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Property Rights in Radio Frequency Utilization Under ITU (International Telecommunication Union) (Frequency Allocation in Indonesia)

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Abstract

Radio Frequency Spectrum is limited natural resources belong to all humanity. Currently, the demand of it was increasing rapidly. On the other hand, the amount of frequency availability is fixed. The utilization in telecommunication has multiplier effect for national growth, specifically in technology and economic growth. Radio frequency spectrum is electromagnetic wave used for various radio communication services with wireless application, such as; Mobile cellular, internet TV, Individual and corporate communication, radio navigation, aviation, maritime, broadcasting, safety and distress radio.

Internationally, radio frequency regulated by International Convention namely "Radio Regulation". It made by ITU (International Telecommunication Union), organization/special agency under UN (United Nations). Radio regulation establishes a basic international framework about radio frequency characteristic which are each countries should obey the rules and make deeply arrangement frequency distribution for their region.

Today, intellectual property era, radio frequency is one of intangible property if the legal subject has license from the government/state within a specified period. Government will give the license if the legal subject has fulfilled technical requirement, operational standard and infrastructure in accordance with radio regulation and domestic law. The development of technology and the number of Telecommunication Company force Indonesia's government to change the basic system in frequency allocation. Frequency distributions for economic sector are doing by auction system.

Keywords

spectrum frekuensi radio, license, telecommunication

国際電気通信連合の基準に基づく無線周波数帯の財産権として利用 (インドネシアにおける周波数分配)

人間社会環境研究科 人間社会環境学専攻
スジャドミコ バユ

要旨

無線周波数帯は、すべての人類が共用する限られた天然資源である。現在、その需要は急速に

増加している。他方、利用可能な周波数帯は決まっている。通信での利用は、国家の成長、とりわけ、携帯電話、インターネットテレビ、個人と企業のコミュニケーション、無線ナビゲーション、飛行通信、海事通信、放送、安全・遭難放送等の技術成長及び経済成長に対して相乗効果を発揮する。

国際的には、無線周波数は、「無線規則」という国際条約によって規制されている。それは、国連機関であるITU（国際電気通信連合）によって制定された。無線規則は、各国がそれに従い、その領域における周波数の割り当てを調整することができるという特徴を有する無線周波数に関する基本的国際枠組みを確立するものである。

法的主体が一定期間国家から許諾を得るということは、現在の知的財産時代においては、無線周波数は無体財産の一つであるということになる。政府は、法的主体が技術的条件、運用水準及びインフラを満たす場合には、無線規則及び国内法に従って許諾を与える。技術の進歩と多くの電気通信会社は、インドネシア政府に無線周波数割り当てにおける基本システムを変更するよう迫っている。経済部門への周波数分配は、オークションによりおこなわれている。

キーワード

無線周波数, ライセンス, 電気通信

A. Introduction

Early progress of wireless telecommunication is found the radio wave (electromagnetic wave) by Germany Scientist, Heinrich Hertz. Radio frequency is the root of the operation processes in communication technology without limits and distance.ⁱⁱ

Radio frequency in the era of technological development is a potential commodity to produce profit in economy market. Therefore, licensed telecommunication companies in radio frequency compete to dominate GSM (Global System for Mobile Communication), UMTS (Universal Mobile Telecommunications System), WiMAX (Worldwide Interoperability for Microwave Access), WiFi (Wireless Fidelity) and LTE (Long Term Evolution) market to gain maximize profit. Regulator as an economic control should respond reducing unhealthy competition between them.

There are four stakeholders who interest with radio frequency, they are; regulators, operators, companies and users. The trend in

this world shows frequency demands for bulk services increase rapidly, whereas frequency availability is limited and fixed. Therefore, countries with ITU (International telecommunication Union) give recommendation by convention to control the frequency utilization and support efficient.ⁱⁱⁱ

The utilization of radio frequency by license holders has to obey to domestic rules in each countries and ITU as an initial guideline. Frequency rights holder^{iv} gets their due by the contract from the regulator (government). Then, can frequency radio be considered as property? Is it equated with domain name as an intangible intellectual property?^v

This paper discusses about relationship between frequency radios as an object of property right. Parts II will describes how frequency radio as a potensial goods for the telecommunication and economy. Next it will analyse how exactly frequency regulation under ITU and Indonesia and because of the frequency issue is too extent, writer give the

limitation about the issue to be discussed only in mobile cellular business and telecommunication business. Parts III will discuss how frequency radio becomes a potential property in competitive business. Part IV will describe frequency distribution scheme in telecommunication and economic value in Indonesia as a developing country. Part V is conclusion about the importance of frequency in sustainability of economic and telecommunication.

