

Estimasi model path loss berdasarkan hasil pengukuran pada komunikasi off-body dan on-body menggunakan antenna tekstil di frekuensi 2,45 ghz = Path loss model estimation based on measurements of off-body and on-body communication using textile antenna at 2,45 ghz

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Abstrak

[ABSTRAK

Pemodelan kanal propagasi menjadi isu penting di dalam sistem komunikasi nirkabel body-centric (BWCS) yang efektif dan efisien. Prediksi karakteristik path loss dapat membantu estimasi kekuatan sinyal yang diterima, optimasi dan analisis interferensi, perancangan dan analisis link budget, serta estimasi ukuran coverage. Model path loss terdiri dari tiga klasifikasi, yaitu model deterministik, empiris dan semi-empiris.

Tujuan dari skripsi ini ialah mengestimasi model path loss berdasarkan hasil pengukuran pada komunikasi off-body dan on-body dengan menggunakan antenna tekstil yang bekerja di frekuensi ISM 2,45 GHz di Anechoic Chamber, serta menganalisis karakteristik kanal propagasinya. Pada skripsi ini digunakan model path loss semi-empiris. Dari berbagai model yang digunakan untuk memodelkan path loss hasil pengukuran komunikasi off-body dan on-body, menunjukkan nilai root mean square error (RMSE) jauh di bawah 6 dB.

Dalam skripsi ini juga dilakukan estimasi model kanal propagasi dari tiap skenario pengukuran komunikasi off-body dan on-body yang dilakukan. Pendekatan model kanal dilakukan dengan melihat kesesuaian distribusi path loss hasil pengukuran dengan jenis model kanal yang diuji. Model kanal uji yang dipakai meliputi model distribusi log-normal, Nakagami, Rayleigh, dan Ricean. Hasil analisis menunjukkan bahwa pada komunikasi off-body, model distribusi Ricean dan Nakagami sama baiknya dalam merepresentasikan data pengukuran. Selain itu, pada komunikasi on-body, fungsi distribusi kumulatif (CDF) pada model Ricean lebih mendekati hasil pengukuran daripada distribusi Nakagami.

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<i>ABSTRACT

, Channel propagation modeling is very essential for effective and efficient performance in body-centric wireless communications system (BWCS). Path loss characteristics prediction plays an important role in estimation of received signal strength, interference optimization and analysis, link budget design and analysis, and coverage area estimation. The Path loss models are commonly classified as deterministic, empirical, or semi-empirical model.

This bachelor thesis is aimed to estimate path loss model based on off-body and on-body communications measurement results in Anechoic Chamber by using a textile antenna at 2,45 GHz of ISM band, and to analyze propagation channel characteristics. In this study, semi-empirical path loss model is adopted. From various path loss models that are used to estimate the propagation channel model from the measurement results in off-body and on-body communications, each root mean square errors (RMSE) of the predicted

model is less than 6 dB.

This thesis also estimates propagation channel model of several off-body and on-body measurement scenarios. The approached channel model is conducted by comparing the measured path loss data with some theoretical channel distribution models. Those models are log-normal, Nakagami, Rayleigh, and Ricean distribution model. The data analysis showed that as for off-body communication, either Nakagami or Ricean distribution model is equally well suited for representing the measured data. Moreover, as for on-body communication, the Ricean distribution model is suited to the measured data rather than the Nakagami model in terms of its cumulative distribution function (CDF).]