A Compact and Lightweight Microstrip Antenna Array with Wilkinson Power Divider for X-band Application at 9.5 GHz

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Abstract

In this paper, a two-element microstrip antenna array with a compatible 1:2 Wilkinson Power Divider operating at 9.5 GHz for X-band application is presented. The design, simulation and optimization of this work are performed using Computer Simulation Technology (CST) Microwave Studio. The proposed design is shown to exhibit good simulation performances with return loss of -38.21 dB, bandwidth of 493 MHz, and gain of 7.08 dB. Coupled with the antenna array, a 1:2 Wilkinson Power Divider is then designed, simulated and optimized. The simulation result of the power divider exhibits three modes of resonance at 8.0-8.5 GHz, 9.09-10.28 GHz and 11.2-11.5 GHz. The operating frequency at 9.5 GHz resulted an equal power division with insertion loss less than 3.68 dB and less mutual coupling as the isolation factor is at 16.23 dB. The antenna array and Wilkinson Power Divider configuration produced an overall dimension of 83.14 mm x 67.34 mm, which realized a portable solution for the parabolic reflector antenna.

Keywords

Author Keywords: Microstrip Antenna; Array Antenna; Wilkinson Power Divider; X-Band; Compact; Lightweight

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