B. Interconnection between Property Rights and Radio Frequency

1. Characteristic of Frequency Radio (safety, services, government and commercial)

Wireless telecommunication started with the discovery of radio wave by Heinrich Hertz.^{vi} Electromagnetic radio/frequency waves is electromagnetic wave which propagate in the air and space without artificial conductor and it is public domain and limited natural resource.^{vii} Whereas, all of tools or technology which uses radio waves (electromagnetic waves) called radio.^{viii} ITU has been divided into three zones of frequency distribution in this earth.^{ix}

Before further analysis about connection between frequency radio and property right, we should look the characteristic of frequency itself. Frequency is a limited natural resources, but we need to understand that limitation likes other limited natural resources such as petroleum, oil, natural gas etc, if they use continuously, they will be discharged. Frequency in terminology, it is a limit but if it uses continuously, it will not be discharged permanently. Frequency is fixed, it is not reduce and increase.^x

Frequency has same amount in every countries. In terms of frequency's management, it gives prosperity for economic and technological

advance. Nowadays, frequency used in almost all aspect of our life, telecommunication, broadcasting, internet, transportation, governmental, health, defense and etc. Especially for defense and security department, the frequency distribution will be allocated specifically by the government and it is uncommercial.^{xi} In other areas such as trade, business telecommunications, transport, health, and other profit oriented sectors, the government will distribute it fairly and use auction system.^{xii}

Frequency for telecommunication has multiplier effect for national growth, especially in technology and economic development. Study conducted by ITU shows that in 1990s, one percent teledensity increment give three percent contribution for GNP (Gross National Product) growth.^{xiii} Therefore, efficiency and effectivity of frequency radio management will give positive influence to telecommunication growth and national development.

The main framework of Radio Frequency Spectrum Regulation is:

- a. International and Asia
 1. ITU (International telecommunication Union)
 - a. World Radiocommunication Conference (WRC)
 - b. Radio Regulation (RR)
 2. Asia Pacific Telecommunity
 3. ASEAN Telecommunity Regulatory Council
 4. State coordination by bilateral Agreement
- b. National/Domestic
 1. Constitution/Telecommunication Act
 2. Telecommunication and Informatic Minister Decision
 3. Telecommunication and Mail General-Director Decision
 4. Other regulation.

2. ITU (International Telecommunication Union)

International Telecommunication Union^{xiv} is specialized agency from United Nations^{xv} whose authority is to control and manage all of telecommunication matters including frequency radio distribution. ITU recognize the sovereign rights of each country to regulate telecommunication side respectively depend on their interest, but they should consider one most important thing, that are frequency has to use in peaceful purposes and social welfare accordance with ITU's aim.^{xvi}

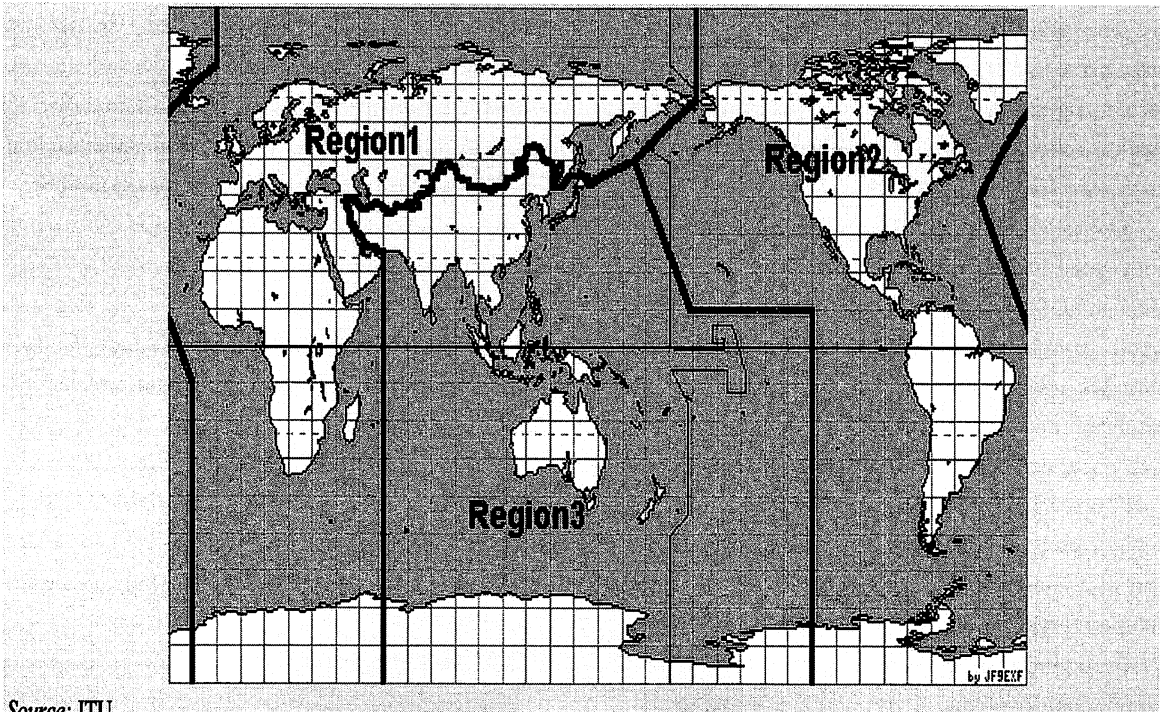
Radio frequency is regulated by International Convention namely "Radio Regulation". It made by ITU (International Telecommunication Union), organization/special agency under UN (United Nations). Radio regulation establishes a basic international framework about radio frequency characteristic which are each countries

