



Draft Information Memorandum

IMT or 3G and beyond

Spectrum Assignment

Band: 1920-1980 / 2110-2170 MHz

National Telecommunications Commission

September 2009

Legal Notice

This Information Memorandum (the “Memorandum”) has been prepared on behalf of the National Telecommunications Commission of Thailand (NTC) by NERA Economic Consulting as advisors in connection with the proposed assignment of spectrum for Mobile Phone Service (IMT or 3G and beyond) by auction in exercise of the powers conferred by Section 51 of the Act on the Organization to assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services, B.E. 2543 (2000), Section 7 of the Telecommunications Business Act, B.E. 2544 (2001),

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1. Introduction

The National Telecommunications Commission (NTC) is the independent authority responsible for the assignment of spectrum and for regulating the telecommunications industry in Thailand.

In accordance with the Master Plan for Telecommunications Services B.E. 2551–2553 (A.D. 2008–2010), which lays down the development framework for telecommunications services in Thailand, the NTC aims to promote more telecommunications service providers and the provision of services with new standardized technology. In conformity with the provision prescribed in the Constitution and Section 25 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services B.E. 2543 (2000), the NTC will offer for allocation four (4) third generation (IMT or 3G and beyond) radio frequency spectrum licenses (together “3G Spectrum Licenses” and separately a “3G Spectrum License”) for the provision of 3G services by way of the auction (Auction) described in this Information Memorandum. A 3G Spectrum License will permit the party granted such spectrum license to operate a wireless communications system for the purposes of providing 3G wireless communications services in Thailand, provided the party obtains all other licenses required by a 3G service provider. This Information Memorandum contains important information that parties should read and understand for the purpose of the Auction.

This Information Memorandum contains:

- Overview of the Thai macro economy
- Overview of the Thai telecommunications industry
- Overview of the Thai wireless telecommunications market
- Description of the NTC and an overview of the NTC’s duties and responsibilities
- Overview of the significance of allocating 3G spectrum in Thailand
- Review of wireless policy issues
- Overview of associated regulatory issues
- Overview of the 3G Spectrum Licenses that will be granted
- Overview and description of the Auction
- Description of the application process and participation in the Auction
- Appendices containing a Glossary of Terms, sample Application Forms required for participation, and Auction Rules

Some important matters that potential participants in the Auction should note are as follows:

- No Bidder may be granted more than one (1) 3G Spectrum License.
- Foreign ownership is restricted according to Foreign Business ACT 1999 the applicable laws of the Kingdom of Thailand. A 3G Spectrum License will be granted only to company limited and public company limited registered under Thai law. The NTC may, at its discretion, decide whether or not to proceed with the Auction. The NTC may grant the 3G Spectrum Licenses using a process other than the one described in this Information Memorandum.
- The NTC has the discretion to determine whether two or more entities that submit Application Forms are Associated Bidders in relation to each other. The NTC may determine that no more than one member of an Associated Bidder Group may participate in the Auction. The Auction Rules contain guidelines as to the level of cross-shareholdings and other connections between such entities that may lead to a determination that a Bidder is associated with another.
- All persons interested in participating in the Auction should familiarize themselves with the Radio Communications Act B.E. 2498 (1955) (and its amendment) ; the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services, B.E. 2543 (2000); the Telecommunications Business Act B.E. 2544 (2001); and the Master Plan for Telecommunications Services B.E. 2551-2553 (A.D. 2008–2010).
- All entities interested in participating in the Auction should familiarize themselves with all relevant NTC notifications and regulations.

The NTC has contracted with NERA Economic Consulting (NERA) to:

- Conduct analyses of the current status of the Thai economic environment and the level of competition in the Thai telecommunications markets, in particular, the wireless market
- Assist the NTC in developing an appropriate policy and regulatory framework for the Thai wireless services environment in order to promote free and fair competition in the relevant market(s)
- Assist the NTC with the appropriate design for the Auction, including the choice of auction format and the procedures for the submission of bids (Bidding Procedure)
- Assist as necessary when the NTC implements the Auction

2. Thai Macro Economy

The macroeconomic performance of the Thai economy over the last twenty years has generally been very strong with periods of significantly high growth (and associated low unemployment) even relative to other high-growth Asian economies.¹ In 1997, an economic and financial crisis swept through Asia, leaving many Asian countries in financial turmoil. Thailand was no exception and was one of the countries hardest hit. Despite the Asian financial crisis, Thailand recovered relatively well, largely attributable to export-led growth and private consumption.²

However, the impact of the recent global financial crisis has affected Thailand along with most other countries in the world. Real GDP growth was between 4 and 6 percent per annum until September 2008 before dropping in the December 2008 and March 2009 quarters. The drops in these quarters have been attributed to falling exports (of both goods and services) and a contraction in domestic demand, which was predominately the result of the global financial crisis. There was also a drop in the annual inflation rate. The inflation rate peaked at 9.2 percent for the year to July 2008 before dropping suddenly into negative numbers in 2009. Consistent with the contraction in real GDP growth has been an increase in unemployment. In the first quarter of 2009, unemployment jumped by a relatively large 0.75 percentage points to 2.1 percent.

Although 2009 thus far reflects the downturn being felt globally, forecasts for 2010 and 2011 look significantly brighter. A number of credible economic and financial institutions provide regular forecasts of macroeconomic indicators for Thailand, for example, the World Bank, the International Monetary Fund (IMF), and the Asian Development Bank (ADB). Overall, these forecasts all predict a contraction in 2009 followed by an expansion in 2010. The World Bank's, IMF's, ADB's, and Thailand's Ministry of Finance's forecasts are for real GDP to expand by around 2.4 percent in 2010. These forecasters differ markedly in their expectations for 2010 inflation with the ADB expecting 1.5 percent inflation, the IMF expecting 3.4 percent inflation, and The Economist Intelligence Unit (EIU) expecting 2.1 percent inflation. The EIU has forecasted that FDI in Thailand is expected to increase by 7 percent in 2010 and remain static in 2011. The EIU also gives forecasts of FDI in 2012 and 2013, which show further large increases of 31 and 18 percent, respectively.

These forecasts suggest that Thailand will recover relatively quickly from the global economic crisis, returning to solid GDP growth of around 3.0 percent by 2011 with low unemployment and low inflation. Indeed, this is consistent with Thailand's "fundamentals" remaining strong throughout the crisis. Thailand's banking system and corporate balance sheets are relatively sound, and the Thai government is looking to implement economic stimulus packages.

¹ See Peter Warr, "Long-Term Economic Performance in Thailand," *ASEAN Economic Bulletin* 24 (1), 2007, pp. 138–163 (Warr).

² See World Bank, "Ten Years on and Beyond: Remembering the 1997 Asian Crisis," Feature Story, 2007, <http://go.worldbank.org/Z7RJIADSP0> (World Bank 2007).

3. Thai Telecommunications Industry

Recent technological developments have fundamentally transformed the communications industry in Thailand and around the globe. Historically, different networks were constructed to provide different types of service: wireline networks carried standalone circuit-switched voice traffic and private line services; coaxial cable and satellite networks transmitted television signals; the Internet was optimized for packet-switched data traffic; and mobile and cellular networks carried wireless voice calls. However, network convergence has brought these formerly disparate industry sectors into direct competition with each other, and local wireline service providers worldwide have lost access lines, while wireless subscribers and broadband lines have increased dramatically. The trends in Thailand, while somewhat different from European and North American countries, are generally the same. Specifically, wireless penetration increased from approximately 6 percent in 2000 to approximately 95 percent in 2008. At the same time, wireline penetration declined somewhat in recent years.

The Thai telecommunications industry is composed of different market sectors: wireless, wireline, and broadband and Internet if one uses the most conservative (i.e., the narrowest) market definition. Defining the markets narrowly, rather than broadly, is generally consistent with the practices of the U.S. Federal Communications Commission, the European Commission, and most of the European Union's National Regulatory Agencies.

Wireline growth in Thailand has been limited, and the teledensity remains relatively low, increasing by merely 2.6 percent over the least nine years, from 8.6 percent in 1999 to 11.2 percent in 2008. The teledensity is limited partly because of the build-transfer-operate (BTO) arrangement, but also because of the declining trend for standalone wireline service. Wireless, on the other hand, has seen significant growth and had a 95 percent penetration rate as of December 2008. However, the broadband penetration rate is quite low and appears to be a consequence of the BTO contracts. BTO contracts have delayed development because they limit the number of facilities-based service providers and constrain the broadband and ISP business case by requiring a concession royalty. Thailand's broadband penetration rate in 2008 was 2.7 percent, a slight increase from its 2.0 percent level in 2007. However, once the 3G licenses are awarded and the licensees start to deploy the advanced broadband services associated with 3G over their own networks, broadband penetration in Thailand should significantly increase.

