

National Broadcasting and Telecommunications Commission





Long Live The King



Communication is an essential factor for national development, prosperity, stability and security, especially in the rapid change situations in the world. The prompt and up-to-date of the communications is highly important and all parties and agencies related to national communications should therefore provide cooperation to one another and share their achievements closely and harmoniously. Above of all, they should take a deep and wide study and research of the technical matter and modern technologies, and select a good and effective parts for being applied to their work wisely and proactively in the way that suits the country status and environment so that the national communications are fully developed and able to facilitate the economic and social development and truly support the stability of the nation.

Chitralada Villa
15 July 1983

(The Royal Proclamation was bestowed by
His Majesty the Late King Rama IX Maha Bhumibol Adulyadej the Great
on the Occasion of the Centennial of the Post and Telegraph Department
and the National Communications Day, 4 August 1983)



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ทรงพระเจริญ





Preface

The National Broadcasting and Telecommunications Commission or NBTC has prepared the NBTC Annual Report 2020 in accordance with Article 76 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment which stipulated that the NBTC shall prepare report on the spectrum management, broadcasting, television, and telecommunications services as the case may be, and submit to the Cabinet and the National Assembly within 120 days as from the ending date of each accounting year as well as disclose to the public.

To comply with the prescribed laws, the NBTC Annual Report 2020 has been conducted with the crucial essence consisting of General Information, Summary of Major Performance of the NBTC and the Office of the NBTC in the year 2020, Report on Market Situation and Competition in Broadcasting, Television, and Telecommunications Services in 2020, Budget Management in the year 2020, Workplan and Budget Expenditure Plan in the year 2021, Problems and Obstacles in Broadcasting, Television, and Telecommunications Business Operation which are Important to the People. Details are as shown in this report. Not only the NBTC Annual Report 2020 shall be presented to the Cabinet and the National Assembly for consideration, but also be disseminated to the public for acknowledgement of the performance of the NBTC in the previous year as stipulated by the laws. It is also expected that the NBTC Annual Report 2020 will be used as information resource in areas of spectrum management and regulation of broadcasting, television, telecommunications, and communication satellite services for all related parties such as scholars, students, mass media, investors, and other interested individuals for their proper use.

The National Broadcasting and
Telecommunications Commission
March 2021

Message From the Chairman of the NBTC

“ The NBTC is ready to fully support and collaborate with the government in order to push forward the country to get through the coronavirus pandemic crisis and perform duties in the spectrum management, the regulation on broadcasting, television, telecommunications, and communication satellite services with full capacity for the utmost benefit our fellow citizens

”



General Sukit Khamasundara

NBTC Commissioner Acting Chairman of the NBTC
(6 October 2017 – Present)

In the year 2020, all countries in the world had to face with the rapid spread of coronavirus disease 2019 (COVID-19) pandemic which mostly affected the lives and ways of life of our fellow Thai citizens. It is therefore inevitable to adapt ourselves to the New Normal Life Style. Through the entire year, the National Broadcasting and Telecommunications Commission (NBTC) has collaborated with the government in pushing forward the country to get through this crisis. Besides, the NBTC had performed duties in spectrum management, regulation on broadcasting, television, telecommunications, and communication satellite services with full capacity for the utmost benefit of our fellow citizens. Major performances are as follows:

1. Having supported the government policies and measures on the operation for preventing, controlling, resolving and mitigating the impact of coronavirus disease 2019 (COVID-19) pandemic so that all Thai people can get through the COVID-19 crisis. The supports are such as (1) issuing measures to assist people while working from home (WFH) to keep social distance by instructing all mobile phone operators and internet service providers to maintain good quality of signal and service provision, offering a free additional 10 GB of data for broadband internet users, as well as increasing the broadband internet speed up to 100 Mbps free of charge (2) approving the sequencing of 17 new Digital TV Channels for Education run by Ministry of Education in order to promote and facilitate the education and learning through Digital TV Channels

for Education (3) approving budget of more than 1,200 million baht to support State Healthcares and State Field Hospitals setting up for fighting the coronavirus disease 2019 (COVID-19) pandemic who still lack of medical facilities, sanitary masks, equipment for infection test, including making applications to facilitate the public. The budget supported by the NBTC had been adjusted from the annual budget expenditure in the year 2020 and the Broadcasting and Telecommunications Research and Development Fund for Public Interest (BTFFP). There were totally 322 State Healthcares and State Field Hospitals passed the consideration criteria.

2. Spectrum management and Supporting government policy in driving the National 5G Strategy, such as (1) having arranged 5G spectrum auction in the frequency band of 700 MHz, 2600 MHz, and 26 GHz in order to promote the development of Thailand towards the 5G technology era and increase competitive potential, promote investment, stimulate the economy, create jobs and generate income. The auction can generate revenue into the the state up to 100,521.178 million baht (2) having revised the Spectrum Management Master Plan for supporting Section 30 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services (NO.3) B.E.2562 (2019) including prepared readiness for supporting the rapid change of industrial ecosystem which will allow more than one service in the same frequency band in the radio frequency plan or be able to provide



service across services, create value-added on spectrum and meet more consumers' demand (3) having revised the radio frequency plans in the digital broadcasting service for trials or testing to be in line with the termination of the analog radio television signal transmission and the worth and efficient utilization of radio frequency, without frequency interference for the utmost benefit to the consumers, and (4) having formulated the Second Broadcasting Master Plan B.E.2563 - 2568 (2020 - 2025), by taking into account the changes of industrial ecosystem, to be used as guideline for regulating the broadcasting and television services in the changing circumstances.

3. Regulation on the broadcasting, television, and telecommunications services and communication satellite service; such as, (1) issuing the Notification of the National Broadcasting and Telecommunication Commission on Satellite Orbital Right Management Plan B.E.2563 (2020) (2) issuing the NBTC Notification on Criteria and Licensing Procedures to Obtain the Right to Use Satellite Orbits to be in accordance with the ITU Radio Regulation in order to support the transition to the procedure of granting the right to use satellite orbit from the concession system to the licensing system (3) issuing the NBTC Notification on Criteria and Procedures to License Foreign Satellite to provide domestic services (4) issuing the NBTC Notification on Mobile Virtual Network Operator Service to promote free and fair competition, encourage market entry of small operators and increase more choices for mobile phone service providers (5) accelerating the improvement of digital terrestrial television network (MUX) according to the Network Development Plan to support the spectrum refarming in the frequency band of 700 MHz, in which 133 stations are done completely and 14 stations in the central, western, and eastern regions have been in process. It is expected to be completed in early 2021.

4. Universal service and social service; such as, having continuously implemented the project on the provision of broadband internet service and mobile phone signal in border areas (Zone C+) and the project on the provision of broadband internet service in remote areas (Zone C) in order to bridge the gap for accessing to basic telecommunications service and raising quality of life of people, teachers, students,

the elderly, the patients, and targeted people living in the rural, remote, and wilderness areas.

5. Promotion and support on research and development of broadcasting, television, and telecommunications services for the public interest; in the year 2020, the NBTC had approved the Fund allocation to promote and support various types of funds consisting of the Type 1 Grant and Type 2 Grant for 75 projects at the amount of 869.540 million baht, including supporting the fund in case of making agreements with government agencies for 298.750 million baht, the type 3 Grant according to the NBTC policy at the amount of 4,567.010 million baht which included the support on Healthcare facilities for fighting the coronavirus disease 2019 (COVID-19) pandemic at the amount of 642.550 million baht, and the Type 4 Grant to the Thai Media Fund in the year 2020 at the amount of 500.00 million baht.

