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# The Analysis of Service Integrity on Video Streaming Services Using Time Division Duplex and Frequency Division Duplex Technology on LTE Networks

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ABSTRACT

The growing use of cellular technology has a rapid impact on the development of technology and information. This development relates to the use of information and communication services that is tailored directly, practically and effectively manner. Responding to the issue, the researcher is interested in conducting research by looking at the parameters using Time Division Duplex (TDD) technology and Frequency Division Duplex (FDD) technology on video streaming services. Service integrity measurement results on LTE networks are carried out in real time in the field according to the research path and eNodeB installed in dedicated mode. Dealing with the results, the effect of DT parameters on service integrity can only be seen in the SINR and CQI parameters. When SINR measured 21.3 dB and CQI measured 13.5, the measured throughput was 3665.2 Kbps so that the measured modulation was 64 QAM, on the other hand, if SINR measured -0.2 dB and CQI measured 10, the measured throughput was 0.5 Kbps so that the modulation measured was small, namely QPSK. From the results obtained, LTE TDD has a better service integrity value, namely throughput has a value of 891.16 Kbps and a latency of 48 ms for Telkomsel while 882.14 Kbps and latency was 49 ms for Smartfren than LTE FDD which had a throughput value of 820.83 Kbps and a latency was 68 ms for Telkomsel while 831.21 Kbps and 77 ms latency were for Smartfren, thus LTE TDD is better in terms of throughput and measured latency.



## 1. Introduction

According to the Indonesian Internet Service Providers Association (APJII), Indonesian internet users in 2019 until the second quarter of 2020 reached 73.7 percent of the population or equivalent to 196.7 million users, this is due to digital transformation due to the Covid-19 pandemic. APJII asserted that this increase was widely accessed by internet users in the use of online videos with 49.3 percent of users, online games with 16.5 percent of users and online music with 15.3 percent of users and 18.9 percent of other uses [1]. It is undeniable that this development must be in line with the quality that must be provided by internet service providers. At this time Long Time Evolution (LTE) technology or better known as 4G (Fourth Generation) technology is one that is widely used by the public to access networks, according to APJII, home internet use is still low, merely 14.5 percent of the total data recorded (APJII)[1]. With the use of home internet which is still low, it creates competition for service providers or providers to provide the best services, the number of operators in Indonesia is quite large, including Telkomsel, XL, Smartfren and H3I (Tri).

With many internet users, it must be in line with good service quality, but the reality is that the internet speed of cellular phones is slow, which is only around 6.8 Mbps. Based on government regulation No. 52 of 2000 concerning the operation of telecommunications, internet service providers are required to meet the service standards set by the government and report the operating performance of the operator periodically to the government. In an effort to overcome poor internet quality, several researchers conducted research to improve quality by conducting research on Quality of Service and Service Integrity on internet services.

## 2. Literature Review

In accordance with Sofya Ariyani (2016) regarding Quality Of Service. According to him, QoS must comply with Key Performance Indicator (KPI) standards in services in accordance with the needs of communication activation such as HTTP, FTTP, Browsing and Video Streaming [2]. In addition, according to Ningsih et al. (2004), the ultimate goal of QoS is to provide better and planned network services with certain parameters[3]. Then the research conducted by Wulandari et al (2011) analyzed the performance of video streaming on the LTE network, for the same data packet length, the greater the distance and utility factor between eNodeB and User Equipment (UE), the greater the end-to-end latency value. and the probability of missing packets generated[4]. Meanwhile, according to Said et al (2016) shows that the quality of web browser services is better than the video streaming application[5]. Furthermore, according to Hasanah et al (eds) (2017) according to him, the throughput value will be higher by 33% and 47% when the user distance is 1250 m and 2000 m respectively from eNode B. In addition, the delay value will decrease by 66.32% and 67.58% when the user distance is 1250 m and 2000 m respectively from eNode B. In addition, the PDR value will be higher by 48.74% and 55.45% when the user distance is 1250 m and 2000 m, respectively. eNode B. The use of a distributed antenna system (DAS) model on an LTE network has resulted in an increase in performance quality when users are streaming video[6]. Meanwhile, according to research conducted by Hassan & Eldaw (eds) (2016), he analyzed the throughput of video streamed via LTE. Using OPNET (Optimized Network Engineering Tool), performance can be simulated having Downlink (DL) and Uplink Scenario (UL) for video conferencing including web traffic. Furthermore, it also measures the delay performance of End-to-End (E2E) packets[7]. According to Dikky Chandra et al (2021) with the growth of subscribers and the expansion of the 4G LTE network, the PCI (Physical cell identity) modulo interference point has been detected so that the signal quality is not optimal. Therefore, it is necessary to optimize by rotating the PCI at the site by considering the modulo value of each site, also by changing the direction of the azimuthsel which is too dominant[8].

