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Introduction

We commissioned CCID, a market research company to conduct a detailed analysis of and report on the communication network antenna and RF device market in China. The methodology employed by CCID combines primary and secondary research to provide an analysis of these markets. Data collection was carried out by analysts with specific knowledge of the antenna system and RF device markets. Secondary sources such as company reports and trade data of industry groups and government statistics provided the historical context for the analysis of trends. In addition, CCID conducted interviews with the three wireless communication network operators in China, as well as other suppliers and manufacturers to support its forecast model. The interviews also served as a method of cross-checking and verifying data and assumptions. CCID's forecasts were developed by modeling key market drivers to determine the future development of the base station antenna system and RF device markets.

The information and statistics as set forth in this section have been extracted from the report by CCID.

The Global Wireless Communication Industry

The global wireless communications industry has grown rapidly over the last few years, primarily driven by the continuous expansion of 2G networks, especially in emerging markets, the significant increase in variety and quality of value-added mobile communication services, and the introduction of 3G networks and services. The number of mobile phone subscribers increased from approximately 2.11 billion as of December 31, 2006, to 4.01 billion as of December 31, 2008, representing a compounded annual growth rate, or CAGR, of 37.9% from 2006 to 2008, according to CCID. The table below sets forth the number of global mobile phone subscribers from 2006 to 2008.

	2006	2007	2008
Global Mobile Phone Subscribers (users in billions)	2.11	3.30	4.01
Year-on-Year Growth	9.3%	56.4%	21.5%

Source: CCID

The rapid growth in recent years has primarily been driven by growth in subscriber numbers in some of the largest and fast-growing markets such as China and India. China is currently the largest mobile communication market in the world by subscriber number. By the end of 2008, the number of mobile subscribers in China has surpassed 600 million. India only had less than 300 million of mobile subscribers by the end of July 2008, implying significant room for future growth.

In terms of protocol, GSM is the most commonly used in Asia, as well as some emerging markets in Latin America, Eastern Europe, the Middle East and Africa. As the 2G networks continue to develop in these regions, both in terms of coverage and capacity, GSM network and services is expected to continue to grow rapidly. On the other hand, CDMA is more commonly used in North America and certain Asian Pacific countries. By the end of March 2008, Verizon in the US, China Unicom and Reliance were the largest CDMA network operators in the world.

The latest generation of wireless voice and data transmission protocols is commonly referred to as the 3G standard. The specifications of the 3G standard is governed by the International Telecommunication Union, or ITU, which has approved six radio interface standards, three based on Code Division Multiple Access, or CDMA technology, commonly known as CDMA2000, W-CDMA and TD-SCDMA, as well as Universal Wireless Communications, or UWC, Digital Enhanced Cordless Telecommunications, or DECT, and Worldwide Interoperability for Microwave Access, or WiMax. Transmission protocols under the 3G standard have improved the rate of data transmissions beyond the data transmission rate of GSM and CDMA, the traditional 2G protocols, and offer better voice and data capabilities. GSM wireless communication network operators worldwide have been initiating their

upgrade to 3G networks by deploying W-CDMA networks directly or indirectly through General Packet for Radio Service, or GPRS, upgrades and Enhanced Data rates for GSM Evolution, or EDGE, upgrades. Similarly, many operators of CDMA networks have been upgrading to 3G by deploying CDMA2000 networks.

Network operators around the world entered into a phase rapid construction and upgrade to 3G since 2006. According to CCID, by the end of 2008 there were 264 W-CDMA networks, 269 CDMA1X networks and 159 CDMA1X-EVDO networks globally which led to the increase in demand for 3G network equipment. The W-CDMA networks are primarily spread across Western Europe. Japan is the first country in Asia to have established and commercialized 3G network and services, using the CDMA2000 protocol. The growth in 3G services has been mainly attributable to (1) the systematic improvements in network, terminals, applications, tariffs and consumer awareness for 3G services; (2) the driving force created by profitable 3G operators in Japan and South Korea in 2008 motivating 3G operators in other countries to ramp-up their 3G services proactively. As the 3G market continues to develop, some of the existing and newly established 3G networks are already adopting more advanced technology such as High Speed Downlink Package Access, or HSDPA, Long-Term Evolution, or LTE, and Evolution-Data Optimized, or EV-DO technologies.

According to CCID, despite of the development of 3G networks and services, 2G networks and services are unlikely to be totally replaced by 3G in the near term, especially in countries like China, India, and other emerging markets in Asia and Africa where mobile penetration is still low. In these regions, 2G networks and services are likely to remain as the core platform of the development of wireless communication industry in the near term.

