FIXED-LINE TELECOMMUNICATION AND WIRELESS TELECOMMUNICATION SERVICES

Conventional telephone companies provide fixed-line voice communication services and data transmission services to their customers. Fixed-line telecommunication services are provided by physical lines which physically connects the locations where telephones or other telecommunication equipment are installed.

Commercial operations for cellular systems were first introduced in the U.S. in the early 1980's. As a mobile alternative to conventional telephone services, cellular systems were then offered to a relatively small niche by limited availability and high prices. In recent years, wireless telecommunication technologies have developed rapidly and reliable cellular systems have been offered to the market. Due to the convenience and enhanced functions offered by the wireless systems and the generally lowering of subscription prices for wireless telecommunications, the number of subscribers for wireless telecommunications has increased rapidly in the past decade.

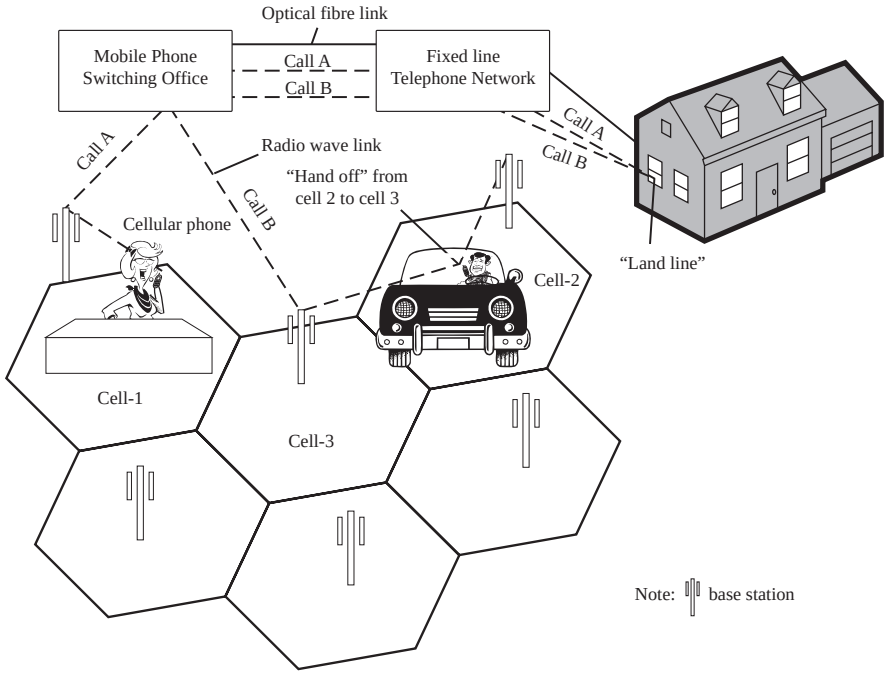
Based on the statistics compiled by ITU and published in April 2003, during the period between 1995 and 2002, on a global basis, the compound annual growth rate for the number of subscribers for fixed line services was approximately 6.9%, whilst that for wireless systems was approximately 43.6%.

FIXED LINE SYSTEMS

Under conventional fixed-line telephone services, voice data of a sender is transformed by the telephone (or a "terminal") into electrical signals and transmitted through a telephone line (which may be a copper wire or optical fibre) to the central office. The central office is installed with a switching system. A switching system enables a single telephone (or a terminal) to make calls to their destinations. Accordingly, the sender's call is routed from the central office to the designated receiver through the telephone line.

CELLULAR SYSTEMS AND BASE STATION

In wireless communications, signals are transmitted in the form of electromagnetic radiation without the medium of physical lines. The following diagram is a simple schematic illustration of cellular communication:



A mobile phone contains a small low-power radio transmitter and receiver. When the sender makes a call (e.g. Call A in the above diagram), the voice data will be transformed into some electromagnetic signals which will be sent by the transmitter in the mobile phone. The signals will be received by the antenna on a nearby base station of the relevant call site and routed to a mobile phone switching office. The signals will then be passed generally by optical fibres to the conventional fixed-line telephone network.

Calls from a fixed line sender to a mobile phone are simply routed in the opposite direction from the conventional fixed-line telephone network to the mobile phone switching office.

The connection between a mobile phone with another mobile phone at other areas can be achieved by virtue of the respective base stations and mobile phone switching offices. The function that achieved this task is known as "roaming". A mobile phone with the function of roaming can connect with another mobile phone, without disruption, at any area.

