

Trends in Standardization Activities in China

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Abstract

The China Communications Standards Association (CCSA) is the sole organization in charge of standardization in the Chinese telecommunications industry. This article introduces recent developments in the CCSA's standardization activities and explains the structure of the Chinese standardization system and trends in the telecommunications industry.

Keywords: standardization activities, CCSA, Chinese telecommunications

1. Introduction

The Chinese economy has grown by leaps and bounds in recent years. Development, however, has not stopped at the economy; the field of telecommunications has also seen remarkable growth. In particular, the infrastructure supporting telecommunications has been expanding rapidly. As of the end of 2014, the number of mobile phone subscriptions had reached nearly 1.3 billion, while the number of Internet users was 649 million.

In addition to the promotion of broadband, systematic measures are being devised and implemented in a variety of fields in China, following a unique Chinese model that entails considerable involvement by the government in the form of guidelines on the direction to take. In China, the central government lays out its policies every five years, determining the areas in which industrial development is to focus. During the period covered by the 12th Five-Year Guideline—from 2011 to 2015—seven industrial fields will be treated as key areas: energy conservation/environmental protection; next-generation information technology; biotechnology; the production of cutting-edge facilities; new energies; new materials; and cars employing new energy sources. At present, the 13th Five-Year Guideline, covering the next period (until 2020), is reportedly being drafted, and we believe that it broadly includes the direction to take in the field of telecommunications as well.

Starting this year in particular, the government began unveiling strategies for the use of telecommunications as a driver of economic growth. These include *Made in China 2025* and *Internet Plus*. *Made in China 2025* identifies ten key areas of development: information technology; robotics/machine tools; aerospace; marine engineering; advanced railway facilities; energy conservation/energy-saving cars; power facilities; agricultural machinery; new materials; and biotechnologies/medical equipment. The objective is to make the manufacturing industry more efficient and to raise its standards by providing financial support and leveraging information and communication technology (ICT). The latter is expected to play a major role and to highlight ICT's increasing importance in the country.

2. China Communications Standards Association (CCSA)

2.1 Overview

The CCSA was founded in 2002 as the only standardization institution in charge of standards in the Chinese telecommunications industry [1]. The CCSA's membership is divided into full members, affiliate members, and observers, which encompass research institutions, telecommunications carriers, vendors, and universities. In recent years, membership has been on the rise, and as of 2014, there were 10 affiliate members and 32 observers in addition to

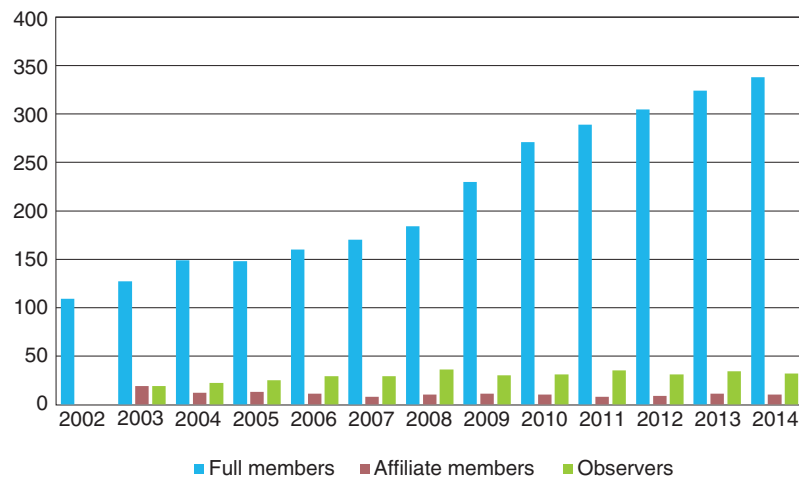


Fig. 1. Changes in CCSA membership since its establishment.

338 full members [2]. The changes in membership over the years are shown in **Fig. 1**.

In addition to activities involving carriers and vendors, CCSA's standardization activities revolve around the China Academy of Information and Communication Technology (CAICT)—China's only government-funded institution for research on telecommunications. CAICT provides support for government measures involving telecommunications, as well as providing consulting and certification services on standards. It is also actively involved in domestic standardization activities by Technical Committees (TCs) within the CCSA and in international standardization activities by the Telecommunication Standardization Sector of the International Telecommunication Union (ITU-T).

A list of the CCSA's TCs and Workgroups (WGs) for 2015 are listed in **Table 1**. The number of meetings held by each TC last year is indicated in **Fig. 2**, while the number of members attending is indicated in **Fig. 3**. The changes in the number of registered members of each TC since 2003 are shown in **Fig. 4**.

