

## **ABSTRACT**

*Synthetic Aperture Radar (SAR) is a method of observing the shape of the earth's surface by performing sensing or monitoring of space rays and presents image data. The image resolution of the SAR is influenced by the bandwidth, the wider the bandwidth, the more accurate the resolution will be. To get the performance on the SAR system used filter, which serves to maintain the stability width of the output bandwidth of the signal generator chirp.*

*In this final project designed the filter using square loop resonator method because it can give small filter size and kemudahannya in conducting optimization process. In addition to using SLR in this design is also used Defected Ground Structure on the ground plane to provide damping effect and also selective filter response. The filter will be designed at a center frequency of 9,610 GHz with a bandwidth width of  $\geq 300$  MHz to obtain a resolution of 0.25 m - 1 m.*

*Results from the realization of the SLR and DGS filters using the 5880 duroid material and the dielectric permittivity of 2.2 obtained the middle frequency of the filter at a frequency of 9.51 GHz with a bandwidth of 610 MHz in the frequency range of 9.19 GHz - 9.8 GHz. The value of the insertion loss and return loss derived from the result is -2.89 dB and -14.1 dB .. The resulting filter size is 22 mm x 16 mm.*

**Keyword:** SAR, Square Loop Resonator, Defected Ground Structure, Resolution.