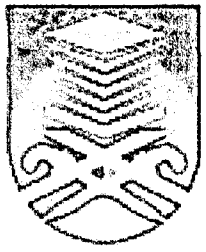
MEASURING AND ANALYZING THE PATH LOSS IN RADIO WAVE LINK USED IN KERETAPI TANAH MELAYU BERHAD (KTMB)

This thesis is presented in partial fulfillment for the award of the

Bachelor of Electrical Engineering (Honours) of

Universiti Teknologi MARA



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ACKNOWLEDGEMENT

All praise be to mighty Allah S.W.T, the merciful and beneficent for the strength and blessing me throughout the entire research and completion of this thesis. Peace is upon our prophet Muhammad S.A.W whose has given light to humankind.

First and foremost, I would like to thank a lot to my supervisor, Dr. Deepak Kumar for his guidance, encouragement and comments and support throughout this project. Without his, this project would not be able to achieve until of submitting this thesis. I also would like to thanks to all lecturer and staff of Faculty of Electrical Engineering, who given the co-operation, knowledge and advise throughout the progress of this project.

My sincere thanks to all the KTMB Communication and Signaling staff, especially to Mr. Rani and Mr. Jefflysham for their assistance and full co-operation towards the success of this thesis. Not to forget my advisor Mr. Suhail for the information on Radio Communication in KTMB.

Finally, I acknowledge with honour my parent
, my brother and friends for their immerse support and advice. Hope the experience and knowledge during the research that I gain will be useful in the future.

ABSTRACT

This project thesis presents the measuring and analyzing the path loss in radio wavelink. This system will be based upon the Keretapi Tanah Melayu Berhad (KTMB) Train Radio System. Basically, KTMB uses both analogue and digital system to transmit the signal.

The main objective of this project is to study the effectiveness of the surrounding object relating to the signal received at the train antenna in open spaces and places with high-rises building that closer to the train railway, and also to test whether the of path loss model that are used in this project is suitable to be used in Keretapi Tanah Melayu Berhad (KTMB)

The whole project actually discussed a focusing parameter of the path loss model such as types of area, population and also surrounding objects. In this paper, literature review is provided and several path loss models such as Free Space Path Loss, Okumura-Hata Path Loss and British Urban Formula are implemented for KTMB Train Radio System. These path loss models are very important in the design of radio wave communication systems.

For data measurement, spectrum analyzer is used to measure the received signal value from the way side base station. In addition the reading of the received signal is taken every one kilometer while train is moving from one station to the next station.

For software development, program is designed especially for planning engineer to do a prediction of site planning based on Okumura - Hata path loss model. Engineer has to input some data in order to system to make some prediction about the site. This program can be use when engineer cannot go out to the required site maybe because of raining, storm or if the engineer is not feeling well to go to the site and he just can do a prediction for planning purposes to view predictly at office or even at home.

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CHAPTER 1
INTRODUCTION

1.1 General

Propagation model aid in the development of wireless communication networks. A wireless network can be characterized by its basic components. A typical network consists of a transmitter, receiver and the surrounding environment. Each variable in the network will affect the propagation model that can be used or developed for the given network. A model can be used for certain frequency range to predict with a higher degree of accuracy the nature of surrounding atmosphere [1].

There are several models that can extrapolate in the range of Ultra High Frequency (UHF), but I felt that the Hata-Okumura and British Urban formula was the best model that I can use in my project.

Propagation mechanisms such as reflection, scattering and diffraction always need to be accounted for. This phenomenon is more profound when there is no existing line of sight between the transmitting and receiving antennas. Therefore a typical mobile channel is characterized by multipath reception.

Predictions of signal strength and propagation coverage area are vital aspect in the design of wireless communication systems. There are basically three approaches used in obtaining received radio signal strength. The first, the empirical model approach is by far the simplest, however its only shortfall is that does not adequately consider local terrain features, which determines characteristic of wave propagation. The second, the measured data approach is very tedious and time consuming, especially in large cities and vast rural area. The last approach happens to be a combination of the previously mentioned