



Information Memorandum

Licensing of Spectrum for Telecommunications Service in the Frequency Band of 890 – 895/935 – 940 MHz

**Office of the National Broadcasting and Telecommunications
Commission (Office of the NBTC)**

The English version of this Information Memorandum is prepared for the sole purpose of providing foreign participants with a greater understanding of the telecommunication rules and regulations in Thailand and shall not under any circumstances be construed or interpreted as being a substitute for or supplementary to the Thai version thereof.

Legal Note

This Information Memorandum (the “Memorandum”) has been prepared on behalf of the National Broadcasting and Telecommunications Commission of Thailand (NBTC) in respect of criteria and procedures for the licensing of spectrum for Telecommunications Service in the frequency band of 890 – 895/935 – 940 MHz. Licensing is to take place by way of an Auction in accordance with the powers conferred by Section 27 (1), (2), (4), (5), (6), (11), Section 41 and Section 45 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E. 2553 (2010), in conjunction with Section 7, Section 9 and Section 10 of the Telecommunications Business Act B.E. 2544 (2001) and its amendments.

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Section 1

Introduction

The National Broadcasting and Telecommunications Commission (NBTC) is responsible for managing the spectrum for telecommunications service and regulating telecommunications business in Thailand. The Master Plan for Telecommunications Services B.E. 2555-2559 (2012–2016) outlines a vision to *“develop the telecommunications business, minimize the gap in access to information technology, enhance the country’s competitiveness and improve Thai people’s quality of life.”* In implementing the Master Plan, the NBTC has devised the regime for spectrum licensing, telecommunications service licensing and the regulation of telecommunications businesses in Thailand.

The NBTC has established a policy on spectrum management and use of spectrum which are national communications resources, considering the utmost public benefits at national and local levels in education, culture, State security and other public interests including fair and free competition, as well as the procedures that will ensure thorough and appropriate distribution of benefits to various services and in line with State policy for the development of digital economy. The NBTC also considers that the mobile telecommunications service is a key factor of industrial, economic and social development which will elevate Thailand’s telecommunication development in line with the global evolution and will promote the public right to communicate and the advancement in receiving information, as well as in compliance with the fundamental telecommunications business policy of the country

The NBTC intends to grant 890 – 895/935 – 940 MHz spectrum licenses by way of auction according to the licensing criteria and procedures prescribed in the NBTC’s Notification regarding Criteria and Procedure for Spectrum Licensing for Telecommunications Service in the Frequency Band of 890 – 895/935 – 940 MHz. The auction is intended for optimal spectrum allocation and corrected the situation in which no operator submits the application, so as to make amendments that are proportionate to Thai telecommunication industry and reduce the barricades that obstruct operators from joining the auction. Moreover, the spectrum allocation is intended to improve the wireless infrastructure and should successfully encourage new telecommunication services with superior quality. All these should ultimately correspond to the government’s scheme for driving digital economy. Disclaimer: If the details contained in this Memorandum are contradictory to or inconsistent with the provisions of the NBTC’s Notification regarding Criteria and Procedure for Spectrum Licensing for Telecommunications Service in the Frequency Band of 890 – 895/935 – 940 MHz, the said NBTC’s Notification or any other regulations of the NBTC shall apply.

This Memorandum contains important information as following;

- Policy objectives for spectrum auction;
- An Overview of Thai economy and telecommunications market;
- Policy and regulatory framework for mobile telecommunications services;
- Overview of the 890 – 895/935 – 940 MHz Spectrum Licensing;
- Description of the application process and participation in the Auction;
- Overview and description of the auction.

1.1 Policy Objectives for Spectrum Auction

The NBTC has duties, by law, in spectrum management. The objectives of spectrum assignment must be conformed with policy objectives stipulated in relevant laws, particularly the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services, B.E. 2553 (2010), the Master Plan on Spectrum Management, B.E. 2555 (2012) as well as international practices.

The Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services, B.E. 2553 (2010), Section 41, Paragraph Four and Section 45 Paragraph One prescribe that the permission to use radio frequency for telecommunications service shall be carried out with due regard to maximum public interests at the national, regional and local levels in education, culture, State security and other public interests, including free and fair competition, and shall be carried out in the manner that extensively and appropriately distributing the utilities as the national communications resource to all segments of enterprises for public interest.

Therefore, it is very clear that the policy objectives of spectrum assignment are based on the principle of public interest together with free and fair competition. The NBTC thus set policy objectives for the spectrum auction for telecommunications service in Thailand with the priority as follows:

- 1) Optimally allocate spectrum, thereby creating the utmost benefits to the public;
- 2) Promote competition in the market with the aim to improve quality of service and reduce costs of services thereby benefiting people at large;
- 3) Ensure transparency in the spectrum auction in the aspects of auction design and auction implementation, thereby creating common understanding among all stakeholders and the mutual acceptance of the auction results;
- 4) Develop the telecommunications industry in Thailand including the enhancement of infrastructure and services, thereby improving capability in supporting the increasing demands in the future;
- 5) Bring revenue from auction to the State, of which the amount should be reasonable, appropriate and beneficial to the State.

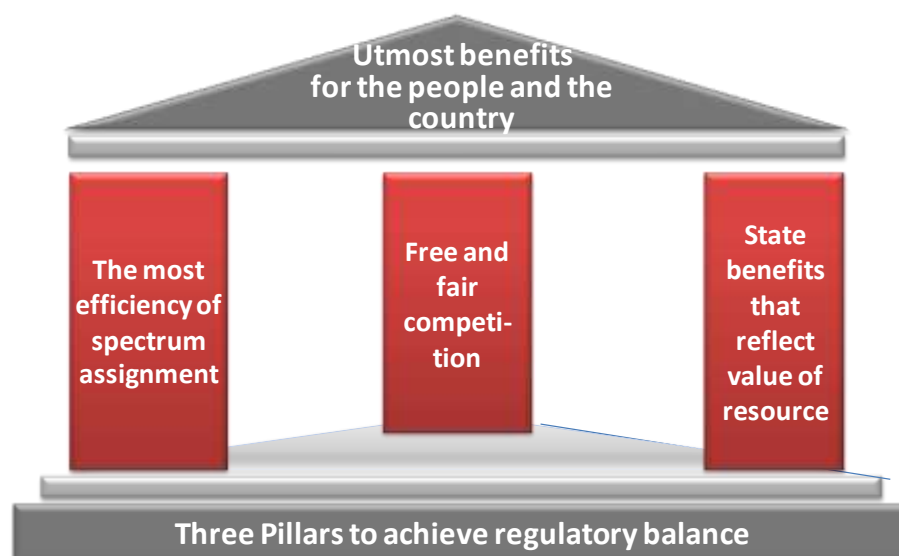
In granting the spectrum license for telecommunications service, the NBTC strives to achieve a regulatory balance composing of three equally important principles that should bring about the greatest benefits to the people and the country. These principles are:

- 1) Highly efficient spectrum assignment. Since spectrum is a national resource belonging to all individuals, the assignment procedure must ensure that the spectrum be assigned to the individual who can best utilize it. The spectrum assignment must also align with usage demand from both operators and end users. Timely succession of auctions thus is the most efficient spectrum assignment method;
- 2) Free and fair competition. The regulation must help creating the regulatory environment that is conducive for market entry and has competition measures in place to prevent

the abuse of market power. The regulation must also be proportionate and not place undue burden to the licensee;

3) State benefits that reflect the value of the resource. The State benefits come in the form of revenues from the spectrum auctions and business operation taxes, as well as the socio-economic benefits and the development brought about by the spectrum utilization.

Figure 1.1 Three Pillars to achieve regulatory balance

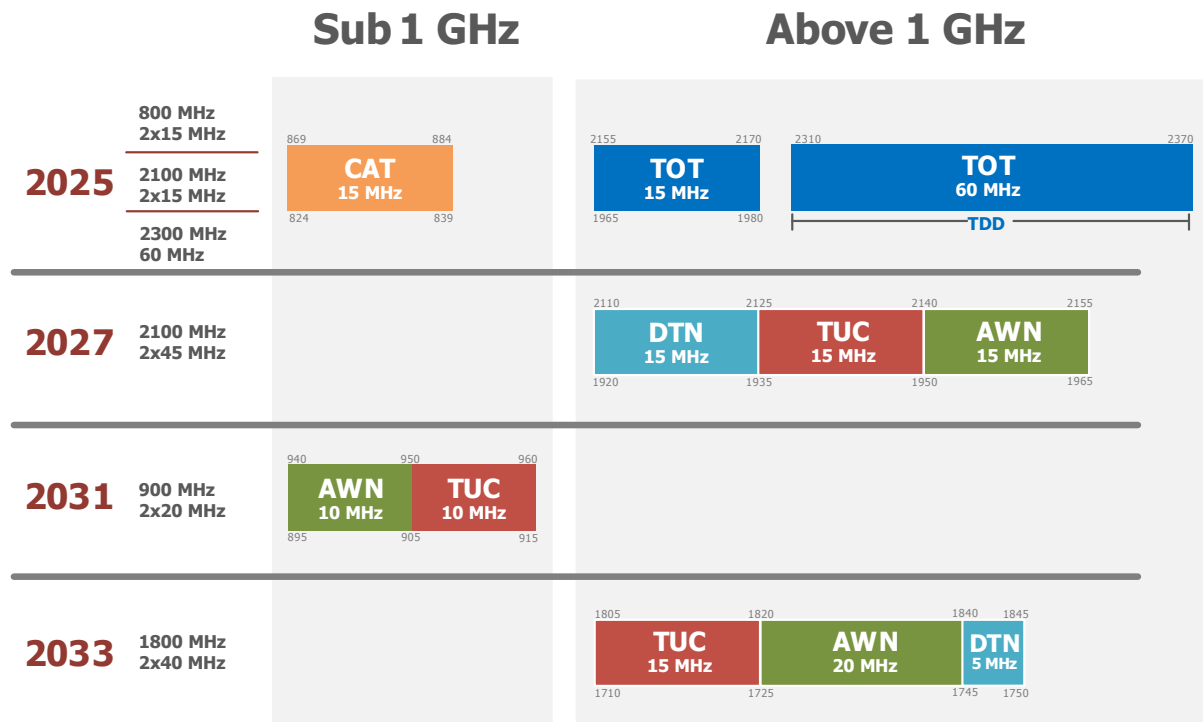


1.2 Spectrum to be auctioned

The mission set forth in the Master Plan on Spectrum Management, B.E. 2555-2559 (2012-2016) is to assign spectrum and to regulate the spectrum utilization efficiently by having due regard to the public interest, the necessity of business operation, the spectrum utilization and the advancement of technologies. In doing so, there must be certain rules with clarity and justification as well as the transparent and fair process. Article 8.2.1 of the Master Plan prescribes a strategy regarding spectrum refarming for reassignment or for utilization improvement that “For the government sectors, state-enterprises and other government agencies who allowing other operators to use their spectrum by granting permission, concession or contract which its legality was already examined by the NBTC, after the end of their permission, concession or contract such spectrum shall be returned to the NBTC.”

The spectrum being used for mobile phone businesses in Thailand are granted permission under the regime of concession from the TOT Public Company Limited (TOT PLC.) and CAT Telecom Public Company Limited (CAT PLC.) and under the licensing regime of the NBTC. The end of concession periods of government agencies and the end of permission of the NBTC can be summarized in year-ordering as follows:

Figure 1.2 Spectrum for mobile telecommunications service



Source: The Office of NBTC

Section 2

An overview of Thai Economy and Telecommunications market

2.1 Thai Economy

In 2017 the Thai economy grew by an estimated 3.9%, slightly higher than 2016's 3.3% growth rate. The country's GDP totaled 15,450.1 billion THB (455.4 billion USD), thus yielding 228,371 THB per capita per year (6,729 USD per capita per year). When compared to last year's which was at 215,454.6 THB per capita per year (6,103.9 USD per capita per year)¹, this year's GDP per capita grew by an estimated 5.99% YoY. Furthermore, the economic stability was considered good, with the average headline inflation rate of 0.7% and the current account surplus exceeding 10.8% of the national GDP. At the end of 2017, net international reserves were 202.6 billion USD, while the government debt was 6,371.4 billion THB (about 41.2% of GDP). In terms of expenses, private consumption and private investment increased at the rate of 3.2% and 1.7%, slightly better than last year's 3.0% and 0.5% respectively. Having achieved the highest growth rate within the past 6 years, export expanded by 9.7%, significantly higher than last year's growth rate of mere 0.1%.

National Stability

The headline inflation rate of 0.7% is probably due to the escalation of the national oil price, which followed the trend of the world's crude oil price. The inflation rate in 2018 is therefore expected to have grown slightly within the range of 0.6-1.6% YoY.

The unemployment rate of 1.2% was a bit higher than last year's. The government debt situated at 41.2% of the GDP, exactly the same proportion as last year's. Nevertheless, the Thai government seems to have maintained its austere stance towards public financing, given that the proportion of the government debt to GDP remains way below the sustainable framework's suggested figure of 60% by the Ministry of Finance.

International Stability

Trade balance and Current account balance have both remained in the surplus since 2014, because of diminishing imports from abroad. Such was due in parts to the recovering economy. The total export amounted to 235.1 billion USD in 2017 with the growth rate of 9.7% compared to the previous year. This feat aligns with the bullish outlook that the world economy has once more regained its positive momentum along with the potentially increasing quantity in trades across the globe. THB has also appreciated when compared to USD since 2015. International stability so far should not raise any concerns as the ratio of net international reserves to short-term debt remains considerably high, while the ratio of external debt to GDP remains low.

¹ National Economic and Social Development Board, Economics and Social News, "Thai economy at Q4 of 2017 and the trend in 2018," 19 February 2018.

Table 2.1 Key economic indicators

Indicator	2014	2015	2016	2017
GDP (current prices, THB billion)	13,230.3	13,747.0	14,533.5	15,450.1
GDP per capita (THB)	196,240.0	201,342.8	215,454.6	228,371.0
GDP growth rate (%)	1.0	3.0	3.3	3.9
Headline inflation rate (%)	1.9	-0.9	0.2	0.7
Core inflation rate (%)	1.6	1.1	0.7	0.6
Unemployment rate (%)	0.8	0.9	1.0	1.2
Total government debt (% of GDP)	42.8	44.4	41.2	41.2
Current account balance (USD billion)	15.2	32.1	48.2	49.3
Trade balance (USD billion)	17.2	26.8	36.5	31.9
Exports (USD billion)	226.6	214.0	214.3	235.1
Imports (USD billion)	209.4	187.2	177.7	177.7
Net international reserves (USD billion)	157.1	156.5	171.9	202.6
External debt at end of year (USD billion)	141,714.69	131,078.21	132,193.70	148,995.34
Exchange rate at end of year (THB/USD)	32.96	36.08	35.82	32.66
Budget cash balance (THB billion)	-397.0	-354.0	-509.0	-539.0

Source: Bank of Thailand, Ministry of Finance, National Economic and Social Development Board

2.2 Competitiveness in Thai Telecommunications Market

World Economic Forum (WEF) at Geneva, Switzerland, released a report that ranks competitiveness of countries across the globe with Global Competitiveness Index (GCI) for 2017-2018. GCI represent a combination of factors that promote sustainable economic growth and is gauged via a set of criteria composed of 114 indices. Thailand's rank has improved from 34th in the previous study period to 32th out of the total of 137 countries. Within ASEAN community, Thailand ranks third behind Singapore that ranks 3rd and Malaysia that ranks 23rd in the world ordering. Other member states in ASEAN such as Indonesia, Brunei, Vietnam and Philippines rank 36th, 46th, 55th and 56th respectively (see more detail in Table 2.2).

