ABSTRACT

The development of current radar technology is so rapid which is evidenced by one of the radar technology developed for remote sensing applications called Synthetic Aperture Radar (SAR). SAR technology operates on L-Band frequency in the frequency range 1,0-2,0 GHz with frequency operation of 1,265-1,275 GHz. The signal emitted by the SAR uses a chirp pulse that transmitted to the surface of the earth, then receives the reflected signal (echo) by the receiver.

In its application, to receive the reflected signal from the surface of the earth that the distance traveled far enough with the transmitter then the emitted high power is needed. In this final project, a power amplifier designed with a class E power amplifier design and a two-stages power amplifier system due to the limitations on the active components in the market. The Active Component used is GaAs (Galium Arsenide) High Pseudomorphic Electron Mobility Transistor (p-HEMT) because the radar signal which amplitude linearity is not needed, bias circuit using a discrete SMD passive component (resistor and capacitor) and inductor using microstrip line.

The first power amplifier prototype result can work at frequency operation of 1,265-1,275 GHz and the characterization results at 1,275 GHz frequency which produces output power of 17,03 dBm, gain of 17,03 dB, input return loss of -18,75 dB, output return loss of -16,08 dB and power amplifier efficiency of 19,79 %. The second power amplifier prototype result with characterization results at 1,2 GHz frequency which produces output power of 6,27 dBm, gain of 6,27 dB, input return loss of -4,18 dB, output return loss of -1,67 dB and power amplifier efficiency of 0,65 %.

Keywords: *Synthetic Aperture Radar (SAR), chirp pulse, High Power Amplifier*, *Pseudomorphic* HEMT (p-HEMT).