2019 NCC
PERFORMANCE REPORT

NATIONAL
COMMUNICATIONS
COMMISSION

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Preface

Chapter one of this NCC Performance Report 2019 introduces the organizational structure and administrative operation model of the National Communications Commission (NCC) with view to ensuring the general public can gain deeper understanding of the roles NCC play in the communications industry.

Chapter two, entitled Performance Results of Domestic Communications Policies, outlines various communications policies and regulations promoted by NCC during 2019, encompassing various aspects of communications, international exchange, digital inclusion, convergence of laws and regulations, and protection of information security working in line with the Executive Yuan to implement national information and communication policies. In the aspect of communications, fixed network services in Taiwan now provide access to services at Gbps level or above. As for mobile broadband networks, in addition to the high accessibility and 4G coverage, NCC issued the first phase of 5G service licenses in February 2020, demonstrating that broadband with increasingly larger bandwidth, lower latency, and connectivity for more devices has become an indispensable element for the next-generation services.

Turning to media communications, NCC also supports cable television operators to broadcast HD contents over basic channels, promotes 4K video streaming services and encourages business operators to provide outstanding services and enhance program quality. As communications services are inseparable from people's daily life, NCC actively revises relevant laws and regulations and proposes whitepapers on communication policies as Taiwan's implantation blueprint of radio and television policies.

As for international exchanges, by participating in international conferences or organizing international forums in Taiwan, NCC can gain insight to policies and regulations, as well as take the opportunity to demonstrate the capabilities of Taiwan in communications internationally through various means and discussions with industry, government, and academic representatives. For its digital inclusion implementation, NCC has improved high-speed broadband access services in remote regions, so that the people in those areas can access the same level of broadband services provided to urban areas. In addition, high-speed broadband networks in remote regions are able to facilitate various innovative applications and services, such as smart healthcare, smart education, and smart agriculture, to facilitate the development of local economic, further reducing the digital divide between urban and rural areas. NCC has also taken various approaches to ensure that beneficial results in digital convergence remain widespread, such as subsidizing audio descriptions for video

productions, improving the recognition of the television rating system, and increasing media literacy ability.

For preparation and convergence of regulations, key achievements include the Telecommunications Management Act declared by the President in June 2019, the draft of the Digital Communications Act, and draft of the Media Diversity Governance and Monopolization Prevention Act. Adjustment in convergence of regulations benefits various innovative applications and services, as well as responds to the digital evolution and emerging models of communications businesses and services.

With respects to information security, NCC has established a remote backup center for the National Communications and Cyber Security Center to enhance communications network operation and management. NCC also continues to supervise telecom operators to improve security management for server rooms, organize security trainings, and conduct drills for key infrastructure protections. These efforts enhance security protection capabilities and operation sustainability, and ensure the rights and interests of citizens in Taiwan.

As outlined in chapter three, Prospects and Vision, NCC will continue to enhance the communications infrastructure in Taiwan and implement major information and communications programs. NCC encourages communications business operators to link to various emerging technologies based on high-speed broadband networks, strive for digital transformation, and build strong foundations for the digital economy, which by nature crosses borders meaning communications industries should expect to face more competitive and rapidly changing markets. Consequently, NCC is committed to rising to this challenge in an increasingly diversified environment to develop appropriate policies and regulations and facilitate the development of an effective regulatory structure for communications in the digital economy, ultimately ensuring the best conditions are in place in Taiwan to power our future new digital lives.

Introduction of NCC

Introduction of the Organization

The National Communications Commission

In response to the development of global communications convergence and the subsequent changes of regulatory supervision, existing affairs of communications in Taiwan were integrated, and the Fundamental Communications Act and The National Communications Commission Organization Act (The NCC Organization Act) were announced in 2004 and 2005 respectively. Consequently, NCC was officially founded on February 22nd, 2006.

NCC is an independent body established in accordance with the Basic Code Governing Central Administrative Agencies Organizations. With reference to communications management experiences in advanced economies, the NCC integrated authorities from Directorate General of Telecommunications, Ministry of Transportation and Communications, and Government Information Office, of the Executive Yuan and specified the management and supervisory roles in telecommunications and broadcasting industries, so that communications supervision can become coordinated under one agency. NCC is committed to policy planning, system supervision, market competition, resource management, and consumer rights. It is a professional, diverse, and efficient agency for improving the communications industry and environment, as well as enhancing the digital capabilities of Taiwan.

Duties and Responsibilities

According to Article 1 of The National Communications Commission Organization Act, the purpose of the NCC is to ensure people's freedom of speech, end state control of the media in order to protect its neutrality, enhance broadcasting standards, ensure fair and effective competition, protect the rights and interests of consumers, respect the rights of minorities and underprivileged groups, promote the development of cultural diversity, and enhance the competitiveness of the nation. In accordance with Article 3 of the same act, the duties and responsibilities of NCC include the following:

- Stipulate communications supervisory policy, and stipulate, draft, amend, abolish and implement communications laws and regulations;
- Manage and supervise the operations of communications businesses and license approval and issuance;
- Review and inspect communications systems and equipment;
- Stipulate technical standards of communications

engineering;

- Regulate the rating system on communications contents and other matters specified in laws;
- Manage communications resources; maintain the order of competitive practices in communications;
- Standardize and manage specifications of technologies of communications security;
- Preside over major disputes between communications operators and matters of consumer protection;
- Conduct international exchanges and cooperation regarding communications;
- Manage funds related to communications businesses;
- Supervise, investigate, and establish rulings on communications operations;
- Penalize and discipline those that violate communications-related laws and regulations;
- Supervise other communications-related matters.

Organizational Framework of NCC

In response to the transformation of the communications technology and industry, NCC adjusted its internal organization based on the hierarchical management model, in line with the trend in amendments to the convergence laws with reference of governance structure of the communications industry in other countries. The new organizational framework took effect on January 1, 2015, consisting of the Department of Planning, Department of Network Infrastructure, Department of Platforms and Businesses, Department of Frequency and Resources, Department of Broadcasting and Content, Department of Legal Affairs, Department of Northern Regional Affairs, Department of Central Regional Affairs, Department of Southern Regional Affairs, Secretariat, Personnel Office, Civil Service Ethics Office, and Budget, Accounting and Statistics Office (Figure 1).

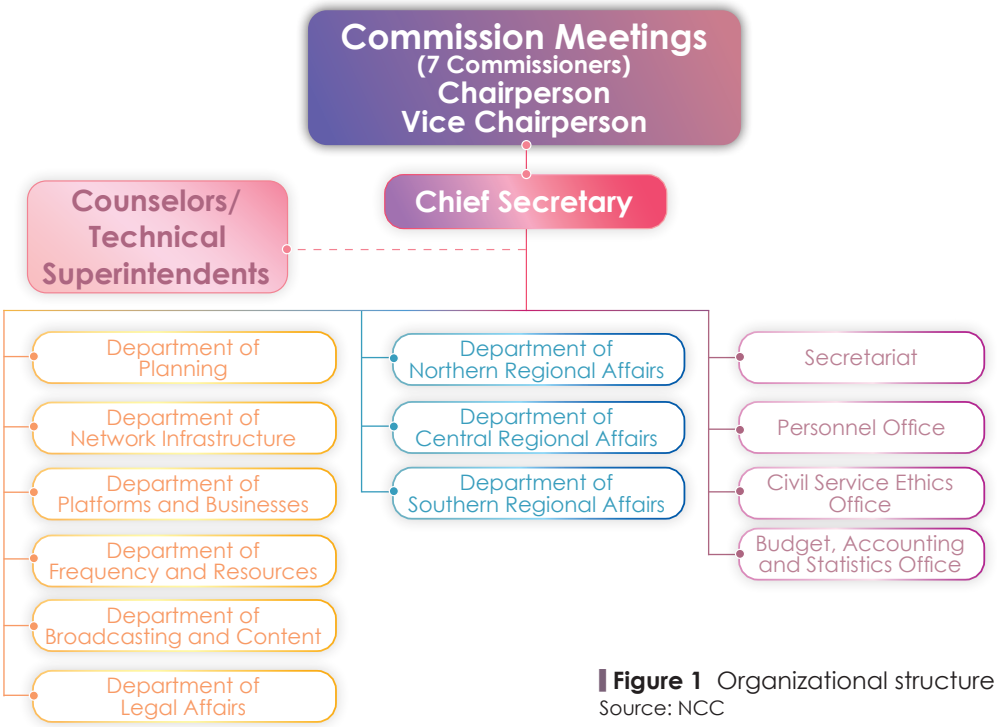

Figure 1 Organizational structure
Source: NCC

NCC Commissioners

According to Article 4 of the NCC Organization Act, seven commissioner positions are designed by the NCC, and all of whom are full-time positions nominated by the Head of the Executive Yuan (Premier) and appointed at the consent of the Legislative Yuan. The commissioners serve a four-year tenure and they may be re-appointed to serve for a consecutive term. The Premier appoints one commissioner as the Chairperson to represent NCC. The Vice Chairperson is compensated as a Grade 14 civil servant. Other commissioners are compensated as Grade 13 civil servants.

