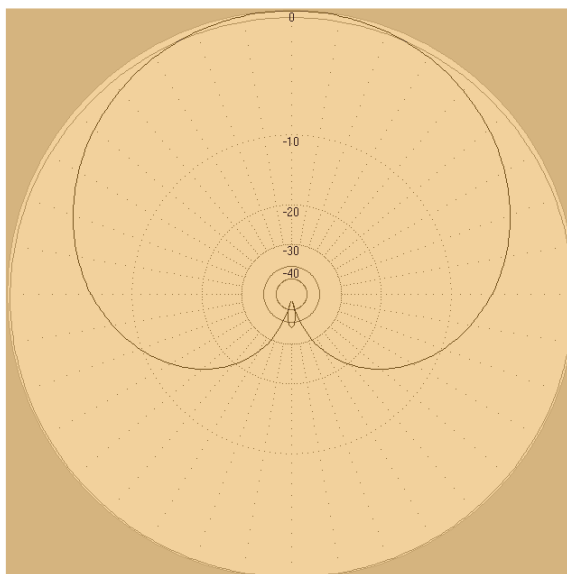
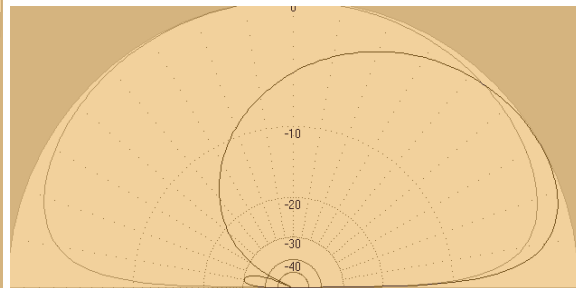
The patterns are computed with MMANA with the following settings: DM1 = 3000, DM2 = 800, SC = 2, EC = 1;

1m quad loop: 3 m height; real ground 13/5; 2 x 1 m vertical dipole: 3 m height; real ground 13/5
All heights are measured to the geometric center of the antenna.

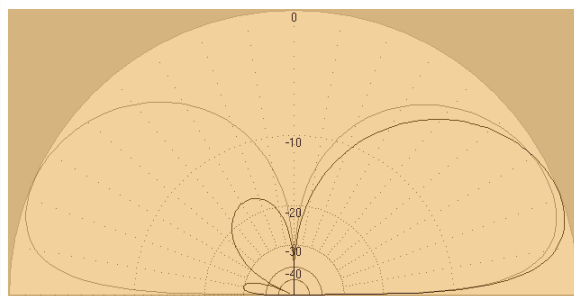
$D/wl = 0.05$



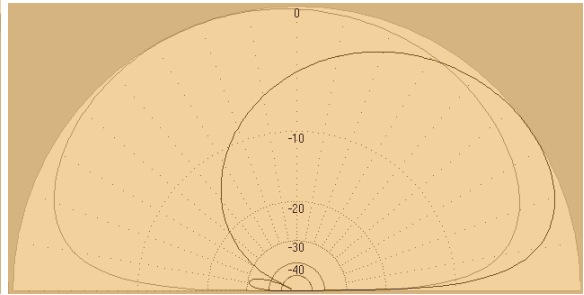
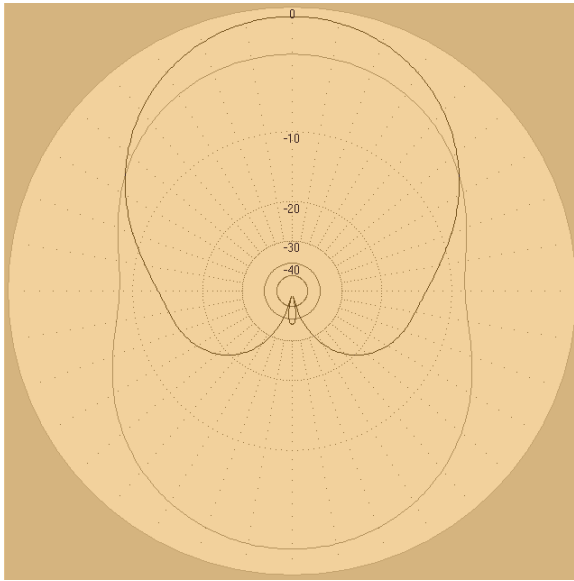
Loop



