

## Rancang bangun dan evaluasi kinerja perangkat monitor parameter base station jaringan GSM = Development and performance evaluation of base station parameter monitoring tool in GSM network

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### Abstrak

Pada tugas akhir ini dilakukan perancangan dan implementasi aplikasi komunikasi port serial antara komputer dengan ME (Mobile Equipment) yang bertujuan untuk mendeteksi kualitas sinyal jaringan GSM. Aplikasi ini berguna untuk mengetahui identitas dari BTS dan optimalisasi jaringan operator berdasarkan hasil pengukuran lapangan. Sistem dibangun dengan menggunakan tiga komponen utama yang terdiri dari perangkat lunak, handset, dan kabel data serial. Bahasa pemrograman menggunakan Borland Delphi 7 dengan mengirimkan AT Command dan membaca respon dari jaringan berupa parameter-parameter seperti LAI (local Area Identity) yang terdiri dari MCC (Mobile Country Code), MNC Mobile Network Code) dan Cell Id. Aplikasi program juga menampilkan kuat sinyal (RxLevel), kualitas sinyal (RxQual), frekuensi BCCH (Broadcast Control Channel) dan BSIC (Base Station Identity Code) cell-cell terdekat. Informasi ditampilkan secara riil dan dapat disimpan dalam database. Pada tahap evaluasi kinerja, pengukuran dilakukan pada 5 lokasi berbeda di lingkungan Universitas Indonesia. Data pengukuran dibandingkan dengan aplikasi lain, hasilnya menunjukkan bahwa persentase kuat sinyal (RxLevel Sub) aplikasi baik di dua lokasi yaitu : Halte FKM = 7.17% Engineering Center = 4.75% Persentase selisih kualitas sinyal (RxQual Sub) juga memiliki selisih yang baik di dua lokasi yaitu: Gerbatama UI = 34.90% Engineering Center = 1.18%.

.....This final project designs and implements serial port application to connect ME (Mobile Equipment) with Personal Computer which is aimed at detecting GSM network signal quality. This application is useful to obtain the BTS identity and GSM operator network optimization based on real measurement. The system is built using three main components consisting of software, handset, and serial data cable. Programming language used is Borland Delphi 7. AT Command is sent and read the response from the network, and parameters collected include LAI (Local Area Identity), which consists of the MCC (Mobile Country Code), MNC Mobile Network Code) and Cell Id. The applications\ also displays signal strength (RxLevel), signal quality (RxQual), BCCH (Broadcast Control Channel) frequency and BSIC (Base Station Identity Code) of neighbouring cells. The information is displayed in real time fashion and can be stored in the database. In the performance evaluation stage, measurements were taken at 5 different locations around University of Indonesia. Measurement data is compared with similar application, the results show that percentage of signal strength (RxLevel Sub) is good in two locations, which are: Halte FKM = 7.17% Engineering Center = 4.75% The percentage of signal quality (RxQual Sub) is also fairly good difference in two locations, namely: Gerbatama UI = 34.90% Engineering Center = 1.18%.