

The First Spectrum Auction in Thailand: Lessons Learned and Achievements

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Abstract—The role of an independent regulator is such that it must ensure an arms length relationship with all stakeholders including government, stakeholders and consumers. As stakeholders are often at risks of losing benefits from regulator policy implementation, being a utility poses significant challenges where the regulator utmost strength to resist being influenced by power of politicians and some groups of consumers, at the same time, monopolistic behavior of operators. This paper aims to provide a detailed account of legal challenges and public criticism faced by National Broadcasting and Telecommunications (NBTC), as an independent regulator in 2.1 GHz spectrum auction and leadership skills and actions implemented to ensure stability of its position. This research concluded that the key factors such as (1) leadership to drive and ensure the right policies are being implemented without influence of stakeholders (2) cooperation with international institutions and external consultants to prove transparency in policy implementation –are of utmost significance to ensure regulators not only hold but thrive in its position. Further these two major factors were the key to ensuring NBTC were not scapegoats of such testing challenges and can continue to perform its role efficiently without any hindrance.

Index Terms—regulatory, spectrum auction, lesson learned, achievement, leadership

I. INTRODUCTION

There are three major responsibilities of an independent regulator. Firstly, to protect consumers from abuse by telecom operators that have ample market power. Secondly is to support operator investment by protecting investors from arbitrary government action. Lastly is to ensure economic efficiency by balancing both pro-investment and pro-consumer protection policies. In short, regulators must balance the policies to take into consideration all stakeholders (government, operators and consumers).

Being a utility regulator has significant challenges where the regulator must ensure it is not influenced by power of politicians and at the same time, monopolistic behavior of operators and some interest groups. In the past, since regulators as institutions were established long after monopoly and state owned telecommunication operators

had made a market entry; and after role of a government as the ultimate authority in decision making and policy implementation for a nation is clearly understood and established—therefore, regulators have had extreme challenges in making its place and establishing its role amidst monopolistic operators and higher power from government authority who have long since established their roles. While the jurisdiction of a regulator has been clearly established, regulators are sometimes put in situations where they become scapegoats for detested policies and become involved in being completely responsible policies that they are supposed to implement [1]. As a result of such challenges, regulators face the highest risk of being removed from its position or face chances of new laws imposed that reduces its authority significantly transferring that on to the government [2]. So how can regulators persevere and succeed when faced with these testing challenges? Regulators need exceptional leadership skills and must continuously keep track with what is going on with operators, politician, consumers and other stakeholders [3]. Regulators must also keep track with the international trends in order to drive policies that are suitable for their country but at the same time is consistent with that of what is proven to be successful to other countries. Regulators should drive important policies by also bringing up critical issues that should not be ignored, evaluate trade-offs of policies to made the best decision and focus on creating stability in the telecommunication sector [3].

This paper provides a case study on NBTC as a telecommunications regulator and describes its role and responsibilities. Further sections provide a detailed example of other institutions inflicting the Thai regulator with testing challenges regarding the spectrum auction in Thailand, the lessons learned post-auction and the leadership actions taken by NBTC to protect the country's benefits and ensure stability in its position.

II. THE ESTABLISHMENT OF THE NBTC

Before the establishment of NBTC Act 2010, Radio Frequencies were permission and authorization for use was granted via administrative approach (concession contract). Under this regime the discretionary power played pivotal role. Administrative approach has impaired the development of many markets in countries worldwide. In Thailand, dominant and monopolistic behavior from

Manuscript received October 11, 2015; revised January 4, 2016.

Financial support for this research paper is provided by National Broadcasting and Telecommunications Commission, Bangkok, Thailand.

state owned enterprises (incumbents) has resulted in lack of efficient competition. As the lack of competition deters real development in the telecommunication industry and affects end users in terms of cost effective and service choice limitation decreasing buyer power. Under the new regime, radio frequency used for telecoms and broadcasting business will be allocated under market-based approach, i.e., auction for 2.1GHz band. Pursuant to the liberalization concept, all sectors (incumbents, existing sectors, new entrants) will be treated equally under the similar regulation without any special privilege.

