UNIVERSITI TEKNOLOGI MARA

WLAN IEEE 802.11B PERFORMANCE MEASUREMENT AND HANDOVER MECHANISM

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Thesis submitted in fulfillment of requirements for the degree of
Master In Science

Faculty of Electrical Engineering

Mac 2007

Candidate' Declaration

I declare that the work in this thesis was carried out accordance with the regulations of Universiti Teknologi MARA. It is original and is the result my own work, unless otherwise indicated or acknowledged as reference work..This thesis has not been submitted to any other academic institution or non-academic institution for other degree or qualification.

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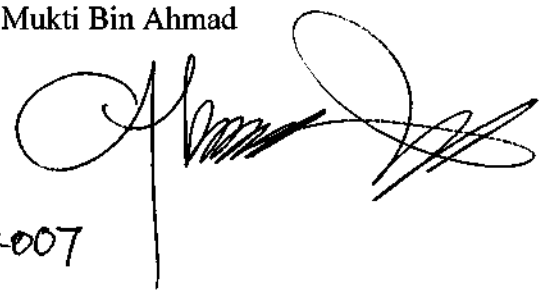
Candidate's Signature: 

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ABSTRACT

The project is focused on measurement analyze of the IEEE 802.11b WLAN performance. A survey of the parameters that affect its performance and an experimental investigation of this impact have been performed as a first step measurements are conducted using the distance method between mobile and Access Point to measure the signal strength. The result of this signal strength is used in the mathematical calculation in order to develop the mathematical model for indoor signal strength. The thesis will go through a rigorous mathematical analysis. First we use an analytical model to verify our measurements results. In the new era of wireless communication, Wireless Local Area Network (WLAN) has emerged as one of the key players in the wireless communication family. There are many obstacles when deploying WLAN, which demands seamless indoor handover. The access point should have the appropriate coverage suitable to the propagation characteristic of the building. The wireless network planner needs a comprehensive tool to implement efficient WLAN network. In this thesis, we have developed a mathematical path loss model using OPNET 10 simulation design tool. By using this simulation program, WLAN planner will be able to setup the access point for the optimum propagation coverage. WLAN products may exhibit the limitation in coverage when performing in crowded office or building due to the propagation loss, transmits power, receive power, fading and other basic obstacles. If user needs a higher data rate for the WLAN, the burden to create seamless coverage becomes crucial. The Network designers need a comprehensive method to locate the Access Point (AP) at the correct angle of the building. If more APs have been deployed, it may increase the cost unnecessarily, however with less APs may compromise the coverage area. In other words the network planner needs to have a first hand experience with the Radio Frequency (RF) characteristic of the facilities. This thesis attempts to provide an efficient method to measure the propagation characteristic for indoor environment using the OPNET 10 simulation software. For the indoor environment, there are two types of elements; namely static and dynamic elements. The static elements such as natural and man made materials. The dynamic element comprises of moving objects. Both terrain contour and human made structures

strongly affect the received mobile signal strength. In an indoor environment, additional parameters must be considered, such as reflection, wall penetration, the channel changing rate and etc. The complexity of these parameters make nearly impossible to derive a generic model to accurately describe indoor propagation. The capability of OPNET 10 to simulate this indoor environment scenario close to the real situation motivates us to employ this software to further investigate on RF indoor characteristics. Wireless LAN OPNET 10 Module permits mobile node to move from one place to another using trajectory attribute. We conducted the simulations using this method and found that the mobile node stunned where there is no throughput occurs when mobile node switch from one access point to another access point. The propagation model employed in the Wireless LAN OPNET Standard is more on the free space or Line of Sight (LOS) model rather than for an indoor environment.

Acknowledgements

First of all, I would like to thank my family Eton, Ati, Alid and Ayum for always being there for me and supporting me. Without their support, I would never have made it this far.

Many thanks to my friendly and kindly Supervisor Prof Madya Dr Mohd Dani Bin Baba at UiTM Shah Alam for giving me the opportunity to do my thesis. I would also like to thank him for discussing the problems of my thesis and reviewing my report. I would like to thank my co-supervisor Ir Mohamad Ibrahim for his constructive comments and for proof-reading my thesis.

Many thanks to Zuraida and Nurul for reading and giving comments on my thesis, for the interesting discussions we had, and for taking their time and answering all my questions. Their help were appreciated.

I would also like to thank again to my supervisor for his initiative to purchase the expensive OPNET 10 simulation program. This program is used extensively and contributes to our research success.