



EVALUATION OF GOVERNMENT POLICY AND ANALYSIS OF QUALITY MOBILE COMMUNICATIONS NETWORK OF FWA-CDMA WITH LOW COST FOR RURAL AREAS IN INDONESIA

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ABSTRACT

Fixed wireless network or abbreviated Fixed Wireless Access (FWA) is a technology for fixed wireless telephone network. In Indonesia, fixed network telecom operators using CDMA wireless instead of cables, due to the high cost of telephone wiring investment. FWA is also known as Radio in the Local Loop (RLL) or Wireless Local Loop (WLL). FWA is used as a substitute for copper wire or partial local loop telephone network. This study aimed to evaluate the feasibility of the government's policy of FWA-CDMA to reduce inequalities in access to communications in rural and analyzes about the quality of the mobile network at a low cost so that it can be applied in Indonesia. Results obtained FWA-CDMA technology is deemed not profitable because the government is not neutral in the use of frequencies and lead to discrimination in fare. Therefore, CDMA operators are required to migrate to the GSM frequency band, in accordance with the Regulation of the Minister of Communications and Information Technology No. 30, 2014. The quality of the GSM network in rural areas is not as good as the CDMA network. This indicates that in order to equalize access to telecommunications, the CDMA network is still needed in the countryside.

Keywords: FWA, CDMA, policy, quality, network.

1. INTRODUCTION

Fixed wireless network or abbreviated Fixed Wireless Access (FWA) is a technology for fixed wireless telephone network. In Indonesia, fixed network telecom operators using CDMA wireless instead of cables, due to the high cost of telephone wiring investment. FWA is also known as Radio in the Local Loop (RLL) or Wireless Local Loop (WLL). FWA is used as a substitute for copper wire or partial local loop telephone network. FWA license using a regular telephone numbering plan that is using the 021 area code example to Jakarta. In contrast to the FWA, cellular licenses follow the rules of other mobile numbering with the prefix 08xx. That is, the FWA service cannot be taken out of town except by replacing temporary with the local area code numbers. Now, both of these licenses commonly used in CDMA (Code Division Multiple Access). These licensing differences have an impact on tariffs. FWA CDMA relatively cheap rates follow a regular phone price "(fixed-line)", while the CDMA cellular GSM service rates follow in general because the operator must pay BHP frequency and so forth, while the FWA operator is not necessary.

In 2000 the number of mobile phone user Indonesia amounted to 3.6 million data from the International Telecommunication Union (ITU), the figure jumped to 280 million in 2012 [1-2]. Using the database population, projected in 2016, 2017 and 2018 the number of mobile phone users in Indonesia reached 389.26 million; 409.25 million; and 426.52 million. The above facts imply one thing: information is strength. This is consistent with the view, that there is a very strong correlation between economic developments with the

amount of investment in the telecommunications field. [3-4]. But in addition to having the advantage, it turns out the use of telecommunications technology also has a problem, such as the results of the study that the problems that arise in developing countries in expanding telecommunications technology [5-6].

The development of telecommunications in urban areas could increase the gap between urban and rural areas. Meanwhile, research on the increased cost efficiencies made by Ritthisoonthorn, 2006 which demonstrated the effectiveness of Broadband Fixed Wireless Access for networking and community building [7-9]. Associated with the development of telecommunications access in rural areas, the government actually has a blue print equalization program telecommunications access program called the Universal Service Obligation (KPU) / Universal Service Obligation (USO). Based on Minister of Communication and Information / Permenkominfo No. 32 / PER / M. KOMINFO / 10/2008, KPU / USO are equitable development program in the telecommunications sector which is directed at Universal Telecommunication Service Area namely: rural, remote border area, stub areas and areas that are not viable economical as well as areas which were not affordable access and telecommunication services. The development of mobile telephones (wireless) in Indonesia is basically divided over full mobility services, which are often referred to as business cellular and limited mobility services (Limo), called FWA (Fixed Wireless Access). Growth in both these services has shown that the market potential and FWA Mobile services developed very well in Indonesia. With many innovations



and breakthroughs made by the organizers of the two services are, in the end the definition of full-mobility and becomes very thin Limo understanding.