When the mobile phone moves with its user (for example, caller "B" moving from Cell-2 to Cell-3 in the above diagram), the call can be passed (or handed off), without disruption, from the base station antenna in Cell-2 to that in Cell-3.

WIRELESS LOCAL LOOP

WLL is a system that connects subscribers to the fixed line systems, using radio signals as a substitute for physical lines (such as copper wires) for all or part of the connection between the subscriber and the switching system. According to an article titled "無線接入" (Wireless Connection) published on the website of UTStarcom on 8 January 2003, the incremental investment cost of WLL is generally believed to be lower than that of copper physical lines, especially for service areas with lower density of mobile phone subscribers. Taking into account factors of the service area such as population density, connection cost (such as equipment and installation cost), level of mobile phone penetration and terrain features, WLL is generally considered to have good development potential in emerging economies. The PAS used by the China Telecom Group is a kind of WLL.

BASE STATIONS AND BASE STATION ANTENNA SYSTEM

A typical base station comprises of the following elements:

1. Pylon

A high-rise tower is usually constructed to allow radio signals to be transmitted and received by the base station antennas with the minimum level of interference. The base station antennas are normally installed near the top of the tower.

2. Base station antenna and feeder

Antenna is a device for transmitting and receiving electromagnetic signals. The receipt function of antenna is to transform such electromagnetic signals into alternating current (energy to trigger signals in electronic equipment), while the transmission function of antenna is to transform alternating current into electromagnetic signals.

Physical designs of base station antennas can vary greatly and may render the functions and features of base station antennas differently.

Base station antennas are classified into omnidirectional antennas and beam antennas by its radiation function. Omnidirectional antennas, with its electromagnetic wave covering all directions, mainly applies to villages and city outskirts which have lower mobile phone subscriber density. Beam antennas, also known as sector antennas, cover different preferential

directions such as 30°, 65°, 90°, 105°, 120°, 180° and 210° with its electromagnetic wave. Different number of antennas are installed to cover prescribed directions and areas based on the number of subscribers and their distributions.

Feeders are RF transmission wires for connecting base station antennas to base station signal receiving and transmitting equipment. It is only capable of transmitting signals, instead of amplifying them.

3. Equipment Room

An equipment room is generally equipped with, among other things, wireless transmission and receipt equipment and power equipment. The function of the equipment room is to transmit a signal to the mobile telephone switching office.

OVERVIEW OF THE DEVELOPMENT OF THE TELECOMMUNICATION INDUSTRY IN THE PRC

The telecommunication infrastructure of the PRC is mainly comprised of public telecommunication networks and dedicated system networks. The public telecommunication networks serve the general public whilst the dedicated system networks serve special needs of certain governmental agencies and departments including military forces, public security, aviation, railway systems and others.

Telecommunication infrastructure and telephone subscribers in the PRC

Based on the statistics compiled by ITU and published in April 2003, the aggregate number of fixed-line and mobile phone subscribers in China in 1990, 1995, 2000, 2001 and 2002 were approximately 6.9 million, 44.3 million, 230.4 million, 323.8 million and 421.0 million respectively. The number of mobile phone subscribers for each of the eight years from 1995 to 2002 was approximately 3.6 million, 6.9 million, 13.2 million, 23.6 million, 43.2 million, 85.3 million, 144.8 million and 206.6 million respectively. The increase represents a compound annual growth rate of approximately 78.1%.

ITU's statistics published in April 2003 showed that in 2002, the penetration rate as measured by the number of mobile phone subscribers in the PRC was approximately 16.2%. In contrast, the average penetration rate in 2002 on a global basis was approximately 18.8%, while that for the U.S. is approximately 48.8%. The Directors believe that there is a strong potential for the continuing growth of the number of mobile phone subscribers.

Public mobile communications services

Based on the statistics compiled by ITU and published in April 2003, the number of mobile phone subscribers in the PRC in 2002 reached approximately 206.6 million and was the top of the world, as compared to approximately 140.8 million in the U.S. and approximately 1,144 million in the world.

As mentioned in the paragraph headed "Telecommunication infrastructure and telephone subscribers in the PRC" above, despite the high growth rate in the number of mobile phone subscribers in the PRC, the overall penetration rate of mobile phone subscribers in the PRC remains relatively low with an average of approximately 16.2% (approximately 206.6 million subscribers) in 2002. This has, as the Directors believe, attracted many telecommunication equipment vendors such as Nokia, UTStarcom and Lucent to establish foreign invested enterprises in the PRC in order to establish their presence in this potential market.