4. Thai Wireless Telecommunications Market

The Thai wireless market appears to have been the sector least affected by the global economic crisis mostly because of the influx of new technology and the subsequent demand. Starting this year, 3G and WiMAX will be the key drivers of the local Information and Communications Technology (ICT) industry. At present, telecom service consumption contributes 3 percent of Thailand's GDP, and investment of approximately US\$1.5 billion is projected to flow into the market within the next three years. The Thailand Information and Communications Technology Market Survey for 2007 projected that the market for IT products and services would reach US\$18 billion in 2008, representing 13.1 percent growth over the prior year. Telecommunications accounted for 72 percent of the total ICT market.³

Thailand has a mature 2G market with 60 million subscribers or a 95 percent penetration rate (as of December 2008), which is expected to reach close to 100 percent by the middle of 2009. The three main players in the current Thai wireless sector are Advanced Info Service (AIS), Total Access Communication (DTAC), and True Move. AIS leads the Thai wireless market in terms of total subscribers with a market share of 44 percent followed by DTAC with 30.1 percent and True Move with 23.8 percent. Hutchison CAT Wireless Multimedia, CAT Telecom, and Thai Mobile are small mobile network operators with a combined market share of merely 2.0 percent.

The three largest wireless service providers operate under BTO concessions. AIS's BTO concession is with TOT Public Company Limited (TOT), a state-owned entity. Similarly, DTAC and True Move operate under a BTO concession agreement with CAT Telecom Public Company Limited (CAT), a state-owned entity. The allocation of the 3G Spectrum Licenses will allow those service providers currently operating under the BTO concession system to eventually switch to a direct licensing system. The elimination of concession payments should produce significant cost savings, thus providing extra capital that these service providers can use to finance the costs of providing 3G services. From a technological perspective, the allocation of the 3G Spectrum Licenses will allow the service providers to introduce new, innovative services, which should supply them with an opportunity to capture additional subscribers, thus increased profits.

The allocation of the 3G Spectrum Licenses in Thailand provides a unique opportunity not only for the incumbents but also for entrants to this market. Unlike in most other nations, there will be a relatively level playing field between the incumbents and the entrants. This is due to the BTO concession agreements described above, which have prevented the current large incumbents from owning a wireless network in Thailand. Hence, all winning bidders in the Auction will be similarly situated in that they all will have to build new networks, rather than simply upgrading existing 2G networks. This, in turn, might provide an opportunity for entrants to compete,

³ United States of America Department of Commerce, Telecom Market Brief, Thailand, <http://www.buyusa.gov/thailand/en/telecom.html>.

Thailand's wireless sector is governed by open, transparent, and specific regulations that are subject to rigorous and complete juridical review. The regulations apply equally to all wireless service providers and are based on careful economic studies and international best practices.

5. National Telecommunications Commission

The National Telecommunications Commission (NTC) is an independent government entity established by the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services B.E. 2543 (2000) to serve as a regulator for the telecommunications industry. The first NTC members were appointed by Royal proclamation on October 1, 2004

The NTC exercises its power pursuant to the provisions of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services B.E. 2543 (2000), also known as the Organization Act. Its duties and responsibilities include, among other things:

- To set policy and formulate a Master Plan for the telecommunications sector
- To set the characteristics and categories of telecommunications services
- To license and regulate the use of spectrum for telecommunications services
- To grant licenses and regulate telecommunication services
- To prescribe the rules and procedures for the licensing as well as the conditions
- To set up standards and technical specifications for the telecommunications services
- To prescribe the rules and procedures on interconnection between telecommunications network
- To formulate the fee and tariff structure for telecommunications services
- To formulate the telecommunications numbering plan and authorize the use of telecommunications numbers
- To formulate the rules and procedures on consumer protection
- To formulate measures to prevent the act leading to monopoly or unfair competition
- To formulate measures to promote free and fair competition

Further details on the NTC and its operations can be found on its Website at: <http://www.ntc.or.th>.

6. IMT or 3G and Beyond

1G and 2G

First generation (1G) wireless communications systems were introduced in the early to mid 1980s. 1G systems offered simple wireless voice services based on analog wireless technology. However, the voice services offered were of low quality, and 1G systems were limited in capacity.

Second generation (2G) systems took wireless technology a step forward. Unlike 1G, 2G systems are based on digital wireless technology that enables voice quality to be improved and wireless devices to have higher capacity. The adoption of a global standard made it possible for 2G wireless phones to have global roaming capability. 2G systems are also able to offer support for simple nonvoice services such as short messaging services.

IMT or 3G and beyond

Standards are still being developed for third generation (3G) technologies, networks, and services. In an effort to harmonize the technologies, networks, and services, the International Telecommunication Union (ITU) established a family of standards known as International Mobile Telecommunications 2000 (IMT-2000). IMT-2000 encompasses both terrestrial and satellite components with the aim of ensuring that roaming services between terrestrial and satellite networks can be provided to subscribers.

3G is designed to facilitate growth, increase bandwidth, and support more diverse applications. 3G improves on previous standards by allowing simultaneous speech and data services and higher data rates, leading to the alleviation of current bandwidth bottlenecks, increased spectral efficiency, and increased growth of data applications. Due in part to the increased popularity of smartphones with their wireless multimedia applications, 3G will deliver packet-switched data with better spectral efficiency at far greater speeds.

To get from 2G to 3G, wireless service providers have made evolutionary (compatible with 2G) upgrades to existing networks, while simultaneously planning their revolutionary (incompatible with 2G) new wireless broadband networks. There are two groups of 3G wireless technologies—one group can be traced back to 2G GSM/GPRS standards and the other group to 2G CDMA or IS-95 standards. This led to the establishment of two distinct 3G families.

GSM/GPRS networks are upgraded to W-CDMA or UMTS and/or EDGE networks and have evolved as follows:

- General Packet Radio Service (GPRS) offering speeds up to 114 Kbps, see http://searchmobilecomputing.techtarget.com/sDefinition/0,,sid40_gci213689,00.html.
- Enhanced Data Rates for Global Evolution (EDGE) offering speeds up to 384 Kbps.

- Universal Mobile Telecommunications System (UMTS) Wideband CDMA (W-CDMA) offering speeds up to 1.92 Mbps.
- High Speed Downlink Packet Access (HSDPA) offering downlink speeds up to 14 Mbps.
- Long Term Evolution (LTE) Evolved UMTS Terrestrial Radio Access (E-UTRA) plans to offer speeds up to 100 Mbps.

GPRS deployments began in 2000, followed by EDGE in 2003. While these technologies are defined by IMT-2000, they are sometimes called 2.5G because they do not offer multimegabit data rates. EDGE has now been superseded by HSDPA (and its uplink partner HSUPA). According to the 3rd Generation Partnership Project (3GPP), there were 166 HSDPA networks in 75 countries at the end of 2007. The next step for GSM operators is LTE E-UTRA, based on specifications completed in late 2008.

IS-95 or CDMAone networks are upgraded to CDMA2000 networks and have evolved as follows:

- One Times Radio Transmission Technology (1xRTT) offering speeds up to 144 Kbps became available in 2002. It is referred to as a 2.5G technology.
- Evolution – Data Optimized (EV-DO) increased downlink speeds to 2.4 Mbps and became available in 2004. See http://searchmobilecomputing.techtarget.com/sDefinition/0,,sid40_gci1219036,00.html.
- EV-DO Rev has increased downlink peak speeds to 3.1 Mbps and reduced latency and became available in 2006.
- EV-DO Rev B is the most recent advance and can use 2 to 15 channels with each downlink peaking at a speed of 4.9 Mbps.
- EV-DO Rev C or Ultra Mobile Broadband (UMB) is supposed to reach 288 Mbps on the downlink.

The next evolutionary step 4G (fourth generation) is just starting to be discussed and introduced in a preliminary fashion. However, unlike 3G, no specific standards spell out what a 4G service, network, or technology is today. LTE and UMB are often called 4G technologies because they increase downlink speeds by an order of magnitude, although what constitutes 4G has not yet been standardized. The ITU is currently considering candidate technologies for inclusion in the 4G IMT-Advanced standard, including LTE, UMB, and WiMAX II. Goals for 4G include data rates of at least 100 Mbps, use of OFDMA transmission, and packet-switched delivery of IP-based voice, data, and streaming multimedia.

Thai service providers currently use predominately 2G network technologies. The expected evolutionary path for a GSM/EDGE network in Thailand is W-CDMA followed by HSDPA and

then possibly HSUPA and LTE. The expected evolutionary path for a CDMA 1x network in Thailand is CDMA2000 followed by EV/DO enhancements.

7. Policy Background and Regulatory Regime

According to the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Services B.E. 2543 (2000), the NTC is required to produce a Master Plan for Telecommunications services, in which Master Plan for Telecommunications services B.E. 2551-2553 (2008-2010) was published in early April 2008. This Master Plan as well as the previous Master Plan note the NTC's intention to establish a Master Plan for Frequency Management and suggest that the key objectives of frequency management are to:

- Be aligned with the intent or purpose of the Thai Constitution, Section 47, in that frequencies used in radio, television, and telecommunications are national resources to be used to benefit the public
- Utilize telecommunications resources efficiently in order to realize their value and to use them in a way that creates maximum benefits for the country and the people as a whole

Thailand's new national constitution, which was approved by referendum in August 2007, mandated the establishment of a single regulator for the telecommunications and broadcasting sectors—the National Broadcasting and Telecommunications Commission (NBTC), which has not yet commenced operations.

