

Large-scale Quality and Innovation Made by CHANGHONG



CHANGHONG is one of the largest volume manufacturers of receivers with headquarters in Mianyang in the Sichuan province of south-western China, some 130 km from the provincial capital of Chengdu. Not only do millions of satellite and terrestrial receivers leave the production premises every year but also an equal number of flat-screen TVs, so that the company ranks among the most important digital corporations in the world.

■ Digital TV manufacturer CHANGHONG is headquartered in Mianyang, a city of 600,000 inhabitants. The administrative building can be seen in the centre, with the development centre to the left and any many satellite antennas on its roof. In the background and extending to the left the CHANGHONG manufacturing plants stretch out over 2 square km.



Looking at their business today it is hard to imagine the humble beginnings of the project. CHANGHONG was founded in 1958 and started out with producing military radar systems. But today the company has evolved into a super-huge, pluralistic, international group of 13 different industries, producing everything from digital tv panel displays to IT systems, air conditioner systems, digital audiovisual products, set top boxes, eco-friendly battery and power supplies up to whole systems of technical equipment, electronic engineering and chemical materials.

One of the 13 industries of the CHANGHONG GROUP is the SICHUAN CHANGHONG NETWORK TECHNOLOGIES Co., Ltd. It is an independent subsidiary of the CHANGHONG GROUP and specializes in research &

development, marketing and manufacturing of digital set top boxes in all standards like DVB-S, DVB-C, DVB-T, ISDB, DMB-TH and of course HDTV including value-added systems for digital tv.

Their production capacity reaches up to 12 million, making them the largest STB manufacturer in China. The company has heavily invested in their quality control and has built up a digital TV laboratory, a digital HFC experimental net, EMC laboratory and most importantly a high accuracy SMT production line. CHANGHONG's aim is to become one of the strongest suppliers for digital tv solutions worldwide.

"In 1978 CHANGHONG started its TV production," Richard Cheng Li remembers. "At the time we imported a complete pro-

duction line from Panasonic in Japan and we also implemented every single production guideline right down to the very last detail." Richard continues to explain that "this is how things go in the first phase of



■ At Chengdu airport: His role as Overseas Sales Director leads Richard Cheng Li to many destinations around the globe.



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Available online starting from 29 January 2010



■ Janet Zhang is in charge of technical communication with customers. With a recent issue of TELE-satellite in her hand she can be seen in front of some satellite antennas that are installed on the roof of the development department. The opposite side of the building houses many more dishes

industrialisation: You simply take everything over because you lack the self-confidence required to come up with something of your own."

In the second phase products are modified and adapted to local markets, which leads to increasing independence as soon as the production process is understood from A to Z.

■ A small section of the enormous CHANGHONG production site. The apartment blocks visible in the background are purpose-built for CHANGHONG employees.



the development department is working overtime.

Indeed, the premises include a dedicated building housing several teams of development and software engineers. Right next to its entrance hall a huge library makes available all major electronics magazines from China and abroad as well as a large section of specialised literature. Engineers are free to look at any piece of literature or information while they are at work.

CHANGHONG even operates joint laboratories with two major chipset manufac-

Finally, phase 3 includes setting up one's one brand name, knowing that a new local or even global player is in the making. "CHANGHONG is currently in phase 2, but eagerly eyeing phase 3 already," Richard Cheng Li summarise the company's current standing. According to Richard, CHANGHONG's ambitions are high-flying: Phase 2 does not only imply that the production lines run at capacity, but also that

turers where engineers from CHANGHONG as well as from the two chipset companies together work on innovative receiver hardware and software. Some 20 engineers work in the NEC joint laboratory, with the ST joint laboratory being home to 30 engineers. 46 additional engineers deal with mechanical components such as housings or internal structural elements.



■ Library head Chen Qiong files TELE-satellite magazine into the comprehensive magazines section of the in-house library. More than 300 publications are at hand for consultation by development engineers.

It goes without saying that a world-class manufacturer doesn't stop at production. State-of-the-art products must comply with a plethora of safety requirements and standards, all of which have to be routinely checked and verified at the end of the manufacturing process. These days testing requires even more technical expertise than mere production, so it is interesting to find out how CHANGHONG approaches this matter.

