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# 3G TELECOMMUNICATION TECHNOLOGY IN MALAYSIA

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## 4.1 INTRODUCTION

3G is the third generation of mobile phone standards and technology, after 2G. It is based on the International Telecommunication Union (ITU) family of standards under the International Mobile Telecommunications programme, "IMT-2000". 3G technologies enable network operators to offer users a wider range of more advanced services while achieving greater network capacity through improved spectral efficiency. Services include wide-area wireless voice telephony and broadband wireless data, all in a mobile environment. Typically, they provide service at 5-10 Mb per second.

## 4.2 3G APPLICATION SYSTEM

### 4.2.1 Third Generation Networks (WCDMA in UMTS)

In EDGE, high-volume movement of data was possible, but still the packet transfer on the air-interface behave like a circuit switch call. Thus part of this packet connection efficiency is lost in the circuit switch environment. Moreover, the standards for developing the network were different for different part of the world. Hence, it was decided to have a network that provides services independent of the technology platform and whose network design standards are same globally. Thus, 3G was born. In

Europe it was called UMTS (Universal Terrestrial Mobile System), which is ETSI-driven.

IMT-2000 is the ITU-T name for the third generation system, while cdma2000 is the name of American 3G variant. WCDMA is the air interface technology for the UMTS. The main components include BS (base station) or node B, RNC (radio network controller) apart from WMSC (wideband CDMA mobile switching centre) and SGSN/GGSN. This platform offers many internet based service, along with video phoning, imaging, etc. [10]

## 4.3 SYSTEM REQUIREMENTS

3G networks serve a different purpose to earlier networks, and major changes from previous network types are:

- Maximum user bit rates up to 384 kbps
- Efficient handover between different operators and technologies(e.g. GSM and UMTS)
- An ability to deliver requested bandwidth
- An ability to deliver different services (both CS and PS) with the required quality

## 4.4 BASE STATION (BS)

The base station is also known as ‘node B’ in a WCDMA radio network. It is more complex than the base station of a GSM network. Its functions include handover channel management, base-band conversion (TX and RX), channel encoding and decoding, interfacing to other network elements, etc. a simplified version of it is shown.

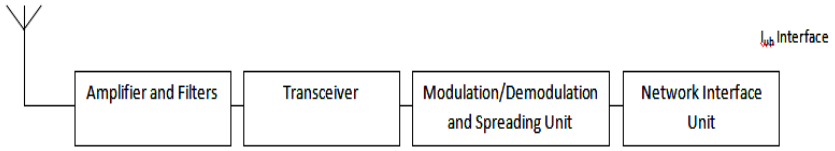


**Figure 4.1** Simplified Block Diagram of WCDMA base station

### 4.4.1 Amplifiers and Filters

This unit consists of signal amplifiers and antenna filters. The amplifiers are used to amplify the signal coming from the transceiver and going towards the RF antenna (the downlink signal), while the filters select the required frequencies coming in from the RF antenna (the uplink signal) and amplify the signals for further processing before sending them to the receiver part of the TRX.

### 4.4.2 Transceiver

The TRX is capable of transmitting and receiving signals, by handling uplink and downlink traffic, or consist of one transmitter and one or more receiver.

### 4.4.3 Modulation /Demodulation and Spreading Unit

This unit is responsible for modulating the signal in the downlink direction and demodulating in the uplink direction. It is responsible for summing and multiplexing the signals and also processing the signals. This unit contains the digital signal processors that are responsible for coding and decoding signals.

### 4.4.4 Network Interface Unit

This unit acts an interface between the BS and the transmission network or any other network element, such as co-sited cross-connected equipment.[10]

## 4.5 COMPARISON OF 3GAND 4G NETWORK TECHNOLGIES

**Table 4.1** Comparison of 3G and 4G Network Technology

| Key Feature | 3GNetworks | 4G Networks |
|---|---|---|
| Data Rate | 384 kbps - 2Mbps | 20 - 100Mbps |
| Frequency Band | 1.8 - 2.4GHz | 2 - 8GHz |
| Bandwidth | 5MHz | About 100MHz |
| Switching Technique | Circuit switched and packet switched | Complete digital with packet voice |
| Radio Access Technology | WCDMA, CDMA-2000 etc | OFDMA, MC-CDMA etc. |
| IP | . IPv4.0, IPv5.0, IPv6.0 | IPv6.0 |

## 4.6 HISTORY OF 3G IN MALAYSIA

Planning for 3G or 3rd Generation Mobile in Malaysia commenced in May 2000. The Malaysian Communications and Multimedia Commission ("Commission') had, in September 2000, consulted various licensees under the Communications and Multimedia Act 1998 (CMA) on the proposed approach to 3G in Malaysia [7]

## 4.7 IMPLEMENTATION OF 3GIN MALAYSIA

The Government is concerned about a situation where there are as many duplicated sets of communications towers as there are service providers. The visual and environmental pollution caused by the proliferation of communication towers at the same sites as

well as unnecessary duplication of network infrastructure are clear indications that we are not managing our resources effectively.

