## ABSTRACT

The use of vehicles are increasing every year and every day. That are caused by the number of motor vehicles, the traffic congestion is increasing, moreover the widening of road is not enforced. Using traffic light at the crossroad greatly assists to a good rate of traffic flow. In this final project, prototype of smart traffic light will be built by using Arduino Mega as traffic light system and ultrasonic sensor observe the rate of traffic jam and will affect to the traffic light. The prototype is not counting the width of the road, the width of out/in a vehicle flow to/from a track and the effective width of the road. In addition, we can monitor the prototype from personal computer with help of XBee module as a medium connection. But excluding the control function for prototype's work.

Based on system examination, maximum range of XBee S2 is 80 meters. Smallest delay of XBee S2 is 0.125188 second on 60 meters and the bigest delay is 0.187525 second on 80 meters, smallest throughput of XBee S2 is 2.2022425 bytes/s on 80 meter and the biggest is 14.21658075 bytes/s on 60 meters. It can be concluded that the value of delay and throughput affect each other.

For the quality of sever network examination, were used 2 network. Indosat Ooredoo 4G and 3G. The result is Indosat Ooredoo 4G better than 3G.

Based on the whole system examination by time, this system has 96.63044% value of availability and 96.51295% value of realibility. And 96.48% of reliability and 96.6% of availability by data examination.



Key word: traffic light, Arduino Mega, ultrasonic sensor, traffic jam, XBee module, delay, throughput, availability, reliability.