

ABSTRACT

The monitoring instrument for Citarum river water quality requires a real-time data transmission system. It is important to pay attention to the compatibility of the beam direction between BTS antenna and monitoring device antenna, especially antennas with directional beam pattern. It is underlined that the deviation of the beam direction between TX and RX antennas can lead to suboptimal signal reception power levels and affect real-time data transmission performance.

To overcome the deviation of beam direction between BTS antenna and monitoring device antenna, in the receiving antenna an automatic antenna alignment system is designed. It can be done by determining the coordinates of object location and the altitude of tracking using sensors of GPS U-blox NEO-6M and BMP 180. After determining the object coordinates, the next process is to forward the latitude, longitude, and altitude to the microcontroller to be processed. Then, the control station instructs moving system to find the polarization angle based on the available data.

The results obtained from testing done on the control system and direction of BTS antenna showed that data in from longitude, latitude and altitude have been successfully converted into azimuth and distance outputs. The antenna alignment control block successfully tracked every block of Mobile Monitoring Device change in distance and coordinates with an angle error of 13.8° or 7.6%. In addition, the maximum communication distance between Mobile Monitoring Device and the antenna alignment control was 70 meters.

Keyword : Citarum, Alignment, Monitoring, Real-time, BTS, Antenna, Tracking