should obey the rules and deeply arrangement frequency distribution for their region.

RR (Radio Regulation) contains a table/channel of frequency allocation, telecommunication agencies and other specific aspect. Each country has to follow it to avoid interference between other countries or other frequency. RR also becomes a model for government/regulator to organize the frequency as they needed.^{xvii}

ITU has divide three regions^{xviii} of frequency distribution in this earth, 39 (thirty nine)^{xix} radio agencies and 54 (fifty four) radio stations.

Next, the other thing that was not less important internationally or domestic beside frequency distribution is license matters. Strict licensing should be enforced because demand of it always rises annually.^{xxi}



Source: ITU

Picture 1. Frequency Allocation of ITU^{xx}

Licensing issues must be considered the guidelines in the Radio Regulations,^{xxii} likes; No one has transmitting station may be established or operated by an individual or bussines company without a license from the regulator accordance with RR and domestic law.^{xxiii} However, the government/state can make a special agreement^{xxiv} with one state or more regarding radio station.^{xxv}

Direktorat Jenderal Pos dan Telekomunikasi Indonesia (Directorate General of Post and Telecommunications)^{xxvi} under *Departemen Komunikasi dan Informatika* (Ministry of Communication and Information)^{xxvii} is government institution whose responsible for the regulation, allocation and management of frequency Radio. They have some main mission to guaraante frequency utilization effectively and efficiently.^{xxviii}

The use of the frequency in Indonesia is mostly done by telecommunications companies both public and private companies. Recently, regulation of telecommunications in Indonesia is still distinguishes between fixed telecommunication and mobile telecommunications. Generally, Telecommunications cellular system is used by the Fixed Wireless Access (FWA)^{xxix} and Cellular Mobile Network Operator. Practically, separation between these systems is inconvenient. There have been a number of efforts to assess and improve the provision of technical regulations, including licensing issues, the amount of fee concession of frequency, interconnection, numbering, etc.

Nowadays, telecommunications business in Indonesia especially mobile cellular begins to develop since 1999.^{xxx} Likewise with cable TV business, internet and network entertainment. This increasing demand has required government to act quickly in fulfilling the organizers or companies who want to move as producers

and society as a user. However, before all of that accomplished the manufacturer have to obtain a license from the government to conduct its business. It is frequency license.

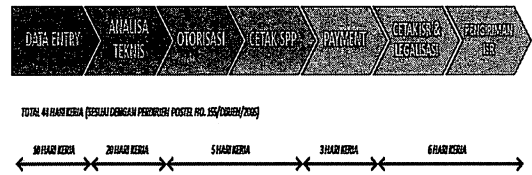
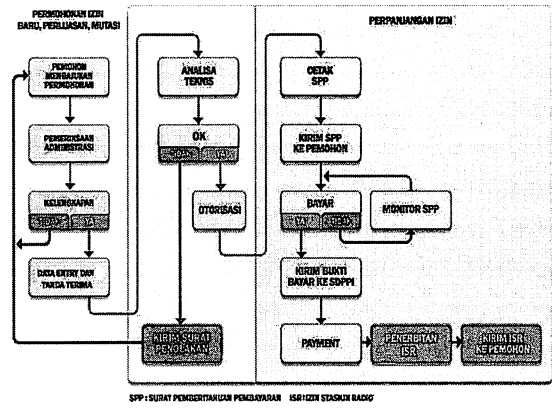


Chart 1. Frequency License Scheme^{xxxi}

From the chart above, we can be explain that a company or legal entity which engaged in the telecommunication have to submit a written application and collect the necessary files to the Director General of Post and Telecommunication.^{xxxii} After that files are entered, they will be analyzed by the authorization and verified regarding eligibility and the entire system that will be used. If a company can complete all the requirements and passed the test of technical feasibility, they will get a license for a specified time.^{xxxiii} Next, this license used by companies as raw material to sell their telecommunication product. They can be mobile cellular, internet, aeronautical, maritime, satellite, broadcast, fixed service, land mobile and type approval, etc.