For the important operation direction in the year 2021, the NBTC will promote and support the application of 5G technology continuously, prepare and set the criteria for spectrum auction in the frequency band of 3500 MHz and the licensing criteria for satellite orbital license package, revise laws relevant to business operation to be in accordance with the context of technology convergence, as well as establish the National Spectrum Monitoring Center, etc.

I would say that, the success of the year 2020 is the result of a great cooperation provided by internal and external agencies. I would, on behalf of the NBTC Commissioners, like to express our sincere thanks to all relevant agencies, the executives, officers and employees of the Office of the NBTC who joined hands to overcome obstacles throughout the year with patience, commitment, and sacrifice made in performing their duties to support the mission of the NBTC for the development of communication services and the drive of a stable and sustainable national economy.

General

(Sukit Khamasundara)

NBTC Commissioner

Acting Chairman of the NBTC

Message from Secretary-General of the NBTC

“

The Office of the NBTC has raised the result of the Integrity & Transparency Assessment (ITA) from the A Level in 2019 to the AA Level, obtaining the 1st rank in the group of other government agencies and the 6th rank of the country

”



Mr. Trairat Viriyasirikul

Deputy Secretary-General Acting Secretary-General of the NBTC
(1 July 2020 – Present)

The Office of the NBTC has continued their commitment to perform the mission on spectrum management and the regulation on broadcasting, television, and telecommunications services and communication satellite service for the utmost benefit of the public and the nation. Major performances are such as:

1. Raising the result of the Integrity & Transparency Assessment (ITA) of the operation

Having participated in the Integrity & Transparency Assessment (ITA) of the operation of the year 2020, a consecutive second year, which the Office of the NBTC has raised the result of the assessment from the score of 94.71 in the A Level in 2019 to the score of 97.75 in the AA Level, the 1st rank in the group of other government agencies and the 6th rank of the country from 8,303 government agencies participated in the assessment (was the 40th rank of the country from 8,299 government agencies participating in the assessment in 2019). The Office of the NBTC shall maintain the standard of the ITA in the AA level and improve a sustainable operation in the year to come.

2. Developing the Office of the NBTC to become a digital office

Having developed the Office of the NBTC to become a digital office according to the Thailand 4.0 policy for driving the country by applying technologies to the work and facilitation of the public. In 2020, the Office of the NBTC had been awarded the Digital Government Awards in 2020 (DG Awards 2020) as the top-10 agencies being selected by the Digital Government Development Agency (Public Organization) and was in the 6th rank from 1,926 government agencies having promoted and supported the

development of digital government who has developed the organization to become a digital government in high level in order to be a good model for other government agencies.

3. Arranging the 5G spectrum auction

Having arranged the 5G spectrum auction in the frequency band of 700 MHz, 2600 MHz, and 26 GHz to drive the country's economy through telecommunication technology to keep up with the global changes in the use of technology to drive the economy by reducing the inequality in public health, agriculture, education, economy, and increasing the national infrastructure capacity to be able to compete with foreign countries, increasing opportunities for access to technology and trade competitiveness. Thailand is considered the first country in regions where 5G is officially launched and has actually been used in many areas, in which the network system has been built to cover areas throughout the country especially in core areas, such as the EEC, to enhance the industrial sector.

4. Licensing the right to use satellite network of Thailand for Non-Geostationary Satellite Orbit (NGSO)

Granting the right to the existing users to use satellite network of Thailand for non-Geostationary Satellite orbit according to the NBTC Notification on Criteria and Licensing Procedure to Obtain the Right to Use Satellite Orbits which consists of: (1) the Royal Thai Air Force in which the Directorate of Communications and Electronics Royal Thai Air Force has been granted the primary right to use the satellite orbit for the NAPA-2 satellite network (NGSO) and the RTAFSAT satellite network (NGSO) (2) the Geo-Informatics and Space Technology

Development Agency (Public Organization) (GISTDA) has been granted the primary right to use the satellite orbit for the THEOS2 satellite network (NGSO) and the complete right for the THEOS satellite network (NGSO) (3) the Radio Amateur Society of Thailand under the Patronage of His Majesty the King has been granted the preliminary right to use the satellite orbit for JAISAT-1 satellite network (NGSO) (4) Bangkok Christian College has been granted the preliminary right to use the satellite orbit for BCCSAT-1 satellite network (NGSO) and (5) the Royal Thai Air Force in which the Navaminda Kasatriyadhiraj Royal Air Force Academy has been granted the preliminary right for THAIOT satellite network (NGSO).

5. Preparation for spectrum allocation in the frequency band of 3500 MHz

Having prepared for the spectrum allocation in the frequency band of 3500 MHz to be used in the 5G spectrum auction by studying the possibility of impacts may arise from the improvement of the use of spectrum in the frequency band of 3500 MHz to be in line with international agreements committed by the country in the National Table of Frequency Allotment (Thailand footnote) T-P11, and preparing (draft) criteria related to the licensing and regulation of spectrum in the frequency band of 3500 MHz.

6. Organizing and installing all overhead telecom and broadcast cables underground continuously.

Having operated in cooperation of the Metropolitan Electricity Authority, Provincial Electricity Authority, Bangkok Metropolitan Administration, and telecommunications operators for accelerating the completion of organizing and installing all overhead telecom and broadcast cables underground as planned, in order to ensure the safety of people's lives and properties and to have a beautiful scenery. In 2020, the NBTC had organized the overhead telecom and broadcast cables underground for a total distance of 34.44 kilometers consisting of (1) the areas of Bangkok and its vicinities, in a distance of 8.08 kilometers, such as the Phra Chan Road Project, Khao San Road Landscape Improvement Project, the Canal Conservation Project in Honor of His Majesty the King, Projects around the Chitralada Palace, etc., and (2) in other provincial areas, in a distance of 26.36 kilometers, such as Chonburi, Songkhla, Nakhon Ratchasima, Sukhothai, Chiang Mai, etc.

7. Urging the improvement of digital terrestrial television network (MUX) to be completed

Having urged the operators of the digital terrestrial television network (MUX) to improve the digital terrestrial television network to support the spectrum refarming in the frequency band of 700 MHz to be completed as planned. For those areas where the frequency of signal of digital terrestrial television had been adjusted, TV programs would unable to be viewed for a short period of time. Therefore, the date and time of the signal adjustment in those areas were also publicized to the public as well as the dissemination of the manual for signal tuning after the adjustment of frequency used for television service in order to be used in telecommunications service and support 5G technology for people living in areas where TV programs cannot be viewed to be able to tune their Set Top Box or TV receiver by themselves so that they can view TV programs again.

8. Decentralization of service provision to the Regional Office of the NBTC

Having decentralized service provision to the Regional Office of the NBTC to ensure that all services are available for people in various areas, and people will also be offered with convenience, reduction of time and costs for traveling to the Office of the NBTC Head office in Bangkok for license application or license period extension, standard test, including requesting for advice, filing complaints or contacting for other services.

On behalf of the Office of the NBTC, I would like to thank the NBTC Commissioners for fully supporting the work of the Office of the NBTC. My thanks also extended to the executives and officers of the Office of the NBTC and relevant agencies who join hands to push forward the nation through the challenges of this pandemic crisis as well as being a crucial forces in driving the mission for the public. The Office of the NBTC is ready to act as a major cog in the development of the national communication service and being a part in supporting the people and the country to overcome the crisis together.