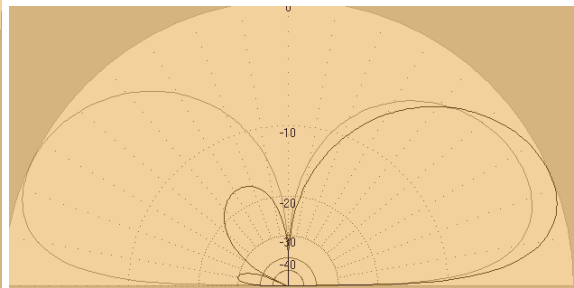
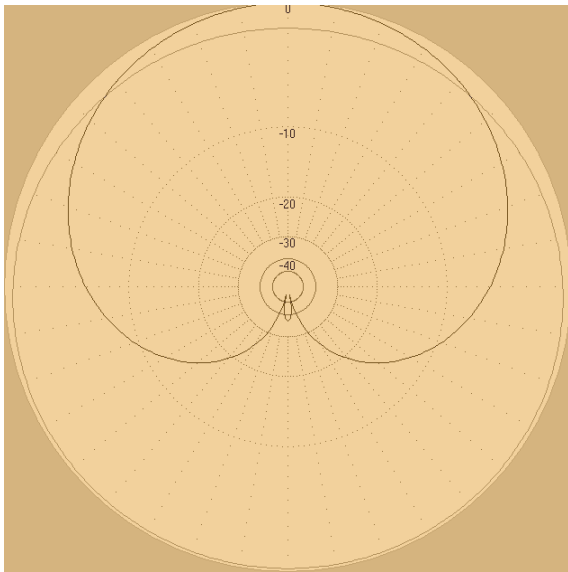
Dipole



$D/wl = 0.1$

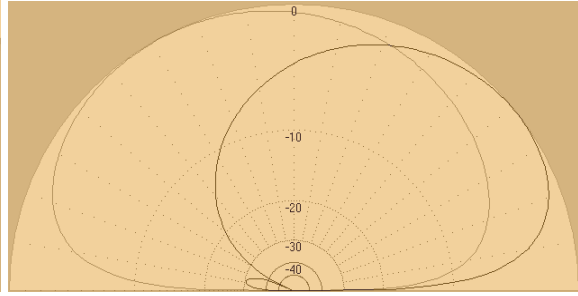
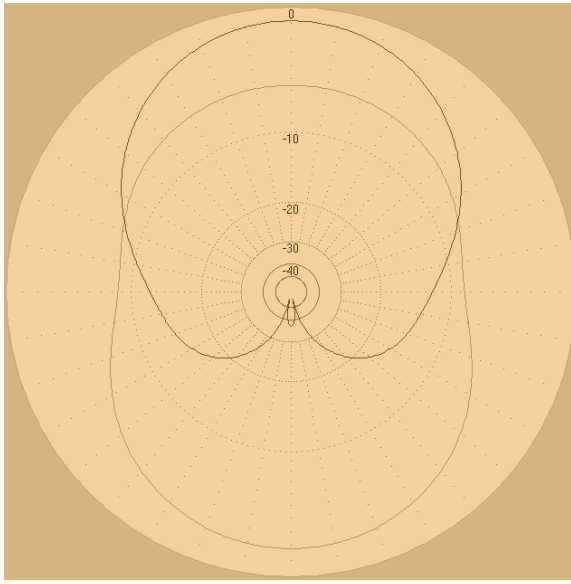


Loop

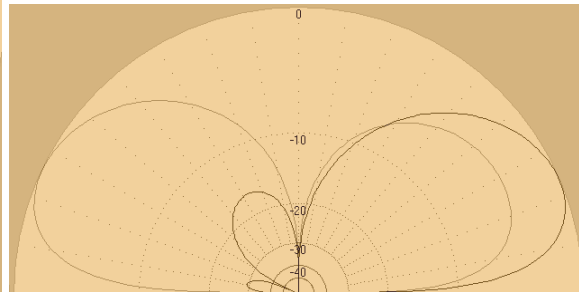
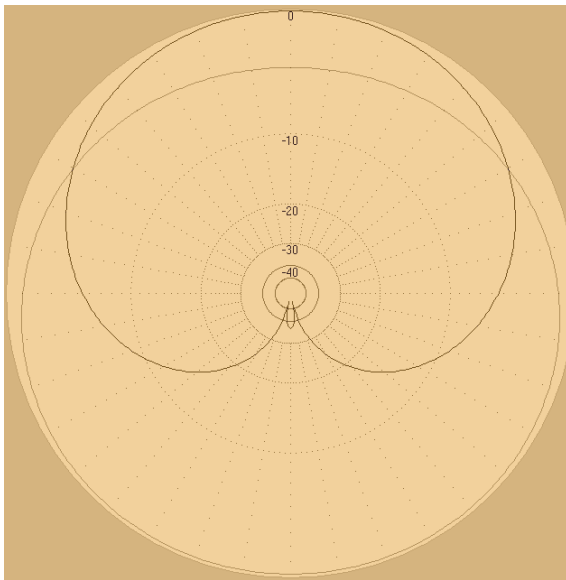


