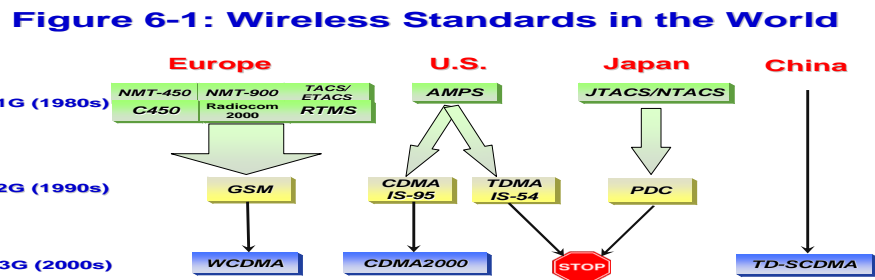


Chapter Six – Use Wireless Telephone (DRAFT)

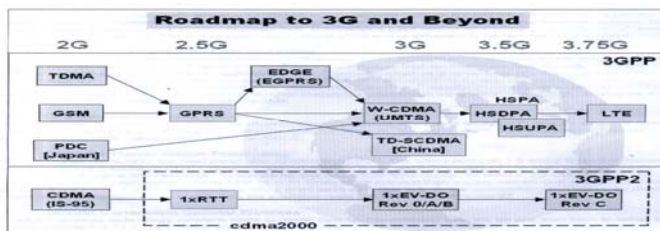
There are a variety of ways to realize wireless telephone/voice services, including cellular phone service, satellite phone services, WiFi phone services, and future WiMax phone services. This chapter focuses on the cellular phone services.

Different Cellular Standards in the World

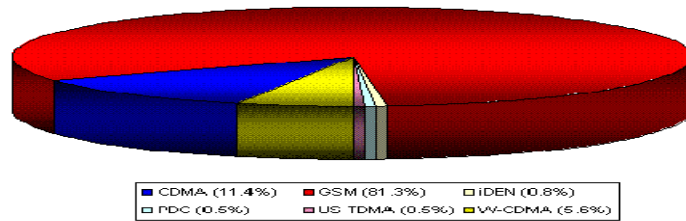
Cellular networks rely on particular technology to provide telephone services. Over the last three to four decades, three generations of cellular standards have been developed, which could be best summarized in figure 6-1.



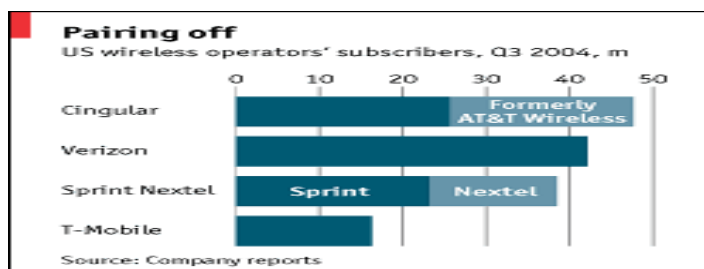
Regarding to deployment, the world is right now in the stage of between 2nd and 3rd generation in most nations. Different names have been used for these between 2nd-3rd generation products as shown in the following “Roadmap to 3G and Beyond” (cited from an unknown source).



Subscribers among different standards are very un-balanced, with GSM having an absolute domination of the 81.3% of market share (www.wcisd.com) in 2008.



US cell phone market's major players have recently been merged into big four, AT&T wireless (GSM, formerly called Cingular), Verizon (CDMA), Sprint Nextel (CDMA + iDEN), and T-Mobile (GSM). There are more than 1,000 small cellular phone operators in US market.



China's cellular industry has only two players so far. China Mobile is running a very successful world-largest GSM network while China Unicom operates two networks simultaneously, a GSM network and a CDMA network. Two new developments are going to shape China's cellular industry in the near future. Firstly, China has started to deploy its own TD-SCDMA standard by China Mobile, making Chinese market to be a competitive one among three standards. Secondly, China has announced its major re-organization of its telecom operators in May 2008. There will be three operators to run various cellular networks of three different standards, GSM/WCDMA (likely by China Unicom), CDMA/CDMA2000 (likely by China Telecom), and TD-SCDMA (likely by China Mobile), in the near future although details remain to be worked out.