Chairperson Ting-I Chan resigned on April 3rd, 2019, and Vice Chairperson Po-Tsung Wong served as the acting Chairperson. Since Po-Tsung Wong resigned on May 30th, 2019, Commissioner Yaw-Shyang Chen has served as acting Chairperson. As of December 31st, 2019, there are a total of five commissioners: acting Chairperson Yaw-Shyang Chen, Chen-Ling Hung, Yeali S. Sun, Wen-Chung Guo, and Wei-Chung Teng (in the order of the number of strokes in their Mandarin surname). The commissioners possess expertise and knowledge in relevant professional fields such as law and regulations, technology and improves the development of communications.

Overview of Administrative Operations

Operations of Commission Meeting

NCC is an independent agency adopting the collegial system. The Commission Meeting is convened primarily in order to implement the NCC policies and affairs. According to Article 10 of the NCC Organization Act, the NCC convenes a Commission Meeting on a weekly basis with interim meetings being convened when deemed necessary.

NCC convened a total of 52 Commission Meetings during 2019, in which a total of 256 motions were resolved (Figure 2).

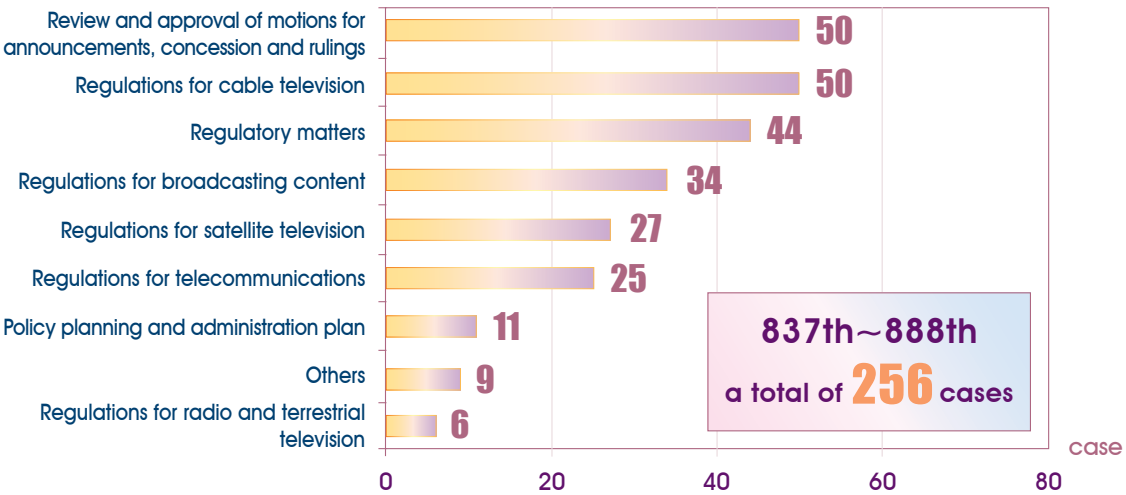

Figure 2 Motions resolved during NCC Commission Meetings
Source: NCC

Results of Domestic Communications Policies

Overview of the Communications Market

As of December 2019, there were 29.21 million mobile communications subscribers, 27.64 million mobile broadband subscribers, 5.9 million fixed network subscribers, and 10.98 million landline phone subscribers in Taiwan. Compared to figures in 2018, both the number of landline phone subscribers and mobile communications users declined slightly. On the other hand, mobile broadband accounts increased by 900,000, indicating that mobile broadband is the primary means for communications in Taiwan (Figure 3).

As of December 2019, there were 33,180,870 fixed network and mobile broadband subscribers, in which 4G service subscribers accounted for 79.44%, followed by FFTx (11.17%), cable modem (4.73%), ADSL (1.7%), (PWLAN) 0.20%, and leased line

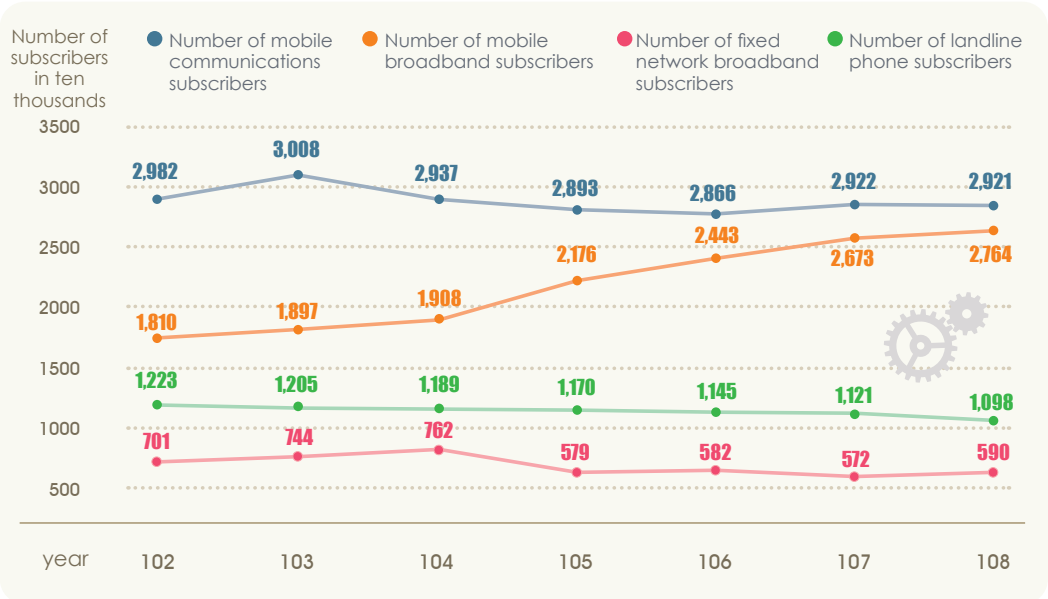

Figure 3 Telecom subscription numbers
Source: NCC

(0.01%)(Figure 4), indicating that mobile broadband service is widespread in Taiwan.

For telecom operators, mobile communications remains the main source of revenue, accounting for 54.26%. Among others, fixed network internet and added services account for 18.73%, network rental for 10.94%, and local calls for 10.12%, while international calls (2.73%), telecom TV (Chunghwa Telecom MOD) (2.10%), and long-distance calls (1.14%) account for more modest returns (Figure 5).

In Taiwan, 99.99% of cable television services have been digitized (Figure 6), leading to all cable television services in Taiwan soon becoming completely digitized.

Turning to domestic productions of television programs during 2019, the five terrestrial television stations in Taiwan produced 1,613 hours of dramas for prime time slots, in which 1,059 hours were new content. Satellite channels broadcasted 36,033 hours of dramas, films, variety shows, and children's programs produced domestically for various time slots, in which 23,315 hours were new content (Table 1). NCC continues to encourage operators to enhance program quality and production capability.

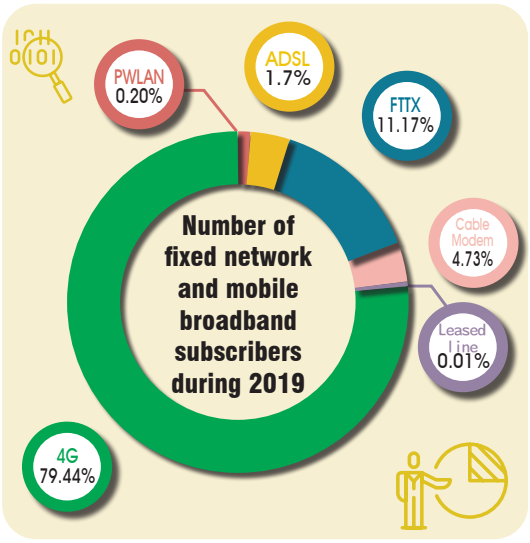

Figure 4 Fixed network and mobile broadband subscribers
Source: NCC

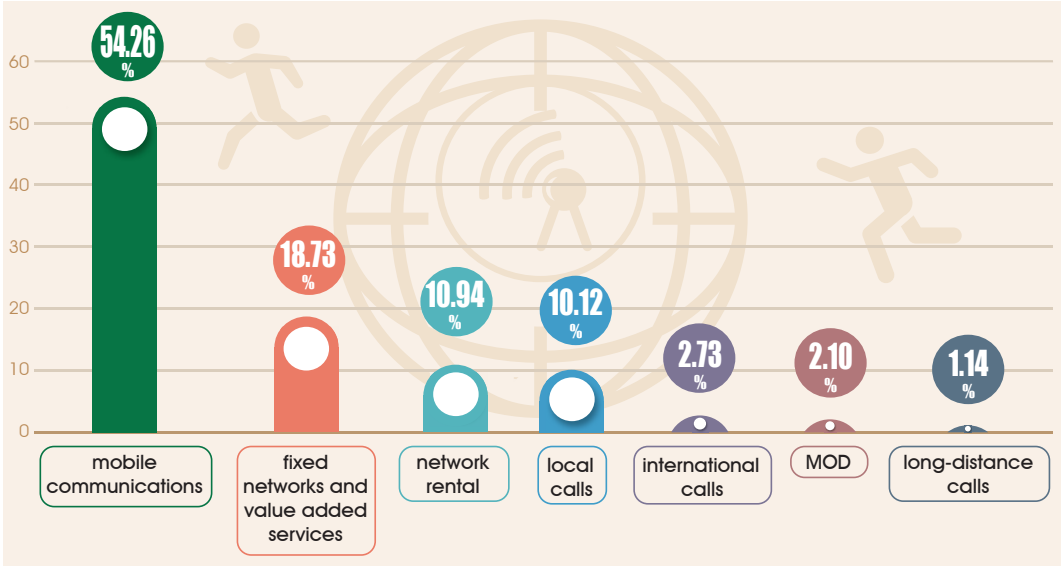

Figure 5 Revenue ratio of various types of telecom services
Source: NCC

Table 1 New broadcasts of self-produced domestic TV programs
Source: NCC

Five terrestrial television stations	107	108
Hours of domestic dramas	2,054.9	1,612.8
Hours of new domestic dramas	1,299.4	1,058.7