(Mr. Trairat Viriyasirikul)
Deputy Secretary-General
Acting Secretary-General of the NBTC

The National Broadcasting and Telecommunications Commission





General Sukit Khamasundara
NBTC Commissioner Acting Chairman of the NBTC

Education

- Bachelor of Science Chulachomklao Royal Military Academy, Class 20
- M.A. in Political Science (Security Resources Management), Burapha University
- Joint Staff Course, Command and General Staff College
- Certificate, National Defence College of Thailand, Class 44
- Professional Engineer (Civil Engineering), the Board of Control of the Professional Engineering
- Certificate, Top Executive Program, Capital Market Academy, Class 15

Work Experience

- Chief of Army Engineering Battalion 1, Royal Guards
- Commander of the 1st Development Division
- Deputy Commander-in-Chief of the First Army Area
- Special Consultant to the Royal Thai Armed Forces Headquarters
- Special Royal Guard
- Judge to the Supreme Military Court
- Member of the Committee to Formulate the Policy for the Provision of Universal Basic Telecommunications Services and Social Services, National Telecommunications Commission
- Advisory Board of the Management of Doctoral Philosophy Program in Political Science, Burapha University
- Person in charge of “the Project of the Construction of Entrance and Services Pathways in Suvarnabhumi Airport”
- Director of the Royal Project Don Khun Huay, Phetchaburi Province
- Director of the Royal Initiative Project Huay Mae Prieng, Phetchaburi Province
- Director of the Queen Sirikit Forest Park Project, Ratchaburi Province
- Director of the Construction Project of Benjakit Park, Bangkok
- Chief of the Secretariat on Psychological Operations and Public Relations, Royal Thai Army
- Chief of the Secretariat Office of the Internal Security Operations Command



Colonel Natee Sukonrat, Ph.D
Vice-Chairman of NBTC



Assoc. Prof. Prasert Silphiphat
NBTC Commissioner

Education

- Bachelor of Science in Electrical Engineering, Chulachomklao Royal Military Academy (Gold Medal Award)
- Master of Science in Electrical and Telecommunication Engineering, University of South Florida, USA
- Ph.D. in Electrical and Telecommunication Engineering, University of South Florida, USA

Work Experience

- Senior Engineering Officer, Project on Globalstar Low Earth Orbit Satellite, San Diego, California, USA
- Consultant to the iPSTAR Satellite Project
- Chairman of the CDMA Project Steering Committee, CAT Telecom Public Company Limited
- Board of Directors, TOT Public Company Limited
- Acting CEO, TOT Public Company Limited
- Senior Engineering Officer, Armed Forces Telecommunications Office, Royal Thai Armed Forces Headquarters
- Chairman of the Working Group on Community Radio Service
- Sub-committee on Broadcasting and Television Services
- Chairman of the Committee for Drafting Spectrum Management Master Plan and National Table of Frequency Allocation
- Chairman of the Committee for Drafting Telecommunications Services Master Plan
- Chairman of the Committee for the Licensing of Broadband Wireless Access Service (BWA)
- Chairman of the Committee for the Licensing of International Mobile Telephony or 3G and beyond
- Commissioner, the National Telecommunications Commission (NTC)

Education

- Bachelor of Arts (Economics), Chiang Mai University
- M.A. (ECONOMICS) Middle Tennessee State University, USA
- Certificate, National Defence College of Thailand, Class 45
- Certificate, Advanced Course for Executives, Class 33
- Certificate, Advance Justice Administration Course for Executives, Class 3

Work Experience

- Professor, Faculty of Economics, Chulalongkorn University, 1975 - 2001
- Vice-Chancellor, Chulalongkorn University, 1997 - 2000
- Deputy Secretary-General of King Prajadhipok Institute, 2000 - 2006
- Special Expert in Economics, the Office of National Telecommunications Commission (2007 - 2008)
- Executive Manager, the Telecommunications Development Fund for the Public Interest, Office of the NTC, 2008 - 2010



Lt. Gen. Perapong Manakit, Ph.D
NBTC Commissioner

Education

- Bachelor of Science, Chulacomklao Royal Military Academy, 1978
- M.A. in Social Development (School of Social Development), National Institute of Development Administration (NIDA), 1987
- Ph. D. Sociology of Development, University of Bielefeld, Germany (Awarded by Germany Government, Thailand-German Student Exchange Program, 1992)

Work Experience

- Rifle Platoon Leader, Rifle Company, the 3rd Infantry Battalion, the 1st Infantry Regiment Chamberlain Guard, 1978
- Technical Officer, Strategic Research and Development Administration, Institute of Higher Army Studies, 1993
- Performing duties on special advisor group, Internal Security Operations Command, 1997 - 2001
- Director of Psychological Operation Division, Military Civil Affairs Department, 1999
- Secretary attached to the Standing Committee on the Military Affairs, the Senate, 2000 - 2005
- Director of Information Division, Directorate of Joint Civil Affairs, 2001
- Performing official duties to support the Counselor to the Minister of Defence, 2001 - 2002
- Assistant Chief of Staff Officer to Deputy Supreme Commander, 2004
- Chief of Satellite Television Division, TV5, 2004
- Expert, the Supreme Command Headquarters, 2005
- Deputy Director, Center for Psychological Operations and Public Relations in the Southern Provinces, National Security Council, 2005 - 2006
- Producer of the Radio Program on “Ruk Mueng Thai” (Love Thailand), 2006 - 2010
- Consultant to the Office of National Security Council, 2006 - 2010
- Spokesman of Ministry of Defence, 2008
- Sub-Committee on Inspection and Investigation in the Committee on Inspection and Investigation for National Reconciliation and Study Research Sub-Committee in the Committee on Inspection and Investigation for National Reconciliation, 2008 - 2009
- Secretary Attached to the Committee for Study and Consideration of Capacity Building and Management of the Army under the Committee on the Military Affairs, House of Representatives, 2009 - 2011



Asst. Prof. Thawatchai Jittrapanun, Ph.D.
NBTC Commissioner



Mr. Prawit Leesatapornwongsa
NBTC Commissioner

Education

- Bachelor of Engineering (Mechanical Engineering), Chulalongkorn University
- Master of Business Administration (Finance), Georgia State University, USA
- Doctor of Philosophy in Business Administration (Ph.D.) (Finance), University of Alabama, USA

Work Experience

- Professor, Faculty of Economics, Chulalongkorn University
- Instructor of Doctoral Program of Finance (Finance Economics), NIDA
- Special Professor of Doctoral Program of Finance (Finance Economics) for the Joint Doctoral Program in Business Administration (JDBA), Chulalongkorn University, Thammasat University, and NIDA
- Chairman of the B.A. Program in Economics (International Program), Faculty of Economics, Chulalongkorn University
- Chairman of Labor and Management Development Center, Faculty of Economics, Chulalongkorn University
- Director of the Computer Centre, Faculty of Economics, Chulalongkorn University
- Scholarship Selection Committee of the Office of the NBTC
- Special Instructor in Finance, Business Administration Course in Public/Private Universities
- Advisor to the Committee on Finance, Treasury, Banking and Financial Institution, the Senate
- Advisor to the Committee on Budget Administration Follow-Up, House of Representatives
- Project Leader, the Index of Exports of the Thai National Shippers' Council

Education

- Bachelor of Medicine, Chulalongkorn University, 1987
- Bachelor of Political Sciences, Sukhothai Thammathirat University, 1992
- Diploma, Preventive Medicine (Public Health), the Medical Council of Thailand, 1992
- Master of Public Health, Institute of Tropical Medicine, Belgium, 1999
- Diploma, Family Medicine, the Medical Council of Thailand, 2004

Work Experience

- Director of Huay Tap Tan Community Hospital, Sri Sa Ket Province
- Director of Sri Rattana Community Hospital, Sri Sa Ket Province
- Director of Lad Bua Luang Community Hospital, Ayutthaya Province
- Director of Uthai Community Hospital, Ayutthaya Province
- Chairman of Rural Doctors Society
- Secretary-General of the Coordinating Committee of Thai NGOs for Primary Health Care
- Secretary-General of Foundation for Consumer
- Member of the 2nd National Economics and Social Advisory Council
- Chairman of Working Group Consumer Protection, National Economics and Social Advisory Council
- Executive Director of the Telecommunications Consumer Protection Institute (TCI)
- Sub-Committee of the Human Rights, the National Human Rights Commission of Thailand