In 2006, the NTC began issuing full operating licenses for privately owned telecommunications network providers. There are three types of licenses: Type One, Type Two, and Type Three. According to the Telecommunications Business Act, B.E. 2544 (2001), Section 7:

(1) Type One Licence: being a licence 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 Commission shall grant a licence once notified by a person who intends to operate such business;

(2) Type Two Licence: being a licence 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 Commission shall grant a licence once a person who intends to operate such business has completely fulfilled the standard criteria prescribed in advance in notification of the Commission;

(3) Type Three Licence: being a licence 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 licence by the Commission.

The three largest wireless service providers in Thailand (AIS, DTAC, and True Move) have thus far conducted their business under Build-Transfer-Operate (BTO) concession arrangements in which they share between 20–30 percent of their revenues with TOT and CAT, the Thai state-

owned telecommunications companies. Under the BTO system, private sector service providers finance and construct a network of set capacity and transfer ownership of the infrastructure to either TOT or CAT. BTO companies provide services over the network for a predetermined period and cover the full range of telephony and data services. The wireline BTO service providers are True Corp and TT&T, and the wireless BTO service providers are AIS, DTAC, and True Move.

The issuance of the 3G Spectrum Licenses is expected to eventually solve the problem regarding the current concession structures, and the one-time licensing fee on the new networks is estimated to be in the 1 to 3 percent range as opposed to the current revenue share range of 20–30 percent. However, this does not mean that the existing BTO concessions will be cancelled as the current BTO concessions are expected to run their full course.

At present, there are two state owned service providers in the Thai wireless sector—CAT under market brand: Hutch (or Hutchinson CAT Wireless Multimedia) and Thai Mobile which operate under TOT. Currently, only TOT has a 3G spectrum license. The NTC has given permission for the privately owned service providers to import 3G equipment so that 3G can be rolled out on existing frequencies. The in-band migration in the existing frequencies will enable the provision of next generation wireless services, but the service providers' revenues will still be shared under the BTO licenses, which is not the case with the new spectrum for 3G that is to be auctioned through the Auction. The awarding of the four (4) 3G Spectrum Licenses will allow all service providers to offer 3G and beyond services and to build and operate their own networks without having to forego a significant portion of their revenues to CAT or TOT.

The Regulations that should be applied to regulate 3G markets include:

- Introduction of mobile number portability (MNP)
- Price regulation with the objective of preventing excessive price levels and anticompetitive pricing practices, including cross subsidization, price squeezes, and predatory pricing⁴
- Allocation of broadband wireless access (BWA) licenses
- Accounting separations⁵
- Introduction of cost-based interconnection rates, including mobile termination rates (MTRs)⁶
- Review of the de facto standard of determining significant market power (SMP) who can raise prices by restricting output without incurring a significant loss of sales or revenues

⁴ The maximum rate notification will apply to 2G services, but at present no decision has been rendered as to its applicability to 3G services.

⁵ Accounting separations is a common method for ensuring the transparency of the costs of services and payments between relevant markets to prevent cross subsidization and to determine the incremental costs in the relevant markets.

⁶ In 2006, the NTC introduced a new cost-based interconnection regime to help achieve market liberalization (see NTC Notification “Telecommunications Network Access and Interconnection, B.E. 2549 (2006).” The NTC is soon to issue its standards for calculating interconnection rates, including MTRs. MTRs are currently governed by commercial contracts and backed by a dispute resolution committee. The NTC aims to put in place ex-ante regulation that requires cost-based interconnection rates.

- Commissioned study by the NTC on the efficient use of radio spectrum management to determine how best to allocate and maximize the use of this scarce resource
- Task force assembled by the NTC to study a national broadband plan for Thailand

The NTC's decision to grant the 3G Spectrum Licenses by way of the Auction was made after careful consideration, taking into account the following factors:

- 3G spectrum is a scarce resource. The Auction, which is essentially based on market forces, will be an efficient, objective, and transparent approach for allocating this scarce resource to those who value it most. The Auction will allow all Bidders to compete fairly on equal terms.
- As 3G technology and capabilities are still evolving, it would be difficult to formulate evaluation criteria if the traditional "beauty contest" method were to be used.

8. Associated Regulatory Issues

The NTC in August 2009 adopted regulations requiring that service providers be ready to implement mobile number portability (MNP) within three months, including the clearinghouse necessary to store the data. The introduction of MNP will reduce switching barriers and thus will have a positive impact on competition.

The NTC is currently dealing with a number of spectrum-related issues. One of the foremost goals of spectrum management is to make optimal use of a scarce resource. The NTC is currently devising rules and regulation for the conversion of 2G spectrum for 3G use. This in-band conversion is common and has been used in a number of countries. From a practical viewpoint, it allows 2G operators to provide 3G services on a limited basis. The NTC also is currently in the process of devising regulation to allocate Broadband Wireless Access (BWA) spectrum. BWA spectrum has the potential to increase broadband penetration rates and increase competition.

The NTC currently has a notification on interconnection Re: Telecommunications Network Access and Interconnection, B.E. 2549 (2006). Further, the NTC is soon to issue its standards for calculating interconnection rates, including mobile termination rates (MTRs). MTRs are currently governed by commercial contracts and backed by a dispute resolution committee. The NTC seeks to put ex-ante regulation into place that requires cost-based interconnection rates. Mandatory interconnection to 3G networks is of utmost importance in order to ensure the continued high level of competition in the wireless sector. In addition, the NTC has been working on terms and licensing conditions for MVNOs.

The NTC has a notification Re: Standards of Telecommunications Service Contracts B.E. 2549 (2006) wherein it discusses service standards between service providers and service users. Clause 13 specifies that the “service provider has the duty to provide telecommunications service in accordance with the standards and quality of service provision as advertised or made known to the service users.” However, the service standards themselves are negotiable items in the contract between the service provider and the service user.

The NTC has a notification, Re: Telecommunications Network Access and Interconnection, B.E. 2549 (2006), which addresses interconnection between telecommunications operators under technical and commercial agreements. The duties of licensees with their own telecommunications network are very specific. Moreover, the NTC clearly states in this notification how current interconnection charges are to be negotiated, service fees collection and sharing, reference access or interconnection offer, the steps and processes in contract negotiations, provision of network access and interconnection, and the dispute resolution process.

The NTC has a notification Re: Criteria and Procedure for the Provision of Universal Basic Telecommunications and Social Services. However, this notification is primarily targeted at wireline carriers. In this Information Memorandum, the NTC specifies coverage requirements associated with a 3G spectrum license, which are in line with universal service provisions.

9. Description of Licenses

The NTC will offer four (4) 3G Spectrum Licenses for the provision of 3G services by way of the Auction described in this Information Memorandum. A 3G Spectrum License will permit the party granted such spectrum license to operate a wireless communications system for the purposes of providing 3G wireless communications services in Thailand.

The terms and conditions of each 3G Spectrum License will set out the rights and obligations of the 3G service provider. Such terms and conditions, described below, include the duration of the license, network and service coverage obligations, limitations on transferability, and rollout requirements. The 3G service provider must comply with all applicable rules and regulations and license conditions listed in Section 9.2 below.

The NTC has established these license conditions to promote free and fair competition and with a view for the 3G Spectrum Licenses to remain efficient as well as functionally correct over time. The 3G Spectrum License conditions take into consideration that predictions of the services and demand characteristics, which will develop over the long term, may be inaccurate. The 3G Spectrum License conditions are restricted in order to limit the scope of terms likely to become obsolete.

9.1. Frequency Assignments

There is 2x45 MHz of paired spectrum for Frequency Division Duplex (FDD) available in the 2.1 GHz band. This spectrum will be assigned as four (4) 3G Spectrum Licenses and each Bidder in the Auction can only acquire one (1) 3G Spectrum License.

There will be one (1) 3G Spectrum License of 2x15 MHz (License A) and three (3) 3G Spectrum Licenses of 2x10 MHz each (Licenses B, C, and D). A graphical depiction of the spectrum band plan is shown in Figure 9.1.

**Figure 9.1
Band Plan**

2165-2170 MHz	FDD12	3G Auction
2160-2165 MHz	FDD11	3G Auction
2155-2160 MHz	FDD10	3G Auction
2150-2155 MHz	FDD9	3G Auction
2145-2150 MHz	FDD8	3G Auction
2140-2145 MHz	FDD7	3G Auction
2135-2140 MHz	FDD6	3G Auction
2130-2135 MHz	FDD5	3G Auction
2125-2130 MHz	FDD4	3G Auction
2120-2125 MHz	FDD3	3G Auction
2115-2120 MHz	FDD2	3G Auction
2110-2115 MHz	FDD1	3G Auction
2020-2025 MHz	TDD3	
2015-2020 MHz	TDD2	
2010-2015 MHz	TDD1	
1975-1980 MHz	FDD12	3G Auction
1970-1975 MHz	FDD11	3G Auction
1965-1970 MHz	FDD10	3G Auction
1960-1965 MHz	FDD9	3G Auction
1955-1960 MHz	FDD8	3G Auction
1950-1955 MHz	FDD7	3G Auction
1945-1950 MHz	FDD6	3G Auction
1940-1945 MHz	FDD5	3G Auction
1935-1940 MHz	FDD4	3G Auction
1930-1935 MHz	FDD3	3G Auction
1925-1930 MHz	FDD2	3G Auction
1920-1925 MHz	FDD1	3G Auction

The four (4) 3G Spectrum Licenses will consist of FDD1 to FDD9. License A will consist of three FDD blocks: FDD1–FDD3, and three licenses (License B, C, and D) will each consist of two FDD blocks: FDD4–FDD5, FDD6–FDD7, FDD8–FDD9.