One of them is the freedom to FWA service subscribers can access from anywhere without being restricted by the issue a different area code. Flexi is a service FWA belongs PT. Telkom Indonesia has made technological innovation by providing a feature known as Flexi Combo. Esia breakthrough provides features similar to Go-Go. Both of these features in turn allow customers FWA "as if" it can roam between two different area codes without having to replace his RUIIM card. Other features of the development are also being conducted by the FWA service providers. Features as well as other derivatives services continue to be developed in the direction of the features provided by Mobile services. This causes the FWA services increasingly in demand by the public. The need to seek investments abroad also can be limited; if the government would provide a low-cost technology solution developed to enable developing countries like Indonesia can avoid the high cost in the use of high-tech equipment such as telecommunications. The government should support the use of FWA-CDMA network through its policies for high-tech with low cost, excellent quality, with equipment that is capable of being produced in their own country such as making telephone devices are cheap [10-13].

Meanwhile, according to studies that have been done by O'Neill (2003) wireless local loop technology (WILL) as the cost of communication to reduce the gap of telephone users in India, where in a very short time has managed to put up more than 20 million telephone lines artificial result of their own country, save billions of dollars and can use the internet, not just a phone, connectivity is very important for rural communities to increase income [14-18]. the CDMA technology has been used rake receivers (able to look for signals to be desired) and CDMA technology is very easy to implement and have a rental tape bandwidth less 6 times that of a GSM (Global System for Mobile Communication) as contained in Decree (KM) NUMBER: 19 / PER.KOMINFO / 10/2005, but why good government policies are not followed up recently by the stakeholders to continue to maintain a cheap telephone? Even PT Telkom itself as a state company should keep the interests of the people is willing to stop the phone's flexi their property and develop GSM through its subsidiary, Telkomsel which significantly shareholding is not 100% (one hundred percentages) State-owned Indonesia [19].

This research aimed to compare the gaps of some of the above studies and it is happening right now so we need a deeper study of the Government Policy Evaluation

and Research Network Quality Analysis FWA-CDMA Mobile Communications Cost Flights to Rural Areas in Indonesia. This study uses the approach of government regulations, cost and budget, interviews and research in a comparative manner (benchmarking) for the use of FWA-CDMA to urban and rural areas. Government regulation already established on the regulation of telecommunications in Indonesia.

2. RESEARCH METHOD

This research was conducted to evaluate the feasibility of the government's policy of FWA-CDMA to reduce inequalities in access to communications in rural areas. The research method is done by:

A qualitative approach was used to determine government policy on the FWA-CDMA, frequency rental policy and tariff policy on CDMA.

Quantitative approaches in order to determine the quality of FWA-CDMA network in rural areas and to determine customer satisfaction CDMA in the countryside.

For qualitative approach, the method used is descriptive qualitative research on data collected and expressed in the form of words and images, words arranged in sentences, such sentences interviews between investigators and informants. Qualitative research departed from the philosophy of constructivism which assumes that reality is plural dimensional, interactive and social experience an exchange interpreted by individuals. The qualitative research aimed at understanding social phenomena from a participant's perspective. Participants are people who are invited to interview, observed, were asked to provide data, opinions, thoughts, perceptions [20].

This study tried to obtain more information about the decision-making development of FWA-CDMA. Qualitative technique is used as an approach in this study, as this technique to understand the rational reality as subjective reality of the society, especially FWA-CDMA and CDMA network operator. The process of observation and in-depth interviews are very primary data gathering. From these observations are expected to be able to explore the impact of the implementation of FWA-CDMA setback for the community as well as the owners of capital so that data can be the first step amelioration of FWA-CDMA network implementations based low cost.