There was an attempt by the National Telecommunication Commission or "NTC" (the predecessor of NBTC) to conduct the auction in September 2010. In compliance Organization Act 2000 the NTC drafted Telecommunications Master Plan (2006-2010) and announced the IMT 2000 Auction to conduct the 2.1GHz spectrum (3G auction) auction. However, the state owned enterprise (incumbent) Communication Authority of Thailand (CAT) filed a lawsuit against NTC, on ground of unconstitutionality of the auction. The Central Administrative Court affirmed by Supreme Administrative Court ruled against NTC suspending the auction in 2010.

In 2011, the National Broadcasting and Telecommunications Commission (NBTC) was established according to the Act on Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services 2010 to handle regulatory matters on broadcast and telecoms sectors. The Act, consistent with the 2007 Constitution of Thailand, brings about significant change in telecoms and broadcasting market in Thailand as the laws require "liberalization" in telecoms and broadcasting markets. The concept of spectrum is national and scarce resource and efficient use will optimize and generate benefit to Thai people. The spectrum must be allocated by means of market based approach spectrum auction under the authority empowered to the NBTC.

The NBTC is an independent convergent regulator comprising of 11 board commissioners who was elected after a competitively selective process and were officially appointed by the King of Thailand, the convergent regulator 'NBTC' is divided into two boards of committee; telecoms and broadcasting committees, for the reason that they can specifically perform their roles and duties which fit mostly for each field of expertise. However, the joint authority and responsibility still remain in term of 1) spectrum management which must be consistent with the radio frequency plan and 2) adopting policies and regulations to promote free and fair competition and with due regard to public interest. There are three main regulations which set the regulatory framework for the NBTC, the NBTC Act 2010, the Telecoms Business Act 2001 and the Broadcasting Business Act 2008, including over 170 notifications dealing with specific matters relating to telecommunications regulations.

III. SPECTRUM AUCTION AND MARKET LIBERALIZATION

Liberalization is a major shift from long term monopoly by state concession to licensing regime under NBTC regulation. The Act requires the NBTC to allocate spectrum resource by means of auction. In October 2012, for the first time in the Thai history, licenses for spectrum in the 2.1 GHz band were auctioned by the NBTC. The NBTC was successful in the auctioning process and the awarding of three licenses to three mobile operators with knowledge, prudence and due process including setting up the subcommittee gathering expertise to conduct the study on regulatory and technical details.

The NBTC designed the auction of 2x45 MHz spectrum to license 9 spectrum blocks with minimum amount of 5 MHz with aim to promote competition because this flexible packaging could attract new entrants with lower demand and limited budget to enter into the market. The spectrum cap set at 15 MHz with aim to prevent excessive holding or spectrum hoarding. The NBTC set reserve price at 4,500 Million Baht/ 5 MHz lot which is 70% of the market value as calculated by Chulalongkorn University. Finally, the total revenue gaining from the auction is 41.63 billion (1.36 billion USD) and also long-term benefits which generate to economic and society as a whole resulting from development of telecoms and other relevant sectors.

A. Regulatory Obstacles and Problems: "Before" and "After" the Auction

The NBTC went through obstacles and regulatory tension separated into two periods; both "before" and "after" the spectrum auction. Firstly, "before" auction, the NBTC had to file petition to the Central Administrative Court to revoke the provisional interim injunction on previous spectrum auction plan prepared by the NTC in 2010. Furthermore, the NBTC took concrete actions to ensure competition by revising and issuing new regulations in order to facilitate the implementation of 3G spectrum allocations. Besides, the NBTC had to tackle attempts by interest groups and related groups to suspend or revoke the auction process. Secondly, "after" the auction stage, there were legal challenges and storm of criticism against the NBTC. The senators, the members of representatives, and the National Anti-Corruption Commission investigated and asked the NBTC to explain and clarify more about the auction process. Such criticisms led to the petition filed to the Ombudsman to suspend the licenses and to revoke the regulation, accusing that the auction lacked free and fair competition. Later, the Ombudsman decided to bring an action against the NBTC at the Central Administrative Court. However, after hearing all relevant evidence, the Central Administrative Court dismissed the lawsuit. The Court reasoned that the Ombudsman had no authority to challenge the NBTC because the NBTC is not state officials but instead, it is an independent organization which has responsibility and authority with discretionary power empowered by the Act.

