

# A STUDY ON THE APPLICATION OF FREQUENCY RADIO OF SIGNAL TRACKER AS A BASE OF COMPARISON OF CHANNELS OF THE USE OF OPERATOR IN GSM FREQUENCY OF GSM 1800

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## 1. INTRODUCTION

### 1.1 Background

Technology of cellular telecommunication has been increasingly developing recently – from analog to digital technology. One of digital technology applications is Global System for Mobile Communication (GSM) representing a system of digital cellular communication that has been developing rapidly and has been accepted globally. It is due to GSM has presented various services and features for the users so that it can facilitate communication. Nowadays, system of GSM mostly used by operators of GSM in many countries is system of GSM 900. However, due to fewer and fewer of frequency allocation available for GSM 900, then the operators of GSM start making an effort to have licence on the use of frequency 1800 for the purpose of the implementation of system GSM 1800. The reason for it is by having the licence, so the operators who have operated system GSM 900 previously, will be able to increase their net capacity and give chance to newly operators of GSM to operate GSM 1800 as a single band.

By operating dual band system, consisting of GSM 900 and 1800 in a single operator of GSM, so the operator can distribute traffic from GSM 900 to GSM 1800. Actually, coverage areas of GSM 1800 cellular are smaller than coverage areas of GSM 900 cellular. But, the capacity of GSM 1800 is bigger than the capacity of GSM 900. Therefore, operators use GSM 900 cellular to overcome the problems of coverage areas; while, use GSM 1800 cellular to overcome the problems of capacity. In addition, the

development of the technology in the field of telecommunication technology has changed rapidly in line with the development of the system of GSM. The increasing number of the developers of information and communication technology, such as, telephone or cell phone providers, impacts directly on the increasing number of handphone with operation system, types, and interesting models as well as they are equipped by various features and service programs, whether from access to communication of data like internet access and internet wireless with high speed, calls with video streaming inter-users, access to digital maps and media for better data transfer. All of this available for satisfying the needs of the users who are nowadays increasingly mobile. The development, of course, will be supported by the development of software made for facilitating the daily works of humanbeings, even in helping analyzing, like, in the process of the analysis of BTS measurement so as to be able to connect between the users of the technology and telecommunication service providers.

The application that will be used is the application of Radio Frequency Signal Tracker, where the application will be used in the system of operation of Android. Android is a system of operation that has been popular in the users of handphone, because it is used in various handphones with interface touchscreen media. The application of *Radio Frequency Signal Tracker* functions to inform parameters of BTS, especially to measure channels in each BTS cellular. In fact, up to now, technicians,

operators, and regulators measure BTS channels by using Spectrum Analyzer.

Spectrum Analyzer is a measuring tool functioning to observe or see frequency spectrum of a signal or channel. Of the result of the measurement by using Spectrum Analyzer, it is hard enough to detect channels used by each BTS, so that the application of Radio Frequency Signal Tracker to measure technical parameters of BTS including Countries Code, Area Codes, BSIC, and ID Cells, and frequency channels including carrier frequency and hopping that functions as a base of channels comparison of the use of each GSM operator in line with the use of hopping frequency in the system of GSM in increasing frequency capacity. By comparing measurement methods of the application of Radio Frequency Signal Tracker to Spectrum Analyzer, it will later impact directly on the calculation of the cost of the user of GSM frequency, especially for GSM 1800 that is wellknown as DCS 1800, because technology of GSM 1800 is a derivative of the GSM 900 Mhz, which is a successful cellular standard. And, it will, of course, impact positively on the Non-Tax National Income (Penerimaan Negara Bukan Pajak) managed administratively by Directorate General Post and Telecommunication.

### 1.2 The Objectives of the Research

The objectives of the research is that the result of the research will be a comparison of the channels of the use of each operator in the frequency of GSM 1800 based on the result of the analysis of measurement of frequency channels using Spectrum Analyzer and Application of Radio Frequency Signal Tracker.