For a quantitative approach, the method used was a survey in the countryside in Kupang City, Nusa Tenggara Barat. Techniques of data retrieval are done by distributing questionnaires to determine the level of customer satisfaction on service CDMA. The grating quantitative research instruments are as follows (Table-1 and Table-2):

**Table-1.** quantitative research instrument.

No	Variable	Indicator	Item
1	Price Policy	a. Transparency	1. CDMA operators set prices appropriately. 2. CDMA operator informs the price increase imposed on the market before
		b. Qualities Ratio	1. Rates CDMA proportional to its quality. 2. Rates CDMA in accordance with its useful life
		c. Relative Price	1. Rates CDMA appropriate specifications 2. Rates CDMA in accordance with the level of consistency
		d. Confidences	1. Rates CDMA is not excessive when compared to GSM 2. Rates CDMA appropriate market price trends
		e. Reliabilities	1. Rates CDMA appropriate the benefits 2. Rates CDMA appropriate financial capability customers
		f. Honesty	1. Rates CDMA relatively the same in each region / area 2. Rates CDMA relatively stable over a relatively long time
2	Consumer satisfaction	a. physical evidence	1. CDMA operators provide convenient service for customers. 2. Equipment used CDMA operators to serve customers a sophisticated and modern. 3. CDMA operators to provide facilities for customers who complain complaint

Table-2. Quantitative research instrument (Continue).

No	Variable	Indicator	Item
		b. Reliability	1. CDMA operators treat the customers are not discriminatory. 2. Representative / Customer Service to have sufficient knowledge about the technologies of CDMA
		c. responsiveness	1. CDMA operators quickly respond to customer desires 2. Handling customer complaints quickly made. 3. Power mechanic (employees) providing services carefully
		d. security	1. Rates CDMA meet the standards 2. CDMA operators fulfill the rights of the customer on the product purchased 3. Rates CDMA meet the standards 4. CDMA operators fulfill the rights of the customer on the product purchased

3. RESULTS AND DISCUSSIONS

3.1 Policy on CDMA

December 2015 is the determination time for CDMA operators. Because, in the month they've had to move to GSM frequencies. Basic displacement or migration is the Regulation of the Minister of Communication and Information No. 30 Year 2014 concerning Settlement radio frequency band of 800 MHz for the Purposes Mobile Cellular Network. One consideration of the issuance of Regulation of the Minister of Communication and Information is the need to restructure the radio frequency band of 800 MHz which has propagation characteristics appropriate for the

purposes of network penetration and improved telecommunication services, to be used optimally for the benefit of society through the application of neutral technologies, especially beneficial for rural communities, In Article 4 states that:

- a) Holders permit the use of radio frequency spectrum in the 800 MHz radio frequency band shall perform the migration using radio frequency spectrum referred to in Annex I, which is an integral part of this regulation.
- b) Migration as referred to in paragraph (1) completed no later than the date in December 2016.



- c) Migration as referred to in paragraph (1) does not alter the terms of validity period of the license to use the radio frequency spectrum.
- d) Migrating the use of radio frequency spectrum in the 800 MHz radio frequency band referred to in paragraph (1) shall be determined in a separate Ministerial Decree.

The provisions in Article 4 of Regulation of the Minister of Communication and Information that makes CDMA operators busy to shut down its service and decided to migrate to the GSM network. Implementation of Fixed Wireless Access (FWA) was originally required in many places in Indonesia given the density of phone availability is still relatively low (less than 3%), and ease of implementation of a wireless network (LAN) as compared with wired networks, especially in the area -area relatively considered less advantageous economically.