B. Regulator's Solution: Pre-auction Period

In order to accomplish the task of 3G-auction process in Thailand successfully, the NBTC had to carefully analyze problems resulting from the failure of NTC to conduct the 3G auction in 2010. The study indicated that clearer criteria and more flexible regulations are needed for free and fair competition. Thus, the revision of criteria and regulations regarding the 3G auction was pursued as follows:

C. Removal of the Former N-1 Condition

In 2010 auction design during the NTC regulatory period, the 2.1 GHz auction had N-1 rule. N-1 rule involves creating artificial scarcity whereby there would be one unsuccessful bidder in the initial round. This would influence bidders' assessment of value and create a high amount of pressure for bidders hence, increasing bid value and higher proceeds from spectrum auction. However, in 2012, NBTC (new regulator since 2011) was not convinced on n-1 rule set by its predecessor will best fit its statutory duties in 2012 [4]. As NBTC is duty bound to promote efficient use of spectrum and to foster competition in the market. Therefore, the policy objectives do not require NBTC to prioritize maximizing economic rent above efficiency in assigning spectrum [4].

Moreover, NBTC was concerned since Thai telecom industry is dominated by three large operators; it was very likely that N-1 might exclude a new entrant or even one strong operator thereby ending up with two operators and permanent negative competitive consequence in the market over prioritizing competition within the auction. Instead, by eliminating the N-1, NBTC has promoted "free and fair competition" by providing a level playing field in Thailand telecommunications market. [4]

D. Spectrum Packaging–New Block Size (Flexible Packaging)

Spectrum packaging set by the NBTC is flexible packaging. 45 MHz was divided into 5 MHz (total 9 lots of 2 x 5 MHz). The study of the Subcommittee previous spectrum packaging design in 2010 auction, fixed fixed packaging (3 lots of 15 x 3 MHz) has a negative impact because new entrants cannot enter the market. The design of 5-5-5 MHz has incentive as it could attract new entrants with lower demand and limited budget to enter into the market which is consistent with aim to promote new entrants in telecoms market.

E. Collusion Prevention

After conducting study and according to the international best practices, anti-collusion rule was taken into consideration as collusion easily in auctions. The collusion prevention measure was highlighted and adopted for the first time by the NBTC with an objective to deter collusive behavior and manipulation of the spectrum auction among all bidders. The anti-collusion measures applied were legal and social measures. The new anti-collusion rules are covered wide range of prohibited behaviors categorized in the 3G spectrum promulgation. Moreover, in supplementing the legal measure, the NBTC

initiated social measure by means of the declaration of the code of conduct of the bidders. Although such declaration imposes no legal pressure, it was expected to draw social action and triggered the sense of social responsibility.

F. Spectrum Cap at 15 MHz

The spectrum cap was set at 15 MHz with aim to prevent the excessive financial power of the bidder, lessen potential of strong market concentration as well as spectrum hoarding.

G. Reserve Price

The NBTC set reserve price at 4,500 Million Baht/ 5 MHz/lot to encourage smaller operators or new entrant. The amount of the reserve price was conducted under the study by the Faculty of Economics, Chulalongkorn University. The NBTC followed international best practices which suggested that regulators should not just aim at maximizing state revenue gaining from auction. Excessive license fee is not objective of telecoms regulation and may later result in adverse effects. Instead, regulators should encourage competition "as a whole"

H. Revision of Foreign Dominance Notification

The NBTC has put its best effort to balance benefit among 3 groups; Thai investors, foreign investors and Thai consumers. As a result, the NBTC removed the problematic elements and adopted clearer criteria by revising the Foreign Dominance Notification earlier introduced by the NTC. The new Notification is based on the principle of transparency and legal certainty in order to facilitate and not to burden the implementation of spectrum auction process. By this means, every operators are treated under the same rule which is "fair" competition. Moreover, the Notification works as the preventive measure to promote good corporate governance and self-help licensees to act consistently with the Foreign Business Act.

