

ANALISIS KUALITAS JARINGAN 4G LTE UNTUK LAYANAN KOMUNIKASI PROVIDER X, Y, DAN Z MENGGUNAKAN METODE *DRIVE TEST*

Nama : Syahrul Rizal Zaini
NIM : 210431100079
Program Studi : Teknik Elektro
Dosen Pembimbing 1 : Dian Neipa Purnamasari, S.ST, M.Tr.T.
Dosen Pembimbing 2 : Achmad Ubaidillah Ms. S.T., M.T

ABSTRAK

Perkembangan jaringan 4G LTE di Indonesia mendukung layanan data berkecepatan tinggi, namun kualitas sinyal di beberapa area, termasuk lingkungan kampus, sering menurun akibat faktor struktural, kepadatan pengguna, dan kondisi geografis. Penelitian ini menganalisis kualitas sinyal 4G LTE dari tiga operator seluler (Indosat, Tri, dan Telkomsel) di Universitas Trunodjoyo Madura menggunakan metode *drive test*. Pengukuran dilakukan pada beberapa titik potensial *blindspot* dengan aplikasi *Net Monitor Lite*, meliputi parameter RSRP, RSRQ, SINR, RSSI, serta pengujian *Quality of Service* (QoS) seperti throughput, latency, *jitter*, dan packet loss melalui *Network Cell Info Lite*. Data dikumpulkan, disimpan, dan divisualisasikan dalam bentuk tabel dan diagram untuk dianalisis secara komparatif. Sebagai pengujian awal, dilakukan pengukuran di sekitar BTS dengan jarak ± 2 meter dari lokasi BTS selama lima menit, yang menunjukkan nilai parameter sementara untuk ketiga provider. Hasilnya, provider Tri memperoleh nilai RSSI -93 dBm, RSRQ -13 dB, SINR 4 dB, dan RSRP -116 dBm. Selanjutnya, provider Telkomsel memperoleh nilai RSSI -91 dBm, RSRQ -12 dB, SINR 4 dB, dan RSRP -117 dBm. Sementara itu, provider Indosat memperoleh nilai RSSI -92 dBm, RSRQ -13 dB, SINR 3 dB, dan RSRP -115 dBm. Hasil penelitian yang telah dilakukan mendapatkan nilai rata-rata parameter yang diinginkan pada rute yang dilalui yaitu: Tri memperoleh nilai RSRP -109,96 dBm, RSRQ -12,47 dB, SINR 5,15 dB, RSSI

-95,05 dBm, *jitter* 26,85 ms, *upload* 23,85 Mbps, dan *download* 24,05 Mbps. Telkomsel memperoleh nilai RSRP -118,72 dBm, RSRQ -12,04 dB, SINR 4,05 dB, RSSI -90,92 dBm, *jitter* 31,92 ms, *upload* 47,66 Mbps, dan *download* 21,24 Mbps. Indosat memperoleh nilai RSRP -119,41 dBm, RSRQ -12,65 dB, SINR 3,33 dB, RSSI -91,61 dBm, *jitter* 39,09 ms, *upload* 21,62 Mbps, dan *download* 26,69 Mbps. Dengan perolehan data *blindspot* area dapat disimpulkan bahwa pada area C, D, E, F, G, I dan J merupakan area dengan kualitas sinyal buruk atau *blindspot* area.

Kata Kunci : *NetMonitor Lite*, metode *Drive test*, *Quality of Service* (QoS), LTE, *Network Cell Info Lite*

ANALYSIS OF 4G LTE NETWORK QUALITY FOR COMMUNICATION SERVICES OF PROVIDERS X, Y, AND Z USING THE DRIVE TEST METHOD

Nama : Syahrul Rizal Zaini

NIM : 210431100079

Program Studi : Teknik Elektro

Dosen Pembimbing 1 : Dian Neipa Purnamasari, S.ST, M.Tr.T.

Dosen pembimbing 2 : Achmad Ubaidillah Ms. S.T., M.T

ABSTRACT

The development of 4G LTE networks in Indonesia has supported high-speed data services; however, signal quality in several areas, including university environments, often decreases due to structural conditions, user density, and geographical factors. This study analyzes the quality of 4G LTE signals from three cellular operators (Indosat, Tri, and Telkomsel) at Universitas Trunodjoyo Madura using the drive test method. Measurements were conducted at several potential blind spot locations using the NetMonitor Lite application, covering parameters such as RSRP, RSRQ, SINR, and RSSI, as well as Quality of Service (QoS) testing including throughput, latency, jitter, and packet loss using Network Cell Info Lite. The collected data were stored and visualized in the form of tables and charts for comparative analysis. As a preliminary test, measurements were carried out around the Base Transceiver Station (BTS) at a distance of approximately ± 2 meters from the BTS location for five minutes, showing temporary parameter values for the three operators. The Tri provider achieved an average RSSI of -93 dBm, an RSRQ of -13 dB, a SINR of 4 dB, and an RSRP of -116 dBm. Furthermore, the Telkomsel provider recorded an average RSSI of -91 dBm, an RSRQ of -12 dB, a SINR of 4 dB, and an RSRP of -117 dBm. Meanwhile, the Indosat provider obtained an average RSSI of -92 dBm, an RSRQ of -13 dB, a SINR of 3 dB, and an RSRP of -115 dBm.

The results obtained from the drive test route measurements showed that Tri achieved average values of RSRP -109.96 dBm, RSRQ -12.47 dB, SINR 5.15 dB, RSSI -95.05 dBm, jitter 26.85 ms, upload speed 23.85 Mbps, and download speed 24.05 Mbps. Telkomsel achieved average values of RSRP -118.72 dBm, RSRQ -12.04 dB, SINR 4.05 dB, RSSI -90.92 dBm, jitter 31.92 ms, upload speed 47.66 Mbps, and download speed 21.24 Mbps. Meanwhile, Indosat achieved average values of RSRP -119.41 dBm, RSRQ -12.65 dB, SINR 3.33 dB, RSSI -91.61 dBm, jitter 39.09 ms, upload speed 21.62 Mbps, and download speed 26.69 Mbps. Based on the blind spot area analysis, Areas , D, E, F, G, I and J were identified as locations with poor signal quality and categorized as blind spot areas.

Keywords: NetMonitor Lite, Drive test method, Quality of Service (QoS), LTE, Network Cell Info Lite