5G Analysis Using Software Applications

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Abstract: *Recently, 5G connection is widely used for mobile communication. The 5G technology is increasingly implemented in Malaysia country and in the big towns. There are many researches have been done to test and improve the connection. For the research analysis, Net Analyzer, nPerf, Meteor and speedtest applications that can measure parameters related to cellular communication have been used as a measurement tool. As a conclusion, internet and mobile connection shows that the performances are good for the users.*

Keywords: 5G Communication, Net Analyzer, Cellular Communication, Speedtest, Connection Speed.

I. INTRODUCTION

5G, also known as the fifth generation of wireless technology, is the latest advancement in mobile network technology. It aims to provide faster data speeds, lower latency, increased capacity, and enhanced connectivity compared to previous generations like 4G/LTE [1]. The objective of this project is to analyze the telecommunication signal around the Pagoh area, especially 5G signal. The second objective is to study the requirements needed for an android or ios to implement the 5G network and the third one is to study the advantages of 5G network compared to the current network which is 4G. Then, the last objective is to study the development of the 5G network in Malaysia [2].

II. METHODOLOGY

Along the time this project was carried out, some applications or software have been used for the analyzation of the telecommunication signal. Since 5G is not yet a widely use network, the analyzer only analyze the strength of the 4G network communication along with the older version to the telecommunication network. Some of the apps or software used in this project are Net Analyzer, Cell Tower Locator, nPerf, Meteor and Speed Test. Fig. 1 shows the logo of the Net Analyzer application. Net analyzer is an application used to analyze the network currently used by the current device. It is an all-in-one iPhone and Android application for network analysis, scanning and problem detection. Some of the information that can be obtained from this app is wi-fi LAN scanner with device name resolution, ping and visual traceroute with geolocation data, DNS and whois lookup, port scanner, network speed tester, information about current cell and wi-fi connection and wi-fi signal meter of surrounding hotspots only for Android devices. The Cell Tower Locator application shows the location of the cell tower into our mobile phone. The cell tower locator will also show the details of the phone's network depending whether the user is using the local Wi-Fi or using the cellular network.

Fig. 1 Net Analyzer Application

Next application that are used during the implementation of this project is nPerf. nPerf is an application that allows user to accurately qualify the internet connection's performance. The speed test on this application relies on an exclusive algorithm allowing the user to accurately measure the download bitrate and latency of the connection [3]. Fig. 2 shows the logo for the app and Figure 5 shows the interface for the website. Another application that is used is Meteor. This application is used for the mobile and wi-fi speedtest, application performance and network coverage map for 3G, 4G and 5G. This is an ad-free internet speed test tool that can be used to check the speed of the mobile and wireless connection. Meteor's unique test also allows users to see how their internet connection and download speed can affect the performance of their favourite mobile apps. Last but not least the Speed Test application & Wifi Analyzer. Some of Speed Test main features include the test wifi analyzer and compare. Basically, users can check the wifi signal strength and compare which is the strongest signal point with SpeedTest app. It also includes an accurate wifi analyzer which shows the user the detailed speed test information with related graphs.

Fig. 2 nPerf Application

III. RESULT AND DISCUSSION

The result from this project will be shown below along with the explanation for each application results. Basically, there are five applications that have been used and tested for this project. The results and explanation are further discussed in the following sections.

Result and Analysis

The first application is nPerf and the result is shown in Fig. 3. For this project, it is decided to do a full test using this application. The result shows the download bitrate, which is 7.63 Mb/s, the upload bitrate, which is 10.03 Mb/s and also the latency rate, which is 38 ms. At the end of the test, the application will give the phone's performance a score and the user can compare it to other phones if they want to [4]. Besides the download, upload and the latency rate, this application also tests the performance rate of the phone on browsing sites and streaming sites. Based on the result below, for the phones that are used in this project, it is 43.61 % for the browsing and 92.27 % for the streaming.

Moving on into the second application which is Meteor. Just like the result for nPerf, this application also shows the download, upload and the ping of the current connection as shown in Fig. 4. The only difference is that this application also shows whether the connection is good enough to be used on other applications like Chrome, Google Maps and Youtube. For the third application which is Net Analyzer, the result from the application is shown in Fig. 5. Based on the result, it basically shows the data state, the operator information and the network and phone type. This application shows the information about the active connection of the phone, the cell connection, and the wi-fi details.

Based on figure, the active connection part shows that we are using a cell type connection. It also shows the IP address and even the subnet mask that the phone is currently using. Since the phone is not connected to wi-fi, the wi-fi detail section will show that the phone is disconnected to wi-fi. It also shows the cell detail which is the operator's name, the data state and even the signal strength which is -57dBm. For the fourth application which is the Cell Tower Locator, the result basically shows the map for the area that we are in currently which is near the campus in Pagoh district. The green dot basically shows that the connection that is currently connected to the phone is stable. It also shows the GPS altitude, the network provider name, and the signal strength. There is not much information that we can get about 5G connection in this application since it mostly analyzes the signal strength the phone currently is using.
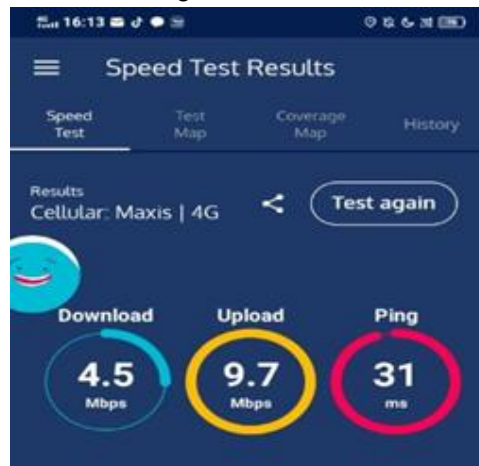
Fig. 3 nPerf result

