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Policy and Regulatory Update – Chinese Taipei

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Renewal of Regulatory Policy

Chinese Taipei

Status of Communications Market

- **Mobile Internet Subscriptions**

During the first quarter of 2014, the number of mobile phone subscribers in Chinese Taipei reached 29.85 million (127.7 subscribers per 100), 15,000 more than the previous quarter. The number of subscribers in the same quarter of 2013 was 29.48 million, which indicates a growth of 0.37 million subscribers year on year. It was also noted that during the first quarter of 2014, the number of both 2G and PHS mobile phone subscribers declined to 3.71 million and 0.71 million respectively, while 3G subscribers soared to 25.43 million, which accounted for 85% of the total mobile phone subscribers. In the same quarter of the previous year, there were 23.11 million, which accounted for 78% of the total mobile phone subscribers.

Among the mobile phone subscribers of the first quarter of 2014, 65% of them included mobile data service functionality; namely, 19.59 million mobile phone subscribers in Chinese Taipei are able to access the Internet. Among those mobile phone subscribers with Internet access, 3G subscribers accounted for 93% (18.31 million). The percentage showed steady growth to reach a record high. In addition, the number of PWLAN and WiMAX subscribers plus the 3G subscribers who had accessed Internet service equaled 14.67 million, 0.86million more than the previous quarter. Finally, including the subscribers of both WBA and WiMAX, total mobile accounts reached 19.01 million. Among these, wireless broadband accounts accounted for 93.5% (18.42 million).

- Fixed Broadband Subscriptions

As of the first quarter of 2014, the number of fixed broadband network subscriptions in Chinese Taipei had reached 5.68[1] million, 100,000 more than the first quarter of 2013. In comparison, the number of xDSL subscriptions reduced to 1.52 million, with its share of fixed

[1]The subscribers of broadband include those who gain access through xDSL, cable modems, FTTx and leased line.

broadband network subscriptions currently at approximately 27%. In contrast, subscriptions of cable modem and FTTx[2] continues to show steady growth. Cable modem subscriptions reached 1.18 million, accounting for 21% of total broadband subscriptions, while subscriptions of FTTx increased by 240,000 compared to the first quarter and reached 2.9 million, representing a market share of 52%.

Communications Regulatory Policy

- Digital Convergence Policy Initiative

In order to enhance the quality of broadband Internet for the populace and build up the environment for the digital convergence industry, the Digital Convergence Policy Initiative of Chinese Taipei was announced in December 2010. This program consists of seven primary aims to achieve the policy objectives of creating quality digital convergence lifestyle, establishing a digital convergence industry and promoting national competitiveness in next generation.

This policy includes seven major aims as follows:

- Build a high-speed broadband network
- Promote telecommunications convergence services
- Accelerate the transition of digital TV
- Develop innovative video media services
- Accelerate the upgrade of the communications industry
- Enrich the content of TV programs
- Harmonize regulations on convergence

In accordance with the initiative, Chinese Taipei aims for 100% household penetration of 100Mbps fixed line broadband by the end of 2013 and the comprehensive digitization of cable TV by the end of 2014. As of December 2013, coverage of broadband network of 100Mbps of households had reached over 97%. Moreover, it is expected that subscriptions of fiber optic

[2]The subscriptions of fiber optics network include FTTH and FTTB, but exclude those of FTTN and FTTC.

network users will reach 7.2 million and wireless broadband subscriptions will reach 11 million by the end of 2015. During the same period, the penetration rate of Emerging Video Services will reach 50%. As of January 2014, subscriptions of fiber optic network users had reached 4.31 million, and wireless broadband subscriptions had reached 13.74 million.

The digital switchover initiative aims to promote the viewing rights of people and to provide greater choice for the public. The switchover also enables broadcasters to run cross-industry business or Internet services, thus accelerating convergence. The digitization of terrestrial television was successfully completed in June 2012; Cable TV is expected to be comprehensively digitized in 2014. The switchover not only enhances TV audio and picture quality but also provides more opportunities to both viewers and broadcasters. As a result, digitization has become an indispensable requirement for the broadcasting industry to run information-communication services.