2.2 Main CCSA trends in 2014

In 2014, WG11 (peripheral facilities for wireless networks) was added to CCSA's TC5. This WG works on peripheral facilities that are not directly related to wireless network systems. This covers passive antennas for communication systems, traditional in-house sharing systems, broadband antenna products, passive components and their peripheral facilities, and the maintenance management of peripheral network facilities.

In 2014, 44 CCSA standards and 10 drafts for approval submitted by individual TCs were discussed throughout the CCSA; 40 CCSA standards and 8 draft proposals were approved. The total number of standards worked on by the CCSA in 2014 was 1647, including national standards, industry standards, CCSA standards, and research reports; of these, 465 standard drafts for approval were completed. This figure exceeded the beginning-of-year targets of 400 total drafts and 120 key standards. A breakdown of completed standards is given below.

- National standards: 9
- Industry standards: 379 (including 128 designated as key standards by the Ministry of Industry and Information Technology)
- CCSA standards: 17
- Research reports: 60

Such activity is remarkable even compared to that of our TTC (Telecommunication Technology Committee), now in its 30th year of foundation, which had a total of 837 enacted standards as of the end of 2014.

Of the standards completed by the CCSA, 168 national and industry standards were issued following a review by the Standardization Administration of the People's Republic of China and the Ministry of Industry and Information Technology. Reviews were also completed on 696 national and industry standards issued before 2009.

2.3 Slogan for standardization in 2014

CCSA's standardization work in 2014 was carried out in line with the slogan "Two levels, three areas."

Table 1. List of TCs and WGs set up within CCSA.

Study group	Subject studied	Study group	Subject studied		
TC1 (IP and multimedia communications)	WG1	NW protocols and facilities	TC7 (Network management and operation support)	WG1	Wireless communication management
	WG2	IP services and applications		WG2	Transmission, access and bearer network management
	WG3	Source encoding		WG3	ICT service management and operation
	WG4	New technologies and international standards	TC8 (Network and information security)	WG1	Wired network security
	SWG2	IPTV		WG2	Wireless network security
	SWG3	Future data networks (FDN)		WG3	Security management
TC3 (Networks and switching)	WG1	Networks in general	WG4	Security infrastructure	
	WG2	Signaling protocols	TC9 (Electromagnetic environment and protection)	WG1	Electromagnetic environment of telecommunications facilities
	WG4	Services and applications		WG2	Measures against thunderstorm damage and environmental adaptability of telecommunications systems
TC4 (Power supply for communications and operational environment of base stations)	WG1	Power supply for communications		WG3	Electromagnetic radiation and safety
	WG2	Communications room environment	TC10 (Ubiquitous networks)	WG1	General
TC5 (Wireless communications)	WG3	Broadband wireless access		WG2	Applications
	WG4	cdmaOne/CDMA2000		WG3	Networks
	WG5	3G network security and encryption		WG4	Sensing/development
	WG6	Research on new frontier wireless technologies	TC11 (Mobile Internet application and terminals)	WG1	General
	WG8	Frequencies		WG2	Service platforms and their application
	WG9	TD-SCDMA/WCDMA		WG3	Terminals
	WG10	Satellite/microwave communication	TC6 (Transmission networks and access networks)	WG1	Transmission networks
TC6 (Transmission networks and access networks)	WG1	Transmission networks		WG2	Access networks and home networks
	WG2	Access networks and home networks		WG3	Optical cable
	WG3	Optical cable		WG4	Optical devices
	WG4	Optical devices			

CDMA: code division multiple access
 NW: network
 IP: Internet protocol
 IPTV: IP television
 SWG: Special Workgroup
 TD-SCDMA: time-division synchronous code division multiple access
 WCDMA: wideband code division multiple access

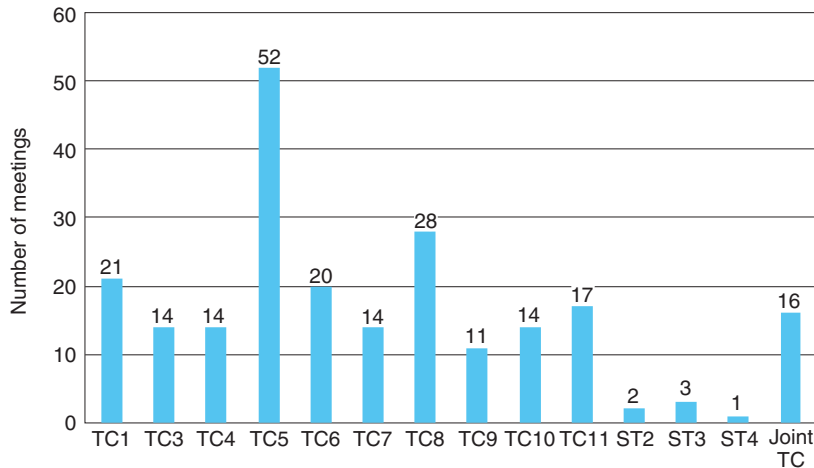


Fig. 2. Number of meetings held by each TC in 2014.