Fig. 4 Meteor result

Last but not least the fifth application is the Speed Test. Almost identical to the result from nPerf and Meteor, this app also shows the download and upload bitrate. The difference for this app is that it also shows the ping, jitter and the loss experienced by the network.
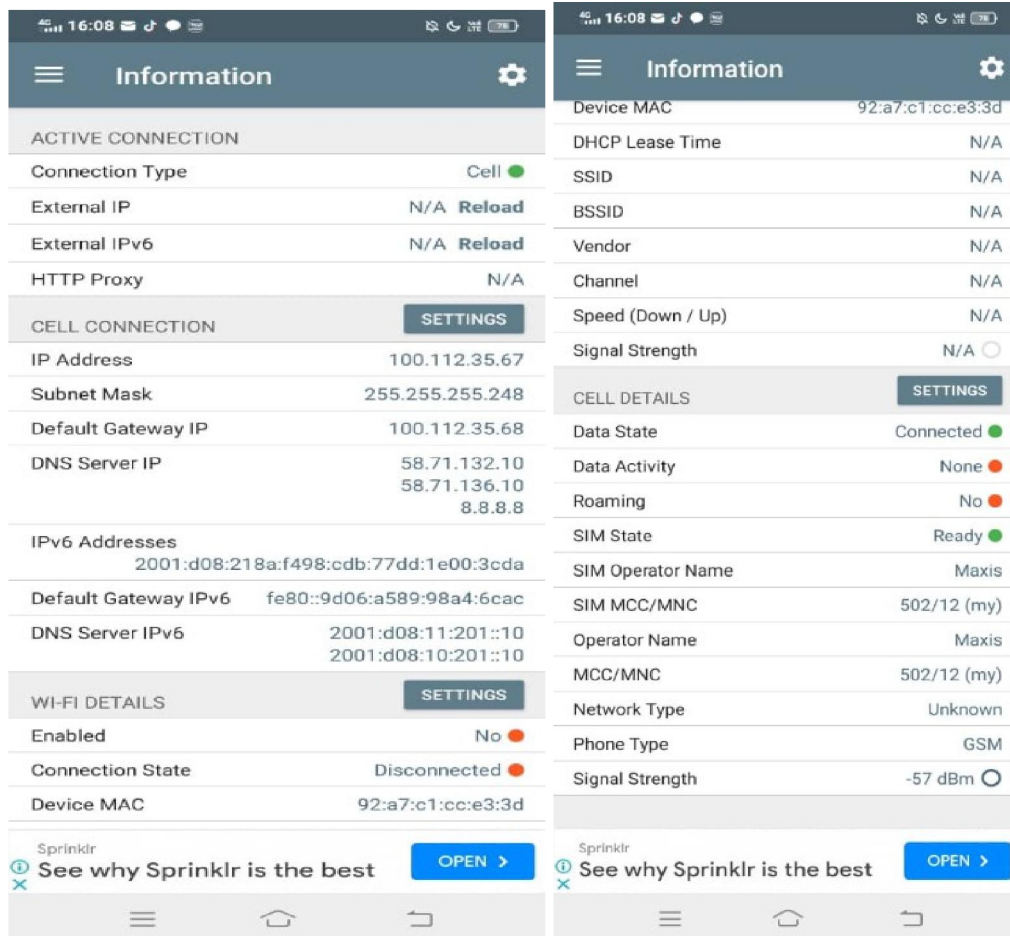
Fig. 5 Net Analyzer result

IV. DISCUSSION

Based on the research that has been done on 5G network performance during the implementation of the project, some of the 5G network advantages are the enhanced speed and capacity [5]. With speeds up to 10 Gbps, 5G enables quick downloads, seamless streaming of high-quality media, and faster data transfers. Additionally, 5G provides increased capacity, allowing for a higher number of devices to connect simultaneously without compromising performance. Another advantage of 5G is that 5G networks have extremely low latency, reducing the delay between sending and receiving data [6]. This is very important for real-time applications such as online gaming, video conferencing, and autonomous vehicles, where instant response times are essential. It is also important to note that 5G is designed to handle the massive influx of Internet of Things (IoT) devices and smart devices that will be connected to the network. With its increased capacity, low latency, and energy efficiency, 5G enables seamless integration of IoT devices, fostering the development of smart cities, smart homes, and interconnected applications. Some of the requirements for the implementation of 5G include hardware compatibility, operating system compatibility and network support [7].

V. CONCLUSION

In conclusion, throughout the implementation of this project, we are able to analyze the telecommunication signal of the 5G network around Pagoh. We are also able to study the requirement that is needed for the 5G network to be working in Android and iOS. Besides that, the objective of studying the advantages of the 5G network compared to the current network which is 4G is also a success. Last but not least, we are able to study about the development of the 5G network

IJARSCT

ISSN (Online) 2581-9429

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Impact Factor: 7.53

Volume 4, Issue 1, August 2024

in Malaysia. Based on the results that we got, it is safe to say that the 5G network is not yet widely used in Malaysia. This is mostly because of the industry concerns over pricing and transparency, as well as worries that a single government-run network would result in a nationalized monopoly. It is highly expected that the 5G network will be used more widely in Malaysia since it is basically an upgrade for the network that most Malaysians have already been using, which is 4G.

VI. ACKNOWLEDGMENT

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