Universal Broadband Service assures the basic communication rights of people – that is access to quality voice and data services at a reasonable fees anywhere in Chinese Taipei. NCC completed the projects of “Broadband for Villages” in 2007 and “Broadband for Tribes” in 2010. All tribes in remote areas in Chinese Taipei can now enjoy 2Mbps broadband services. Since the beginning of 2012, NCC has been promoting the increase of broadband speeds from 2Mbps to 12Mbps; it is estimated that the coverage of remote areas can reach 75% in 2013, 85% in 2014, and 95% by 2015. Universal Broadband Service brings tangible benefits and allows people in the area to enjoy digital convergence. It is already bridging the divide in the level of education in remote areas and providing multi-play services, which can resolve the problems in local telephony, public telephones, broadband Internet, MOD service, and mobile telecommunication. Furthermore, those in remote areas are taking advantages of Internet marketing and ecommerce to develop ecological tourism and local agriculture to connect with a global audience.

In order to meet the demands of future digital convergence, NCC plans to facilitate a sound environment for telecommunications, broadcasting, and the Internet through universal services and the digital switchover. Also, through promoting the integrated information-communication policy, we aim to encourage an effective innovative mechanism of

market competition, so that all people can enjoy better broadband convergence services at a reasonable rate. Consequently, this increases people's digital ability and strengthens industry competitiveness.

- **Promoting the development of mobile broadband networks (4G)**

Chinese Taipei established the Accelerating Mobile Broadband Services and Industry Development Plan consisting of six working groups: Infrastructure Group, Application and Development Group, Safe Consumption Group, Technology Development Group, Talent Cultivation Group, and Strategy Planning Group. With the aim of accelerating the construction of mobile broadband networks, the primary tasks for the Infrastructure group include expediting wireless broadband infrastructure, as well as educational campaigns on electromagnetic waves; advancing the co-location of mobile communications platforms; building the next generation radio monitoring system; planning the future use of spectrum. The duty of NCC is to accelerate the deployment of 4G networks infrastructure and enhance public's awareness on the benefits of 4G, so as to create a harmonious mobile broadband environment so the public can enjoy quality mobile broadband services anytime anywhere at reasonable rates.

In order to provide the public with a high-speed, high-quality, and diversified telecom service, Chinese Taipei, on 28 September 2012, announced its intention to issue mobile broadband licenses in three frequency bands – 700MHz, 900MHz and 1800MHz – before the end of December, 2013. On 8 May 2013, Regulations for Administration of Mobile Broadband Businesses was announced; the bidding activity began from 3 September 2013 and ended on 30 October 2013 and was made up of 393 rounds over forty days. Six operators won bids with the following winning bids for each frequency: TWD30.52 billion for 700MHz, TWD9.345 billion for 900MHz, and TWD78.785 billion for 1800MHz. The total bid price was TWD118.65 billion, which was TWD82.75 billion (231%) higher than bottom price of TWD35.9 billion.

In addition, since March 12, 2014, NCC has issued licenses to several mobile broadband businesses for 4G. Thus, a peak period of construction is anticipated. To assist operators in accelerating the infrastructure of 4G base stations, NCC has accelerated approvals of licensing for base stations installation. By the end of July 2014, NCC had already issued approvals for 7,490 base stations in total.

To boost the approval of base stations even further and control their progress, NCC has assigned more personnel to review applications and has also appointed personnel specialized to manage the review and time of licensing of each application so as to completely control the timescale of construction.

By the end of Aug, 2014, 4 operators had officially begun 4G operations and about 640 thousand consumers had subscribed - a penetration rate of 2.73%.

Key achievements in 4G development include:

(1) Communications Quality

- Periodical review of rules and regulations.
- Simplified process of application.
- Regular mobile broadband speed tests and announcement of the test results. Test area has reached more than 70% of population.

