ABSTRACT

Radar (Radio Detection and Ranging) is an important system in a wide range of applications involving object detection, tracking and monitoring. In phased array radar applications, the resulting radiation pattern needs to be electronically altered, directing or focusing electromagnetic wave energy in a specific direction without having to physically move the antenna. To fulfill the capabilities of the radar, the beamwidth required must be wider in order to compensate for the scan-loss. scan-loss is a decrease in the effective gain of an antenna array system (especially a phased array antenna) when the beam direction is shifted from the normal direction (broadside) to a certain angle (off-axis).The greater the beamwidth width, the better the radiation efficiency of the radar antenna. In this case, an antenna using wide-beamwidth technology is needed to accommodate this.

In phased array radar applications, the antenna is an important thing where if the system uses wide-beamwidth technology then, the antenna used must also use wide-beamwidth technology. This research discusses the design of a dipole magnetic microstrip antenna sub-system with the addition of a parasitic strip so that the beamwidth value is wider. This design starts from determining the calculation of antenna dimensions, designing antenna parts and simulating through CST Studio Suite 2019 software and then measured with a Vector Network Analyzer (VNA) to determine antenna performance. In this study, the antenna works at a frequency of 3 GHz with a directional radiation pattern and linear polarization. In addition, in the simulation, the HPBW value obtained is 174,2˚ and S11 is -35,881775 dB. While in the measurement after fabrication, the HPBW value obtained is 210˚ and S11 is -12,69 dB.

***Keywords**: Phased Array Radar, dipole magnetic microstrip antenna, wide-beamwidth.*