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Estimation of satellite link's fade margin using non-meteorological technique and worst month analysis
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Abstract

Satellite technology is shifting to higher frequencies such as Q or V-band to cater to greater bandwidth and higher data rates applications such as videoconferencing, internet of things (IoT) and telemedicine. The main challenge in deploying high-frequency bands in heavy precipitation areas is severe rain attenuation. In this paper, a frequency scaling technique was developed to estimate the fade margin at a higher frequency. The worst month analysis was also conducted since the analysis is also important in determining dependable fade margin. The result was evaluated and analyzed using root mean square error (RMSE) and percentage error. The proposed model offers the smallest RMSE and lowest percentage error when compared to all existing prediction models. A dependable fade margin acquired from high-accuracy rain attenuation estimation is very important. This is to apply the best mitigation technique in overcoming rain attenuation in the satellite-Earth link so that, the best system performance can be delivered. © 2023 Institute of Advanced Engineering and Science. All rights reserved.

Author Keywords

Frequency scaling; Rain attenuation; Satellite-earth link; Tropical region; Worst month

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