IV. LESSON LEARNED: POST-AUCTION PERIOD

After 2.1 GHz auction, NBTC was heavily criticized on spectrum design and transparency of the auction by mass media, academics, politicians and independent consumer groups. This led to the Senate of Good Governance who sought to court the four telecommunications committee members by demanding the National Anti-Corruption Commission (NACC) to investigate the committee members on collusion with private operators in regards to 2.1 GHz spectrum auction. On 16th October 2012, nine slots of 2.1 GHz spectrum were auctioned and held by National Broadcasting and Telecommunications Commission (NBTC), independent regulator responsible for spectrum management and licensing in Thailand. The 2.1 GHz auction drew heavy criticisms and was challenged on aspects such as pricing, lack of competition and foreign ownership. So, NBTC was challenged heavily on the transparency of the 3G auction that took place and five petitions were filed to the National Anti-Corruption

Commission to investigate whether the 3G spectrum auction was in violation of Anti-Price Collusion Act of 2009. After investigation since 2012, it was concluded in August 2014 that National Broadcasting and Telecommunications were cleared of all charges by the NACC. The NACC had confirmed it was clear that there were no collusion with private operators in the seven round 2.1GHz license auction for 3G since price paid for the 2.1 GHz spectrum license was comparable with that of spectrum license fees paid in other countries with similar GDP per capita. As for the case of lack of competition within the auction, the scrapping of the N-1 condition is aimed at promoting a level playing field in the telecommunications industry under the Frequency Allocation Act. Further, NBTC was criticized for permitting Norwegian-backed telco, dtac Trinet Company Limited (DTN) to bid for spectrum. However, NBTC was cleared of wrongdoing and charges were dropped for permitting DTN to auction for 2.1GHz, as DTN is registered as a Thai company by law and foreign ownership is under 49% which is consistent with Thailand's foreign ownership act.

To ensure that the auction conducted by the NBTC is legitimate, efficient and consistent with international best practices, The NBTC sought international assistance by working with ITU as a partner to conduct the study on the 3G auction evaluation. After the study in depth, the ITU confirmed that Thailand 3G auction process was consistent with international standards and achieved fair competition.

A. Outcome Assessment Confirmed by the ITU

In order to overcome legal challenge and public criticism about the auction result, the NBTC have sought appropriate measure and conduct with best effort and prudence including clarification to the public in order to remove legal hurdles and public misunderstanding caused by misleading information. The result of ITU's study confirms legitimate auction process as follows:

1. Spectrum licenses were efficiently and fairly assigned;
2. Licenses incorporate important measures to improve competition including infrastructure sharing and better access spectrum for MVNO;
3. Benefit to consumers is ensured by price reduction of 15% in comparison to 2G services (details described in [4])
4. Principles, objectives, design and outcome of the auction are consistent with international best practice.

Apart from ITU's assessment, there is also a confirmation by a specialized agency. The NBTC's auction process was conducted by a well-known consulting company for spectrum auction, i.e, the Power Auctions LLC. It confirmed publicly that the auction concluded successfully and consistently with international best practices.

The reserve price resulted in an efficient allocation. The

auction rules achieved a more efficient outcome than many other spectrum auctions internationally.

B. Strengthening Stakeholder Consultation Process

Under the NBTC Act 2010, the NBTC is required to hold public hearings when revising or issuing new regulation and the law required public consultation for a period of a month. The ITU study points out that one of the crucial reasons leading the Thai public to have negative attitude on the 3G auction process was lack of understanding of the spectrum auction [4]. ITU recommended that, apart from legal requirement, the NBTC should carry out consultation with stakeholders and invite feedbacks throughout the whole process from the beginning of preparation, throughout the auction design and planning process and till the end of the plan. While NBTC law only specified that public consultation was required for a month but did not specify the methodology for means for the public consultation, nevertheless, NBTC had gone above and beyond and followed ITU advice to sought out public consultation and view using variety of methodologies, through internet, face to face from large audience public hearing, focus groups with key experts, and interviews with subject matter experts. NBTC has sought out public view from many stakeholders to get a 360 public view on spectrum auction and it has considered various relevant issues from affected parties and has made changes according to public consultation.

C. Implementing the Auction Result to Ensure Fair Competition and Protect Consumers' Interests

In implementing the auction result, the NBTC has recently issued three regulations to be effective, namely, infrastructure sharing, mobile network roaming, and MVNO services. These regulations will draw better competition, speed up the 3G service launch and assist the licensees to fulfill their roll out network obligation.

