

Smart plug prototype for monitoring electrical appliances in home energy management system

ABSTRACT

Recently, the technology of Home Energy Management System (HEMS) has expanded for the purpose of reducing energy consumption. This paper presents the development of a smart plug with a wireless Zigbee sensor for measuring power consumption of electrical appliances in the HEMS. Experiments were carried out to evaluate the power consumption of a wireless sensor node in a smart plug using only Zigbee as a microcontroller. Experimental results showed that the smart plug using Zigbee is capable of processing and analyzing the analogue sensor signal with lower power consumption. In addition, the data obtained from the wireless sensor is more accurate and smoother as compared with the data obtained from the oscilloscope. The proposed smart plug has the characteristics of simple design, low cost, low power consumption and easy to control electrical home appliances by switching on/off from the HEMS controller.

Keyword: Energy efficiency; Home appliance; Home energy management; Power consumption; Smart plug; Zigbee