To find out, we walk down one floor and enter the realm of hardware test manager Wang Xiao Bo. He presides over a huge range of measuring equipment and proudly draws our attention to test transmitters: "We are able to generate DVB-S, DVB-S2, DVB-C and of course Chinese DMB-T and ABS-S signals. With the help of special software we can even create ISDB-T signals for test purposes." Units from current production are selected and sent to the test lab to be checked for compliance with all relevant specifications.

Speaking of specifications – does CHANGHONG really check and verify whether all safety requirements are met? We hop into a car and drive a few miles to the other end of the vast CHANGHONG production premises. Behind company-owned apartments for employees and next to the dispatch centre an EMC laboratory has been set up by CHANGHONG.

You Meng is the lab manager and shows us a framed certificate on the wall: "Our measuring laboratory was certified by the FCC in 2008." Incidentally, this is hardly surprising as the EMC lab boasts professional technology and state-of-the-art systems. Radiation tests are performed in a 9 x 6 metre hall which is fully encased with metal. Four smaller chambers are available for EMI tests and other checks. "This

measuring lab represents an investment of more than one million USD," You Meng reveals. A total of six engineers work in the lab and check pre-production as well as production samples for compliance with safety requirements. Evidently, quality assurance and quality checks are well-established procedures at CHANGHONG. What we do not yet know, however, is what the sales figures look like.

Overseas Sales Manager Richard Cheng Li has the details: "We produce some ten million multimedia devices per year, mostly TV sets, as well as three to four million receivers. Some 70% of receivers and some 80% of multimedia devices stay in China, the rest goes into export."

And this is where we tap into a delicate situation: CHANGHONG's production site is not really ideally situated for export business, with the coast and any ports for shipping into all corners of the world rather far away. "We have found a solution, however," Richard Cheng Li reveals. "Rather than trying to export finished products we decided to export production!"

Today, CHANGHONG operates manufacturing plants in the Czech Republic, Indonesia, Australia and the CIS countries. In Brazil, Dubai and India CHANGHONG runs assembly sites and sales offices. All this is impressive proof for the company's expansion plans.

Which leads us to another cue for Richard Cheng Li: How does he evaluate the

company's future? "The coming years will see a significant upswing in the terrestrial digital receiver segment, as virtually all countries are currently in a transitional phase from analog to digital terrestrial broadcasting."

CHANGHONG is well placed to cover this government-driven market as it also manufactures TV sets next to their digital receivers and both products groups will experience a genuine boom in coming years.

Presently, CHANGHONG is working hard on boosting its market position. "We participate in all major specialised fairs and exhibitions," Richard Cheng Li states and lists the following examples: "IFA in Germany, IBC in Netherlands, CSTB in Russia, CABSAT in Dubai, Convergence in India, BroadcastAsia in Singapore and Broadcast & Cable in Brazil."

CHANGHONG has come a long way. Today the company boasts state-of-the-art production facilities using all the latest technical tools that are available. What's more, there is a spirit of trying to be best in everything it does, which further adds to the overall appeal of CHANGHONG.

Focusing on the receiver and TV segments the company is right on track to ride the digital and HDTV wave over the course of the coming years and finds itself in an enviable position for becoming a major global player.