9.2. License Conditions

License duration: Each 3G Spectrum License shall be valid until fifteen (15) years after it has been granted, unless suspended or cancelled by the NTC due to violations of the licensing terms and conditions set forth herein or upon written approval from the NTC in response to the Licensees request to terminate the license. The NTC may extend or further renew the licenses for such a period as the NTC finds appropriate.

Fees and Charges: In compliance with applicable laws and regulations, 3G service providers will be subject to reasonable, nondiscriminatory, and cost-based fees, such as universal service obligation (USO) fees, numbering fees, license fees, and regulatory spectrum fees.

Provision of service: Throughout the validity period of each 3G Spectrum License, the Licensee shall be required to operate, maintain, and provide high quality, efficient, and continuous service in a manner that is consistent with applicable laws and regulations.

Customer charter: The Licensee shall prepare a customer charter that provides in detail the minimum standards of service that it shall provide to its customers and that shall serve as a guiding document to the Licensee’s employees in dealing with its customers. The document shall be submitted to the NTC for approval within six (6) months of the licensing award date.

Confidentiality of subscriber information requirement: The Licensee shall not disclose or use any personal data about a customer except with the explicit consent of the customer and in strict adherence with applicable laws and regulations. The form of consent shall be approved by the NTC. Licensees shall be exempted from this rule if the information is requested by Thai authorities for the prevention or detection of crime or the apprehension or prosecution of offenders in accordance with applicable laws, mainly, “Notification of the National Telecommunications Commission, Re: measure for consumer protection on matters pertaining to personal data, right of privacy and freedom to communicate by means of telecommunications.

Licensing transparency: The NTC will make the terms and conditions of the 3G Spectrum Licenses publicly available.

Rollout obligation: The Licensee is required to install, maintain, and operate a 3G network that covers at least 50 percent of the population within two (2) years of the license award date. After four (4) years of the license award date, the Licensee shall cover at least 80 percent of the population.

The Licensee’s 3G network must be capable of supporting a download speed of at a minimum 700 kilobits per second for an individual customer, being the speed at which information is

transferred across the air interface from the base station to the customer's apparatus connected to the network of the Licensee. Similarly, it is required that the 3G network must support an upload speed of at a minimum 240 kilobits per second for an individual customer.

The Licensee shall provide supporting evidence of its mean upload and download speeds within ten (10) days upon request by the NTC.

Required metering accuracy: The Licensee shall take all reasonable steps to ensure that any metering equipment used in connection with its 3G services is accurate, reliable, and consistent with the NTC notifications on technical standards for telecommunications equipment. The Licensee shall regularly test the metering equipment and retain all records of such tests. These records shall be provided to the NTC upon request.

Public emergency services: The Licensee shall provide public emergency services by means of which anyone may at any time and without incurring any charge and by means of compatible apparatus connected to the network of the Licensee communicate with the relevant policy service, the fire and ambulance services, or any other emergency center as required by applicable laws and regulations.

Nondiscriminatory treatment in the provision of service to customers: The Licensee shall not show undue preference towards or exercise undue discrimination against any person or class of persons in, inter alia, the price and performance characteristics of the services provided or the terms and conditions under which the services are provided. In particular, the Licensee shall not give any undue preference to, or receive an unfair advantage from, a business carried on by it or an associated or affiliated company, service, or person if the NTC is of the opinion that the Licensee's competitor could be placed at a significant competitive disadvantage or that competition would be prevented or substantially restricted.

Standards of telecommunications service contracts: The Licensee shall publish and charge no more than the published tariff rates for the services provided under this license. The tariff shall include the relevant terms and conditions for the provision of the services. In addition, all service contracts must be in strict compliance with the "Notification of the National Telecommunications Commission, Re: Standards of Telecommunications Service Contracts B.E. 2549 (2006)."

Unsolicited advertising/SMS restrictions: The Licensee shall not use the service and shall endeavor to prevent the service from being used by any user for the transmission of messages or communications comprised of any unsolicited advertising or unsolicited promotional information and shall comply with any regulations that may be issued by the NTC in this respect.

Quality of service standards (reservation of right only): The NTC reserves the right to impose quality of service standards, in addition to existing regulations, should it determine that the Licensee provides retail and wholesale service quality that does not meet international best practices.

Compliance with international obligations of the Thai government: The Licensee shall comply with all international obligations as well as the objectives of the Thai government with respect to national security and the furtherance of public welfare, including international obligations and treaties.

Disabled consumer services: The Licensee shall provide hearing disabled consumers with appropriate handsets or hearing aid apparatus at no additional charge to the disabled consumer. Furthermore, the Licensee shall cooperate with the NTC in the development and provision of reasonable solutions for consumers with other disabilities.

License transferability: Unless prior written approval is obtained from the NTC in accordance with the “Notification of the National Telecommunications Commission, Re: Spectrum License transfer and Spectrum Sharing in Telecommunications Services B.E. 2550 (2007), the Licensee is prohibited from assigning, transferring, subletting, or otherwise disposing of its rights, duties, liabilities, and privileges with regard to its 3G Spectrum License

Purchase of license: The Licensee is prohibited from purchasing, partially or fully, additional 3G spectrum in the 2.1 GHz range. All other parties wishing to purchase, partially or fully, a 3G Spectrum License in the 2.1 GHz range must comply with all applicable laws and regulations.

Enforcement of mandatory and cost-based interconnection pricing: The Licensee shall, where directed by the NTC, interconnect its services and network with other licensed telecommunications networks and services at cost-based rates and in compliance with the “Notification of the National Telecommunications Commission, Re: Telecommunications Network Access and Interconnection B.E. 2549 (2006)” and other applicable regulations.

Accounting separations including 2G/3G services: The Licensee shall prepare separate accounts for 2G and 3G services or business activities. In addition, where required by NTC regulations, the Licensee shall prepare separate accounts for other services and business activities. The accounting practices used by the Licensee must be consistent with generally accepted accounting principles in Thailand. In order to monitor the Licensee’s compliance with this condition, the NTC may direct the Licensee to arrange, at its own cost, a separate and independent audit of its accounts.

Quality standard for interconnection services: The Licensee shall treat all requests to interconnect with its services and networks on a reasonable and nondiscriminatory basis and in strict compliance with applicable laws and regulations. The NTC reserve the right to request supporting evidence that interconnecting parties were not unduly discriminated against.

Prohibition against anticompetitive pricing and behavior: The Licensee shall not enter into any agreement or arrangement, whether legally enforceable or not, which shall in any way prevent or restrict competition in relation to the operation of the system or provision of services by the Licensee or any other telecommunications system and/or services licensed by the NTC. Furthermore, the Licensee shall comply with the “Notification of the National

Telecommunications Commission, Re: Measures for the Prevention of Monopoly or Unfair Competition in Telecommunications Business B.E. 2549 (2006)” and all other relevant laws and regulations.

Regulatory compliance requirement: The Licensee shall strictly and without any undue delay comply with any and all directions that the NTC may issue when exercising its power as the regulator of the telecommunications industry in Thailand and the functions and duties imposed onto the NTC by the applicable laws and regulations.

Compliance with the Auction rules: The Licensee hereby represents and warrants that it has complied with all the procedures and conditions of participation for the Auction issued by the NTC and has not been involved in any act or omission of any act constituting a breach of the rules. Failure to do so might result in the cancellation of the 3G Spectrum License and either a financial or a criminal penalty or both a financial and a criminal penalty.

Mobile number portability for 3G services: The Licensee shall conform to the “Notification of the National Telecommunications Commission, Re: Criteria on Mobile Number Portability Service, B.E. 2552 (2009).” Under this requirement, the Licensee shall, in any manner the NTC may direct, facilitate the portability of numbers assigned to any customer of any Licensee so that any number may be used by that customer should it cease to be a customer of any such entity and become a customer of any other wireless service provider.

Numbering plan conformity: The Licensee shall conform to the numbering plan made or approved by the NTC and any directions given by the NTC with respect to that numbering plan, including the “Notification of the National Telecommunications Commission, Re: Telecommunications Numbering Plan B.E. 2549 (2006).”

MVNO wholesale access under RAND terms: The Licensee shall negotiate with potential mobile virtual network operators in a fair and nondiscriminatory (RAND) manner. The NTC reserves the right to set wholesale access prices and terms and conditions should it be found that the Licensee failed to negotiate under RAND terms.

Infrastructure sharing: The NTC strongly encourages the Licensee to share masts, sites, and other infrastructure in order to minimize the environmental impact of the networks and to expedite the deployment of 3G services in Thailand. Furthermore, the NTC reserves the right to require infrastructure sharing, particularly in rural areas or marginal markets and in areas of potential infrastructure overcrowding.

Variation of terms of license: Pursuant to its powers and obligations, the NTC may vary or amend any of the terms of the 3G Spectrum Licenses by giving the Licensee at least one (1) month’s notice in writing.