Executive Summary



Executive Summary

The challenge of regulating communication service nowadays is the rapid change of technology convergence which resulted on the unpredictation of consumer behavior that can change as rapid as technology. The business sector therefore needs to adapt themselves to meet the growing demand of consumers, and these factors definitely drive the NBTC to strive to manage the spectrum to keep pace with the change of the industrial ecosystem for the utmost benefit of people and the country and to raise the level of regulation in a new era. In 2020, the NBTC had considered laws related to business operation to be in line with the convergence of technology and issued a number of notifications and criteria for regulating business operators appropriately according to the development of technology and current situation as well as determining guidelines to prevent the potential impacts may arise from these technologies for people' security and safety whether in terms of

safety on the use of information technology and communications, surveillance of telecommunication threats has been conducted as well as enhancing cooperation among related agencies for the development of the broadcasting, television, telecommunications, and communication satellite services in accordance with the direction of the country development. In addition, the NBTC had pushed forward the expansion of the infrastructure to cover various areas along with enhancing knowledge and understanding of new technology to the public. In 2020, the NBTC had implemented the important mission which is to drive the National Policy and National Strategies as well as the NBTC policies to be accomplished which will be beneficial to the nation, the general public, and the broadcasting, television, and telecommunications industries. The major performances are as follows:





1. The arrangement of spectrum auction in the frequency band of 700 MHz, 2600 MHz, and 26 GHz for supporting 5G technology, which can generate revenue from the auction to be delivered to the state over a hundred billion baht. This creates value-added of economy and increases competitive potential. The key mission shall be continued includes promoting and encouraging the application of 5G technology in various sectors, expansion of the signal coverage, preparation for the spectrum auction in the frequency band of 3500 MHz and the improvement of criteria to be in line with technology convergence. The result of the 5G spectrum auction will benefit the national economy especially in the telecommunication industry, manufacturing, trade and finance industries, as well as expanding opportunities for the likely highly trend of digital services.

2. Issuance of license to use spectrum for 5G trial/testing for telecommunications operators and granting permission for the trial/test in the regulatory sandbox areas to support innovation development and testing and to promote the application of 5G technology. In the year 2020, 7 licenses have already been granted to related entities.

3. Preparation of the Satellite Orbital Right Management Plan B.E.2563 (2020) to support the transition to the procedure of granting the right to use satellite orbit from the concession system which will be ended on 10 September 2021 which included setting the NBTC Notification on Criteria and Licensing Procedures to Obtain the Right to Use Satellite Orbits to be used as guidelines for granting the right for the existing users before the Notification has become effective (19 February 2020) and new individuals wishing to apply for obtaining the right to use satellite orbits of Thailand. On 30 September 2020, the NBTC had granted the primary right to use satellite orbit (Non-Geostationary Satellite Orbit - NGSO) to the existing users from 5 entities (6 satellite networks) and is in the process of preparing the draft notification, criteria, and licensing procedure for satellite orbital license package in order to further select the grantee of the right.

4. Preparation of guidelines for improving the spectrum use in the frequency band of 3500 MHz to support 5G technology and the spectrum assignment in the frequency band of 3500 MHz will initiate the expansion of 5G mobile telecommunications network which is the core infrastructure for the country development. At present, the operation is in the process according to the Resolution of the NBTC Meeting No.19/2020 on 28 October 2020 approving the guidelines for improving the spectrum use in the frequency band and assigning the Office of the NBTC to further proceed according to the procedure.

5. Setting policy on the spectrum management and revising the NBTC Notification on Spectrum Management Master Plan (2019), Annex A, Annex B, and the National Table for Frequency Allotment (2019) to support the provision regarding convergence, implementation under the plan and time frame for the enactment of the Royal Decree according to Section 30 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services including obligations under the Radio Regulations 2020.

6. Supporting the government policies on the operation to help people and operators to get through the coronavirus disease 2019 (COVID-19) pandemic crisis such as issuing measure to relieve burden of the public in case of working from home, supporting the use of mobile broadband internet by offering a free additional 10 GB of data for broadband internet users, increasing the broadband internet speed up to 100 Mbps for 30 days free of charge, and issuing measures to assist telecommunications licensees and broadcasting licensees who got effects by the COVID-19 pandemic in extending the payment period of telecommunication numbers fee and annual license fee. Moreover, the Office of the NBTC has received the cooperation from Thai mobile operators to offer mobile users the right to register for free 100 minutes of calls for 45 days without the need for the NBTC financial support. In addition, the NBTC has support the learning of youth and families by having approved a resolution for the Public Broadcasting Service of Thailand to use the spectrum for temporary trial or



testing under the Active Learning TV (ALTV) Project, and approving the Ministry of Education to use the spectrum for temporary trial or testing under the trial digital terrestrial television broadcasting project for education, which consists of channels for basic education, channels for distance learning, and channels for vocational education.

7. Organizing and installing all overhead telecom and broadcast cables underground nationwide which has been set as important policy and implemented constantly since the year 2016. In the year 2020, the overhead telecom and broadcast cables have been brought underground with the a total distance of 34.44 kilometers, which can be divided into areas of Bangkok and its vicinities for 8.08 kilometers and in provincial areas for 26.36 kilometers. Also, the NBTC has completely prepared the Plan to Organize the Overhead Telecom and Broadcast Cables B.E.2563 - 2564 (2020 - 2021) which determining 3,960 routes for organizing overhead telecom and broadcast cables for a total distance of 8,623.64 kilometers. In 2020, The operation on organizing overhead telecom and broadcast cables in the areas of Metropolitan Electricity Authority (MEA) has been completed for 8 routes in the distance of 69.8 kilometers and the rest are in process of operation according to the Plan.

8. Improving digital terrestrial television network (MUX) to support the spectrum refarming in the frequency band of 700 MHz to be used in telecommunications service. In January 2021, the NBTC has completed the improvement of digital terrestrial television network for 147 stations or accounting for 100 percent including publicizing the improvement of digital terrestrial television networks to support the spectrum refarming in the frequency band of 700 MHz via 3 channels: broadcasting (On Air). Social media (Online), and filed operation (On Ground). The spectrum assignment of the frequency band of 700 MHz to develop the use of 4G/5G technology will bring benefits to the people and relevany sectors as the internet network will be expanded to cover all areas throughout the country.

9. Having collaborated with relevant agencies to enhance the development of broadcasting, television, and telecommunication services, such as (1) cooperating with the Thai Red Cross Society and network partners to implement the project on the installation of telemetering stations to measure climate data, rainfall and water levels in upstream forest areas in order to level up the sustainable flood prevention (2) cooperating with the Telecommunications Association of Thailand under the Royal Patronage and leading telecommunication service providers to establish the Thailand Telecommunication Computer Emergency Response Team (TTC- CERT) to strengthen the security in dealing with computer threats and promote the development of telecommunication service to have a standard that is internationally recognized (3) cooperating with the Royal Thai Army by the Royal Thai Army Television to implement the trial project on digital radio broadcasting DAB+ and testing application program such as electronic programs for digital radio broadcasting to be usable (4) cooperating with the office of Trade Competition Commission to enhance the regulation efficiency, reduce problems and obstacles, and redundancy regulation, exchange information, exchange personnel, etc., and collaborating with the Food and Drug Administration, Office of the Consumer Protection Board, Royal Thai Police, and the Ministry of Digital Economy and Society to resolve problems regarding the advertisement of illegal food, drugs, and health products or the operation in a way that is considered to be the exploitation of consumers in the broadcasting, television, and telecommunication services.

