

ABSTRACT

Energy harvesting is the process by which energy comes from external sources such as solar or solar, heat, radiofrequency waves (RF), and other electromagnetic waves that emit signals then are processed to convert to DC voltage. RF energy harvesting system is a way that can be used to harvest the maximum RF energy or RF waves as an alternative energy source. With the development of many antennas for RF harvester, to carry out the harvesting process efficiently, the antennas must work together.

In this Final Project, a power combiner has been designed and realized with a working frequency range from 400 MHz to 2600 MHz which can be used for RF power harvester applications. This power combiner has 4 input ports and 1 output port. In the optimization results, a resistor is used to increase the value on the input port. The tool is designed using CST Studio Suite 2017.

The measurement results of the combiner power are obtained the parameter value of S11 at 1770 MHz which is -32.93 dB, with a total bandwidth of 116.98%. The value of S22 at 1530 MHz is -29.734 dB with a total bandwidth of 79.192%. The value of S33 at 1260 MHz is -30.629 dB, with a total bandwidth of 79.792%. The S44 value at 1830 MHz is -33.968 dB, with a total bandwidth of 77.59%. The value of S55 at 2445 MHz is -31.56 dB, with a total bandwidth of 70.393%. The insertion loss value looks constant at each port, with the maximum value at S13 on the 400 MHz frequency of -6.388 dB. The isolation port values S32 and S23 at 1635 MHz are -36 dB. The parameters S24 and S42 at 1980 MHz are -21 dB. The parameters of S52 and S25 at 2010 MHz are -21 dB. The parameters S43 and S34 at 2040 MHz are worth -21 dB. The parameters of S53 and S35 at 2025 MHz are worth -21 dB. The parameters S54 and S45 at 1619 MHz are worth -35 dB. The measurement results on several frequencies are in accordance with the specifications for use in RF power harvester antenna applications.

Keywords: RF harvesting, Power Combiner, Ultra Wideband, Return Loss, Insertion Loss, Port Isolation