Table 2.2 GCI ranking for member states in ASEAN

Country	2017 - 2018		2016 - 2017	
	rank	score	rank	Score
Total	137		138	
Singapore	3	5.71	2	5.72
Malaysia	23	5.17	25	5.16
Thailand	32	4.72	34	4.64
Indonesia	36	4.68	41	4.52
Brunei	46	4.52	58	4.35
Vietnam	55	4.36	60	4.31
Philippines	56	4.35	57	4.36
Cambodia	94	3.93	89	3.98
Laos	98	3.91	93	3.93
Myanmar	-	-	-	-

Source: The Global Competitiveness Report 2017 – 2018; World Economic Forum

The three countries that have their ranks improved are Singapore, Cambodia and Laos, while the six countries that have their ranks worsened are Malaysia, Thailand, Indonesia, Brunei, Vietnam and Philippines (refer to Table 2.2).

Embedded within GCI are the two factors that measure competitiveness in the telecommunications market. These are infrastructure (2nd Pillar) and technological readiness (9th Pillar).

The augmented competitive edge in Thailand is due to, first, a better infrastructure, motivated by the fact that mobile telephone subscriptions/100 pop now ranks 5th (previously 31th in the world). Some significant indicators for technological readiness include the number of internet uses %pop that now ranks 86th of the world, fixed-broadband Internet subscriptions/100 pop ranking at 69th, Internet bandwidth Kbps/user at 75th and the number of mobile-broadband subscriptions/100 pop at 24th (previously 34th) of the world.

Furthermore, in respect of ICT Development Index (IDI) compiled by International Telecommunications Union (ITU) in 2017, 176 countries across the globe were ranked. Iceland placed 1st (previously 2nd), followed by South Korea (previously 1st). The top 10 countries include 7 countries in Europe and 3 countries in Asia-Pacific region (Table 2.3). All of these nations have consistently demonstrated strength in their ICT markets and retained considerable investment in the industry in the past years. These thus are indicative of the correlation between IDI ranking and the level of economic development.

Table 2.3 Top ten countries with the highest IDI

Country	2017		2016		Change in ranking
	ranking	score	ranking	score	
Iceland	1	8.98	2	8.78	
South Korea	2	8.85	1	8.80	
Switzerland	3	8.74	4	8.66	
Denmark	4	8.71	3	8.68	
UK	5	8.65	5	8.53	-
Hong Kong	6	8.61	6	8.47	-
Netherland	7	8.49	10	8.40	
Norway	8	8.47	7	8.45	
Luxemburg	9	8.47	9	8.40	-
Japan	10	8.43	11	8.32	

Source: Measuring the Information Society Report 2017; ITU

Embedded within Digital Divide is the separation of those with access from those without access to information and knowledge through ICT. One study by the ITU compared the development of ICT between developed countries and developing countries, and found that in 2017 developed countries had IDI of 7.52 on average (7.37 in 2016) while developing countries had IDI of 4.26 on average (4.06 in 2016). It is no surprise that 4.26 is lower than the world average (Table 2.4).

Table 2.4 IDI scores categorized by the level of development

Average Score	IDI 2017	IDI 2016
World	5.11	4.94
Developed Countries	7.52	7.37
Developing Countries	4.26	4.06

Source: Measuring the Information Society Report 2017; ITU

Table 2.4 indicates that the gap in technology development between the developed countries and developing countries remains vast, the magnitude of which can be accounted for by the following reasons. First, leading nations like Iceland, South Korea, and Switzerland encourage ICT development and strictly adhere to their development plans. Second, developing nations have been following suits, though still lagging behind by a fair margin. These efforts from the followers however are not in vain since the world's average IDI increased from 4.94 in 2016 to 5.11 in 2017.

Table 2.5 IDI categorized by regions in 2017

	Max	Min	Average
Europe	8.98	5.14	7.50
CIS	7.55	4.37	6.05
America	8.18	1.72	5.21
Arab countries	7.60	1.82	4.84
Asian and Pacific	8.85	1.95	4.83
Africa	5.88	0.96	2.64

Source :Measuring the Information Society Report 2017; ITU

Table 2.5 demonstrates the variation in average IDIs between regions. Most nations in Europe are in developed states and so their average IDI is 7.50, which starkly differs from Africa's average of 2.64 since most African countries are still in the stage of developing. When compared within region, Asia and Pacific region has the most diversity as the highest IDI is 8.85 while the lowest IDI is just 1.95. This extensive level of dissimilarity, also encrypted in the form of Digital Divide, can be to some extent explained by the variance in economic structures, development policies and societal differences such as cultures, languages and nationalities.

When focusing on just the 10 member states of ASEAN, the leaders in ICT are still Singapore, Brunei and Malaysia, whose rankings according to IDI scores are 18th, 53rd and 63rd respectively. Thailand ranked 4th among ASEAN countries and 78th in the world in 2017, compared to 79th in 2016 (Table 2.6).

Table 2.6 Ranking via IDI in ASEAN

Country	2017		2016		Change in ranking
	World ranking	Score	World ranking	Score	
Singapore	18	8.05	20	7.85	↑
Brunei	53	6.75	54	6.56	↑
Malaysia	63	6.38	62	6.22	↓
Thailand	78	5.67	79	5.31	↑
Philippines	101	4.67	100	4.52	↓

Country	2017		2016		Change in ranking
	World ranking	Score	World ranking	Score	
Vietnam	108	4.43	108	4.18	-
Indonesia	111	4.33	114	3.85	↑
Cambodia	128	3.28	128	3.04	-
Myanmar	135	3.00	140	2.59	↑
Laos	139	2.91	144	2.43	↑

Source :Measuring the Information Society Report 2017, ITU

Although Thailand has improved its ranking by one order when compared to last year, indicators such as fixed-broadband Internet subscriptions/100 pop and Internet bandwidth Kbps/user are still lower than the world's average. These numbers seem to imply that Thailand is still capable of building up infrastructure for wired Internet connection and widening bandwidth for international interconnection in the future.

In regards to regulation, NBTC and the Office of NBTC have intended to allocate spectrum bands and organized an auction in 2018. They have been working incessantly on the establishment of high-speed broadband connection and mobile connectivity in 3,920 villages in marginal areas. These are in line with the government policy to improve telecommunications infrastructure and ultimately elevate the public welfare. The enhanced foundation for telecommunications services should also support digital investment and the opening of data storage services; and ease the transition to Digital Economy especially when the public can easily access digital services. The role of telecommunication industry in spurring the country's Digital economy cannot be emphasized enough, as sustainable growth could not have been achieved without stable infrastructure in telecommunications markets.

2.3 Mobile Market

2.3.1 Market Structure

Currently, the mobile market consists of two types of operators:

Group 1: 6 private mobile operators including

- 1) Advanced Wireless Network (AWN), AIS's subsidiary
- 2) Total Asset Communication (DTAC)
- 3) DTAC Trinet (DTN), DTAC's subsidiary
- 4) True Move H Universal Communication, True Mobile's subsidiary
- 5) CAT Telecommunication (CAT)
- 6) TOT

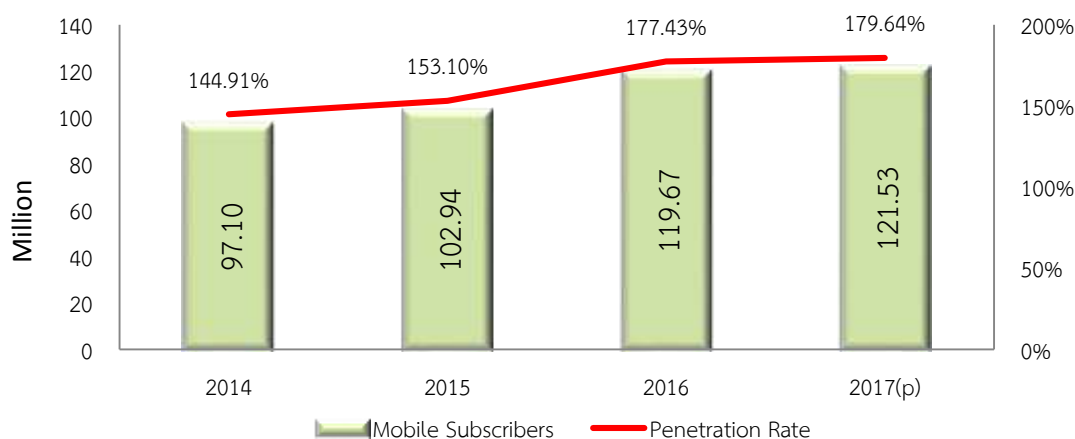
Group 2: Mobile Virtual Network Operators (MVNOs) including

- 1) Private companies with small market caps who collaborate with TOT3G and CAT such as Whitespace and 168
- 2) RealMove, True Mobile's subsidiary, that operates under the alias of True Move H and provides wholesale-resell services from CAT

2.3.2 Subscribers and Penetration Rates

As of 2017, there are 121.53 million mobile subscribers, of which 78.17% are prepaid subscriptions and the rest, 21.83%, are postpaid subscriptions. The penetration rate of mobile services is 179.64% of the population. In other words, an individual owns more one mobile subscription on average.

Figure 2.1 Number of mobile subscriptions (million) and Mobile penetration rate (%)



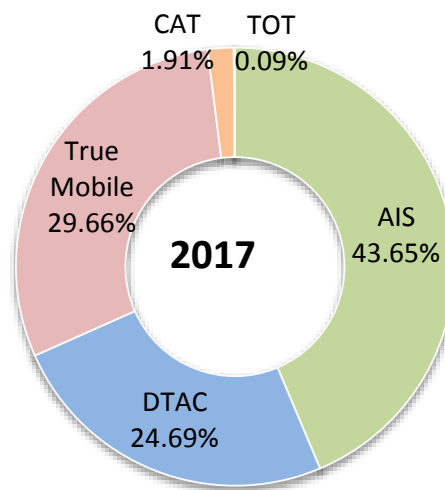
Note: p indicates preliminary data

Source: The Office of NBTC

2.3.3 Market Share and Market Competition

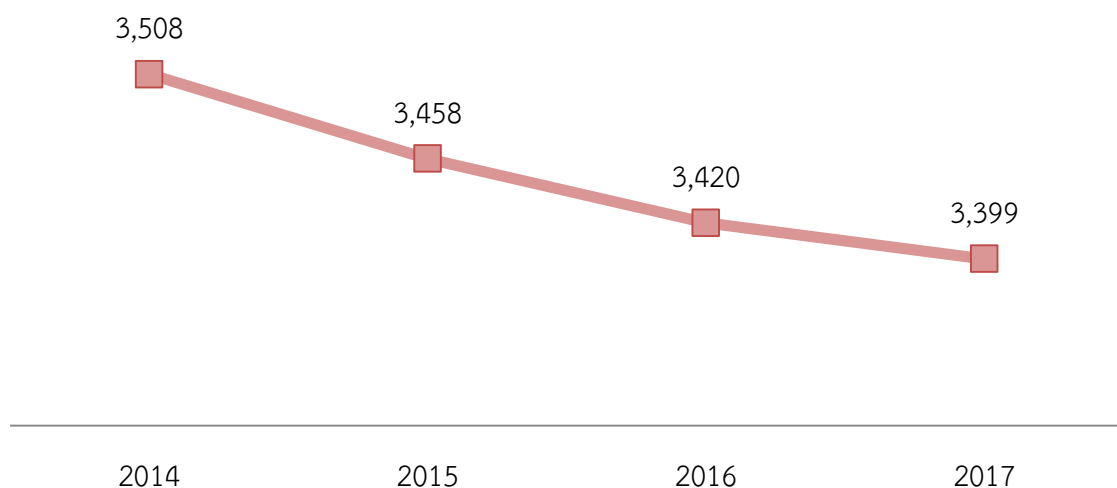
The mobile market is led by three main players whose combined market share amounts to 98.00%. These leaders include AIS, True Mobile and DTAC groups. At the end of 2017, AIS has the highest market share of 43.35%, followed by True Mobile and DTAC with market shares of 29.66% and 24.69% respectively. The two minor operators are CAT, whose share is 1.91%, and TOT, whose share is 0.09%. The Herfindahl-Hirschman Index (HHI) of the mobile market at the end of 2017 is 3,339 points, as shown in Figure 2.3. The fact that HHI has been declining over the years seems to signal that the competitiveness has been on the rise.

Figure 2.2 Market Shares of the Mobile Market (based on subscribers, in %)



Source: The Office of NBTC

Figure 2.3 HHI in the Mobile Market



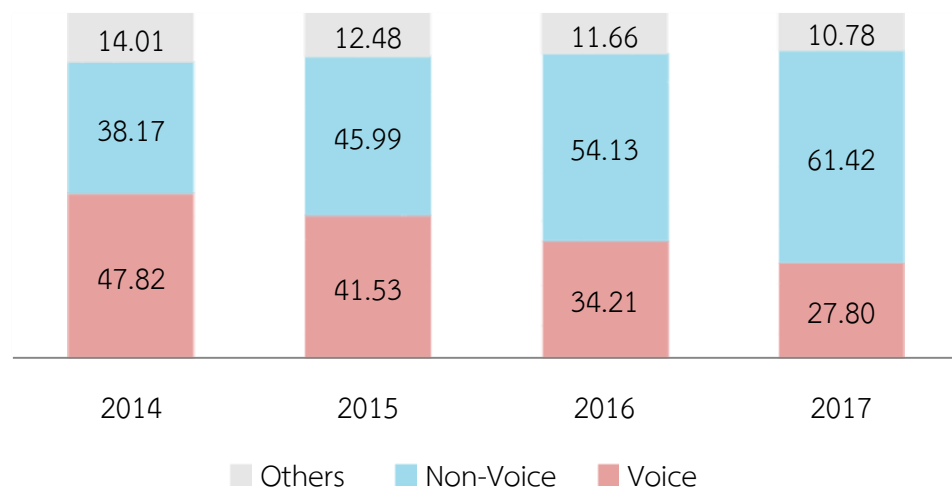
Source: The Office of NBTC

2.3.4 Revenue Breakdown

Revenues in the mobile market can be categorized as revenues from voice, non-voice² or other services. In the last six years, the share of non-voice revenue has been growing continuously; meanwhile, the shares of voice and other revenues have subsided. Out of the total revenue of mobile services in 2017, voice and others contribute just 27.80% and 10.78% respectively, but non-voice does 61.42%. The trends of these compositions are evident in Figure 2.4.