Compliance with the law: The license shall be governed by and construed according to the laws of the Kingdom of Thailand. Furthermore, the Licensee shall observe and comply with all

applicable telecommunications laws and regulations and any relevant treaties or conventions to which Thailand is a party.

Third-party compliance: If the Licensee employs any person under contract for the purpose of the service or for the installation, maintenance, or operation of the network (“contractor”), the Licensee shall continue to be responsible for compliance with the conditions of the 3G Spectrum License, and the performance thereof, by any contractor.

Sovereign Immunity Waiver: The Licensee shall agree to waive any and all sovereign immunity rights with respect to its 3G operations and activities in Thailand.

Indemnity clause: The Licensee shall indemnify the NTC and any employee, or agent thereof, or contractor working on behalf of, the NTC (each being hereinafter referred to as an “Indemnified Party”) in this matter against any losses, claims charges, expenses, actions, damages, or demands that an Indemnified Party incurs or which may be made against an Indemnified Party as a result of or in relation to the activities of the Licensee or any employee, agent, or contractor of the Licensee in relation to the provision of the service or the installation, maintenance, and operation of the network.

10. Overview of the Auction

The NTC has chosen to award 3G Spectrum Licenses using a Simultaneous Multiple Round (SMR) Auction. The SMR Auction is a popular auction methodology that has been widely used in the assignment of spectrum licenses. Countries that have used an SMR Auction to assign 3G Spectrum Licenses include, among others, Germany, Singapore, and Italy.

The NTC has chosen a Bidding Procedure whereby Bidders place Bids online via the Internet from their place of business using specialized software (Auction Software). Each Bidder that has complied with all requirements for participation in the Auction will receive confidential information, including an initial password, which the Bidder must use to access the Auction Software. At first login to the Auction Software, a Bidder will be required to change the initial password provided by the NTC and will be required to accept the Terms and Conditions of Access to the Auction Software by clicking on “I agree” in a pop-up window. The Auction Software allows Bidders not only to submit bids on a 3G Spectrum License, but also to view the Auction results and to receive secure messages from the NTC. The NTC acts as the Auction Master, communicates with the Bidders, and sets the parameters of the Auction.

The Auction methodology and Bidding Procedure are described in more detail below. The Auction Rules, which provide more details on the Auction methodology and Bidding Procedure, are provided as Appendix C to this Information Memorandum.

10.1. Auction Methodology: the SMR Auction

The Auction format is a Simultaneous Multiple Round (SMR) Auction. The SMR Auction is called “simultaneous” because this auction methodology assigns all four (4) 3G Spectrum Licenses together in a single process. The SMR Auction is called a “multiple round” auction because it can offer Bidders multiple opportunities to submit Bids. A Bidder that would not be awarded a 3G Spectrum License on the basis of the results of a particular Round may increase its bid on a 3G Spectrum License or switch its bid to another 3G Spectrum License in the next Round.

There are four (4) 3G Spectrum Licenses in the Auction: one (1) 3G Spectrum License of 2x15 MHz (License A) and three (3) 3G Spectrum Licenses of 2x10 MHz (Licenses B, C, and D). Each Bidder can place a Bid on at most one of the four (4) 3G Spectrum Licenses in a Round. By Placing a Bid, the Bidder indicates that it is willing to purchase the 3G Spectrum License at a particular price announced by the Auction Master. A Bid is a binding offer that may not be rescinded.

The 3G Spectrum Licenses on which a Bidder may place a Bid depend on the Financial Guarantees provided by the Bidder in advance of the Auction. A Bidder that posts the higher level of Financial Guarantee will be eligible to bid on any of the four (4) 3G Spectrum Licenses in the first Round of the Auction. The Bidder may continue to be eligible to place a Bid on any of the four (4) Spectrum Licenses subject to the rules of the Auction. A Bidder that posts the lower level of Financial Guarantee will be eligible to place a Bid on any of Licenses B, C, and D in the first Round of the Auction. The Bidder may continue to be eligible to place a Bid on Licenses B, C, and D subject to the rules of the Auction, but the Bidder will never be eligible to place a Bid on License A.

The price for a 3G Spectrum License announced by the Auction Master and at which Bidders are invited to place a Bid in a Round is called the “Going Price” for that 3G Spectrum License in a particular Round. In the first Round, the Going Price is called the “Starting Price.” The NTC will announce the Starting Price for each 3G Spectrum License in advance of the Auction. The Starting Price for License A is expected to be 1.15 times the Starting Price for each of Licenses B, C, and D. For each further Round, the Auction Master will announce a Going Price for each of the four (4) 3G Spectrum Licenses based on the bidding in the previous Round.

In the first Round, Bidders place their Bids by indicating the particular 3G Spectrum License that the Bidder is willing to purchase at the Starting Price for that 3G Spectrum License announced by the Auction Master. If one or more Bidders place a Bid on a particular 3G Spectrum License, one Bidder is selected as the Standing High Bidder and is assigned the status as the provisional winner of the 3G Spectrum License. (A provisional winner status is assigned because if the Auction were to end with no further Bids on any of the 3G Spectrum Licenses, this particular Bidder would be awarded the 3G Spectrum License.) Further, if one or more Bidders place a Bid on a particular 3G Spectrum License, the Going Price for that 3G Spectrum License is increased

in the second Round. The Auction Master communicates to the Bidders the results of the bidding, including the Going Prices for all 3G Spectrum Licenses. The Auction Master communicates individually to each Bidder whether the Bidder is a Standing High Bidder on any 3G Spectrum License.

In the second and all subsequent Rounds, a Bidder that is a Standing High Bidder for a 3G Spectrum License must maintain its Bid on that 3G Spectrum License and may not place a Bid on another 3G Spectrum License. A Bidder that is not the Standing High Bidder on any 3G Spectrum License can choose to place a Bid at the Going Price on any 3G Spectrum License for which the Bidder is eligible. A Bidder that placed a Bid in the last Round is eligible to place a Bid at the Going Price on any of the Licenses B, C, or D, and is also eligible to place a Bid on License A if the Bidder provided a sufficient Financial Guarantee. Such a Bidder may increase its Bid on the 3G Spectrum License for which it placed a Bid in the last round, or such a Bidder may switch its bid to another 3G Spectrum License for which it is eligible. A Bidder may also submit a Waiver, which allows a Bidder to remain eligible to place a Bid without placing a Bid in the Round. A Bidder is allowed a maximum of three (3) Waivers during the Auction. If the Bidder fails to submit a Bid or a Waiver, the system automatically submits a Waiver for the Bidder unless the Bidder has no Waivers remaining. The Auction Master announces the Going Prices for all 3G Spectrum Licenses and communicates individually to each Bidder whether the Bidder is a Standing High Bidder on any 3G Spectrum License.

The Auction concludes in the Round when no new Bids are placed and no Bidders are requesting a Waiver. The Final Price for a particular 3G Spectrum License is the Standing High Bid for that 3G Spectrum License in the last Round.

10.2. Bidding Procedure

The Auction will be conducted in Rounds. Each Round will have a determined schedule. For example, each Round could be scheduled to last one (1) hour. Each round consists of three (3) different phases:

- Bidding Phase (30 minutes). Bidders must place their Bids during this phase.
- Calculation Phase (20 minutes). During this phase, the Auction Master calculates Round results.
- Reporting Phase (10 minutes). During this phase, the Auction Master communicates the results of the bidding to Bidders.

The precise timing of each Round and the phases within the Rounds are decided by the Auction Master and are announced to the Bidders via the Auction Software.

Bidders place their Bids online using specialized Auction Software. The Auction Software allows the Bidder not only to place Bids, but also to view the Auction results and to receive

secure messages from the Auction Master. Each Bidder will receive a username (or Login ID) and password to access the Auction Software. At first login, Bidders will be required to change their passwords and then accept the Terms and Conditions of Access to the Auction Software by clicking on “I agree” in a pop-up window.

By Placing a Bid, the Bidder indicates that it is willing to purchase a particular 3G Spectrum License at a particular price announced by the Auction Master. To place a Bid, the Bidder checks a box to indicate the 3G Spectrum License that the Bidder is willing to purchase at the price the Auction Master has announced. The Auction Software then checks that the Bid conforms to the Auction Rules. For example, as explained in the Auction Rules, a Bidder may or may not be eligible to place a Bid on License A. If a Bidder places a Bid for a 3G Spectrum License for which the Bidder is not eligible, the Auction Software will require that the Bidder resubmit a Bid so that it conforms to the Auction Rules.

Once the Bidder has placed a Bid that conforms to the Auction Rules, the Bidder is asked to verify the Bid. The Bidder may choose to verify the Bid or to change the Bid to a different 3G Spectrum License. As long as the Bidding Phase of the Round is open, a Bidder may change the Bid. The Bid that “counts” is the last Bid placed and verified during the Bidding Phase and processed by the Auction Software.

If a Bidder fails to place a Bid in a Round and does not place a Waiver, the Bidder will lose its ability to place a Bid in all future Rounds. It is the responsibility of the Bidder to ensure that Bids are placed on time.

The Calculation Phase of the Round begins after the bidding ends. The Auction Master determines the Going Prices for the next Round. The Going Price for a 3G Spectrum License increases if one or more Bidders have placed Bids for that particular License. During the Calculation Phase, Bidders cannot place Bids and do not yet have access to the current round results.

