

ABSTRACT

CubeSat is a type of cubic satellite that has a smaller size compared to a standard satellite. As of now, CubeSat is very popular to research because it attracts researchers due to its low production and deployment cost. One of the many functions of a CubeSat is to communicate in low data rate or M2M (Machine-to-Machine), CubeSat can communicate with IoT devices on Earth using M2M. Furthermore, CubeSat can communicate with IoT devices that is in remote areas such as islands, forests, and mountains.

In this Thesis a CubeSat receiver for IoT communication in remote areas will be developed and realized. A LoRa SX1276 module will be used for processing passband signals that is capture by the antenna. The tools for designing the schematic and the PCB will be using a software called Eagle Autodesk. The PCB that has been design will be printed and performance tested.

A CubeSat receiver using LoRa is not a new concept, there are already CubeSats deployed using this system such as Norby, VR3X-B-Petrie, and many more. One of the reasons to design a new receiver is that these CubeSat like Norby use the 433 MHz, 868 MHz, and 915 MHz frequencies, whereas in Indonesia the regulated frequency is in 920-923 MHz. The CubeSat that will be developed is hoped to help data communication for IoT devices in remote areas that is used as a monitoring devices and other types of IoT devices. After designing the device, the most optimal configuration for outer space communication is to use SF 12. The RSSI that is achieved at the distance 900 m is -83.06667 dBm. The value of $(C/N)_u$ of the assumed CubeSat that has been deployed is -4.8435 dB and for the received power the value is -118.3685 dBm.

Keywords: CubeSat, receiver, LoRa, SX1276, Machine-to-Machine (M2M), IoT.