² Non-voice services include data-delivery services, SMS and MMS

Figure 2.4 Revenue Composition in the Mobile Market (%)

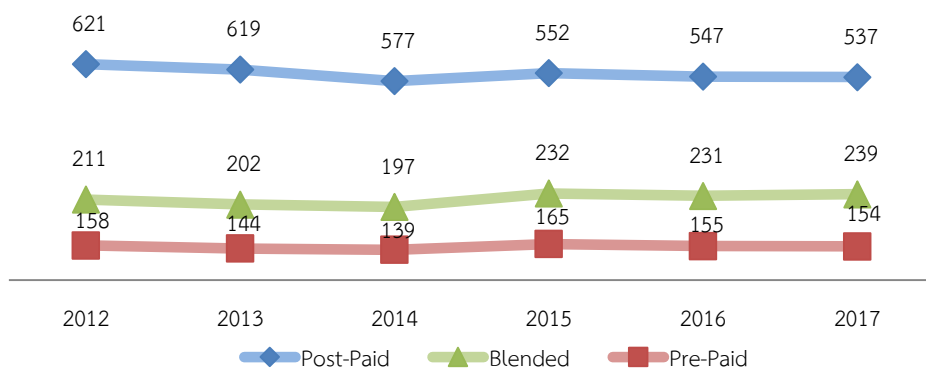


Source :The Office of NBTC

2.3.5 Average Revenue per User (ARPU)

Average Revenue per User (ARPU), as of the end of 2017, was at 239 THB per month per subscription, ARPU of prepaid subscription at 154 THB and ARPU of postpaid at 537 THB. Further details appear in the figure below.

Figure 2.5 ARPU per month per subscription (THB)



Source :The Office of NBTC

2.3.6 Market Performance

The mobile market was particularly competitive in 2017, because every operator put quite a sum of investment into improving their infrastructure and thus boosted the quality of 3G and 4G services. The market participants further competed in terms of packaging and maintaining their consumer bases and niches. Given such a fierce competition among operators, the market observes a declining trend in ARPU for voice services and others services (such as roaming and interconnection charges). The net profit as of the end of 2017 was thus lower than last year's.

Table 2.7 Key Financial Reports of the major three operators (million THB)

Results	AIS group			DTAC group			True Mobile group		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Total Revenue	155,276	152,150	157,722	87,753	82,478	78,275	82,671	93,876	111,311
Revenue from services (excluding IC)	120,500	121,701	125,485	66,221	64,694	64,821	45,051	57,856	67,884
Voice Revenue	60,547	51,250	42,829	29,252	22,953	15,539	18,523	20,797	21,185
Non-voice Revenue	53,193	63,857	76,062	30,746	35,744	43,581	23,449	34,002	42,416
Other Revenue	6,760	6,594	6,594	6,223	5,997	5,701	3,079	3,057	4,283
Gross Profit	70,457	69,158	65,463	25,689	21,632	18,746	19,210	23,366	30,073
EBIT	50,366	39,382	40,385	8,829	4,158	3,890	709	-1,245	2,590
EBITDA	70,776	60,741	70,498	27,941	27,915	30,446	10,123	15,540	26,641
Net Profit	39,152	30,667	30,077	5,893	2,086	2,115	1,082	-4,878	-215

Source: Operators' financial reports

Table 2.8 Operational Figures of the major three operators

Results	AIS group		DTAC group		True Mobile group	
	2016	2017	2016	2017	2016	2017
Subscriptions (million)	41,031,200	40,055,500	24,480,000	22,652,000	24,525,000	27,220,000
Post-paid	6,429,600	7,390,100	5,025,000	5,637,000	6,060,000	6,880,000
Pre-paid	34,601,600	32,665,400	19,455,000	17,015,000	18,465,000	20,340,000
ARPU (THB/month/subscriber)						
Post-paid	600	581	556	578	507	476
Pre-paid	186	183	159	152	116	117
Blended	251	256	235	250	213	208
MOU (Minutes/month/subscriber)						
Post-paid	296	257	276	260	N.A.	N.A.
Pre-paid	201	151	138	116	N.A.	N.A.
Blended	215	170	165	149	N.A.	N.A.

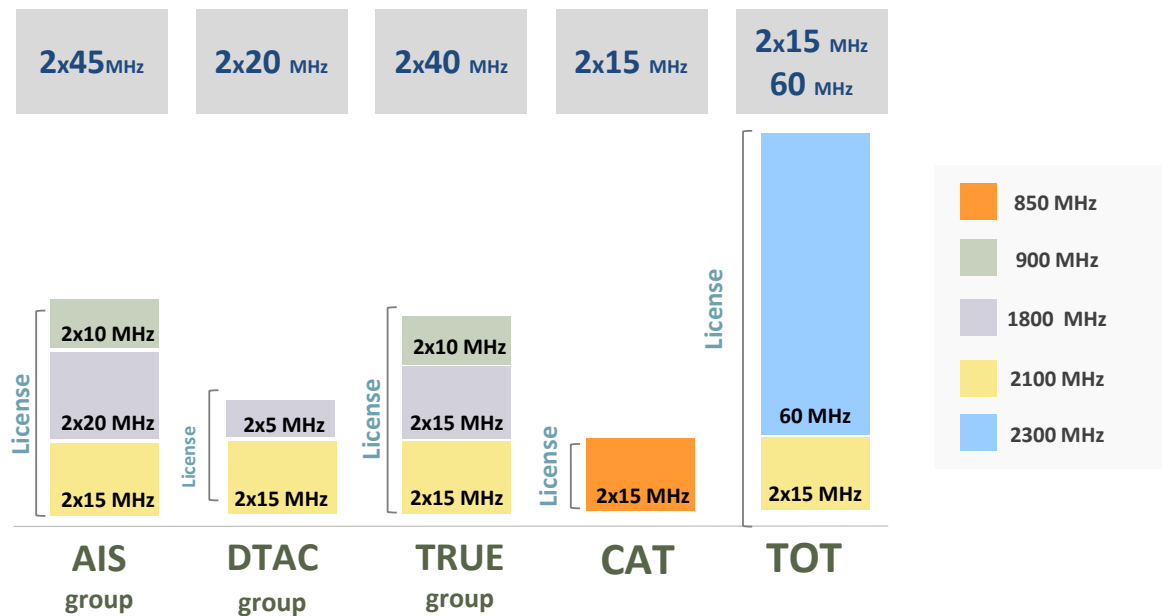
Note :N.A. = no data

Source :Operators' financial reports

2.3.7 Ownership Status of IMT Bandwidths

From the allocation of spectrum through either licenses or concessions, the amount of allocated spectrum summed up to 330 MHz. The current status of ownership and validity is depicted below:

Figure 2.6 Current ownership status of the bandwidths



Source : The Office of NBTC

Under the hypotheses that all bandwidths have the same properties and both FDD and TDD have similar properties. As of now, the AIS and TOT groups possess 90 MHz, considered 27.27% of all allocated spectrum and also the highest among operators. Next in line is TRUE group that possesses 80 MHz, which is 24.24%. Further details appear in Table 2.9 as follows:

Table 2.9 Shares of spectrum

	Type	AIS group	TRUE group	DTAC group	CAT	TOT	Total
850 MHz	FDD	0	0	0	30	0	30
900MHz	FDD	20	20	0	0	0	40
1800 MHz	FDD	40	30	10	0	0	80
2100 MHz	FDD	30	30	30	0	30	120
2.3 GHz (unpaired)	TDD	0	0	0	0	60	60
Total holdings		90	80	40	30	90	330
Share of spectrum		27.27%	24.24%	12.12%	9.09%	27.27%	100%

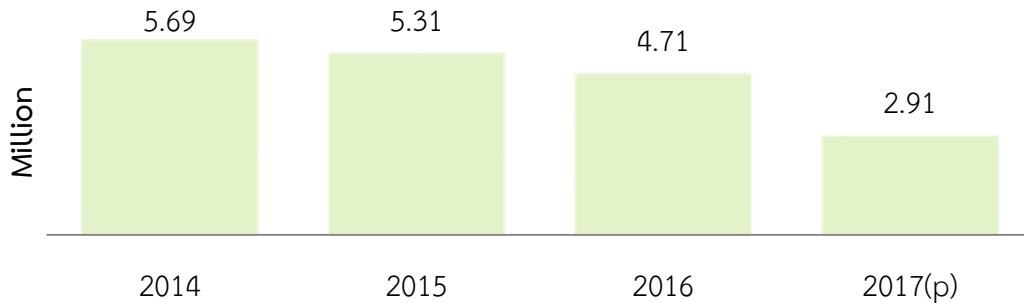
Source : The Office of NBTC, retrieved on December 31st, 2017

2.4 Fixed Telephone Market

2.4.1 Subscribers and Penetration Rates

The fixed telephone market has been declining over the recent years (Figure 2.7), primarily as a result of migration to mobile and VoIP services that give more values, as well as the increasing popularity of smart phones and 3G/4G services. At the end of 2017, there were 2.91 million subscriptions of fixed telephones including public phone booths and Personal Communications Telephones (PCT).

Figure 2.7 Fixed telephone subscriptions (million)

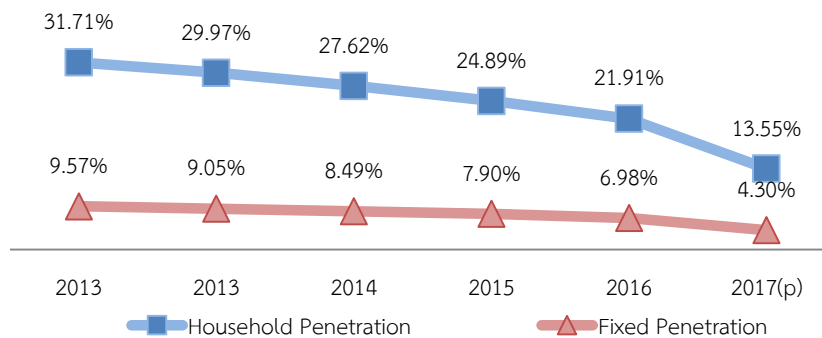


Note : p indicates preliminary data

Source : The Office of NBTC

The penetration rate of fixed telephone services is at 4.30% of the total population, or 13.55% of the total households (Figure 2.8).

Figure 2.8 Penetration Rates of fixed telephones (%)



Note: p indicates preliminary data

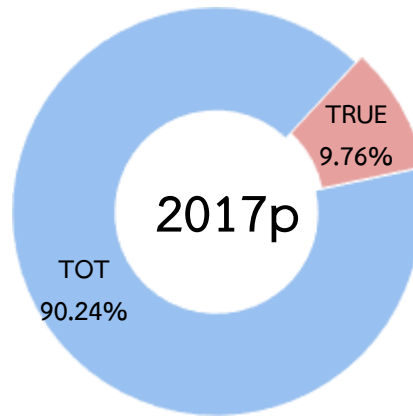
Source: The Office of NBTC

2.4.2 Market Structure and Market Shares

The fixed telephone retail market consists of two main operators including TOT and True Corporation (True Corp). TOT's share is 90.24% (higher than last year's) and True Internet Corporation (TRUE)'s is 9.76%. True Corp's concession for metropolis areas expired on October 28th, 2017. TT&T also ceased its service as the Central Bankruptcy Court issued a

receiving order on February 28th, 2017, which ultimately resulted in the transfer of service provision to TOT.

Figure 2.9 Market Shares of Fixed Telephone Market (%)



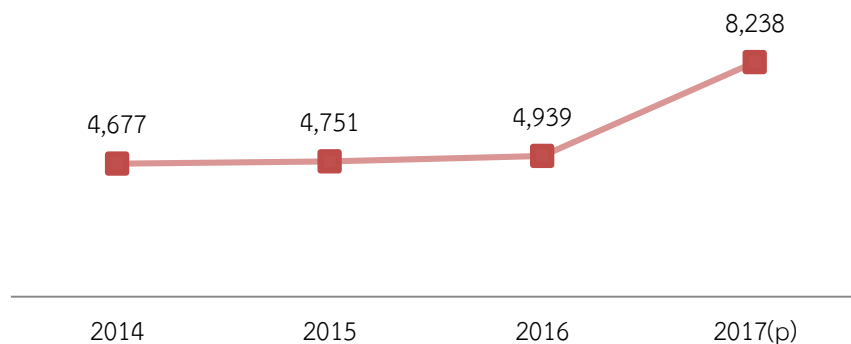
Note: p indicates preliminary data

Source: The Office of NBTC

2.4.3 Market Competition

Based on the aforementioned market shares, the HHI of the fixed telephone market as of 2017 is 8,238 and has grown by 3,299 points, or 66.79%, when compared to last year's.

Figure 2.10 HHI of the Fixed Telephone Market



Note: p indicates preliminary data

Source: The Office of NBTC

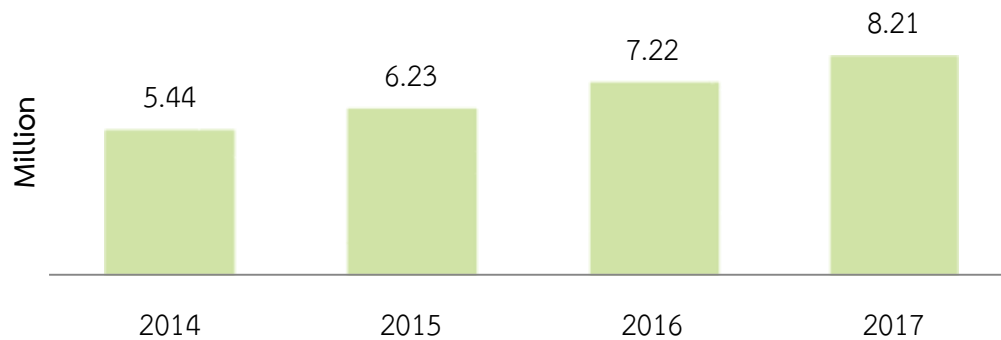
2.5 Fixed Broadband Market

2.5.1 Subscribers and Penetration Rates

The fixed broadband market has been growing continuously in the past few years, with Compound Annual Growth Rate (CAGR) of 14.70% between 2014-2017. In 2017, there

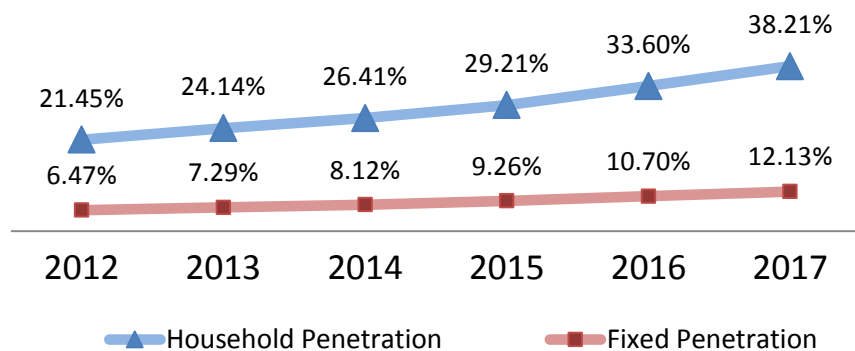
were 8.21 million registered broadband users (Figure 2.11), considered 12.13% of the total population or 38.21% of all households.