(2) Billing

- Require the Operator to disclose information.
- Principles of pricing: simple, diversified, based on volume of usage, and fair.
- 7-day free trial to allow users to understand the condition of signal reception.

(3) Universal Service

- Expected coverage: more than 90% of the population by the end of 2016.
- Subscribers: more than 10 Million by the end of 2017.
- 82 remote areas: reach more than 90% by the end of 2019.

To give impetus to the construction of mobile broadband networks and facilitate high-speed, high-quality mobile broadband services at reasonable rates, NCC regularly coordinates with relevant governmental authorities, 22 local governments, and parties of the telecom industry to discuss the release of regulations on the installation of base stations; urban and non-urban land zoning ordinance; regulations on evaluation and rewards for installing base station in public buildings or land; base station point coordination and rental; improving quality of mobile communications services along the transportation system; and educational campaigns on electromagnetic waves.

- **Enhancing the management of mobile base stations**

In response to the strong demand for mobile broadband, NCC, on February 19, 2014, released the amendment of Article 4, Article 7, Attachment 1 and Attachment 2 in Article 7 of Regulations for Administration of Base Stations of Mobile Communications Network Businesses to simplify the application procedure for operators that divert their own approved base station equipment for use by other mobile communication businesses.

For the co-location and beautification of base stations, NCC continuously supervises operators to conform to the rule of the percentage co-location, incorporating base stations with their landscapes and preserving the environment in accordance with Regulations for Administration of Base Stations of Mobile Communications Network Businesses. Statistics showed that in late July 2014 the percentage of 2G and 3G base stations co-located was 25.2%, an increase of 0.3% compared with 24.9% at the end of 2013.

- **Measurement of mobile broadband speed**

In order to determine the true quality of mobile internet services, in 2012, BOST requested Telecom Technology Center (TTC) to conduct an evaluation of mobile broadband speeds in six major cities; NCC took over this evaluation in 2013 and is now into the third year. The results of measurements taken at the consumers' end at the end of 2013 showed that the average nationwide download speed was 4.44Mbps, which is 76.19% faster than the average of 2.52Mbps in 2012. The average upload speed was 1.13Mbps, 151.11% faster when compared with 0.45Mbps in 2012. This demonstrates that the evaluation of mobile broadband speeds has had a positive effect on supervising the promotion of mobile network quality.

To encourage telecom operators to continually improve the domestic mobile broadband network environment, NCC initiated a sub-project, "Promoting 4G Network Service Quality" as part of the Accelerating Mobile Broadband Services and Industry Development Plan, subsidized by National Science and Technology Development Fund of the Executive Yuan. NCC will continuously measure the speed of Internet access provided by 3G and mobile broadband operators and will include a long-term monitoring system of 4G LTE internet access. As such, construction of networks both in offshore islands and in remote areas can be expected, enabling universal access to 4G LTE high-speed networks.

- **Mobile broadband services follow-up licensing planning**

According to the broadband internet access report in Taiwan 2014 from TWNIC, the percentage of mobile internet subscribers has shown substantial continual growth for three years. It is estimated that the number of adults accessing mobile internet is approaching 10 million. MOTC also estimates that the demand for bandwidth for mobile broadband will reach around 1000MHz by year 2020. Still, 540MHz bandwidth has been planned for mobile broadband now. In order to ensure the sound and stable development of communications industry, it is necessary to continually release spectrum for mobile broadband.

During 2013, NCC released the 1800MHz band (the most commonly used band across the globe for 4G) as well as the 700MHz band for 4G services. However, to facilitate the stable development of terminal equipment such as smartphones, and for vigorous development of mobile communication systems manufacturing related industries, NCC is planning to release the 2600MHz band (the second most commonly used band for 4G services) in 2015 - an estimated increase of 190MHz of bandwidth for mobile services.

