Abstract

The IEEE 802.15.4 is a wireless standard introduced for low power, low cost wireless communication with moderate data rates. In the next few years, it is expected that Low Rate Wireless Personal Area Networks (LR-WPAN) will be used in a wide variety of embedded applications, including home automation, industrial sensing and control, environmental
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monitoring and sensing. In these applications, numerous embedded devices running on batteries are distributed in an area communicating via wireless radios. This work presents a method which can be used for comparing current consumption of wireless data transfer embedded systems. This paper implements a small subset of the IEEE 802.15.4 protocol to achieve a point to point communication. The implemented protocol uses 802.15.4 MAC compliant data and acknowledgment packets. Current consumption is measured while doing one data packet transmission. Measurements are compared with existing work. IEEE 802.15.4 protocol implementation is done using Verilog language. Code implementation is done in such a manner so that it can be ported to any platform with minimal changes. It can also be modified to suit any special experimental setup requirements.

Reference

1. Institute of Electrical and Electronic Engineers, Inc., "IEEE Std. 802.15.4-2003, IEEE Standard for Information Technology – Telecommunications and Information Exchange between Systems – Local and Metropolitan Area Networks – specific Requirements – Part 15.4 : Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low Rate Wireless Personal Area Networks (LR-WPAN)"
11. J. Misic and V. B. Misic, Duty Cycle Management in Sensor Networks Based on 802.15.4 Beacon Enabled MAC, Ad Hoc and Sensor Wireless Networks Journal, pp. 207–233,
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