

## CEST02\_161

# (Link Budget of GEO Satellite (Hot Bird) at Ku-band Frequency) Case of study: Tripoli and Sebha

Sana Fadil1\*, Nassir Abuhamoud2

1, 2 Department of Communication and Computer Engineering, Faculty of Engineering Sciences and Technology,  
Sebha University, Libya

s.fadil322@gmail.com, [mans.Abuhamoud1@sebhau.edu.ly](mailto:mans.Abuhamoud1@sebhau.edu.ly)

### ABSTRACT

The link between a satellite and the Earth Station is suffering several impairments such as noise, rain and atmospheric attenuations the reason behind successful implementation of satellite communications is the efficient system design to ensure robust air links for the communications signals. However, the quality of these signals is subject to degradation through the atmosphere due to atmospheric impairments. It is therefore crucial to design for all possible losses scenarios before the satellite is deployed. The performance indicator "Link budget" is used to estimate the effectiveness and reliability of the link in satellite communications. The link budget is the compilation of all gains and losses in the satellite links. This paper presents the fundamentals of a satellite link analysis. link budget calculated for GEO satellite (Hot Bird) to accounting of atmospheric attenuation, predict signal strength and the signal quality at the ground station during the differing atmospheric conditions in Tripoli and Sebha using actual climatic parameters. This paper also presents evaluation of the satellite link performance. The performance of the satellite link is evaluated in terms of carrier to noise ratios, bit energy-to-noise ratios, bit error rate and link margin. The results show that signal atmospheric attenuation is high in Tripoli and this caused decrease in the received signal quality as implied by lower values of carrier to noise ratio, bit energy to noise ratio.

**Keywords:** budget, GEO, Downlink , EIRP, Propagation Losses, attenuation