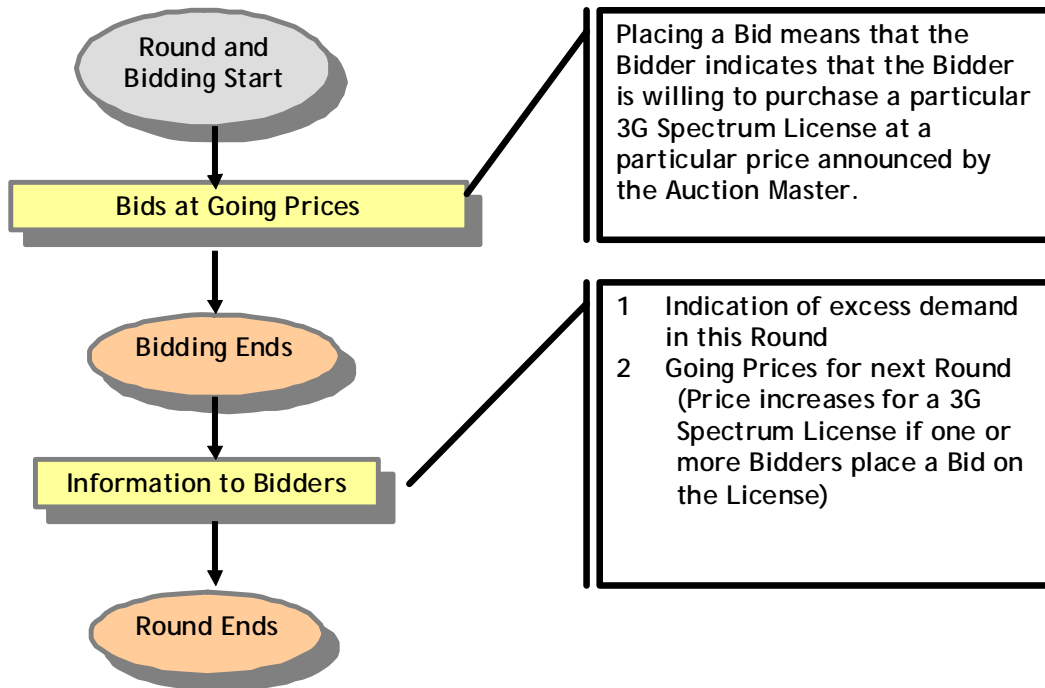
The Reporting Phase begins when the Auction Master communicates to Bidders the results of the preceding Bidding Phase. The Auction Master communicates to all Bidders the Going Prices for each 3G Spectrum License and an indication of the level of excess demand. In other words, in the Reporting Phase, each Bidder will learn the Going Prices for the next Round. Each Bidder will also learn if it has the Standing High Bid on a License. In addition, Bidders will be told if there is more or less than a predetermined threshold of eligibility points left in the Auction (this is an imprecise indication of the level of excess demand).

The Auction Master will not tell Bidders precisely how much excess demand is left. For example, if there are six (6) Bidders left, each with three (3) eligibility points, the precise demand is eighteen (18), but the Auction Master will only tell Bidders that it is more than predetermined threshold. The Auction Master communicates individually to each Bidder whether the Bidder is the Standing High Bidder for a 3G Spectrum License. These Round results can be

viewed through the Auction Software. Results for a given Round remain available during subsequent Rounds.

The phases of the Round are illustrated in Figure 10.1.

Figure 10.1.
Schematic of Phases



The system requirements needed to place Bids online are as follows:

- A standard PC-compatible computer running Windows 98, Windows Me, Windows NT 4.0, Windows 2000, Windows XP, or Windows Vista.
- An Internet connection.
- A Web browser that is supported and maintained by the Auction Software.

The Auction Master will announce before the Auction a list of Web browsers that are supported and maintained by the Auction Software. This list is expected to include Firefox 3.0 or higher, Safari 4, Internet Explorer 7 or higher, as well as Chrome 2.

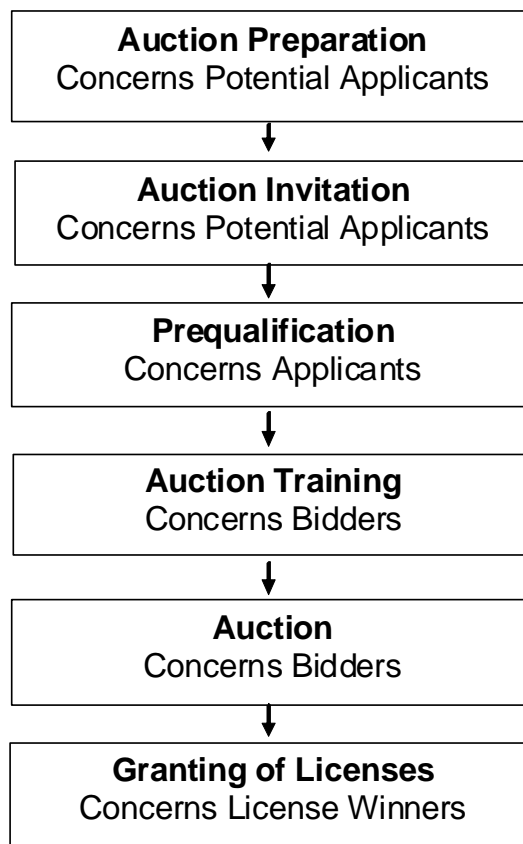
11. Participating in the Auction

In order to participate in the Auction, a Bidder must submit an Application. Each Bidder in the Auction must be an entity that is able to fully comply with all 3G Spectrum License Conditions, has successfully met the Prequalification Criteria, and has provided the required Financial Guarantee to participate in the Auction.

11.1. Phases of the Auction Process

The auction process consists of the six phases illustrated in Figure 11.1.

Figure 11.1



Phases of the Auction Process

The Auction Preparation Phase ends with the publication of the Information Memorandum. At the Auction Invitation Phase, all Potential Applicants are invited to participate in the Auction. Interested parties must submit an Application and meet the Application Criteria. Qualified Applicants must then submit a Financial Guarantee before they will be allowed to participate in the Auction as Bidders. In the Auction Training Phase, the NTC will host an Information Session for qualified Applicants as well as a Mock Auction. During the Auction Phase, an SMR Auction is conducted with the four (4) 3G Spectrum License winners being determined. Finally, after the

Auction Phase, License Winners will have to make a payment for the 3G Spectrum Licenses before the 3G Spectrum Licenses can be issued in the Granting of Licenses Phase.

Table 11.1 outlines an indicative timetable for the six (6) phases of the auction process. The NTC reserves the right to change the timetable. Any changes to the timetable will be announced on the NTC's Website at <http://www.ntc.or.th>.

Table 11.1
Timetable for Auction Procedure

Task	Date
Auction Preparation Phase	
Draft IM published	September 11, 2009
Public consultation session	September 28, 2009
Public consultation close	October 5, 2009
Publication of final IM	October 2009
Auction Invitation Phase	
Public information session	After Publication of final IM
Public mock auction	
Prequalification Phase	
Application deadline	30 days after the publication of final IM
Notification of qualified bidders	7 days after the application deadline
Financial guarantee deadline	7 days after the notification of qualified bidders
Auction Training Phase	
Qualified bidders information session	7 days after the financial guarantee deadline
Qualified bidders mock auction	
Auction Phase	
Auction start	14 days after the financial guarantee deadline
Granting of Licenses Phase	
Payment deadline	Auction end +14 days
Issue licenses	Auction end +21 days

11.2. Prequalification Process

The purpose of the prequalification process is to select Applicants who are deemed by the NTC to be suitable holders of a 3G Spectrum License. The prequalification process follows the following four (4) steps:

1. Applicants submit Application Forms and pay the Application Fee in the total amount of 500,000 baht (excluding 7 percent VAT).
2. The NTC evaluates the Application Forms.
3. Applicants are informed whether their Application has been successful.
4. Successful Applicants submit a Financial Guarantee.

Only prequalified Applicants will be allowed to participate in the Auction. To be eligible to bid in the Auction, each Bidder must complete all qualification requirements listed below.

▪ *Information Requirement*

Each Applicant must comply with the requirement for the provision of information. Each Applicant must submit the Application Forms attached as Appendix B to this Information Memorandum.

Failure to provide any of these documents before the due date may result in the Applicant not qualifying for the Auction. As a guide to Applicants, Form 6 in Appendix B provides a checklist of the required information.

▪ *Legal Requirement*

Each Applicant must prove that it is a Limited Company in conformance with the following Thai legal requirements:

- Closely held (private) limited companies are governed by the Civil and Commercial Code. According to the terms of such, firms must document the valid creation and continuing existence, governing structure, and proper Thai shareholder ratio, and so on.
- Public limited companies are governed by the Public Companies Act, which, along with applicable SET regulations, governs the documentary evidence necessary to be provided good standing, structures, shareholder structures including Thai shareholder ratio, and so on.

No other types of juristic or quasi juristic entities (such as individuals, partnerships, foreign representative offices, joint ventures, and foreign corporations) will be deemed eligible to participate in the Auction.

The information requirements of Forms 1 and 4, as attached in Appendix B, will form the basis for this requirement.

