

ABSTRACT

One type of radar technology is a short-range radar that uses high frequencies in its application. Therefore, the K-band frequency range is considered suitable to be applied to short range radar. Short range radar is usually used on automotive radar or detect small objects at close range. So that wideband is needed to get high resolution. Apart from bandwidth, filter characters are also seen from the insertion loss, return loss, radiation loss and sensitivity to EM interference and dimension minimization.

In the short-radar system there is one important device, the filter. The filter ensures that the signals that enter the system are only signals with a predetermined frequency. The frequency range of the specified filter is 1 GHz at a frequency of 24 GHz, so a microstrip filter is made using the substrate integrated waveguide method to meet the specified filter character.

The final project, entitled Design and Realization of Band Pass Filters in K-Band Frequency for Short Range Radar Application, filters are simulated using HFSS 15.0 software using the substrate integrated waveguide (SIW) method with a frequency range of 23.5 GHz to 24.5 GHz with a center frequency of 24 GHz that has VSWR equal to 1.0308, return loss of -36.9344 dB and insertion loss of -0.6695 dB. The filter is realized using the Roger RO4003 substrate material which gets the measurement results at a frequency of 24 GHz with VSWR of 1,385, return loss of -14,791 dB and insertion loss of -2,8771 dB after deducting from the existing loss. There is also a shift and change in the value of the bandwidth to 22.98 GHz up to 23.56 GHz or as much as 580 MHz, which occurs due to changes in the dimensions of the SIW components and taper dimensions during the fabrication process.

Keywords: Short Range Radar, Band Pass Filter, Microstrip, Substrate Integrated Waveguide, K-Band