

## ABSTRACT

*Joining IT Telkom in research of manufacturing IiNUSAT (Indonesian inter University Satellite) involves IT Telkom to design the Remote Sensing Payload (RSPL) application of nanosatellite that is in LEO (Low Earth Orbi) with 700 km on height. RSPL application needs a transmitter to transmit image data to the ground station by S-band frequency. In order to achieve the transmit frequency required an up converter to convert the frequency, from intermediate frequency (IF) 70 MHz into radio frequency (RF) 2.4 GHz.*

*In this final assignment, oscillator 2.33 GHz is designed and realized as a local oscillator of the up coverter on S-band transmitter. Advanced Design System (ADS) software is used to simulate the design of oscillator. BJT transistor of BFP450 is used as an active component that has stability factor value  $K < 1$  by common base configuration. The design method used is negative resistance, mapping  $\Gamma_T$  in the unstable region to result negative real resistance of  $Z_{IN}$ . The result of simulation has approached specification that is oscillation frequency 2.33 GHz, output power  $\geq -10$  dBm, phase noise  $\leq -55$  dBc/Hz, quality factor  $> 100$ .*

*Performance test of the oscillator has been done by comparing the result of measurement and the design specification. Oscillation occurred after placing a capacitor beside base-collector and a resistor before output port in collector. The performance of oscillator is unstable, it is indicated by fluctuation of oscillation frequency. The measurement results oscillation frequency  $(2552.058843 \pm 0.300569)$  MHz, output power  $(-11.371429 \pm 0.402543)$  dBm, phase noise  $-38.8$  dBc/Hz @ 154 kHz, and quality factor of  $BW_{-3dB}$  is 44016.*

*Key word : nanosatellite, IiNUSAT, oscillator, up converter, S-band transmitter, remote sensing payload, oscillation frequency, output power, phase noise, quality factor, stability.*