

A design of compact ultra wideband coupler for butler matrix

Abstract

A design of 3 dB compact ultra wideband (UWB) coupler for a 4×4 Butler Matrix, which is operating between 3 and 11 GHz frequency range, is presented in this paper. The proposed design uses multilayer technology that allows having a compact and broad bandwidth coupler. The design uses elliptically shaped broadside coupled strips and a slot created in a common ground plane of two dielectric substrates with the same shape. The design then being fabricated on 0.8 mm thick FR4 substrates and it occupies the dimension of 30 mm \times 15 mm. The simulation and experimental results show a good performance in terms of bandwidth, which covers the entire UWB operation. In addition, detailed analysis of air gap effect for S-parameters and phase difference of the designed coupler is presented in this study.