With the development of technology, the convergence between fixed and technology mobile, the separation between FWA and mobile has been difficult to distinguish. There have been a number of attempts to assess the improvement of regulatory and technical provisions, including licensing issues, the amount of BHP (Operation Fee) Radio Frequency, interconnection, numbering, and so on. Status of existing conditions in the Radio Frequency Spectrum for FWA Network Operator and Mobile Cellular Network in Indonesia, among others:

a. There are 11 permits cellular providers / national FWA in Indonesia, which consists of: mobile Operator / FWA with CDMA technology standard, a frequency band of 450 MHz, 850 MHz and 1900 MHz. Organizers cellular technology standard GSM / UMTS in the 900 MHz band, 1800 MHz and 2.1 GHz.

b. As a result of the application of two different technology standard between CDMA and GSM, as well as frequency planning is not harmonized between frequency planning mobile USA is used for CDMA, as well as frequency planning cellular Europe's GSM, then there is a problem of potential interference requires a "guard band" adequate, between two adjacent cellular systems, namely: (i) Downlink CDMA-850 MHz (BTS to mobile) with GSM-900 MHz uplink (mobile to BTS) in the frequency band 885-890 MHz; (ii) The potential interference between CDMA BTS Tx to Rx GSM BTS; (iii) Downlink PCS / CDMA-1900 MHz (BTS to mobile) with 2.1 GHz UMTS Uplink (mobile to BTS) in the frequency band 1950-1990 MHz; (iv) the potential interference between CDMA BTS Tx to Rx GSM BTS. In 2005, carried frequency arrangement IMT / 3G in the bands at 1.9 and 2.1 GHz with: (i) migration of the frequency PCS / CDMA-1900 MHz for a number of organizers FWA / Mobile operation in the band 1950-1990 MHz and the rearrangement of the organizers FWA / cellular CDMA in the 850 MHz band. (ii) FWA FWA Telkom and Indosat in Greater Jakarta, Banten and West Java with a standard PCS-1900 MHz migrated to the 800 MHz spectrum. Then, the adjustment Provider License or Permit FWA / CDMA cellular to Mobile-8 and Bakrie Telecom. Do also

consolidate between PT. WIN and PT. Primasel, as well as the transfer of PCS-1900 frequency allocation granted prior permission to band frequency band outside the core IMT-band (1920-1980 MHz). Frequency migration PCS / CDMA-1900 MHz and 850 MHz can be completed by the end of 2007. Structuring frequency bands at 1.9 and 2.1 GHz are also to provide additional opportunities for the frequency allocation of global multimedia mobile services (IMT / 3G) frequency band 1940-1955 MHz paired with 2130 - 2145 MHz.

c. In February 2006, made the selection of IMT / 3G in the 1.9 and 2.1 GHz band through an auction method that was first performed in Indonesia. A number of regulatory changes made that policy-making and regulatory structuring 3G mobile frequencies, selection / auction organizer 3G / IMT-2000 in the 2.1 GHz band, the imposition of tariffs BHP frequency band for 3G providers.

There are a number of advanced policies that have been and will be resolved, among other things:

(i) Increase the frequency allocation of IMT-2000 / 3G for cellular providers GSM-900/1800 fastest at the start of 2008 from 5 MHz to 10 MHz FDD FDD. Through Kominfo Decree No. 268 / KEP / M. KOMINFO / 9/2009 on Stipulation Allocation of Additional Block Radio Frequency Band, Tariffs and Payment Scheme Fee of Radio Frequency Spectrum for Operator of IMT-2000 At Radio Frequency Band 2.1 GHz, an additional band of 3G by 5 MHz has been awarded to Telkomsel and Indosat after the addition of the Ribbon 3G deals to five organizers mentioned above.

(ii) Imposition BHP frequency band to the organizers of IMT-2000 / 3G and conversion into BHP BHP ISR ribbon for other service providers gradually. Socialization conversion into BHP BHP ISR Ribbons for cellular providers have done with DGPT who has published a white paper application usage fees based on bandwidth (BHP-PITA) on the telecommunication mobile and fixed wireless access (FWA) in October 2009.

