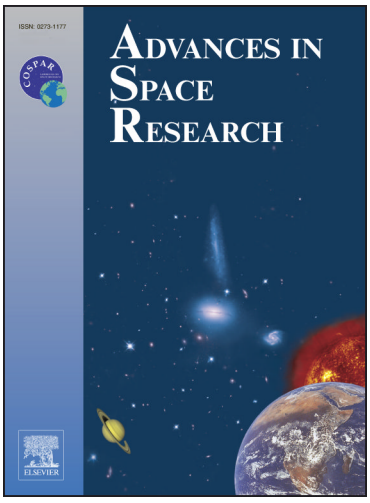

Rain Fade Duration Prediction Models For A High Elevation Angle Based On Measured Data In Tropical Climate

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Abstract
Rain fade duration is one of the essential components for engineers to design and plan satellite communication systems at high frequency bands. In this paper, rain fade duration was obtained for twelve consecutive months at Ku-band with 77.4° elevation angle from MEASAT3 in Kuala Lumpur, Malaysia. Empirically, the fade duration was found discrepant to the results predicted by models. Therefore, a modification of fade duration model is proposed based on measured data for this tropical climate and high elevation angle.

Keywords
Satellites, rain attenuation, fade duration, fade mitigation techniques, predictive models, tropical climate.

1. INTRODUCTION

Attenuation due to rain is the major cause that degrades signal on satellite communication above 10 GHz (*Dao et al., 2012*). As such, a reliable system design is necessary to ensure optimum services offered via satellite communication. Therefore, a service provider must deploy suitable fade countermeasure techniques to achieve a reliable system during severe periods, particularly due to rain (*Dao et al., 2012*). Several mitigation techniques employ first-order and second-order statistics of rain attenuation for the design and implementation of satellite and wireless communication *(Cheffena and Amaya, 2008).* The statistics of rain attenuation can provide valuable insights to the fade mitigation techniques (FMT) during rain events.

Fade duration is important to estimate performance, availability and Quality of Service (QoS) for a