

# Testing Needs in China's Electronics Industry

**Walt Strickler, Senior Business Manager,  
Keithley Instruments, Inc.**

**T**HE rapid growth of the Chinese economy, and of Chinese industry, presents Western companies with enormous opportunities. The booming electronics industry beckons Western test equipment suppliers, but doing business with China is not as simple as sending catalogs and salesmen and starting to take orders. There are many ways in which Chinese and Western practices differ; specifically to the test industry, the way the Chinese look at testing and at test equipment is not the same as it is here. It is vital for Western companies attempting to do business there to be aware of these differences in culture and approach to a specific industry. This article will cover the factors affecting the types of test equipment the Chinese want and the way they use test equipment, although the lessons to be learned apply to all industries.

## What China Wants

The first thing to remember about China is what the Chinese seem to never forget: their biggest competitive advantage is low-cost production, and they pay extraordinary attention to maintaining that advantage.

They will maintain it in ways they feel are best for them, and they are not wedded to Western approaches to cutting costs. As an example, the Chinese will not automatically embrace automation. While they will use it where it is appropriate, automation has little value in China as a labor saving strategy, because unit labor costs are very low and unemployment is rising. The Chinese People's Daily for March 7, 2004 reports that government urban unemployment targets have increased to 4.7 percent in 2004, and there are widely-publicized estimates that the true rate of unemployment is probably 10 percent, and perhaps greater. This great pool of underutilized labor helps to keep wage costs down, so there is little incentive to replace workers with automated equipment.

For equipment suppliers to be successful in China, it is more important to emphasize ease of operation, applications support, and total cost of ownership, all with a view to lower costs.

## Purchase Decisions Increasingly Made in China

Several years ago, it was common for Chinese companies to manufacture products

designed by Western companies. In those situations, the Chinese engineers in the plant had little input into methods or procedures, as they were asked only to replicate processes developed elsewhere. Today, as the skill level and experience of Chinese engineers has grown, their influence over test strategies and the choice of test equipment is growing as well. For example, with 40% of phones now being made in China, they are on the front lines of production and in an excellent position to reduce wireless test costs.

## Overall test philosophies in China

Test equipment suppliers find that Chinese customers need more applications support than others, because their companies tend to lack engineering and test engineering expertise in many areas. A factory that last week was producing computers or cordless phones or other consumer electronics may now be asked to produce mobile phones. The managers and engineers running the factory likely have little experience in a new segment and need a vendor that can describe why a particular test is needed – how it lowers cost. At the same time, the Chinese view this level of customer service differently than their counterparts in the West. While it's traditional to value and even charge for customer support levels in other parts of the world, the Chinese consider extensive customer support a "given", and they put pressure on equipment vendors to provide this support at low or no cost.

With test costs as a driver, the Chinese seek out test equipment that offers only the features they truly need. Superfluous bells and whistles have little or no attraction for them. Chinese manufacturers may initially perform the same number of tests as their Western counterparts but are more likely to question closely both the need for each test and the justification for the level of test resolution others might just use because of legacy. In keeping with their overall attention to keeping costs down, Chinese contract manufacturers tend to have very good cost-of-test data and pay close attention to the amount of time each device is in a test fixture. For test equipment providers, it's important to provide equipment that can be more sensitive, or provide better accuracy or repeatability, so users can tighten up limits, increase yields, and reduce unit test cost.

