

ABSTRACT

Antenna is an important device in a wireless communication system that is used to send and receive electromagnetic waves. LoRa is a wireless communication system for IoT that has a communication range of more than 2 km and low power. In this study, the antenna designed uses a microstrip antenna because of its light weight, easily adjustable shape, and low cost to fabricate. The design of a rectangular microstrip antenna with FR4 Epoxy substrate type with a thickness of 1.6 mm and a dielectric constant of 4.3. Several measuring parameters that must be achieved are return loss ≤ 10 dB, VSWR ≤ 2 , gain 3-12 dBi and omnidirectional radiation polarization. The problem raised from this study is that the receiving antenna on LoRa devices only receives signals from certain directions. So that from these problems, this study developed a receiving LoRa-gateway antenna that can receive signals from all directions and has a high gain by designing a 2x2 (4 element) rectangular array microstrip antenna. Then do a comparison of each antenna parameter before and after using the 2x2 array method. Before using the 2x2 array method, the return loss is -8.690 dB, VSWR 2.162, gain -0.183 dBi, and unidirectional radiation pattern. While the results of the antenna parameters after using the 2x2 array method obtained a return loss of -57.730 dB, a VSWR of 1.002, a gain of 9.670 dBi, a bandwidth of 5 MHz, and an omnidirectional radiation pattern. From the results of the parameters that have been obtained, this proves that the use of the 2x2 array method in designing a rectangular microstrip antenna can achieve antenna parameter specifications, can increase the gain which is very optimal and can form an omnidirectional radiation pattern.

Keywords: *Rectangular Microstrip Antenna, LoRa-gateway, 2x2 Array Antenna, Omnidirectional Radiation Pattern.*