

## ABSTRACT

Radar (*Radio Detection and Ranging*) is a device that radiates electromagnetic waves to some targets and receives reflection waves from targets that are within its reach. In 3D radar, the results that are displayed are not only distance and direction information like 2D radar, but also height and dimension of the captured object by the radar. One type of antenna on the radar is *phased array*, which function is to scan electrically. *Phased Array* antenna is an antenna which consists of identical elements and the structure is arranged orderly and given a feeder cable with certain weight patterns.

This antenna was designed and simulated with a 4×4 *phased array mikrostrip antenna* with a rectangular-shape patch and realized with substrate material FR-4 ( $\epsilon_r = 4,4$  and  $h=1,57$  mm) and on the patch and groundplane using copper material ( $\epsilon_r = 1$  and  $h=0,035$  mm). This antenna works on *S-Band* frequency (2,975-3,025 GHz). In the simulation and optimization process on the antenna using software assistance with CST Microwave Studio 2016. In the fabrication process, the antenna uses a coaxial feeding method on each patch and uses a cable feeder to set phase difference on the antenna.

After the realization process of the antenna, from the measurement results obtained that VSWR is 1,121 at its center frequency of 3GHz and on the bandwidth limit with VSWR at 1,907 and 1,926, circular polarization, *Gain* 19.24 dBi with unidirectional radiation pattern. The antenna has 191×184,2×1,74 mm dimensions and is electrically able to shift phase up to 10° and 30° with phase differences of 25° and 80° using variation of supply cable. With this specification, the *phased array* antenna works well enough for the performance of a three-dimensional radar system.

**Key Word : Radar, Phased Array antenna, S-Band**