## 3. Method

This LTE QoS analysis research used a non-participatory observational qualitative method, namely by comparing each QoS parameter to a predetermined path from the eNodeB point. In this study, 2 technologies used, namely LTE TDD and LTE FDD. The following research flow is shown in Figure 1 Research Flow.

After determining the path to be followed, the next step is to collect data for the problems to be studied. This data retrieval using TEMS Pocket software. TEMS Pocket was used for retrieval of quality data and network determinants. The data were taken in the TEMS Pocket software are RSRP (Received Signal Reference Power), SINR (Signal to Interference and Noise Ratio), RSRQ (Received Signal Reference Quality), Streaming Throughput, streaming Latency[9].

This data collection used operators in which it has used LTE FDD and LTE TDD, namely 850 MHz for LTE FDD and 2300 MHz for LTE FDD[10]. Operators who have both frequencies are Telkomsel and Smartfren operators.


**Figure 2.** Research Flow

# 4. Results

## 4.1 Results of Time Division Duplex Technology Data Processing

### 4.1.1 Reference Signal Received Power (RSRP)


**Figure 2.** Results of RSRP Smartfren data processing

In Figure 2 it can be seen the quality of the RSRP parameters from 313 measured points, in the **Bad** range (<-110 dBm) **Low** range ((-110) dBm x < (-95) dBm), **Good** range (-95) dBm x < (-80) dBm), and for **Excellent** range ((-80<= x)dBm [12].

From the results of data processing, it can be seen that the RSRP results have reached 100%. Where the Bad range (<-110 dBm) has a percentage of 16.61%, the Low range ((-110) dBm x < (-95) dBm) has a percentage of 75.4%, the Good range (-95) dBm x < (-80) dBm) has a percentage of 7.99%, and for the Excellent range ((-80<= x)dBm) has a percentage of 0%.

With an average area in the range -110 dBm to -95 dBm. From these results, when compared to the KPI, this region is in the “Low” category or where the quality in the area is quite poor for the level of power acceptance.

Based on Figure 3 the results of data processing can be seen the quality of the RSRP parameters from 312 measured points. From the results of data processing on Telkomsel operators, it can be seen that the RSRP results have reached 100%. Where the Low range ((-110) dBm x < (-95) dBm) has a percentage of 41.07%, the Good range (-95) dBm ≤ x < (-80) dBm) has a percentage of 52.5% while the Excellent range (-80 <= x) dBm) has a percentage of 6.43%.

With the average area in the range -95 dBm to -80 dBm. From these results, when compared to the KPI this region is in the "Good" category or very good for the level of power acceptance in the area.

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**Figure 3.** Results of Telkomsel RSRP data processing

### 4.1.2 Reference Signal Received Quality (RSRQ)


**Figure 4.** Results of RSRQ Smartfren data processing

In Figure 4. 1 it can be seen the quality of the RSRQ parameters from 313 measured points, in the Bad range (x<-20 dB) Low range ((-19) dB x < (-15) dB), Good range (-15) dB x < (-9) dB), and for Excellent range ((-9<= x) dB).

From the results of data processing, it can be seen that the RSRQ results have reached 100%. Where the range of Good (-15) dB x < (-9) dB) has a percentage of 36.42% while the Excellent range ((-9<= x) dB) has a percentage of 63.58%

With the average area in the range of -9 dB to max dB. From these results, when compared to the KPI, this region is in the "Excellent" category or very good in terms of the quality of the available network.


**Figure 5.** Results of Telkomsel RSRQ data processing

Figure 5 shows the quality of the RSRQ parameters at 312 measured points. From the results of data processing, it can be seen that the RSRQ results have reached 100%. Where the Bad range (x<-20 dB) has a percentage of 0.64%, the Low range ((-20) dB x < (-15) dB) has a percentage of 19.55%, the Good range (-15) dB x < ( -9) dB) has a percentage of 67.63%, while the Excellent range ((-9<= x) dB) has a percentage of 12.18%.

With an average area in the range of -15 dB to -9 dB. From this result, when compared to KPI, this area is in the "Good" category, where the network quality in this area is good for signal quality.