3. Radio Frequency as a Marketable Goods

Nowadays, frequency radio is using for anykind of radio communication as follow; private communication, companies, navigation, government, satellite and air space communication. Indonesian Government is divided frequency distribution into two parts; firstly, the allocation of frequencies used for government or public service which is not-for-profit purposes and the frequency allocation for economic purposes. In this chapter, the writer will be focus on frequency allocation in economic interest, such as; private and public companies tellecommunication, broadcasting, internet, mobile cellular and transportation.^{xxxiv}

Why then frequency radio is said marketable goods? In economic sphere, frequency can be used as goods or services for the consumers. Consequently, someone or privat company get benefits from it.^{xxxv} Mostly, big telecommunication companies in the world use frequency as a raw material to sell their product.^{xxxvi}

Main reason is based on the frequency itself. Frequency is exhausted natural resources, but it utilization is based on demand and number of users. The more demand comes, the more frequency will be used and also in the vice versa.

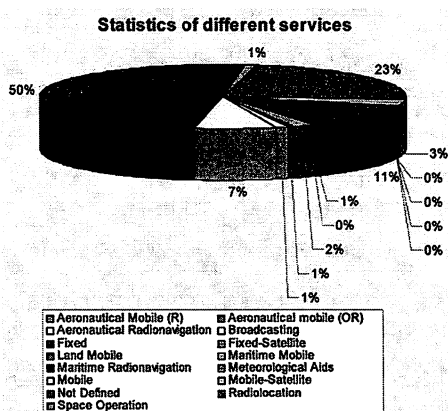


Chart 2. Frequency user^{xxxvii}

From the chart above, we see that 50 percent frequency used in all the world is on land mobile^{xxxviii}. Because of this condition, many company notes that frequency is a potential thing which can gain bigger profit. Another reason is that most of communication technology in recent day using frequency network. Cellular telecommunication market is the biggest market in all around the world which all people use mobile phone and internet to communicate.^{xxxix} The last reason is that company rivalry in getting the license of frequency. Looking for market development, telecommunication business look promising to gain profit in which the need of communication is increasing every year.^{xl}

C. Is Radio Frequency a property?

So then, what is the connection between radio frequency and property right? Is radio frequency including as one of the property that needs to be protected? Firstly, lets analyze what is property right? In TRIPS, (Trade Related aspect of Intellectual Property Rights) world organization had agreed that there are 8 elements of intellectual property include frequency technology. Trade is not only goods but also services of telecommunication and technology.^{xli}

Based on the constitution of intellectual property in Indonesia,^{xlii} Property right is right who owned by someone or institution upon an object to be utilized, changed or used. The term of "property right" in this article is too extent,^{xliii} so the writer specify the term "property right" into "economic right".^{xliiv} Economic right means right on a thing^{xlv} to be used and utilized in order to get the profit from it.

Radio frequency is natural resources which

has the same amount in every single country, which organized as radio wave/wireless in the atmosphere without having limitation on country territorial.^{xlvi} The thing is intangible and formed as ion electromagnetic which create profit for the telecommunication company. Then, what kind of process which made frequency has high valuable price? In developed country, especially in the big city, the need of technology is high. It can be sure that it is sufficiently high rate. As the result, the market of technological tools and wireless user are increase. This condition is utilized by some public or private telecommunication company to get license of frequency such as LTE (4G), WiMax, GSM, HSDPA etc.

Because of their definit characteristics, government as the regulator should be carefull in giving license of frequency to the company. The form of license itself can be conclude that radio frequency is an intangible property which turn into tangible form and become a right of company to utilize it in the spesified period. After the license expired, the company can prolong or stop it.^{xlvii}