Satellite channels	107	108
Hours of domestic programs	37,090	36,033
Hours of new broadcast of domestic programs	23,532	23,315

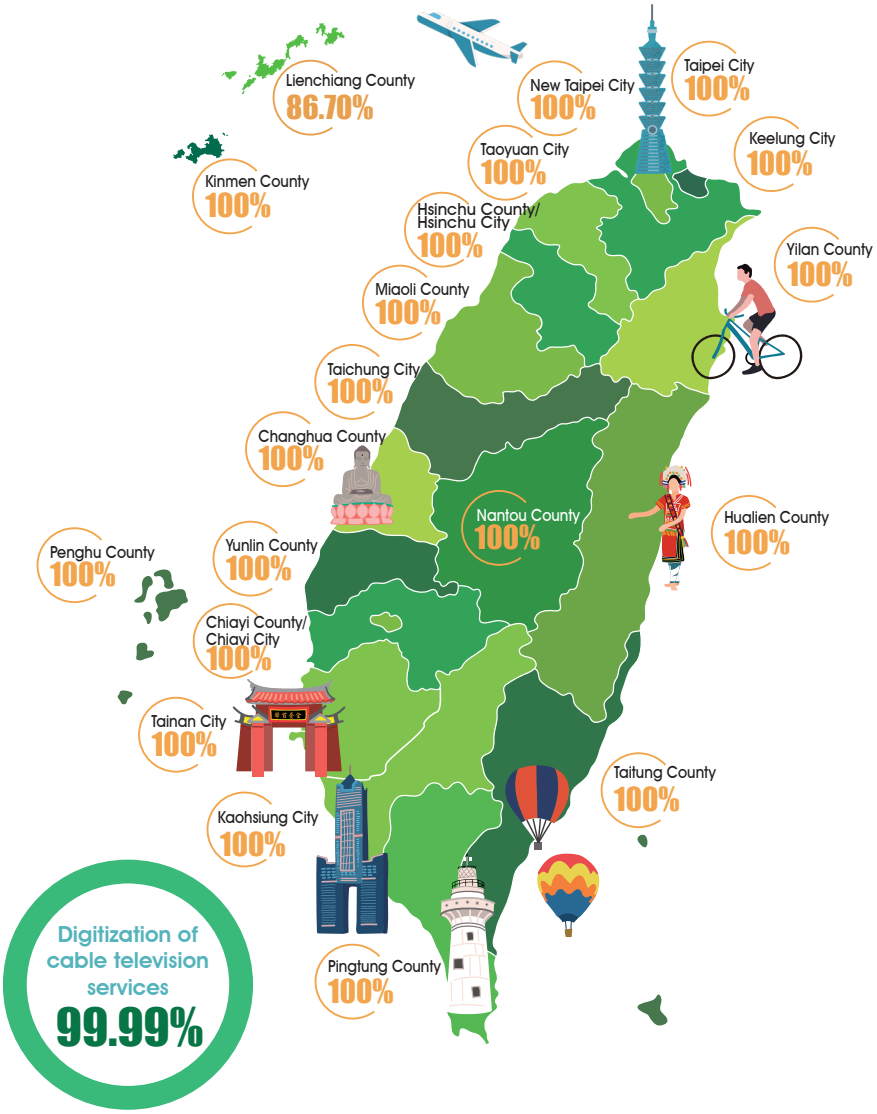

Figure 6 Digitization of cable TV services in Taiwan
Source: NCC

Broadband Networks to Facilitate the Digital Economy

5G Infrastructure

NCC auctioned 1.8GHz, 3.5GHz, and 28GHz bands in December 2019 for the first phase of bidding process for 5G; Chunghwa Telecom, Taiwan Mobile, Taiwan Star Telecom, Asia Pacific Telecom, and FarEasTone were deemed as eligible bidders. After 261 rounds of quantity bidding, the winning bids totaled NT$138.081 billion and 1870MHz of bandwidth was released. The second phase bidding began on February 21st, 2020 and after one round, the winning bids totaled NT$4.11 billion. With a total of NT$142.19 billion in bids (Figure 7), the first batch of 5G licenses was issued. After the forthcoming completion of key development procedures and 5G infrastructure deployment, 5G services will soon be provided.

As the 3.5GHz band for 5G services is close to regular satellite business bands in Taiwan, the NCC has had to ensure that forthcoming 5G services do not cause adjacent satellite network interference. NCC conducted empirical trials with 5G stations (Figure 8) and fixed satellite business ground receivers (Figure 9) with enhancement measures. Tests indicated that fixed satellite business ground receivers with enhancement measures comply with NCC requirements and that the two services do not interfere with each other. NCC also announced a subsidy guideline for 3.5GHz band facilities, requiring 3.5GHz operators to deploy frequency improvement measures prior to deploying 5G infrastructure in order to prevent interference for existing users.

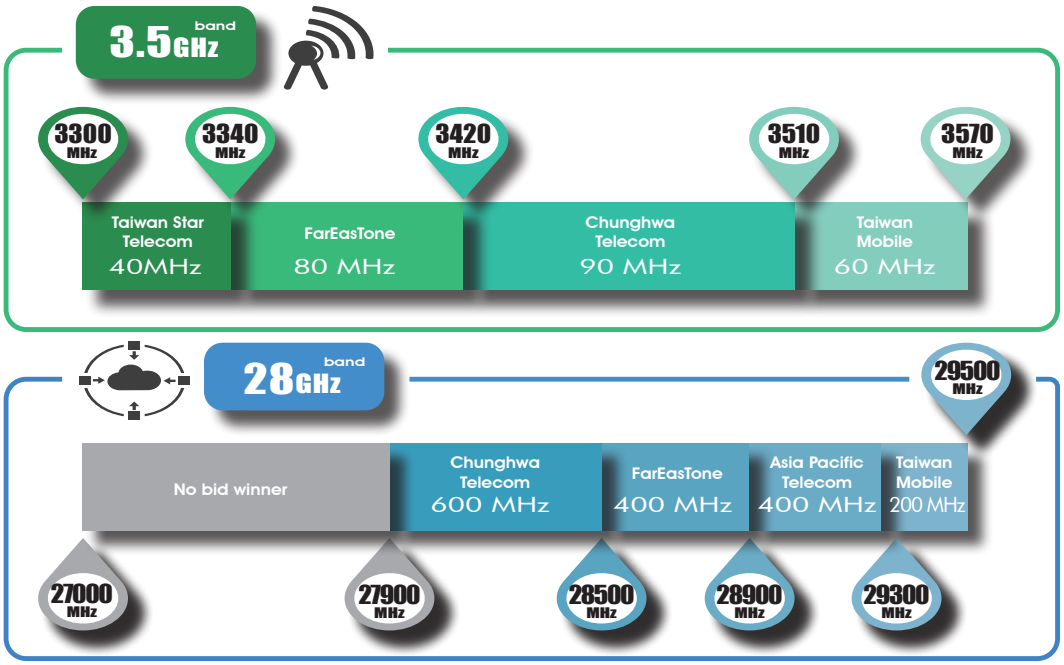

Figure 7 Frequency allocations for the first phase of 5G licenses
Source: NCC

Figure 8 Trials of 5G stations
Source: NCC

Figure 9 FSS satellite ground receiver
Source: NCC

IPv6 Utilization

The utilization of IPv6 in Taiwan increased significantly to 43.06% in 2019, ranking 8th in the world (Figure 10). Major domestic internet access service providers and mobile network operators in Taiwan fully support IPv4/IPv6 dual systems. Taiwan has also delivered outstanding performances in regards to updating IPv6 facilities. For example, 87.6% of iTaiwan hotspots support IPv6 services and nearly half of the public high schools are equipped with IPv6 compatible ICT facilities. As 5G connectivity and IoT continue to develop, NCC will assist end and network devices, application services, smaller fixed network, and other fixed network operators to implement IPv4/IPv6 dual systems and foster IPv6 ecosystem for basic and application services.