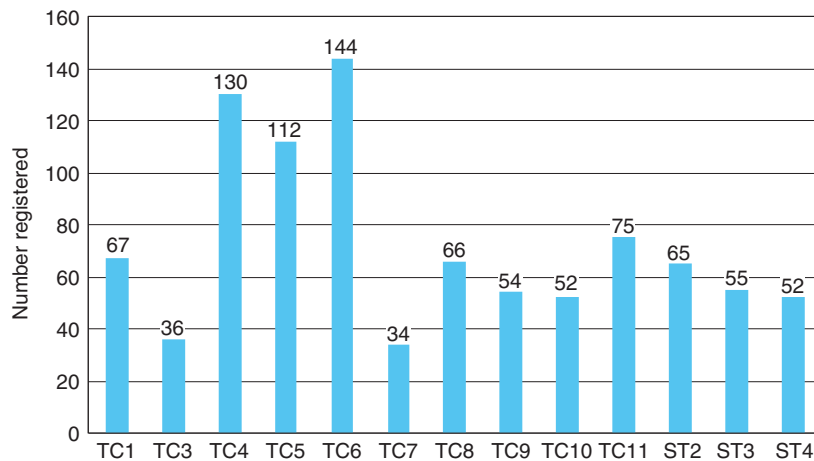


Fig. 3. Number of registered members of each TC in 2014.

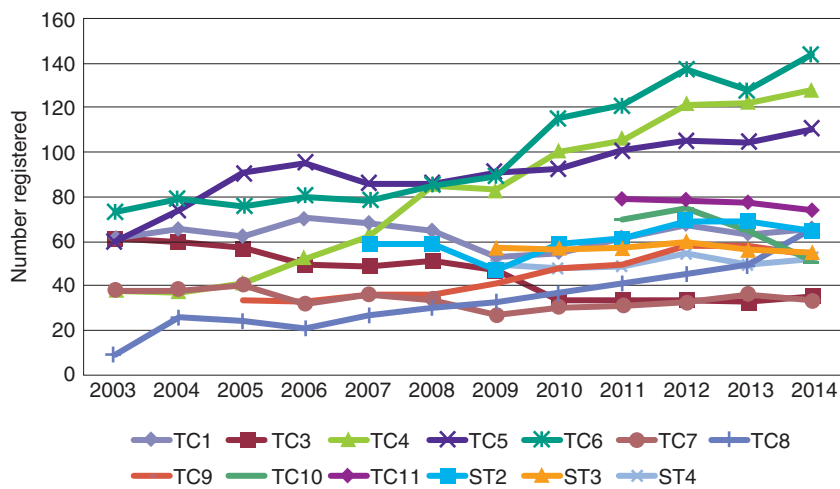


Fig. 4. Changes in number of registered members for each TC since CCSA's establishment.

Here, “two levels” means to conduct standardization under different rules in China and at an international level in view of the need to adapt to differences in the nature, areas, and direction of standardization. The aim is not consistency with international standards, but rather, flexible standardization to suit circumstances in different areas within China.

The expression “three levels” indicates the government’s intent to place particular focus on the following three areas.

- (1) Level 1: Standardization to meet urgent needs for purposes such as industrial development and government regulations
- (2) Level 2: Software-defined networking (SDN),

cloud computing, and other new areas of technology

- (3) Level 3: 5G and other areas of technology with future potential

3. CCSA standardization in 2014

3.1 Key areas of domestic Chinese standards

In 2014, the CCSA worked on three key areas of standardization: standards required by governmental sector regulations and public services; standards issued in a timely fashion to meet the needs of industrial development; and support for industries and member companies to begin new standardization

work. The CCSA indicates the specific nature of standardization initiatives undertaken on a priority basis in each area as follows.