The deeper investigation found that the bigger problem is in the global rivalry. Some industry processes have a major impact on the shape of markets as they develop. For example, as its evident in the development of GSM, UMTS, WiMAX, WiFi and LTE, the development of standards determines the technologies that may be used, the radio spectrum that will be required, and services that can be provided.^{xlviii} These standards may not be laws handed down by authorities, but they have so much importance in setting market conditions over long periods that they have an implicit quasi-regulatory nature, analogous to the way software “code” has

been described as “law.”^{xlix} Various standard-setting organizations, such as the Institute of Electrical and Electronics Engineers (IEEE) and the European Telecommunications Standards Institute (ETSI), for example, seek to resolve these issues by focusing on “essential patents.” These are licenses that would be infringed by the implementation of a particular standard or specification. The standards bodies will require members to disclose such essential patents and license them on fair, reasonable and non-discriminatory terms, on a reciprocal basis with other members. Despite this, the complexity of new ICT technologies, and licenses fragmentation, mean that thousands of disclosures of essential licenses might be made (together with royalty claims), risking the rapid and efficient development of standards.¹ Many companies have not developed clear legal positions on such matters, and regulators face the challenge of broadening their vision to understand the dimension played by intellectual property rights and standard setting processes.

D. Commercial Side Practice in Indonesia

Frequency distribution system in Indonesia is divided into two parts, they are: commercial and non commercial (government, safety, scientific research, etc). Commercial frequency distribution is seluler telecommunication, broadcasting,ⁱⁱ maritime and commercial aviation and the last is satellite service. Principally, the rights to get license in all sector in both comercil and non-comercil is remain the same. But the technical requirement, facilities, and registration and subscriber cost is different one and another.ⁱⁱⁱ Considering the broaden sharing and distribution of frequency in Indonesia, the writer will give image about the

current condition of seluler telecommunication distribution in Indonesia.

Before 2005, all license of seluler telecommunication used Radio Station License (ISR) which used per BTS (Base Transceiver Station) per canal. This condition creates difficult verification because the change of BTS development is everyday or the canal changes very dynamic based on its traffic. Meanwhile, calculation of BHP (Utility right cost) ISR frequency is costed per year. After the efectivity of Ministry regulation No.17 year 2005 about System of License and Operational Regulation of Radio Frequency Spectrum, the alternative of license is Licensed Band Frequency Radio and Class Licensed.

Licensed Band Radio Frequency is valid for operator whose get exclusive band frequency allocation in a service area which based on the license. The license is given based on selection method meanwhile the Utility Right Cost (BHP) is based on selection (auction). For those operators whose license is under 2005, the Utility Right Cost (BHP) of the ISR is still used current permission (PM.19/2005) maximally until the year 2010 then it can be prolonging.

In the 2013, it is hopefully all exclusive wireless access operator will used radio band frequency for it Utility Right Cost (BHP). The conversion from BHP ISR to Radio Band Frequency BHP is still being investigated by the Directorate General of Post and Telecommunication and it will be implemented step by step. The socialization of conversion have been done by publicize white paper of implementation utility right cost by the width of band (BHP PITA) for seluler telecommunications operator and fixed wireless access (FWA) since October 2009. The draft of white paper can be downloaded at official site of Directorate

General of Post and Telecommunication, in frequency section.^{liii}

Nowadays, government has decided that the license for fixed line operators are PT Telkom^{liv} and PT Indosat^{lv}, both of them has accept license to operate telecommunication in national and international scale, meanwhile operator for seluler ranged telecommunication system (STBS) is given to PT Telkomsel, PT Indosat, PT Excelcomindo,^{lvi} PT Ratelindo,^{lvii} PT. Hutchison CP Telecommunications^{lviii}, PT Mobile 8^{lix}. Thus Indonesian operator has come into competition era based on the service given to the customer. In the other hand, society/costumer has freedom to choose operator based on their interest and assessment of quality or tarif occured.

E. Conclusion

Based on the definition, characteristic and function of radio frequency spectrum, it can conclude that radio frequency spectrum is an intangible property which can be used its function by a license from the party concerned. License can be accepted by user especially company if they do an agreement or contract with government body under United Nation (UN) who has power to arrange frequency distribution in all around the world. Each country has a sovereignty to arrange, distribute and give license to user based on the radio regulation. However, the form of agreement in the development of licensed radio frequency is under intellectual property and technology law.

