

## INTERCONNECTION CHARGE IN TELECOMMUNICATIONS: A CASE STUDY ON TELECOMMUNICATIONS SERVICE IN ASEAN AND THAILAND

SETTAPONG MALISUWAN & WASSANA KAEWPHANUEKRUNGS

*National Broadcasting and Telecommunications Commission, Thailand, Bangkok*

### ABSTRACT

*Mobile markets in ASEAN have been steadily developed and expanded as reflected in mobile penetration rates. The 4G mobile subscribers are projected to grow steadily in line with market expansion and investment made by service providers competing for subscribers. To effectively connect all ASEAN countries, the Interconnection (IC) Charge is one of the most important issues in development of ASEAN telecommunications service. The objective of this paper is to study the IC rates of ASEAN countries. A Comparison of IC termination rates for mobile services in ASEAN is provided in this paper. An analysis of the IC for Thailand is focused in this research.*

**KEYWORDS:** ASEAN, Comparison, Interconnection, Rate, Thailand

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### INTRODUCTION

The past few years have seen fairly substantial changes in Thailand's Interconnection (IC) charge regime. Earlier from 2007, the IC rate in Thai telecommunications industry was 1 baht/minute. Then in 2010, some telecom service providers started to reduce it to 0.50 baht/minute, and by 2013 almost all service providers cut it further to 0.45 baht/minute. In mid-2015, this was trimmed to 0.34 baht/minute [1].

The steady decline of IC rates has been a result of telecom development and growth that help cut costs under the supervision of the National Broadcasting and Telecommunications Commission (NBCT) which enforces and constantly improves relevant regulations as well as promotes their understanding by the general public while keeping an eye on different practices in neighboring countries so as to ensure that the Thai regime is appropriately updated. For this research, the paper has incorporated a study by NBCT on IC rate supervision for 4G (LTE) and NGN telecommunications services to give readers an overview, so that they know where Thailand stands among ASEAN countries on this issue. In the telecommunications industry, the IC rate refers to a fee for interconnection of telecom networks that is a key part of operating costs for service providers. Telephone services by nature require interconnection among various service providers which is essential to ensure smooth phone services.

For an example, subscribers of the AIS service like to call friends that are DTAC's subscribers, but if the two operators had not had their networks linked, then subscribers could not make direct calls without switching service providers.

One crucial issue is that in the case of the former, subscribers pay only the AIS charge while DTAC, whose lines also serve the calls, is not paid. This issue is called in the industry term "calling party pay", that is callers are responsible for paying the phone charges to service providers where the calls originate.

This leads to the issue of service providers paying each others, the so-called IC. In this particular case, AIS pays IC to DTAC in exchange for AIS-originated calls to reach DTAC line destinations, the so-called call termination which is regarded as the most crucial, most utilized IC service. Other IC services include call origination and call transit.

### Thailand's IC Supervision

When Thailand chose to adopt the "calling party pays" system in which telecom service providers pay each other for their IC services, government authorities have to step in to enforce regulations designed to discourage any fixing of unfair, inappropriate IC charges which might lead to the lack of network connections to the great disadvantage of phone subscribers who will be the final losers. NBTC issued the Notification Regarding Standard Method for calculation Interconnection Charges B.E. 2556 (2013), that set broad regulations on fair IC charges that each service can impose on one another with one condition that the adopted charges must reflect their costs [2]. Subsequently, procedures on how to calculate "long-run average incremental costs or LRAIC" were adopted as industry reference rates announced by NBTC and have since been followed by service providers as shown in Table 1.

**Table 1: Telecommunication IC Service and IC Rates [3]**

Service	Telecom IC Service	IC Rates Telecom Reference Rates (baht/minute)
		1 Jul 2015 - 30 Jun 2016
Mobile Phone	Call Origination	0.34
	Call Termination	0.34
	Call Transit	0.34
Fixed Line	Call Origination	0.34
	Call Termination	0.34
	Call Transit	0.16

### Background of ASEAN Members

Before a review of IC supervision of ASEAN countries, the national background of each ASEAN member is provided in order to appreciate circumstances faced by each country.