Dipole

$D/wl = 0.15$

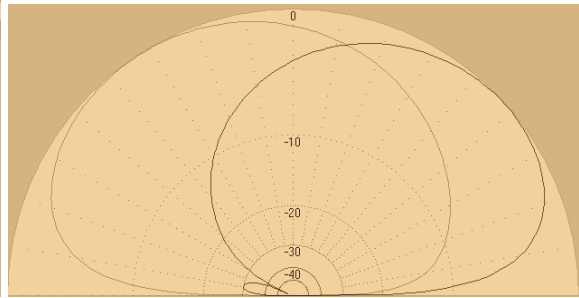
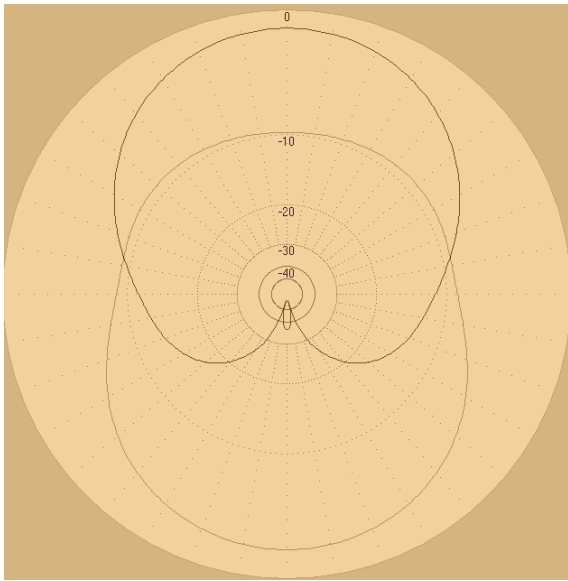


Loop

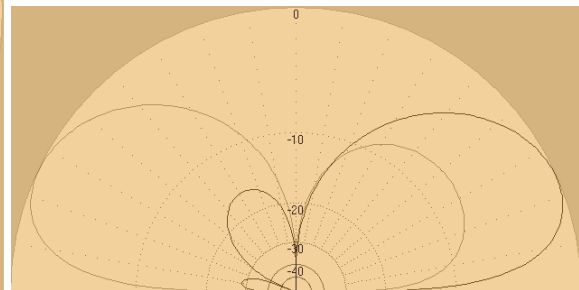
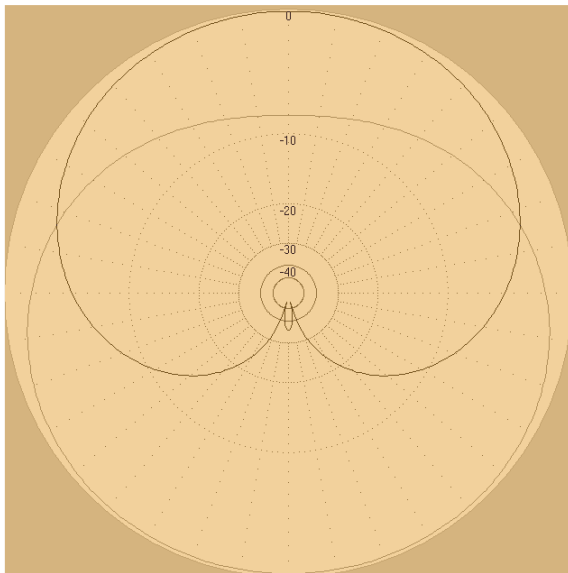


Dipole

$D/wl = 0.2$

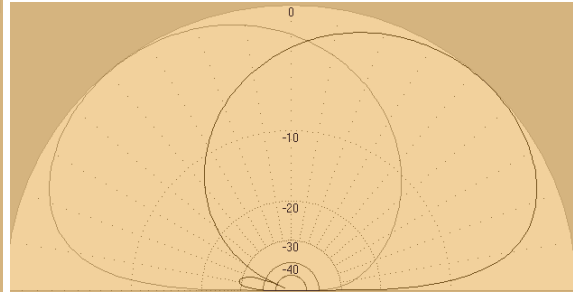
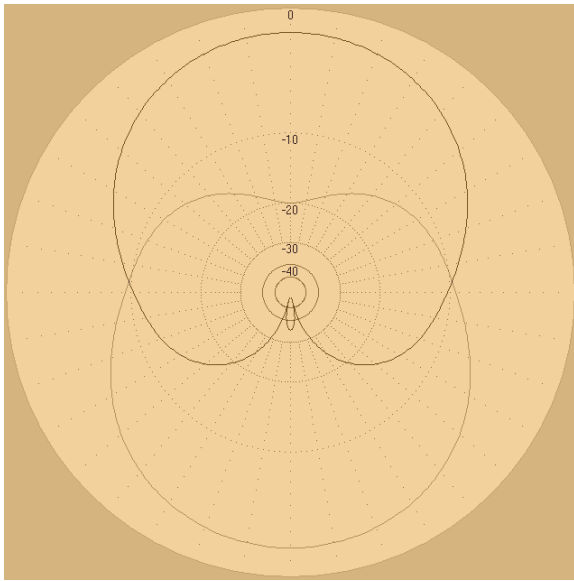


