ABSTRACT

Radar is an electromagnetic wave system that is used to detect, measure distances and map objects such as ships, aircraft and motor vehicles. The radar coverage area can be determined from bandwidth, transmit power, signal propagation, *gain*, beamwidth and antenna polarization. The radiation pattern of one antenna element is relatively wide and each element gives a low *gain*, this can only be fulfilled by increasing the size of the antenna by forming the element according to a certain geometrical configuration called an array.

This research discusses the microstrip array antenna at X-Band frequency for radar applications. Each additional number of antenna array elements, the smaller the sidelobe radiation pattern that occurs but the transmission excitation currents needed become more. So this research is focused to find out the effect of antenna array used in radar applications on the value of radiation patterns and beamwidth resulting from the addition of the array.

The results of the microstrip array antenna at the X-Band frequency have met the antenna specifications with VSWR of 1.39, 86 MHz bandwidth, 19.5° azimuth beamwidth and 19.8° elevation beamwidth and antenna *gain* of 14,623 dBi. These results have met the radar application antenna specifications with a narrow beamwidth and a large enough *gain*.

Keywords: Square *patch* array microstrip antenna, beamwidth, radar applications