

Rhombic Loop Twofer Modeling Results

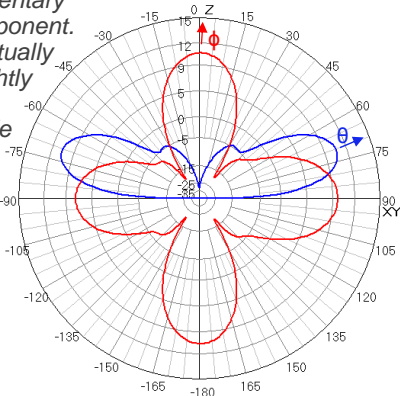
I used 4NEC2 – www.qsl.net/4nec2/ – a feature-rich, user friendly antenna modeling tool – to predict this antenna’s radiation pattern.

Loop Mode

Rhombic Mode

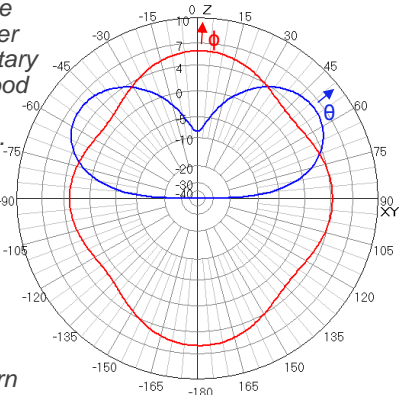
20 meter loop mode takes on a cloverleaf pattern, with a strong complementary perpendicular component. Takeoff angle actually decreases slightly relative to rhombic mode

20m



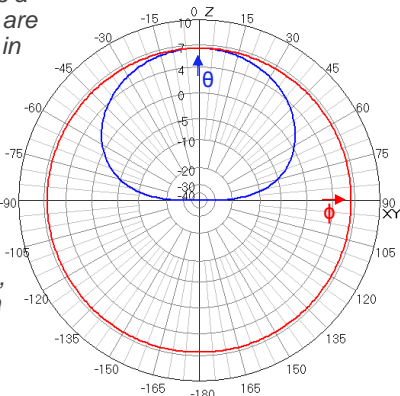
40 meter loop mode takeoff angle is lower than and complementary to rhombic mode, good for longer range nighttime contacts.

40m

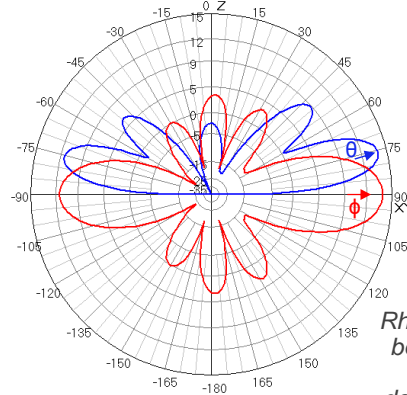


Radiation pattern characteristics as a function of height are relatively stable in loop mode.

80m

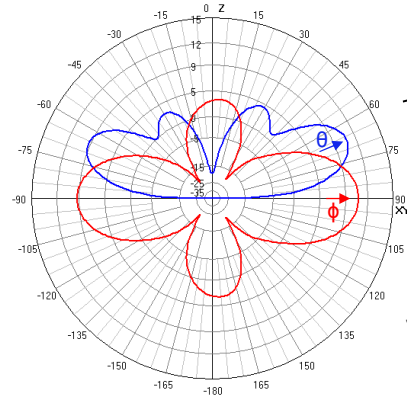


80 meters loop mode radiates up, as expected for a Loop Skywave.



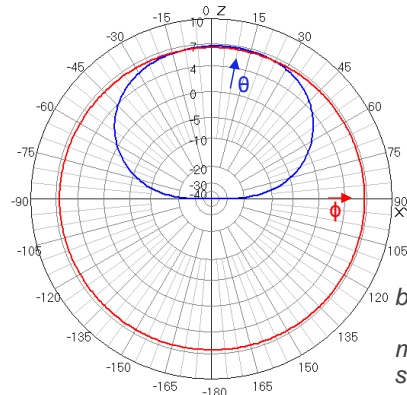
15m

Rhombic gain increases, beamwidth decreases, and takeoff angle decreases as frequency increases



20m

Rhombic takeoff angle can vary widely with height, as vertical sidelobes combine and separate. This height (14m) has a good single, relatively-low vertical lobe.



40m

Interestingly, rhombic mode behaves completely different on 40 meters and radiates straight up, good for daytime contacts

KEY:

— Horizontal Radiation Pattern

— Vertical Radiation Pattern

θ (Theta) – the elevation of maximum gain

ϕ (Phi) – the azimuth of maximum gain

Graph units: dB – gain relative to an isotropic radiator.

Modeling parameters: PSK31 frequency in each band, Height above ground = 14 meters, ‘Real ground’ of type ‘Mountainous Hills < 1000 meters’, 18 gauge wire, no wire loading.

My thanks to Jon Griffiths, W6PI, for his expert advice designing this antenna!