









With the summary of the model above, GEO satellite mobile communication system channel model will be established as is indicated in Fig.8. Fading model switches among the three states in semi-Markov process.

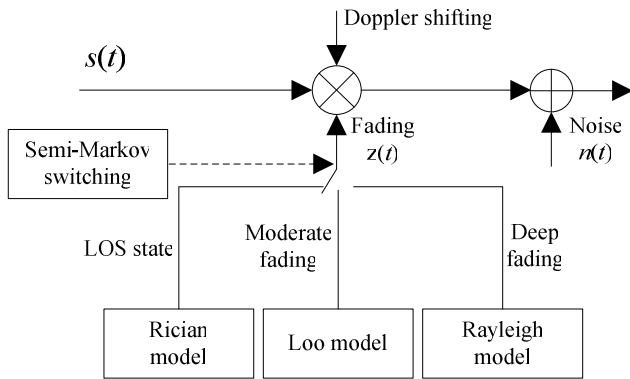


Fig.8. Channel simulation model

Tab.2. gives the measure results of parameters in satellite channel. Fig.9. shows the comparison of theoretical and simulated values of three states. At deep shadowing state, channel degenerate into Rayleigh fading; at light shadowing state, it is Rician fading with a certain fading factor; at moderate, channel state is between Rician and Rayleigh fading and similar to this fading at some time.

Tab.2. The measure results of parameters in satellite channel

Fading degree	$0.5\sigma_z^2$	$\mu_z$	$\sigma_z$
light	0.1580	0.115	0.115
moderate	0.1260	-0.115	0.161
deep	0.0631	-3.910	0.806

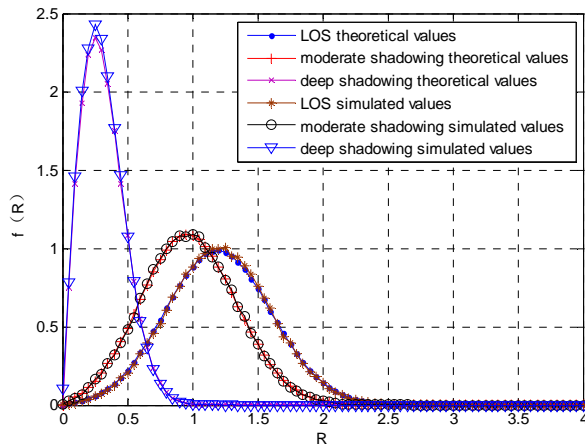


Fig.9. The comparison of theoretical and simulated values of three states

Fig.10. gives the signal power fading at different channel state, fading degree differs from each other, signal power at LOS state is 10~20dB higher than at deep fading state.

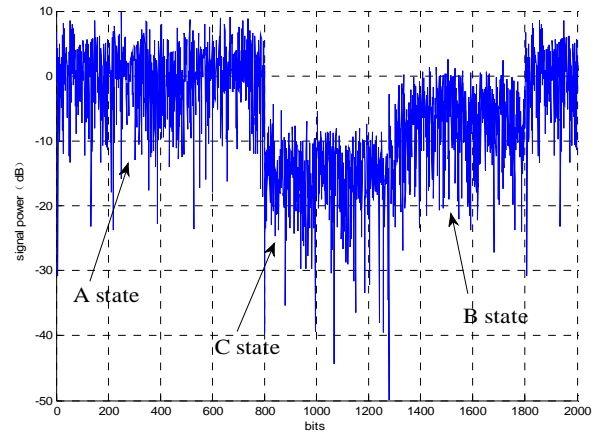


Fig.10. Fading signal power of three states

## V. CONCLUSION

In this paper, a channel model based on three-state semi-Markov process is discussed. For LOS condition, the channel is described as Rician distribution and for deep shadowing condition is Rayleigh distribution. When in rural and suburb area, the channel state is under moderate shadowing condition and described as C.Loo model. The three states switches by semi-Markov process, each state remains about 5m, due to this result it allows us to describe the distribution of time duration. On the other hand, this channel model shows better properties than other systems. With the analysis of received signal PDF at the three states and the fading power of this model, it is possible to conclude that this model may be used in GEO satellite.

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