- **IPv6 Development**

In order to cope with limited number of IPv4 addresses, the Executive Yuan approved the “The IPv6 Upgrade and Promotion Program” on December 30, 2011, with the objective of the seamless transfer from IPv4 to IPv6 network environments in Chinese Taipei. Additionally, on January 30, 2012, “The IPv6 Upgrade and Promotion Office” was initiated by the National Information and Communication Initiative of the Executive Yuan to actively promote the gradual upgrade of IPv6.

According to the program schedule, 50 percent of external services, including the websites of government agencies, DNS, email and major international services would be upgraded to IPv6 by the end of 2013, and the remaining 50 percent by the end of 2015. As for internal services, the upgrade of IPv6 shall be completed around 2016.

To further enhance IPv6 to the home networking environment, Chinese Taipei not only encourages IPv6 equipment manufactures and vendors to have their products IPv6 Ready Logo certified, but also works with the local ISPs to begin to deploy for more IPv6 connectivity services to speed up IPv6 penetration.

By the end of July 2014, key achievements in IPv6's development include:

1. Government agencies had been conducting IPv6 upgrade to its external services based on the "Internet Protocol Upgrade and Promotion Program"；3,244 out of 4,982 applications services were upgraded, resulting in a 65.11 percent completion rate.

2. According to RIPE statistics, the Chinese Taipei IPv6 Prefix number of autonomous systems is 29.92% in the global Internet BGP routing table. The TWNIC has allocated 60 IPv6 prefixes for Internet communities in Chinese Taipei.

3. According to Google statistics, Over 56,000 (0.33%) Internet users can access Google by IPv6 in Chinese Taipei.

4. Domestic Information and Communication Technology (ICT) products were provided with assistance to apply for the International IPv6 Ready Logo. Chinese Taipei has now 260 ICT products bearing the Phase 2 (Gold) Logo, including 10 new additions in 2014. Chinese Taipei now ranks the second in terms of the number of Phase 2 (Gold) Logo. (See Figure 1).