At present, the import of mobile phones into the PRC is subject to an import duty. The Directors believe that, following the PRC's accession to the WTO, the PRC will open up the telecommunications market further by gradually reducing the import duty and eventually driving the retail prices of mobile phones down, making them more affordable to the people in the PRC. An increase in the number of mobile phone service subscribers entails a greater number of base stations, and hence base station antennas. The Directors believe that the increasing competition in the PRC telecommunications market will provide tremendous business opportunities for the Company's future growth.

Based on the latest report published by the MII at its website on 18 February 2003, the number of subscribers of mobile phone services in the PRC has reached over 200 million in December 2002. As at the Latest Practicable Date, there were only two mobile licences officially granted by the PRC central government, one to China Mobile Group and the other one to China Unicom Group. On such basis, it is estimated that, China Mobile Group and China Unicom Group, in aggregate, have over 200 million of mobile phone service subscribers. In April 2000, China Unicom Group introduced the CDMA network, which was planned to become a mobile communication network with a capacity of 50 million lines in the next three years.

At the initial phase of its CDMA network development plan, China Unicom Group intended to expand its coverage by constructing more repeaters. Meanwhile, the Company has already obtained the Network Access Licence for GSM/CDMA repeater systems, which allows it to produce the equipment so as to capture the opportunity.

In December 2001, China Unicom announced the completion of its phase I CDMA network development project on its website, and the total investment of which was approximately RMB24 billion. The said project was designed to accomplish a nationwide coverage with a network capacity of approximately 15.15 million subscribers of mobile phone users.

Before 2001, the base station antenna market within the PRC mobile communication industry was substantially dominated by a number of major foreign or foreign-invested mobile communication equipment vendors/system integrators, with a few small and less competitive domestic enterprises. The Company was the first domestic enterprise which was able to capture a significant market share in the local base station antenna market. In relation to GSM/CDMA antenna series in 2001, the Company made a breakthrough, capturing a portion of the market share which is pre-dominated by foreign or foreign-invested mobile communication equipment vendors/system integrators. According to the "2002 Analysis Report on the PRC Mobile Telecommunication Equipment Market" (2002年中國移動設備市場分析報告) compiled by Winfor Consulting, the Company ranked fourth in the market for base station antennas in the PRC in 2001, which was behind three foreign or foreign-invested mobile communication equipment vendors/system integrators.

The Directors understand that to be in line with MII's general policy, PRC mobile communication network operators plan to separate the purchasing of base station antenna and feeder systems from its other major base station equipment in order to reduce infrastructure cost of its networks. The Directors believe that this would enable domestic base station antenna and feeder manufacturers to capture a greater market share in the respective markets in China.

Investment

Investment in fixed assets and penetration rate of mobile phones in the PRC's telecommunication industry from 1996 to 2002:

Year	Investment in fixed assets in the PRC's telecommunication industry completed *(RMB billion)*	Fixed-line telephone subscribers *(in million)*	Mobile phone subscribers *(in million)*	Telephone penetration rate *Set/hundred persons*	Penetration rate of mobile phones *Set/hundred persons*
1996	103.6*(Note)*	61.8	6.9	6.3	0.6
1997	124.5*(Note)*	83.5	13.2	8.1	1.1
1998	150.0	87.4	23.6	10.5	1.9
1999	141.3	110.0	43.2	13.0	3.5
2000	213.5	145.1	85.3	20.1	6.8
2001	234.4	179.0	144.8	25.9	11.2
2002	203.5	214.4	206.6	33.7	16.2

Source: Statistical information of MII of the PRC

Note: This represents the total investment in fixed assets in the post and telecommunication industries.

The regulatory framework

The PRC telecommunications market is regulated by the MII. Before 1993, the PRC telecommunications market was monopolised by the MPT, the former ministry of MII. In 1993, the market began to open up for additional network operators, most of which were State-owned enterprises.

In March 1998, the Ninth National People's Congress of the PRC at its first plenary session adopted a reform proposal for agencies under the State Council. As a result of the policy approved by the State Council, the telecommunication industry has gradually realized the segregation of governments and enterprises.

In March 1998, the MII was formally established to be responsible for the planning and development of telecommunication and information industry, and formulation of policy and regulations in the communications sector.