Notes

- i Bayu Sujadmiko is a Doctoral Student in Kanazawa University, majoring of Intellectual Property Law
- ii Melinda S. giftos, Reinventing A Sensible view of Trademark Law in the Information Age, Chicago-Kent College of Law, Journal of Intellectual Property, 2000, p.1.
- iii ITU (International Telecommunication Union) "Trends In Telecommunication on Reform 2008 Six Degrees of Sharing", International Telecommunication Union Publication, Geneva, Switzerland, 2008, p.83.
- iv Frequency rights holders usually are telecommunications companies, like Mobile cellular company, Internet TV company and Radio Commercial Company
- v *Kremen v Cohen* 67 USPQ 2d 1502 (CA 9 2003), reversing *Kremen v Cohen* 99 F Supp 2d 1168 (ND Cal 2000), question whether a domain name is the kind of intangible property that can support a state law claim for conversion certified 65 USPQ 2d 1733 (CA 9 2003), refused High Court of California, unreported, 25 February 2003 (as cited in, Burshtein Sheldon, Is a Domain Name is Property?, Oxford University Press, Journal of Intellectual Property Law and Practice, Vol.1, N.1, 2005, p.59.
- vi In 1864, James Clark Maxwell used mathematical and predicted that there was a wave through space without introductory which had speed equal with light speed. It can be reflected and refracted like light, but it can not be seen. Unfortunately, he passed away before he can prove his theory. Next 20 years later, Heinrich Hertz proved the truth of Maxwell's theory. Afterwards, in 1896, Guglielmo Marconi found a radio tools which was more practical with the electromagnetic waves.
- vii The definition about definition of Frequency Radio is in Indonesia's Tellecommunication Act No 36 1999, Broadcasting Act No.32 2002 and Tellecommunication Minister Decision No.53 2000, about Frequency Radio and Orbit Satellite.
- viii Article I, Section I, paragraph 1.4-1.5 Radio Regulations ITU 2012
- ix Indonesia Communication and Informatic Department, "*Menuju Kepastian Hukum di Bidang Informasi dan Transaksi Elektronik* (Towards Legal Certainty in Informations and Electronic Transaction Scope)", Jakarta, 2005., also see Denny Setiawan, "*Alokasi Frekuensi, Kebijakan dan Perencanaan Spektrum Indonesia* (Frequency Allocation, policy and Indonesia's Spectrum Planning)", Indonesia Communication and Informatic Department, General Director of Telecommunication and Mail, Jakarta, 2011, p.5.
- x Judhariksawan, "*Pengantar Hukum Telekomunikasi*" (Introduction of Telecommunication Law), Rajagrafindo Persada, Jakarta, 2005. p.41
- xi In Indonesia, distribution of frequency for special department like security and defense department, orbit space, satellite, etc, regulated closely and secretly. These frequencies has fixed and can not be auction or transferable to other party because Country/state is full right holder on that.
- xii One cases in Indonesia. Governments do auction system to choose one of telecommunication companies to get mobile cellular service frequency in one areas or one of frequency number/channel. Denny Setiawan, *supra* noteix, p.96.
- xiii *See. id., p. 3*
- xiv <http://www.itu.int/en/Pages/default.aspx>
- xv <http://www.un.org/en/aboutun/structure/index.shtml>
- xvi Judhariksawan, *supra* notex, p.53.
- xvii <http://www.itu.int/pub/R-REG-RR-2012>, Based on that rule, Indonesia sets the regulation about frequency in Communication and Informatic Minister Ordinance No 29/PER/M.KOMINFO/07/2009 or well know by *Dokumen Tabel Alokasi Spektrum Frekuensi Radio*. This Regulation is content about specific, rigid and operational frequency allocation. It also refer to World Radiocommunication Conference 2007.
- xviii Article 5, Section I, paragraph 5.2 Radio Regulations ITU 2012
- xix rticle I, Section III, paragraph 1.19-1.60 Radio Regulations ITU 2012.