(iii) Adjustment supporting regulations: Regulation on Unified Access License (converged Fixed / Mobile), revision of Government Regulation regarding BHP Frequency, and so on.

Associated with the 800 Mhz frequency band, in the early 1990s, has been granted a license for cellular mobile telecommunications operators to Komselindo regional AMPS, Metrosele and Telesera in the band 800 MHz sub-band A (835-845 MHz and 880-890 MHz). In the mid-1990s, has been granted a license for cellular mobile telecommunications operators to Ratelindo regional AMPS (Bakrie) in the band 800 MHz sub-band B (825-835 MHz and 870-880 MHz) in the Greater Jakarta area. The development of AMPS cellular services decreased until the end of the 1990s, since the advent of more reliable technology services. In development since the early 2000s, all the AMPS cellular providers to switch to CDMA technology gradually. In about 2002, citing the need to raise teledensity on the approval of the rate increase, Telkom CDMA WLL license obtained in 800 (outside of West Java, Banten, DKI) and WLL CDMA



1900 in West Java, Banten, and Jakarta. Similarly, Indosat is given the same permissions, for the preparation of a duopoly local PSTN provider. In the development of the CDMA WLL providers to evolve into a limited service in the city / area code one (Fixed Wireless Access). Even with the development of mobile technology, it is difficult to distinguish again between fixed service (WLL, FWA) and cellular mobile.

Initial conditions permit the delivery and allocation of frequencies FWA / cellular CDMA 800 MHz / 1900 MHz in Indonesia before 2005 are as follows:

1. 800 MHz band

a. Frequency allocation (Jakarta, West Java, Banten)

- 1) 825-835 MHz and 870-880 MHz: Komselindo (Group Mobile-8)
- 2) 835-845 MHz and 880-890 MHz: Bakrie Telekom

b. Frequency allocation (outside Jakarta, West Java, Banten)

- 1) 825-830 MHz and 870-875 MHz: Telkom Flexi
- 2) 830-835 MHz and 875-880 MHz: Indosat
- 3) 835-845 MHz and 880-890 MHz: Komselindo, Telesera, Metrocel (Group Mobile-8)

2. Band 1.9 GHz (PCS-1900)

a. Organizers FWA-1900 CDMA coverage Jakarta, West Java, Banten

- 1) Indosat (1880-1885 MHz and 1960-1965 MHz)
- 2) Telkom (1885-1890 MHz and 1965-1970 MHz)

b. Organizers cellular and wireless data is CDMA-1900 (a national license, not yet in operation)

- 1) WIN (1895-1900 MHz and 1975-1980 MHz)
- 2) Primasel (1900-1910 MHz and 1980-1990 MHz)
- 3) Type of License

- a) FWA: Bakrie Telecom, Indosat, Telkom,
- b) Cellular Mobile: Mobile-8, Primasel
- c) Wireless Data: WIN

In July 2005, the Government decided to do the rearranging cellular frequency bands at 1.9 and 2.1 GHz band to avoid interference between systems PCS-1900 and IMT-2000 (UMTS) as well as inefficient use of frequencies. So it was decided to do the migration implementation of PCS-1900 to the outside ribbon core band IMT-2000 (UMTS). The government also established that the organizers will be migrating to the cellular PCS-1900 800 MHz, to facilitate service migration to the 800 MHz CDMA 1900. Telkom Flexi and Indosat Starone in Jakarta, Banten and West Java had to migration of mobile PCS- 1900 to 800 that had been occupied by Mobile-8 and Bakrie Telecom.

