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## Investigation of radio propagation characteristics in UHF band over straight and circular paths in Central Tanzania

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### Abstract

A study was conducted to investigate radio propagation characteristics in ultra-high frequency (UHF) bands over straight and circular paths in central Tanzania. The received signal power values (in dBm) were collected using a spectrum analyzer in straight and circular paths. The collected values were further converted to path loss values and validated against those computed from theoretical formulas of ITU-R P.452-16, ITU-R P.1812-4, Hata and Longley-Rice models. The study used the experimental spectrum measurements approach and Pearson's correlation coefficient (PCC) to determine the best-fit propagation model for the UHF spectrum band allocated for digital terrestrial television (DTT) in central Tanzania. The DTT spectrum band ranges from 470 – 694 MHz in Tanzania after successfully migrating from analogue to digital broadcasting. The study found a significant difference between measured path loss values and those computed from theoretical formulas. The Hata and Longley-Rice models had a better convergence with reality for most of the fixed locations. The accuracy of the empirical propagation model plays a critical role in the optimal planning of the television white space (TVWS) network and contributes to efficient spectrum utilization.