Choose a Right Service Provider in US

Most US cell phone users have to make a choice among the big fours – AT&T wireless, Verizon, Sprint Nextel, and T-Mobile. There are many factors which could contribute to the final decision. Among them, any user should be aware of the following factors.

- Coverage

Users have to make sure that their residential/work area and frequently traveled areas are well covered by the chosen service providers. Otherwise, they would suffer poor signal or even no signal and/or pay for expensive roaming charges in many locations. Major service providers usually publish their national coverage map on their website such as [AT&T's coverage](#), [Verizon's coverage](#), [Sprint Nextel's coverage](#) and [T-Mobile's](#)

[coverage](#). By typing in the zip code in these websites, any user should be able to find out the signal coverage of any particular location by any service provider.

From a national coverage perspective, Verizon and AT&T have had a long history in this industry starting from the 1st generation cellular phone networks in the 1980s. Their networks have a better overall geographic coverage since FCC had required 1st generation service providers to fully cover their territories gradually. Sprint Nextel and T-Mobile are relatively new to cellular industry and have a less dense coverage since FCC had changed its policy of requiring universal coverage since the 2nd generation cellular network. However, this general conclusion might be wrong for some particular locations where some users live and travel.

- Plans and Handsets Availability

There are indeed some differences among the available plans and handset choices among different service providers. However, the differences are minimal. The significance of these factors toward to the final choice varies a lot depending on individual users.

In general, AT&T and Verizon Wireless have similar plans and rates. T-mobile usually offers some kinds of discounts on its plans and handsets, compared to AT&T and Verizon. Sprint/Nextel often emphasizes its features for business users. Details about the plans and handsets are published on their websites.

- Contract vs. Prepaid

This is indeed a significant factor for any user. Contract approach often asks for a 1-2 year contract for service. One rough example of a contract service could be \$59.99 dollars for 750 minutes peak air time and free weekends and nights. Two points are worth noticing. First, customers have to pay various taxes on top of the \$59.99 monthly fee, which could make the final number to be about \$70-80. Secondly, penalty will occur if customers walk away from the service provider before the contract expires. Joining a contract plan is definitely best choice for heavy cell phone users. Operators often offer a free phone or a deep discounted phone to 2-year contracted customers.

The prepaid approach such as [AT&T's GoPhone](#) does offer value to light cell phone users who use cell phone as an occasional or emergency tool and keep every conversation brief. There is no contract bounding and no extra tax. However, users have to remember to add credits to the phone, which could be a pain to some people. In addition, the charge is often \$0.10-0.25/minute.

- Technologies (GSM vs. CDMA)

It is hard to argue whether GSM is superior in technical terms than the CDMA or vice versa. However, it is easy to argue that GSM is the best choice if you travel a lot internationally. This is because over 80% users in the world are GSM subscriber. GSM is adopted in almost all the countries except Japan and a few others. In addition, GSM have

adopted the SIM approach, which allows users to switch SIM cards while keeping using the same phone under different service providers. This approach has greatly increased the value of the GSM handsets. CDMA phones do not have separated SIM cards in most countries, with China as an exception. Therefore, if you plan to use your phone in China or you want to bring your phone from China to the US, GSM operators, i.e. AT&T Wireless or T-Mobile, are your definite choices.

- **GSM: Best Solution for Global Travel**
(http://www.telestial.com/getting_started_part1.php)

Internationally, most countries – more than 205 - use the GSM standard. The only difference is that four frequency bands have been used in different countries: 800 MHz, 900 MHz, 1800 MHz, and 1900 MHz. If your GSM phone covers the four bands, it could be used everywhere in the world. However, if your GSM phone covers some of the 4 frequency bands, your phone could not be used in where the frequency band(s) is not covered by your cell phone. US service providers use a combination of the 850 MHz and 1900 MHz frequency bands. Most other countries including China often use the 900 MHz and 1800 MHz frequency bands. You could use this [Check Phone Compatibility](#) website to check whether your GSM phone works in a particular country.

Generate a figure to show GSM phone in four bands (highlight US and China)

There are some phones which would support all four bands and usually are a little more expensive. Many GSM phone in the market support two or three bands only. You should be able to find this information from the manufacturer of the phone. In reality, having the frequency does not guarantee the compatibility since the phone could be “locked”.

