Abstracts

Factors Affecting Earth-Satellite Millimeter Wavelength Communications

A.W. Straiton and C.W. Tolbert. "Factors Affecting Earth-Satellite Millimeter Wavelength Communications." 1963 Transactions on Microwave Theory and Techniques 11.5 (Sep. 1963 [T-MTT]): 296-301.

The use of millimeter wavelengths for earth-satellite transmissions is suggested by the large bandwidths and high gain with small antennas possible at these wavelengths. The factors discussed are 1) propagation path loss, 2) refraction, and 3) antenna temperature. The attenuation through the entire atmosphere over the millimeter spectrum is given as a function of elevation angle of the antenna beam. The attenuation and scattering loss due to water and ice particles varies over a wide range of values depending on the number of particles and their sizes. Refraction by the atmosphere is less than one milliradian for elevation angles for which the absorption is low enough to make the transmission practical. Fluctuations due to refraction may, however, be quite severe. Contribution to antenna temperatures from the atmosphere, the earth, the sun and moon are given for earth-based antennas and antennas in space.

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