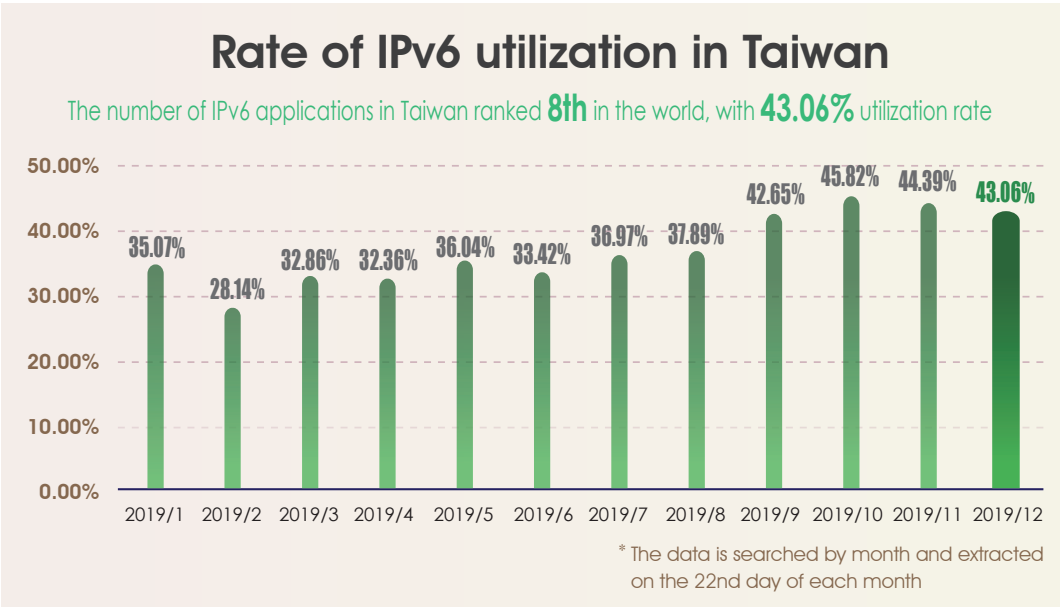

Figure 10 IPv6 utilization rate
Source: TWNIC

Mobile Communications along Railways and Highways, and in Mountainous Areas

In order to provide travelers with high-quality broadband service during their journey, the NCC continues to improve mobile services along eastern Taiwan's railroads and mountainous areas and expand wireless internet coverage to provide broadband services. For mobile services along key traffic networks in eastern Taiwan, the NCC optimized the Eastern Railway Line (Badu to Taitung), the Nanhui Line (Dawu to Puan signal station) (Figure 11), and five sections on the Suhua Highway (Figure 12). Travelers along these routes can now enjoy fast internet access enabled by broadband networks.

In addition to improving mobile services along key traffic networks, the NCC launched the Mt. Jade North Peak telecom station in August 2019 (Figure 13). It effectively improved telecom coverage for Mt. Jade, including the Batongguan Ancient Trail, the S2 section on Central Mountain Range, and the Provincial Highway 21 to Tataka. It also elevated the communications quality in Yushan National Park and improved the effectiveness of emergency relief and support in the mountainous areas. In December 2019, the services at Kuaigu Lodge were also enhanced. NCC plans to work with the Forestry Bureau to optimize the mobile service coverage at the Jiujiu Lodge, the Tianchi Lodge, the Xiangyang Cabin, the Jiaminghu Cabin, and the Shichisei Mountain Trail by the end of 2020, and also plans to optimize mobile coverage for 63 other mountainous locations.

Figure 11 Optimization of mobile communications services along railway networks in eastern and southern Taiwan
Source: NCC

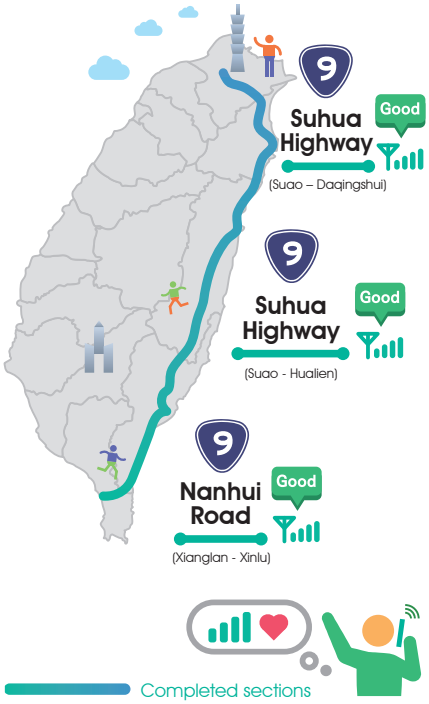

Figure 12 Optimization of mobile services along the Suhua Highway
Source: NCC

Figure 13 Launch ceremony of Mt. Jade North Peak station
Source: NCC

Communications Platforms for Disaster Prevention and Relief

NCC developed the Mobile Communications Infrastructure Deployment Plan for Disaster Prevention and Reduction subsidizing telecom operators to deploy fixed and mobile stations and improve resistance and backup capabilities for base stations in remote and disaster-prone areas. As of 2019, the NCC had supported operators to establish 89 fixed and 44 mobile base stations for disaster prevention and relief operations. After disasters, over 93% of the base stations remained active. Mobile emergency communications service capabilities increased 1.5 times. In total, 89 stations have been equipped with over 72 hours of backup power capacity and 55 stations can withstand wind speeds over 50m/s (Figure 14). During major disasters in recent years, these mobile communications platforms have already proved to be effective in helping rescue efforts.

Figure 14 Telecom engineers deploy mobile communications platform for disaster prevention and relief
Source: NCC

Development of Radio & Television Industries and Protection of the Rights and Interests of Audiences

Communications Policies

NCC published the Communications Policy Discussion Paper in the Age of Convergence (green paper) in 2018. After a series of public consultations, the communications policy whitepaper was passed during the 895th Commission Meeting on February 12th, 2020. The whitepaper is founded on four core values: freedom of speech and expression, fair and effective competition, diverse and local cultures, as well as democratic and public engagement and outlines six visions the NCC is committed to fulfilling: (1)infrastructure for digital convergence, transformation, and smart connection, (2)an audiovisual platform that facilitates fair and effective competition and innovation, (3)audiovisual content imparting local cultural identity, quality, and quantity, (4)free speech and expression with effective self-regulation, (5)communications with digital literacy and professional ethical requirements, and (6)protection of public interests, consumers and disadvantaged communities.

The whitepaper also contains proposals of the NCC outlining initial plans and improvements in eight significant areas: control and coordination between competing platforms, a legal system to prevent media concentration, a broadcast license and evaluation system, channel licensing, listing and options, audiovisual production and local cultural revival, content regulation and media literacy, future development of radio, terrestrial television, and public media development industries(Figure 15). Preliminary planning and improvement measures have also been proposed as a reference for future regulatory framework and policy objectives.

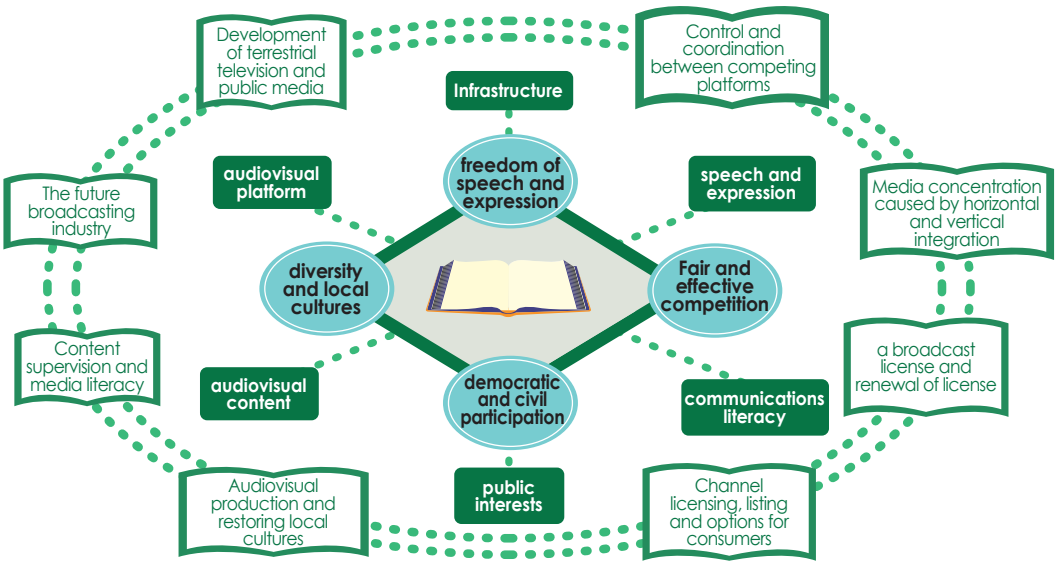

Figure 15 Structure of the Communications Policy Whitepaper
Source: NCC

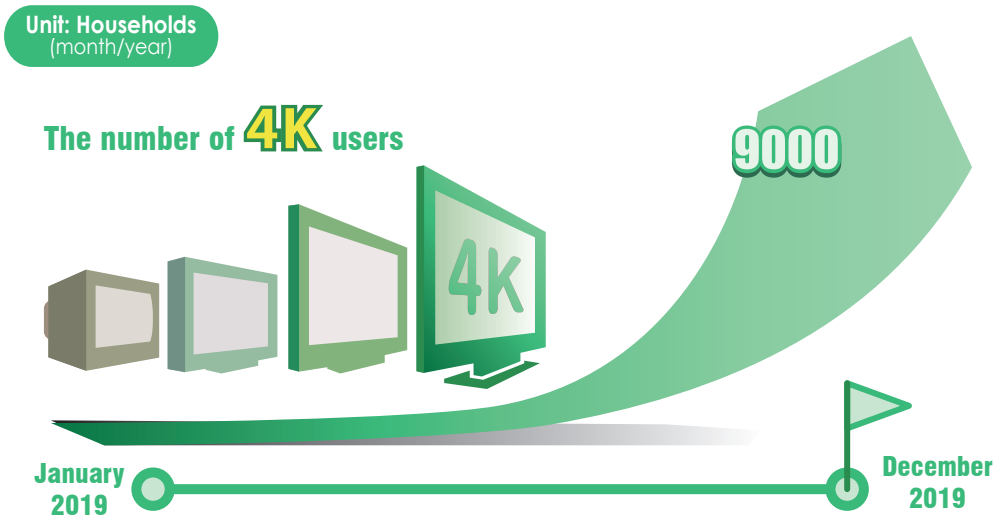

Figure 16 The number of 4K service users
Source: NCC

UHD Broadcast Capabilities of Cable Television Operators

With view to strengthening the quality of domestic productions, and to synchronizing with the Tokyo Olympics broadcasting in 4K UHD resolution, the NCC subsidized 19 cable system operators to upgrade their transmission systems and digital set-top boxes to deliver 4K UHD services to 9,000 households (Figure 16). Through this program, the NCC hopes that cable system operators can continue to invest in infrastructure for outstanding audiovisual transmission environments to enhance the "television ecosystem."