- **Lock and Unlock a GSM Phone**

Service providers in US and some other countries offer their customers with a package of either a contract-based service or a prepaid service with deep-discounted handsets and a SIM (Subscriber Identity Module) card. The deeply discounted handsets aim at attracting customers to sign up and stay at their network or to buy its prepaid services. Service providers would turn-off other frequency bands and leave on only the band they are using for those deep-discounted phones. In this way, you are encouraged to stay with your current service provider and discouraged to switch to another one. This is what called the “lock of a GSM phone”. When a user switches to another network or travels to another country, the only way for him to keep using the same phone but another service provider is to turn-on the frequency bands other networks are using and to insert another SIM card from another network. This process is called the “unlock of a GSM phone”. This lock and unlock process are consequences of service providers’ protective actions.

There are two primary methods to unlock GSM phones - code unlocking and cable unlocking. Which method is used depends largely on the handset manufacturer as well as the service providers. Code unlocking is an easy way involving using an unlock code from an expert source. Phone owner gives the expert via online or by phone some details

about his handset including the IMEI number (International Mobile Equipment Identity), the handset model, the name of network service provider, and the country. IMEI No. could be obtained by press the following keys, * # 0 6 #, one by one on any cell phone. Handset model information is usually under the battery. The information is then used to generate the unlock code which is often sent back to the phone owner together with instructions on how to use the unlock code to unlock the GSM phone by the owner. Once the phone is unlocked, it will not be locked anymore. This process does not create any harm to the GSM phone.

When firmware which often refers to some set-ups and functions beyond the basic phone services in the phone needs to be updated, cable unlocking might be necessary. This method requires an unlocking software, a USB cable and a PC. The unlocking software often patches a small fragment of the phone's software to open the 'locks'. Or, the software accesses the phone's internal hardware, finds the unlock code stored on the handset and brings the unlock code to the PC screen. The phone owner could then type in the unlock code into the phone.

The most common lock is the service-provider-lock (SP-lock) for commercial purposes while sometime there is a countrywide-lock. The legality of locking and unlocking a GSM has been an interesting topic. Locking a GSM is considered as legal in many countries. But, locking a phone could help counter-competitive practice in the market, which has led to some countries to pass laws to illegalize the practice. Therefore, unlocking a phone could be legal in one country, but illegal in another country. [Wikipedia.com has provided a comprehensive cover on this issue.](#)

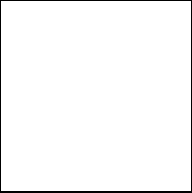
In US, a user might first try to unlock his phone via his service providers. According to [Wikipedia](#), “in the United States, one of the two national GSM carriers, [T-Mobile \[1\]](#), will unlock your handset if you have an active account in good standing for at least 90 days. The other, [AT&T Wireless \[2\]](#), will sometimes not do so until you have concluded your contract, but may unlock the phone in some situations. The US does NOT have any simlocking (i.e. GSM locking) regulations --- and American GSM carriers are still providing unlocking codes for free.” There are some service companies such as [www.uniquephones.com](#), which are providing the unlocking services. However, users have to be aware of the legal debate on this practice.

- **Get Cellular Services in Foreign Countries When on Travel**

There are literally three different ways for a user to continue using his original GSM phone to get services when traveling in another country.

1. International Roaming

Any GSM phone user could always ask his current service provider to turn on international roaming service for him. With this service, a user could walk into another country and start to use his phone and his original phone number right away. The upside is that the user does not need to do anything with his phone. The downside is that every



minute call will be US \$1-\$6 roaming charge depending on which country he is traveling. In addition, when anyone in the traveled country calls him, it is an “international roaming” call.

2. Using a Local Prepaid SIM Card

The traveler could always buy a prepaid local SIM card and insert it into his original phone. Now, he has a new local phone number and pays according to the prepaid plan, which is often much cheaper than the international roaming charge. This is the most economic solution while buying a local SIM card and a local prepaid calling plan are required. Adding the local prepaid plan might need some knowledge about local language and local market rules.

3. Using an International Roaming SIM Card

Some companies such as Telesial (www.telesial.com) offers an international SIM card which allows the user to use the same phone, the international SIM card, and the same phone number in many different countries. However, the per minute charge is between the international roaming and local prepaid SIM card.

Other options

On top of the above mentioned three approaches, a user could rent a local phone, buy a local phone, or buy a satellite phone from [Iridium System](#) in order to receive the seamless wireless services when traveling in foreign countries. However, these approaches are often more expensive.