

5G Signal Analysis using Opensignal Application

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Abstract: *Recently, 5G connection is becoming popular and widely implemented for cellular connection in many countries. The 5G technology is also increasingly implemented in Malaysia country and in the big towns. There are many researchers have been done to test and improve the connection. For the research analysis, Opensignal applications that can measure parameters related to cellular communication and has been used as a measurement tool. At the end of the research, it is concluded that internet and mobile connections give the good performances for the users.*

Keywords: 5G Communication, Opensignal, Cellular Communication, Connection Speed, Cell Tower

I. INTRODUCTION

5G, or the fifth generation of wireless technology, represents the latest advancement in mobile networks. It is designed to deliver significantly faster data speeds, lower latency, greater capacity, and improved connectivity compared to earlier generations such as 4G/LTE[1]. The first objective of this project is to comprehensively understand the requirements for implementing 5G technology. This entails examining the spectrum availability and allocation, which is essential for deploying 5G networks. By analysing the high data rate and low latency prerequisites, we aim to gain insights into the technical capabilities required to achieve optimal 5G performance [2]. Additionally, we will explore the concept of massive device connectivity, network slicing, and virtualization, which are crucial aspects for efficiently managing diverse applications and services on 5G networks. Lastly, we will investigate the enhanced security and privacy measures needed to safeguard the integrity and confidentiality of data transmitted over 5G networks.

II. METHODOLOGY

To achieve a comprehensive understanding of 5G development in Malaysia, we incorporated the use of Opensignal software as part of our methodology. Opensignal is a widely recognized tool for measuring and analyzing mobile network performance, including signal coverage. By utilizing Opensignal, we aimed to assess the local signal coverage and gain insights into the availability and quality of 5G networks in different areas of Malaysia. As a starting point, we conducted a literature review to understand the methodology and reliability of Opensignal data. We examined academic research, industry reports, and technical documentation related to the usage of Opensignal and similar tools for network analysis. This review provided us with a solid foundation for using Opensignal effectively in our project.

We collected relevant data from Opensignal by accessing their platform and utilizing their mobile application. Opensignal collects network performance data from users' smartphones, providing insights into various network metrics such as signal strength, latency, and availability. We ensured that the Opensignal application was installed on a diverse range of devices to capture a representative sample of network performance across different user segments. Using the collected Opensignal data, we focused on analyzing the local signal coverage of 5G networks in Malaysia and especially in Pagoh area.

We examined key metrics such as 5G signal availability, signal strength, and geographical coverage. This analysis allowed us to understand the current state of 5G signal coverage in different regions of Malaysia, identifying areas of strength and potential gaps in network deployment. By measuring using the application, the key metrics data will be acquired. The Opensignal application is shown in Fig. 1.



Fig. 1 Opensignal Application

III. RESULT AND DISCUSSION

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

A. Result and Analysis

The Opensignal application offers a range of features and functionalities designed to provide users with valuable insights into the performance and coverage of cellular networks. This article highlights the key capabilities of the Opensignal application in relation to cellular networks, empowering users to make informed decisions about their network usage and understand the quality of their network experience. By using Opensignal application we were able to capture some information about cellular service in the local area.

There is some limitation about the testing capability, since this area is not fully covered in 5G yet, hence the data we collected will more to 4G bias [3]. By using the Opensignal application we can scan the available cell tower that is nearby and up to a certain range, it is based on what cellular company you are using, for example my phone was using Digi so I can search Digi cell tower easily. By looking at the map I shows all the available cell tower in the application. The analysis of nearby cell towers using the application are shown in Fig. 2.