Inside the Hardware Test Center

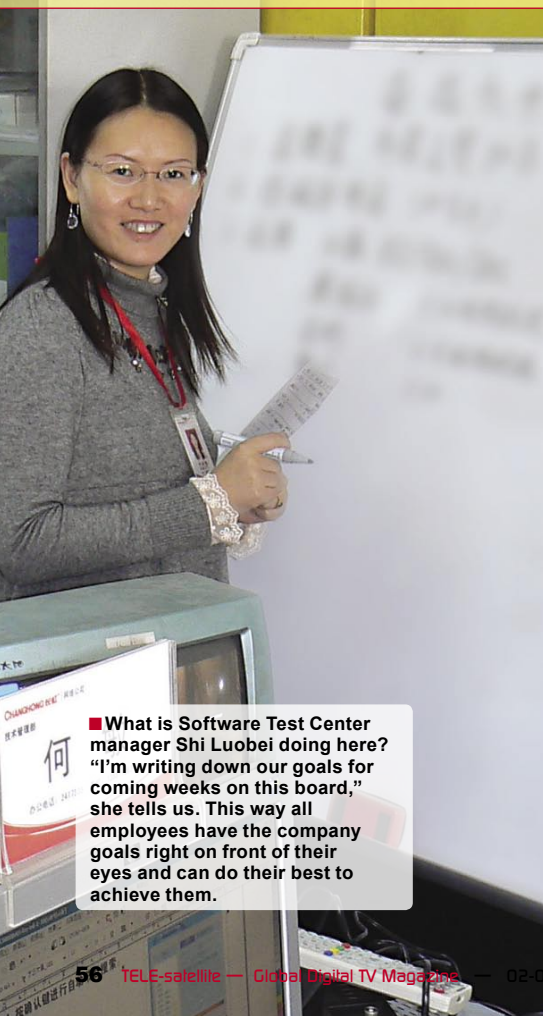


■ Wang Xiao Bo is the manager of CHANGHONG's Hardware Test Center and poses in front of a professional R&S measuring device. He proudly lists some of the equipment available to his staff: "We use the SFE by R&S, the DDS200 and VM700T systems as well as two DVT200 units made by Tektronix, various MPEG-2 generators, the VM6000 video measuring system and many other state-of-the-art systems."



■ Two staff members test sample models taken from current production.

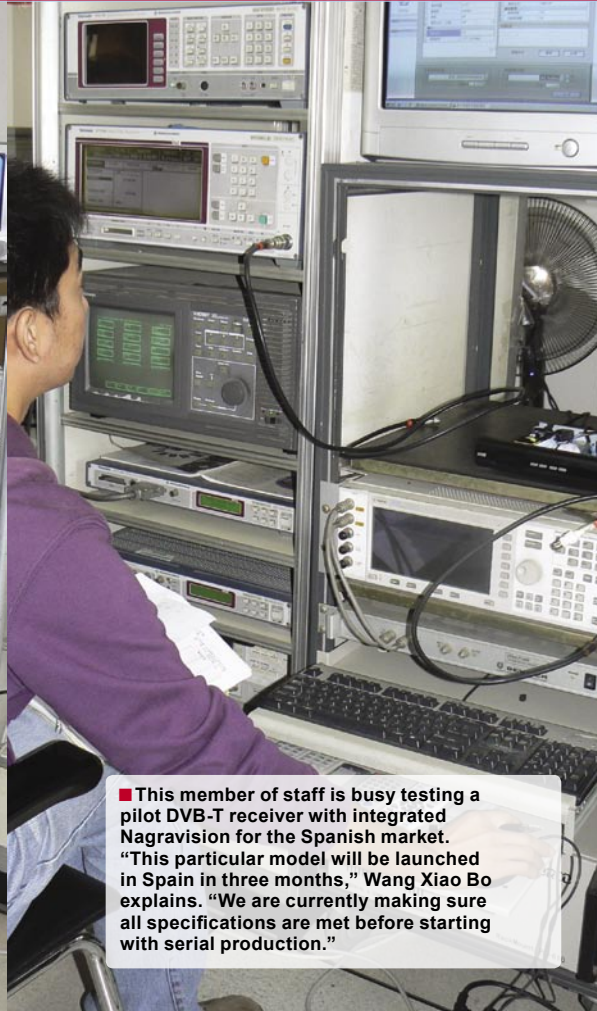
Software Test Center



■ What is Software Test Center manager Shi Luobei doing here? "I'm writing down our goals for coming weeks on this board," she tells us. This way all employees have the company goals right on front of their eyes and can do their best to achieve them.



■ The Software Test Center evaluates receiver software and is hunting for any bugs. All receiver functions are thoroughly tested so that customers will be able buy a flawless product.



■ This member of staff is busy testing a pilot DVB-T receiver with integrated Nagravis for the Spanish market. "This particular model will be launched in Spain in three months," Wang Xiao Bo explains. "We are currently making sure all specifications are met before starting with serial production."