### 4.1.3 Signal to Interference Noise Ratio (SINR)


**Figure 6.** Results of Smartfren SINR data processing

In Figure 6 it can be seen the quality of the SINR parameters from 313 which measured points, in the Bad range (x<0 dB) Low range ((0)d B x < (13) dB), Good (13) dB x < ( 20) dB), and for the Excellent range ((20<= x) dB).

From the results of data processing, it can be seen that the SINR results have reached 100%. Where the **Bad** range (x<0 dB) has a percentage of 2.56%, the **Low** range ((0) dB x < (13) dB) has a percentage of 64.22%, the **Good** range (13) dB x < (20) dB) has a percentage 23.96%, and for the **Excellent** range ((20<= x) dB) it has a percentage of 9.27%.

With the average area in the range 0 dB to 13 dB. From these results, when compared to KPI this region is in the "Low" category or not good for signal interference to power in the area.

Responding to the results of data processing, there were several badspot points on the measurement results of the SINR value. The following is the measurement at the badspot point in the following image[11].


**Figure 7.** SINR Results for Badspot Points

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In Figure 7, you can see the measurement results at the circled badspot points. In the picture the SINR value is at -3.6 dB, the streaming throughput is 44.87 Kbps, the CQI value is at an average of 7.6 and the modulation that is read is QPSK.

**Figure 8.** SINR Results for Badspot Points

In Figure 8, it can be seen the measurement results at the circled badspot points. In the picture the SINR value is at -0.2 dB, the streaming throughput is 162.53 Kbps, the CQI value is on average 10 and the modulation that is read is QPSK.

**Figure 9.** Results of Telkomsel's SINR data processing

In Figure 9, the quality of the SINR parameters can be seen based on the 312 measured points. From the results of data processing, it can be seen that the RSRP results have reached 100%. Where the Bad range (x<0 dB) has a percentage of 3.21%, the Low range ((0) dB x < (13) dB) has a percentage of 56.73%, the Good range (13) dB x < (20) dB) has a percentage 32.05%, and for the Excellent range ((20<= x) dB) has a percentage of 8.01%.

With the average area in the range 0 dB to 13 dB. From these results, when compared with KPI this region is in the "Low" category, the influence of power on interference and noise is high.

**Figure 10.** SINR Results for Badspot Points

In Figure 10, it can be known the measurement results at the circled badspot points. In the picture the SINR value is at -2.2 dB, the streaming throughput is 0.23 Kbps.

### 4.1.4 Channel Quality Indicator (CQI)

**Figure 11.** Results of Smartfren's CQI data processing

In Figure 11 it can be known that the results of CQI based on 302 measured points. From the results of data processing, it can be seen that the CQI results have reached 100%. Where range 4 x < 8 has a percentage of 3.31%, and range 8 x < 12 has a percentage of 67.55%, range 12 x has a percentage of 29.14%.

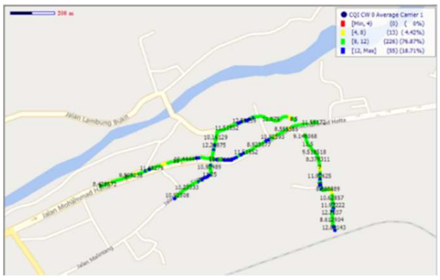

**Figure 12.** Plotting Results of Telkomsel CQI

In Figure 12 it can be seen that the results of CQI based on 294 measured points. From the results of data processing, it can be seen that the CQI results have reached 100%. Where range 4 x < 8 has a percentage of 4.42%, and range 8 x < 12 has a percentage of 76.87%, range 12 x has a percentage of 18.71%.

### 4.1.5 Throughput and Latency

In the measurement of the throughput section, it was undertaken by adding up the average value of each serving cell being served. The throughput value was influenced by the modulation obtained from the measurement results in each route taken. This calculation was carried out for each frequency and provider used. The following is the correlation between modulation and throughput values for both providers and using LTE TDD technology which is obtained in Table 1 and Table 2 [13].

