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Rain fade slope model for terrestrial microwave links (Article)

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Abstract

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The dynamic characteristic of rain fade slope is one important factor in determining the availability of a communication system, and it is very useful in the design of fade countermeasures. In the literature, many models were proposed for rain fade slope for earth-to-satellite links. However, there are no models available for rain fade point to point terrestrial microwave links. This paper proposes a new model for the estimation of rain fade slope statistics for terrestrial microwave links in tropical regions. First, the ITU-R model for rain fade slope for earth-to-satellite link was compared with the corresponding statistics obtained from rain attenuation data measured from three terrestrial links in Malaysia. It is found that the expression of its distribution and its standard deviation should be modified. This leads to the derivation of the proposed rain fade slope model based on the statistics of one link. Then, it is tested using the remaining data and its results were very close to the measured statistics for all attenuation levels higher than 1 dB. Moreover, the model was validated using the chi-square goodness-of-fit test. © 2020 Cambridge University Press and the European Microwave Association.

SciVal Topic Prominence

Topic: Rain | Electromagnetic wave attenuation | ITU-R model

Prominence percentile: 89.600

Author keywords

Rain attenuation | rain fade | rain fade dynamics | rain fade slope

Indexed keywords

Engineering controlled terms: Electromagnetic wave attenuation | Frequency bands | Microwave links | Satellite links

Engineering uncontrolled terms: Attenuation levels | Chi-square goodness-of-fit test | Dynamic characteristics | Earth to satellite links | Rain attenuation | Rain fade slope | Rain fades | Terrestrial links

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