5.8.1 Corner Reflector with Rotated Dipole for CP

A circularly polarized corner reflector can be built by rotating the dipole. The rotated dipole excites ground plane currents on the two plates in phase quadrature. The combination of the rotated dipole and ground plane currents produce a circularly polarized pattern in broadside direction without requiring dual elements and a feed network [1]. The amount of rotation depends on the size of the plates and the height of the dipole over center.

Below are two examples found by iteration of the dipole rotation angle for a corner reflector with λ x λ plates rotated to form a 90° wedge. Figure 5.8.1.1 shows the best response when the dipole is spaced λ/4 from the vertex.

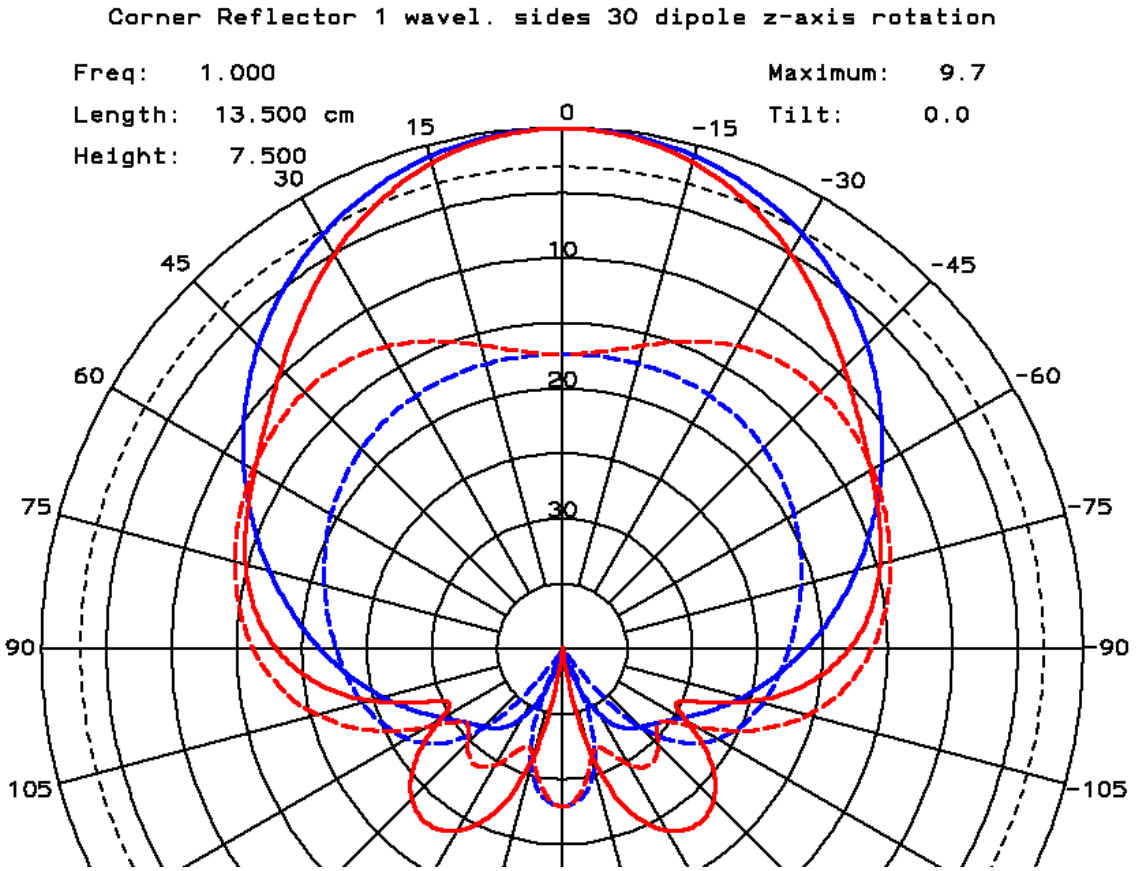

Figure 5.8.1.1 Rotated dipole corner reflector λ/4 vertex height 30° rotation to produce RHC polarization (solid) LHC (dashed) with blue curves in the axis of the vertex and red curves normal to the vertex axis

A CCW rotation of the dipole (RH) produces RHC polarization while the antenna will radiate LHC polarization when the dipole is rotated CW (LH). The antenna will not produce perfect circular polarization on axis and small rotation of the dipole does not significantly change the cross polarization response. Figure 5.8.1.2 illustrates the response of a corner reflector with

dipole vertex spacing of 3λ/8 spacing. The dipole was rotated further (45°) to produce the best cross polarization.