10. Supporting the broadband internet network expansion to be covered all areas as follows: (1) implementing the project on the provision of broadband internet service and mobile phone signal in border areas (Zone C+) to expand the mobile phone signal network and broadband internet service to cover all villages in Thailand for 3,920 villages, in which the progress of the implementation is accounted for 85 percent, and (2) implementing the project on the provision of broadband internet service in remote areas (Zone C) to expand the broadband internet service network to cover all remote villages for 15,732



villages, in which the progress of the implementation is accounted for 85 percent. When the said projects is completed, it will affect the enhancement of the country's competitiveness, and people are able to access services thoroughly, equally and fairly in both spatial and social dimensions which will lead to further upgrading the quality of life of the people.

11. Protecting consumers in the broadcasting, television and telecommunications services as follows: (1) developing a system for national identity verification and authentication through the electronic ID card format on mobile phones to provide more channels and promote new innovation for safe access to electronic transactions of the public or agencies, both public and private (2) strengthening consumers, raising awareness and protecting rights to use telecommunications service through the dissemination of useful information in various channels including organizing activities and workshops (3) regulating the action that is considered an exploitation of consumers, promoting consumers strength and enhancing potentials of people on media literacy, promoting and protecting the right of the disabled and the disadvantaged to be able to access or recognize and utilize the TV programs as well as developing criteria and management on consumer protection in broadcasting and television services in four key dimensions: prevention, suppression, promotion of consumer strength, and encouraging the access to information of the disabled and the disadvantaged.

In addition, the NBTC and the Office of the NBTC have emphasized on performing duties based on the good governance principles along with the collaboration of personnel within the Office of the NBTC to set a common goal in developing the organization towards a digital office. Also, the Office of the NBTC has focused on the development of personnel potential to high performance so that they become an important force in driving the mission of the NBTC and the Office of the NBTC. The operation is as follows:

1. Raising the result of the Integrity & Transparency Assessment (ITA) of the operation of the Office of the NBTC to the AA level. In 2020, the Office of the NBTC

had participated in the ITA and been awarded an Honor Shield for the ITA of the operation of government agencies in the fiscal year of 2020 with the highest scores of 97.75 in the AA Level, the 1st rank in the group of other government agencies and the 6th rank of the country from 8,303 government agencies participated in the assessment. The Office of the NBTC shall maintain the standard of the ITA in the AA level and improve a sustainable operation in the year to come.

2. Driving the policy on the development of working model and system of the Office of the NBTC to become a digital office in order to support the reform of public management system. The operational plans are set into four workplans which are: (1) the public service portal development plan (2) the database synchronized plan (3) the digital signature plan and (4) the electronic document system development plan. In addition, a working group has been established to drive the operation to develop the Office of the NBTC to become a digital office during the year 2020 - 2022 through applying technologies to the work and facilitation of the public. In 2020, the Office of the NBTC had been awarded the Digital Government awards in 2020 (DG Awards 2020) as the top-10 agencies being selected by the Digital Government Development Agency (Public Organization) ranking 6th from 1,926 government agencies.

3. The budget management of the Office of the NBTC in the year 2020 had been prepared as a surplus budget with the revenue collected in the amount of 9,129.539 million baht while the expenditure budget in 2020 was prepared for totally 6,548.329 million baht. The result of the budget expenditure of the operation of the Office of the NBTC was 6,124.720 million baht and the NBTC had already submitted money to the Digital Economy and Society Development Fund according to Section 24 (4) of the Digital Development for Economic and Social Development Act B.E.2560 (2017) based on cash basis accounting in the amount of 1,364.984 million baht. It is expected that the Office of the NBTC will submit more money as state revenue for 1,639.835 million baht.

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General Information



The NBTC and the Office of the NBTC

On 7 October 2011, the National Broadcasting and Telecommunications Commission or “NBTC” has been appointed by the Royal Proclamation according to Section 17 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services (the Act on the Organization) B.E.2553 (2010) consisting of Chairman of the NBTC, Vice Chairman of the NBTC, and NBTC Commissioners. Section 35, Section 37, Section 38 and Section 40 of the Act has stipulated that the NBTC shall appoint the Broadcasting Commission, called in short “BC” and the Telecommunications Commission, called in short “TC” to have power to act on behalf of the NBTC in regulating the broadcasting, television, and telecommunications services by taking into account the utmost benefits of the public at national and local levels in education, culture, state security, and other public interests, free and fair competition, determining criteria and procedures on the network access interconnection in broadcasting, television, and telecommunications services, and determining criteria for broadcasting, television, and telecommunications business operation, including the protection of consumers’ rights and freedom to access and utilize frequencies in the broadcasting, television, and telecommunications as well as the encouragement of the public participation in the public media operation. The NBTC also performs other tasks in accordance with the provisions of relevant laws. The NBTC Commissioners shall hold office for a term of six years as from the date of being appointed by the King and shall serve for only one term.

The NBTC has continued performing its mission under the powers and duties prescribing by the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and on 22 June 2017,

the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services (No.2) B.E.2560 (2017) has been published in the Royal Gazette. The Act has abolished Section 35, Section 37, Section 39, and Section 40 of the Act on the Organization B.E.2553 (2010) and stipulated that the NBTC shall consist of seven commissioners with an expertise in broadcasting and television services, telecommunications service, engineering, laws, economic, and consumer protection or people’s right and freedom promotion. In addition, the Transitory Provisions has stipulated that “the commissioners who still hold the office on the effective date of this Act shall remain in office to continue performing their duties until the expiration of the term or vacation of office upon other causes. In the case where there is a vacation of office, no matter of what causes, it shall be deemed that the NBTC consists of the existing commissioners unless the remaining commissioners consists of less than four persons where all the commissioners shall vacate office upon the cause of expiration of term, and the NBTC commissioners shall be appointed according to the Act on the Organization B.E.2553 (2010), which is additional amended by this Act. While the new NBTC commissioners have not yet been appointed, the existing NBTC commissioners shall continue perform duties until the new commissioners appointing by the Act on the Organization B.E.2553 (2010), which is additional amended by this Act, take the office. In the case where the Chairman vacates office, the existing commissioners shall elect one among themselves to be the Chairman to continue perform the duties”. In the meantime, the Office of the Secretary-General of the Senate has begun the selection and selection process for the appointment of person to be the commissioners of the National Broadcasting and Telecommunications Commission.



Later on, the Head of the National Council for Peace and Order had the Order No.7/2018 dated 24 April 2018, regarding Cancellation and Suspension of the Nomination and Selection Process for the Appointment of Commissioners of the National Broadcasting and Telecommunications Commission, Article (1) the nomination and selection process for the appointment of commissioners of the NBTC which has been carried out on the day before the date this Order comes into force shall be cancelled, Article (2) the commissioners who still hold the office on the effective date of this Order shall remain in office to continue performing their duties as necessary as prescribed by Section 42 of the Act on the Organization (No.2) B.E.2560 (2017). In the meantime, in the case where there is a vacation of office, no matter of what causes, it shall be deemed that the NBTC consists of the existing commissioners until the Head of the National Council for Peace and Order will provide another Order, and Article (3) the relevant organizations shall consider the solutions for solving problems related to the nomination and selection process to be appointed as the NBTC in accordance with the spirit of the law that requires those who have been selected shall eligible with knowledge, ability, and experiences that are beneficial to perform duties, and carrying out the nomination and selection process for the appointment as soon as possible. On 16 April 2019, the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services (No.3) B.E.2562 has been published with the view to amending the Act on the Organization to Assign Radio frequency and to Regulate the Broadcasting and Telecommunications Services to be more suitable and in accordance with the provisions of the constitution. However, later on, the Head of the National Council for Peace and Order had considered that the performance of the NBTC shall be further continuously, and, therefore, the Order No. 8/2019 dated 8 July 2019 regarding Measures to Solve the Problems of Continuity of the Commissioners of the NBTC has been issued. The Order also includes the expansion of telecommunication services for national security and public interest as follows: Article (1) To suspend the

nomination and selection process for the appointment of commissioners of the NBTC until the Act on the Organization which has the additional amendment in the part concerning the nomination and selection process for the appointment of commissioners of the NBTC has been put into force or until the Prime Minister, with the approval of the Council of Ministers, issues another Order; Article (2) in the case where a commissioner vacates office upon having attained the age of seventy years, the commissioner shall remain in office to continue perform duties until the new NBTC commission be appointed according to the additional amended Act, as stipulated in Article (1) and take the office, or until vacate the office due to other causes. Besides, according to Article (3) in the case where a commissioner vacates office upon having attained the age of seventy years as stipulated in Article (2), the remaining commissioners shall continue to perform duties.

