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4 February 2015, Article number 7031640, Pages 217-219

5th International Conference on Computer and Communication Engineering, ICCCE 2014; Sunway Putra HotelKuala Lumpur; Malaysia; 23 September 2014 through 24 September 2014; Category numberE5413; Code 110844

Rain attenuation prediction for higher frequencies in microwave communication using frequency scaling technique (Conference Paper)

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Abstract

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At a frequency range above 5 GHz, rainfall becomes a serious and major source of attenuation for microwave communication. Atmospheric effects play a major role in designing terrestrial or satellite-to-earth links operating at frequencies above 5 GHz. Raindrops absorb and scatter radio waves, leading to signal attenuation and reduction of the systems availability and reliability. Rain attenuation is very critical in tropical region compare to temperate region due to the geographical location. There are many techniques to predict the rain attenuation. In this research paper frequency scaling technique has been considered and discussed. In this research, three pair of frequencies, 5.8 GHz, 15 GHz and 26 GHz was compared and analyzed. All the measured data of rain attenuation for the above operating frequencies are presented. The equation of power n value for all percentage of time at certain operating frequency was identified. The results show that the proposed new power $n = 1.57$ closely agreed with the predicted and measured rain attenuation for all the three frequency range (5.8, 15 and 26 GHz). This data will be very useful for any researcher and mobile operators in this region for designing their microwave communication links. © 2014 IEEE.

Author keywords

Frequency scaling Rain attenuation Received signal strength Terrestrial link

Indexed keywords

Engineering controlled terms: Electromagnetic wave attenuation Satellite links Systems engineering

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ISBN: 978-147997635-5
Source Type: Conference Proceeding
Original language: English

DOI: 10.1109/ICCCE.2014.69
Document Type: Conference Paper
Volume Editors: Gunawan T.S.
Sponsors: Felda Wellness Corporation, Malaysia Convention and Exhibition Bureau (MyCEB), Malaysian Industry-Government Group for High Technology, University Putra Malaysia, Yayasan Kesejahteraan Bandar
Publisher: Institute of Electrical and Electronics Engineers Inc.

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