Although we cannot check other company's cell tower ID we can have a glance of how their cellular network signal strength and latency as well as the average speed they are capable to supply. As we can see from the screen shot, we can observe their download speed, upload speed, latency, signal strength. But keep in mind that these data are collected by the user that uses Opensignal application and averaging their data. Another cool feature from the Opensignal app is that it can check the cellular coverage. In this mode we can check different type generation of cellular service, from 2G up to 5G. Here we have a screen shot of the nearby coverage map of 5G signal from different service provider company as shown in Fig. 3. The small green square box indicates that there is being covered by 5G service. As we can see there is very little amount of 5G coverage in nearby neighbourhood.

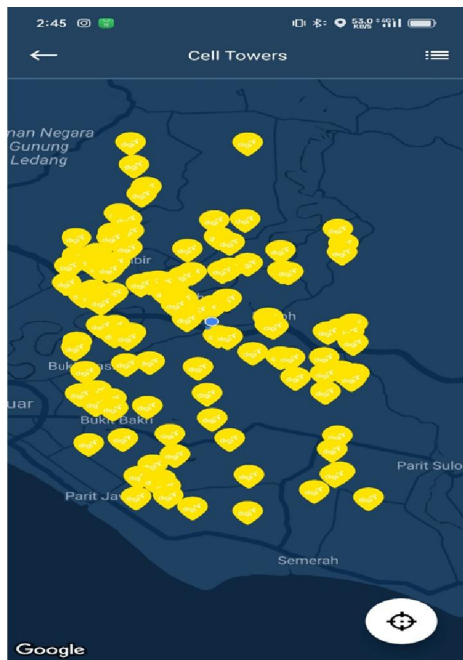


Fig. 2 Available cell towers around Johor state.



Fig. 3 5G coverage in Kuala Lumpur
DOI: 10.48175/IJAR SCT-19641

Last but not least, Opensignal application also have a tool that let you to run a speed test with your current network. At the end of the speed test user will get to know the download speed and the upload speed as well as the latency of their current network. But bear in mind that the network speed does not mean everything as not all the application can utilize all the bandwidth that service provider given. Some of the test result may not same compared to the average speed in the area that observe by the Opensignal application. This might be cause by the different subscription to the cellular service, some service my come with a speed cap to limit the usage of bandwidth, cheaper plan tends to have this kind of speed cap [4].

B. 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]. The advent of 5G technology marks a significant milestone in the evolution of wireless communication, promising a host of advantages and benefits that will shape the future of connectivity. With its faster download and upload speeds, reduced latency, improved network capacity, support for a massive number of connected devices, and enablement of emerging technologies, 5G is set to revolutionize industries, enhance user experiences, and drive innovation across various domains.

The introduction of 5G brings unparalleled speeds and bandwidth, enabling users to download and upload data at lightning-fast rates. This empowers individuals and businesses to engage in data-intensive activities, such as high-definition video streaming, real-time collaboration, and seamless multimedia content consumption. The era of buffering and slow downloads becomes a thing of the past as 5G delivers a new level of efficiency and convenience. Low latency, a defining characteristic of 5G, enables real-time applications to thrive [6]. From remote surgeries and autonomous vehicles to immersive virtual reality experiences, the reduced delay ensures instant responsiveness and a seamless user experience. Critical applications that demand reliable and instantaneous communication find their ideal match in 5G technology, creating new opportunities for advancements in healthcare, transportation, and entertainment.

IV. CONCLUSION

Throughout the implementation of this project, we are able to analyze the telecommunication signal of the 5G network nearby locations [7]. 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 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.

In conclusion, 5G technology brings forth a new paradigm in connectivity, delivering faster speeds, reduced latency, improved network capacity, and the ability to support a multitude of connected devices. The advantages and benefits of 5G are poised to transform industries, revolutionize user experiences, and unlock the full potential of emerging technologies. As 5G continues to evolve and expand its reach, the world stands on the cusp of a hyperconnected future, where possibilities are boundless and the power of seamless connectivity is harnessed for the betterment of society.

V. ACKNOWLEDGMENT

This work was supported by Department of Electrical Engineering Technology, Faculty of Engineering Technology, Universiti Tun Hussein Onn Malaysia (UTHM).

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