



vol. 17 / 2023



## **The 7th International Conference on Science Technology**

organized by  
Faculty of Social Science and  
Law Universitas Negeri Manado and  
Consortium of International Conference  
on Science and Technology

# **The Innovation Breakthrough in Digital and Disruptive Era**

## Comprative Analysis of 4G Network Quality Between Telkomsel and Indosat Operators Using the G-Net Track Pro Application in the City of Ternate

Irwan Abdullah<sup>1\*</sup>, Zulaeha Mabud<sup>2</sup>, Fahrizal Djohar<sup>3</sup>, Fedi Haryanto H Tjan<sup>4</sup>

<sup>1,2,3,4</sup>Electrical Engineering, Faculty of Engineering, Universitas Khairun, Ternate, Indonesia

**Abstract.** In some areas the distribution of telecommunications networks is not evenly distributed, one example is in the city of Ternate. Several areas in the city of Ternate. The purpose of this study is to determine the quality of the 4G LTE network from providers in the city of Ternate, namely (Telkomsel and Indosat) using the G-Nettrack Pro application, the parameters measured are rsrp or network strength, The method used in this study is the drive test, The results showed that the RSRP distribution of Telkomsel operators in Sasa Village had a percentage of 43.05% with a sample of 155. Meanwhile, Indosat operators had a percentage of 34.83% with a sample of 117, the RSRP distribution of Telkomsel operators in Gambesi Village had a percentage of 42.02% with a sample of 133. While Indosat Operators have a percentage of 24.64% with a sample of 70, RSRP Distribution of Telkomsel Operators in the Stadium Village has a percentage of 64.29% with a sample of 117. Meanwhile, Indosat Operators have a percentage of 53.05% with a sample of 87, Distribution of RSRP Telkomsel Operators in Kelurahan Stadiums have a percentage of 57.76% with a sample of 145. Meanwhile, Indosat Operators have a percentage of 37.18% with a sample of 87.

**Keywords.**

Network,

Telecommunication,

4G

---

\* Corresponding author: [irwanabdullah2507@gmail.com](mailto:irwanabdullah2507@gmail.com)

## 1 Introduction

Telecommunication network is all telecommunications equipment that can connect its users with other users so that the two users can exchange information.[1] Currently, wireless telecommunications networks have developed very rapidly to meet the demands of mobile users for data transfer and services.

However, in some areas the distribution of telecommunications networks is not evenly distributed, for example in the city of Ternate. Several areas in the city of Ternate have far from standard telecommunications networks. This problem can be seen from the insufficient number of BTS., In addition, a significant increase in the number of subscribers will also lead to a decrease in the quality of cellular networks.[2]

From the existing problems, a solution emerged to analyze the strength comparison of the 4G LTE network between Telkomsel and Indosat providers in several areas in the city of Ternate, where the method used was a drive test, using the g-nettrack pro application, the measurement parameter was RSRP.

## 2 Literature Review

Long Term Evolution (LTE) is a name given to a project within The Third Generation Partnership Project (3GPP) created to develop Universal Mobile Telecommunication System (UMTS) technology to meet future data needs. According to the Standard, LTE provides a downlink speed of 100 Mbps. LTE will bring many benefits to the development of cellular networks besides that[3]

### 2.1 Drive Test

Drive test is one part of the work in radio network optimization. Drive test aims to collect real network information in the field. The information collected is the actual condition of Radio Frequency (RF) in an eNodeB[4]

### 2.2 RSRP

RSRP (Reference Signal Received Power) Merupakan sinyal daya LTE yang diterima oleh pengguna pada frekuensi tertentu. RS adalah Sinyal Referensi atau RSRP di setiap cakupan cakupan cakupan. Pada teknologi 2G parameter ini dapat dianalogikan RxLevel, sedangkan pada 3G sebagai RSCP.[5]

### 2.3 G-Nettrack Pro

G-Net Track is an application for network monitoring and walk test on devices operating the Android OS system. The technologies supported in the G-Net Track Pro application are LTE, UMTS, GSM, CDMA, EVDO, HSDPA.[4] Measurements can also be

made at indoor and outdoor locations. Parameters that can be measured using the G-nettrack software are RSRP, RSRQ, SNR, and RSSI. [6]

## 3 Research Method

This study uses the drive test method in several areas in Ternate City, where the drive test data collection method uses the Cluster and Benchmark method.