Due to this problem a limitation on service provider is one of the approaches that have been taken by the government. The 3G spectrum will be allocated to the successful bidders for the provision of network facilities. Eligibility of bidders who do not currently possess a network facility individual license may be considered on a case by case basis subject to meeting the necessary requirement for the granting a network facility individual license.

## 4.8 HOW MANY 3GNETWORK OPERATORS WOULD THERE BE IN MALAYSIA?

Following consultations with the Cabinet, it has been decided that the 3G spectrum will be allocated to three network facility providers. By having only three operators of 3G networks, unnecessary investment in duplicated large-scale infrastructure can be minimized whilst maintaining a healthy level of competition at the network facilities level. For the time being, Maxis and Celcom are the only telecommunication company that has been given 3G licenses. [7]

## 4.9 HOW MUCH FOR THE 3G SPECTRUM COST IN MALAYSIA?

After undergoes a discussion in the cabinet, Malaysian government has decided that each successful entity will be granted a 2x15-megahertz (2 x 15 MHz) block of spectrum for a period of 15 years.

The Government is cognizant of the pressures facing the communications and multimedia industry in Malaysia and has decided that the price component for each 2x15- megahertz (MHz) block of 3G spectrum would be priced at RM50 million which would be payable on an installment basis.

The industry should also refrain from passing this cost on to the consumers. The successful applicants will also have to pay the annual fee for the maintenance of the spectrum assigned.

This annual fee component is already stipulated in the Communications and Multimedia (Spectrum) Regulations 2000. The current cellular operators are already paying their annual fees based on this Regulation. [7]

## 4.10 CRITERIA OF THE SERVICE PROVIDER FOR THE 3G

The selection of those entities permitted to apply for the spectrum and provision of 3G infrastructure services would be done through a `beauty contest'. The criteria that will be used for the 'beauty contest' would include as in Table 4.2: [7]

The list below is not exhaustive but indicative of the intent of the Government to ensure that the introduction of 3Gservices in Malaysia will help to increase the broadband penetration for the country and that the introduction of such mobile broadband services would be of benefit to everyone.

**Table 4.2** Criteria of the service provider for the 3G

| No | Criteria |
|---|---|
| 1 | The degree of infrastructure sharing with both current and new infrastructure. As an example, the applicant should utilize the existing networks as much as possible |
| 2 | Evidence of good performance and corporate experience of the company or of the consortium or JVCo partners |
| 3 | The financial strength of the applicant and its shareholders, the cost of funding, and the source of such funds |
| 4 | The proposed network service and roll out plan backed by service coverage guarantees |

| | |
|---|---|
| 5 | Performance guarantees |
| 6 | Convincing demonstration of comprehensive plans and programmes for providing consumers with access to a choice of content and application services |
| 7 | Seamless domestic roaming to 2G and vice versa |
| 8 | If foreign partners are involved, the level of technology transfer, and level of foreign ownership including investment and strategic partnership should be clearly spelt out |
| 9 | Level of research and development already taken by the applicant or the consortium partners and whether any efforts have been taken in fostering local research and development |
| 10 | The potential and willingness of the applicant or JV or shareholders to manufacture 3G equipment and development of software applications in Malaysia within a specific timeframe |

## 4.11 THE REACTION OF 3G IN MALAYSIA

Although 3G telecommunication in Malaysia is still new, there are potential of increasing in demand for 3G. In addition, one of the main telecommunication providers, DiGi is still going on persuading the government to give them the 3G license.

3G service providers have widened their coverage through out the whole peninsular by constructing many infrastructures for 3G. These entire infrastructure are very expensive and at the same time risen up their investment. For these reason, the 3G charge to the consumers are very expensive.

The use of 3G telecommunication technology in Malaysia is usually use by the higher income consumer. This is because of the expensive 3G gadgets and rates of the 3G charges by the telecommunication provider. At the mean time, 3G service in Malaysia are commonly use for downloading data, web browsing, MMS and etc. because it is more faster than the General Packet Radio Service commonly known as GPRS.

## 4.12 3G SYSTEM CAPABILITY

3G services will add an invaluable mobile dimension to services that are already becoming an integral part of modern business life such as Internet and Intranet access, videoconferencing, and interactive application sharing.