Figure 2.11 Number of Fixed Broadband Subscriptions (million)



Source: The Office of NBTC

Figure 2.12 Penetration Rates of Fixed Broadband Services (%)

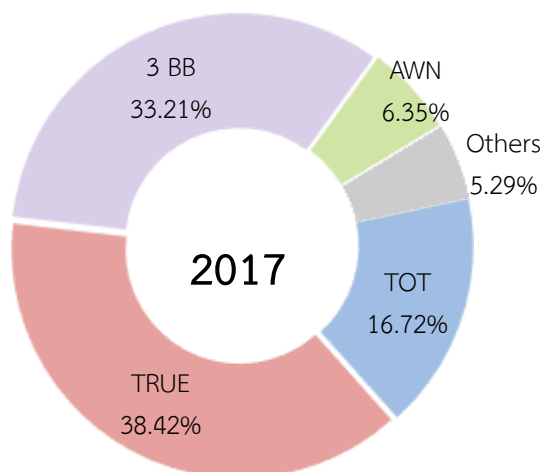


Source: The Office of NBTC

2.5.2 Market Structure, Market Share and Market Competition

The fixed broadband market consists of 4 main players including (1) True Internet Corporation (TRUE) with the market share of 38.42%, (2) Triple-T Broadband (3BB) with the share of 33.21%, (3) TOT with the share of 16.72%, and (4) Advance Wireless Network (AWN) with the share of 6.35%. There are a few minor competitors as well, whose combined market share is roughly 5.29%. The market's HHI was at 2,927 at the end of 2017, decreasing by 34 points when compared to last year's.

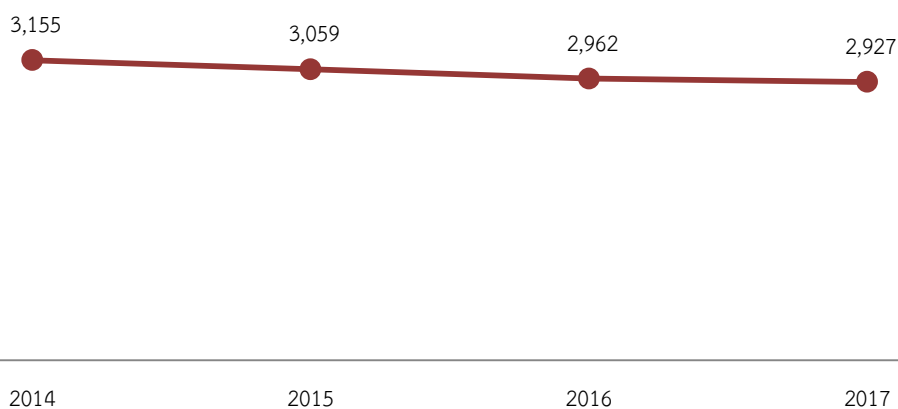
Figure 2.13 Market Shares of Fixed Broadband Market (%)



Note: Market shares are computed from the number of registered fixed Broadband Internet users

Source: The Office of NBTC

Figure 2.14 HHI of Fixed Broadband Market



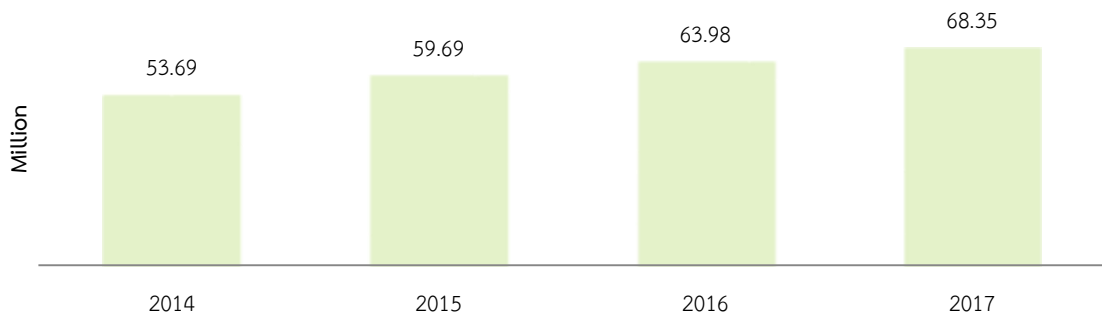
Source: The Office of NBTC

2.6 Mobile Broadband Market

2.6.1 Subscribers

The number of mobile broadband subscribers has been increasing continuously from 2014 to 2017, with the CAGR of 8.38% annually. In 2017, the number of subscribers amounts to 68.35 million users (Figure 2.15)

Figure 2.15 Mobile Broadband Subscribers (million)

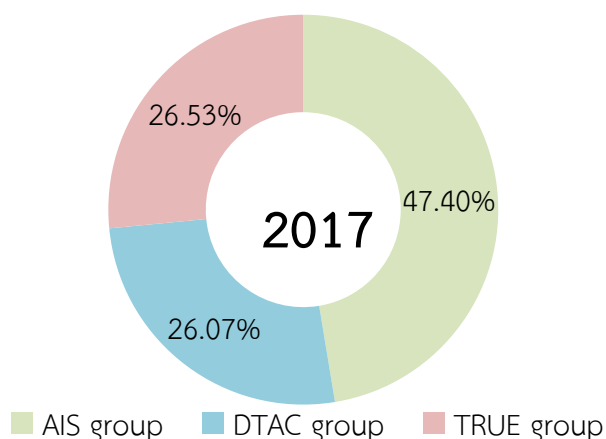


Source: The Office of NBTC

2.6.2 Market structure, Market Share and Market Competition

The share distribution of market revenue due to non-voice services in 2017 shows that AIS group retained the highest share of 47.40% (0.78% lower than the previous year's), followed by TRUE group whose share was 26.53% (2.3% lower than the previous year's) and DTAC group whose share was 26.07% (0.84% lower than the previous year's). Refer to figure 2.17. The HHI of the mobile broadband internet service in 2017 was 3,630, which indicates the increasing level of competitiveness within the market. Mobile broadband has grown rapidly following the auction of the 2.1 GHz, 1800 MHz and 900 MHz spectrum held by the NBTC. Most mobile broadband plans charge users according to actual usage in Megabytes.

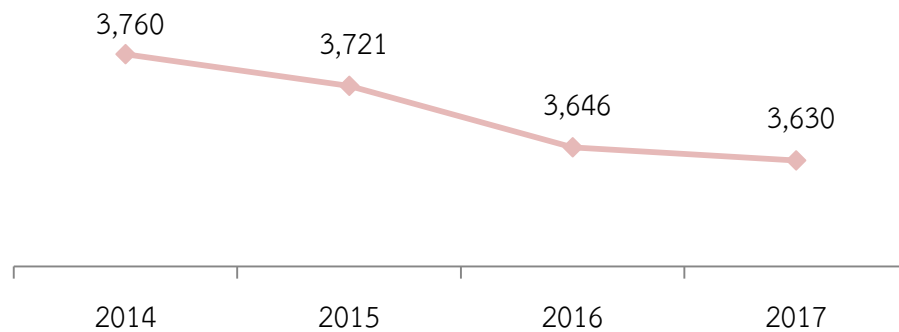
Figure 2.16: Market shares in mobile broadband Internet market



Note: Market shares are computed from revenue of non-voice services

Source: The Office of NBTC

Figure 2.17: HHI of mobile broadband internet market



Source: The Office of NBTC

2.6.3 Price Structures and Packages

In addition, there are packages with the Fair Usage Policy, where once the purchased quota (for example 90 MB, 1 GB, 2 GB or 5GB) is depleted, Internet is still accessible but at a reduced speed. There are several examples of such plans:

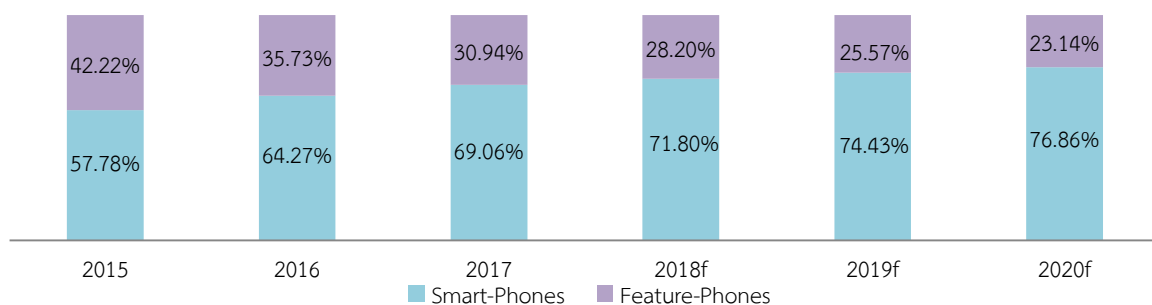
- 4G+ Fun Limited package from True Mobile: 299 THB/month offers 100 minutes of voice, 1 GB of data (maximum speed at 300 Mbps), access to Wi-Fi, and free Wi-Fi calling from any location in the world;
- 4G Max Speed from AIS: 299 HB/month offers 100 minutes of voice to any service provider, 1 GB of data (once capacity is depleted, the speed becomes 128 Kbps), access to Wi-Fi, and complementary packages of one-month free-of-charge access to movies/TV channels;
- Super Non-stop from DTAC: 299 THB/month offers 100 minutes of voice to any service provider, 1.5 GB of data (once capacity is depleted, the speed becomes 128 Kbps), access to Wi-Fi, and 25 GB of cloud storage service for photos and videos.

Mobile broadband market is fairly competitive. Usually when one provider offers a new plan, others will follow suit by offering similar packages or something of higher value in an effort to retain customers. Some bundled services also offer discounts on smart phones, further contributing to the ongoing growth of mobile broadband.

2.6.4 Data Consumption and Usage Types

Current users have been switching from feature phone to smart phones. In 2017, of all the phones current used in the market, more than 69% are smart phones, while less than 31% are feature phones. GSMA forecasted that the proportion of smart phones to all phones will become 76% in 2020.

Figure 2.18 Forecast of number of handsets

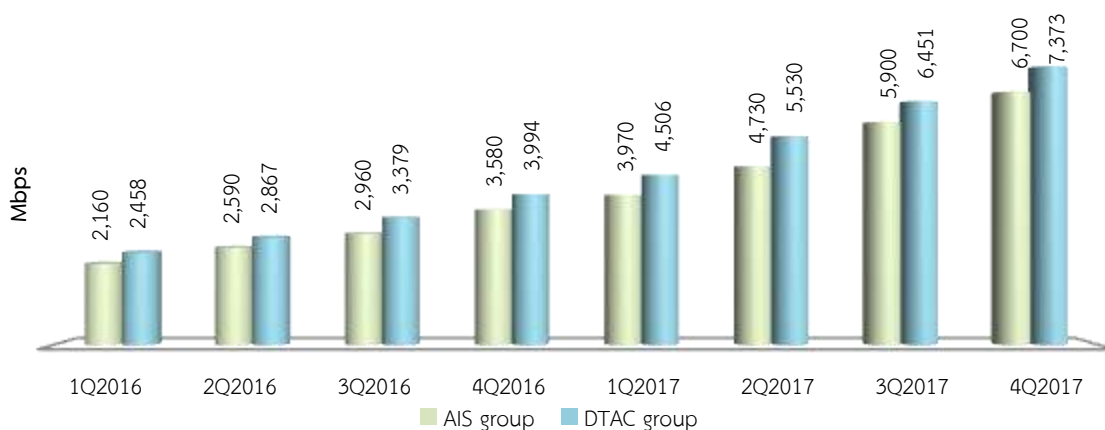


Source: GSMA Intelligence

Note: f indicates forecasted value

Mobile data consumption has been on the rise. In 2017, a typical AIS user consumes 6,700 MB of mobile data per number per month, with the average quarter growth of 17.55% from Q1/2016 to Q4/2017. DTAC user's average consumption of mobile data is 7,373 MB per number per month, with the average quarter growth of 16.99% from Q1/2016 to Q4/2017 (Figure 2.18).

Figure 2.19 Average Mobile Data Consumption per Number per Month



Source: GSMA Intelligence

Section 3

Legal and Policy Background and Regulatory Regime

3.1 Act on the Organisation to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E. 2553 (2010) and its Amendment

Section 27 prescribes powers and duties of the NBTC regarding the spectrum licensing as follows:

- (1) To formulate and implement a Spectrum Management Master Plan, Table of National Frequency Allocations, Broadcasting Master Plan, Telecommunications Master Plan, Frequency Plan, and Telecommunications Numbering Plan. These Plans shall also be consistent with the national policy and plan on digital development for economic and society;
- (2) To allocate radio frequencies for the undertaking of sound broadcasting, television broadcasting, radio communications, and telecommunications services;
- (4) To license and regulate the use of radio frequencies and radio communications equipment in the undertaking of sound broadcasting, television broadcasting and telecommunications services, or radio communications services; and prescribe licensing criteria and procedures, conditions, or licensing fees;
- (6) To license and regulate the operations of sound broadcasting, television broadcasting and telecommunications services to allow service users to have choices of services with quality, efficiency, timeliness, reliability and fairness; and prescribe licensing criteria and procedures, conditions, or licensing fees;
- (8) To prescribe criteria and procedures for network access and interconnection, access rates, and interconnection rates within services and across the services in the undertaking of sound broadcasting, television broadcasting and telecommunications services, or radio communications services. The criteria and procedures shall be fair to users, investors and other telecommunications operators with due regard to the public interests.
- (11) To prescribe measure for the prevention of anti-competitive conduct or unfair competition in sound broadcasting, television broadcasting and telecommunications services.
- (13) To protect the right and freedom of citizens from exploitation by operators, to protect the privacy and freedom right of individual communications, and to support the rights, freedom and equality of citizens to access and utilise broadcasting, television broadcasting and telecommunications services
- (24) To prescribe Regulation, Order and Notification regarding to the powers and duties of the NBTC.

Section 28 prescribes that NBTC shall hold a public consultation from relevant stakeholders and the general public in order to take their views into consideration before releasing a Notification. The public consultation period shall be at a minimum of thirty days except for

emergency case or compelling necessity; in which case the NBTC may shorten the public consultation period.

Section 41

(Paragraph 4) The permission to use radio frequency for the purpose of sound broadcasting or television broadcasting services shall be carried out with due regard to maximum public interests at the national, regional and local levels in education, culture, state security and other public interests, including free and fair competition, and shall be carried out in the manner of extensively and appropriately distributing the utilities as the national communications resource to all segments of enterprises for public interest.