The steps of this research include 1. Preparation for a drive test, including cellphones, sim cards, laptops, and motorbikes, 2. Map making Routes that will be carried out Drive Test, 3. Carry out a Drive Test, 4. Analyze the results of the Drive Test Components

## 4 Results and Discussion


### 4.1 Comparison of Drive Test Results

After collecting data using the drive test method in the specified area, then we will compare the data we have obtained, where the data we have taken is the RSRP value of Telkomsel and Indosat. To compare, we need to calculate the RSRP range value with a very good predicate plus a range with a good predicate where the range with a very good predicate starts from -80 dBm to 0 dBm and for the range with a good predicate, starting from -90 dBm to -80 dBm. For calculating the percentage of RSRP parameters, it is necessary to use the following formula:

$$\text{Percentage (\%)} = \frac{\text{Sample}}{\text{Total Sample}}$$

#### 4.1.1 Sasa Village

Table 1 Comparison of RSRP in the Sasa sub-district





RSRP (dBm)	Sample	Percentage	RSRP (dBm)	Sample	Percentage
$(-80) \leq x$	60	16,66%	$(-80) \leq x$	31	9,23%
$(\leq -90) x < (-80)$	95	26,39%	$(\leq -90) x < (-80)$	86	25,60%
Total	155	43,05%	Total	117	34,83%

The RSRP distribution of Telkomsel operators in Sasa village has a percentage of 43.05% with a total sample of 155 samples, out of a total sample of 360 samples. Meanwhile, Indosat Operators has a percentage of 34.83% with 117 samples out of a total sample of 336 samples.

#### 4.1.2 Gambesi Village


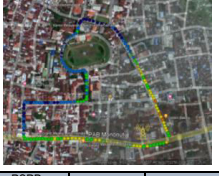
Table 3 Comparison of RSRP in Gambesi Village

					
RSRP (dBm)	Sample	Percentage	RSRP (dBm)	Sample	Percentage
$(-80) \leq x$	35	12,03%	$(-80) \leq x$	17	5,98%
$(\leq -90) \times (-80)$	96	32,99%	$(\leq -90) \times (-80)$	53	18,66%
Total	131	45,02%	Total	70	24,64%

RSRP distribution of Telkomsel operators in Gambesi Village has a percentage of 42.02% with a sample of 133 out of a total sample of 291. Meanwhile, Indosat operators have a percentage of 24.64% with a sample of 70 out of a total sample of 284

#### 4.1.3 Stadion Village



Table 3 Comparison of RSRP in Stadion Village

					
RSRP (dBm)	Sample	Percentage	RSRP (dBm)	Sample	Percentage
$(-80) \leq x$	73	40,11%	$(-80) \leq x$	43	26,22%
$(\leq -90) \times (-80)$	44	24,18%	$(\leq -90) \times (-80)$	44	26,83%
Total	117	64,29%	Total	87	53,05%

RSRP distribution of Telkomsel operators in the Stadion Village has a percentage of 64.29% with a sample of 117, out of a total sample of 182. Meanwhile, Indosat operators have a percentage of 53.05% with a sample of 87, out of a total sample of 164

#### 4.1.4 Kalumpang Village

Table 4 Comparison of RSRP in the Kalumpang sub-district

					
RSRP (dBm)	Sample	Percentage	RSRP (dBm)	Sample	Percentage
$(-80) \leq x$	90	35,85%	$(-80) \leq x$	36	15,39%
$(\leq -90) \times (-80)$	55	21,91%	$(\leq -90) \times (-80)$	51	21,79%
Total	145	57,76%	Total	87	37,18%

RSRP distribution of Telkomsel operators in the Kalumpang Village has a percentage of 57.76% with a sample of 145 out of a total sample of 251. Meanwhile, Indosat operators have a percentage of 37.18% with a sample of 87 out of a total sample of 234.