Safeguarding the Rights of Legal Operators

In order to ensure fair market competition and safeguard the legal rights of operators, the NCC addresses issues concerning intellectual property rights among wireless multimedia set-top boxes on the market. Measures include conducting extensive campaigns, reviewing information disclosures, authenticating certificates, issuing reminders to certificate applicants, updating qualification information, and carrying out random inspections. During 2019, the NCC carried out inspections on 33 wireless set-top boxes, of which 12 passed and 20 failed; one was amended before the deadline (Figure 17).

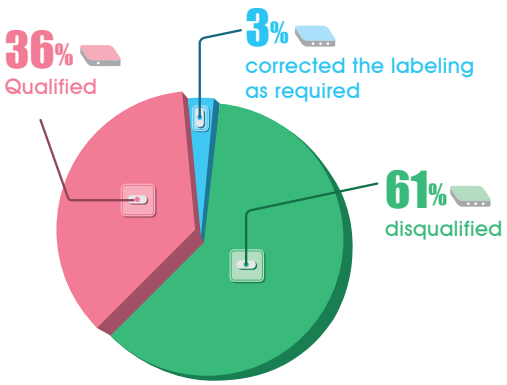

Figure 17 Results of random inspections on wireless multimedia set-top boxes (2019)
Source: NCC

Enhancement of Self-Regulations for Radio and Television Media

NCC actively consults with multiple stakeholders to improve self-regulation in media outlets. On October 2-3rd, 2019, the NCC held a Television Content Production and Operation Conference inviting media operators, unions, associations, civic groups, experts, and scholars to discuss relevant topics, including news fact-checkers, gender, children and adolescents, and innovative business models.

After acting NCC Chairperson Yaw-Shyang Chen delivered the opening remarks (Figure 18), Commissioners Wei-Chung Teng, Wen-Chung Guo, and Chen-Ling Hung participated in the discussions. Television operators were able to gain deeper understanding of regulations to enhance media self-regulation, improve program quality, and elevate channel operations through case studies. The event also emphasized that creative content and innovative and feasible business models could also inspire industry development.

Figure 18 The Acting NCC Chairperson Yaw-Shyang Chen delivers a speech during the Television Content Production and Operation Conference
Source: NCC

International Exchanges with view to Internet Governance

The International Digital Transformation Trends Forum

With the aim of gaining insight to the latest global trends in digital transformation and digital convergence, as well as local policies and regulations, the NCC commissioned third parties to organize the Across & Beyond – Digital Transformation Trends Forum 2019 in Taipei on September 10th, 2019. The Excutive Yuan's Minister without portfolio, Audrey Tang discussed how Taiwan has responded to digital innovations. Both domestic and international experts, operators, and scholars were invited to discuss key issues, including 5G deployment, industrial innovations, global trends, and audiovisual media. The event also covered international communications technologies and policy trends, new digital innovation strategies in advanced economies, and innovative applications enabled by 5G, AI, and other emerging technologies. It was also highlighted that by leveraging on existing advantages, Taiwan could explore key factors in digital innovation and transformation.

The forum highlighted 5G deployment strategies by operators, both domestic and overseas, business digital transformation, interdisciplinary applications, and practical experiences in data-driven applications with

emerging technologies.

The event also provided a reference for Taiwan when developing innovative communications applications and services and promoting vertical integration so as to stimulate the digital economy (Figure 19).

The International Cybersecurity and Emerging Technology Conference-jointly organized by Taiwan, USA, and Japan

With view to enhancing cooperation on cybersecurity among countries across the Asia Pacific, Taiwan, the US, and Japan jointly organized an international cybersecurity and emerging technology conference under the Global Cooperation and Training Framework from May 28-30, 2019; on the 29th, NCC Commissioner Yeali Sun moderated a session entitled "Practice on Taiwan Communications Protection and Cyber Security," in which she introduced broadband development in Taiwan, the significance of 5G connectivity to Taiwan as a digital nation, as well as 5G startup structure and security supervision. Exchanges during the session can be valuable references for Taiwan when improving communications infrastructure and service security. NCC also invited the US Department of Homeland Security, the Department of State, FCC officials, and GCTF participants to visit the National Communications and Cyber Security Center and learn more about communications

Figure 19 Across & Beyond - Digital Transformation Trends Forum 2019
Source: NCC

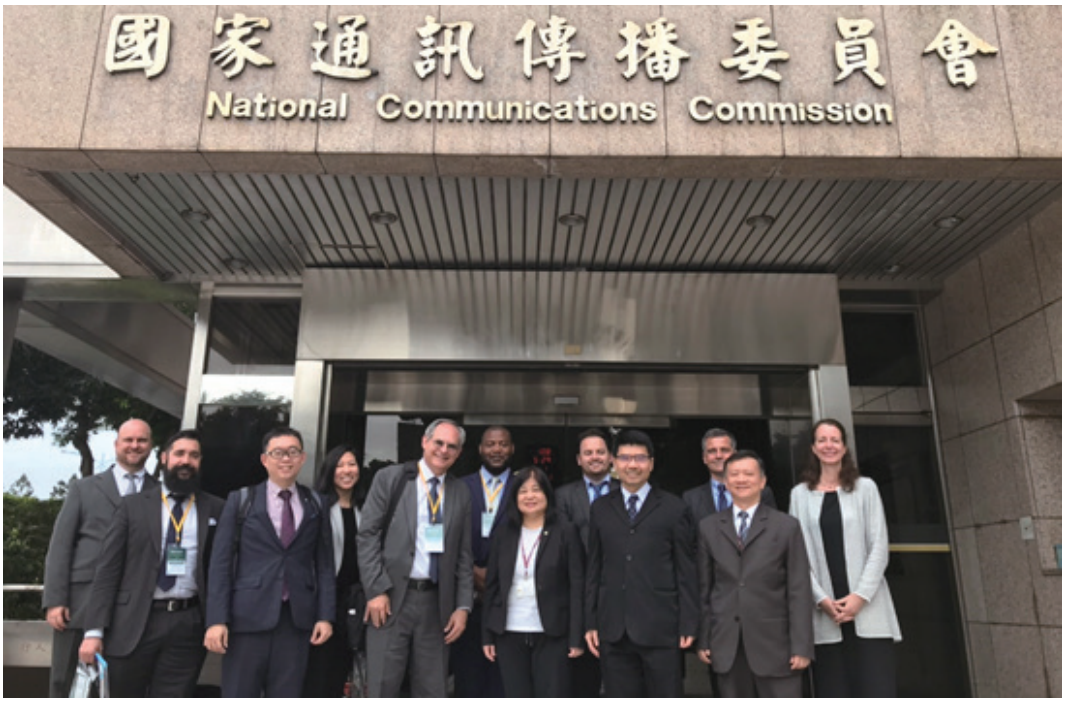

Figure 20 International Cybersecurity and Emerging Technology Conference - Practice on Taiwan Communications Protection and Cyber Security
Source: NCC

cybersecurity protection practices in Taiwan (Figure 20).

On May 30th, the session focused on the feasibility of establishing an International Cybersecurity Center of Excellence in Taiwan. NCC Commissioner Yeali Sun was invited as a panelist, and AIT representatives also attended the same session to discuss security co-protection and explore the feasibility of establishing an International Cybersecurity Center of Excellence in Taiwan.

2019 Asia Video Industry Association Summit

Each year the Asia Video Industry Association organizes policy roundtables and summits, which are considered a key means for engagement on video content industries. The AVIA Policy Roundtable and Summit in 2019 was held in Singapore from November 4-6. The Policy Roundtable on November 4th focused on content production business models, user privacy protection, anti-piracy measures, regulations, and policies. NCC Commissioner Chen-Ling Hung was invited as the keynote speaker in the "Meet the Regulator" session. She was given the opportunity to explain how the NCC has worked with emerging video industry operators in Taiwan to protect online intellectual property rights and consumer rights. She also highlighted how the NCC communicated with other official bodies to international government and industry representatives.