Loop

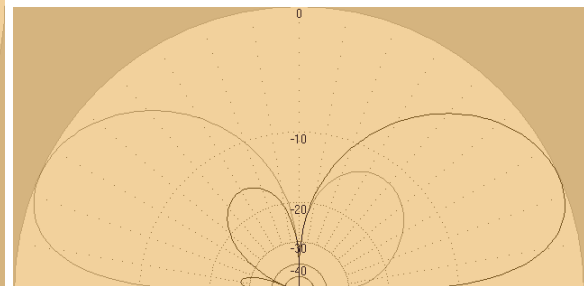
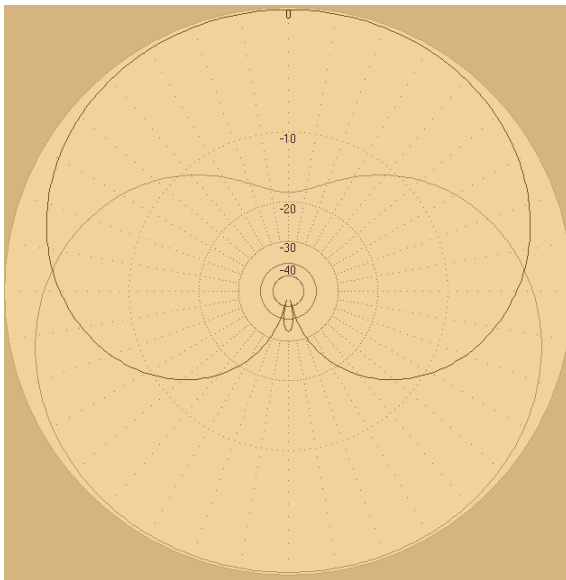


Dipole

$D/wl = 0.25$

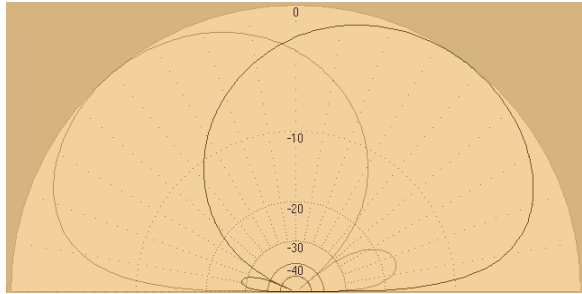
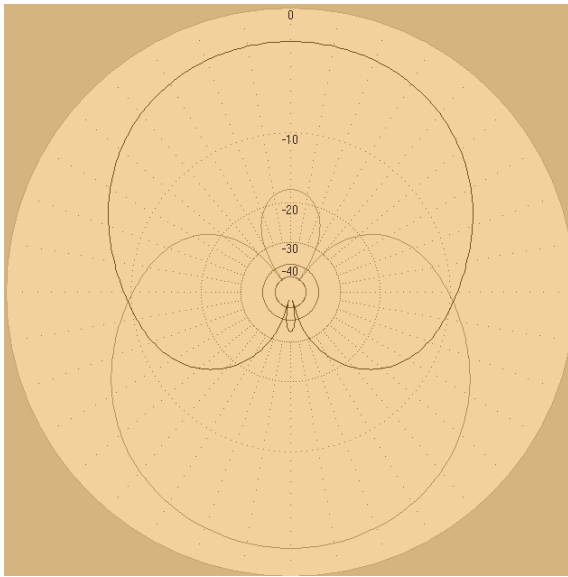


Loop

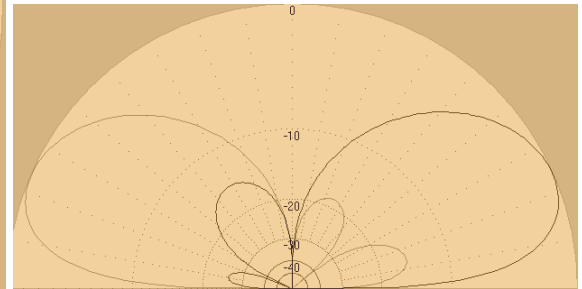
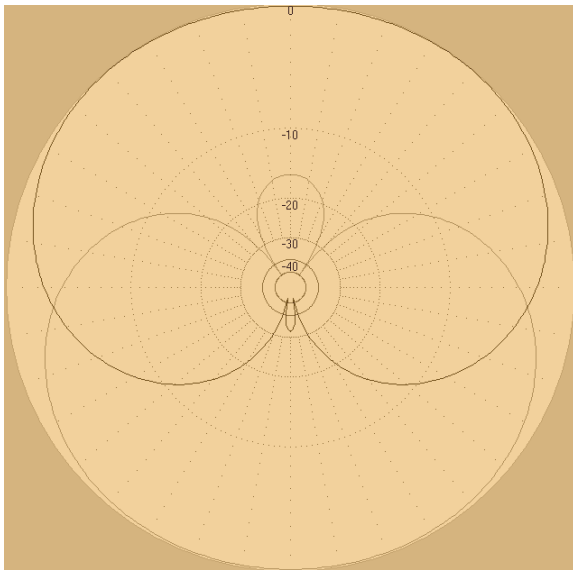