## 2. THE RESULT AND DISCUSSION

### 2.1 Process of Installation of the Application of Radio Frequency Signal Tracker in Handphone Huawei Ideos X5

Ways to install the application of Radio Frequency Signal Tracker in handphone Huawei Ideos X5 is as follows:

1. Open the feature of Google Play which is installed in the android set, shown in the Picture



Figure 1. Front Display of Handphone Set

2. Having been chosen, then the display like in the Picture 2 will be appeared.



Figure 2. Page in the Application of Google Play

3. Then, click search engine and write down the searched application – write down *Radio Frequency Signal Tracker*. Some applications will appear related to the written application, as shown in the Picture 3.



Figure 3. The display after search engine is active

4. After the display of some applications has been finished, then choose Radio Frequency Signal Tracker. The next menu will include the process of installation and description of the applications, as shown in Picture 4.



Figure 4. Page of information on Radio Frequency Signal Tracker

5. Process of installation will continue till it will be finished and the application will appear on the screen of the handphone as shown in Picture 5



Figure 5. Process of Installation of Radio Frequency Signal Tracker finished

## 2.2 The Use of the Application of Radio Frequency Signal Tracker in Handphone Huawei Ideos X5

Having installed the application of Radio Frequency Signal Tracker, then additional menus will appear in the handphone as shown in Picture 6.



Figure 6. The Display of the Application of Radio Frequency Signal Tracker has been installed


Open software Radio Frequency Signal Tracker Buka software *Radio Frequency Signal Tracker* , then the menus of application will appear as shown in Picture 7.



Figure 7. Initial Display or Menu of Application of the Radio Frequency Signal Tracker

After entering into menu of application of Radio Frequency Signal Tracker, technician can use

the menu in accordance to the needs. Because of, there are so many menus that some of the sub menus related to the research will be used for the sake of the research, as shown in Picture 8.

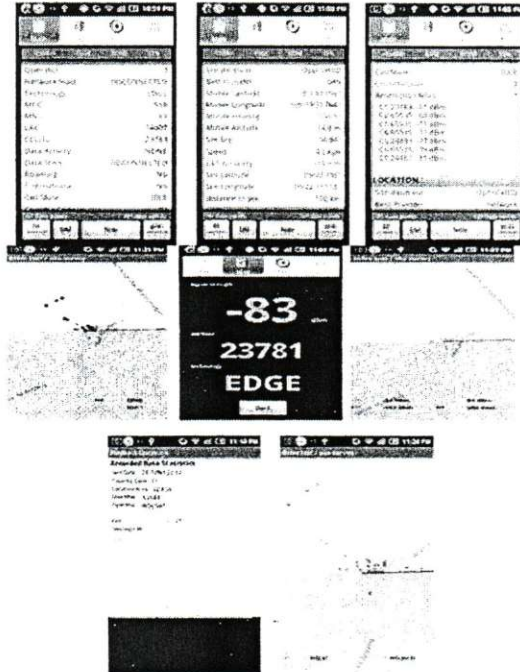


Figure 8. Menu Display of the application of Radio Frequency Signal Tracker that will be used.

Exit from the application of Radio Frequency Signal Tracker by turning off the system of detecting and pressing exit button existing in the handphone Huawei Ideos X5.

### 2.3 The Menu of Radio Frequency Signal Tracker in handphone Huawei Ideos X5

Measuring technical parameters of BTS GSM in the research just uses some of the menus existing in the application of RF Signal Tracker.

Ways to read the menus in application of Radio Frequency Signal Tracker are as shown in Picture 9.



Picture 9. Menu of application of Radio Frequency Signal Tracker

### 2.4 The Result of the Data Recapitulation of the Channel Record of the Operator X, Y, and Z

Table 1. Recapitulation of the Frequency of Carrier by using Spectrum Analyzer

Operator	Frequency Channels (MHz)	Total
Y	1816, 1816.8, 1818	3 Frequencies of Carrier
X	1826,4 ,1827,2 ,1828	3 Frequencies of Carrier

In operator Z, the measurement of Spectrum Analyzer (SPA) is hard to know and make sure the frequency of carrier, hopping, and frequencies of other BTSs that are being measured.

