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HIGH DIRECTIVITY CIRCULAR ARRAY OF SHROT BACKFIRE ANTENNAS FED BY A COAXIAL WAVEGUIDE

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Abstract

This paper is mainly concerned with theoretical investigation of radiation parameters of uniformly distribution circular array of short backfire antennas fed by a coaxial waveguide elements excited by TE_{11}-mode. The mathematical expressions for the radiation fields of this array have been derived, based upon the principle of superposition of the fields. This work studied the effect of elements number N and radius of the array circle R on the radiation parameters. It concluded that this arrangement gives larger directivity, smaller beamwidth, lower sidelobe levels and reduce maximum cross-polarization at $(N \le 5, R \le \lambda)$. 30 dB of the directivity may be achieved with a seven element circular array at $(R = \lambda)$.

In particular, It is shown that the performance of such array is preferable in comparison with that linear and planar arrays, and a good agreement has been obtained between the computed results and those reported by other research workers.