China mobile phone vendors

Company	Standard	Location	Technology sources	Related Taiwanese companies	Related South Korean companies	Investors
Alcatel	GSM	Suzhou, Jiangsu province	-	Lite-On Technology	-	Alcatel
Amoisonic	GSM/GPRS	Xiamen, Fujian province	-	-	-	-
Capitel Group	GSM, CDMA	Beijing	Agere Systems, Qualcomm, TI	Chi Mei Communication Systems (CMCS), Dbtel Technology	Pantech	Nokia
Chabridge	GSM	Xiamen, Fujian province	-	-	-	-
Chinese Electronics Corporation Telecom (CECT) (Chinese only)	GSM/GPRS, CDMA	Beijing	Qualcomm	Ares Communications, Mitac International	-	-
Dalian Daxian	CDMA	Dalian, Liaoning province	Qualcomm	-	-	-
Datang Telecom Technology	CDMA	Beijing	Qualcomm	Compal Electronics	-	-
Dbtel Technology	GSM	Shanghai and Tianjin	-	-	-	Dbtel Technology
Eastcom	GSM/GPRS, CDMA	Hangzhou, Zhejiang province	Motorola, Agere Systems, Qualcomm	BenQ, Compal Electronics	Sewon Telecom (GSM)	Motorola
Ericsson Beijing	GSM	Beijing	-	Arima Communication	-	Sold its stake in Ericsson Nanjing to Nanjin Panda.
Haier	GSM, CDMA	Qingdao, Shandong province	Philips, Motorola, Qualcomm, Sando	BenQ, Compal Communications, Inventec Appliances, Lite-On Technology	Sewon Telecom	-
Hisense	GSM, CDMA	Qingdao, Shandong province	Qualcomm	-	Telson (CDMA)	Hitachi
Kejian (Chinese only)	GSM, CDMA	Shenzhen, Guangdong province	Samsung Electronics, Wavecom, CommQuest, Chinese Academy of Science	-	Samsung Electronics	Samsung Electronics.
Konka	GSM/GPRS, CDMA	Guangdong province	Agere Systems, Qualcomm	Compal Communications, Arima Communication	Pantech & Curitel, Telson Electronics	-
LangChao	CDMA	Jinan, Shandong province	Qualcomm	-	-	-
Legend/Xoceco joint venture	GSM/GPRS, CDMA	Xiamen, Fujian province	Qualcomm	Arima Communication	-	Legend Computer invested 160 million yuan for an 80.8% stake in the company.
Mitsubishi Beijing (Chinese only)	GSM	Beijing	-	-	-	-
Motorola	GSM, CDMA	Tianjin	-	BenQ, Compal Communications	-	Motorola, Eastcom
NEC Wuhan	GSM	Wuhan, Hubei province	-	-	-	-
Ningbo Bird	GSM/GPRS, CDMA	Ningbo, Zhejiang province	Siemens, Qualcomm	BenQ, Quanta Computer	-	-
Nokia Beijing	GSM/CDMA (2H 2003)	Beijing	-	-	-	Joint venture between Nokia and Capitel.
Nokia Dongguan	GSM	Dongguan, Guangdong province	-	-	-	Joint venture between Nokia and Dongguan Nanshin.
Panasonic Beijing (Chinese only)	GSM	Beijing	-	Quanta Computer	-	China Putian Corporation, Panasonic
Panda Electronics Group	GSM	Nanjing province	Ericsson	Arima Communication, Foxconn	Sewon Telecom	Microcell, a Finland-based handset designer, bought part of Ericsson's stake in Panda.
Putian	GSM, CDMA	Beijing	-	-	-	-
Samsung Electronics	GSM, CDMA	Tianjin and Guangzhou province	-	-	-	Samsung Electronics
Sanyo	CDMA	Tianjin	Qualcomm	-	-	-
Shenzhen Sed Electronics Corp.	GSM	Shenzhen, Guangdong province	-	Inventec Appliances	-	Affiliate of CEC, formerly Philips Shenzhen, collaborates with Ningbo Bird and Holley Group on CDMA handsets.
Siemens Shanghai	GSM	Shanghai	-	Quanta Computer	-	SVA Group, Shanghai Mobile, Shanghai FRI Telecom R&D General Corp.
Sony Beijing	GSM	Beijing	-	Arima Communication	-	Sony
Soutec	GSM, CDMA	Guangzhou, Guangdong province	Motorola, Qualcomm	-	-	-
TCL	GSM/GPRS, CDMA	Huizhou, Guangdong province	Qualcomm, Wavecom	Compal Electronics, Foxconn	-	-
Telsda	GSM	Shenzhen, Guangdong province	-	-	-	-
Top Group	GSM	Chengdu, Sichuan province	-	-	-	-
Zhenhua*	CDMA	Guizhou province	Qualcomm	-	-	-
ZTE	GSM/GPRS, CDMA, PCS	Shenzhen, Guangdong province	Qualcomm, Samsung, CommQuest	-	-	-



### Test Philosophies Applied to the Wireless Market

When mobile phone production first moved to China, it was simply a manufacturing extension of a company based elsewhere in the world. Designs and prototypes occurred at the parent facility, where all of the test methodologies were dictated. In fact, in many cases, the Chinese workers were not even given access to source code to prevent them from making any changes. Moreover, the technologies in the production lines moved to China were very mature so as to require little change. However, as more and more manufacturing was moved to China and as local expertise grew, more responsibility and autonomy has been given to the Chinese factories. For mobile/wireless devices, test cost for mobile phones constitutes a larger portion of overall manufacturing cost than it does for other types of electronics. One hundred percent of mobile phones are tested to ensure regulatory and standard compliance, where many other consumer electronic products are merely sample tested.