(Paragraph 7) In specifying qualifications of persons who are eligible for auctioning under paragraph six, due consideration shall be given to the benefit from efficient and optimum allocation of spectrum resources, prevention of anti-competitive conduct, promotion of free and fair competition, efficient supplying of services, burdens on the consumers, and right protection for potential licensees to operate business at regional and local levels.

Section 45 Any person who wishes to use spectrum for the purpose of telecommunications business operation shall obtain a license under this Act by means of spectrum auctions; except in the cases of use of spectrum with sufficient supply, or use of spectrum in services with nonprofit purpose in accordance with the characteristics and types as prescribed by the NBTC in advance, in which other methods of selection may be used. This shall be in accordance with the criteria, procedures, duration, and conditions as prescribed by the NBTC and the provision of Section 41 paragraph four, paragraph seven, paragraph nine, and paragraph ten shall apply mutatis mutandis. Income from spectrum allocation after deducting expenditure and allocation to the Digital Development for Economy and Society Fund pursuant to the law on digital development for economy and society shall be remitted to the state treasury.

3.2 Telecommunications Business Act, B.E. 2544 (2001) and its Amendment

Section 7 Any person who intends to operate a telecommunications business in accordance with the nature and categories prescribed in notification of the NBTC under the law on the organisation to assign radio-frequency spectrum and to regulate the sound broadcasting, television broadcasting and telecommunications services shall obtain a license from the NBTC.

There shall be three types of license as follows:

(1) Type One License: being a license granted to the telecommunications business operator who operates without his or her own network for telecommunications services which are deemed appropriate to be fully liberalized. The NBTC shall grant a license once notified by a person who intends to operate such business;

(2) Type Two License: being a license granted to the telecommunications business operator who operates with or without his or her own network for telecommunications services intended for a limited group of people, or services with no significant impacts on free and fair competition or on public interest and consumers. The NBTC shall grant a license once a person who intends to operate such business has completely fulfilled the standard criteria prescribed in advance in notification of the NBTC;

(3) Type Three License: being a license granted to the telecommunications business operator who operates with his or her own network for telecommunications services intended for general public, or services which may cause a significant impact on free and fair competition or on public interest, or a service which requires special consumer protection. A person who intends to operate such business can commence the operation only after he or she is approved and granted a license by the NBTC.

The rights of Type One, Type Two or Type Three licensee to operate telecommunications business in which nature, categories and scope of service shall be in accordance with notification prescribed by the NBTC, which shall be in conformity with the nature of telecommunications business for each type of license under paragraph two. In issuing such notification, the NBTC shall also have regard to the development of diverse telecommunications services and fairness among the operators.

Section 9 Type Three License for telecommunications business shall be of a term stated in the license which shall be within the maximum and minimum term of license prescribed in the Commission's Notification.

Section 10 In applying for telecommunications business license, if that telecommunications business requires the use of spectrum, the applicant shall also require an authorization to use the spectrum pursuant to the Law on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services.

In the case where the spectrum license of the licensee is revoked, it shall be deemed that the telecommunications business license for the part that uses such spectrum is also revoked.

3.3 The Telecommunications Master Plan No. 1, B.E. 2555-2559 (2012-2016)

The Telecommunications Master Plan, B.E. 2555-2559 (2012-2016) highlights the public's equal, pervasive and reasonably priced access to diverse telecommunications services through modernised networks on a fair competition basis and with efficient use of telecommunications resources as the core network to support the national development into an intellectual and creative society, with a view to narrowing the rural-urban disparities, continually enhancing the country's competitiveness in terms of telecommunications infrastructure, as well as developing efficient consumer protection measures. The Master Plan has been outlined in six aspects as follows:

(1) Development and Promotion of Free and Fair Competition

Monitoring and ensuring fair business operations in all markets where a monopoly or a reduction or restriction of competition is prevalent, at both national and local levels; and preventing the major operators or the operators with significant market power from abusing their market powers or any single one or group of them from manipulating or distorting market mechanism which could relatively lead to inefficient competition, so as to ensure fair competition and people's access to telecommunications services on a fair and reasonably-priced basis.

(2) Spectrum Licensing and Business Operation Licensing

Allowing the licensed operators to operate telecommunications services on a free and fair competition basis; encouraging the deployment of modern technologies based on technological neutrality; and coordinating with concerned authorities in the formulation of licensing rules, guidelines and conditions for satellite communication services, in order to promote competition and diversification of telecommunications and broadband services.

(3) Efficient Resources Utilization

Ensuring the management and approval of efficient telecommunications resources utilization; encouraging infrastructure sharing for the utmost benefit at national and local levels in education, public health, culture, State security and other public interests such as in the case of emergency or disaster breaks out, with due regard to the proper, necessary and sufficient utilization, the technological advancement, as well as the encouragement of an optimized utilization of telecommunications, radio communications and communication satellite resources for the utmost benefit and in conformity with international practices and obligations.

(4) Universal Basic Telecommunications Services

Implementing measures to promote operators to make available the universal basic telecommunications services in the target areas; encouraging the provision of basic telecommunications services to the underprivileged in accordance with the plan on universal basic telecommunications services and social services to ensure the access to quality services at a reasonable price; fostering the provision of telecommunications services for social development and quality of life improvement; and promoting the capacity enhancement of telecommunications device and service industry for the disabled and the underprivileged in the society.

(5) Consumer Protection

Enhancing the awareness among consumers of their basic rights in telecommunications service, benefits from consuming various types of telecommunications services, needs to keep abreast of technological advancement to ensure their efficient use of services, understanding of their right and freedom in consuming telecommunications services, and efficient access to complaint channels; and devising measures to step up roles of the operators in providing services in an ethical manner and with responsibility for consumers and the society.

(6) Preparedness for and Entry into the ASEAN Economic Community (AEC) and Promotion of International Cooperation

Fostering the enhancement of Thailand's potential and readiness for the forthcoming AEC membership in 2015 by developing telecommunications cooperation and linking of infrastructure, rules and regulations, industry sector, researchers and developers, regulating agencies, and the public; and promoting international cooperation under various frameworks at bilateral and multilateral levels with due regard to the national interests.

3.4 The Spectrum Management Master Plan, B.E. 2555 (2012)

The NBTC has prescribed the Spectrum Management Master Plan to be as the guideline for spectrum management, spectrum licensing, and broadcasting and telecommunications businesses licensing and regulation. The Plan can be summarised as follows:

1) Vision

To manage the spectrum to achieve public interests at the national, regional and local levels with due regard to free and fair competition as well as the extensive and appropriate distribution of the spectrum utilization in various segments including education, culture, state security and other public interests.

2) Mission

To efficiently allocate, assign and regulate the spectrum utilization with due regard to public interests, business necessity, spectrum usage and technological advancement through certain, clear and reasonable criteria as well as transparent and fair process

3) Goal

The Spectrum Management Master Plan has defined goals consisting of six areas as follows:

3.1) To build the international cooperation mechanism in spectrum management among related parties including, international organisations, international frequency coordination committee, regulators and relevant operators;

3.2) To develop criteria and timeframe for spectrum refarming for reassignment or utilization improvement;

3.3) To develop spectrum management regulations and mechanism for national security agencies;

3.4) To assign spectrum and prescribe spectrum usage regulations in Public Protection and Disaster Relief (PPDR), case of emergency and other public services;

3.5) To set the transition plan for digital radio and television transmission;

3.6) To assign spectrum for public service and non-profit community uses at least twenty percent of the spectrum to be licensed for broadcasting business in each area.

4) Strategy

The Spectrum Management Master Plan has defined the strategy and guideline regarding spectrum refarming as follows:

8.2 Refarming Strategy

The refarming guideline is described as follows:

8.2.1 In case of government, state enterprises, and other government agencies who allowing other operators to use their spectrum by granting permission,

concession or contract which its legality was already examined by the NBTC, after the end of their permission, concession or contract such spectrum shall be returned to the NBTC;

8.2.2 Those who have been legally licensed for the spectrum usage with the expiry dates shall return the spectrum after the end of their license;

8.2.3 For those who have been legally licensed for the spectrum usage without the expiry dates, the NBTC will set the expiry dates by considering public interest, business necessity and spectrum utilization:

8.2.3.1 In case of radio broadcasting service, the maximum period shall not exceed 5 years as from the date of the Spectrum Management Master Plan coming into force;

8.2.3.2 In case of television broadcasting service, the maximum period shall not exceed 10 years as from the date of the Spectrum Management Master Plan coming into force;

8.2.3.3 In case of telecommunications service and other services, the maximum period shall not exceed 15 years as from the date of the Spectrum Management Master Plan coming into force. However the permitted period shall not exceed expiry date of their telecommunications business license.

8.2.4 Spectrum refarming in any other cases will be as specified by the NBTC.

Table 3.1 Criteria and timeline for the spectrum refarming according to the Master Plan

Details	Spectrum return time line
1) In case of the legal permission, concession or contract has definite expiry period	Spectrum shall be returned after the end of the permission, concession or contract
2) In case of legally obtaining spectrum license with no expiry period for spectrum usage	The maximum period shall not exceed 15 years as from the date of the Spectrum Management Master Plan coming into force. However the permitted period shall not exceed the expiry date of its telecommunications business license.

3.5 Important Regulatory Issues

3.5.1 Telecommunications Numbers Management, and Mobile Number Portability and Record of Prepaid Mobile Phone Service's Users

The NBTC has a policy to allocate telecommunications numbers efficiently and sufficiently for the operators' service provision and network expansion. It recognizes the importance of an allocation of numbers for public services, businesses and for national security, as well as for supporting the emergency or disasters. In 2014, the NBTC has issued the Notification regarding telecommunications numbering plan to manage telecommunications numbering to be sufficient to services as well as to optimise the use of telecommunications numbering efficiently and in fair basis regarding to the public interest. This numbering plan has been issued to support mobile numbering, VOIP numbering, premium service number, technical numbering and other short code. At the present, the numbering plan is sufficient to the demand of number demand and support future service provision employing innovative technologies.

In addition, the NBTC has issued the Notification regarding telecommunications numbers management to efficiently and sufficient allocate and manage telecommunications numbering in a fair basis. the Criteria for Allocation and Management of Telecommunications Numbers, which details the basic principles of telecommunications number management and allocation with a clear and efficient process, including inter alia: guidelines on telecommunications number planning; application procedures for allocation of telecommunications numbers; procedures and criteria for allocation of telecommunications numbers; rights and duties of holder of allocated numbers and regulating guidelines. Besides, the holders of allocated numbers are duty-bound to pay fee for the telecommunications numbers at the rate specified in the Notification.

The other important duty of the NBTC regarding mobile numbers management that gain interest from the public is the regulation of mobile number portability. This operation is under the NBTC's Notification Regarding the Criteria for Mobile number Portability which outlines rules and guidelines for porting mobile number to another network provider while retaining their existing mobile numbers. Such number portability not only benefits the users, but also promotes competition in telecommunications services, improves service quality in order to retain the customers as well as supports the optimum utilization of numbers. The Notification also prescribes an investment in a Clearing House for data collection through a consortium of the mobile service providers, with the investment proportion to be specified.

The NBTC has set forth a rule regarding the record of prepaid mobile phone service's users (prepaid SIM card) under the NBTC's Notification regarding the Criteria for Allocation and Management of Telecommunications Numbers. The NBTC has also determines a guideline on the registration of prepaid mobile phone service's users (prepaid SIM card) to be complied by all mobile operators in order to protect the right of mobile phone users as well as to protect the society and national security. Moreover, there is a requirement that, for new numbers, the mobile operators must register the users' SIM card prior to SIM activation.

3.5.2 Telecommunications Network Interconnection

In 2013 the NBTC issued the Notification regarding Telecommunications Network Access and Interconnection B.E. 2556 prescribing criteria and procedures for network interconnection. The Notification requires that a licensee who owns network must allow other licensees to interconnect with its network on a fair, reasonable and non-discriminatory basis.

The Notification also requires the licensee who owns network to develop and submit the Reference Interconnection offer together with supporting document that prescribes principle and method for calculating interconnection charge. Such interconnection charge must be cost-oriented and calculate on long run incremental cost basis. The charge for necessary facilities for interconnection must also be cost-oriented. The NBTC, however, may impose a certain calculation method and appropriate reference interconnection charge for certain interconnection services.

In addition, this Notification also provides guidelines for contractual arrangements as well as dispute resolution procedure in the case where there is any refusal of network interconnection or access for which the petition should be submitted within one year as from the date of the refusal or the date the dispute regarding network interconnection or access arises. During the dispute settlement process, the NBTC may order temporary access or interconnection following conditions in the existing contract, conditions in the same type of contract or use the calculation method for interconnection charge that the NBTC sees appropriate. In this regard, the NBTC has issued the Notification Regarding Standard Method for Calculating Interconnection Charges B.E. 2556 (2013) to be the calculation standard for transparency.

Furthermore, in 2016 the NBTC issued the Notification regarding the Reference Interconnection Charges B.E. 2557 (2014), which applies the calculation method according to the Notification regarding the standard method for Calculating Interconnection Charges mentioned above. The purpose of this Notification is to set fair regulatory guideline and fair interconnection charge for telecommunications service users where an agreement regarding the charges cannot be reached among the licensees, where there is a dispute regarding the charge, or where temporary charge is required.

Table 3.2: Reference Rate for Interconnection Services

Services	Network Interconnection Services	Reference Rate for Interconnection Services	
		1-Jan-2017 – 31-Dec-2017	Jan-2018 – 31-Dec-2018
Mobile	Call Origination	0.27 (THB/min)	0.19 (THB/min)
	Call Termination	0.27 (THB/min)	0.19 (THB/min)
	Call Transit	0.03 (THB/min)	0.03 (THB/min)
Fixed	Call Origination	0.31 (THB/min)	0.28 (THB/min)
	Call Termination	0.31 (THB/min)	0.28 (THB/min)
	Call Transit	0.16 (THB/min)	0.15 (THB/min)
	Call Termination for Local Call	0.83 (THB/time)	0.75 (THB/time)

Source: The NBTC's Notification on Reference Interconnection Charges

3.5.3 Telecommunications Network Access

The NBTC's Notification Regarding Telecommunications Network Access and Interconnection B.E. 2556 (2013) also prescribes criteria and procedures for network access. The Notification requires that a licensee who owns network must allow other licensees to access to its network on a fair, reasonable and non-discriminatory basis.

The Notification also requires the licensee who owns network to develop and submit the Reference Access offer together with supporting document that prescribes principle and method for calculating access charge. Operators are permitted to determine the access rate among themselves via commercial negotiations on a fair, reasonable and non-discriminatory basis. The NBTC, however, may impose a certain calculation method and appropriate reference interconnection charge for certain interconnection services.

In addition, this Notification also provides guidelines for contractual arrangements as well as dispute resolution procedure in the case where there is any refusal of network interconnection or access for which the petition should be submitted within one year as from the date of the refusal or the date the dispute regarding network interconnection or access arises. During the dispute settlement process, the NBTC may order temporary access or interconnection following conditions in the existing contract, conditions in the same type of contract or as the NBTC sees appropriate.