Dipole

$D/wl = 0.3$

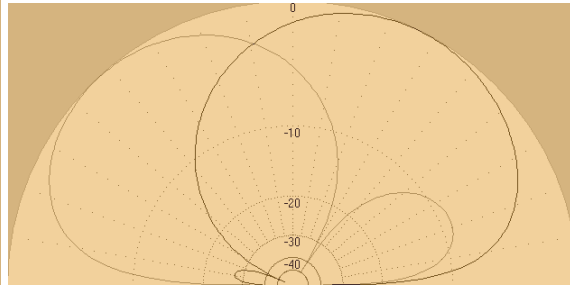
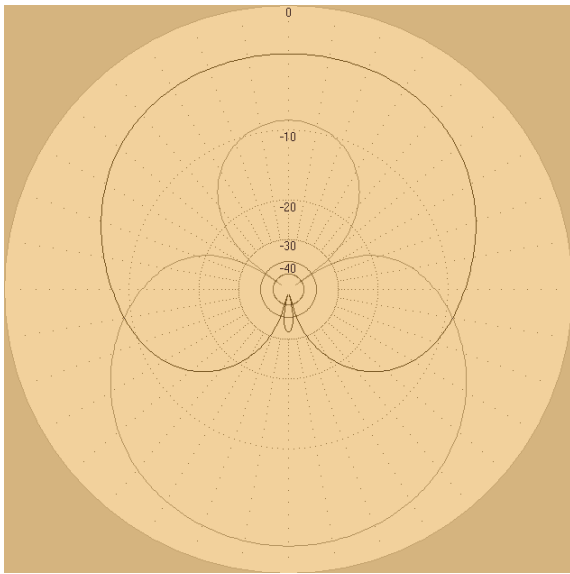


Loop

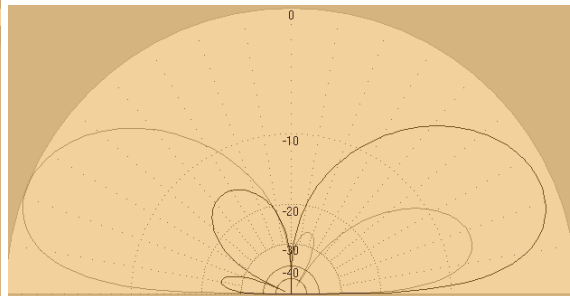
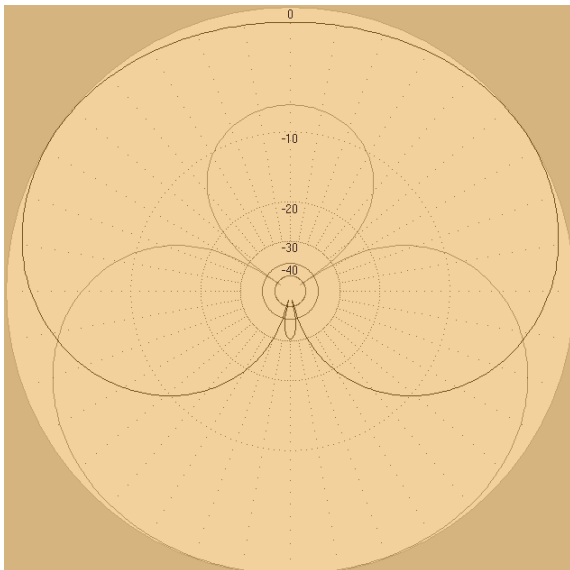


Dipole

$D/wl = 0.35$

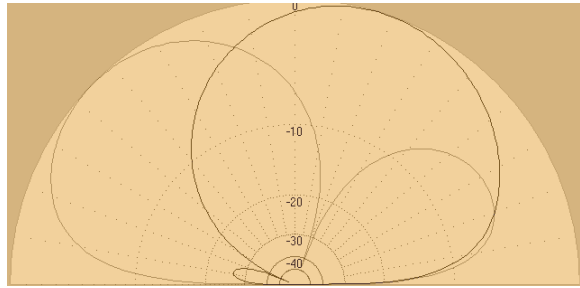
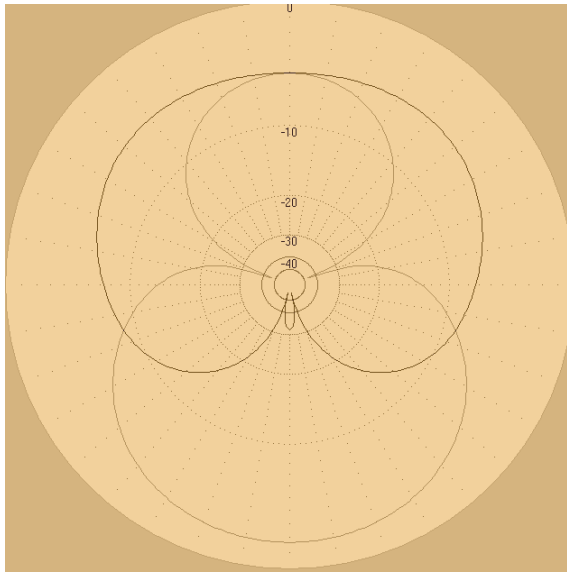


