

ABSTRACT

Communication is one of the most important requirements in modern society. Communication is needed to obtain information from others or provide information to others. The needs for information is increasing alongside with the current development, so communication device that can be used in every circumstances is strongly needed. One of the most reliable communication system for the development of global telecommunications system integration is a wireless communication system that use the propagation of electromagnetic waves (microwaves) as the transmission medium. As wireless systems become more popular, the development of antennas for these systems becomes hugely important. Therefore, antenna is considered as the backbone of wireless systems. Microstrip antenna is an antenna that is widely used in current time because it has some advantages and easy to integrate. However, this type of antenna has the disadvantage such as, narrow bandwidth and also the small gain, so the performance of this antenna is not quite effective when it is used in terrestrial communication - radio links.

This thesis designs a microstrip antenna array 4 which aims to improve the antenna gain. For comparison, two antennas that are the same but using two different materials, gold and copper, are built. These antennas are designed to work effectively at the center frequency 7450MHz with 700MHz bandwidth, unidirectional radiation pattern, linear polarization, and gain $\geq 10\text{dBi}$. The design of this antenna is using dielectric FR-4 substrate with $\epsilon_r = 4.3$ and thickness 1.6 mm. For the antenna simulation process, software CST Microwave Studio is used.

The results of this thesis will be a comparison of the performance effectiveness between the two microstrip antennas which are designed using two different materials with the parameters of return loss, VSWR, polarization, radiation pattern and gain. And the result of this research shows that the array method could increase the gain, as we can see the gain are 10,97 dB in copper and 10.96 dB in gold, then the actual result of VSWR value in this research is 1,435 on frequency 7.190GHz – 7.870GHz in copper antenna and 1.442 on frequency 7.475GHz – 7.980GHz in golden antenna, and the result of radiation pattern is unidirectional pattern with elliptical polarization. The difference between the simulation results and the actual measurement results is influenced by the accuracy and precision in the manufacturing process which can affect the performance of this antenna.

Keywords: Microstrip antenna, terrestrial, radio links, gain, wireless.