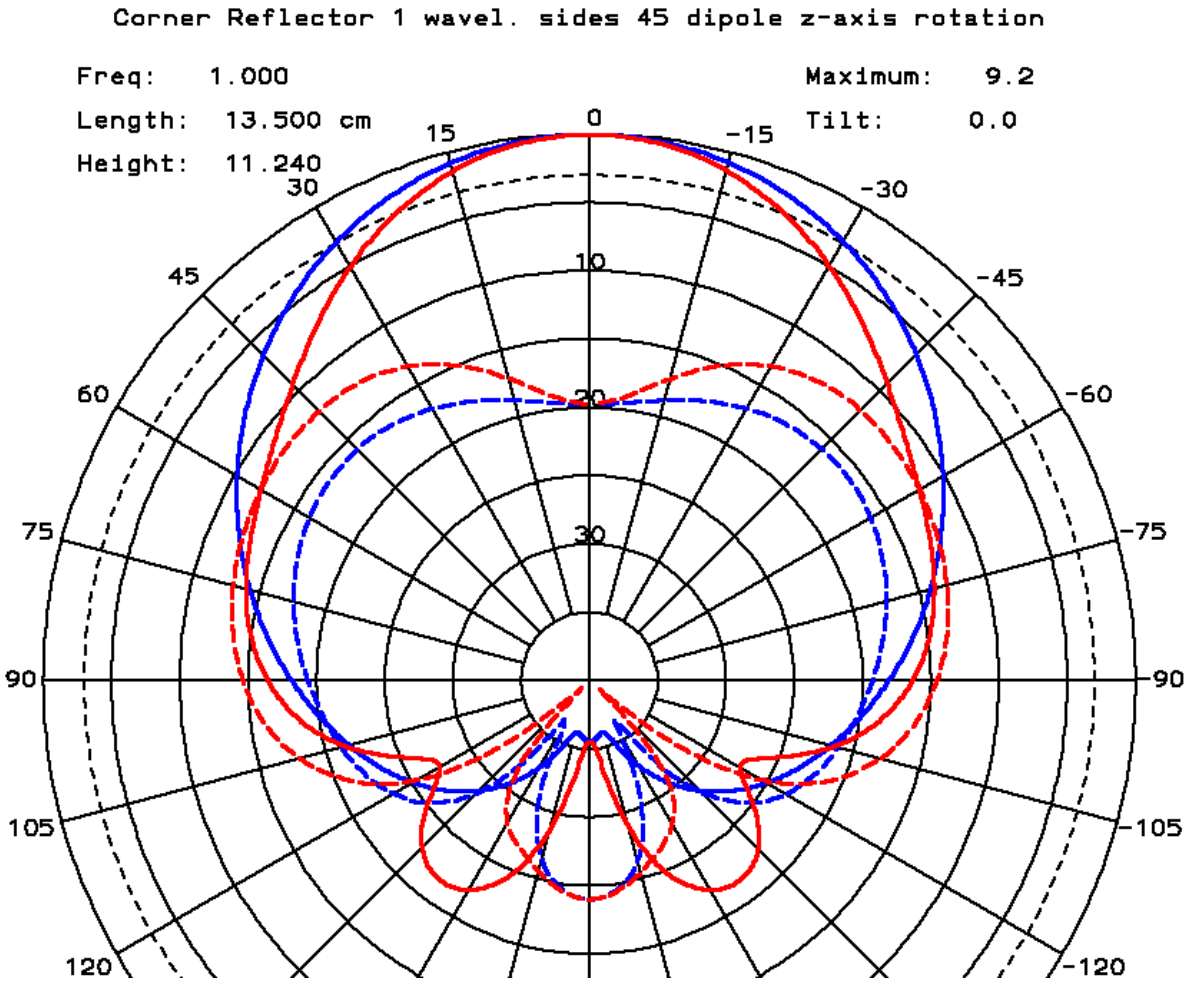

Figure 5.8.1.2 Rotated dipole corner reflector 3λ/8 vertex height 45° rotation to produce RHC polarization (solid) LHC (dashed) with blue curves in the axis of the vertex and red curves normal to the vertex axis

[1] Kai Fong Lee, *Principles of Antenna Theory*, John Wiley, Hoboken, NJ, 1984, pp. 203f.