- **Overall Market Circumstances**

ASEAN is made up of 10 South East Asian countries namely Thailand, Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore and Vietnam, with a combined population of 610 million people and a total 4.5 million square kilometers of sovereign territories. ASEAN's northern most territories border China, its eastern boundaries border Papua New Guinea, its southern borders are next to Australia, and its western territories border India.

Although South East Asia has always been regarded as one of the world's key trading hubs dating back to the pre-colonial era, most of its members are classified as developing or under-developed countries. Only two members Brunei and Singapore are classified by the World Bank as high income nations. The member countries, therefore, have widely contrasting levels of economic development, including a big gap of information and communications technology (ICT) development among its member states as show in Table 2.

**Table 2: Geography and Overall Key Data of ASEAN Members [4], [5]**

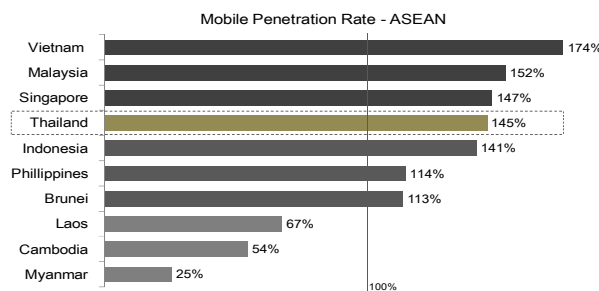
Region Key Data	
No. of Countries:	10
Area:	4,500,000 km <sup>2</sup>
Population Approx:	626,000,000
ICT Development Index (IDI) Rank	
Brunei	71
Cambodia	130
Indonesia	108
Laos	138
Malaysia	64
Myanmar	142
Philippines	98
Singapore	19
Thailand	74
Vietnam	102

Details on Table 2 show levels of ICT development in ASEAN members. Based on the 2014 ICT Development Index (IDI) compiled by the International Telecommunications Union, Singapore was the only ASEAN member out of 10 in the group that was ranked 19th among the top 25 countries in the ITU total membership of 167 countries [4].

Singapore, Malaysia, Brunei and Thailand were the only ASEAN members that managed to exceed the IDI world average while the other remaining ASEAN members were among the lowest ranked countries in ITU.

- **Overview of Mobile Phone Markets**

Most mobile phone markets in ASEAN have been steadily developed and expanded, and most are highly competitive with many service providers in each country and steadily increasing subscribers as reflected in mobile penetration rates.



**Figure 1: Statistics on Mobile Penetration Rates in ASEAN**

Figure 1 showed high mobile penetration rates in ASEAN led by Vietnam with a rate of 174% of population. At the end of 2014, only Laos, Cambodia and Myanmar had penetration rates of less than 100%. However the three countries enjoyed high penetration growth rates especially in Myanmar which just opened up and liberalized its telecom market in 2013 which led to two new private service providers entering the market and a projected further rise of operators in the future.

In summary, mobile market development in members of ASEAN has started to show signs of near saturation. This has been reflected by the fact that mobile penetration rates in Malaysia, Singapore, Thailand and Indonesia are at closely similar levels and which showed declining growth rates. All ASEAN members currently have 2G and 3G services, while the 4G service has started to be available in some countries.