3.5.4 Infrastructure Sharing for Mobile Network

In order to promote free and fair competition and to bring the quality and efficient service to the consumers, the NBTC has prescribed the Notification Regarding Infrastructure Sharing for Mobile Network B.E. 2556 (2013) which requires the licensee (Type III and the mobile operators under concessions) to permit other licensees to share its own infrastructure for mobile network. The Infrastructure sharing includes tower and mast, base station area, transmission network between base station and base station controller. In sharing its own network, the licensees must treat other licensees on a fair, reasonable and non-discriminatory basis and the infrastructure sharing charge can be determined among licensees on a fair, reasonable and non-discriminatory basis. In addition, this Notification has also prescribed criteria and procedures for contract negotiation and dispute resolution where an agreement cannot be reached among the licensees.

3.5.5 Domestic Mobile Roaming Services

The NBTC has prescribed the Notification Regarding Domestic Mobile Roaming Services B.E. 2556 (2013) to promote free and fair competition and to enable nationwide service to consumers. This Notification requires the licensees (Type III mobile operators and mobile operators under concessions) to allow other mobile operators to roam on its own network except the licensee network is non-interoperable with the roamer's network due to different standard and technology employed. Furthermore, the licensee must treat other licensees on a fair, reasonable, and non-discriminatory basis and the domestic mobile roaming charge can be determined among the licensees on a fair, reasonable, and non discriminatory basis as well as must be reasonable comparing with the retail rate paid by its customers. In addition, this Notification has also prescribed criteria and procedures for contract negotiation and dispute resolution where an agreement cannot be reached among the licensees.

3.5.6 Mobile Virtual Network Service

The NBTC has prescribed the Notification Regarding Mobile Virtual Networks Service B.E. 2556 (2013) to promote free and fair competition as well as to promote market entry for small entrant in order to escalate mobile service competition and provide service alternatives to customers. The Notification requires the licensee (Type III mobile operators and mobile operators under concessions) who is a wholesaler to treat Mobile Network Operators (MVNOs) on a fair, reasonable and non-discriminatory basis. The rates of the services can be determined by the agreement between the wholesaler and MVNOs on a fair, reasonable, and non-discriminatory basis as well as must be reasonable comparing with the retail rates paid by the wholesaler's customers. In addition, this Notification has also prescribed criteria and procedures for contract negotiation and dispute resolution where an agreement cannot be reached among the licensees.

3.5.7 Setting of Service Tariff

The NBTC regulates service fees in accordance with the NBTC's Notification Regarding Maximum Rate of Service Tariff and Advance Collection of Service Tariff in Telecommunications Business B.E. 2549(2006). The said notification aims at protecting service users and promoting efficient competition in Thai telecommunications market on a free and fair basis. The Notification specifies the methods for determining maximum rate of service tariff that is fair to operators and users, as well as specifies the duty of operators to report the service tariff which enables the NBTC to monitor whether the service tariff is in appropriate level or conducive to any anti-competitive or discriminatory practices and affect the service users or not. In addition, the Notification also specifies criteria and procedures to obtain the NBTC's permission for advance collection of service tariff.

Following the aforementioned Notification, in 2012 the NBTC issued the Notification Regarding Maximum Rate of Service Tariff for Domestic Mobile Voice Service B.E. 2555(2012) which determines the maximum rate of mobile voice service tariff at 99 Satang (0.99 THB) per minute, applicable solely to the operators with significant market power (SMP). Nevertheless, the Notification does not apply to anyone given there is currently no SMP in retail markets.

The NBTC has also implemented policies that regulate tariffs for services on the spectrum bands of 2.1 GHz, 1800 MHz and 900 MHz. For 2.1 GHz, the tariffs must comply with Annex A, Clause 7.5, of Telecommunication Business Act's License Type Three's section 3. The condition requires that the licensee impose fair, reasonable and non-discriminatory tariffs. Also, upon offering services on 2.1 GHz to customers, the tariffs for both voice and non-voice services must on average decrease by no less than 15% of the average tariff on the day the licensee receives the approval for operation on 2.1 GHz; such a requirement holds until further amendment by the NBTC.

In addition, the tariffs for services on 1800 MHz and 900 MHz must comply with Clause 21 (5) of the NBTC's Notification on Criteria and Allowance's Procedure for Using the Spectrum 1800 MHz, and Clause 21 (5) of the NBTC's Notification on Criteria and Allowance's Procedure for Using the Spectrum 895-915 MHz/940-960 MHz respectively. Firstly, this clause insists that the licensee impose fair, reasonable, non-discriminatory and unambiguous tariffs as well as offer quality services in accordance to the NBTC's standards. Secondly, the tariffs for both voice and data services on average must be lower than the average tariffs of comparable services on 2.1 GHz computed on the day this Notification is announced effective (August 25th, 2015). Thirdly, the

licensee must offer at least one price plan that encourages consumers to purchase services operated on 900 MHz. Such a promotion package must satisfy three conditions: the tariffs must be lower than the average tariffs of comparable services on 2.1 GHz when computed on the day this Notification is announced effective (August 25th, 2015); the tariffs are charged based on the actual usage; and, the service quality needs not be lower than the average quality of services on 2.1 GHz. All these three specifications are to be held accountable by 900 MHz licensees unless directed otherwise by the NBTC.

Table 3.3: Reference Rate for services on 2.1 GHz, 1800 MHz and 900 MHz

Spectrum bands	Tariff			
	Voice (THB/minute)	SMS (THB/message)	MMS (THB/message)	Internet Access (THB/MB)
Tariffs of services on 2.1 GHz <i>must not exceed</i>	0.82	1.33	3.32	0.28
Tariffs of services on 1800 MHz and 900 MHz <i>must be less than</i>	0.69	1.15	3.11	0.26

Source: The NBTC's Notification on Tariffs for Mobile Services that Operate on the IMT Spectrum 2.1 GHz. The NBTC's Notification on Criteria and Allowance's Procedure for Using the Spectrum 1800 MHz, and Notification on Criteria and Allowance's Procedure for Using the Spectrum 895-915 MHz/940-960 MHz.

The construction of a unified tariff regulation scheme is underway. This transition should result in a regulation policy that corresponds to the current economic state and the convergence of technologies.

3.5.8 Measure for the Prevention of Monopoly and the Identification of Market Power in Telecommunications Business

The NBTC implements two types of competition regulation – the ex-ante and ex-post regulation. Ex-post regulation is governed by the NTC Notification on Measures to Prevent Monopolistic and Unfair Competition Practices in Telecommunications Business B.E. 2549 (2006), which aims to ensure free and fair competition among telecommunications service providers and to promote and support competition in and development of the telecommunications industry in an efficient and sustainable manner. The Notification prohibits operators who have been deemed to have Significant Market Power (SMP) from carrying out certain anti-competitive practices such as services subsidisation and cross-services subsidization for the service or the business under competition in the market, acquisition of business of the same service type; and any conduct deemed as abuse of market power in the manner of monopoly, or reduction or restriction of competition. The Notification also institutes a process of inquiry dealing with the licensee who acts or behaves in such manner, as a standard of practice for the NBTC.

For the ex-ante regulation, in 2014 the NBTC issued two key notifications. The first is the NBTC Notification on Market Definition and Relevant Markets in Telecommunications B.E. 2557 (2014), and the second is the NBTC Notification on Criteria and Procedures for Identifying Operators with Significant Market Power in Telecommunications Business B.E. 2557 (2014). According to these Notifications, the Office of the NBTC must prepare a report on analysis of the level of competition in the relevant markets and propose a list of operators with SMP in each

relevant market for the NBTC's consideration. This will be used as a basis for outlining measures for the supervision of anti-competitive behaviors in telecommunications market in alignment with the above-mentioned Notification, and also for formulating a guideline to prevent the operators with SMP from abusing their market power to restrict or hinder free competition in the market.

The NBTC additionally issued the Notification Regarding Criteria and Procedure for Accounting Separation in Telecommunications Business as a tool to support the implementation of measures for the prevention of monopoly or unfair competition in telecommunications business. Under the Notification, the operators with SMP are required to undertake accounting separation for the NBTC's analysis. This aims to:

- Identify the anti-competitive behaviors such as predatory pricing, margin squeeze, etc.
- Identify the discriminatory behaviors such as cross subsidisation, a case in which the operators with SMP set an overly high price in a market where they have powers and use the received profit for cross subsidisation in another market where they are inferior to their rivals; and
- Be a basis for determining the cost-based rates without excessive return/profit.

3.5.9 Universal Basic Telecommunications and Social Services

Telecommunications plays an important role in people communication and also in promoting capability development in other sectors such as manufacturing sector, trade and commerce sector as well as public and private service sectors. Therefore, the distribution of Universal Basic Telecommunications and Social Services will minimise the gap in communication and technology access which will improve the quality of life of the people in remote areas and bring about the equality and fairness in standard of living for all citizens both in the city and the remote areas. This will ultimately affects the national competitiveness level.

With all reasons mentioned above, the Telecommunications Master Plan B.E. 2555-2559 (2012-2016) aims to adopt measures to encourage operators in providing basic telecommunications services universally, promote the provision of basic telecommunications services to the underprivileged in accordance with the Universal Basic Telecommunications Services and Social Services Plan to ensure the access to quality telecommunications service at a reasonable tariff, to foster the provision of telecommunications service for social development and quality of life improvement as well as to improve the capability of telecommunications device manufacturing and telecommunications service for the disabled and the underprivileged.

In 2017, the NBTC has issued the NBTC's Notification Regarding Plan on Universal Basic Telecommunications Services and Social Services No.2 (B.E. 2560-2564) (2017-2021) aiming to efficiently integrate the provision of universal basic telecommunications and social services among public sectors, public sectors and private sectors. Another aim is to promote and encourage nationwide distribution of wireline and wireless telecommunications network as well as to provide opportunity and develop capability in internet access for the underprivileged, the disabled, children, and senior citizens to be able to access basic telecommunications services to increase their skills on ICT and internet use which will subsequently improve their quality of life and the overall national competitiveness level.

Subsequently, the NBTC has issued the NBTC's Notification Regarding the Criteria and Procedure for Revenue Collection to Fund the Provision of Universal Basic Telecommunications Services and Social Services which prescribes the criteria and procedure for revenue collection from telecommunications service licensees for contribution to support the provision of universal basic telecommunications and social services as well as consistent with the NBTC's Notification Regarding Plan on Universal Basic Telecommunications Services and Social Services No.2 (B.E. 2560-2564) (2017-2021). The criteria require the licensees to contribute 2.5% per year of their net income from their telecommunications services as defined in the said notification to support the provision of universal basic telecommunications and social services.

It is expected that, after the successful implementation according to the Universal Basic Telecommunications and Social Services Plan (B.E.2017-2021), mobile phone penetration rate will be at least 98% of Thai population and the high speed internet will reach village, school, local hospital and government organisation that still lack the services. Also, there will be internet community center, internet service in school, internet service in community hospital as well as internet service center for target groups nationwide and telecommunications system for the disabled to access to information as others.

3.5.10 Current Spectrum Assignment for Telecommunication Services in Thailand

The utilisation and the regulation of radio frequencies spectrum in telecommunication businesses is mandated by the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E. 2553 (2010) (the Organization Act), which was amended by the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services (No. 2) B.E. 2560 (2017), and the Telecommunications Business Act, B.E. 2544 (2001).

Section 46 of the Organisation Act states that a spectrum license for telecommunications business is the exclusive rights and is not transferable. The licensee who has been authorised to use spectrum shall carry out the services by himself or herself. Also, business management either in whole or in part shall not be rendered or permitted to other to act on his/her behalf.

In addition, Section 47 of the Organisation Act stipulates that for any licensee who has been authorised to use spectrum for telecommunications services that has not carried out the business by using such spectrum within period specified by the NBTC, or by using such spectrum in other services not relating to its objectives, or fails to comply with the business operation conditions, or conducts any prohibitive acts as specified in Section 27 (11) or fails to comply with the provision of Section 46, the NBTC shall take action to rectify the situation or issue an order to revoke the spectrum license in whole or in part.

Section 4

The License

4.1 Spectrum to be licensed

The spectrum to be licensed is 2 x 5 MHz of 900 MHz spectrum in the band of 890 – 895/935 – 940 MHz according to the International Mobile Telecommunications (IMT) Spectrum Plan in the frequency band of 885 – 895/930 – 940 MHz. The frequency band of 890 - 895 MHz is the spectrum in the 900 MHz band which used for the provision of mobile phone service by Total Access Communications Public Company Limited under the concession with CAT Telecom Public Company Limited which ended on September 15th, 2018, and the frequency band of 935 – 940 currently have not assigned to any stakeholder.

Figure 4.1 Spectrum assignment before the auction

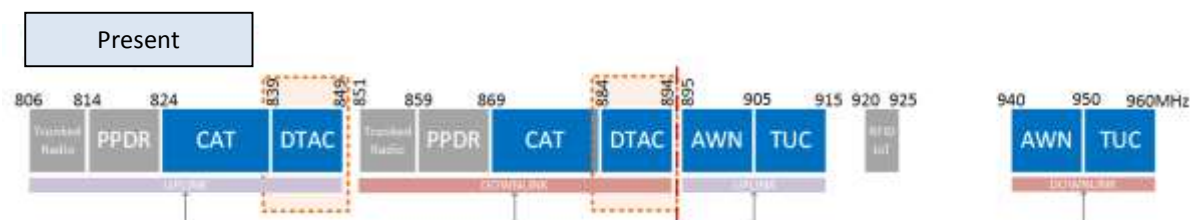
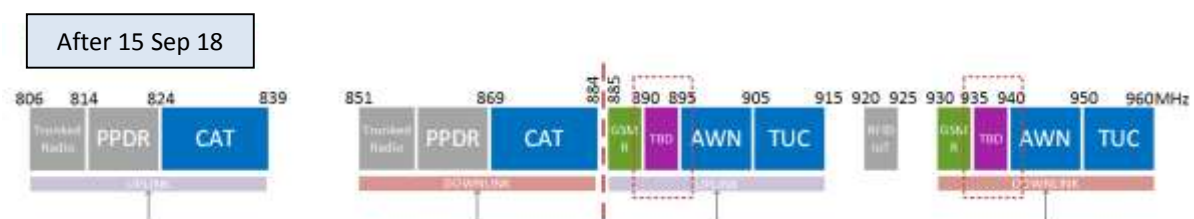


Figure 4.2 Spectrum assignment after the auction



4.2 Number of Licenses

The NBTC will grant one spectrum license of 2 x 5 MHz as in Table 4.1.

Table 4.1 Spectrum to be licensed

Bandwidth	Lower Frequency	Upper Frequency
2x5 MHz	890-895 MHz	935-940 MHz

In the case where there is no bidder, NBTC reserves the right to dismiss the auction and will consider schedule of next auction as appropriate.

4.3 License and Its Scope

4.3.1 The winning bidders, after the conditions precedent have been duly fulfilled, will be awarded the 900 MHz Spectrum License and Type Three Telecommunication Business License in accordance with Section 7 of the Telecommunications Business Act B.E. 2544 (2001) for the provision of services in accordance with the scope of the license.

