

Investigation of mobility supports for smart-secured-seamless (SSS) public transportation in Kuala-Lumpur based on TV white space

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3

Author(s)

Anabi Hilary Kelechi ; [Rosdiadee Nordin](#) ; [Mahamod Ismail](#)

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Abstract: The future smart public transport infrastructure is emerging as a complex web, where fine-grained monitoring of all transportation systems via wireless communication will be made possible. Inadvertently, resulting in Smart-Secured-Seamless (SSS) public transportation network infrastructure. Kuala-Lumpur (KL), the capital city of Malaysia is endowed with a network of well-developed and articulated public transportation system. However, there is no hotspot while in or around the KL public transport hubs to facilitate Smart-Secured-Seamless connectivity either for the management or for the commuters. Leading to relying on commercial Internet providers for internet access. In order to solve this problem, we are proposing using Television White Space (TVWS) technology to provide connectivity to all bus/train public transport hubs in Kuala-Lumpur and environs. Based on our framework, we draw conclusion regarding the feasibility and commercial importance of SSS public transport framework, and identify some of the remaining technical challenges. We presented simulation based on Clarke-Gans channel model to study Doppler shift effects. Results, indicate that there is no remarkable performance difference between 802.22 TVWS wireless standard and 802.16e WiMAX, which is the closest wireless standard to 802.22. Hence, offering TVWS as the preferred and alternative wireless standard for intelligent transport system in Malaysia. View less

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 **Contents**

I. Introduction

The recent spectrum measurement conducted in Kuala-Lumpur is in conformity with the other global results; that spectrum in the upper VHF and UHF bands allocated for TV broadcast are currently underutilized as depicted in Fig. 1 [1]. The temporary vacant TV channels are referred as Television White Space (TVWS). TVWS technology is the first real world deployment of Cognitive Radio (CR) technology. Some wireless standards have indicated an interest to offer wireless access to the consumer markets using TVWS and subsequently, have defined the PHY and MAC layers parameters for the ensuing standards. These wireless standards include; IEEE 802.22 - Wireless Regional Area Networks (WRANs), 802.11af Wireless Local Area Networks (WLANs), and IEEE 802.15.4 - the Smart Utility Networks (SUN) [2]. TVWS technology is spurred by the underutilization of TV spectrum in most rural areas as well as the digital switchover. By 2015, Malaysia will be

expected to join the league of countries that have moved from analogue TV transmission to digital television transmission [3]. Fig. 1

Spectrum utilization measurement for KL [1]

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