

Investigation and Evaluation of Scintillation Prediction Models at Ota

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Abstract

Understanding of scintillation is a significant occurrence in the design of communication satellite system. In this research, two years (January 2015-December 2016) tropospheric scintillation records dig out from Astra 2E/2F/2G at 28.2 o E Satellite path link observation at (Lat: 6.7 o N, Long: 3.23 o E) at Ota, southwest Nigeria, at 12.245 GHz and an elevation angle 59.9o . The result and analysis were likened with some reliable tropospheric scintillation estimate models in

order to acquire best model for Ota environment. The result findings revealed that the Karasawa model provides the minimum percentage error for scintillation fades and enhancements of approximately 0.57 % at 0.1 unavailability of time and 6.93 % at 0.01 unavailability of time respectively. Hence, Karasawa model is the most found suitable for the estimation of transmission loss in this region. Also, scintillation intensity is noticed to be high throughout the non-rainy season likened to rainy season months. Conversely, the model must be verified more by means of higher frequency band like Ka and V bands to affirm the accurateness of the model. The statistics provided in this work will assistance in fade margin for performance and antenna sizing required for communication satellite link.

Keywords: Attenuation prediction, electromagnetic wave, Ku band, Satellite communication
Tropospheric scintillation

Suggested Citation

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