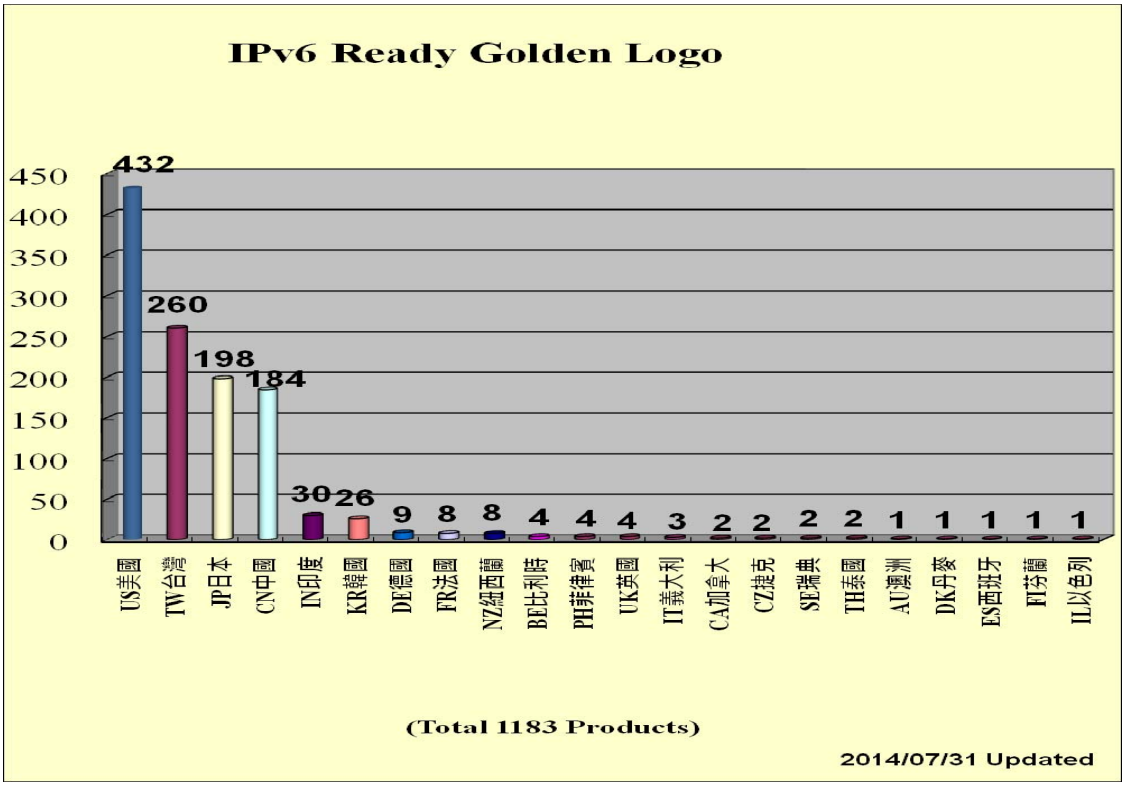


Figure1. The number of Phase 2 (Gold) Logo worldwide

5. Regarding IPv6 training, a total of 11 seminars and training sessions for government employees had been held as of the end of July 2014, receiving 347 attendees.

Cyber Security

- **National Strategy for Cyber security**

Since Chinese Taipei established National Information & Communication Security Taskforce (NICST) at the cabinet level in 2001, it has drafted a new version of the national strategy for cyber security every four years. Since last year, Chinese Taipei has entered the 4th phase of national strategy (i.e., master plan). The master plan is comprised of 20 strategies and 52 action plans. We anticipate that through these joint efforts, we can achieve 4 strategic objectives from policy, technology, readiness and human resources perspectives.

- **Cyber Security Exercise**

Chinese Taipei conducted a large-scale cyber exercise in 2013. 33 agencies were chosen as evaluation targets in this Cyber Offensive and Defensive Exercise (CODE). This exercise is not only a domestic public-private partnership effort, Chinese Taipei also wants to facilitate international cooperation, US, Thailand, Malaysia and Slovakia dispatched delegates to observe the whole event and shared their valuable experiences.

In this event, Chinese Taipei mobilized more than 100 people from different agencies and private sectors to join the CODE taskforce, a joint force of units from national security, national defense, law enforcement, government CSIRT and academia research institute.

In order to understand cyber security readiness and resilience of agencies regarding their incident handling process maturity, system defense capability and officials' awareness to APT (Advanced Persistent Threat), we designed Table-top Drill, Red Team/Blue Team Live Action Exercise and Targeted Phishing email test in this event. CODE 2014 is scheduled to be held in Oct. this year; we will focus on local government agencies, financial services, and telecommunication operators.

- **International Cooperation**

Chinese Taipei actively cooperates with international cyber security organizations. During 2014, Taiwan National Computer Emergency Response Team (TWNCERT) received and handled 1,969 international incident reports from other international cyber security organizations. Especially in the case of Botnets information exchange, TWNCERT has sent 187,230 Botnet and C&C incident reports to 33 foreign CSIRTs. TWNCERT has also collaborated with APNIC to analyze malware used by Mobile Botnet, and has begun mutual exchanges of information with CERT-EU and MCMC.

In February 2014, TWNCERT participated in APCERT Drill 2014 hosted by APCERT. The theme was "Countering Cyber-ops with Regional Coordination," with the goals of enhancing cyber security defense, domestic reporting and international cooperation capabilities; 20 members from 16 economies participated in this drill. TWNCERT has successfully completed all 8 scenarios set by the drill within the time limit and established the procedures for quickly involving other domestic organizations responsible for critical infrastructure protection.

Nowadays, security issues on mobile devices are becoming more sophisticated and international; strengthening response to them has become a critical task. Chinese Taipei has published a guideline for Mobile Device Security to promote security awareness for mobile devices. This year, the Safety Tips for Mobile Devices was announced in conjunction with the Cybersecurity Awareness Day campaign.