The NBTC Commissioners has continued to perform their duties until now which is in accordance with the Order of the Head of National Council for Peace and Order No. 8/2019 with the composition as follows:

- | | |
|----------------------------------|--|
| 1. General Sukit Khamasundara | Commissioner
Acting Chairman
of the NBTC |
| 2. Colonel Natee Sukonrat | Vice-Chairman |
| 3. Lt. General Perapong Manakit | Commissioner |
| 4. Mr. Prasert Silhiphat | Commissioner |
| 5. Mr. Thawatchai Jittrapanun | Commissioner |
| 6. Mr. Prawit Leesathapornvongsa | Commissioner |

The NBTC and its power and duties

According to The Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and the amendment (No.2) B.E.2560 (2017), and (No.3) B.E.2562 (2019) Section 27, the NBTC shall have the power and duties as follows:

1. To formulate a Spectrum Management Master Plan, Table of National Frequency Allocations, Broadcasting Master Plan, Telecommunications Master Plan, Radio Frequency Plan, Satellite Orbital Right Management Plan, and Telecommunications Numbering Plan and proceed according to the Plans. However, such Plans must comply with National Digital Economy and Society Development Plan and Policy.

2. To assign radio frequencies for the undertaking of broadcasting, television, radiocommunications, and telecommunications services.

3. To prescribe characteristics and categories of broadcasting, television, telecommunications and radiocommunications services.

4. To license and regulate the use of radio frequencies and radiocommunications equipment in the undertaking of broadcasting, television, and telecommunications services or radiocommunications service; and prescribe licensing criteria and procedures, conditions, or licensing fees. In this regards, the NBTC may assign the Office of the NBTC to grant licenses instead of the NBTC only for the licensing in the part of radiocommunications equipment according to the criteria and conditions specified by the NBTC.

5. To prescribe criteria for the efficient use of radio frequency without causing interference to the same type of business and other type of business.

6. To license and regulate the operation of broadcasting, television, and telecommunications business operation to ensure that service users have been provided of services with quality, efficiency, timeliness, reliability and fairness; and prescribe licensing criteria and procedures, conditions, or licensing fees.





7. To license and regulate the use of tele-communications numbers; and prescribe licensing criteria and procedures, conditions, or licensing fees.

8. To prescribe criteria and procedures for network access and interconnection, and criteria and procedures for setting access charges or interconnection charges to be applied to the undertaking of broadcasting, television, and telecommunications services, both for the same type of business and other type of business, which shall be fair to service users, service providers, and investors, or between the telecommunications service providers with due regard to public interest.

9. To set tariff structure and price structure for the broadcasting, television, and telecommunications services which shall be fair to service users and service providers with due regard to public interest.

10. To set standards and required technical specifications for the broadcasting, television, telecommunications and radiocommunications services.

11. To prescribe measure for the prevention of anti-competitive conduct or unfair competition in the broadcasting, television, and telecommunications services.

12. To prescribe measure for the provisions of telecommunications services universally and equally in accordance with Section 50.

(12/1) To reform the frequencies which is unused or unworthy used or to make it more worth as specified in the Plan, which shall be determined in accordance with (1), from those who have been authorized to re-allocate in accordance with the criteria, procedures and conditions prescribed by the NBTC. However, such conditions must define the method of compensation, disbursement, or remuneration for those whose frequencies have been reformed by taking into account the rights of those affected by the frequency reforming in each case.

13. To protect rights and liberty of the people from being exploited by the operators; protect individual right of privacy and freedom to communicate by means of telecommunications; promote rights, freedom and equality of the people in the access to, and use of frequencies in the sound broadcasting, television, and telecommunications services.

14. To act as a governmental administrative agency who has an authority in international communication service management with the International Tele-communication Union or international organizations, governments and international agencies either being within the duties and powers of the NBTC or being assigned by the government including support the public affairs in order to have satellites or obtain the rights to access to satellite orbit in order to be in accordance with the Plans to be determined under (1) and the National Digital Economy and Society Development Plan and Policy.

(14/1) To proceed for obtaining and maintaining the rights to access the satellite orbit which is a national treasure and exercising the rights to maximize benefits for the country and the people in case that the protection of the rights has created a burden on the state beyond its benefits to be received, the NBTC may waive the said rights as stipulated in the management plan for the rights to access satellite orbit and report to the Cabinet as well as having announced a detailed reasons to the public. In exercising the rights to access the said satellite orbit, the NBTC shall have the power to prescribe criteria, procedures and licensing conditions, fees and exemption of licensing fees including other expenses on relevant operation that the licensing applicant or the licensee, as the case may be, will have to bear the burden. The license fee, after deducting the cost of the licensing, shall be remitted as state revenue.

(14/2) To license and regulate the business operated under this Act by using foreign satellite channels and prescribe licensing criteria and procedures concerning licensing, conditions and licensing fees.

15. To determine and resolve issues relating to interference of frequencies.

16. To monitor and provide advices on the undertaking of broadcasting, television and telecommunications services.

17. To set forth regulation on merger, cross ownership-holding or frequency-used broadcasting market dominance amongst mass media business or by any other person, which has the effect of impeding the liberty of the public in perceiving information or obstructing public access to a diversity of information.

18. To promote a formation of licensees, broadcasters, and mass media professionals in the radio and television businesses into diverse forms of organizations which will have the mandate to set forth ethical standards and self-regulation pertaining to the occupation or profession under the ethical standards.

19. To issue regulations or notifications with respect to general administration, personnel administration, budget, finance and property and other businesses of the Office of the NBTC according to Section 58.

20. To approve the budget expenditure of the Office of the NBTC, including the monetary to be allocated to the Broadcasting and Telecommunications Research and Development Fund for the Public Interest according to Section 52.

21. To determine and approve financial allocation for the Fund as proposed by the Fund Management Committee according to Section 55.

22. To provide information and participate in negotiations or making agreements between the Kingdom of Thailand and foreign governments or international organizations in matters relating to spectrum management, broadcasting, television, telecommunications services, or other related services.

(22/1) To provide information relating to the performance of the NBTC and operators having been authorized by the NBTC, in respect of digital as requested by Office of the National Digital Economy and Society Commission for the use of analyzing and formulating the National Digital Economy and Society Development Plan and Policy.

23. To give advices to the Cabinet for an issuance of, or amendment to, legislation related with frequency allocation and other matters relating to frequencies, broadcasting, television, and telecommunications services.