The Global Base Station Antenna and Base Station Subsystem Markets

The wireless base station radio frequency, or RF, component market consists of products that improve coverage, capacity and data transmission rate in the wireless communications networks. These products, covering a variety of standards, protocols and frequency bands, together with the base station constitute a part of the base station system that, in turn, constitute a part of the wireless communication networks. In other words, in order to have wireless communication, a consumer's handheld device must be located in an area that is covered by the radio signal emitted from a wireless base station RF component.

The wireless base station RF component supply chain includes the base station antennas and base station subsystem components, which are also called RF devices. Base station antennas generally constitute approximately 5% - 6% of the cost of a base station, while base station antennas and RF devices, together, generally constitute approximately 11% - 12% of the cost of a base station. Because the wireless base station RF components are usually developed in conjunction with the design of the base station manufacturers or wireless network solution providers, the base station manufacturers and wireless network solution providers have become very selective of their suppliers over the years. Factors such as a supplier's ability to develop new products, provide technical services, communication skills and having a culture of providing cooperative services, are some of the selection criteria chosen by the base station manufacturers and network solution providers.

Traditionally, foreign network solution providers such as Ericsson, Nokia Siemens Networks, Motorola and Alcatel-Lucent have dominated the network solution provider market in China. In the past, these network solution providers had also chosen the suppliers that they have worked with such as Powerwave, Andrew, Kathrein-Werke (an antenna manufacturer) and RFS, as their principal suppliers. However, as China's domestic network solution providers increased their sales revenue and market shares, the RF suppliers in China have also become technically sophisticated. As these sophisticated Chinese suppliers began to supply their services to foreign network solution providers and telecom operators, they ventured into the overseas markets on a large-scale. Moreover, with the construction and development of the 3G networks in China, the domestic market size for domestic suppliers has been expanding further.

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According to CCID, in line with the steady growth of mobile communication users and their level of usage and the rapid developments of 3G networks and services globally, the global base station antenna market has been growing in recent years, operators are expected to continue to increase the coverage and capacity of their existing and new networks, fuelling the future growth of the global base station antenna and RF device market. By the end of 2008, the size of the global base station antenna market has reached US$ 4.6 billion. CCID is estimating the global base station antenna market to grow to US$ 5.5 billion by the end of 2013. Likewise, by the end of 2008, the global RF device market has reached a size of US$ 2.7 billion. CCID is estimating the global RF device market to grow to US$ 3.4 billion by the end of 2013. According to CCID, the Company is the only Chinese company listed as one of the top ten worldwide suppliers of both base station antennas and RF devices based on 2008 industry data.

The Wireless Communication Industry in China

According to CCID, China has grown to become the largest wireless communication market in the world by the number of mobile subscribers. By the end of 2008, the number of mobile subscribers in China has surpassed 600 million. CCID is projecting the number of mobile subscriber in China to reach 980 million by the end of 2013, representing an increase in penetration from 48.5% in 2008 to 72.7% in 2013.

In 2008, China completed the reorganization of its telecommunications industry, pursuant to which the number of mobile communication licenses increased from two to three, namely China Mobile, China Unicom and China Telecom. Some of the key components of such reorganization include China Telecom acquiring the CDMA network from China Unicom, and the merger of China Unicom with China Netcom. In January 2009, China announced the grant of three 3G operator licenses for TD-SCDMA, W-CDMA and CDMA2000 networks to China Mobile, China Unicom and China Telecom, respectively. Prior to the official grant of 3G licenses, China Mobile has already built and soft launched a small number of small scale regional networks using the TD-SCDMA technology, which is a protocol developed by the PRC government together with members of the TD-SCDMA Industry Association in China.

After the official grant of 3G licenses in China, the relevant operators have immediately and substantially increased their capital expenditure in rolling-out their 3G networks. According to CCID, sales volume of base stations in China in the first half of 2009 increased by close to 200% as compared to the same period in 2008, both in terms of volume and sales amount. According to CCID, there were approximately 2.5 million of 3G service subscribers in China by the end of June 2009, compared to approximately 0.8 million at the end of 2007. CCID is projecting the number of 3G subscribers in China to reach 161 million by the end of 2013, representing a penetration of 11.9%.