**Table 1.** The Correlation of Modulation on the Value of Telkomsel's Throughput Provider

| Serving Cell PCI | PDSCH Phy *Throughput* (kbps) | | | PDSCH TB1 Modulation Type | | |
|---|---|---|---|---|---|---|
| | **Mean** | **Min** | **Max** | **QPSK** | **16QAM** | **64QAM** |
| 162 | 6,8 | 0,1 | 85,6 | 80,0 | 15,0 | 5,0 |
| 163 | 562,7 | 0,1 | 6294,9 | 43,1 | 21,5 | 35,4 |
| 164 | 1205,7 | 0,0 | 14124,2 | 36,6 | 30,5 | 32,9 |
| 217 | 6,9 | 6,9 | 6,9 | 100,0 | | |
| 218 | 3,9 | 3,8 | 3,8 | 100,0 | | |
| 291 | 543,2 | 0,1 | 5786,8 | 60,0 | 11,4 | 28,6 |

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**Table 2.** The Correlation of Modulation on the value of Throughput Provider Smartfren

| Serving Cell PCI | PDSCH Phy *Throughput* (kbps) | | | PDSCH TB1 Modulation Type | | |
|---|---|---|---|---|---|---|
| | **Mean** | **Min** | **Max** | **QPSK** | **16QAM** | **64QAM** |
| 191 | 1025,8 | 819,7 | 1232,0 | 100,0 | | |
| 326 | 807,1 | 0,0 | 3994,9 | 100,0 | | |
| 409 | 974,8 | 0,0 | 3952,1 | 100,0 | | |

From the two tables, it can be seen that the effect of modulation on the throughput value obtained from each serving cell is served, this is due to the modulation affects the throughput value. Thus, the use of QAM modulation has a better throughput value than the use of PSK modulation. As for Latency and packet loss, it is obtained from the average calculation of each measured log file which can be seen on the attachment page. So from these results obtained throughput values, latency and packet loss from both providers in LTE TDD mode as shown in the table 3.[14]

**Table 3.** Results of Throughput and Latency

| Provider | *Throughput* (Kbps) | *Latency* (ms) |
|---|---|---|
| **Smartfren** | **882.14** | **49** |
| **Telkomsel** | **891.16** | **48** |

From the measurement results, it can be seen that the throughput of Telkomsel operators has a better value than smartfren operators. Where the Telkomsel operator has a throughput value of 891.16 Kbps while the Smartfren operator has a throughput value of 882.14 Kbps where the throughput value is in a good enough range for streaming based on the downlink value.

As for Latency, data is taken based on prebuffering to reproducing streaming. The latency of the two operators has a value that is not too far away, where the latency of the Telkomsel operator is 48 ms while the smartphone operator is 49 ms. Based on the QoS value, this value is in a good range for the Latency parameter.

## 4.2 Data Processing Results of Frequency Division Duplex Technology

### 4.2.1 Reference Signal Received Power (RSRP)


**Figure 13.** Results of Smartfren RSRP data processing

Based on Figure 4.12, the results of data processing can be seen the quality of the RSRP parameters from 280 measured points. From the results of data processing, it can be seen that the RSRP results have reached 100%. Where the **Low** range ((-110) dBm x < (-95) dBm) has a percentage of 41.07%, the **Good** range (-95) dBm x < (-80) dBm) has a percentage of 52.5% while the **Excellent** range (-80 <= x) dBm) has a percentage of 6.43%.

With an average area in the range -110 dBm to --95 dBm. From these results, when compared to KPI this region is in the "Low" category or not good for the level of power acceptance in the area.


**Figure 14.** Results of Telkomsel RSRP data processing

In Figure 14, it can be seen the quality of the RSRP parameters based on 289 measured points, in the **Bad** range (<-110 dBm) **Low** range ((-110) dBm x < (-95)dBm), Good range (-95) dBm x < (-80) dBm), and for **Excellent** range ((-80<= x) dBm).

From the results of data processing, it can be seen that the RSRP results have reached 100%. Where the **Good** range (-95) dBm x < (-80) dBm) has a percentage of 41.18%, and for the **Excellent** range ((-80<= x) dBm) has a percentage of 58.82%

With the average area in the range of -80 dBm. From these results, when compared to the KPI this region is in the "Excellent" category or where the quality of power reception in the area is very good.

### 4.2.2 Reference Signal Received Quality (RSRQ)


**Figure 15.** Results of Smartfren's RSRQ data processing

In Figure 15 it can be seen that the quality of the RSRQ parameters of the 280 measured points. From the results of data processing, it can be seen that the RSRQ results have reached 100%. Where the range of **Good** (-15) dB x < (-9) dB) has a percentage of 34.64% while the **Excellent** range ((-9<= x) dB) has a percentage of 63.63%.

With the average area that has green and blue indicator colors in the range of -9 dB to max dB. So from this result, when compared to KPI, this region is in the "Excellent" category where the network quality in this area is very good for network quality on LTE networks.

