Study of Power Divider / Combiner

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ABSTRACT

Design of a four-way Ku-band Wilkinson power divider/combiner is presented in this dissertation. The proposed structure uses multiple two-way Wilkinson dividers to achieve broadband characteristics while maintaining the conditions of being matched, reciprocal and isolated between the output ports. The Wilkinson power divider is implemented using a planar environment on RT/ duroid® 5880 and Alumina substrates. The design procedures and methods are provided and validated with the simulated results. For the design on RT/ duroid® 5880, the circuit gives an insertion loss of less than 6.4 dB, an input/output return loss of higher than 13 dB, and an isolation of greater than 15 dB from 12 to 18 GHz. On the other hand, for the design on Alumina results in an insertion loss not more than 6.13 dB, an input/output return loss of more than 8 dB, and isolation between output ports is better than 15.7 dB at 15 GHz centre frequency. The simulation results of the four-way Wilkinson divider design on both substrates are compared in this report.

Keywords: Broadband characteristic, four-way power divider, quarter-wavelength, transmission lines, Wilkinson power divider/combiner.