

EVALUASI RUGI LINTASAN JARINGAN 5G CLUSTER CENTRAL BUSINESS DISTRICT DENGAN MODEL COST 231 HATA

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ABSTRAK

Perkembangan jaringan 5G menuntut kinerja optimal, terutama di kawasan padat seperti *Central Business District* (CBD) yang memiliki kepadatan gedung tinggi dan kompleksitas propagasi sinyal. Permasalahan utama yang dihadapi adalah rugi lintasan (*path loss*) yang signifikan akibat *multipath* dan obstruksi bangunan, sehingga diperlukan model prediksi yang akurat. Penelitian ini menggunakan model *COST 231 Hata* untuk mengevaluasi rugi lintasan pada skenario jaringan 5G di area CBD. Metode yang diterapkan meliputi pengumpulan parameter lingkungan, simulasi propagasi, dan analisis hasil prediksi terhadap kondisi lapangan. Kontribusi penelitian ini adalah memberikan gambaran kuantitatif tentang performa rugi lintasan 5G di kawasan CBD menggunakan model klasik yang diperluas. Kebaruan penelitian terletak pada penerapan model *COST 231 Hata*, yang umumnya digunakan untuk 2G/3G, pada konteks jaringan 5G di lingkungan urban modern. Hasil penelitian diharapkan menjadi acuan perencanaan jaringan 5G yang lebih efisien.

Kata Kunci: 5G, *Central Business District* (CBD), rugi lintasan (*path loss*), model propagasi, *cost 231 hata*, perencanaan jaringan, lingkungan urban.

EVALUATION OF PATH LOSS IN A 5G NETWORK OVER A CENTRAL BUSINESS DISTRICT CLUSTER USING THE COST 231 HATA MODEL

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ABSTRACT

The development of 5G networks demands optimal performance, particularly in dense areas such as Central Business Districts (CBDs), which are characterized by high building density and complex signal propagation conditions. The main challenge encountered is significant path loss caused by multipath effects and building obstructions, making accurate prediction models essential. This study employs the COST 231 Hata model to evaluate path loss in a 5G network scenario within a CBD area. The applied methodology includes the collection of environmental parameters, propagation simulation, and analysis of prediction results in relation to field conditions. The contribution of this research is to provide a quantitative overview of 5G path loss performance in CBD environments using an extended classical model. The novelty of the study lies in the application of the COST 231 Hata model, which is commonly used for 2G/3G systems, to the context of 5G networks in modern urban environments. The results are expected to serve as a reference for more efficient 5G network planning.

Keywords: 5G, Central Business District (CBD), path loss, propagation model, COST 231 Hata, network planning, urban environment.