■ Wang Xiao Bo turns on the DVB-S2 generator. Right below generators for DVB-C, DMB-T, ABS-S and DVB-T can be seen.



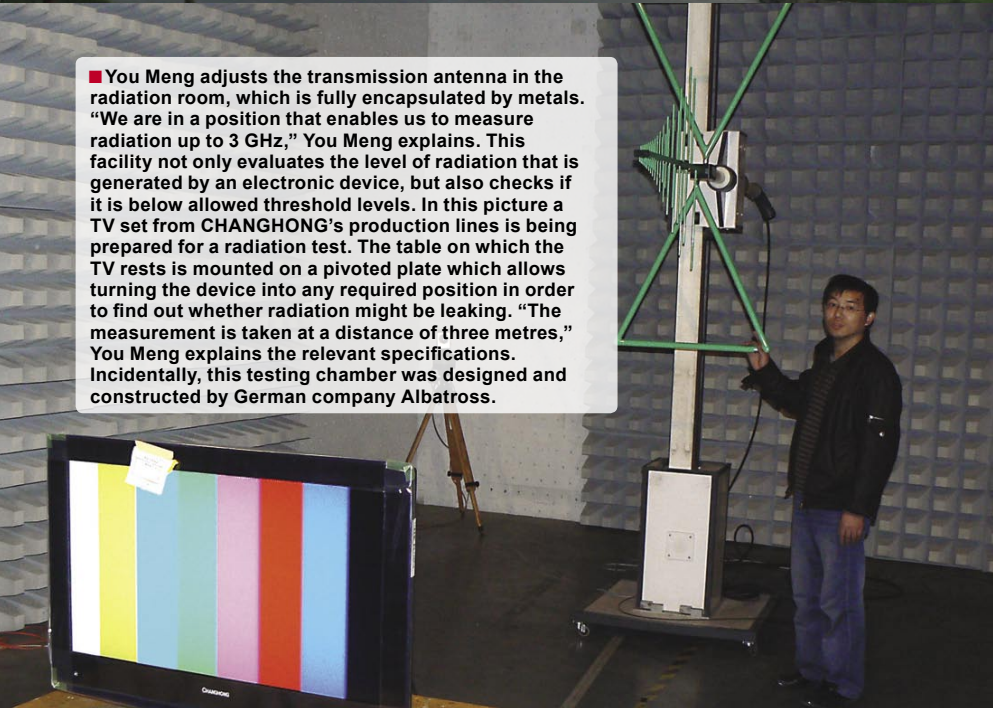
■ A Software Test Center member of staff wracks his head about a software bug. It definitely has to go before this model can go into despatch.

■ The three buildings seen here house the EMC lab as well as video and audio testing chambers.



■ EMC Test Laboratory manager You Meng draws our attention to the certificate issued by the United States' FCC. This document authorises the CHANGHONG EMC Test Center to officially issue test certificates. The second document on the right was issued by the Chinese section of the international EMC laboratories group.

■ You Meng adjusts the transmission antenna in the radiation room, which is fully encapsulated by metals. "We are in a position that enables us to measure radiation up to 3 GHz," You Meng explains. This facility not only evaluates the level of radiation that is generated by an electronic device, but also checks if it is below allowed threshold levels. In this picture a TV set from CHANGHONG's production lines is being prepared for a radiation test. The table on which the TV rests is mounted on a pivoted plate which allows turning the device into any required position in order to find out whether radiation might be leaking. "The measurement is taken at a distance of three metres," You Meng explains the relevant specifications. Incidentally, this testing chamber was designed and constructed by German company Albatross.



■ EU standards are even stricter than most other national standards. This room is used for testing receivers according to EU standard EN55020.

SMT Production



■ Somewhere in the vast expanses of the production area Zhou Bo, Sales Manager Europe, leads us into this building.