- ^{xx} Region I covers an are bounded on the east by line A and on the west by line B, except a half Republik Islam Iran, Region I also include Armenia, Azerbaijan, Federasi Rusia, Georgia, Kazakhstan, Mongolia, Uzbekistan, Krgyzstan, Tajikistan, Turkmenistan, Turki, Ukraina and north of Rusia. Region 2 is American Continent and Africa and Region 3 is Asia, Japan and Australia Continent. See in "Spectrum Management System for Developing Countries" Version 3, SMS4DC 2010 Training Seminar, October 2010, p.10.
http://www.itu.int/ITU-D/asp/CMS/Events/2010/SMS4DC/SMS4DC2_AllocationsV2.pdf
- ^{xxi} Comparisons can be drawn between developed countries and developing countries in frequency request is the mechanism of frequency license. Developed countries impose auction in licensing system on most of department, while developing countries only use it on some dense network likes mobile cellular and internet. Developed countries such as, Europe, America and some countries in South America have long trade spectrum due to high demand of the business such as the frequency of Australia (Australian Communications and Media Authority), Canada (CRTC (Canadian Radio-Television and Telecommunications Commission)), Germany and the UK (Office of Communications (Ofcom)). See in "Trends Telecommunication Reform 2008, Six Degrees of Sharing", ITU, Geneva, 2008, Pg. 73-78. <http://www.itu.int/pub/D-REG-TTR.10-2008>.
- ^{xxii} RR tend to Hybrid Norms, it means that the mixture norm, the contents is hard law, while the application is softlaw. This theory is one opinion from Veerle Heyvaert. He is one of lecturer on Law Faculty in The London School of Economics and Political Science (LSE) whose talk about this issue in his article, "Hybrid Norms in International Law", LSE Law, Society and Economy Working Papers 6/2009. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1342366.
- ^{xxiii} Article 18, Section I, Radio Regulations ITU 2012.
- ^{xxiv} Coordination or agreement made about utilization of frequency radio with other countries can be divided into two kinds; they are coordination terrestrial frequencies and satellite coordination. Frequency *terrestrial* is cover services, broadcast, sellular High frequency Broadcast, High Frequency fixed and Mobile and *microwave link (point-to-point)*. Denny Setiawan, *super* note ix, p.19.
- ^{xxv} Article 18, Section I, Radio Regulations ITU 2012. This article has purposes that states have a right to regulate or manage their radio station or frequency in places which adjacent on near countries. This is accomplished to avoid interference between neighbouring countries.
- ^{xxvi} <http://www.postel.go.id/>, Directorate General of Post and Telecommunications is Indonesia's Radio Frequency Spectrum Management Institution which is recognized by ITU as a Telecommunications Administration. They represent the country in international and regional conferences in the field of radio frequency spectrum management.
- ^{xxvii} <http://kominform.go.id/>.
- ^{xxviii} Fundamental Duties of Directorate General of Post and Telecommunications are planning and coordinating of the frequency application at the international, regional and sub-regional level, determining, managing and Monitoring frequency in domestic area and lastly is looking for solutions for frequency interference.
- ^{xxix} <http://searchmobilecomputing.techtarget.com/definition/fixed-wireless>, http://en.wikipedia.org/wiki/Wireless_local_loop,
- ^{xxx} Telecommunication business development is marked by telecom blueprint 1999 and Indonesian Act No. 36 of 1999 about teltelecommunication. They are formal legal aspects which are the approval of the WTO Basic Telecommunication agreement. These rules are the deregulation of the previous regulations regarding the dominance of the two telecommunications companies. Previously, PT Telkom was dominates for telecommunications services in Indonesia

and PT. Indosat for international calls service. At that time, telecommunication in Indonesia was starting to embrace open system. It means competition between Telecommunication Company already running. It characterized by the emergence of seven major companies in the telecommunications sector in Indonesia, such as PT Telkomsel, PT Indosat, PT XL Axiata, PT Hutchison, PT Mobile 8, PT Natrindo and PT Bakrie.

^{xxxix} http://www.postel.go.id/artikel_c_7_p_1856.htm.

^{xxxix} <http://www.postel.go.id/>

^{xxxix} There are three licenses were granted, namely:

Firstly, Licensed Band Radio Frequency (*izin Pita Spektrum Frekuensi Radio* (IPSR)). It is given in the form of radio frequency band for a period of 10 (ten) years and may be extended for 1 (one) time for 10 (ten) years. Secondly, Radio Station License (*Izin Stasiun Radio* (ISR)). It is given in the form of radio frequency channels for a period of 5 (five) years and may be extended for 1 (one) time for 5 (five) years. Lastly, Permission Class (class license). It is given to the user for operate the device with the frequency of specific technical terms, so that usage of the frequency can be utilized commonly (sharing). Permit Class certificate attached to the telecommunication equipment issued by the Director General of Resources, Post and Informatic (*Direktorat Jendral Sumber Daya dan Perangkat Pos dan Informatika* (SDPPI)).

^{xxxix} Indonesian Ministry of Post and Telecommunications has a right to construct frequency direction policy, see in, "White Paper", Structuring Services Radio Frequency-Based Broadband Wireless Access (BWA) (*Penataan Spektrum Frekuensi Radio Layanan Akses Pita Lebar Berbasis Nirkabel*).

^{xxxix} Someone or person can be translate as a businessmen/women. This companies has economic purposes to public telecommunication interest, see in, "Study of Future Demand for Radio Spectrum In Canada 2011-2015", Red Mobile Consulting, 2010. www.redmobileco.com.

^{xxxix} Ten (10)telecommunication companies use and

take wireless network,

<http://www.fb.co.id/blogs/4646/550/perusahaan-telekomunikasi-terken>

^{xxxix} "Spectrum Management System for Developing Countries" Version 3, SMS4DC 2010 Training Seminar, October 2010, p.26

^{xxxix} Land Mobile or usually called as public/privat Land Mobile System is a technical network system in telecommunication. It is usually use in cellular phone, navigation system, ranged communication services and internet.