Moreover, in order to better protect consumers' interests, the NBTC initiates the license conditions imposed to the licensees to require them to submit the Corporate Social Responsibility (CSR) Plan and the Consumer Protection Plan to the NBTC before launching the services. The CSR Plan must cover electronic waste management, concerns of users' health and risk management plan for rapidly changing technology. The Consumer Protection Plan must include measures to handle improper services, mechanisms without charge in receiving complaints from customers etc. Although there two conditions seem to impose obligations to the operators beyond regular rules under the core legislation, all operators are willing to comply since they want to have good image for the public.

The situation of 2.1GHz 3G auction in Thailand presented in this section is relevant to the principle of leadership in [1]-[3] which states that "To be successful, regulators need to recognize context, changes in context, and patterns in the changes. But when changes occur, some people have to give up things that they have valued about the past, which adds peril to the regulator's job because the regulator might be blamed or scapegoated.

Furthermore, the regulator might play an evolving role in policy development. But this, too, has perils because the role will be situational, and important stakeholders will disagree on the boundaries of the regulator's political authority. But in the end, even though regulation might sometimes be dangerous work, it is always interesting work.”[3]

V. OUTCOME AND POSITIVE IMPACT OF SPECTRUM ASSIGNMENT

Since the 2.1GHz 3G spectrum action has successfully launched in October 2012, the positive impact on the performance and quality of mobile networks and competitiveness index can be demonstrated as following:

(1) Expanded 3G coverage and utilized spectrum for 4G LTE by the two major carriers has seen median speeds rise significantly over the second year of the license as shown in Fig. 1[5].

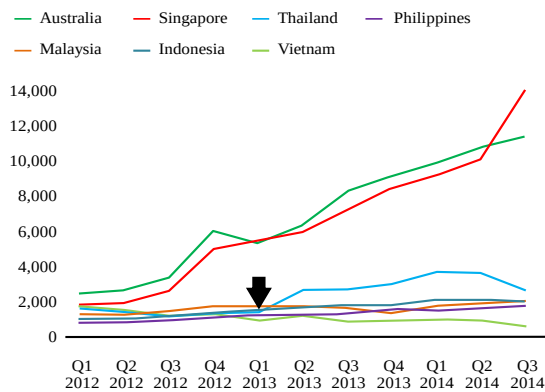


Figure 1. Median (50 percent probability) [5] downlink throughput (Kbps)

(2) App coverage studied by Ericsson's analysis on Speedtest.net data, mobile operators can offer more reliable streaming experience, across their entire networks over the second year of the license as shown in Fig. 2 [5]. Ensuring network performance meets the current App coverage and data requirement is critical to meeting user expectations on network performance. Smartphones and tablets have become an integral part of every users' lives and mobile user behavior has transitioned from voice focus to app focus.

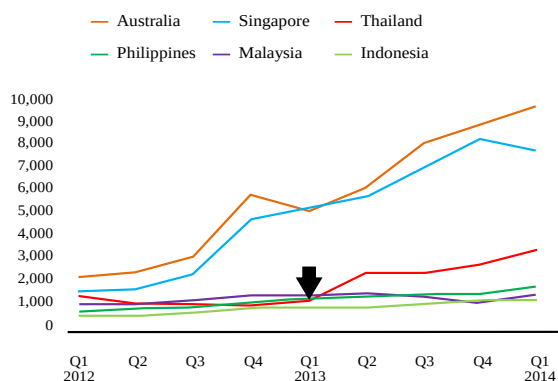


Figure 2. Median (50 percent probability) [5] downlink throughput (Kbps)

(3) Mobile broadband penetration in Thailand is now growing rapidly. This trend has started to grow after the award of 2.1GHz 3G licenses. Fig. 3 shows mobile broadband penetration in Thailand as compared to the average from selected emerging countries in the Asia-Pacific region.

