Land-Mobile Satellite Channel Modeling

Chun Loo

Communications Research Centre Canada

3701 Carling Avenue, P.O. Box 11490, Station H

Ottawa, Ontario, Canada K2H 8S2

July 23, 1999

Abstract

During the early 1980's, there were many investigators interested in developing channel models for land-mobile satellite communications. Interest in refining channel models are still in evident even today(Sept., 1999). This paper, tutorial in nature, will review statistical models developed by various investigators over the years for land mobile satellite communications. A critique on each of the models will be given. However, the emphasis of the paper will be on a shadowed Rician model developed by the author for both L Band and Ka Band land-mobile satellite channels. This channel model is intuitively appealing and it was developed under the assumption that the line-of-sight(LOS) component under foliage attenuation(shadowing) has a lognormal distribution and that the multipath effect has a Rayleigh distribution. Additionally, these two random processes may be correlated. Results derived from the model are compared with those derived from measurements and are found to be in good agreement. Also, the model can emulate shadowing(lognormal) effect alone. Rician(LOS+multipath) and multipath(Rayleigh) alone. With respect to models developed by other investigators, details are described in the references.