

## Enhanced experimental investigation of threshold determination for efficient channel detection in 2.4 GHz WLAN cognitive radio networks

*Mohammad Nayeem Morshed<sup>1</sup>, Sabira Khatun<sup>2</sup>, Latifah Munirah Kamarudin<sup>3</sup>, Syed Alwee Aljunid<sup>1</sup>, R. Badlishah Ahmad<sup>1</sup>, Ammar Zakaria<sup>3</sup>, Md. Moslemuddin Fakir<sup>4</sup>*

<sup>1</sup> Embedded, Networks and Advanced Computing Research Cluster (ENAC), School of Computer and Communication Engineering, Universiti Malaysia, Perlis, Malaysia

<sup>2</sup> Faculty of Electrical and Electronics engineering, Universiti Malaysia Pahang, Malaysia

<sup>3</sup> Centre of Excellence for Advanced Sensor Technology (CEASTech), Universiti Malaysia, Perlis, Malaysia

<sup>4</sup> Centre of Excellence for Advanced Research in Fluid Flow, Universtiti Malaysia Pahang, Malaysia

### ABSTRACT

This paper presents an experimental investigation of threshold determination for efficient channel detection in wireless LAN (WLAN) based cognitive radio (CR) networks. The spectrum saturation problem is a critical issue in wireless communication systems worldwide due to on growing user demands day by day with many new applications to the limited frequency spectrum. Hence, present demand is an efficient and intelligent spectrum management and allocation system. In this paper, we proposed an adaptive threshold determination technique based on free space path loss (FSPL) model to detect the presence or absence of PUs. The model is designed especially for Android based smartphones and tablets. The smartphones act as secondary users (SUs) and existing 2.4 GHz WLAN channels as PUs. The network is prepared in a usual noisy lab/outdoor environment and tested for the robustness of the proposed model. Results show the desired range of usable threshold and the channel detection performance depends on the noise floor level of the surrounding environment.

### KEYWORDS

Cognitive Radio; Noise floor; Received Signal Strength (RSS); Signal to Noise Ratio (SNR); Threshold

**ACKNOWLEDGEMENT**

This paper is an extended version of “Adaptive Threshold Determination for Efficient Channel Sensing in Cognitive Radio Network using Mobile Sensors”, which was presented in 11th Asian Conference on Chemical Sensors, Penang, Malaysia on 16th to 18th November 2015 and published in the Conference Proceedings of American Institute of Physics (AIP), Vol. 1808, No. 1, 13th March 2017. This work is supported by Ministry of Higher Education, Malaysia, Grant LRGS/ TD/ 2011/ UKM/ ICT/ 02/ 05/ 901200005