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**Figure 16.** Results of Telkomsel RSRQ data processing

In Figure 16, it can be seen the quality of the RSRQ parameters from 289 measured points, in the **Bad** range (x<-20 dB), **Low** range ((-20) dB x < (-15) dB), **Good** range (-15) dB x < (-9) dB), and for **Excellent** range ((-9<= x) dB).

From the results of data processing, it can be seen that the RSRQ results have reached 100%. Where the Low range ((-20) dB x < (-15) dB) has a percentage of 11.42%, the Good range (-15) dB x < (-9) dB) has a percentage of 77.85%, while the Excellent range ( (-9<= x) dB) has a percentage of 10.73%.

With an average area in the range of -15 dB to -9 dB. From this result, when compared to KPI, this area is in the “Good” category, where the network quality in this area is good for signal quality.

### 4.2.3 Signal to Interference Noise Ratio (SINR)


**Figure 17.** Results of Smartfren SI SINR data processing

In Figure 17, it can be seen the quality of the parameters based on the 280 measured points. From the results of data processing, it can be seen that the RSRP results have reached 100%. Where the Bad range (x<0 dB) has a percentage of 3.23%, the Low range ((0) dB x < (13) dB) has a percentage of 66.32%, the Good range (13) dB x < (20) dB) has a percentage 13.62%, and for the Excellent range ((20 <= x) dB) has a percentage of 16.85%.

With the average area in the range 0 dB to 13 dB. From these results, when compared with KPI this region is in the "Low" category where the influence of power on interference and noise is high.

From the results of data processing, there are several badspot points, where these points affect the throughput value. This is because the value of SINR determines the value of CQI which has an impact on the use of modulation, which can be seen in chapter II.

**Figure 18.** SINR Results for Badspot Points

In Figure 18, it can be seen the measurement results at the circled badspot points. In the picture the SINR value is at -0.1 dB, the streaming throughput is 0 Kbps, the CQI value is on average 7.078948 and the modulation that is read is QPSK.

**Figure 19.** SINR Results for Badspot Points

In Figure 19, you can see the measurement results at the circled badspot points. In the picture the SINR value is at -2.8 dB, the streaming throughput is 0 Kbps, the CQI value is on average 6 and the modulation that is read is QPSK.

**Figure 20.** SINR Results for Badspot Points

In Figure 20, it can be seen that the measurement results at the circled badspot points. In the picture the SINR value is at -3.7 dB, the streaming throughput is 224.73 Kbps, the CQI value is on average 4.823529 and the modulation that is read is QPSK.


**Figure 21.** Results of Telkomsel's SINR data processing

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In Figure 21 it can be seen the quality of the SINR parameters from 289 measured points, in the **Bad** range(x<0 dB) **Low** range ((0)dB x < (13)dB), **Good** range (13)dB x < (20) )dB), and for the **Excellent** range ((20<= x)dB).

From the results of data processing, it can be seen that the SINR results have reached 100%. Where **Bad** range (x<0 dB) has a percentage of 9.69%, range Low ((0)dB x <(13)dB) has a percentage of 73.63%, **Good** range (13)dB x <(20)dB) has a percentage 15.57%, and for the **Excellent** range ((20<= x)dB) it has a percentage of 1.38%.

With the average area in the range 0 dB to 13 dB. From these results, when compared to KPI this region is in the "Low" category or not good for signal interference to power in the area.

From the results of data processing there are several badspot points on the measurement results of the SINR value. The following is the measurement at the badspot point in the following image.

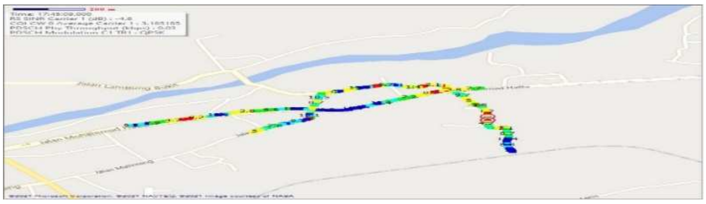

**Figure 22.** SINR Results for Badspot Points

In Figure 22, you can see the measurement results at the circled badspot points. In the picture the SINR value is at -4.6 dB, the streaming throughput is 0.03 Kbps, the CQI value is on average 3.185185 and the modulation that is read is QPSK.

**Figure 23.** SINR Results for Badspot Points

In Figure 23, you can see the measurement results at the circled badspot points. In the figure, the SINR value is -6.2 dB, the streaming throughput is 232.44 Kbps, the CQI value is on average 5.233333.