Chinese Taipei also participates in Internet Corporation for Assigned Names and Numbers（ICANN）conferences to discuss the interests of consumers, the operation of the Internet's impact on governments, and concerns of governments or international organizations, in order to maintain the network stability, reliability, diversity, and security of internet operation, as well as ensuring rights of internet users.

- **Intelligent Metering Infrastructure Promoting**

Turning to the issue of a low-carbon economy, the construction of a Smart Grid plays a vital role in our energy conservation and carbon reduction strategy; consequently, Chinese Taipei has been approved for the National Advanced Metering Infrastructure (AMI) Deployment Plan for Chinese Taipei's transition to smart metering systems, the Bureau of Energy (BOE) and Taiwan Power Company (TPC) have recently been executing the National AMI Deployment Plan. Low voltage users have been deployed 1,200 meters by BOE for technical feasibility demonstration in 2010-2012. During 2013, TPC completed 24,123 and 10,392 meters installation for high-voltage and users and low-voltage users (residential) respectively. To evaluate the cost benefit analysis for building AMI system, Phase I Time-of-Use (TOU) stratagem for enhanced energy conservation and carbon reduction strategy in residential users was also completed in 2013.

The Phase II TOU stratagem will be executed from April, 2014. The experience gained from deploying small-scale low voltage AMI facilitates future expansion in this regard.

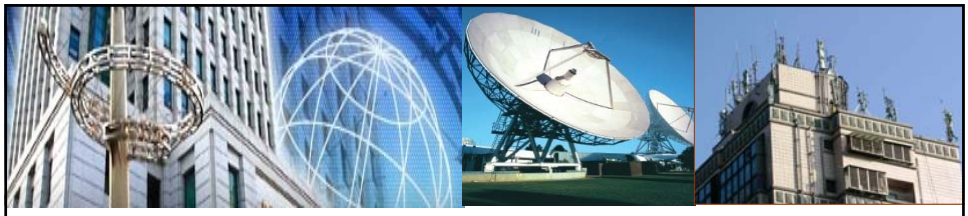
- **Green ICT**

In line with energy-saving and carbon reduction policies of the government, Chinese Taipei has established an energy management platform to guide public sectors to achieve four-saving goals: fuel-efficient, energy, water, and paper saving. The platform also aims to deepen public awareness of energy conservation, and to ultimately create a greener

environment and low-carbon economy. Meanwhile, we have been assisting schools in the promotion of concepts of energy conservation, with the aims of realizing the concept of “low-carbon community” and fulfilling the vision of "low-carbon city."

To continue to fulfill the energy-saving and carbon reduction policies of the government, Bureau of Energy, Ministry of Economic Affairs has actively promoted LED street light energy-saving project. Chunghwa Telecom has used Information and communication technologies (ICT) to construct cloud based platforms to monitor LED street lights and provide intelligent management services, including electronic maps for guiding, alarm notification, and power usage monitoring functions. Meanwhile, Chunghwa Telecom, the first ISO 50001 certified telecom, has developed an ISO 50001 assistance system to help enterprises conduct ISO 50001 energy management system, with the aim of realizing the vision of sustainable environment.

Due to government’s policy on promoting public transportation systems and reducing carbon dioxide emissions in private vehicles, Chunghwa Telecom has developed real-time eBus information service system with information and communication technologies (ICT). It provides idle speed detection and gives warning and reports for monitoring driver’s driving behavior to reduce vehicle fuel consumption and idle speed time effectively. Besides, it offers a variety of means for queries, such as websites, mobile APPs, LED smart stops and LCD displays. Passengers can ascertain a wide range of useful information, such as arrival times of buses, route and fare information, as well as other travel arrangements – all of which increases willingness to use public transportation.