## 2.5 The Implementation of the Result of Measurement of Total Channels in Determining the Cost of the Users of the Frequency (CUF)

**Table 2.** The Result of the Calculation of Cost of the Users of the Frequency in Operator X, Y, and Z

Operator	Total Frequencies of Carrier	CUF Frequency per Channel	Total CUF (Spectrum Analyzer)	Total CUF (Radio Frequency Signal Tracker)
PT. Y	3	Rp. 8,960,252	26,881,574	Rp. 591,394,622
PT. Z	-	Rp. 9,756,926	-	Rp. 87,812,333
PT. X	3	Rp. 10,155,127	30,465,380	Rp. 396,049,935

It can be seen the differences in the calculation of CUF per year based on data Spectrum Analyzer and Radio Frequency Signal Tracker, because in determining CUF by data Spectrum Analyzer just uses frequency of carrier, whereas, Radio Frequency Signal Tracker uses both frequency carrier and hopping.

Through the difference of total measured frequency channels, it will effect on the CUF. The more the frequency channels detected, the more non-tax national income through CUF managed by Directorate General Post and Telecommunication. In implementing the application of Radio Frequency Signal Tracker as a base for comparing channels used by Operator GSM is more prioritized by using the application, because the result is more significant and supported more completely than previous generation, namely, fieldtest running in the operating system of Symbian.

### 3. CONCLUSION

1. Of the result of measuring by the application of Radio Frequency Signal Tracker and Spectrum Analyzer, it is got maximum result, by obtaining the yield of measurement 66 frequency channels for site Y, 9 frequency channels for site Z, and 39 frequency channels for site X.

2. The result of measuring the total channels can be a reference for calculating CUF and in the time of implementation in the calculation of

CUF, the differences occur between the calculation by using Spectrum Analyzer and Radio Frequency Signal Tracker.

### REFERENCES

Decree Letter of Ministry of Communication and Information No. 19/PER.KOMINFO/10/2005 on the Guideline for the Implementation of Tariff of Non-Tax National Income from Cost of the Use of Radio Frequency Spectrum, Jakarta.

Decree Letter of the Government of Republic of Indonesia No. 28 Year 2005 on Tariff for Types of Non-Tax National Income applied in the Department of Communication and Information, Jakarta.

Decree Letter of the Government of Republic of Indonesia No. 7 Year 2009 on Tariff for Types of Non-Tax National Income applied in the Department of Communication and Information, Jakarta

<http://www.iec.org/>, Global System for Mobile Communication (GSM), Quoted on May 25, 2012, 21:15 – 21:45

<http://www.gsmfavorites.com/documents/introduction/mobile/>, Introduction to GSM, the Global System for Mobile Communication. Quoted on May 2 2012, 22:15 – 22:45.

<http://nurjai.wordpress.com/2009/06/08/spectrum-analyzer/>, on spectrum analyzer. Quoted on June 16, 2012, 23:08 – 23:30.

[www.anritsu.com](http://www.anritsu.com), Spectrum Analyzer (SPA) Anritsu Type: MS2723B. Quoted on June 23, 2012, 00:10 – 01:35.

<http://www.wpsantennas.com/>, Cellular Phone Field Test Modes. Quoted on June 17, 2012, 22:10 – 22:25.

<http://www.postel.go.id>, Formula of CUF. Accessed on June 20, 2012, 23:02 – 23:25.

<http://www.postel.go.id>, Decree Letter of Ministry of Communication and Information No. 19/PER.KOMINFO/10/2005 on the Guideline for the Implementation of Tariff of Non-Tax National Income from Cost of the Use of Radio Frequency Spectrum. Accessed on July 7, 2012, 21:05 – 21:20.

<http://www.postel.go.id>, Decree Letter of the Government of Republic of Indonesia No. 28 Year 2005 on Tariff for Types of Non-Tax National Income applied

in the Department of Communication and Information. Accessed on July 7, 2012, 21:21 – 21:35.

<http://www.postel.go.id>, Decree Letter of the Government of Republic of Indonesia No. 7 Year 2009 on Tariff for Types of Non-Tax National Income applied in the Department of Communication and Information. Accessed on July 7, 2012, 21:36 – 21:50.

Jari.P.Jokinen, 2004, *Field Test Display Specification*, Nokia. refer