#### 4.2 Comparative analysis of Drive Test Results

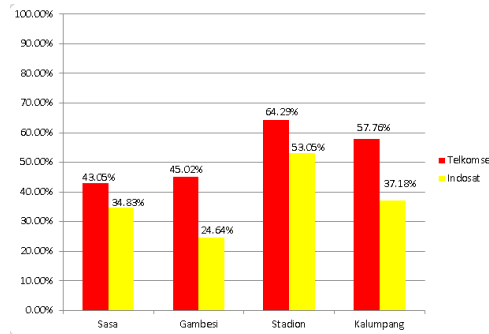


Figure 4.17 Graph of the percentage ratio of the number of RSRP samples

The data from the graph above is taken from the previous comparison, the data taken is the number of samples that have been converted into percent. From the results of the rsrp measurements carried out, it appears that Telkomsel providers have good signal strength compared to Indosat in each tested area. ternate is 90 while for Indosat providers only 6 BTS sites.

### 5 Conclusion

Based on the results of this measurement and analysis, it can be concluded that Telkomsel is the better choice, in terms of signal strength. However, further analysis is still needed regarding the costs and features offered by each provider before making a decision. In the city of Ternate, in the areas where the signal quality is measured and which has the highest RSRP range for Telkomsel providers, it is found in the Gambesi village, namely the range  $(\leq -100) \times (-90)$ , with a percentage of 45.02%. Meanwhile, for Indosat providers, the highest RSRP range is also in the Gambesi sub-district, namely the range  $(\leq -100) \times (-90)$ , with a percentage of 46.83%.

### References

- [1] N. Kn and B. Salam, "Analisa Quality Of Service ( QoS ) Di Area Tangerang - Banten," *J. Teknol. Ind.*, vol. 10, no. 1, pp. 89–99, 2021.
- [2] F. A. Rahmat, "Analisis Kinerja Kualitas Jaringan 4G LTE Di Kawasan Perumahan Singgalang, Koto Tangah,

- Kota Padang.” *Telekontran J. Ilm. Telekomun. Kendali dan Elektron. Terap.*, vol. 10, no. 2, pp. 106–115, 2022, doi: 10.34010/telekontran.v10i2.7904.
- [3] F. K. Karo, E. S. Nugraha, and F. N. Gustiyana, “Analisis Hasil Pengukuran Performansi Jaringan 4G LTE 1800 MHz di Area Sokaraja Tengah Kota Purwokerto Menggunakan,” vol. 16, no. 2, pp. 115–124, 2019.
- [4] M. V. Panjaitan and A. A. Zahra, “ANALISIS QUALITY OF SERVICE ( QOS ) JARINGAN 4G DENGAN METODE DRIVE TEST PADA KONDISI OUTDOOR MENGGUNAKAN APLIKASI G-NETTRACK PRO”.
- [5] “Analisa Perbandingan Kuat Sinyal 4G LTE Antara Operator Telkomsel dan XL AXIATA Berdasarkan Paramater Drive Test Menggunakan Software G-NetTrack Pro Di Area Jalan Protokol Panam . Rendi Efriyendro \*, Yusnita Rahayu \*\* \* Alumni Teknik Elektro Universitas R,” vol. 4, no. 2, pp. 1–9, 2017.
- [6] Y. R. Yungka and D. C. Widiyanto, “4G LTE Network Walk Test Analysis using Android Application G-Net Track on SWCU FTI Building,” *J. Tek. Inform.*, vol. 4, no. 2, pp. 441–448, 2023.