Regulatory and Policy Update

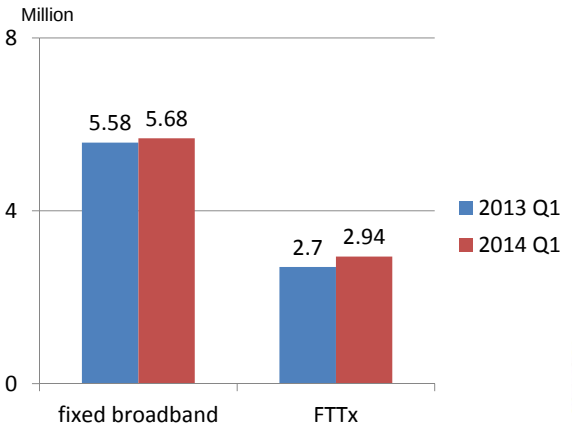
Chinese Taipei

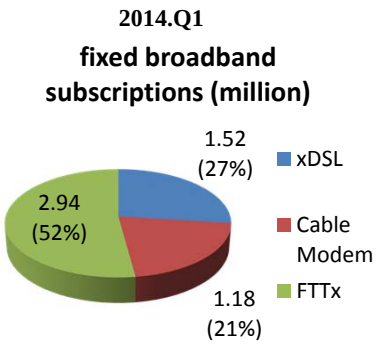
29 Sep, 2014

Outline

- Broadband Market
- Promotion of 4G development
- Future license planning
- Cyber security
- IPv6 Development

Fixed Broadband





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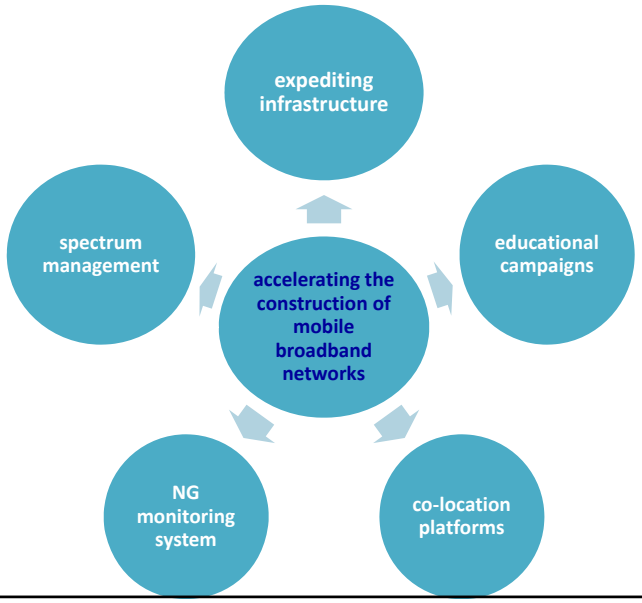
Mobile Broadband

- 3G
  - Subscribers : approx. **18.31 million** with a penetration of **93%.** (Mar. 2014)
- **4G**
  - Auction completed on Oct. 30, 2013
  - 6 **winning bidders**
  - 4 already operating 4G services
  - Subscribers : approx. **640,000** with a penetration of **2.73%.** (Aug. 2014)

Promotion of 4G development



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Future license planning

- In 2020 :
  - demand for bandwidth for mobile broadband is estimated to reach approx. 1000MHz
- Next step:
  - releasing 2600MHz
  - increase of 190MHz of bandwidth for mobile services(estimated)

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Cyber Security

- Government Information Sharing and Analysis Center (G-ISAC) began operations in Nov. 2009
  - **to establish capabilities in sharing and analyzing information on cyber security**
  - **to enhance coordination**
- Feb. 2014: TWNCERT participated in APCERT Drill 2014 "Countering Cyber-ops with Regional Coordination,":
  - 20 members from 16 economies
  - TWNCERT successfully completed all 8 scenarios
- During 2014, G-ISAC members exchanged 1,969 pieces of information, including
  - 33 C&C incidents
  - 187,230 Botnet incidents

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IPv6 Development

- **Jan 30, 2012: IPv6 Upgrade and Promotion Office established**
- **July 2014: 260 ICT products had passed the IPv6 Ready Phase-2 Gold Logo**
- **July 2014: 3,244 out of 4,982 governmental application services were upgraded to IPv6 (65.11%)**

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Thank you for your attention