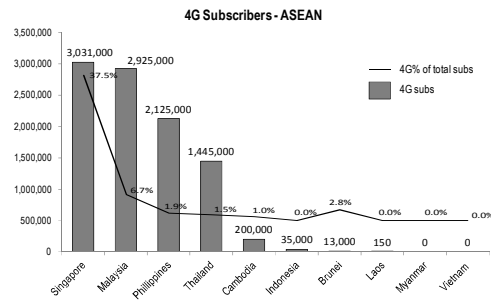


Figure 2: Statistics on 4G Mobile Subscribers in ASEAN

Figure 2 shows numbers of 4G mobile subscribers in ASEAN as of the end of 2014, led by Singapore with 37.5% of total mobile users in the country. The chart shows that all ASEAN countries except Singapore still have extremely low numbers of 4G subscribers. Next to Singapore with the highest number of 4G subscribers is Malaysia which has 6.7% of its mobile subscribers using 4G. Thailand ranks fourth in ASEAN in terms of 4G subscribers at 1.5% of total mobile phone users. More than half of ASEAN members have 4G subscribers numbering less than one percent of total mobile users. However, 4G mobile subscribers are projected to grow steadily in line with market expansion and investment made by service providers competing for subscribers.

**Overview of Fixed Line Market**

Fixed line markets in ASEAN differ from one member country to another according to varying levels of market development ranging from the highly sophisticated ones in Singapore and Brunei to very poorly developed ones in Myanmar, Cambodia and Laos, as reflected in the access to fixed phone lines and broadband Internet in each ASEAN country.

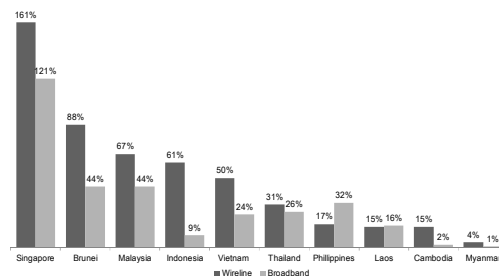


Figure 3: Statistics on Wire Line and Broadband Internet in ASEAN [4]

Figure 3 shows access of fixed lines and broadband Internet per household in each ASEAN member at the end of 2014 that highlights the gap of telecom development from the highly sophisticated one in Singapore with access rates of 161% of total fixed line households, and 121% of total broadband Internet-wired households, followed by Brunei with respective rates of 88% and 44%. At the other low end of the development scale, a developing member of ASEAN with a poorly developed telecom sector like Myanmar, its fixed line and broadband Internet access was only 4% and 1% respectively.

An interesting observation is the projection of subscription of fixed line phone service in most ASEAN countries is for a steady decline due to its emerging saturation which is in line with the broader world picture in which more and more subscribers are switching to mobile phones, with only Myanmar, Cambodia and Laos still seeing expansion of fixed line markets due to their poor levels of development which leave room for further development and expansion of household services.

However, while the fixed line service segment in most ASEAN countries is being phased out, the fixed broadband Internet segment in every ASEAN country is projected to grow steadily due to expanding market demand and new technology development in line with the prevailing worldwide trend for broadband Internet.

### IC Supervision in ASEAN

Most ASEAN countries impose an IC

**Table 3: IC rates of ASEAN Members**

Country	Fixed line (per min)				Mobile (per min)			
	Origination		Termination		Origination		Termination	
	Peak	off-Peak	Peak	off-Peak	Peak	off-Peak	Peak	off-Peak
<b>1 Thailand (THB)</b>	0.34		0.34		0.34		0.34	
<b>2 Malaysia (RM)</b>	- Local (Mobile)				0.0389		0.0365	
	- National (Mobile)				0.0392		0.0388	
	- Local (Fixed)		0.0165					
	- Single tandem		0.0410					
	- Double tandem		0.0483					
<b>3 Singapore (SSD)</b>	0.0078	0.0039	0.0078	0.0039	No charge			
<b>4 Myanmar (Kyat)</b>	No charge				No charge		20	15
<b>5 Indonesia (IDR)</b>	- Local				73.00		73.00	
	- Single tandem				202.00		202.00	
	- Double tandem				586.00		586.00	
	<b>Cambodia (USD)</b>							
<b>6</b>	- Mobile to Fixed						0.02	
	- Fixed to Fixed (local or Intra-Provincial)						0.01	
	- Fixed to Fixed (Province to Phnom Penh)						0.01	
	- Fixed to Fixed (Phnom Penh to Provinces)						0.02	
<b>7 Philippines (PHP)</b>	No information				No information		1.5	
<b>8 Vietnam (VND)</b>	- Mobile to Fixed				270			
	- Fixed to Mobile						270	
	- Mobile to Mobile						550	
	- Mobile in Province / local						150	
	- Provincial Mobile to Mobile							
	- Mobile to Provincial Mobile						270	
<b>9 Laos (USD)</b>	No information				0.014		0.014	
<b>10 Brunei (BND)</b>	No charge				No charge			

