Design and Measurement Microstrip Dual-Band Antenna at Frequency 144 MHz and 430 MHz for Transceiver Portable Nano Satellite

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ABSTRACT

Satellite technology is a product of technological progress, it’s solution for many problems. Today in Indonesia the first-generation Nano Satellites is being developed. One component of the communication subsystem of the satellite is the antenna, on the space station and ground station.

This Final Project, presents a antenna design for dual-operation for a portable transceiver with microstrip technology. Microstrip antenna is an antenna that made of PCB plate and consist of patch and ground plane. Dual frequency is choosen to support the portable transceiver. Both at 144MHz and 430 MHz. Initial design is a rectangular microstrip antenna with FR-04 as a substrate and has dimension around 500 mm x 250mm.

This research consists of two steps, simulation and direct measurement of antenna design. Line feeding is chosen and techniques of U-slot on a ground plane is applied to reduce the dimensions of the antenna. From the simulation is obtained return loss about -12.28 dB, VSWR of 1.64 at frequency 144 MHz. On frequency 430 MHz is obtained return loss about 16.80 dB and VSWR about 1.34. Bandwidth is obtained around 2,065 MHz or 1.4299% and 10 MHz or 2.334% for each frequency, 144 MHz and 430 MHz. From the measurement results obtained return loss and VSWR values about -11.725 dB and 1.7 for the uplink frequency. And downlink frequency obtained for return loss and VSWR values about -12.207 dB and 1.65. Bandwidth of the measurement is only obtained in the uplink frequency about 2MHz or 1.397%. Measurement of gain is obtained 1.24dBi at 144 MHz and 1.23 dBi for 430 MHz. Referring to the results of simulation and testing, can
be inferred that antenna design can be used as prototype that applied to portable transceiver Nano satellite.

Keyword : microstrip dual-band antenna, U-slot, feed line, portable transceiver