

## **ABSTRACT**

*Indonesia is a tropical country with high rainfall intensity. This high rainfall intensity makes rain attenuation one of the main factors affecting the quality of satellite communication systems, including satellite communication systems using VSAT IP services. Rain attenuation is caused by the absorption and scattering of electromagnetic waves by raindrops, which can result in signal power reduction. This study aims to determine the impact of rain attenuation on the quality of the Merah Putih satellite communication system for VSAT IP services, focusing on the C-Band and Extended C-Band frequencies in the Bogor–Sorong communication link. It also analyzes the effect of rainfall intensity on rain attenuation using two rain attenuation models, the Crane Global Model and ITU-R P.618-14, and identifies the appropriate rain attenuation model based on the link budget calculation with optimal values. Based on the research conducted, it can be concluded that the higher the rainfall intensity and the frequency used, the greater the resulting rain attenuation, and vice versa. The appropriate rain attenuation model identified in this study is the ITU-R P.618-14 model, which, despite the signal reduction due to rain attenuation, still provides a more optimal link budget value compared to the Crane Global Model. This is demonstrated by the total C/N parameter values for the C-Band frequency at 15.605415 dB and for the Extended C-Band frequency at 15.655086 dB. The Eb/No parameter values for the C-Band frequency are 10.58852 dB and for the Extended C-Band frequency are 10.63819 dB. Additionally, the ITU-R P.618-14 Model produces smaller BER parameter values, namely  $2.1849 \times 10^{-6}$  for the C-Band frequency and  $2.0742 \times 10^{-6}$  for the Extended C-Band frequency.*

*Keyword : Crane Global Model, ITU-R P.618-14 Model, Link Budget, Rain Attenuation.*