24. To prescribe regulations, notifications or orders under the powers and duties of the NBTC.

25. To perform any other acts as prescribed in this Act or other laws.



The Office of the NBTC and its powers and duties

Power and duties of the Office of the NBTC

Section 56 and Section 60 of the Act on the Organization B.E.2553 (2010) and its amendment stipulates that the Office of the National Broadcasting and Telecommunications Commission, or called in short “the Office of the NBTC” which is a juristic person, having a status of state agency and shall not be subject to the government agency under the law on public administration, or state enterprise under the law on budgetary procedure or other laws, and directly report to the Chairman of the NBTC. The Office of the NBTC shall have a Secretary-General of the NBTC who shall be responsible for the work performance of the Office of the NBTC and shall be the superior of officials and employees of the Office of the NBTC, and coupled with Section 57 has prescribed the powers and duties of the Office of the NBTC as follows:

1. Be responsible for the Office of the NBTC’s revenues and expenditures.
2. Prepare the Office of the NBTC’s annual budget expenditure and submit to the NBTC for endorsement. The said annual budget expenditure shall include any budget with respect to the conduct of official duties of the NBTC, the Performance Follow-up and Evaluation Committee and Office of the NBTC. Such annual budget expenditure shall be prepared with consideration of worthiness, cost effectiveness and efficiency. In case that any item or project is already been allocated of the budget but has not paid or created debt obligations within the fiscal year, the item or project shall be cancelled and the Office of the NBTC shall submit the budget for such item or project as state revenue.
3. Monitor and follow up spectrum utilization.
4. Receive and consider complaints with regard to the use of spectrum, the operation of broadcasting, television, and telecommunications services in order to examine and solve the problems or propose recommendations to the NBTC for consideration according to the criteria prescribed by the NBTC.

5. Study, compile, and analyze information related to the spectrum, the use of spectrum, the broadcasting, television and telecommunications business operation.

6. Be responsible for the administrative work of the NBTC and the Fund Management Committee.

7. Perform other acts as entrusted by the NBTC.

Preparation of the Annual Budget Expenditure of the Office of the NBTC

In the preparation of the annual budget expenditure under Section 57 (2), before the Office of the NBTC proposes the draft annual budget expenditure to the NBTC for approval, it has to propose the draft budget to the National Digital Economy and Society Commission for consideration and comments, and the Office of the NBTC shall improve the draft budget expenditure according to the comments, except the annual budget expenditure of the Performance Follow-up and Evaluation Committee, the Office of the NBTC shall propose to the Performance Follow-up and Evaluation Committee for further improvement. In case that the Office of the NBTC or the Performance Follow-up and Evaluation Committee, as the case may be, disagrees with the comments of the National Digital Economy and Society Commission, the Office of the NBTC shall propose the said draft annual budget expenditure together with the comments of the National Digital Economy and Society Commission to the NBTC for further consideration. After the NBTC has approved the Office of the NBTC’s annual budget expenditure, the Office of the NBTC shall disclose that annual budget expenditure, together with items or projects that have been approved, to the public via the information network or other methods that are easily accessible. In addition, the Office of the NBTC must propose the annual budget expenditure to the National Digital Economy and Society Commission not less than ninety days prior to the beginning of the fiscal year, and the National Digital Economy and Society Commission shall complete the consideration and comments not less than thirty days prior to the

beginning of the fiscal year. After receiving the comments or after the said period, the Office of the NBTC shall propose the draft annual budget expenditure to the NBTC for further action.

Revenues of the Office of the NBTC

Section 65 of the Act on the Organization B.E.2553 (2010) and its amendment prescribes that the Office of the NBTC's revenues shall consist of licensing fees and licensing fees to use spectrum according to Section 44/2 paragraph one, licensing fees and business licensing fees according to Section 45 paragraph one, and license transfer fee to use spectrum according to Section 44/3, revenues or benefits accrued from the conduct of duties of the NBTC and the Office of the NBTC, revenues derived from the Office of the NBTC's property, money and property donated to the Office of the NBTC in accordance with the regulation set forth by the NBTC for the work of the Office, and subsidies from the government. Revenues from the licensing fees, licensing fees to use spectrum, business licensing fees and license transfer fee to use spectrum and revenues or benefits accrued from the operation under the powers and duties of the NBTC and the Office of the NBTC after deducting by expenditures for efficient conduct of the Office of the NBTC, necessary burden costs, and money allocated for the Fund under Section 52 and the Edtech Fund under the law on national education, and the Digital Economy and Society Development Fund under the law regarding the Digital Development for Economy and Society, shall be remitted to the state treasury. In the case where the Office of the NBTC revenues are not sufficient for efficient conduct of the Office of the NBTC, including necessary burden costs, and other sources are not available, the government shall allocate the national budget to the Office of the NBTC as necessary.

The Broadcasting, and Telecommunications Research and Development Fund for the Public Interest

Section 52 of the Act on the Organization B.E.2553 (2010) and its amendment stipulates that the Broadcasting and Telecommunications Research and Development Fund for the Public Interest shall be established with the following objectives:

- To ensure that the people have been provided with the broadcasting, television, and telecommunications services universally, as well as to promote community services and support community service operators.
- To promote and support communication resources development, research and development in the broadcasting and telecommunications sector, as well as to increase people's capabilities in keeping pace with the media and technology in the aspect of spectrum utilization, information technology, facilities for the disabled, elderly, or underprivileged as well as telecommunications industries and related industries.
- To promote and support human resource development in the broadcasting, television, and telecommunications services, information technology, as well as the operation of the organizations who is responsible for setting ethical standards of the occupations or professions under the law on broadcasting and television business operation.
- To support, promote, and protect consumers in the broadcasting, television, and telecommunication services.
- To support the operation under the Thai Media Fund Act by allocating money to the Thai Media Fund.
- To encourage the most efficient use of frequencies, the spectrum refarming in order to re-allocate, and support the substitution, compensation or remuneration for the refarmed frequencies for the maximum efficiency in the use of frequencies.

Vision

Being a leading organization in the ASEAN regulating and developing communications business for sustainable national development.

