UNIVERSITI TEKNOLOGI MARA

SOFTWARE DEVELOPMENT FOR KU-BAND SIGNAL AVAILABILITY DUE TO RAIN ATTENUATION

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ABSTRACT

Ku-Band signal is often used for satellite communication mainly for direct to home (DTH) broadcasting. One of the major issued using this band is that the signal will be affected by raindrops. Raindrops absorb and scatter the signal that operates more than 10 G Hz. However, there are studies were done to predict and measure the rainfall rate and rain attenuation. The rain attenuation in Ku-Band range and the rain rate were measured at the satellite receiving dish, pointed towards the orbital slot 91.5 E over a one year period (2013). The cumulative distribution of rain rate obtained as well as a cumulative distribution of rain attenuation obtained are presented and compared with the rain prediction models. The aim is to get the best model to be used for the purposed of software development. It was found out that the DAH predictions model is fairly equitable when compared with direct satellite dish receiving measurements in Malaysia. The model provided a suitable baseline in developed a user interface software for weather forecast prediction. The method of designing the software were using the QtSDK. The metadata of the software is gathered from MMD and NOAA.

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CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

Ku-Band difficulties- When frequencies higher than 10 GHz are transmitted and received in a heavy rain fall area, a noticeable degradation occurs, due to the problems caused by and proportional to the amount of rain fall (commonly known as known as "rain fade"). This problem can be combated, however, by deploying an appropriate link budget strategy when designing the satellite network and allocating a higher power consumption to overcome rain fade loss. In terms of end-viewer TV reception, it takes heavy rainfalls in excess of 100 mm per hour to have a noticeable effect. Also, the Ku-band satellites typically require considerably more power to transmit than the C band satellites. However, Ku-band satellite dishes are smaller varying in size from 60 to 120 cm in diameter (the size is based on 21st schedule of the Class Assignment 2015)[1] but, larger dish will causes in increase for the received signal and better quality of the system.

Advantages of Ku-band compared with C-band, this band is not similarly restricted in power to avoid interference with terrestrial microwave systems, and the power of its uplinks and downlinks can be increased. This higher power also translates into smaller receiving dishes and points out a generalization between a satellite's