During the AVIA Summit on November 5-6, emerging video business models, the future of pay-tv, anti-piracy, video talent education, and video technology development, as well as other issues, were discussed. Besides engaging with international representatives, NCC Commissioner Chen-Ling Hung also visited Infocomm Media and Development Authority (IMDA) in Singapore and discussed communications and internet supervision issues with the representatives from IMDA (Figure 21). NCC learned more about opinions and responses on the latest market development and key competition issues, all of which can serve as valuable references when formulating future policies in Taiwan.

Online Safety for Children and Adolescents

Mandated by Article 46 in The Protection of Children and Youth Welfare and Rights Act, the NCC commissioned relevant government bodies to establish the Institute of Watch Internet Network (iWIN). This public-private partnership aims to ensure online safety for children and adolescents. It offers the latest information about free filtering services around the world and filtering services by local ISPs. During 2019, the iWIN received 3,139 reports from the public, in which 1,367 incidents were related to children and adolescent regulations. Depending on the nature of the cases, the iWIN either refers the case to local or international organizations or informs online platform operators to remove the content in question.

To promote knowledge of online safety, the iWIN organized the 2019 Online Safety for Children and Adolescents Meeting on August 6th, 2019. iWIN Executive Director discussed the "literacy revolution," and emphasized the "five don'ts" of online usage. A forum was held and attendees included government representatives, academics, industry representatives, and iWIN's executive secretary to discuss and optimize the online safety net. The iWIN also organized major educational campaigns on various occasions in 2019, including IT month (Figure 22), Taipei Zoo, Cikasuan Park, Kaohsiung Cultural Center, and Caowu Square. By advocating the concept of healthy Internet access, online literacy and safety awareness have been improved.

Figure 21 Commissioner Chen-Ling Hung (second right) with the representatives from IMDA, AVIA and HBO
Source: NCC

Figure 22 The Acting NCC Chairperson Yaw-Shyang Chen (second left) at the ITmonth in Taipei
Source: NCC

Converged Environment to Power Digital Lives

Improvement of Broadband Access and Infrastructure in Remote Areas

With the aim of balancing digital economic and social development between urban and rural areas and to enhancing national competitiveness, NCC has continued its efforts in increasing broadband access infrastructure in remote areas and digital inclusion infrastructure. NCC subsidized 414 qualified applications in 2019, including deploying Gbps-grade fixed network broadband services to 26 remote villages, deploying and expanding 100Mbps-grade fixed network broadband services to 99 remote areas, increasing WIFI hotspot bandwidth in 215 locations, and adding 74 4G mobile broadband base stations. NCC also offers subsidies of up to 49% of a project's budget as an incentive to deploy infrastructure around the country (Figure 23).

Digital Accessibility

Following international conventions and adhering to Article 5 and Article 12 of the Fundamental Communications Act, Taiwan strives to maintain human dignity, respect the rights of disadvantaged groups, advocate balanced cultural development and cultural diversity, and increase communications access. During 2019, the NCC offered subsidies to television business, satellite channel programmers, and television producers to increase audio descriptions of programs,

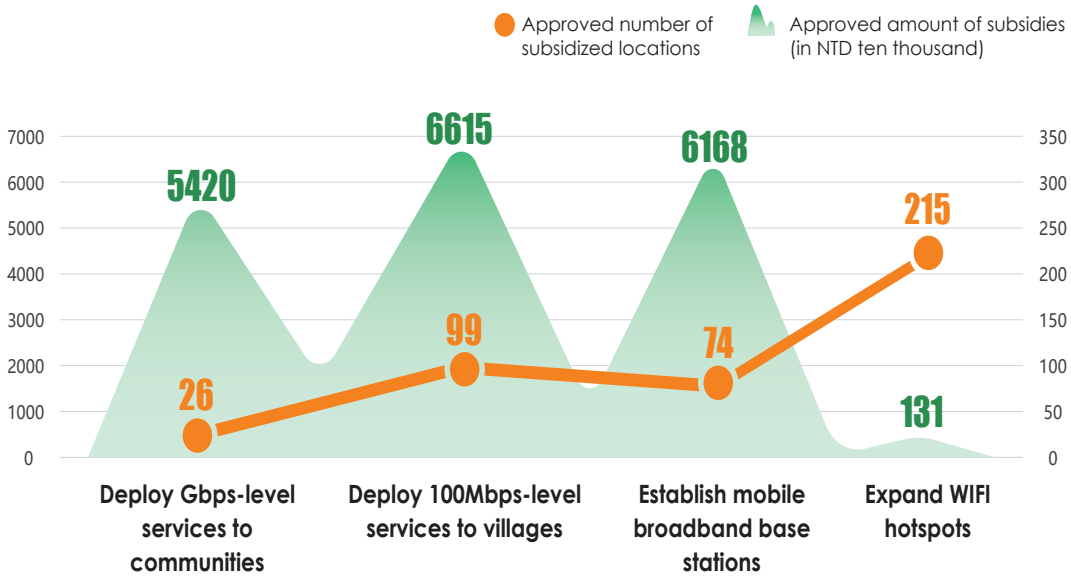

Figure 23 Improvement of broadband access and infrastructure in remote areas
Source: NCC

Figure 24 Dramas with audio narrative descriptions subsidized by NCC
Source: NCC

Figure 25 Online celebrities promoting the television content rating system
Source: NCC

ultimately subsidizing the production of eight hours of dramas, four hours of movies, two hours of television films, and two and a half hours of children's program with audio description, reaching 590,000 people (Figure 24) throughout the year.

Television Content Rating Systems and Public Awareness

NCC and other government bodies are committed to offering outstanding content and safeguarding the physical and mental health of children. Based on international practices, NCC has strived to improve the television content rating systems for children in Taiwan since 2016. In order to raise the public's awareness of content rating systems and media literacy, NCC commissioned a third-party to organize an open call for short films and comics, and invited YouTubers to produce videos (Figure 25). Through short films and comics, the television content rating system was explained in an easy-to-understand way, allowing the public to use this important reference system to make informed television content choices for children.

During the summer vacation, the NCC organized five television content rating campaigns in Taipei, Taichung, Kaohsiung, and Hualien to explain that the content rating systems for domestic television, gaming software, films, and recorded programs are identical, and to help parents and children understand the five types of classification: 0+, 6+, 12+, 15+, and 18+.

Legal Framework for Digital Convergence and Innovation

The Telecommunications Management Act

Forthcoming 5G connectivity, digital economy, and online social developments have necessitated the changing of the regulatory framework; hence, NCC, in December 2016, drafted the Telecommunications Management Act. After deliberative and legislative processes undertaken by the Executive Yuan and the Legislative Yuan, the act was announced by our President in June 2019. A three-year transition period has been put in place for the new law to integrate seamlessly with the current Telecommunications Act, allowing existing businesses to adjust their pace and gradually align with the stipulations set forth in the act.

The Telecommunications Management Act reduces market entry thresholds, promotes the flexible use of frequencies, increases incentives for infrastructure investment, establishes safe and reliable public telecom networks, maximizes public interests, and ensures a free, innovative, and fair environment for industry to flourish. NCC plans to complete the subsequent legislative process for 50 article mandates as soon as possible (Figure 26).

Draft of the Digital Communications Act

In order to safeguard the communications environment and to assist the digital

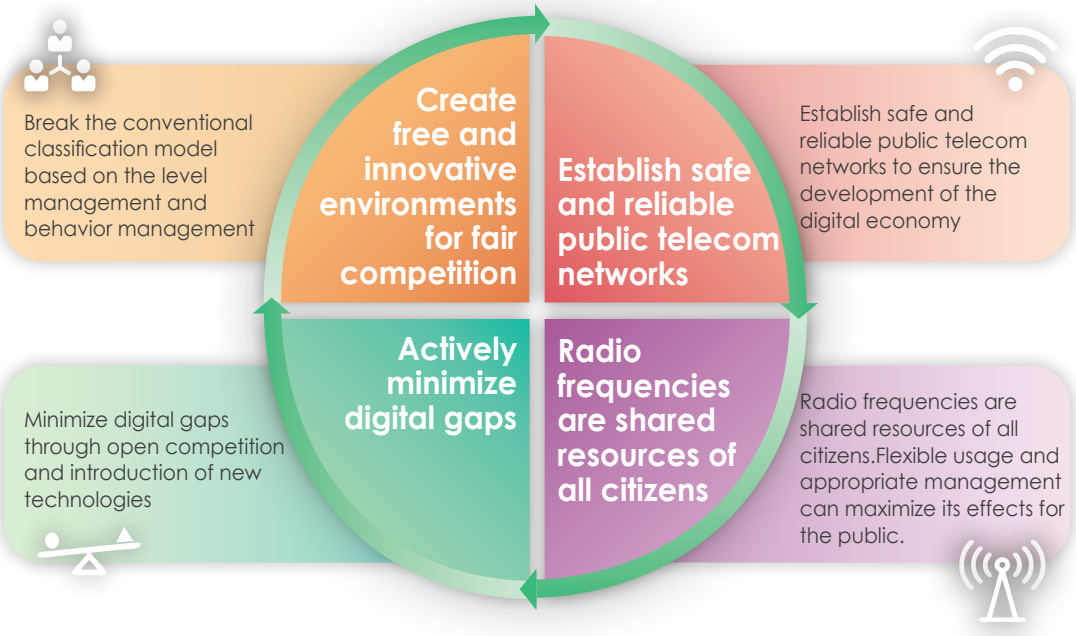

Figure 26 Legislative structure of the Telecommunications Management Act
Source: NCC

transformation, NCC drafted the Digital Communications Act in late December 2016, which was deliberated and passed by the Executive Yuan in November 2017 and delivered to the Legislative Yuan for deliberation in November 2017. After it was reviewed by the Transportation Committee in May 2018, it was sent to the caucus negotiation in November 2018.

