

## Abstract

LPG rampant cases of explosion is a serious problem in Indonesia, especially at the beginning of the conversion of kerosene to LPG gas past 2007. This happens because people are not aware of the danger of gas leaks due to lack of knowledge and information about how to avoid explosion due to LPG gas leakage. In addition, LPG is colorless so that people are often unaware of the existence of a gas leak. Therefore, researchers conducted a study with the aim of developing an leakage of LPG gas detection system.

In this study, an LPG gas leakage detection system with a protocol based on IEEE 802.15.4 WSN that integrates seamlessly with smartphones is developed. The use of IEEE 802.15.4 protocol is based on the characteristics of low cost, low power, and low data rate required in WSN. While the use of a smartphone with internet access allows the user to be aware of any leakage of LPG, wherever and whenever. In the process of the development of LPG leakage detection systems was conducted several stages, which are: developing systems, sensor threshold test, test the threshold accuracy sensors, RSSI test, test the system response time, and the IEEE 802.15.4 performance analysis is built.

Based on test results, obtained by some analysis of the system is built. The system produces an accuracy of 100%, with a threshold voltage of 0.5 Volts output sensors at 24°C environment temperature. The system works reliably with a range of -64 to -77 dBm RSSI in WSN. Average response time of the system is very minimal, which is 251.86 ms, consisting of components of WSN 10.76 ms delay, and delay from servers to smartphones at 241.10 ms. The trade off of the low-power IEEE 802.15.4 low data rate does not adversely affect the system, with respected contribution 0.042% of the total delay.

**Keywords:** LPG, detection, Wireless Sensor Network, IEEE 802.15.4, *smartphone*