For example, 3G service can provide us to determine geographic position of mobiles and report it to both network and the mobile terminal. Maxis telecommunication service from now on has launched their GPS service in Klang Valley, Selangor as a trail to see the attraction of consumer in that 'busy' and crowded area. What can be seen here is, they are helping consumer to track up the location they are going to for an example, it can easily help the consumer to go to the nearest government places such as administration centre, police station, hospital and etc. without lost. [6]

## 4.13 WIRELESS 3G– MOULD TELECOMMUNICATON IN MALAYSIAN WAY

Malaysia has just started towards digital economic era and new telecommunication companies are still searching for steady position when they are given chance to compete with Telekom Malaysia which can be said as senior in this business.

The government effort to increase the competition in the telecommunication sector by giving more licenses to the telecommunication companies has create an outburst in this field in the country.

The introduction of Telecommunication and Multimedia Acts, the changing of Energy, Telecommunication and Post Ministry to the Ministry of Energy, Telecommunication and Multimedia and formation of Communication and Multimedia Commissioner (CMC) on 1998 has take us to a new scenario of telecommunication industry in our country.

Many initiatives have been taken by the Communication and Multimedia Commissioner (CMC) to increase the ICT usage

in the community by widening the fixed line licenses, equal access, increasing the number of Internet Service Provider (ISP) company and etc, to make sure that Information and Communication Technology (ICT) in Malaysia growth rapidly.

Nowadays, 3G license issues have been the world main attraction because this field is said to be future telecommunication trend which is people can communicate and get information in multimedia without the need of cable or wire connection.

However, the scenario in Malaysia is different at all when the government has line up a new strategy for giving the license or 3G spectrums to the telecommunication companies based on their qualification.

The government announcement has given big impact to the local telecommunication industries. If we look at the numbers of local telecommunication companies, now we have 5 active players such as Celcom, Maxis, DiGi, Time and TMTouch which is for sure they are interested with the offer.

Basically, they have to prove their capability to make sure that they are qualified to get the 3G license that have been offered by the government and money factor is almost the main thing that they have to think about because they have to make sure that their investment will give them a lot of profits.

3G network infrastructure as example can cost as low as AS$150 million (RM50 million) and can reach up to AS$1 billion (RM3.8 billion) and that is not a small amount of money to invest. [4]

## 2.14 3G NETWORKS – FUTURE PHONES IS IT VALUABLE TO INVEST

Third Generation (3Gtelecommunication network technology is still a hot topic among the industries as well as consumers not only in Malaysia but all over the world. Actually, the 3G network has been uproar since the late of 90's. However, the network first

attempt is said to be done in Japan on the year 2001 and then widely spread in Europe and Asia Pacific.

In other point of view, investment consultant in their analysis said that 3G phones production will be increasing in Malaysia for the next few years but in slow progressing. This is due to the government decision to make sure that 2G network will still be in use as well as 3G network at the same time. So, the 3G phone providers are force to build a 3G phone with capability of 2G modes at the same time.

This problem is said to be the main reason why 3G phones are extremely expensive. The used of 3G phones are normally for the executive peoples. As the result, the 3G communication will be in slow progression in Malaysia but surely can be improve in the future. [5]

## 4.15 3G IN MALAYSIA FOR THE PAST FEW YEARS

The telecommunication companies such as DiGi Telecommunication are among of the others that have failed to get the government agreement to provide 3G service in Malaysia.

Lately, DiGi Telecommunications has come with such a controversy in our telecommunication industries where it had made the Energy, Water and Communication Minister Datuk Seri Dr Lim Keng Yaik to give them such a warning. The Energy, Water and Communications Minister Datuk Seri Dr Lim Keng Yaik said that the government will not hesitate to revoke the third generation (3G) spectrum licenses if the license holders fail to roll out their services in the timeframe set. He add in the media conference DiGi have to give a business plan, then they will be given a certain period to roll out the services In this case DiGi Telecommunication have been given their 3G license by TIME dotCom(TdC) TdC after TIME have accepted DiGi's offer to form a strategic alliance and it planned to be a substantial shareholder in DiGi by increasing its stake up to five percent.

The government has given out the 3G licenses to four service providers, namely Celcom, Maxis, TIME dotCom (TdC)

and MiTV Networks Sdn Bhd, which has changed its name to U Mobile Sdn Bhd.

Dr Lim recently said the 3G license could not be leased or transferred unless with special permission from the ministry or the Malaysian Communications and Multimedia Commission (MCMC). Under the alliance, DiGi will offer 27.5 million new DiGi shares worth RM654.4 million to TdC in exchange for the right to use its 3G spectrum till 2018, and DiGi plans to roll out the 3G services by second half of 2008[9].

## 4.16 CONCLUSION

3G is an important technology that brings a lot of advantage to user like faster communication system. 3G also enable network operators to offer users a wider range of more advanced services while achieving greater network capacity through improved spectral efficiency and provide services include wide-area wireless voice telephony and broadband wireless data, all in a mobile environment and so on.

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