While Primasel and WIN have to go out of ribbon coreband IMT-2000 (UMTS). At first, the government will facilitate business cooperation between Telkom and Mobile-8 and Bakrie with Indosat in order to facilitate migration to PCS-1900 cellular 800 MHz, but ultimately a business deal went wrong. Additionally do facilitation in order to WIN and Primasel can join and move to PCS-1900 beyond IMT-2000 core band. After for more than

one year of intensive discussions with the organizers cellular PCS-1900 and 800 MHz, the government decided the policy as follows:

- a) Bakrie Telecom (Esia) allocated frequency FWA CDMA nationwide with the following settings: 1) channels 201, 242, 283 CDMA 800 MHz in Jakarta, West Java and Banten; 2) channels 37, 78, 119 CDMA 800 MHz outside Jakarta, West Java and Banten
- b) Telkom Flexi CDMA FWA granted national frequency allocation with the following settings: 1) channels 37, 78, 119 CDMA 800 MHz in Jakarta, West Java and Banten; 2) channels 201, 242, 283 CDMA 800 MHz outside Jakarta, West Java and Banten
- c) Channel 160 CDMA 800 MHz will be contested between Bakrie Telecom and Telkom Flexi based on performance evaluation of development. As of December 31, 2007, for the purposes of migration, channel 160 "loaned" to Bakrie Telecom.
- d) Through Kominfo Decree No.363 / KEP / M.KOMINFO / IO / 2009 regarding the Second Amendment to Decree of the Minister of Communication and Information Technology Number 181 / KEP / M.KOMINFO / 12/2006 About Channels 800 MHz Radio Frequency Band for the Provision Networks Local fixed Wireless With Limited Mobility and Mobile Cellular Network, Telkom Flexi obtain additional channel allocation in 1019 outside Jakarta, West Java and Banten and Bakrie Telecom outside Jakarta, West Java and Banten.
- e) Mobile-8 allocated frequency CDMA cellular national frequency channels 384, 425, 466 and 507
- f) Indosat allocated frequency CDMA cellular national frequency channel 630. Channel 589 and is adjacent to its GSM in the 890-900 MHz so as to facilitate coordination and planning and network operations into one company to reduce the impact of interference between CDMA and GSM in adjacent frequency bands,
- g) Channel 548 CDMA 800 MHz will be contested between Mobile-8 and Indosat Starone based on performance evaluation of development. As of December 31, 2007, for the purposes of migration, channel 548 "loaned" to Indosat Starone.
- h) 800 MHz cellular migration process by the deadline until December 31, 2007 i. WIN and Primasel joined in 2006, and awarded 5-1900 CDMA channels beyond IMT-2000 core band, on tape 1903.75 - 1983.75 1910 - 1990 MHz. The two companies formed a new company namely PT. Sinar Mas Telecommunications (SMART).

Based on interviews with informants, obtained by the fact that there are three factors that make CDMA does not move in the face of GSM. First, a consortium of CDMA incorporated in 3GPP2 (3rd Generation



Partnership Project 2) does not intend to further develop the CDMA technology. So, in the next generation of CDMA evolution they have declared themselves to join the consortium LTE (Long Term Evolution). This means that they move from CDMA 2000 technology to LTE.

Second, priced war which began in 2008, practical CDMA with GSM cellular tariffs have been almost the same. Previous governments regulate BHP (usage fees) CDMA frequency cheaper than GSM. However, it is now no longer valid. The impact of capital costs and operating costs to be borne CDMA operator swell.

Third, the limited availability of handsets than GSM handsets. CDMA 450MHz Moreover, operators must sell phones as well. To cope with the death of CDMA services, the policies pursued by the government, according to some informants, should refer to aspects of the urgency of CDMA technology itself. The policy, among others:

First, create a neutral technology in CDMA frequency, 850 MHz. The operator will be given the freedom to determine the network technology that would be used, including the switch to the extended GSM (E-GSM). CDMA spectrum is as wide as 20 MHz will be divided so that each operator only has a small spectrum. Second, the consolidation frequency. Later CDMA frequency will be divided into 2 blocks of carriers, each as wide as 10 MHz. The first block uses 3G technology while the second block put on a 4G or Long Term Evolution (LTE). Third, the entire frequency spectrums CDMA open to all operators so that no blocks.

