

ABSTRACT

Long Range Wide Area Network (LoRaWAN) is one of the IoT wireless technologies that is being widely discussed, the presence of LoRaWAN was reported to be able to fill the limitations of traditional technology. LoRaWAN has reliability in communication because it only requires very low energy with the ability to Long Range communicate and also has reliability in the use of batteries that can last up to 10 years.

In this research, the writer will design a LoRaWAN Gateway using Raspberry Pi 3 B + and RAK831 concentrator module as receiver for communication with the LoRa end device. The frequency works in the range of 920.1 MHz to 921.5 MHz using 8 available channels. This research will test the performance of Quality of Service from the LoRaWAN Gateway with a test scenario based on distance differences and use the spreading factor method and the second test will test the performance of the LoRaWAN Gateway while it is operating. The parameters used as a reference in testing to determine QoS on LoRaWAN connectivity include Throughput, Time on Air, Packet Delivery Ratio, or RSSI.

The results of the LoRaWAN Gateway test when receiving information from the LoRa end device up to the LoRa server will get the value of time on air when testing that the higher the SF value used, the time on air value will be higher. The highest value time on air when testing SF-12 at a distance of 0 meters with the number 3,724 seconds. The second test is the value of the PDR, the worst value when testing the SF-7 at a distance of 200 meters with the presentation of a value of 63.3% package arrived at the LoRa server. The third test is the value of throughput by calculating the average of each distance, then the best distance is at 0 meters with a large average of Throughput 416,9483333 bits/s. The best RSSI test at a distance of 0 meters SF-7 with an average RSSI value of -61.68 dBm. The final test is on the LoRaWAN Gateway performance that when the LoRaWAN Gateway is operating, the CPU usage level can reach 25 % and the highest RAM usage value reaches 533MB and the average RAM usage ranges from 375MB.

Keywords: Internet of Things (IoT), Gateway, Server LoRa, RSSI, SNR, delay, throughput, packetloss