

Omni-Directional Circular Polarization Antenna for Multipath Fading Mitigation

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Multipath fading has a non-negligible effect on mobile communications in general. This is particularly so in the defense industry, where split second decisions could be irreversible. The sudden loss of link in such situations is simply unacceptable. Traditionally, fading has been compensated by radiating more power out of the antennas. This however, produces interference on other nearby antennas, particularly on ships, where most of the antennas are closely placed high on the masts and yardarms.

A possible solution to the multipath fading problem is the use of circular polarization. Circular or elliptical polarization offers the convenient characteristic that waves reverse their sense of rotation upon reflection. With perfectly circular polarization, a reflected right-hand CP wave, will turn left-hand, and vice versa. The reflected wave will then be uncorrelated with the direct path wave, eliminating fading. In the case of elliptical polarization, the effects of fading will not be totally eliminated, but can be substantially reduced. This can help in reducing the level of output power required to establish link, and reduce or eliminate interference on nearby antennas.

This paper presents an omni directional, broadband, circularly polarized antenna that was designed for this purpose. Measurements of the antenna's impedance and axial ratio characteristics are compared with the results obtained by computer simulation. Evidence of its multipath mitigation capability is also presented.