In September 2000, the State Council approved a proposal of MII to establish local agencies to manage telecommunication industry. The State Council stipulates that the telecommunication industry to adopt a management system by which it is under the dual leadership of the MII and the local governments of province, region or municipality, with the MII assuming the main governing role. The MII is responsible for the national management of communication industry, and communication management bureaus are established in each province, region or municipality. By the end of December 2000, communication management bureaus in 31 provinces, regions and/or municipalities had been established.

The State II Tenth Five-year Plan

According to the State II Tenth Five-year Plan issued by the MII in May 2001, the scale of information industry by 2005 would be double of that in 2000 and ahead of all other industries, with an added value accounting for over 7% of GDP. The information industry is planned to become a strategic industry that will drive the growth of national economy, upgrade the industry structure, and strengthens the overall competitive advantages of the PRC.

According to the State II Tenth Five-year Plan, as the leading sector in the information industry, the communication industry is expected to generate a revenue of RMB1,000 billion by the year 2005 with an average annual increase of 23.38% which is more than three times of the national economic growth rate of 7%. Out of the RMB1,000 billion, RMB920 billion is expected to be attributable to the revenue from telecommunication industry, which is approximately three times that of RMB307 billion in 2000. The total capacity of mobile communications switching equipment is expected to exceed 360 million subscribers. In addition, the number of mobile phone subscribers is expected to amount to 260-290 million. During the period of the State II Tenth Five-year Plan, the PRC plans to construct the largest scale communication network with advanced technology and high security and reliability to meet the basic needs of national economy and social development. In order to achieve the objectives of the State II Tenth Five-year Plan, based on preliminary calculation, the investment scale during that period for communication industry is expected to be RMB1,700 billion, among which RMB1,250 billion is expected to be invested in the telecommunication operations.

TECHNOLOGIES TO BE USED IN FUTURE MOBILE COMMUNICATIONS

WAP

Mobile communications and the Internet are two of the world's fastest developing communication sectors. In support of such environment, WAP provides a universal standard for bringing Internet content and advanced value-added services to mobile phones and other wireless devices. WAP refers to an application environment supported by a set of telecommunication protocol for mobile devices, designed to enable technology-dependent access to the Internet and other advanced services. WAP is planned to support major digital networks including GSM and CDMA. In simple terms, WAP may enable the linkage of the Internet to all mobile devices.

GPRS

Currently, the mobile networks are offering services that are commonly referred to as 2G technology, which can only cater for voice and low speed data (9.6Kbps or 14.4Kbps) transmissions. 2G technology allows low speed data transmission over mobile phones in the form of Short Message Service ("SMS") in existing GSM networks. SMS currently lets users send and receive messages of up to 160 characters on their mobile phones. However, as mobile devices develop, users will expect higher speed for higher volume of data transmissions.

GSM is able to satisfy this expectation with a multi-slot data technique known as GPRS now being rolled out by network operators around the world and commonly referred to as 2.5G mobile services. GPRS can offer transmission speeds of up to 115.2 Kbps, which is more than seven times faster than the existing 2G mobile technologies. GPRS is an innovative non-voice value-added service which allows information to be exchanged across a mobile telephone network.

As GPRS allows the possibility of charging by data volume rather than time, users are able to register on the network at the beginning of the day and stay "virtually" on line, receiving and sending the volume of information as needed. Such system is expected to be well received by users of e-mail, web and database access, who will not want to pay high call charges for short message transmissions. Above all it offers highly efficient connectivity with IP networks. For the above reasons, GPRS is likely to be one of the most popular delivery mechanism for telecommunications services in the future.

CDMA2000

CDMA2000 is proposed to ITU as an access standard for the 3G mobile communication. CDMA2000 is a broadband CDMA technology developed for application in 3G. The highest data transmission speed of CDMA2000 is above 2 Mbps. As published in the website of China Unicom, it was launched in the PRC by China Unicom in early 2003.

3G mobile communications

With the increase in consumer appetite for speed and the rapid development of mobile communication technology, GPRS is only regarded as an interim solution because it will not be sufficient to meet the demand of highly interactive multimedia and high resolution video services in the future. The next significant development is expected to be the introduction of 3G systems which will offer data rates up to 2 Mbps and broadband capabilities. In other words, 3G systems will provide data transmission speeds that are 20 times faster than 2.5G systems and more than 100 times faster than the existing 2G systems.

