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Design of a 3-dB Directional Coupler Using Symmetric Coupled-Lines

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Abstract : In this paper, the study and design of a 3-dB 90° directional coupler operating in the S-band is proposed. The coupler employs symmetrical multi-section coupled lines designed in a stripline technique. Design is realized in AWR Design Environment and CST Microwave Studio. Using these two programs played a key role in attaining outcomes swiftly and precisely. The simulation results show that the coupler maintains amplitude consistency within ± 0.3 dB, isolation and reflection losses better than 16 dB, and phase difference between two output ports of 88º±0.6˚ in the 1.7 – 4.35 GHz range. This simulation results indicate an improvement is achieved in fractional bandwidth (FBW) performance around the center frequency of f0 = 3 GHz.

Keywords : coupled stripline, directional coupler, multi-section coupler, symmetrical coupler
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