The Base Station Antenna Market in China

According to CCID, with the growing 3G base station market and the increasing proportion of 3G base station antenna, the sales revenue of the base station antenna market in China for the first half of 2009 amounted to RMB3.79 billion, representing an increase of 82% as compared to the same period in 2008. In the next few years, the base station antenna market in China will follow the development trend of the base station market in China, CCID projects China's base station antenna sales revenue to increase from RMB2.08 billion in 2008 to RMB 3.97 billion in 2010, and annual sales is expected to stabilize around this level for a few years from 2011 to 2013 before another phase of significant growth in China's antenna market begins when the next generation of mobile technology is commercialised.

In terms of application structure, the 2G base station application market still had an absolute leading advantage in 2008 according to CCID, the market shares of GSM and CDMA(2G) in the application market were 78.8% and 18.8%, respectively. Despite the fact that TD-SCDMA base stations accounted for 5% market share in the total sales of base stations, the relatively lower usage

of antenna in single stations resulted in only 2.4% market share of TD-SCDMA in the base station antenna market application structure. It is anticipated that by 2013, the market share of 3G base station antenna will reach 90.6%, of which the market sizes of CDMA, CDMA(3G) and TD-SCDMA will be RMB1.21 billion, RMB1.06 billion and RMB1.12 billion, respectively.

The following table shows the percentage split of base station antenna sales in China in 2008 and CCID's projected percentage split from 2009 to 2013.

Year	2008	2009E	2010E	2011E	2012E	2013E
GSM	78.8%	30.6%	25.6%	13.0%	9.0%	7.0%
W-CDMA	—	18.2%	19.9%	24.6%	29.4%	32.4%
CDMA(2G)	18.8%	12.1%	13.9%	11.3%	4.9%	2.4%
CDMA(3G)	—	17.2%	18.4%	22.9%	26.8%	28.3%
TD-SCDMA	2.4%	21.9%	22.2%	28.2%	29.9%	29.9%
Total	100%	100%	100%	100%	100%	100%

Source: CCID

In addition, with the strengthening of the solid capability of our domestic base station antenna enterprises and the gradual rising of product technological levels, domestic base station antenna enterprises have ventured into overseas markets on a large-scale, and exports have become an important source of sales revenue for domestic base station antenna enterprises. Currently, the major export markets for domestic base station antennas are mainly emerging mobile communication markets in Southeast Asia, Middle East, Latin America, Africa, India and Russia, these regions have become bright spots for market developments. While at the same time, orders from mature markets such as North America and Europe also continue to increase. Part of these orders are exports resulting from the overseas engineering contracts undertaken by Huawei, and end-to-end IP network and services provider, and ZTE, but most of the orders are direct sales to overseas manufacturers and operators of mobile communication equipment. Therefore, those Chinese base station antenna manufacturers who have international system equipment customers or whose products had large-scale applications overseas will enjoy certain advantages in developing international sales channels. According to the estimation of CCID, the total export revenue of base station antenna in 2008 amounted to approximately US$130 million, representing an increase of 72.9% as compared to 2007.

The base station antenna market in China is highly concentrated. The PRC base station antenna market was dominated by international antenna producers in the past due to technology barrier and bundled sales of antennas with base stations that were principally sourced overseas. Since 2000, strengthened research and development capabilities have allowed PRC antenna providers to grow significantly. According to CCID, the market share represented by PRC antenna providers has increased from nil in 2000 to approximately 25% in 2002 and exceeded that of overseas antenna providers in 2004. In particular for PRC operators who split from the system and implemented centralized procurement measures after the network reorganization was completed and in order to meet the market demand for lower communication tariffs, the domestic antenna industry was facing tremendous market opportunities. Domestically produced antenna currently have greater competitive advantage in the market. Particularly in the 2G network, the technology of domestic antenna is more mature and has occupied nearly the whole market. At present, there are numerous domestic antenna enterprises and competition is intensive but most of them are not strong in technology capability. Those enterprises with higher technology levels and larger sizes include Comba, MOBI, Xi'an Haitian, Guangdong Shenglu and Tongyu Communication. With increasing investments in 3G base stations in China, and the driving force of improved technology and price advantages, the market shares of domestic antenna enterprises in the new generation of base station antenna market will increase continuously.