Loop

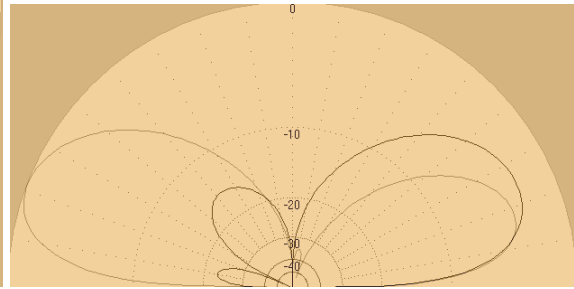
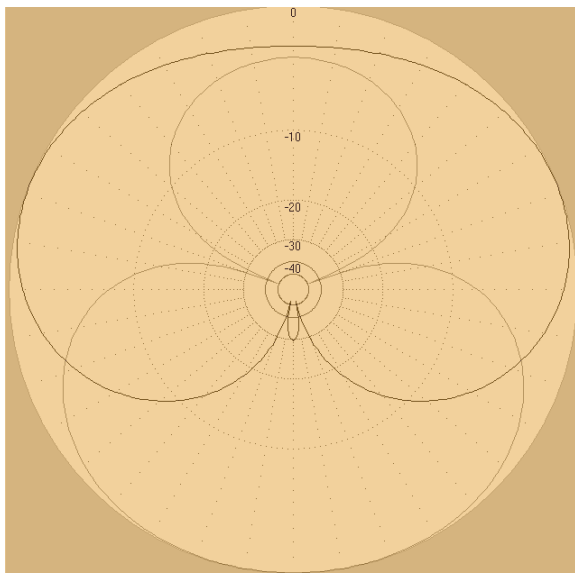


Dipole

$D/wl = 0.4$

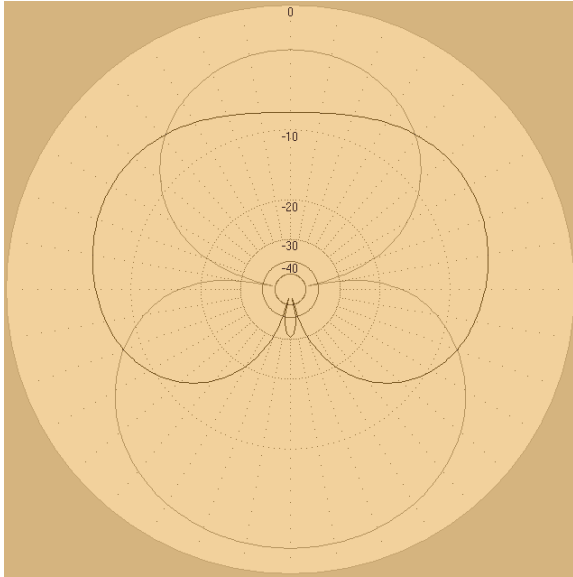


Loop

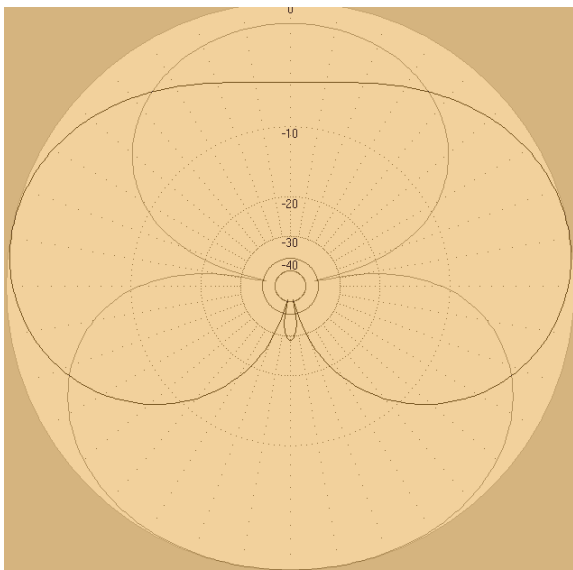
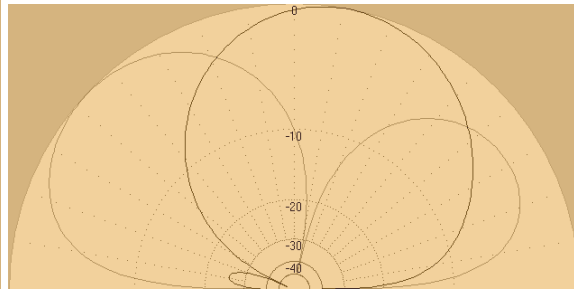


