ABSTRACT

Telkom University in collaboration with Aerospace Exploration Center are developing a nano satellite with the name Tel-U Sat. The satellite has a dimension of 10 cm × 10 cm × 10 cm with a weight less than 10 kg. The one of Tel-U Sat payloads is Automatic Packet Reporting System (APRS). APRS nanosatellite work on frequency 145 880 MHz that is used to transmit satellite position to the Ground Station periodically.

APRS communication requires an antenna with wide coverage radiation pattern that is used monopole antenna with a length of 54.5 cm. The length of the antenna disturb packaging process of satellite into *launch adapter* before it laying on the rocket so its necessary a techniques to roll up the antenna. When the satellite at a low altitude orbit (Low Earth Orbit) is 300-1000 km above the Earth's surface, the antenna is released so APRS can start active. Antenna deployment is required as a roller and release the antenna when it is in the proper orbit. The APRS antenna using monopole antenna with nanosatellite structure as a groundplane. The structure is made from aluminum with a size of 10 cm × 10 cm × 10 cm with a thickness of 2 mm. Monopole antenna is made from zinc of measurement tape with length of 54.5 cm. Mechanism of deployment technique is to cut off nylon thread from the heater resistor on the heating element which is triggered by altitude information based on GPS data.

Monopole antenna measurement results with the structure as groundplane on the working frequency 145.880 MHz are VSWR 1.358 and bandwidth 21.54 MHz. Obtained polarization is elliptical polarization with axial ratio value is 12.58 dB. The radiation pattern obtained is omnidirectional with HPBW at θ = 90° is 104.25 ° and HPBW φ = 0° is 77.63° and gain value obtained is 4.44 dB. Testing deployment technique get the antenna release (deployed) with an average time of 3.88 minutes with details of 3.85 minutes of the GPS module locking time and 1.8 seconds of time to break the nylon thread from the heater resistor.

Key Words : APRS, antenna deployment, GPS