Characterization of Indoor and Outdoor Propagation in Wireless Sensor Networks

Name: Triuli Novianti
Nrp: 2209 203 006
Supervisor: Dr. Ir. Wirawan, DEA

Abstract

A sensor network is an infrastructure that has the ability of sensing (detection), calculation and communication elements that gives administrators the ability to measure, observe, and react to events (incidence) and phenomena in a particular environment.

In this study has been designed and implemented the propagation characterization measurements using the mote micaz on wireless sensor networks by comparing the value of measuring RSSI (Received Signal Strength Indication) on the indoor and outdoor conditions.

Based on the results of measurements show that the value of RSSI on Indoor better than in Outdoor caused by multipath and fading effects which are prevalent in Indoor. At the distance of node 0 - 7.5 meters from the sink, the value of RSSI in indoor ranges from -60.2309 to -95.0000 dBm dBm dBm while at Outdoor -63.6500 to -94.7619 dBm. The farther the distance from the sink node then the RSSI value will also decrease. The smaller the power is used then the RSSI value will also decrease. By leveraging the power supply from 2 AA batteries with average current capacity of 30mA, the node with a period of 100 ms messaging capable menstransmisikan message until 42 hours 10 minutes and decreased about 2 dBm RSSI, for nodes with a period of 500 ms messaging capable transmits a message up to 42 hours 40 minutes and decreased approximately 1 dBm RSSI, the nodes with the period of 1000 ms messaging capable of transmitting messages of up to 42 hours 50 minutes and decreased approximately 0.5 dBm RSSI. From the measurement data obtained in this study generated mathematical modeling for outdoor propagation of RSSI (dBm) = - 86.8 + 0153 h (cm) + 8.62 P (mW) - 1.87 d (m) and mathematical modeling for indoor propagation of RSSI (dBm) = - 89.0 + 0139 h (cm) + 2.17 P (mW) - 1:22 d (m).

Keywords: Propagation, wireless sensor networks, RSSI, distance, transmit power