

ABSTRACT

Tel-USAT 2 is the second generation of satellite communication system that Telkom University has been developing. The first mission of Tel-USAT was RSPL (Remote Sensing Payload) that used camera technology and developed into SAR that used imaging radar technology. One of the component of the subsystem of satellite communication system is antenna as a transmission device. The antenna will be installed in the space segment of this SAR system. The antenna will send the result of SAR sensing to ground station. Electromagnetic wave that has been transmitted from antenna will experience Faraday effect in ionosphere that will change its polarization. In a previous study, S-Band transmitters were made for circularly polarized SAR systems with dual-feed technique of parasitic front-end method with size (61,2×67,5×50) mm so the size was not compact.

In this research, microstrip antenna will be realized with the addition of end parasitic element, dielectric substrate is used as a separator between elements. The distance between the groundplane with the end parasitic element will be optimized to minimize back lobe. To obtain circular polarization, dual-feed techniques will be used. Dielectric substrate that will be used is Rogers Duroid 5880 to get a good antenna performance.

The antenna obtained in this study has circular polarization ($AR \leq 3\text{dB}$) and unidirectional radiation pattern with $HPBW > 70^\circ$. The antenna works on the S-band frequency of 2,325 to 2,375 GHz with a bandwidth of 50 MHz. The bandwidth of $VSWR < 1,5$ is 54,2 MHz and the bandwidth of axial ratio $\leq 3\text{ dB}$ is 54,3 MHz so it has effective bandwidth equal to 54,2 MHz, antenna gain is 10,15 dBic and dimension (100×100×4.83) mm

Keywords: Microstrip Antenna, S-band transmitter, SAR (Synthetic Aperture Radar)