The draft of the act outlines three primary objectives: support the digital economy, deepen internet governance, and increase international cooperation (Figure 27). When drawing up regulations for convergence, NCC consults with multiple stakeholders to ensure internet governance meets the interests of the majority while respecting those of the minority. As civic participation, open information, rights relief, and diverse values are core internet concepts, the NCC avoids administrative interventions, implements open government with public consultation and participation, and clearly states civil responsibilities to service providers to ensure consumer rights, laying foundations for a sound digital economy.

Draft of the Media Diversity Governance and Monopolization Prevention Act

Under digital convergence, the media industry landscape has changed substantially, affecting how audiovisual industry chains operate. NCC drafted the Media Diversity Governance and Monopolization Prevention Act, designed with two policy objectives: facilitating diverse media development and

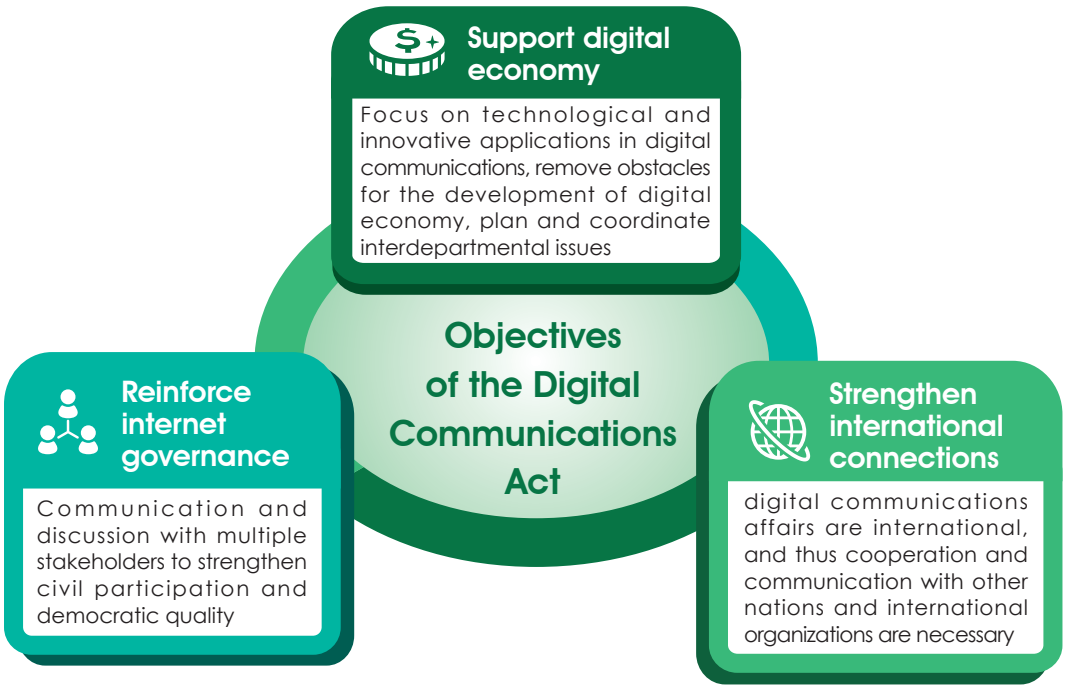

Figure 27 Objectives of the Digital Communications Act
Source: NCC

Figure 28 Policy objectives of the Media Diversity Governance and Monopolization Prevention Act
Source: NCC

safeguarding professional and autonomous journalism supplementing the three main audiovisual acts. After its completion of the draft it was forwarded to the Executive Yuan for deliberation in May 2019. With a spirit of protecting diversity in social expressions in response to changing industry environment and regulatory requirements, the act emphasizes professional and autonomous journalism and protects news media from external influences, such like investors. The act aspires to balance industry development, social responsibilities, and cultural communications to protect the freedom of expression and information, safeguard professional and autonomous journalists, and facilitate diverse cultural development (Figure 28).

After the draft has been passed, it should result in marked improvements in production quality, enhanced diversity in public opinions, fair market competition, elevated professional and autonomous journalism, advanced media industry, and the general media industry ecosystem.

Upgrading Cyber Security Systems and Securing Communications

Remote Backup for National Communications and Cyber Security Center

With the aim of enhancing security protection capabilities and mechanisms in Taiwan, the NCC established the National Communications and Cyber Security Center (NCCSC) in 2018 as a backbone for communications networks across the nation. The NCCSC includes C-NOC for internet operation and C-SOC, C-ISAC, and C-CERT for security monitoring, analytics, and reporting. Mindful to the fact that extreme climate changes or international terrorist attacks have devastated key communications infrastructure around the world, these platforms aim to improve efficient responses to disasters affecting communications businesses, security protection, internet operation status, and to ensure safety, stability, and consistency of communications networks. In order to guarantee the NCCSC's consistent operations, the NCC planned a remote backup in 2019, which was launched in December 2019. The real-time simultaneous backup structure sustains effective supervision in the face of natural disasters and emergencies to protect key communications infrastructure and improves security (Figure 29).

Training Exercises and Drills for Information Security

Through conversions in DNS and IP Address, users can connect by using memorable names and browse internet services more easily,

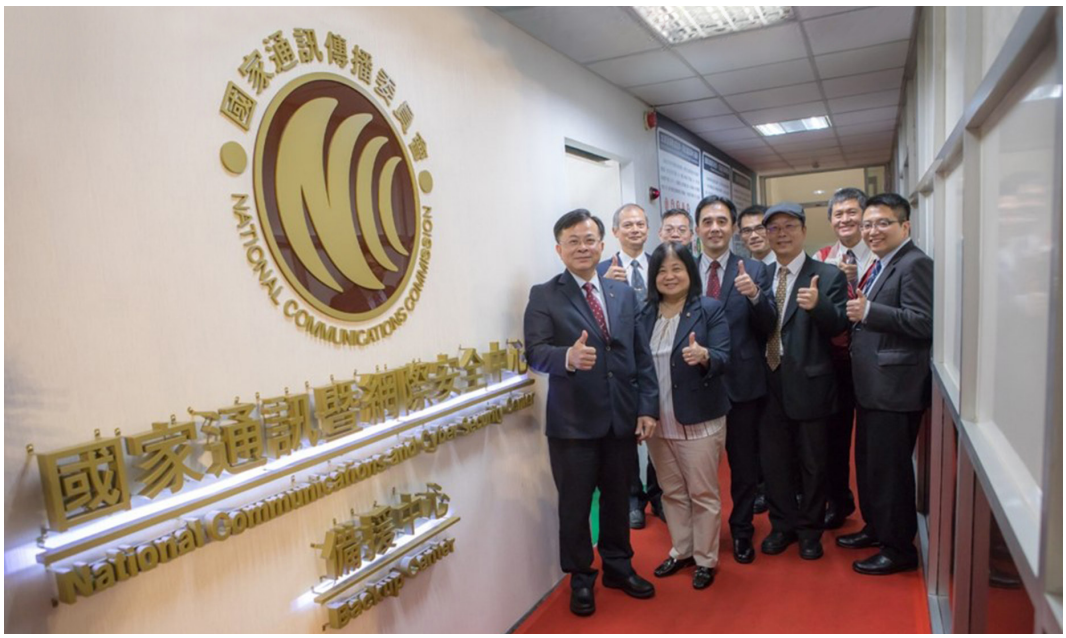

Figure 29 Launch of the NCCSC Backup Center
Source: NCC

meaning the DNS system is a key information infrastructure in most nations. Since 2017, the NCC has organized DNS and Cache DNS security training to verify DNS security protection mechanisms and response protocols (in telecom operators), identify potential issues, improve reporting and responding capabilities in security incidents, and ensure service stability and continuous operations. Throughout 2018 and 2019, the NCC invited eight and seven operators respectively to organize training and practice drills (Figure 30).

To ensure sufficient protections for DNS and critical service websites, the NCC conducted a weakness scanning and penetration test in 2019 at the Taiwan Network Information Center (TWNIC), the only organization that coordinates domain names and issues IP addresses. By reviewing risks and patching weaknesses, the aim was to increase security protections in critical internet infrastructure and core system stability.

Trainings and Drills for Key Infrastructure

According to the National Critical Infrastructure Security Protection Guidelines of the Executive Yuan, communications is one of the eight critical infrastructures in Taiwan. In order to increase industrial capabilities, critical infrastructure protection has become a key issue of national security. Since 2015, the Homeland Security Office of the Executive Yuan has implemented various practices, and the NCC coordinates protection practices in the communications industry. Over the years, the NCC has organized nine critical infrastructure protection practices and mobilized the communications industry to organize seven critical infrastructure protection drills. During 2019, the NCC coordinated with the Homeland Security Office to organize designated drills with one operator, visiting drills with two operators, and protection practices with four operators. These events mobilized 805 people and 6,446 individuals across 241 meetings, and effectively increased continuous operation capabilities (Figure 31).