The Base Station Subsystem Market in China

The base station subsystem products (also known as RF devices) include filters, duplexers, splitters, combiners, tower-mounted amplifiers, power amplifiers, and other advanced coverage solutions. Filters are used to select intended RF signals and isolate these signals from unwanted interference and noise. Duplexers are used to allow one antenna to both transmit and receive signals. Splitters allow the signals received from one antenna be distributed to different RF components. Combiners allow the combination of multiple signals from different RF components into one transmitting antenna. Tower mounted amplifiers improve network performance by performing the filtering and amplifying function as physically close as possible to the actual receiving antenna, thus eliminating additional signal loss and noise. Power amplifiers, which are located in base stations, are used in wireless networks to increase the radio signal power for transmission over long distances. All of these components are integrated into an end-to-end wireless communication network system and deployed in a wireless network at the base station or at a tower amplifier site.

For base station RF devices, their market development trend is consistent with that of the production volume of base stations in China. According to CCID, affected by the global economic conditions in 2008, the export volume of base stations declined by 17.7% in China. As a result, both production volume of base stations in China and the RF device market in China were affected to a greater extent, the sales of RF device market in China amounted to RMB2.14 billion in 2008, declined by 15.6% as compared to 2007. In 2009, the base station RF device market in China began to recover, recorded a growth of 35.5% in the first half of the year as compared to the same period year-on-year. CCID projects China's RF device sales revenue to increase from RMB 2.14 billion in 2008 to RMB 2.96 billion in 2010, and then further to RMB 3.52 billion by 2013, as both the coverage and capacity of the networks in China continue to increase over the next few years.

In the application structure, the rapid growth of 3G applications is also a major development trend of the RF device market in China. It is anticipated by 2013, 3G applications in the RF device market of China will account for a market share of 72.5%, while W-CDMA, CDMA(3G) and TD-SCDMA will account for 32.4%, 16.8% and 23.3%, respectively, in the total market.

The following table shows the percentage split of RF device sales in China in 2008 and CCID's projected percentage split from 2009 to 2013.

Year	2008	2009E	2010E	2011E	2012E	2013E
GSM	38.3%	28.2%	26.0%	23.7%	21.2%	19.6%
W-CDMA	26.2%	23.9%	26.0%	27.5%	30.6%	32.4%
CDMA(2G)	18.2%	12.1%	11.2%	9.8%	8.8%	8.0%
CDMA(3G)	15.4%	13.6%	14.5%	15.2%	15.9%	16.7%
TD-SCDMA	1.9%	22.2%	22.3%	23.8%	23.5%	23.3%
Total	100%	100%	100%	100%	100%	100%

Source: CCID

Considering the cost advantages, the RF device industry in China has been developing rapidly in recent years, international mobile communication equipment leaders have been shifting their procurement focus continuously to Mainland China. The rapid development of the global communication equipment market has driven the ever increasing market demand for RF devices. Suppliers of mobile communication RF subsystems and devices mainly supply their products to base station manufacturers and wireless RF equipment production enterprises (including the wireless network optimization industry). Judging from the existing conditions, exports of RF devices mainly exist in two forms, one type is by way of "indirect export" if the RF device is installed in a completed machine; another type is "direct export" of RF devices. In the current stage, indirect export of RF

devices account for more than 80% market share. With the continuous expansion of the overseas business scale of domestic equipment production enterprises such as ZTE and Huawei, such "indirect exports" are also growing rapidly. On the other hand, in order to lower product costs, equipment manufacturers procure RF device products directly through their Chinese companies or overseas companies, and then make allocations according to business needs on a global scale. Such procurement efforts is increasing year by year in China, stimulating the growth of "direct exports" of the RF devices. Overall speaking, at the current stage, "indirect exports" is still the mainstream in the exports of RF devices and remains the dominant form of exports for base station RF devices in China.

At present, the suppliers of base station RF devices mainly include European and American enterprises such as CommScope of the United States, Kathrein-Werke of Germany, RFS of France, PowerWave of the United States, etc. and domestic manufacturers such as Fingu, MOBI and Grentech, etc. In recent years, frequent consolidations have been going on in the industry with increasing mergers and acquisitions and reorganizations among enterprises, and the RF supply chain in China has gained significant growth in technology capability. Meanwhile, as multinational base station system equipment companies increase their purchases in China, the Chinese RF device suppliers are beginning to supply to international base station system equipment makers and start to exporting to emerging markets and countries such as India and South America. The competitiveness of domestic RF device manufacturers is expected to continue to strengthen in the future.

Information about CCID

CCID Consulting Co., Ltd, or CCID, is a Chinese consulting firm listed in the Growth Enterprise Market of the Stock Exchange (GEM) of Hong Kong (stock code: 8235). It provides professional market research and management consultancy services. CCID prepares periodic research reports on many different industries including the telecommunication industry. CCID is independent of our Group and none of our Directors or its associates has any interest in CCID.