### 4.2.4 Channel Quality Indicator (CQI)


**Figure 24.** Results of Smartfren's CQI data processing

In Figure 24 it can be seen the results of CQI based on 302 measured points. From the results of data processing, it can be seen that the CQI results have reached 100%. Where range 4 x < 8 has a percentage of 3.31%, and range 8 x < 12 has a percentage of 67.55%, range 12 x has a percentage of 29.14%.


**Figure 25.** Results of Telkomsel CQI data processing

In Figure 25 you can see the results of CQI based on 294 measured points. From the results of data processing, it can be seen that the CQI results have reached 100%. Where range 4 x < 8 has a percentage of 4.42%, and range 8 x < 12 has a percentage of 76.87%, range 12 x has a percentage of 18.71%.

### 4.2.5 Throughput and Latency

The measurement of throughput and latency values in LTE FDD mode is the same as the calculation of LTE TDD seen from the modulation that serves the cell. The following is the correlation between modulation and throughput in Table 4.4 and Table 4.5. [15]

**Table 4.** The Correlation of Modulation on Telkomsel's Throughput Provider Value

| Serving Cell PCI | PDSCH Phy *Throughput* (kbps) | | | PDSCH TB1 Modulation Type | | |
|---|---|---|---|---|---|---|
| | **Mean** | **Min** | **Max** | **QPSK** | **16QAM** | **64QAM** |
| 15 | 2,7 | 2,7 | 2,7 | 100 | | |
| 128 | 642,9 | 0 | 2633,7 | 100 | | |
| 163 | 564,3 | 0 | 4713,3 | 13,6 | 31,8 | 54,6 |
| 164 | 1009,8 | 0 | 10381,9 | 20,9 | 46,5 | 32,6 |
| 255 | 1226,7 | 0,1 | 12750,9 | 16,7 | 83,3 | |
| 261 | 730,8 | 0 | 7878 | 50 | 50 | |
| 262 | 239,6 | 0 | 1372,5 | 50 | 33,3 | 16,7 |

**Table 5.** The Correlation of Modulation on Throughput Provider Smartfren

| Serving Cell PCI | PDSCH Phy *Throughput* (kbps) | | | PDSCH TB0 Modulation Type | | |
|---|---|---|---|---|---|---|
| | **Mean** | **Min** | **Max** | **QPSK** | **16QAM** | **64QAM** |
| 326 | 756,6 | 0 | 4962,4 | 100 | | |
| 357 | 1034,7 | 0 | 3631,2 | 100 | | |
| 409 | | | | 100 | | |

Thus, dealing with these results, it obtained the value of throughput, latency and packet loss from both providers in LTE FDD mode as shown in table 4.6. [16]

**Table 6.** Throughput and Latency Results

| Provider | *Throughput* (Kbps) | *Latency* (ms) |
|---|---|---|
| Smartfren | 831.21 | 77 |
| Telkomsel | 820.83 | 68 |

From the measurement results, it can be seen that the throughput of smartfren operators has a better value than Telkomsel operators. Where smartfren operators have a throughput value of 831.21 Kbps while Telkomsel operators have a throughput value of 820.83 Kbps where the throughput value is in the range of values good enough to perform the streaming process based on the downlink value.

Whereas for Latency, data is taken based on prebuffering to reproducing streaming. The latency of the two operators has far different values but is still in a good QoS range, where the latency of the Telkomsel operator is 68 ms while the smartphone operator is 77 ms.

## 5. Conclusion

Measurement of Service Integrity on the LTE network was carried out in real time in the field according to the research path and ENodeB installed in dedicated mode. The effect of DT parameters on service integrity was merely seen in SINR and CQI parameters. When SINR measured 21.3 dB and CQI measured 13.5, the measured throughput was 3665.2 Kbps so that the measured modulation was 64 QAM, on the other hand, if SINR measured -0.2 dB and CQI measured 10, the measured throughput was 0.5 Kbps so that the modulation measured was small, namely QPSK. The result indicated that LTE TDD had a better service integrity value, namely throughput had a value of 891.16 Kbps and a latency of 48 ms for Telkomsel whereas 882.14 Kbps and latency of 49 ms for Smartfren than LTE FDD which had a throughput value of 820.83 Kbps and latency of 68 ms for Telkomsel while 831.21 Kbps and 77 ms of latency for Smartfren, so LTE TDD is better in terms of throughput and measured latency.

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