In the case that the winning bidder is already a spectrum licensee or is already a Type Three Telecommunication Business Licensee, the NBTC will, after the conditions precedent have been duly fulfilled, consider licensing the 900 MHz Spectrum for the additional provision of services in accordance with the scope of license as specified by the NBTC under the existing spectrum license or Type Three Telecommunication Business License, as the case may be.

Furthermore, the licensee shall be deemed as the person authorized to possess and use radio communications equipment and install radio communications station under the Radio communications Act with respect only to the radio communications equipment concerned with the services in accordance with the scope of the license, whereby the Licensee must abide by the related rules and notifications.

4.3.2 In providing the service, the Licensee can employ any technology based on neutral technology concept under ITU-R Recommendations relating to IMT. However, the Licensee can use Global Systems for Mobile Communication (GSM) technology in the beginning period until the complete transition to IMT, under terms and conditions prescribed by the NBTC.

4.3.3 The licensee will be able to provide telecommunications services as a network provider and service provider as well as telecommunications facility which include the following characteristics and types of service:

- 1) Wireless telecommunications network service;
- 2) Telecommunications Facility;
- 3) Telecommunication services, i.e.
 - 3.1) Mobile phone service;
 - 3.2) Public Broadband Multimedia Service;
 - 3.3) Value-added Service for the licensed telecommunication services; and
 - 3.4) Wholesale services for services in 3.1) – 3.3)

In the case that the licensee intends to provide broadcasting business, the Licensee must conform to laws on the provision of broadcasting business and other relevant laws.

4.4 License Duration

The 900 MHz Spectrum License and Type Three Telecommunication Business License will be valid for 15 years from the date of obtaining the License.

In the case where the Licensee is already a spectrum Licensee or a Type Three Telecommunication Business Licensee, the License duration for only the telecommunications services

using 900 MHz Spectrum in accordance with the scope of License will be valid for 15 years from the date of obtaining the rights.

The Licensee must comply with the conditions precedent to service dissolution as specified by the NBTC and must submit service users' management plan at least two years in advance before the end of the license period in order to avoid effects on service users. The Licensee must return the granted spectrum to the NBTC when the license period lapses.

4.5 Annual License Fee

The licensee has the duty to pay the Type Three Telecommunication Business Annual License fee, spectrum administrative fee, telecommunication numbering fee, revenue contribution to the Broadcasting and Telecommunications Research and Development Fund for the public Interest, and any other related fees under the criteria and procedures set forth by the NBTC.

4.6 Licensing Terms and Conditions

4.6.1 The licensee must strictly comply with the terms and conditions on the use of radio frequency and telecommunications business operation under the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E. 2553 (2010) that was amended by the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E. (No.2) 2560 (2010) , the Telecommunications Business Act B.E. 2544 (2001) and its amendment, the NBTC's Notification regarding Spectrum Plan for the International Mobile Telecommunications (IMT) Spectrum Plan in the Frequency Bands of 885 – 895 MHz/930 - 940 MHz, conditions for Type Three Telecommunications Business License, as well as rules, regulations, notifications, orders and any criteria prescribed by the NBTC.

4.6.2 Responsibilities to prevent interference

While the telecommunications network construction of the licensee is not yet completed, should the licensee, in a base station, wishes to use the 850 MHz frequency band in the frequency range 839-844/884-889 MHz for which the licensee or its affiliated company was the existing user, the use of the 850 MHz frequency band in a base station is permitted for the duration of not more than two years for transition to the use of the 900 MHz frequency band. In this regard, the licensee shall inform its intention and frequency usage plan to the Office of the NBTC in advance, and the use of both frequency bands in one base station simultaneously is not permitted.

In this respect, the terms of payment and the license duration of the licensee shall remain as specified in Article 11 and Article 14.

4.6.3 Annual license fee

The Licensee has the duty to pay the Type Three Telecommunication Business Annual License fee, spectrum administrative fee, telecommunication numbering fee, revenue contribution to the Broadcasting and Telecommunications Research and Development Fund for the public Interest, and any other related fees under the criteria and procedures set forth by the NBTC.

4.6.4 Coverage Obligation

1) The licensee must provide telecommunications network for rendering services covering at least 50 percent of the population within four years as from the date of obtaining the License and at least 80 percent of the population within eight years as from the date of obtaining the License.

The provision of telecommunications network for rendering services will be inclusive of the installation and the leasing of telecommunications network, but excluding the national roaming of other operators' mobile phone network.

2) The licensee's telecommunications network must be capable of supporting a data transmission rate not less than the rate prescribed in the NBTC' Notification Regarding the Standard and Quality of Data Service. In the case that the Licensee has advertises its quality of telecommunications service, it is the duty of such Licensee to comply with its advertisement.

3) The licensee must report the network installation status as scheduled by the NBTC, and must provide supporting evidence demonstrating the average data transmission rate upon request by the NBTC. In this regard, the NBTC will subsequently set forth the criteria, conditions and method to measure the population coverage in the service areas and transmission speed.

4) In the case that the licensee fails to comply with the conditions on network provision for rendering service described above in 4.6.4 1), the Licensee will be obliged to pay a daily penalty charge at the rate of 0.05 percent of its highest bid price throughout the period of its failure until complying with the conditions of the NBTC.

4.6.5 Infrastructure Sharing

The licensee must comply with the NBTC's Notification Regarding Infrastructure Sharing for Mobile Network B.E. 2556 (2013).

4.6.6 Services for Mobile Virtual Network Operator (MVNO)

1) The licensee must comply with the NBTC's Notification Regarding Mobile Virtual Network Operator Service B.E. 2556 (2013).

2) The licensee must provide telecommunications network service with the minimum capacity of 10% of its networks to the MVNO who is not the connected person with any licensee when receiving such service request.

4.6.7 National Roaming Service

The Licensee must comply with the NBTC's Notification Regarding National Roaming of Mobile Phone Network B.E. 2556 (2013).

4.6.8 Record of prepaid mobile phone service's users

The licensee must comply with the NBTC's Notification Regarding Criteria for Telecommunications Numbers Assignment and Management as well as the guideline prescribed by the Office of the NBTC which includes the prepaid user's registration prior to service activation.

4.6.9 Corporate Social Responsibility and Consumer Protection Measures

1) The licensee must prepare its Corporate Social Responsibility (CSR) plan covering the electronic waste management, users' health, risk management plan for rapidly changing technologies, and services for disabled which include at least special tariff and special invoice or contract with large font or in Braille at no additional charge. In this regard, the Licensee must submit such CSR plan to the NBTC prior to launching its service and must implement according to its plan within 1 year as from the date of launching its service.

2) The licensee must prepare a consumer protection plan covering measures to handle complaints free of charge, measures to handle unsatisfactory service, procedure to develop understanding among the public regarding the establishment of radio communications stations, as well as building the consumer recognition regarding rights to use telecommunications service which include publication of consumer rights in consuming mobile phone service as specified by the Office of the NBTC. In this regard, the Licensee must submit the consumer protection plan to the NBTC prior to launching its service and must implement according to its plan immediately after the launch of its service.

3) The licensee must support the mission of the NBTC regarding telecommunications service for social benefits as prescribed by the NBTC, particularly in arranging public telecommunications service and facilitating the access to public telecommunications services universally for low-income earners, the disabled, children, the elderly, people in remote areas, and the underprivileged.

4) The licensee must heedfully prevent any person from using its network for illegitimate activities or disseminating any information that may undermine peace or morality of the people, and must support the state and private agencies in any act intending to protect rights of consumers for the safety of society and the State security.

5) The licensee must provide the service in a fair nature, which includes setting of tariff that is clear, reasonable and not taking advantage of consumer, and shall provide service with quality as prescribed by the NBTC. For this purpose, the licensee must set forth the tariff for voice and data services which is, on average, lower than the average tariff of mobile phone service using 2.1 GHz spectrum on the date of this Notification coming into force. In doing so to promote and increase the opportunity for users in accessing the mobile telecommunications service using 1800 MHz spectrum, the Licensee must provide at least one promotion which has tariff lower than average tariff of mobile phone service using 2.1 GHz spectrum on the date of this Notification coming into force, as well as charges based on actual usage and has the quality not lower than the average quality of mobile phone service using 2.1 GHz spectrum. All this will apply until the NBTC prescribed criteria relating to the regulation of tariff and quality of service otherwise.

Section 5

Licensing Procedure

5.1 Licensing Phases

The spectrum licensing process can be divided into 6 phases as summarised in table below:

Table 5.1 Licensing Phases

1) Regulations Preparation	<ul style="list-style-type: none">▪ Formulation of spectrum licensing criteria▪ Preparation of Information Memorandum (IM)▪ Published the Notification regarding criteria and procedure for spectrum licensing in the Government Gazette
2) Auction Invitation	<ul style="list-style-type: none">▪ Auction invitation and publication of Information Memorandum
3) Pre-Qualification	<ul style="list-style-type: none">▪ Consideration of compliance with application method▪ Consideration of Applicant's qualification
4) Auction Training	<ul style="list-style-type: none">▪ Bidder information session and mock auction
5) Auction Phase	<ul style="list-style-type: none">▪ Bidding session
6) License Granting Phase	<ul style="list-style-type: none">▪ Fulfillment of conditions precedent▪ License granting

5.1.1 Regulations Preparation

In this phase, rules and regulations are drawn up along with related documentation which are the Notification regarding Criteria and Procedure for Spectrum Licensing and the Information Memorandum for Spectrum Licensing.

5.1.2 Auction Invitation

In this phase, the auction invitation and the Information Memorandum will be published to invite potential operators to participate in 900 MHz spectrum auction. Interested parties must process in accordance with the application method for pre-qualification screening. The NBTC may arrange a public information session for the interested parties to familiarize themselves with the application form filling and the auction process.

5.1.3 Pre-Qualification

In this phase, compliance with the application method and the Applicants' qualification will be examined according to the prescribed regulation. The Applicants who fully meet all the requirements are entitled to be the Bidders.

5.1.4 Auction Training

The NBTC may arrange a bidder information session for all qualified Applicants who are eligible to be the Bidders so that they could familiarize themselves with the auction method, criteria and procedures.

1) Bidder Information Session

Bidders will be introduced to the auction and auction software prior to the auction day.

2) Mock Auction

The NBTC will invite all Bidders to participate in learning and practicing the auction software. The Mock Auction will provide the Bidders with an opportunity to practice the bidding procedure using the Auction Software. Also, it serves as a test of the Auction Software.

5.1.5 Auction Phase

The auction will be proceeded by opening the bid for the 2x5 MHz-lot of 890 - 895/935 - 940 MHz Spectrum to be licensed in multiple rounds. The bidding price in each round will increase correspondingly (Ascending Bid Auction) and the Bidder can place bid for a spectrum lot.

The Auction will be conducted through the Auction Software via the Internet or Intranet system in the specified venue. The Office of the NBTC will provide computer system, PC and necessary peripherals.

5.1.6 License Granting Phase

The NBTC will issue the 900 MHz Spectrum License and Type Three Telecommunication Business License to the Winning Bidder after the Winning Bidder has correctly and completely fulfilled the conditions precedent.

5.2 Timetable for Spectrum Licensing

The following table shows the spectrum licensing timetable to help those wishing to apply for the license in preparing for filing the application forms and participating in the auction. The NBTC reserves the right to change the timetable and/or to extend or shorten the timetable. Any of such changes (if any) will be informed in advance on the NBTC's website (www.nbtc.go.th).

Table 5.2 Timetable for Spectrum Licensing

Task	Date
Regulations Preparation	
Publication of the Regulation regarding licensing criteria in the Government Gazette	28 September 2018
Auction Invitation	
Auction invitation and publication of Information Memorandum	During 1 – 8 October 2018
Pre-Qualification	
Application Day	9 October 2018

Task	Date
Pre-qualification screening	During 10-11 October 2018
Bidders announcement	12 October 2018
Auction Training	
Information Session and Mock Auction for Bidders	18 October 2018
Auction Phase	
Auction Day	20 October 2018
Announcement of winning bidders	24 October 2018

Note: In case that there is one participating bidder, NBTC will extend Auction Invitation period by 7 days since the day on which the office announces the qualified bidder.

5.3 Pre-Qualification Process

5.3.1 Process

The purpose of the pre-qualification process is to select appropriate applicants to be the Bidders. The pre-qualification process encompasses the following 3 steps:

- 1) The interest entities submit the application forms together with relevant information and document and pay the application fee in the amount of 500,000 Baht (excluding VAT) and place the auction guarantee in the amount of 1,900,000,000 Baht;
- 2) The NBTC evaluates the completeness of license application and applicant's qualification including relevant documents as prescribed in the Notification;
- 3) The Applicants will be notified whether their application has been successful. Only qualified Applicants will be allowed to be the Bidder.

5.3.2 Qualifications and Other Requirements

Each applicant must fully meet the qualifications and complete all requirements as listed below:

1) Submission of Information and Documents

1.1) Submit the completely-filled application forms for obtaining the 900 MHz Spectrum License and the accompanying documents and information as prescribed in Annex A of the NBTC's Notification regarding the Criteria and Procedure for Spectrum Licensing for International Mobile Telecommunications in the frequency band of 890 - 895/935 - 940 MHz with 2 sets of their copies and the electronic documents to the Office of the NBTC. All the required forms appear in Annex A of this IM.

1.2) Submit the documents of the Applicant that documented compliance with the Schedule of Prohibitions as prescribed in the NBTC's Notification regarding the Prescription of Prohibitions on Acts Constituting Foreign Dominance B.E. 2555 (2012), together with an affirmation signed by an authorized signatory that the applicant will not conduct any act that is contrary to any of the restrictions, the affirmation in accordance with the measures for restricting collusive behavior and the affirmation that if obtaining a License, the Applicant agrees to prepare

and act in accordance with a Corporate Social Responsibility (CSR) plan as approved by the NBTC, and sign in the bidder's consent letter, as prescribed in the application form for 900 MHz Spectrum License;

2) Application Fee and Auction Guarantee

2.1) The Applicant must pay the application fee of 500,000 Baht (excluding VAT) by cash or bank cheque issued by a financial institution operating commercial banking business under the Financial Institutions Business Act B.E. 2551 (2008), dated on or not more than three business days prior to the date of payment to the Office of the NBTC. This fee will be deemed as the application fee for the spectrum license and Type Three Telecommunications Business License and will not be refunded by the Office of the NBTC in any cases;

2.2) The Applicant must place an auction guarantee by bank cheque issued by a financial institution operating commercial banking business under the Financial Institutions Business Act B.E. 2551 (2008), dated on or not more than three business days prior to the date of payment to the Office of the NBTC, for an amount of 1,900,000,000 Baht;

In the case the Applicant does not proceed in accordance with specified methods in 1) and 2), the Office of the NBTC will not accept the License application.