Details of different IC rates as follows:

- **Malaysia**

Malaysia's telecom supervisory body MCMC says phone service operators are obligated to set call termination rates which are based on TS-LRIC (total service LRIC) and weighted average cost of capital (WACC) that has come out at 9.86%. Subsequently after MCMC conducted a market study in October 2012, it announced in December 2013 the Commission's

determination of the mandatory standard on access pricing which will serve as principle guideline for fixed wholesale service rates, fixed origination and termination rates, mobile origination and termination rates. It announced that licensed voice service providers must not impose charges exceeding those mandated by MCMC, effective from January 1, 2013 [6].

### **Singapore**

Since mobile phone subscribers in Singapore are subject to the "receiving party pays" agreements, the interconnected service providers agree not to collect IC charges which leave the mobile termination rate at zero, or the so-called "Bill and Kill". However, the fixed termination rate remains in place as the fixed line phone service in Singapore still uses "charge (Interconnection charge). But in some countries, there is a "receiving party pays" system in which case there is no IC charge for call termination, thus the so-called "Bill and Keep" which is what has been adopted in Singapore and Brunei. In Laos and the Philippines, there is an IC charge for mobile services but there is no IC charge for fixed line connections. Table 3 shows details of IC charges in different ASEAN members, in their different local currencies in 2015 as follows: calling party pays" system with the fixed termination rate depending on peak/off peak hours. And since Singapore is a small country, a call to a fixed line in local graphic format does not need involving an additional long-distance charge regardless of whether it is on a single tandem or double tandem level [7].

### **Myanmar**

Myanmar's telecom sector started to see competition after licenses were awarded to both local and foreign 3G telecom service providers in 2013, which prompted the previous sole service provider MPT to forge alliance with new operators. Myanmar's telecom regulatory agency PTD asked the previous service provider to draft interconnection proposals (RIO) including IC rates as well as peak and off-peak mobile termination rates. As for details of fixed line services which currently do not involve any IC charges among service providers, MPT's RIO is in the process of being vetted and certified by PTD [8].

### **Indonesia**

Indonesia has fixed IC rates for call termination and call origination for both mobile and fixed line services, with 24-hour uniform rates for both call termination and call origination. But fixed termination and origination rates are also subject to variables of local/single tandem/ double tandem transit traffic, while mobile termination and origination rates are one and the same. The IC rate is based on forward looking long run incremental cost (FL-LRIC) [9].

### **Cambodia**

Cambodia enforces call termination rates in accordance with types of services, namely nationwide mobile phone services and fixed line services which are split into 1) calls originating from mobile services, 2) calls originating and terminating in the same province, 3) calls originating from regional provinces to receiving parties in Phnom Penh, 4) Calls originating in Phnom Penh to receiving parties in regional provinces.

### **The Philippines**

The Philippines has adopted a call termination rate for mobile phone services at 0.014 peso/minute

### **Vietnam**

Vietnam has adopted IC rates according to types of service, namely nationwide mobile phone service, provincial

mobile phone service, variable fixed line rates for outgoing calls to various service networks but all of these rates are on 24-hour basis.

Vietnamese regulations include options for service providers to negotiate two-way interconnection agreements with other operators within 45 days as stipulated by the supervisory authorities. Any contractual disputes are to be arbitrated by government supervisory agencies with either contractual party given a legal recourse to further appeal such decision to the country's Administrative Court. The law does not require service providers to disclose details of interconnection agreements although they are under the supervision of the Ministry of Information and Communication (MIC).