Because the Chinese are newer at mobile phone manufacturing, they can look at test with a fresh perspective. This willingness to (carefully) embrace new test methods can be a competitive advantage for them. Many incumbent mobile phone manufacturers in

the West have large capital and intellectual investments in existing methods, and the fact that many have had significant reductions in test engineering departments can make them more resistant to change. That's not the case with the Chinese, who will seek out only those test methods that work best for them.

China has been a laggard in getting new technologies as designs and early production were conducted elsewhere. However, the rapid condensing of product lifecycles from 12 months to as few as three is bringing China another benefit – more local design. At the same time, worldwide mobile phone sales totaled 520 million units in 2003, a 20.5 percent increase from 2002 sales, according to Gartner, Inc. The number of Chinese mobile phone users has been estimated at about 250 million, and is expected to increase to 500 million in that country alone by 2007. With such a large domestic market and with the higher costs associated with dealing with the ultra-short life cycles found in the wireless industry, one can expect more and more design to move to China.

### Mobile Phone Standards Are Evolving

China has a mix of mobile phone technologies, with AMPS, TACS, GSM and TDMA all in use. Third-generation wireless

is just beginning to spread there, and three standards—WCDMA, CDMA2000, and the Chinese-developed TD-SCDMA—are vying for dominance in a market in which, as recently as early March of this year, no 3G licenses had been issued.

The Chinese view WCDMA as a “European” standard, CDMA-2000 as an “American” one, and TD-SCDMA as “Chinese”. The Chinese Ministry of Information Industry (MII) has indicated it will issue four 3G licenses to Chinese wireless service providers and will allow each Chinese telco to choose its preferred standard, but most observers believe that pressure will be exerted on at least one operator to go with the Chinese TD-SCDMA standard. Aside from national pride, the use of TD-SCDMA would spare Chinese telecom operators from paying for foreign standards and technology, according to a report in the People's Daily. It has been reported that several Chinese vendors will introduce commercial TD-SCDMA phones before mid-year, and several European companies have shown interest, including Siemens, which entered into a \$100 million joint venture last fall with Huawei for R&D, manufacturing and sales of TD-SCDMA phones.

TD-SCDMA's big advantage is that it provides greater capacity for densely popu-

lated areas than other standards. CDMA provides more density than GSM does, and TD-SCDMA offers still more, because it combines the best—and worst—of both. Yet while TD-SCDMA is best from a user-density standpoint, it is the worst from a test complexity standpoint, because it combines the code-domain access of CDMA with time slots. Some people feel that it goes against the Chinese competitive advantage in labor costs, because it requires vendors to develop new test equipment without economies of scale. On the other hand, the Chinese may be banking on the sheer size of their market to make this happen. This obviously has important implications for equipment vendors.

### Chinese Business Practices

As mentioned before, Chinese business practices differ significantly from those of the West. Relationships—among people and

among organizations—are much more important than they are here. This takes time and effort, but it has its rewards. Having established a good rapport with one Chinese company can open the door to others, as word spreads, but this is a two-edged sword: it is a bad idea to treat one customer or supplier better than another, or offer one a special deal, because there is no secrecy in these matters. Help one, and you risk alienating the others, or at least causing them all to demand the same favored treatment.

### Conclusion

China represents a great opportunity for Western test equipment makers and others, but it's vital to remember that success in China depends on understanding the Chinese approach to testing and to doing business in general. **KEITHLEY**

### About the Author

Walt Strickler is Senior Business Manager for the Wireless Business Unit at Keithley Instruments, Inc., responsible for strategic marketing and business development. Prior to coming to Keithley, Strickler spent nearly 10 years in various business development and engineering positions in the Space Communications Office and Space Electronics Divisions at the National Aeronautic and Space Administration's (NASA's) Glenn Research Center. Strickler holds a B.S. in Electrical Engineering from The University of Akron and an MBA from the Weatherhead School of Management at Case Western Reserve University.

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**Keithley Instruments, Inc.**

28775 Aurora Road • Cleveland, Ohio 44139 • 440-248-0400 • Fax: 440-248-6168  
**1-888-KEITHLEY (534-8453) • [www.keithley.com](http://www.keithley.com)**

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