The five key areas of standardization for standards required by governmental sector regulations and public services are:

- (1) The standard series relating to Security Capabilities for Smart Mobile Terminals
- (2) The standard series relating to Protection of Personal Information in Telecommunications and Internet Services
- (3) Standards for domain names in Chinese
- (4) Technical Requirements for the Mutual Exchange of Information in Smart Cities
- (5) The standard series relating to electronic IDs (identification) in Network Spaces

The six key areas of standardization for standards issued in a timely fashion to meet the needs of industrial development are:

- (1) The standard series relating to LTE (Long Term Evolution) Multi-Module Single-Card Terminals
- (2) The development of a standard system for managing LTE networks
- (3) Packet expansion-type OTN (optical transport network) (facility function model adopted by ITU-T as well)
- (4) IPv6 (Internet protocol version 6) address management
- (5) Remote positioning for electric bikes
- (6) High-voltage DC (direct current) 240 V/336 V power supply systems

The five key areas of standardization for support for industries and member companies to begin new standardization work are:

- (1) ITU-T's enactment of PTN (packet transport network) standards enacted by the CCSA
- (2) Strategically breaking through barriers of patents for video encoding held by foreign companies
- (3) Smart ODNs (optical distribution networks)
- (4) OTA (over-the-air) testing standards for LTE mobile terminals
- (5) Industry standards for adult head models with numerical evaluation of short-range electromagnetic radiation, in which China has intellectual property rights to the developed technology

3.2 Key areas of international standardization

The national government is also focusing its efforts on international standardization and is bolstering its support for the appointment of executives of interna-

tional standardization bodies and article contributions. China is now an important player in the field of international standardization and makes a remarkable contribution of over 7000 articles each year to ITU, the 3rd Generation Partnership Project (3GPP), IEEE (Institute of Electrical and Electronics Engineers), the Internet Engineering Task Force (IETF), and other associations. In this context, China is focusing on SDN, LTE, and cloud computing, and is emphasizing the results through CCSA's reports, among other things. For example, results obtained in the field of SDN include the creation of Y.2301, a standard for smart communication networks in which China is a leader, and the creation of working items for SDN-based smart pipe architectures.

In the field of LTE, China has formulated an international proposal centered around air interfaces that meet API (application programming interface) technical requirements (the first step) for the use of broadband trunking communications systems (B-TrunC) employing LTE technology—the Chinese industry's standard. In November, this was adopted as proposal ITU-R (Radiocommunication Sector) M.2009, and was reportedly established as the broadband trunking air interface for PPDR (Public Protection and Disaster Recovery) in ITU-R Recommendations.

Moreover, in the field of cloud computing, China is leading ITU-T's review on cloud computing frameworks in accordance with the cloud computing standard created by the CCSA. It has completed four standards, which include high-level and infrastructure requirements as well as resource management frameworks (Y.3501, Y.3510, Y.3520, and X.1601). Twelve standardization projects in other areas of cloud computing and big data are also reportedly in progress.

China is also working with standardization bodies other than ITU. In 3GPP, articles contributed by China in the field of wireless technology now account for over 25% of the total, and about one-third of the 3GPP executives are Chinese. China has also made its presence felt within the IETF, and Chinese companies have completed 195 Requests for Comments (RFCs) to date. This figure accounts for about 2.71% of all RFCs, placing China ninth in international rankings. The WG on ACTN (Abstraction and Control of Transport Networks) is currently being led by China, according to reports.

Furthermore, the Chinese government has developed a support framework for international standardization work and is providing such support proactively in the form of subsidies. In particular, in the

Table 2. Key areas of work engaged in by each TC in 2014.

TC name	Key areas of work in 2014	TC name	Key areas of work in 2014
TC1	IPv6-based next-generation Internet	TC6	PTN (packet transport network) series standards
	Cloud computing		Standards of packet expansion-type OTN (optical transport network) series
	FDNs		Standards for the smart ODN (optical distribution network) series
	SDN and NFV (network function virtualization)		400G/1T high-speed transmission technology
	Internet work		OTN technologies over 100G
	New technologies in the IP bearer network area		SDTN (software defined optical transport network)
	Signal coding and meta-data		TWDM-PON (time-wavelength division multiplexing passive optical network)
	Big data		
	Removal of information barriers		
TC3	Smart communication networks	TC7	LTE network management
	Unified IMS (IP multimedia subsystem)		5G network management
	SDN/NFV		Big data management
	RCS (Revision Control System) operations	TC8*	Information security for mobile Internet
	Open APIs for operational capabilities based on REST (Representational State Transfer)		Security for new mobile Internet businesses
TC4	240 V/360 V high-voltage DC power supply		Security management for mobile Internet
	Energy efficiency at datacenters		Cloud computing security
	Renewable energy		Electronic IDs for domain spaces
TC5	LTE terminals		* Released to joint and foreign-invested companies also from this year onwards.
	LTE broadband trunk B-TrunC	TC9	Measurement of performance of mobile terminal antennas
	Public wireless area networks		Electromagnetic compatibility and protection
	Research on frequencies		Lightning surge protection
	Peripheral equipment and facilities		Electromagnetic radiation
	Satellite/digital microwaves, security	TC10	M2M (machine to machine)
	Remote positioning services for electric bikes		
	Smart cities		
		Vehicle-to-vehicle networks	

