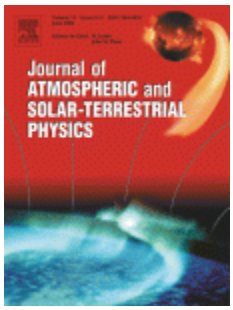
Journal of Atmospheric and Solar-Terrestrial Physics

Volume 71, Issues 8–9, June 2009, Pages 830–840



Impairment of radio wave signal by rainfall on fixed satellite service on earth–space path at 37 stations in Nigeria

- T.V. Omotosho*,
- C.O. Oluwafemi

Show more

doi:10.1016/j.jastp.2009.03.016

Abstract

This study investigates the effect of rainfall on horizontally polarized radio waves for fixed satellite service at Ku, Ka and V bands for links to the recently launched Nigeria Communication Satellite one (NigComSat-1), for annual time availabilities of 99–99.99% in an average year for 37 stations in Nigeria. The results obtained at Ku-band downlink shows that 99.99% availability is possible in all the 37-stations in Nigeria. At Ka-band downlink the results also show that only 99.9% availability is practicable in all the 37 stations in Nigeria. At V-band downlink, 99.99% availability is also not possible in all the 37 stations in Nigeria. An availability level of 99.9% is only practicable in the North–West (NW) and North–East (NE) regions, where the attenuation is between 14 and 17.9 dB. Total fade out of signals during rainfall are probable in the South–South (SS), South–East (SE), South–West (SW) and Middle–Belt (MB) regions at 99.9% availability.

Keywords

- TRMM and AIRS satellite data;
- Ku, Ka and V bands;
- Slant-path rain attenuation;
- Fixed satellite services

Corresponding author. +23408050401655 (Mobile).