ABSTRACT

The development of technology in this digital era is increasing rapidly, we find that the wider community uses the internet as their daily life. This can be seen from the many technological devices around, of course, it is not surprising that there are several automatic tools that we encounter, such as automatic garden watering tools, flood detection devices, and automatic livestock feeding devices. With some types of tools, a device or remote communication tool is needed that can facilitate the use and monitoring of the tool, so the LoRa module is used. Currently LoRa uses a modulasion technique based on chirp spread spectrum technology. LoRa technology was developed due to the high demand for wireless network devices that have long-distance connectivity, are power efficient, and low cost. This LoRa-based network is considered a potential new technology to handle wireless communication for a variety of IoT applications.

Microstrip antennas have a light time and are also easy to fabricate with this microstrip antenna is very easy to place almost on all surfaces also this antenna is much smaller in size than other antennas. Thesonic used for miniaturization is the Rectangular Complementary Split-Ring Resonator (RCSRR) Agar able to meet LoRa specifications with a frequency of 922 Mhz

The results of the simulation in this study show that every 1 metamaterial will affect the movement of frequencies on the antenna. In the first design results, it received a return loss of -18.26 dB and a gain of 1,099 dBi, as well as reducing the patch dimensions by 20.8% and on the grounplane size resulted in a reduction in antenna dimensions by 9.75%. The second method reduces the dimensions of the *patch* by 20% and on the grounplane size it reduces the dimensions of the antenna by 1%, getting a return loss of -13 dB and a gain of 1,929 dBi in the measurement results.

Keywords: rectangular complementary split-ring resonator (RCSRR), microstrip antena, LoRa.