field of telecommunications, the CCSA, entrusted by the development department of the Ministry of Industry and Information Technology, accepts applications for subsidies in aid of international standardization projects in the telecommunications industry. In the first quarter of 2014, the amount of 420,000 RMB was provided for 29 projects, while 550,000 RMB was provided for 30 projects in the second quarter. The amount for 26 projects during the third quarter was under review as of December 2014. With the aim of providing subsidies to help with the expenses of drafting international standards, the CCSA also enacted the CCSA Administrative Measures for Subsidies for International Standardization in the Communications Industry in 2014, accentuating the fact that the entire country's resources are being tapped into in order to promote international standardization.

3.3 Key areas of work by each TC in 2014

Additional areas worked on by individual TCs in 2014 are listed in **Table 2**.

At the NTT Beijing Representative Office, we are participating in WG1 of CCSA's TC10 as observers in order to gather information. In 2014, TC10 focused on standardization in four areas: machine to machine (M2M), remote positioning services for electric bikes, smart cities, and vehicle-to-vehicle networks.

In the field of M2M, TC10 created ratified drafts of industry standards concerning "Technical Requirements for Service Capabilities of M2M Terminals" and "Technical Requirements for M2M Service Platforms." It simultaneously developed a more in-depth discussion of the existing "General Technical Requirements of M2M Service" and "Requirements of M2M Communication Protocols."

TC10's work in 2014 emphasized in particular the

industry standards concerning positioning services for electric bicycles. These standards consist of service platforms, technical requirements for positioning services, and measurement methods for peripheral components. In establishing these standards under the lead of the Ministry of Industry and Information Technology and the Ministry of Public Security of the PRC, the CCSA and public security system staff engaged in cross-departmental cooperation, which resulted in the joint creation of a standard series on remote positioning services for electric bicycles by local government bodies and corporations. These standards make it possible to reduce economic losses from theft and other factors, and their commercialization is already underway in more than ten provinces and cities. As of September 2014, 2 million electric bicycles had been sold, with sales across the industry reaching 520 million RMB, and profits reported at 130 million RMB.

Standardization in the field of smart cities is underway in response to the demand generated by the construction of smart cities in China. The standardization review has encompassed smart city standard systems, public support platforms, information-sharing technologies, open data requirements, construction management, and service models. This has resulted in the issuance of the industry standard “Technical Requirements for the Mutual Exchange of Information in Smart Cities.”

In the field of vehicle-to-vehicle networks, TC10 has been conducting a review since 2011 and has produced numerous CCSA standards, which include: “Service Requirements and General Framework for Vehicle-to-Vehicle Informatization Employing Ubiquitous Networks”; “General Framework for Smart Transportation Systems Supported by Communications Networks”; and “General Technical Requirements for Vehicle-to-Vehicle Networks.” TC10 has also completed a draft for approval on the industry standard “Technical Requirements for Public Communications Network-Based In-Vehicle Gateways,” and has completed a series of standards.

Additionally, TC10’s WG1 has systematized a series of nine standardization documents on smart cities and is pushing forward with a review. WG1 is also working on standardization in relation to healthcare services employing mobile Internet and the Internet of Things (IoT) and has begun standardization efforts on “IoT-based Mobile Health (Needs)” and “Electronic Health Service Categories.” The main targets of these standards are the needs faced in providing healthcare services through mobile Inter-

net and use case categories; in the future, however, the review is expected to move on to more specific models, and we may need to keep track of future trends.

4. Conclusion

This article has provided a summary of the CCSA—the only standardization body for telecommunications in China—and of the main areas of standardization that the CCSA worked on in 2014. China is seeking to use ICT as a driver for its industrial development. We expect that it will not only push forward with domestic standardization but will also intensify its efforts in international standardization. In particular, we will need to keep an eye on trends in the areas on which the government is focusing. At the NTT Beijing Representative Office, we will continue to gather information on standardization trends in the Chinese telecommunications industry on behalf of the NTT Group and to pursue/promote new cooperative relationships with China.

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