ABSTRACT

Floating Net Cages (KJA) in lakes are at risk of causing water pollution that can disrupt fish farming activities. Therefore, an early monitoring system is needed that can measure water quality such as temperature, pH, and dissolved oxygen (DO) in real-time. This system utilizes the LoRa RFM95W module to transmit environmental data wirelessly from sensors installed on the cages, which continuously integrate water quality parameters such as temperature, pH, and dissolved oxygen (DO) in real-time. The data obtained is then processed to combine changes in water toxicity in real-time, allowing early detection of potential threats to the ecosystem. Tests were conducted at distances of 50m, 180m, 300m, 330m, and 440m. The results showed that the system worked well up to a distance of 300m with RSSI values between -85 dBm and -120 dBm and LOS data SNR of more than 2 dB. However, at distances of 330m and 440m, the signal decreased and the delay increased, which caused NLOS. At 330m depth, the delay increased to 11.3 seconds and there was 15% packet loss. At 440m depth, only 6 out of 20 trials were successful, with a delay of 15.2 seconds, with 70% packet loss. The prototype system successfully transmitted water quality data to a web-based monitoring center. Data from the sensors were sent via the LoRa network to a central server for further monitoring.

Keywords: *Floating Net Cages (KJA), LoRa RFM95W, RSSI, Delay, SNR*