

ABSTRACT

Telemetry, Tracking, and Command (TTC) system is functioning for communication interface between the satellite and earth station. One important part in TTC is a transmitter that works at 437.430 MHz downlink frequency. By link budget calculation it's required a high power amplifier (HPA) which has 30 dBm output power in order to make the data transmitted can still be received by the earth station.

In this final project is designed and realized two stage of HPA that can works in 437.430 MHz with bandwidth 30 KHz. HPA can produce power output 30 dBm when given input 0 dBm or in other words it has strengthened by 30 dB. The maximum dimension of the HPA is 6.5 cm x 4.0 cm x 0.72 cm. The active component used in the first stage amplifier is a BFR96S transistor and in the second stage amplifier used MRF555 transistor. Impedance matching input of HPA circuit used Pi-network impedance matching technique, for interstage and output impedance matching used T-network impedance matching technique. In the design and simulation of HPA used Advance Design System (ADS 2015) software.

HPA design has characterization results at 437.430 MHz frequency as follow 28,400 dB for gain, 1,291 of VSWR_{in}, 1.295 of VSWR_{out}, and -17.936 of return loss respectively. In the measurement of HPA realization, at 437.430 MHz frequency has characterization results 23.01 dB for gain, 2.126 of VSWR_{in}, 1.695 of VSWR_{out}, -8.864 of return loss input, -11.762 of return loss output and 50 MHz of bandwidth. HPA realization has dimension 7.26 cm x 3.59 cm x 1.0 cm.

Keywords : Nanosatellite, TTC, HPA, gain, VSWR, impedance matching.