ABSTRACT

This research aims to analyze connectivity in emergency communication systems for mountain climbers based on the Internet of Things (IoT) and LoRa technology. The main focus of the study is to determine the best performance of LoRa technology based on the Spreading Factor (SF) and Coding Rate (CR) parameters, which affect the measurements of Received Signal Strength Indicator (RSSI) and packet loss in mountainous areas.

The study also compares the connectivity performance of LoRa in Line of Sight (LOS) and Non-Line of Sight (NLOS) conditions for emergency communication devices. The equipment used in this research is the LoRa Breakout V2 connected to an ESP32 for point-to-point communication. The test results indicate that in LOS conditions, the communication range reaches between 100 meters to 1 kilometer, while in NLOS conditions, the communication range is between 100 meters to 500 meters.

The implementation of the connectivity tool using the LoRa Breakout V2 module with ESP32 was successfully carried out, achieving a range of 100 meters to 1 km in both LOS and NLOS areas. In LOS, the best configuration is SF 7 and CR 4/5 with an average RSSI of -103 dBm, while in NLOS, the configuration of SF 11 and CR 4/7 yields an RSSI of -101 dBm. Packet loss testing shows varying results, with the best configuration in LOS being SF 7 and CR 4/5, and in NLOS being SF 10 and CR 4/6. Obstacles such as trees, vehicles, and weather affect signal transmission, but overall, the tool demonstrates adequate performance in various conditions.

Keywords: *Connectivity, LoRa, Received Signal Strength Indicator (RSSI), Packet Loss.*