Dipole

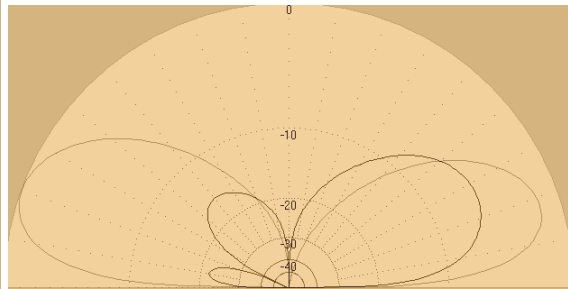
$D/wl = 0.45$



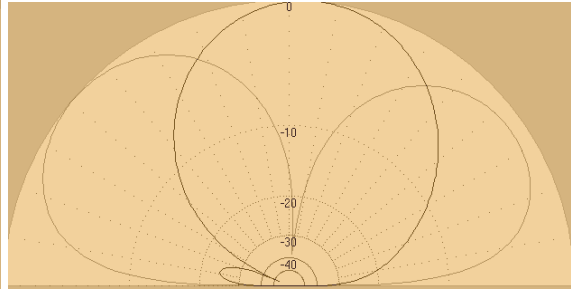
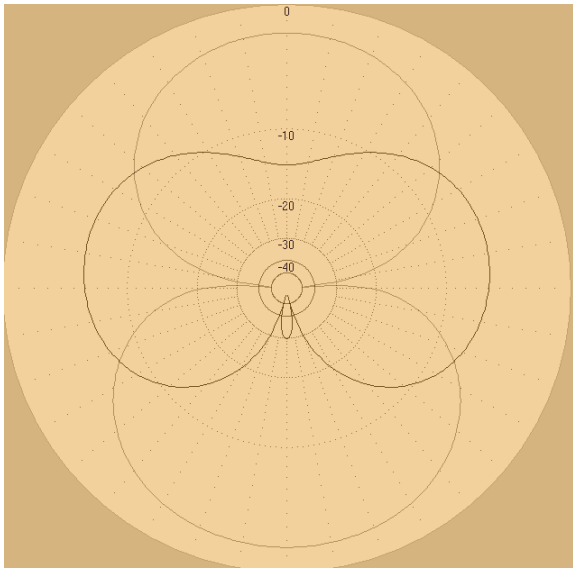
Loop



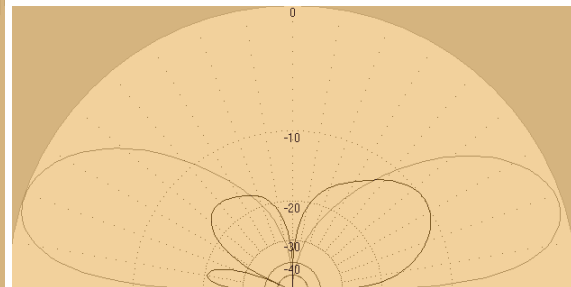
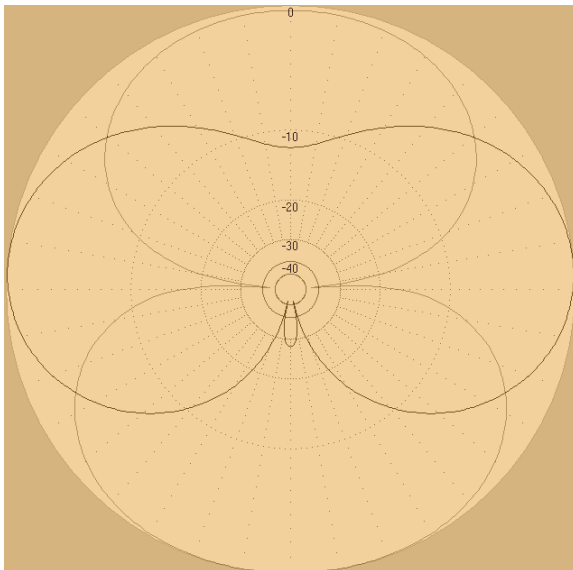
Dipole



$D/wl = 0.5$

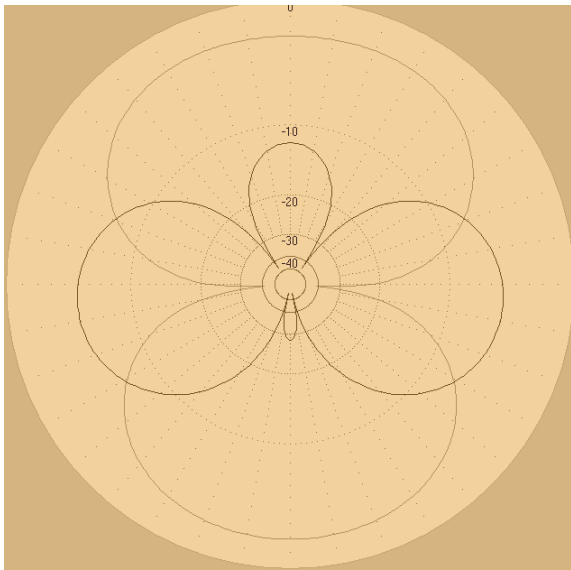


Loop

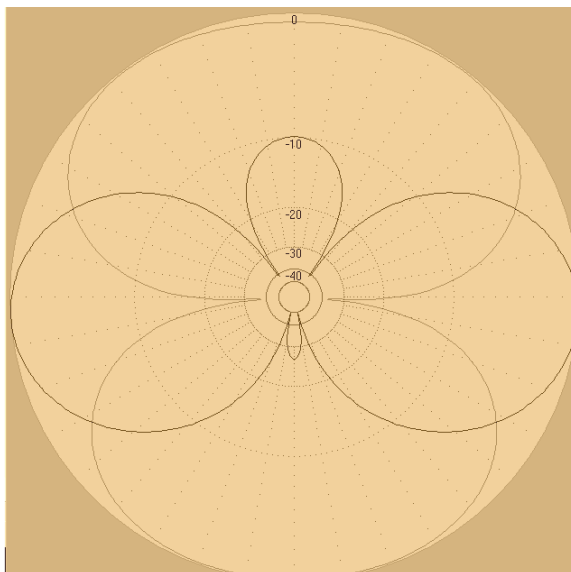
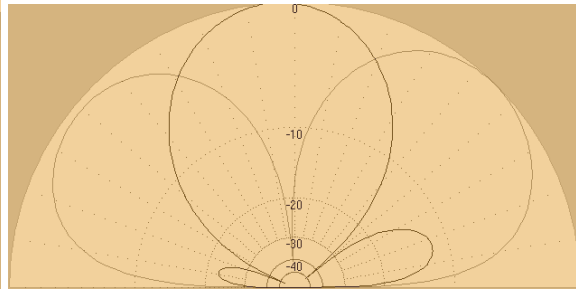