Figure 30 Practical training for DNS protection
Source: NCC

Figure 31 Key Infrastructure Protection Trainings and Drills
Source: NCC

Prospects and Vision

The Digital Infrastructure

Throughout 2019, NCC has made considerable efforts to ensure fast, stable, and affordable mobile broadband services, such as better mobile broadband signals along public transportation networks, base stations on public buildings and lands, and evaluations of service quality. Following the first bidding for 5G frequency in February 2020, the next steps include eliminating 5G service interference, facilitating cooperation between telecom operators and stakeholders, and enhancing mobile communications services in mountainous areas. With 5G connectivity's eMBB, mMTC, and uRLLC features, the NCC plans to promote pilot sites, optimize POB for new business models, and eliminate interference with micro and remote interference monitoring systems to ensure frequency harmony with view to facilitating vertical integration that in turn can bring forth innovative applications and services, such as smart transportation and smart classrooms.

Fixed network rates and coverage have been a key ICT development indicator in international evaluations. Therefore, all major ICT policies in Taiwan include fast broadband fixed networks to deliver 100Mbps to each household. Gbps in Taiwan has reached over 70% (remote areas excluded) but to catch up with various innovative applications and services, it is still a priority to incentivize operators to invest in fixed networks. NCC has facilitated tubing construction mechanisms, established infrastructure resource databases, reduced communications market entry barriers, and increased the Gbps broadband network coverage. Moreover, NCC also works with other departments to improve fast fixed network access in remote areas to deliver Gbps broadband services to remote areas, provide 100Mbps to main community clusters, expand WIFI hotspot bandwidths, enhance communications quality in mountainous areas, and stronger mobile communication signals in mountainous areas to achieve the goal of universal fast broadband access.

With evolving technologies and increasing consumer appetites towards emerging services, communications operators need to deploy broadband infrastructure, adopt emerging technologies, including IPv6, AI, dynamic spectrum, and edge computing to compete in the market, dramatically changing how society and industries operate. In order to enrich innovative applications and services in Taiwan, NCC aims to complete dynamic spectrum sharing mechanisms as a feasible tool for flexible spectrum management. Proof of concept and proof of service for sharing application scenarios can be tested on experimental platforms as preparation for increasing spectrum efficiency.

Besides fast broadband services and

emerging technologies, sound security systems are also critical to a mature communications infrastructure. NCC plans to build an information security protection system, including the NCCSC, a security monitoring platform, a security reporting and response platform, and an information analytics and sharing platform. And along with IoT's security defense system, security protection for emerging services and communications ecosystems will be significantly improved.

It is highly likely that this digital transformation and its derivative effects will spread to various industries and platforms, and inspire more digital innovation along the way, leading to emerging applications and services that will ultimately drive the future digital economy. Thus, NCC is steadfastly committed to improving communications infrastructure in Taiwan as foundations for various innovative applications and services to propel Taiwan into the digital era.

Enhancement of the Radio and Television Markets

The audiovisual market in Taiwan is diverse, allowing viewers to access content through various means. With view to safeguarding these achievements, NCC promotes various communications policies. With emerging platforms and changing consumer habits, maintaining market balance while transforming the industry and driving positive development is the best solution. The cable television industry in Taiwan has now converted all basic channels to HD. In response to 4K and 8K technology developments, NCC encourages cable operators to deliver 4K services, establish 4K pilot areas, and produce programs in 4K and UHD to provide a better audio-visual experience for viewers.

To revive the industry, the NCC has relaxed product placement regulations and strengthen domestic production regulations, and supports the content industry's principle of "content is king." Through evaluations and license renewals, the NCC supervises operators to increase service quality, enforce media self-regulation, and enhance internal control measures. NCC also highlights media access rights for children and adolescents, facilitates other-regulations among consumers.

For opportunities created by digital convergence and digital transformation, NCC has published a communications policy whitepaper as a roadmap for the next stage. Based on the four core values in the whitepaper, including freedom of speech and expression, fair and effective competition, diverse and local culture, and democratic and civic participation, the NCC ensures an audiovisual environment that deepens local cultural identity and strikes an appropriate balance between quality and quantity for a communications market that is oriented to digital transformation. As for emerging video services, the NCC maintains supervision and balance in existing markets and plans to draft an act for online video services. It can be noted that regulatory transparency reduces uncertainties and is an effective incentive to increase investments and adherence among local and foreign operators.

A rich and diverse audiovisual market is attainable, but this does not happen overnight. The work of the NCC continues to be focused on both traditional and emerging services to provide diverse and authentic content and

outstanding services that are on par with other advanced economies.

Regulatory Coherence

Through digital transformation and globalized development, the communications industry not only integrates vertically but also launches pioneering services via emerging businesses. In fact, market trends and industry developments rely on long-term business commitments so technologies, services, and industries can further integrate and compete fairly for leadership. Consumers can also benefit from the process.

A sound regulatory structure for convergence is key to establishing a sound and comprehensive digital ecosystem. During 2019, the NCC drew up regulations and enhanced capabilities of our digital economy. Penned by the NCC, the President announced the Telecommunications Management Act in June 2019 to increase free information circulation in the communications market. To increase broadband connectivity, optimize infrastructure, and enhance internet and information security, NCC has introduced horizontal regulation systems and facilitated emerging services. In the future, the NCC plans to continue to ascertain the latest international trends and practices as a reference to develop regulations that respond to various requirements during the three-year transition period of the new law, and complete the digital transformation of the telecom legal structure.

With new developments in emerging technologies, decision-making processes should respond to changing services. NCC continues to advocate for the Digital Communications Act to introduce internet governance models and coordinate with multiple stakeholders. In response to diverse information channels, the NCC safeguards information transparency and freedom of expression in radio and television services. Since 2019, the NCC has been an advocate for the draft of Media Diversity Governance and Monopolization Prevention Act and has amended regulations, such as the Cable Radio and Television Act. These efforts protect professional and autonomous journalism, optimize the radio and television market in Taiwan, and elevate cultural diversity.

Advanced economies have all adopted regulations for convergence as a foundation of the digital economy. NCC will continue to modify communications regulations, provide enablers to digital transformation, and increase economic dynamics. As convergence regulations cover many aspects, the NCC will continue to communicate and advocate for a digital nation.

Practical Implementation of Digital Inclusion

Taiwan has always valued digital inclusion. Various ICT policies and regulations have been adapted to align with international standards. The essence of digital inclusion in Taiwan continues to expand and encompasses multiple authorities. For telecom service access, NCC continues to promote services and increase access for disadvantaged communities. Through Digital Nation and Innovative Economic Development Program(DIGI+) and the Forward-looking Infrastructure Development Program, remote areas and aboriginal villages can enjoy access to 100Mbps and even Gbps

broadband services.

Based on fast broadband services, other authorities have also proposed digital inclusion measures to increase digital literacy and digital application capabilities for new immigrants, offer information applications and services in remote areas, and elevate digital application and marketing capabilities for businesses and individuals in remote areas. Inclusive services and fast broadband fixed network services in remote areas can increase digital service access for disadvantaged communities. NCC will continue to strengthen infrastructure and expand fast broadband coverage according to the demands from relevant authorities so that residents in remote areas can enjoy fast broadband services inspiring more innovative economic activities.

NCC protects digital information access for disadvantaged communities. It encourages television operators to offer subtitles, sign language, or audio descriptions for physically and mentally-challenged communities. As citizens have more sources of information, the demands for outstanding programs and contents have become higher than ever. NCC encourages radio and television businesses to organize media literacy campaigns, improve media literacy and capabilities among media practitioners, and connect media productions with consumers. With view to ensuring children and youths are protected, NCC has promoted the television content rating systems to ensure suitable content for consumers. In this system, children and adolescents can access age-appropriate and superior digital information.

The Digital transformation is a critical factor of future ICT policies. While communications and other industries continue to develop and progress, it is essential that the benefits this progress brings is made available to disadvantaged communities. NCC will continue to support digital inclusion measures, advance communications infrastructure, and promote digitization services beneficial to disadvantaged communities with relevant authorities so that everyone can enjoy the fruits of digital convergence.

NCC Performance Report 2019

PUBLISHED BY : National Communications Commission
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DESIGN & PRINTER : Showwe information Co.,Ltd.

SALES :
1. Government Publications Bookstore-1F, No.209, Songjiang Rd., Zhongshan Dist., Taipei City 104,Taiwan(R.O.C.)
2. Wunan Book Co., Ltd. No.600, Junfu 7th Rd., Beitun Dist., Taichung City 406, Taiwan (R.O.C.)

DATE OF PUBLICATION : August 2020
PRICE : NTD 200
GPN : 1010901112
ISBN : 978-986-5457-20-4

2019 NCC
PERFORMANCE REPORT

ISBN 978-986-5457-20-4
00200
9 789865 457204

國家通訊傳播委員會
NATIONAL COMMUNICATIONS COMMISSION