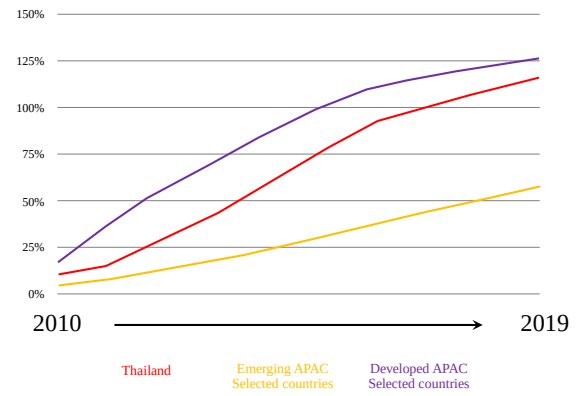


Figure 3. Mobile broadband penetration in Thailand vs. average from selected emerging and developed Asia-Pacific countries [6]

(4) Based on the results of the research in [6], with Thailand's current ICT development dynamics, it would reach ICT maturity within the forecast period 2013 - 2020. In terms of its overall ICT development level, Thailand is ranked tenth in the Asia-Pacific region and stands at the upper end of the developing countries' group as illustrated in Fig. 4.

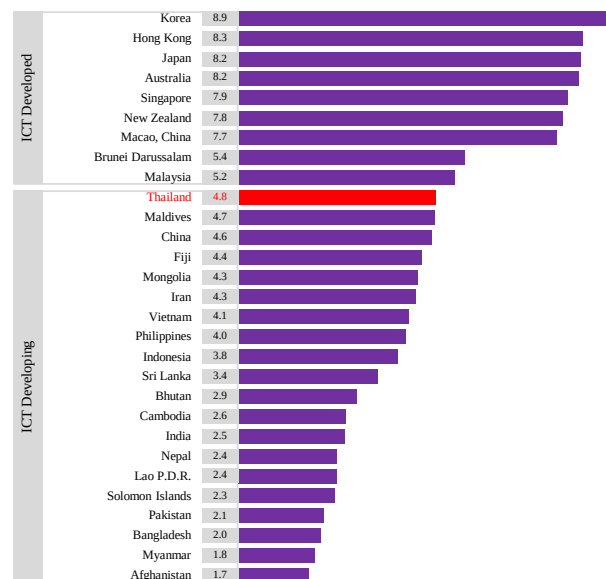


Figure 4. ICT development index-Asia-Pacific region (2013)

(5) In 2013, Thailand took the world record in migrating 2G subscribers to 3G, with migration taking even less time than in Japan. 30% of Thailand's existing 95 million 2G customers shifted to 3G in just five months [7].

(6) Based on the modeling result in [6], the research estimates that if the Thai authorities are able to facilitate the development of a vibrant broadband market (which

will also meet the targets set by the Digital Economy Plan), broadband connections penetration in the country could increase from 52% in 2013 to 133% by 2020.

(7) Thailand's ranking for development of information and communications technology, the ICT Development Index (IDI) for 2013, jumped to 81st from 91st in 2012, according to the ITU's "Measuring the Information Society Report" [8].

(8) According to Bangkok Post, "with the study by the World Economic Forum on ICT competitiveness in 2014 through the Network Readiness Index (NRI), in which Thailand was ranked 67th, up from 74th in 2013" [9].

VI. CONCLUSION

In this research we provide a case study of the role of NBTC as a spectrum management leader. As a regulator, NBTC actively analyzed the spectrum auction rules set in 2010 to establish whether it is apt for 2012 spectrum auction by benchmarking against other countries. Regulators such as NBTC are frequently challenged on their decisions and policy implementation, NBTC was also investigated by the National Anti-Corruption Commission on whether NBTC favoring operators in regards to 2.1 GHz spectrum auction. NBTC was cleared of all charges as it established leadership in the past by cooperating with ITU to conduct a study on 3G-auction evaluation. The study confirmed that Thailand 3G auction process was consistent with that of international standard, achieved fair competition and was indeed transparent. As regulators are often scapegoats to being scrutinized as the role involves doing what is right for all stakeholders, this research has proven that leadership to ensure the right policies are being implemented and cooperation with international institutions and consultants who are specialist in the field is of utmost significance. Last and most importantly, NBTC had gone above and beyond and followed ITU advice to seek out public view from many stakeholders to get a 360 public perception on spectrum auction. In regards to public consultation, the regulator had done more than what is required by the law to ensure

transparency on 2.1 GHz spectrum auction. As a result, leadership action of NBTC in ensuring public transparency of 2.1 GHz through variety of methods and cooperation with ITU has led to success in withstanding all testing challenges.

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