

ABSTRACT

Remote sensing technologies is known as the technologies that have broad benefits. In the development of remote sensing technology using satellite platform, many developers adopt the technology of cameras, both spectral camera and push-broom to get the image of the earth on a regular basis. However, camera technology has several drawbacks, including not able to map the cloud covered area and the area at night conditions. This challenge is answered by technology Circularly Polarized Synthetic Aperture Radar (CP-SAR), which are included in the category of microwave remote sensing remote sensing technology that uses radio waves as a means of data collection. In the CP-SAR system needed an antenna with circular polarization characteristics.

In this study is designed a microstrip antenna using perturbation technique that is truncated edge, cutting at the edge of a circular-shaped patch with an angle of 45° and 225° to the direction of clockwise for RHCP polarization and counterclockwise for LHCP polarization from the feeding axis. Proximity coupled feeding techniques are used with the height of the upper and lower layers are created equal. The design process uses an antenna simulator based on Finite Integration Technique (FIT) with FR-4 epoxy substrate material has a dielectric constant at a frequency of 4.3 at 1.27 GHz.

The results of this study indicate that truncated edge perturbation technique can modify the polarization of microstrip antenna into circularly polarized LHCP and RHCP with dimensional parameters that affect the circularity is the patch radius (r), the width of the segment truncated (tr), and the length of the feeding (pc). The relationship between the percentage ratio of tr and r due to frequency is linear and can be formulated in equations. Proximity coupled fed usage can reduce the dimension of antenna up to 40% compared with microstripline fed. From the results of measuring the impedance bandwidth is 69 MHz, 27.78% wider than the simulation results. Meanwhile axial ratio bandwidth is 50 MHz from measurement results, 230% wider than the simulation results with comparison between tr and r is 7.23%. The designed antenna can be applied to CP-SAR sensor as compliance with system specifications.

Keywords: Microstrip, Circularly Polarized Antenna, Synthetic Aperture Radar (SAR), truncated edge.