Dipole

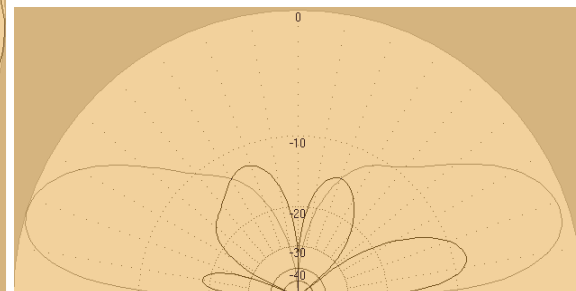
$D/wl = 0.6$



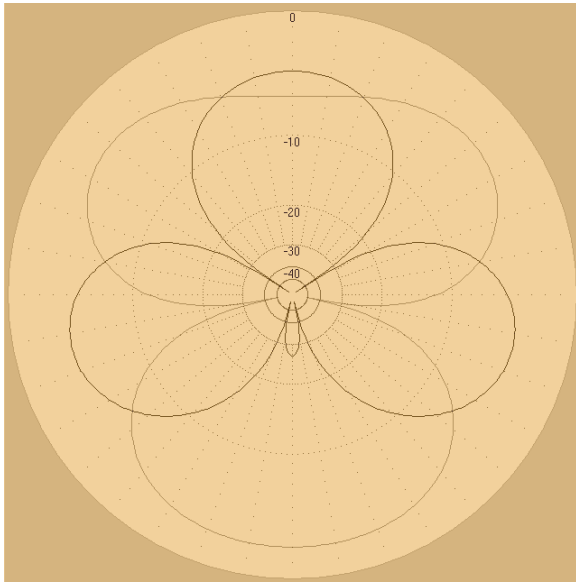
Loop



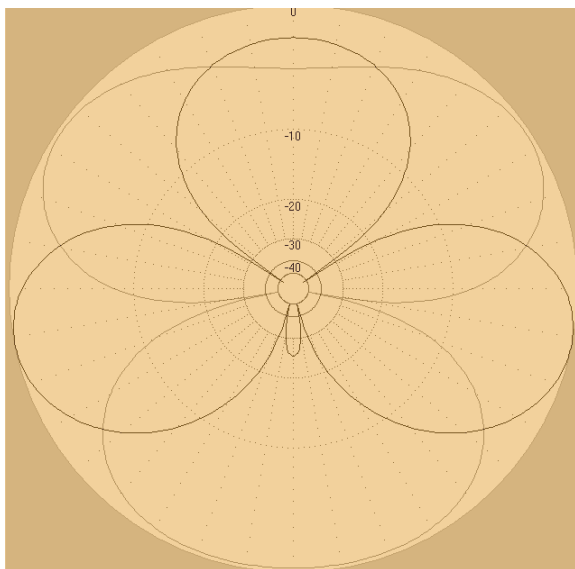
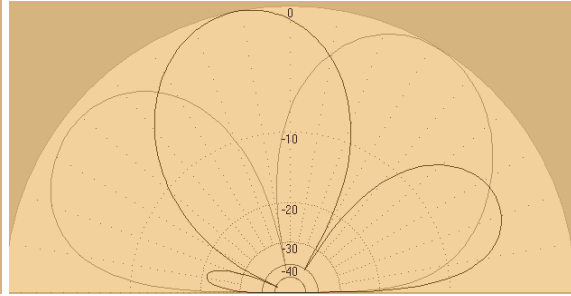
Dipole



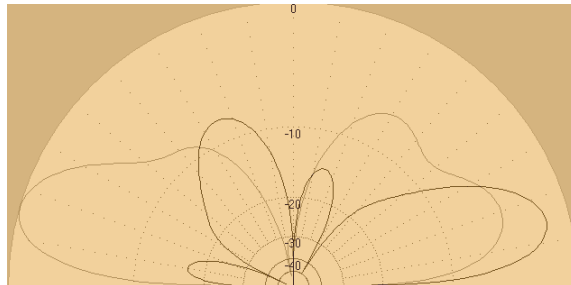
$$D/wl = 0.7$$



Loop



Dipole



Remark:

Above $D/wl = 0.35$ the unidirectional patterns degenerate but since the array most probably will be used at these higher frequencies the user should be aware of the patterns shape. The antenna is usable up to the cutoff frequency of the LC delay line. Below $D/wl = 0.05$ the array preserve excellent unidirectional pattern but the effective height might become too low.

Links:

www.lz1aq@signacor.com www.active-antenna.eu