- ***Financial Guarantee***

- Each Qualified Applicant must provide either a cash deposit or an approved bank guaranty that proves its ability to pay in the event of winning a 3G Spectrum License.
- Qualified Applicants will be required to make additional Financial Guarantees available if the Bids they place exceed a predefined multiple of their original Financial Guarantee.

- ***Ownership Restrictions***

- Ownership restrictions must be in compliance with Thai law.
- Each Applicant must disclose ownership, control, and associational ties so as to ensure a competitive Auction absent conflicting incentives. This prequalification criterion is designed to ensure that proper competition is observed and no participant has an incentive to intervene in the Auction process. The prequalification documents do this in two ways:
 - By ensuring that any and all Applicants are independent of each other and thus will act in a properly competitive fashion, not constrained by common ownership or oligopolistic maneuvering.
 - By ensuring that Applicants are not associated with the existing assignee or beneficiary of such an assignment in the IMT-2000 core band (the 2.1 GHz band).

To check for both, the NTC requests information on the holdings and obligations of Applicants and their immediate family and parent companies. The NTC retains the right to decide on whether an association between Applicants exists and to apply any needed remedy, including, but not limited to, barring participation or requiring the end of the association.

In particular, each Applicant is required to submit information on:

- Those parties who control or are controlled by an Applicant.
- Those parties with a direct or indirect minority ownership interest in the Applicant who are “concerned” with the participation in the Auction, where “concerned” may be defined as:
 - Being in possession of confidential information with respect to the Applicant. For example, business case, auction strategy, and the highest price the Applicant is willing to pay in the Auction.
 - Having entered into any agreement or understanding to finance the Applicant or assist it in any other way in connection with the Auction.
- Any party who controls or is controlled by a party falling under either of the two conditions listed immediately above.

The information requirements of Forms 1, 4, and 5, as attached in Appendix B, will form the basis for the Ownership Restrictions.

- ***Confidentiality Requirement***

Applicants must refrain from disclosing any confidential information to other Applicants, including exchanging information with other Applicants regarding bidding strategy or strategy for the use of the 3G Spectrum License.

Applicants must refrain from entering into agreements with other Applicants in relation to the 3G Spectrum Licenses or the Auction. Applicants are reminded of their obligations under existing anticollusion laws (see the “Trade Competition Act, B.E. 2542 (1999)”).

Applicants are required to sign the Certifications on Form 6, which can be found in Appendix B.

- ***Other Requirements***

The NTC reserves the right to request an Applicant to provide additional information or documentation relating to its Application. Any such request will be allowed a reasonable period for provision.

11.3. Financial Guarantees

As the last step in the prequalification process, Applicants are informed whether their Application has been successful or not. If successful, an Applicant will be required to post a Financial Guarantee before being allowed to participate in the Auction. As a Financial Guarantee, each Applicant must provide either a cash deposit or an approved bank guarantee (see Forms 2 and 3, respectively, in Appendix B).

There will be two (2) levels of Financial Guarantees. The first and lower level of Financial Guarantee applies to Licenses B, C, or D. The second and higher level of Financial Guarantee applies to License A. The Financial Guarantee required for License A is expected to be 1.15 times the Financial Guarantee required for Licenses B, C, or D.

An Applicant that posts the higher level of Financial Guarantee will be eligible to place a Bid on any of the four (4) 3G Spectrum Licenses in the first Round of the Auction. An Applicant that posts the lower level of Financial Guarantee will be eligible to place a Bid on any of Licenses B, C, and D in the first Round of the Auction and will never be eligible to place a Bid on License A during the Auction.

After submitting a Financial Guarantee that satisfies the requirements, an Applicant is fully qualified to participate as a Bidder in the Auction.

The NTC may request Bidders to supply an additional Financial Guarantee during the Auction if the Going Prices of the 3G Spectrum Licenses reach a level where they substantially exceed the

Starting Prices. In such an event, the Auction will be paused for a sufficient time to allow Bidders to comply.

Deposits will be returned following the end of the Auction Phase, during the Granting of Licenses Phase. For License Winners, the amount of the deposit will be offset in the license payment.

11.4. Auction Preparation

Bidder Information Session

To provide qualified Applicants with an opportunity to learn about the Auction Format, Auction Rules, and Procedures, the NTC will host a Bidder Information Session prior to the Auction.

At this event, the NTC will introduce qualified Applicants to the Auction Software and provide a Bidder Manual that contains practical details on the operation of the Auction Software and system requirements. The NTC will announce before the Auction a list of Web browsers that are supported and maintained by the Auction Software. This list is expected to include Firefox 3.0 or higher, Safari 4, Internet Explorer 7 or higher, as well as Chrome 2.

The Bidder Information Session will also feature a question and answer session.

Mock Auction

Prior to the Auction, the NTC will set up a Mock Auction where all qualified Applicants are invited to participate. The NTC will deliver by registered letter to the postal address given in the Application Forms the login information and passwords to the contact person listed in the Application Forms.

The Mock Auction provides qualified Applicants with an opportunity to practice the bidding procedure using the Auction Software. Second, it serves as a test of the Auction Software and Backup Procedures. In case a Bidder is experiencing technical difficulties during the Auction, it is possible to place Bids using a fax machine.

Participation in the Mock Auction is not mandatory.

11.5. The Auction

The Auction will be conducted via the Auction Software over the public Internet. Each Bidder is responsible for arranging an Internet connection, including hardware and Web browser. The login information and passwords used for the Mock Auction will also be used for the Auction.

The Going Price is the price announced by the Auction Master and at which Bidders are invited to bid for that 3G Spectrum License in a particular Round. In the first Round, the Going Price is called the "Starting Price." The NTC will announce the Starting Price for each 3G Spectrum

License in advance of the Auction. For each further Round, the Auction Master will announce a Going Price for each of the four (4) 3G Spectrum Licenses based on the bidding in the previous Round. The Auction concludes in the Round when no new Bids are placed and no Bidders are placing a Waiver. The schedule of Rounds (beginning and end of Bidding Phases) for the first day of the Auction will be announced by the NTC no later than one (1) day before the start of the Auction.

The auction master reserves the right to halt the Auction if deemed necessary.

11.6. Granting of Licenses

Payment

The Auction determines the assignment of 3G Spectrum Licenses to Bidders as well as the amount to be paid for a 3G Spectrum License that is assigned. The Auction assigns a particular 3G Spectrum License to the Bidder holding the Standing High Bid for that License in the last Round of the Auction, and the amount to be paid for that 3G Spectrum License is the amount of the Standing High Bid.

Payment will be due in a single lump-sum payment within fourteen (14) calendar days after the Auction ends. Payment in installments will not be permitted.

Issue Licenses

The NTC will award each License to the Bidder with the Standing High Bid for that License upon receipt of full payment of the amount of the Standing High Bid.

12. List of Appendices

The following documents are provided as appendices to the Information Memorandum.

Appendix A: Glossary of Terms

Appendix B: Application Forms

Appendix C: Auction Rules

Appendix A: Glossary of Terms

- **3G Spectrum License:** A 3G Spectrum License will permit the party granted such spectrum license to operate a mobile communications system for the purposes of providing 3G wireless communications services in Thailand.
- **Applicant:** A party that submits an Application Form to the NTC.
- **Application (Forms):** An Application consists of Forms 1–6 as attached in Appendix B of this Information Memorandum.
- **Auction:** The method by which 3G Spectrum Licenses are awarded.
- **Auction Master:** The NTC is the Auction Master.
- **Auction Software:** The NTC has chosen a bidding procedure whereby Bidders place Bids online using specialized Auction Software.
- **Bid:** A Bid for a 3G Spectrum License is a binding offer to obtain the 3G Spectrum License at a price announced by the Auction Master via the Auction Software.
- **Bidder:** An Applicant that passes the prequalification tests and submits a Financial Guarantee is allowed to participate in the Auction as a Bidder.
- **Bidding Phase:** Bidders must place their Bids during this phase.
- **Calculation Phase:** During this phase, the Auction Master calculates Round results.
- **Final Phase:** The Auction Master may declare the Auction to be in its Final Phase, which implies additional activity requirements for Bidders with three (3) Points of Eligibility.
- **Financial Guarantee:** An Applicant can submit either a cash deposit or a bank guarantee. Both constitute a Financial Guarantee.
- **Going Price:** The price for each License at which Bidders can place a Bid.
- **License A, B, C, and D:** The four (4) 3G Spectrum Licenses that will be awarded in the Auction.
- **License Winner:** A Bidder who holds the Standing High Bid when the Auction concludes. When the License has been issued, a License Winner is referred to as a Licensee.
- **Mock Auction:** A test auction that will be held prior to the Auction.
- **Points of Eligibility:** A measure of which 3G Spectrum Licenses each Bidder is allowed to place a Bid on. Placing a Bid on License A requires three (3) Points of Eligibility while placing a Bid on Licenses B, C, or D requires two (2) Points of Eligibility.
- **Reporting Phase:** During this phase, the Auction Master communicates the results of the bidding to Bidders.