**Laos**

Laos has adopted a uniform mobile call termination and origination IC rate of 1.50 dollar/minute.

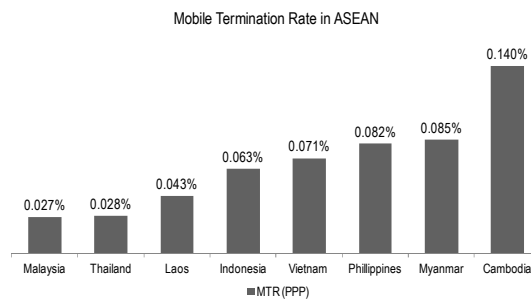
**Brunei**

Brunei has currently adopted "receiving party pays" system except calls within the same service networks and the services subject to contractual monthly service fees which are not regarded as IC rates but already cover mobile termination costs.

The fixed line service does not have any IC and termination charges. Brunei's supervisory agency AITI has tried to encourage service providers to adopt the "sender keep all" system in which there are no additional charges for both ends of service providers and for both call makers and receivers. This means that the current "receiving party pays" system will eventually be phased out over time.

**Telecom Networks (IC Rates)**

The key factors of IC rates are the levy of mobile termination fees. On this issue, Singapore and Brunei are excluded for review as both have already adopted the "receiving party pays" model which leaves the mobile termination IC rates under the "bill and keep" regime at zero, thus making it pointless to compare with other countries adopting the "calling party pays" regime for mobile services.



**Figure 4: Comparison of IC Termination Rates for Mobile Services in ASEAN**

Figure 4 shows comparison of the mobile termination rates in 2015 in ASEAN members which adopt the "calling party pays" regime based on their purchasing power parity which take into account their diverse currency values and purchasing power. The comparison reveals that Thailand's mobile termination rate ranks as the second lowest in ASEAN trailing only Malaysia. At the same time, other ASEAN members that are still in the process of developing their telecom sectors like Cambodia and Myanmar impose relatively high mobile termination rates which, if remain at these levels, would impede future interconnection of their mobile services.

Even though this review shows that Thailand has relatively effective IC supervision as reflected in its relatively low IC rates. But constant global technology development should further reduce IC rates. The NBTC is currently conducting a study on IC costs in ASEAN members as part of a process to update Thailand's IC reference rates that will replace the current regime due to expire on June 30, 2016 [3]. The research in this paper expected that the updated rates will further help develop and upgrade quality of Thailand's IC supervision vs. not only its ASEAN neighbors but also remain competitive against international standards in the future.

## CONCLUSIONS

Rates of network interconnection charges are determined by most ASEAN member countries. However, there are some of the countries such as Singapore that adopt the bill-and-keep interconnection pricing approach, and some countries such as Brunei Darussalam where charges for receiving a call are levied, but the rate of call termination is not determined. As for some countries such as Laos and Cambodia, there exist some details of rates of interconnection with mobile networks but details of fixed network regulation. Furthermore, the information concerning Thailand's rates of mobile termination charges compared with other countries in the region are ranked very low, after Singapore which adopts the bill-and-keep pricing approach and Vietnam by means of making calls from a fixed phone.

Nowadays, it has been found that the rate of mobile phone utilization has rapidly increased due to emergence of several new technologies and modern services. Therefore, the NBTC has announced the Standard for the Calculation of Network Interconnection Charges, B.E. 2556 to be enforced in Thailand. This particular standard requires that the Long Run Average Incremental Cost Method (LRAIC) must be used in calculating network interconnection charges and improving interconnection calculation guidelines to be in line with the current market condition. This must be carried out by taking into account the utilization of effective technologies and more modern services, both in Thailand's fixed and mobile telephony markets, so as to promote fair and free competition under effective cost regulatory methods.

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