3.2 Quality mobile communications network

Network quality measurement method for a test drive Kupang region, especially in the area of the University of Widya Mandira, obtained the following data, Table 3 to 5.

Table-3. Performance of 2G (Level and Quality of signal).

RX Level	Telkomsel		XL		HCPT		Indosat	
	Sample	Percentage	Sample	Percentage	Sample	Percentage	Sample	Percentage
-75 to -10	2314	86.57%	1755	71.90%	0	0.00%	1975	62.07%
-80 to -75	343	12.83%	471	19.30%	0	0.00%	661	20.77%
-85 to -80	16	0.60%	214	8.77%	0	0.00%	339	10.65%
-90 to -85	0	0.00%	1	0.04%	0	0.00%	200	6.29%
-95 to -90	0	0.00%	0	0.00%	0	0.00%	7	0.22%
-110 to -95	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Table-4. Level signal of 2G to Fourth Operator.

RX Qual	Telkomsel		XL		HCPT		Indosat	
	Sample	Percentage	Sample	Percentage	Sample	Percentage	Sample	Percentage
0 to 2	5416	71.33%	6482	86.20%	0	0.00%	7176	92.02%
2 to 5	966	12.72%	559	7.43%	0	0.00%	429	5.50%
5 to 7	1211	15.95%	479	6.37%	0	0.00%	193	2.47%

Table-5. Performance data speed of 3G (downlink and uplink).

DL Throughput	Telkomsel		XL		HCPT		Indosat	
	Sample	Percentage	Sample	Percentage	Sample	Percentage	Sample	Percentage
0 to 64000	7331	44.24%	0	0.00%	0	0.00%	0	0.00%
64000 to 128000	2441	14.73%	0	0.00%	0	0.00%	0	0.00%
128000 to 256000	6798	41.03%	0	0.00%	0	0.00%	0	0.00%
256000 to 512000	0	0.00%	0	0.00%	0	0.00%	0	0.00%
512000 to 1512000	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Mobility in communication, now it has become an important part of human life. Including data service customers in the use of Internet applications has also been increasing both in terms of quantity and mobility. The increase in the number of subscribers led to a decline in quality of service so that complaints from customers will be more and more also. Therefore any provider or operator is required in order to solve these problems quickly and accurately.

Problems on the cellular network that is located on the access limitations and downlink speeds. Such problems can be seen from the performance level of the received signal, wherein the signaling is a key parameter in determining the problems that occur in the network. To determine the signaling processes in the network interface, we need a method called the drive test. This method is used to determine the signal quality of a telecom operator's network. The term drive test used for job driving route that has been determined to test the signal quality. So from these test results can be known whether the condition of the outcome requires optimization or not. Network optimization is done when there is some decrease in the value parameter drive test results, with the aim to improve the performance of a network that benefit the customer. One of the factors that lead to optimization of the network have to do is obstruction of the sector antenna (transmitter signal) by a high building so that the power level radiated to the predetermined area to be reduced drastically when it is received by the MS (Mobile Station). Once the optimization is done and then do the tests drive again to ensure network quality in areas previously disturbed.

Based on the results of the test drive around the University of Widya Mandira Kupang, it is known that the quality of the network is bad, so the Development of network base stations are not recommended on the grounds: (1) the potential for co-location, (2) area small area, and (3) close to the tower macro.

4. CONCLUSIONS

FWA-CDMA technology is deemed not profitable because the government is not neutral in the use of frequencies and lead to discrimination in fare. Therefore, CDMA operators are required to migrate to the GSM frequency band, in accordance with the Regulation of the Minister of Communications and Information Technology No. 30, 2014. To cope with the death of CDMA services, the policies pursued by the government, should refer to aspects of the urgency of CDMA technology. The policy, among others: First, create a



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