- **Round:** The Auction is conducted in Rounds. Each Round will consist of a Bidding Phase, a Calculation Phase, and a Reporting Phase.
- **SMR Auction:** The auction methodology chosen by the NTC to award the 3G Spectrum Licenses.
- **Standing High Bid:** After each Round, the Standing High Bid is determined for each 3G Spectrum License. The Bidder with the Standing High Bid is not required to raise its Bid.
- **Starting Price:** The Starting Price is the Going Price of the first Round.
- **Waiver:** Instead of placing a Bid, a Bidder can place a Waiver (up to three [3] times). When a Bidder places a Waiver, it will carry over its Points of Eligibility to the next Round.

Appendix B: Application Forms

This Appendix B contains the Application Forms each Applicant is required to submit to NTC as part of the Prequalification Procedure:

Table 12.1
Application Forms

Application Form	Mandatory
Form 1: Information on the Applicant	Yes
Form 2: Application Deposit	Either Form 2 or Form 3
Form 3: Sample Bank Guarantee	Either Form 2 or Form 3
Form 4: Ownership of the Applicant	Yes
Form 5: Holders of Information on Applicant’s Participation in the Auction	Yes
Form 6: Certifications and Checklist	Yes

The Application Forms will be made available for download in MS-Word format at <http://www.ntc.or.th>.

All Application Forms must be submitted to:

Secretary General of the National Telecommunications Commission
Office of the National Telecommunications Commission
87 Phaholyothin Rd. Soi 8 (Sailom), Samsennai, Phayathai, Bangkok 10400

B.1 Form 1 – Information on the Applicant

See attachment.

B.2 Form 2 – Application Deposit

See attachment.

B.3 Form 3 – Sample Bank Guarantee

See attachment.

B.4 Form 4 – Ownership of the Applicant

See attachment.

B.5 Form 5 – Holders of Information on Applicant’s Participation in the Auction

See attachment.

B.6 Form 6 – Certifications and Checklist

See attachment.

Appendix C: Auction Rules

Licenses

Table C.1 provides the Starting Prices for each of the four (4) 3G Spectrum Licenses. The larger License A is assigned a higher Starting Price than the smaller B, C, and D Licenses. The Starting Prices will be the Going Prices for the four (4) 3G Spectrum Licenses in the first Round.

Table C.1 also provides “Points” to each of the four (4) 3G Spectrum Licenses that are used for activity and eligibility calculations. The larger License A is assigned three (3) Points, while the smaller B, C, and D Licenses are each assigned two (2) Points. This reflects the expected higher value of License A, which is endowed with 2x15 MHz of spectrum.

**Table C.1
Licenses**

License	MHz Blocks	Lower Band	Upper Band	Starting Price	Points
A	2x15 MHz	1920 – 1935 MHz	2110 – 2125 MHz	To be announced	3
B	2x10 MHz	1935 – 1945 MHz	2125 – 2135 MHz	To be announced	2
C	2x10 MHz	1945 – 1955 MHz	2135 – 2145 MHz	To be announced	2
D	2x10 MHz	1955 – 1965 MHz	2145 – 2155 MHz	To be announced	2

Initial Points of Eligibility

In the first Round, each Bidder’s eligibility is determined by the amount of the Financial Guarantee. Table C.2 provides an illustrative example of the level of Financial Guarantee required to obtain two (2) or three (3) Points of Eligibility. Table C.2 is for illustrative purposes only and is not an indication of the level of Financial Guarantee that will be required to participate in the Auction.

In the first Round, a Bidder that posts the higher level of Financial Guarantee has three (3) Points of Eligibility and will be eligible to bid on any of the four (4) 3G Spectrum Licenses. The Bidder may continue to be eligible to bid on any of the four (4) 3G Spectrum Licenses subject to the rules of the Auction. A Bidder that posts the lower level of Financial Guarantee has two (2) Points of Eligibility and can place a Bid on any of Licenses B, C, and D in the first Round of the Auction. The Bidder that posts the lower level of Financial Guarantee may continue to be eligible to place a Bid on Licenses B, C, and D subject to the rules of the Auction, but the Bidder will never be eligible to place a Bid on License A. In subsequent Rounds, eligibility is determined based on the bidding in the previous Round.

Table C.2
Initial Eligibility

Financial Guarantee	Initial Eligibility
Less than 100% of Starting Price	0 Points
At least 100% but less than 115% of Starting Price	2 Points
At least 115% of Starting Price	3 Points

Rounds

The Auction will be conducted in Rounds. Each Round will have a determined schedule. For example, each Round could be scheduled to last one (1) hour. All Rounds consist of three (3) different phases:

- Bidding Phase (30 minutes). Bidders must place their Bids during this phase. Once the Bidder has placed a Bid that conforms to the Auction Rules, the Bidder is asked to verify the Bid. The Bidder may choose to verify the Bid, place the Bid, or place the Bid on a different 3G Spectrum License. As long as the Bidding Phase of the Round is open, a bidder may reenter the Bid. The Bid that “counts” is the last Bid placed and verified during the Bidding Phase and processed by the Auction Software.
- Calculation Phase (20 minutes). During this phase, the Auction Master calculates round results. Bidders cannot place Bids and do not yet have access to the current round results.
- Reporting Phase (10 minutes). During this phase, the Going Prices for the next Round and the Standing High Bid for each 3G Spectrum License are announced to the Bidders. During the Reporting Phase, the Auction Master communicates to Bidders the results of the Bidding Phase. The Auction Master communicates to all Bidders the going prices for each 3G Spectrum License and an indication of the level of excess demand. The Auction Master communicates individually to each Bidder whether the Bidder is the Standing High Bidder for a 3G Spectrum License. These round results can be viewed through the Auction Software. Results for a given Round remain available during subsequent Rounds.

The precise timing of each Round and the phases within the Rounds are decided by the Auction Master and are announced to the Bidders via the Auction Software.

Placing Bids

A Bid for a 3G Spectrum License is a binding offer to buy the 3G Spectrum License at a price announced by the Auction Master. When a Bidder places a Bid on a 3G Spectrum License, it replaces the Bid placed by the Bidder in a previous Round. In each Round, Bidders may place a Bid for one (1) 3G Spectrum License (subject to eligibility) in accordance with the following rules.

When a Bidder is the Standing High Bidder on a 3G Spectrum License, the Bidder is not allowed to change its Bid.

When a Bidder is not the Standing High Bidder on a 3G Spectrum License, the Bidder has three (3) options for placing a Bid:

1. The Bidder can refuse to agree to the Going Price on any 3G Spectrum License (in which case the Bidder withdraws from the Auction).
2. The Bidder can agree to the Going Price on a 3G Spectrum License for which the Bidder placed a Bid in the last Round at a lower price.
3. The Bidder can agree to the Going Price on a 3G Spectrum License for which the Bidder is eligible to place a Bid on and which is a 3G Spectrum License other than the 3G Spectrum License for which the Bidder placed a Bid in the last Round.

Identifying the Standing High Bidder

During the Calculation Phase of each Round, all Bids are considered. If one Bidder agrees to a price higher than all other Bidders, that Bidder is the Standing High Bidder. If two (2) or more Bidders have agreed to the same price for a 3G Spectrum License, the Standing High Bidder is chosen at random. A Standing High Bidder status is assigned to each 3G Spectrum License because if the Auction were to end with no further Bids, the Standing High Bidders would be awarded the 3G Spectrum Licenses.

Points of Eligibility

A Bidder is deemed to be active if the Bidder:

1. Has the Standing High Bid on a 3G Spectrum License
2. Accepts the Going Price for a 3G Spectrum License
3. Places a Waiver

A Bidder that is not active in a Round sees its eligibility diminish to zero (0) Points of Eligibility in the next Round. Effectively, the Bidder has withdrawn from the Auction and will consequently be logged off from the auction session. It is the responsibility of the Bidder to ensure that Bids are placed on time.

In the Initial Phase, any active Bidder in a Round retains all of its Points of Eligibility in the next Round. The Auction Master may, at its discretion, declare the Auction to be in Final Phase. This will be announced to the Bidders via the Auction Software. When the Auction is declared to be in Final Phase, Bidders with three (3) Points of Eligibility are required to place a Bid on License A in order to maintain three (3) Points of Eligibility. A Bidder with three (3) Points of Eligibility will have its Points of Eligibility reduced to two (2) points if the Bidder places a new Bid on licenses B, C, or D.

Waivers

Instead of placing a Bid, a Bidder can place a Waiver. When a Bidder places a Waiver, the Bidder will carry over its Points of Eligibility to the next Round.

A Waiver may be used on no more than three (3) occasions during the Auction. It is not possible to place a Waiver in the first Round.

Information to the Bidders during the Auction

During the Reporting Phase of each Round, Bidders will receive information on the Going Price for each 3G Spectrum License in the next Round and each Bidder will also learn whether it has the Standing High Bid for the 3G Spectrum License for which the Bidder placed a Bid.

In addition, Bidders will be informed if the total of Points of Eligibility for all Bidders is higher/lower than a predetermined threshold.

Conclusion of the Auction

The Auction concludes in the Round when no new Bids are placed and no Bidders are placing a Waiver. The Bidder with the Standing High Bid for each 3G Spectrum License has won the bidding for that 3G Spectrum License and the final price for a particular 3G Spectrum License is the Standing High Bid for that 3G Spectrum License in the last Round.