3G evolves from the digital mobile communications systems and supports multimedia and interactive telecommunication functions. In short, 3G would enable high speed mobile access with IP based services and other functions. Consumers will have high mobile access to the Internet, entertainment, information and e-commerce services wherever they are, and 3G application can range from web browsing, file transfer to the ability to access and control remotely in-house appliances and machines.

Intelligent Antenna System

One important core technology of 3G technology is the intelligent antenna technology. It is a technology which enables the wave bundle being emitted by the antenna to trace automatically the mobile subscriber and stem other interference. TD-SCDMA, one of the 3G standards introduced in China, is a technology which has its own intellectual property rights. Datang Telecom is making every effort to enable it industrialised. The Company and Datang Mobile have entered into an agreement for cooperative development of intelligent antenna.

COMPETITION

The mobile communication industry of the PRC was developed relatively lately as compared with the U.S., Canada, Sweden and Finland. Before 2001, the PRC base station antenna sector was predominated by mobile communication equipment vendors based in such countries. Because of the technological edge enjoyed by these vendors, the Company faces considerable competition from them.

ENVIRONMENTAL REGULATIONS AND REQUIREMENT

The Company shall, during its production and operations, comply with the relevant laws and regulations of the PRC such as Environmental Protection Law of the PRC (中華人民共和國環境保護法), Law on Evaluation of Environmental Effects of the PRC (中華人民共和國環境影響評價法), Regulations Concerning Environmental Protection of Building Projects (建設項目環境保護管理條例), Decisions Concerning Certain Issues of Environmental Protection of the Sate Council (Guo Fa [1996] No. 31) (國務院關於環境保護若干問題的決定(國發[1996]31號) and Directory of Classified Management on the Environmental Protection of Building Projects (建設項目環境保護分類管理目錄).

Article 7 of Regulations Concerning Environmental Protection of Construction Projects (建設項目環境保護管理條例) provides that: "The State shall, based on the effects of construction projects on the environment, implement the classified management on the environmental protection of building projects in accordance with the following provisions: (1) for any construction project which may cause material effect on the environment, a Report on Environmental Effects shall be prepared to conduct the overall detailed evaluation of the pollution and the environmental effects arising from construction projects; (2) for any construction project which may cause minor effect on the environment, the Statement of Report on Environmental Effects shall be prepared to conduct the analysis or special evaluation of the pollution and the environmental effects arising from construction projects; (3) for any building project which may cause minimal effect on the environment, it is not required to conduct an evaluation of environmental effects, but the Registration Form of Environmental Effects shall be filled out." Before handling the approval formalities with the competent administrative authority for environmental protection, the construction unit shall prepare the Report on Evaluation of Environmental Effects and Statement of Evaluation of Environmental Effects, respectively, or fill out the Registration Form of Environmental Effects, in accordance with the directory of classified management for building projects formulated by the State Administration of Environmental Protection. The Report (Statement) of Environmental Effects shall be prepared by the qualified environmental evaluation unit authorized by the construction unit.

On 27 September 2000, Xi'an Municipal Environmental Protection Research Institute (Qualification Certificate No.: National Environmental Evaluation Certificate Yi Zi No. 3604) – a qualified unit for the evaluation of environmental effects recognised by the State Administration of Environmental Protection, prepared the Statement of Report on Environmental Effects of Building Projects in respect of "base station antennas for mobile communication systems" project of the Company. Based on the Approval Opinions on the Statement of Report issued by the Planning and Construction Environmental Protection Bureau of the Xi'an National Hi-tech Industrial Development Zone, "The completion of Haitian engineering shall be checked with environmental protection before putting into operation." On 24 December 2001, the Planning and Construction Environmental Protection Bureau of the Xi'an National Hi-tech Industrial Development Zone issued a Certificate certify that the preliminary stage environmental evaluation report in respect of base station antennas for mobile communication systems constructed by the Company in the Xi'an National Hi-tech Industrial Development Zone has been approved, and the environmental protection facilities construction carried out during the construction has complied with the requirements of environmental protection. On 10 October 2002, the environmental monitoring center of Xi'an National Hi-tech Industrial Development Zone issued the Check and Monitoring Report on the Completion of Environmental Protection Facilities for Building Projects. On 23 October 2002, the Company obtained the Check Form of Environmental Protection Facilities for Building Projects issued by the planning and construction environmental protection bureau of Xi'an National Hi-tech Industrial Development Zone. According to the legal opinion issued by Jingtian & Gongcheng, the Company already completed the environmental protection procedures in respect of the business operations currently carried on and is in compliance with the applicable environmental protection laws and regulations.