3) Qualification Requirement

3.1) The Applicant must have the qualifications as stipulated in Section 8 of the Telecommunications Business Act B.E.2544 (2001) and its amendment, and must have the qualifications and must not possess the prohibited characteristics as prescribed in Clause 3 of the National Telecommunications Commission's Notification Regarding Criteria and Procedure for Granting Type Three Telecommunications Business License;

3.2) The applicant must be a juristic person in the type of a limited company or public limited company established under Thai law and must not be a foreigner under the law on foreign businesses.

The applicant must specify the prohibitions as prescribed in the NBTC's Notification regarding the Prescription of Prohibitions on Acts Constituting Foreign Dominance B.E. 2555 (2012) together with affirmation signed by authorized signatory that the applicant will not conduct any act that is contrary to any of the prescribed restrictions. After the auction, in the case where the licensee conducts any act that infringe the mentioned prohibitions, the NBTC's Notification regarding the Prescription of Prohibitions for the Act having Nature of Foreign Dominance B.E. 2555 (2012) will be applied;

3.3) The Applicant must have no connection with other Applicant(s) by means of being the major shareholder, subsidiary company, associated company or person in authority or a controlled entity or related entity or have cross-shareholding with other Applicant(s). An exception will be made in the case of being related due to relationship as the entity who grants or is granted authorization, concession or contract under Section 80 of the Telecommunications Business Act B.E. 2544 (2001). Whereby the consideration shall be in accordance with the provisions in Clause 2 of the NBTC's Notification regarding Criteria and Method of Merger & Acquisition and Cross-Shareholding in Telecommunication Business B.E. 2553 (2010);

3.4) The Applicant shall not be the person having breached or failed to comply with the rules and conditions precedent to licensing in any previous spectrum licensing for

telecommunication service; and shall not be a juristic person which contains the same director, managing director, or authorized control person as the said applicant; or shall be a person who is not related parties of the said applicant by means of being a major shareholder, a subsidiary, a joint company, a control person or controlled person; cross-shareholding; having the same major shareholder or control person as the said applicant; as stipulated in Form 3 Ownership and Control Report as part of the Application Form for Spectrum Licensing for Telecommunications Service in the Frequency Band of 900 MHz.

In the examination, if it is found that the applicant does not have qualifications as prescribed, or the fact subsequently show that the applicant who is the bidder or the winning bidder does not have qualifications as prescribed, such applicant will be removed from the list of the applicants, the bidders or the winning bidders, as the case may be.

5.4 Spectrum Auction Fee

5.4.1 Minimum Price of the 900 MHz Spectrum Licensing

The minimum price of the Spectrum Licensing for each spectrum lot is equal to 37,988,000,000 Baht.

5.4.2 Payment of the 900 MHz Spectrum Auction Fee

(1) The Winning Bidder must pay the 890 - 895/935 - 940 MHz Spectrum auction fee by the amount of the highest bid price. The payment must be completed in four installments as follows:

The first installment - the Winning Bidder must pay 4,020,000,000 Baht and submit a letter of guarantee, issued by a financial institution operating commercial banking business under the Financial Institutions Business Act B.E. 2551 (2008), for the remaining of spectrum auction fee within 90 days as from the date it is notified in writing as being a Winning Bidder;

The second installment - the Winning Bidder must pay 2,010,000,000 Baht and submit a letter of guarantee, issued by a financial institution operating commercial banking business under the Financial Institutions Business Act B.E. 2551 (2008), for the third installment and fourth installment within 15 days after the lapse of 2 years as from the date of the license award. The Office of the NBTC will return the bank guarantee submitted with the first installment within 15 days as from the date of the receipt of the second installment;

The third installment - the Winning Bidder must pay 2,010,000,000 Baht and submit a letter of guarantee, issued by a financial institution operating commercial banking business under the Financial Institutions Business Act B.E. 2551 (2008), for the fourth installment within 15 days after the lapse of 3 years as from the date of license award. The Office of the NBTC will return the letter of guarantee submitted with the second installment within 15 days as from the date of the receipt of the third installment;

The fourth installment – the Winning bidder must pay the remaining auction fee within 15 days after the lapse of 4 years as from the date of the license award. The Office of the NBTC will return the bank guarantee submitted with the third installment within 15 days as from the date of the receipt of the fourth installment;

The spectrum auction fee to be paid by the Winning Bidder does not include tax, other fees and interest as prescribed by law.

(2) In case that the Licensee fails to make a full payment of the second or third installment within the specified period, the Licensee must pay additional fee equal to the amount of the outstanding spectrum auction fee multiplied by the interest rate of 15 percent per year, calculated daily. In the case that the Licensee fails to pay within the specified period, it will be deemed that the Licensee fail to comply with conditions specified in this Notification and the NBTC may consider suspending or revoking its License.

(3) For the payment of the first installment, the Office of NBTC will count auction guarantee as part of the payment. The Winning bidder must pay the remaining auction fee in accordance to the required timeline.

In case that there are laws, notifications or orders that will change the terms of the auction payment for 895 – 915 / 940 – 960 MHz, those shall be adopted.

5.5 Granting of Licenses

5.5.1 Condition Precedent

Before obtaining the license, the Winning Bidder must fulfill the following requirements within 90 days as from the date it is notified in writing as the Winning Bidder:

1) The winning bidder must pay the first installment of the spectrum auction payment and submit a letter of guarantee, issued by a financial institution operating commercial banking business under the Financial Institutions Business Act B.E. 2551 (2008), to guarantee payment of the second and third installments of spectrum auction fee;

2) If it is found that the necessary documents and information required for granting the applicant of Type Three Telecommunication Business License, as submitted in accordance with Clause 4 of Annex A to the NBTC's Notification Regarding Criteria and Procedure for the Licensing of Spectrum for Telecommunications Service in the Frequency Band of 890 - 895/935 - 940 MHz are inaccurate or inadequate, the Winning Bidder must rectify such documents as informed by the Office of the NBTC for completeness and accuracy.

In the case that the winning bidder fails to completely and accuracy comply with the precedent conditions in the specified period; it will be deemed that the winning bidder is renounced from the 900 MHz spectrum license. NBTC will forfeit the auction guarantee and the winning bidder must pay the penalty fine not less than 5,699,000,000 Baht.

In the case that the winning bidder fails to completely and accurately comply with the precedent conditions in the specified period; other juristic persons, in which committee, managing director or any person who has the authority to operate the juristic persons, are the same entity, in which committee, managing director or any person who has the authority to operate the juristic persons, who is the winning bidder failing to completely and accuracy comply with the precedent conditions in the specified period, or have any type of relationship (the relationship can be in a form of being major shareholders, being subsidiaries, being associated companies, being authorized control or being controlled, or being cross-share holders) with the winning bidder failing to completely and accuracy comply with the precedent conditions, or having major shareholder, or

authorized control as the same person with the winning bidder, cannot apply for the spectrum license or any telecommunications license until the NBTC will approve.

5.5.2 Granting of Licenses

The NBTC will issue the 900 MHz spectrum license and Type Three Telecommunication Business License to each winning bidder after such winning bidder has correctly and completely fulfilled the conditions precedent.

5.6 Measures for Restricting Collusive Behaviour

5.6.1 The Applicants are prohibited from any kinds of communication among each other in the nature of exposing or exchanging confidential information, or any information with regard to spectrum licensing, from the date of the application submission until the time of auction result announcement on the day the auction ends.

5.6.2 The Applicant must not conduct any act having the following natures:

- 1) Mutually agree on a bid with other applicant(s), with an objective to benefit any person to be eligible for the License, thus avoiding a fair bid competition.
- 2) Give, ask to give or agree to give money or assets or any other benefit to others for an advantage in the auction with an objective to persuade that person to cooperate with any act that will benefit any person to be eligible for the License, or to persuade a person to bid at a high or low price that is obviously an unconventional bid, or to persuade a person not submit a bid or to withdraw a bid or to not become an Applicant or a Bidder in the auction.
- 3) Coerce others to unwillingly cooperate with any act in a bid, or not to submit a bid, or to withdraw a bid, or have to bid as specified, by violence or threat with any mean, causing others to fear of physical harm to their life, physique, liberty, reputation, or property of the threatened person or third party, until that coerced person does as told.
- 4) Use deception or any other act to cause others not to have a chance to bid fairly, or to bid mistakenly.
- 5) Fraudulently submit a bid to the Office of the NBTC with the knowledge that the bid is abnormally high or low and can be obviously perceived as an unconventional bid, having an objective to deprive fair price competition, and the said conduct causes the spectrum auction to derail.

The Applicant must comply with the criteria, period, procedure, and conditions as prescribed in the NBTC's Notification Regarding Criteria and Procedure for the Licensing of Spectrum for Telecommunications Service in the Frequency Band of 890 – 895 / 935 - 940 MHz, and must sign the Bidder's consent letter.

Section 6

Auction Methodology and Rules

6.1 Auction Methodology

The NBTC will allow bidding for the single lot of 890 - 895/935 - 940 MHz Spectrum with the size of 2x5 MHz. Ascending Bid Auction will proceed in several rounds, and the bidding price in each round will increase correspondingly. A bidder is required to place a bid in the first round.

6.2 Spectrum to be Auctioned and the First Round Price

The spectrum to be auctioned and the first round price are indicated in this table.

Table 6.1 Auctioned spectrum and the reserved price

Spectrum	Reserved price (million THB)
890 - 895/935 - 940 MHz	37,988

6.3 Auction Round

The timetable for auction rounds will be announced via auction software. Each round of the auction consists of three stages as follows:

6.3.1 Bidding Stage

Each round of the auction begins with the bidding stage which lasts for 15 minutes. The bidders may place their bids within this 15 minutes period.

6.3.2 Processing Stage

The processing stage will begin after the end of the bidding stage.

6.3.3 Result Reporting Stage

For this result stage, the round result, the bid price of the spectrum lot for the next round, and other information as specified in Section 6.6 will be announced five minutes prior to the beginning of bidding stage in the next round.

6.4 Auction Process

6.4.1 Bid Price in Each Round

In each round, the bid increments by 76,000,000 THB. If no one places their bid in the previous round, the bidding price will remain unchanged in the current round.

6.4.2 Auction in the First Round

- 1) All bidders must place bids at the price specified by the NBTC in Section 6.2.
- 2) Criteria for assigning a provisional winner for each spectrum lot are shown in Table 6.2.

Table 6.2 -Criteria for assigning a provisional winner in the first round

In Case that	Criteria
1) there is only one bidder	That bidder will be assigned the provisional winner status.
2) there are two or more bidders	One of the bidders in that round will be randomly assigned the provisional winner status.

3) In the first round of the auction, no bidder can use their waiver. If a bidder does not place bid, such action is considered a direct opposition against the auction requirements; thereby, the bidder's status will be terminated and the NBTC reserves the right to forfeit the auction guarantee.

6.4.3 Auction in the Second and Subsequent Rounds

- 1) In each round, bidders are obliged to do the followings:
 - 1.1) In case that the bidder is a provisional winner, the bidder can top-up its bid. If the bidder does not place bid, it will be deemed that the bidder confirms its existing bid price.
 - 1.2) In case that the bidder is not a provisional winner, the bidder must do either of the followings:
 - (1) Place a bid
 - (2) Use a waiver

Should the bidder fail to complete either of these options and have no waiver left, it will be deemed that the bidder no longer has the right to place bid in the subsequent rounds.
- 2) In case that the bidder is not a provisional winner and still has waivers, the bidder can choose not to use the waiver. Such bidder will no longer have the right to place a bid or use the waiver in subsequent rounds.
- 3) Criteria for assigning a provisional are shown below.

Table 6.3 Criteria for assigning a provisional winner for each spectrum lot in the second round and onwards

In Case that	Criteria
1) there is only one bidder placing bid	That bidder will be assigned the provisional winner status.
2) there are two or more bidders place bids	One of the bidders in that round will be randomly assigned the provisional winner status.
3) no bid is placed but a provisional winner was assigned	The bidder with the provisional winner status retains such status.

4) In case that the single participating bidder receives the provisional winner status in the first round, that provisional winner must bid no less than one time in the second round and onwards.

6.5 Waivers

6.5.1 Each bidder is allowed a maximum of three waivers during the auction. However, in the first round the bidder cannot use the waiver and must place a bid for the spectrum lot. In the second and subsequent rounds, the bidder who is the provisional winner is not allowed to use the waiver.

6.5.2 In the second and subsequent rounds, the bidder who is not the provisional winner who still has waivers can use a waiver via these two means:

- 1) Declaring to use a waiver; or
- 2) Not placing a bid during the bidding stage, thus a waiver will be used automatically in this case.

In case that the bidder is not the provisional winner and still has waivers, the bidder can choose not to use the waiver and thus forfeits the right to place bid or use waivers in subsequent rounds.

6.6 Information Disclosure

In the result reporting stage of each auction round, each bidder will be informed of the followings:

- 6.6.1** Bidding price in the next round;
- 6.6.2** The number of bids submitted in the previous round;
- 6.6.3** The provisional winner status;
- 6.6.4** The number of own remaining waivers.

6.7 Termination of a Bidder Status

The bidder will no longer have the right to place bid in the following case:

6.7.1 In the case where a bidder fails to place a bid for any spectrum lot in the first round, it will be considered that such bidder does not comply with the auction requirements and its bidder status will be terminated, whereby the NTC reserves the right to forfeit the auction guarantee of that bidder.

6.7.2 In the second and subsequent rounds, in the case where a bidder who is not a provisional winner in any spectrum lot fails to comply with requirements as described in Section 6.4.3 1) while having no waiver left, it will be deemed that such bidder no longer has right to place bid in the subsequent rounds.

6.7.3 In the second and subsequent rounds, in the case where a bidder who is not a provisional winner and still has waivers choose not to use the waiver. Such bidder will no longer have the right to place bid or use the waiver in the subsequent rounds.

6.8 Conclusion of the Auction

The spectrum auction will be concluded in the round where there is no bidding and no bidder used a waiver. The provisional winner will be declared the winner of this auction.

The auction process will be concluded after the winning bidder has duly signed the verification form that confirms their highest bid price and the NBTC announces the auction result on the date on which the spectrum auction is concluded.

6.9 Reserved Rights

In case there are any force majeure or other necessities that prevent the auction from proceeding smoothly under the auction rules, the NBTC reserves the right to change the format, procedure, methodology and rules of the auction, as well as to cease, suspend or cancel the auction.

Annex A

Application Forms

Appendix A contains the application forms for the applicant and the winning bidder as follows:

1. Application forms for the applicants to be submitted at the application day

Application forms for the applicants	
Form 1	Applicant Information and Documents Supporting License Application
Form 2	Affirmation of the Applicant
Form 3	Ownership and Control Report
Form 4	Persons Entitled to Possess and Access Information of the Applicant for Spectrum License
Form 5	Bidder's Consent Letter

2. Application form for the winning bidder to be submitted within 90 days after receipt of a letter of bid winning confirmation

Application Form for the Winning Bidder	
Form 6	Letter of Bank Guarantee

Annex B

License Conditions for Type Three Telecommunications Business Operation; General Conditions and Specific Conditions for Telecommunications Business with Its Own Network