^{xxxix} Mobile Phone and Internet users increase until 120 percent in developed countries and 100 percent in developing countries, <http://www.itu.int/ITU-D/ict/statistics/>

^{xl} Lucy Yu, "How can the interests of end users in the information society be balanced with the interests of business, in the UK?", essay form, ITU, 2006. <http://www.itu.int/osg/spu/youngminds/2006/essays/essay-lucy-yu.pdf>.

^{xli} WTO *agreement on Basic Telecommunication* 1997 formally known as *Fourth Protocol of General Agreement to Trade in Services* is the first multilateral trade agreement which apply the principals of interconnection technology includes frequency. In *Reference Paper*, WTO determines that the main principals of interconnection are transparency, non-discrimination, and cost-based tariff. There are some agreement about technology development and networking. It can be completely seen at http://wto.org/english/tratop_e/inftec_e/inftec_e.htm and http://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm.

^{xlii} There are 6 constitutions in Indonesia which arrange about HAKI (Intellectual Property), there are Right, Patent, Trademark, Geographical Indication, Solid Circuit and Industrial Design.

^{xliii} Based on TRIPS Agreement, there are 6 kinds of protected property right, they are; Copyright, Trademark, Geographical Indications, Patent, Industrial Design, Lay-out Design (Topographies) of Integrated Circuits, Protection of Undisclosed Information and Control of Anti-Competitive

Practices in Contractual Licenses

- xliv The word “property right” is still debating about the meaning, aims and used. There are two theoretical approach which concerns on this problem; they are Anglo American Approach which emphasize on the immaterial property character of works and their protection against unauthorized Commercial exploitation, and Continental European Basis which focuses on the protection of the immediate work creator which has been adopted by France, Germany and Japan. See in Peter Ganea, Cristhoper Heath and Hiroshi Saito, “Japanese Copyright Law”, Kluwer Law International, Netherlands, 2005, p.11.
- xlv Meaning of “thing” in a Law of intellectual property right has two different points a view, they are: tangible form thing and intangible thing.
- xlvi In every border between two country, the use of radio frequency in new radio communication technology always need good coordination between both country to prevent any harmful interference.
- xlvii Based on application procedure of frequency in Indonesia, though service cellular company, mobile TV, internet etc.
http://www.postel.go.id/artikel_c_7_p_1856.htm.
- xlviii The International Organization for Standardization (ISO) defines a formal standard as “a document, established by consensus that provides rules, guidelines or characteristics for activities or their results.
- xlvi For an argument for how computer code effectively establishes the laws inherent in Internet architecture, see Lawrence Lessig, *Code version 2* (Basic Books 2006). See in trends Telecommunication reform 2009, *supra note*, p.29.
- ¹ For a reference of this problem in the development of mobile WiMax, see Tobias Kaufmann, “Intellectual Property in Broadband Mobile Telecommunications: Predictions on 4G WiMAX”, <http://www.frlicense.com/IntellectualPropertyin-BroadbandMT.pdf>.
- ii Broadcasting in Indonesia can be divided into some criterias, which are; Mobile TV (Cable TV), Internet provider, Radio privat and citizen.
- iii Everything about requirement, application and administrasion fee to get licences can be seen at official site of Direktorat General of Mail and Telecommunication,
http://www.postel.go.id/artikel_c_3_p_93.htm,
http://www.postel.go.id/artikel_c_7_p_1856.htm
- iiii www.postel.go.id
- lv <http://www.telkom.co.id/>
- lv <http://www.indosat.com/>
- lvi <http://www.xl.co.id/>
- lvii PT Radio Telepon Indonesia (Ratelindo), established since Agustus 1993, it is a subsidiary company of PT Bakrie & Brothers Tbk work on telecommunication in Jakarta, Banten and West Java base on *Extended Time Division Multiple Access* (ETDMA). In September?2003, PT Ratelindo changed its name into PT Bakrie Telecom, which migrated to CDMA 1x, and started to launch Esia,
<http://www.myasia.com/home.html>, in the early time, Esia network was only can be used in Jakarta, Banten and West Java, but until the end of 2007, it has been reach into 26 cities in Indonesiaand growth rapidly into others city.
- lviii <http://www.tri.co.id/about.php>
- lix PT Smartfren Telecom Tbk (smartfren) <http://www.smartfren.com/ina/home/>, firstly named PT Mobile-8Telecom Tbk (Mobile-8) before April 2011. The company owned by PT. Global Mediacom Tbk. But, because of financial crisis and decrease product sales, it was acquisite by Sinar Mas Group (<http://www.sinarmas.com/id/>) in November 2011.

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