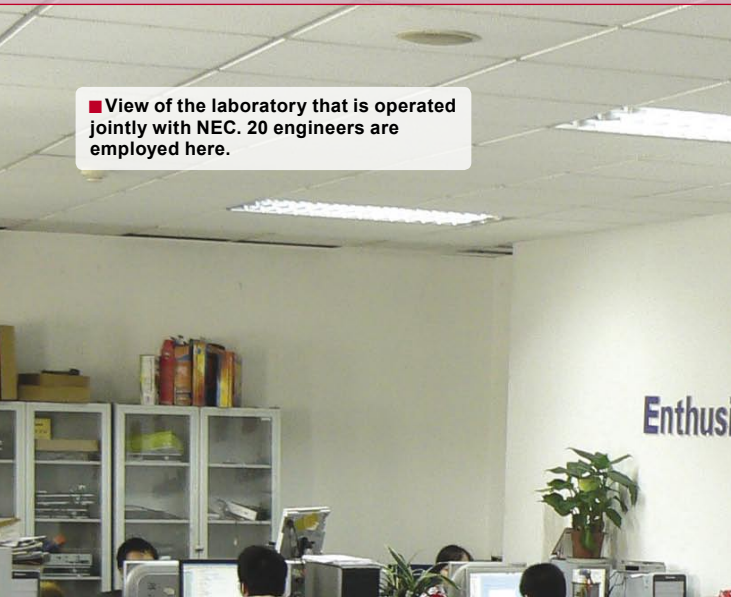


SMT Production



■ The sixth floor is supervised by SMT manager Yeng Fei who is not only in charge of a total of 29 SMT production lines, but also for 400 employees working around the clock in two shifts. "Our machines must be running all the time," Yeng Fei emphasise, "which is why we use a two-shift roster with a 12-hour shift followed by two days off."

NEC Joint Laboratory



■ View of the laboratory that is operated jointly with NEC. 20 engineers are employed here.

CHANGHONG

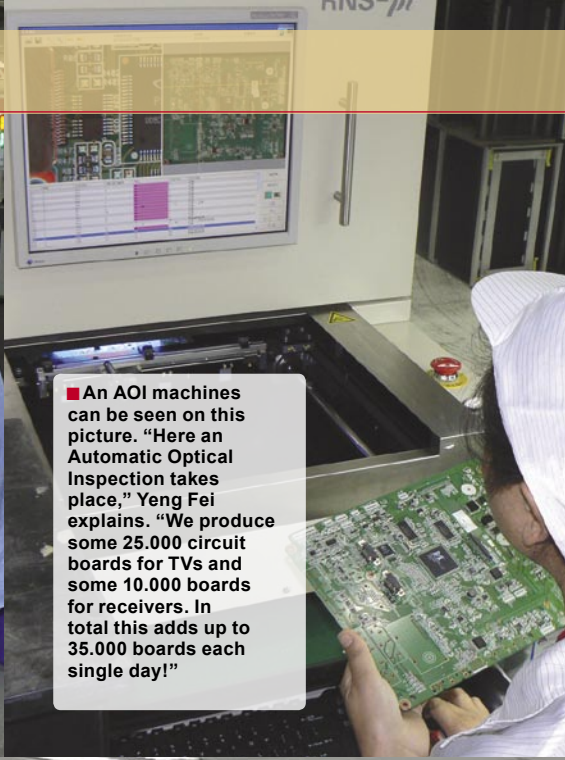


■ Wang Yong Sheng heads the NEC Joint Laboratory. Here he is seen discussing a new task for the EMMA3 chip with an NEC engineer. This chip is used for HDTV.





■ A member of staff checks assembly to the SMT machine. "This is the most recent addition to our equipment," Yeng Fei reveals and points to the Panasonic system. "We also work with SMT machines supplied by Siemens and Fuji."



■ An AOI machines can be seen on this picture. "Here an Automatic Optical Inspection takes place," Yeng Fei explains. "We produce some 25,000 circuit boards for TVs and some 10,000 boards for receivers. In total this adds up to 35,000 boards each single day!"



■ Random samples are also inspected using this X-ray machine.

ST Joint Laboratory



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■ In total 30 CHANGHONG and ST engineers collaborate on the further development of the STI7101 chip and the development of the new STI7105 chip. They also work on Broadcom chips for HDTV.

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■ Some of the 46 CHANGHONG hardware engineers can be seen in the background on this picture. Left in front is Zhang Lei Ming, manager of the Software Joint Laboratory, and to the right Zhou Jun who heads the Hardware Department.