UK-China Science Bridges: R&D on 4G Wireless Mobile Communications

China Telecommunication Technology Labs

For the first UK4G workshop

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Contents

• CTTL Introduction
• Current interests and projects in wireless communications
• Our vision in UC4G
Who we are

• CTTL is a leading third-party Laboratory in telecommunication area.
  – Administred by the China Academy of Telecommunication Research (CATR), MIIT

• In the past two decades, CTTL always stands at the front of telecommunication technology development and gradually enlarged to other fields in information industry.

• CTTL has became a compositive and professional Global Test Body.

• CTTL is the location of the Secretariat for APEC TEL MRA working Group in China.
Role and Task

- R&D of standard of telecom network and equipment as well as testing method.
- Inspection and test for Network Accessing License in China.
- Telecom and Information Equipments anti-seismic test.
- Conformity assessment test for ‘CCC’ mark.
- Conformity assessment test for ‘CE’, ‘FCC’ and other global market entry certificates.
- Test for type procurement and technical appraisal for telecom product.
- Measurement and calibration of telecom instrument.
- Appraisement and validation of telecom software.
- Arbitration & appraisal for quality argument on mobile or telephone set.
- Providing the solution for telecom equipment to comply with required standard.
- Research and test of interconnection and inter-working between different telecom system and equipment.
Governmental Authorizations

- National Telecommunication Metrology Station;
- National Telephone Quality Supervision and Testing Center;
- National Scientific and Technical Results Testing Appraisal Body for Telephone products;
- China Testing Body for Network Access of Telecommunication Equipment;
- National Laboratory for China Compulsory Certification (CCC);
- Telecommunication Metrology Center, MIIT;
- Graphic and Text Communication Equipment Quality Supervision and Testing Center, MIIT;
- Mobile Communication Equipment Quality Supervision and Testing Center (Beijing), MIIT;
- Telephone Switching Equipment Quality Supervision and Testing Center (Beijing), MIIT;
- Posts and Telecommunication Industry Products Quality Supervision and Testing Center, MIIT;
- EMC Test Center for Telecommunication Equipment, MIIT;
- Quality supervision and Test center for Anti-seismic Performances of Telecommunications Equipment, MIIT.
Organization

Director, Deputy Director, Chief Engineer

Technical Committee

Radio Communication
Fixed Network Communication
Wireline Terminal Communication
Telecom Fundamental Product
Software Verification
Telecommunication Metrology
EMC Test
Safety Test
Reliability Test
Environmental Protection Test
Anti-seismic Test
Southern CATR Test Department

Administrative Department
Technical Quality Department
Marketing Department
Test Capabilities

• The largest communication testing institution in China
• Integrated test capabilities in telecommunication related fields:
  – telephonometry, data communication, multimedia communication, mobile communication, signaling, switching, access network, synchronization networks, intelligent networks, transmission systems, satellite communication, telecom. Cables and power supply, EMC, hazardous substances testing and safety, security of network and information, software reliability, environment protection, and anti-seismic test

• Many International Testing Capabilities:
Research in CTTL

• Testing technologies for telecommunication
  ➢ CTTL has devoted to the new technology development, network evolution, research of technology standards as well as test methods. Its scope has now been gradually enlarged to include some other fields of information industry.

• R&D of testing systems
  ➢ A high level R&D team is formed from taking part in national key projects, dedicated to R&D in testing systems and methods.

• Standardization
  ➢ CTTL is the active member to attend the activities of ITU, IEC/CISPR, IEEE, 3GPP, GCF, OMA, etc. ,and major national research and standardization bodies, such as CCSA, CEASI, and EMIC of CMEEA and etc.
Clients

• Regulators
• Network Operators
• Communications Manufacturers
• Research organizations
• End-Use Consumers
Contents

• CTTL Introduction

• Current interests and projects in Radio communication

• Our vision in UC4G
Radio Communication Research in CTTL

• Research in testing methods and product designing optimization, covering
  - TD-SCDMA、WCDMA、cdma2000、GSM/GPRS and CDMA 1x mobile terminals, repeaters, base stations and wireless communication switching systems;
  - Trunk systems, microwave communication systems, satellite communication systems;
  - Various wireless access systems including WiMAX、WLAN、Bluetooth、RFID and UWB;
  - Other short range devices, etc.

• R&D in testing systems for wireless mobile equipment
• Research in national and industrial telecommunications standardization as well as private standardization for companies.
Radio Communication Testing in CTTL

Base-Station Test

Three-G Test

Mobile Station Test
Research Projects in Wireless Communication

- Production testing platform for TD-SCDMA smart antenna, development fund program of electronics and information industry, No.: MII (2007) 292, 10/2007—10/2008
  - R&D in testing system for passive array antennas pattern and smart antennas algorithm

  - Developed RF interface equipment and the automatic testing system for TD-SCDMA direct repeaters

- R&D for TD-SCDMA terminal conformance testing system, National High Technology R&D Program of China (863 plan), No. : 2005AA123790
  - Developed RF conformance testing system for TD-SCDMA terminals
  - Developed conformance testing system for TD-SCDMA station-card interfaces
Contents

• CTTL Introduction
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4G Research Interests in CTTL

• Green 4G test technology and standardization

• R&D on 4G testing methods and systems
Green communication Research(1/2)
— Our role

• Help Chinese government to develop green telecommunication industry as an important technology consultant of MIIT:
  – Environment Protection Improvement Center of MIIT, China
  – Promote the China 4G industry in a cost-effective, environment-friendly, health-friendly and spectrum-efficient way
  – Push ICT deployment for a Prosperous Green World
  – Based on our wide range of collaborations with leading Chinese mobile terminal design houses, chipset and equipment manufacturers, and main carriers in testing and standardization

• Research in establishment of a test and validation experiment platform for Green communication
Green Communication Research (2/2)

— Existing Green-Relative Testing Research in CTTL

- Newly built Environmental Protection Test Department of CTTL
  - Green product design and consultation service
  - RoHS Test to Electronic and electrical equipments, Accessories, Materials
  - Leader member of special task group of Environment Protection Standards of Telecommunication Products, China Communications Standards Association (CCSA),
- Currently, CTTL is drafting a series of standards for Energy Consumption of Communication Equipment in CCSA

- Integrated Specific Absorption Rate (SAR) and ElectroMagnetic Field (EMF) testing systems
  - supporting TD-SCDMA, WCDMA, cdma2000, GSM and CDMA 1x mobile and data terminals
  - EMF evaluation capabilities facilitate the electromagnetic environmental protection
R&D in 4G testing methods and systems

- Go further to research in testing methods and test bed for 4G
  - CTTL has advanced testing method research and experience. Already built the most integrated mobile and wireless communication testing and research platform in China
  - Test abilities: RF conformance, air-interfaces, wireless protocol conformance, IP-based protocols, application, EMC tests, and …
  - Existing cooperation: has already tested almost all the wireless/mobile terminals and base stations of national and international mainstream brands
  - LTE test platform is in construction
  - The Next step: 4G
Thanks for your attention