Mission

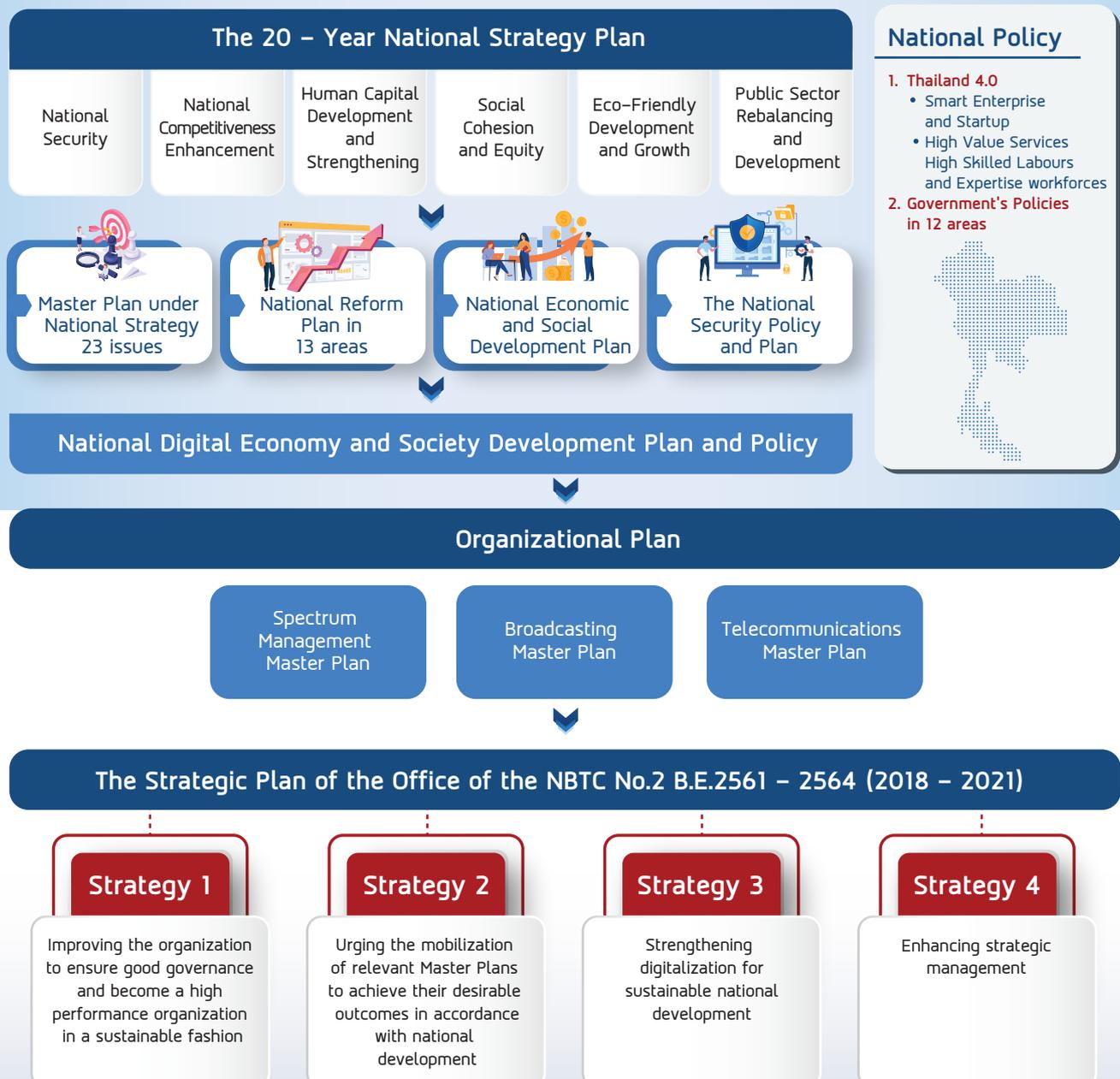
To support the NBTC concerning spectrum management as well as licensing and regulating the broadcasting, television, radiocommunications, and telecommunications business operation with efficiency, transparency and good reputation in ASEAN.

Core Value



Strategic Issues of the Office of the NBTC and the Connection with the Government's Policies, National Strategy, Master Plan under the National Strategy, and National Reform Plan

In 2020, the NBTC has taken parts in supporting the drive of important government's policies and national plans through the preparation of Spectrum Management Master Plan B.E.2562 (2019), Telecommunications Master Plan No.2 B.E.2562 - 2566 (2019 - 2023) and Second Broadcasting Master Plan B.E.2563 - 2568 (2020 - 2025) which are connected to National Strategy Plan, Master Plans under National Strategy, relevant National Reform Plan and National Digital Economy and Society Development Plan and Policy by having aligned into the Strategic Plan of the Office of the NBTC No.2 B.E.2561 - 2564 (2018 - 2021)



The High-Level Executives of the Office of the NBTC



Mr. Takorn Tantasith

Secretary-General of
the NBTC Term of Office
(2010 – 30 June 2020)

Mr. Trairat Viriyasirikul

Deputy Secretary-General
Acting Secretary-General of the NBTC
(1 July 2020 – Present)



Air Marshal Dr. Thanapant Raicharoen

Deputy Secretary-General of
Regional Affairs Cluster



Asst. Prof. Dr. Pakdee Manaves

Deputy Secretary-General of
Broadcasting Cluster



Mr. Sutisak Tantayotin

Deputy Secretary-General of
Telecommunications Cluster





Mrs. Supinya Jampee

Principal Expert

Mr. Chanthaphat Khamkhokgruad

Principal Expert



Mr. Sombat Leelapata

Principal Expert

Mr. Saneh Saiwong

Principal Expert



Ms. Achara Panyavanija

Assistant Secretary-General of
Strategic and Internal Affairs Cluster

Mr. Chalermchai Kokheadtikul

Assistant Secretary-General of
Administration Cluster



Ms. Chitsata Sriprasertsuk

Assistant Secretary-General of
Telecommunications Cluster

Ms. Maneerat Kamjornkitjakarn

Assistant Secretary-General of
Broadcasting Cluster





Organization Structure and Manpower of the Office of the NBTC

In 2020, the manpower of the Office of the NBTC was totally 1,719 persons, as shown below:



Management Position		
Acting Secretary-General	1	person
Deputy Secretary-General	3	persons
Assistant Secretary-General	4	persons
Executive Directors	43	persons
Division Directors	227	persons

Technical Position		
Principal Experts	4	persons
Senior Experts	5	persons
Experts	2	persons

Operation Position		
Senior Officers	426	persons
Middle-level Officers	426	persons
Junior Officers	155	persons
Employees	361	persons

Staff to NBTC Commissioners		
Advisor/Secretary/Staff	62	persons

Remarks: Data as of 31 December 2020

Source: Human Resources Management Bureau, Office of the NBTC

Organization Structure

The Office of the National Broadcasting and Telecommunications Commission





Chairman of the NBTC

Secretary-General of the NBTC

 **Regional Affairs Cluster**

Deputy Secretary-General

Assistant Secretary-General

- Regional Affairs Bureau
- Office of the NBTC, Region 1 (Central)
- Office of the NBTC, Region 2 (Northeast)
- Office of the NBTC, Region 3 (North)
- Office of the NBTC, Region 4 (South)

 **Telecommunications Cluster**

Deputy Secretary-General

Assistant Secretary-General

- Telecommunications Policy and Resources Management Bureau
- Legal Telecommunications Bureau
- Telecommunications Tariffs Bureau
- Facilities-based Telecommunications Business Licensing Bureau
- Services-based Telecommunications Business Licensing Bureau
- Telecommunications Enforcement Bureau
- Telecommunications Technology and Standard Bureau
- Numbering Management Bureau
- Government Radiocommunications Licensing Bureau
- Business Radiocommunications Licensing Bureau
- Telecommunications Access Bureau
- Universal Services Bureau
- Telecommunications Consumer Protection Bureau



The Management Team of the Office of the NBTC

Secretary-General of the NBTC

Mr. Trairat Viriyasirikul

(Deputy Secretary-General Acting Secretary-General)

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Fax: 0 2290 5138

Deputy Secretary-General, Strategic and Internal Affairs Cluster

Mr. Trairat Viriyasirikul

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Deputy Secretary-General, Regional Affairs Cluster

Air Marshal Dr. Thanapant Raicharoen

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Fax: 0 2290 5142

Deputy Secretary-General, Broadcasting Cluster

Asst. Prof. Dr. Pakdee Manaves

Tel: 0 2670 8888 ext. 5099

Deputy Secretary-General, Telecommunications Cluster

Mr. Sutisak Tantayotin

Tel: 0 2670 8888 ext. 1699

Principal Experts

Mrs. Supinya Jampee

Principal Legal Expert

Tel: 0 2670 8888 ext. 1888

Mr. Chanthaphat Khamkhokgruad

Principal Policy and Planning Expert

Tel: 0 2670 8888 ext. 3333

Mr. Sombat Leelapata

Principal Legal Expert

Tel: 0 2670 8888 ext. 5188

Mr. Saneh Saiwong

Principal Engineering Expert

Tel: 0 2670 8888 ext. 1818

Assistant Secretary-General

Assistant Secretary-General, Strategic and Internal
Affairs Cluster

Ms. Achara Panyavanija

Tel: 0 2670 8888 ext. 1858

Assistant Secretary-General, Administration Cluster

Mr. Chalermchai Kokkeadtikul

Tel: 0 2670 8888 ext. 2000

Assistant Secretary-General, Telecommunications
Cluster

Ms. Chitsata Sriprasertsuk

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Assistant Secretary-General, Broadcasting Cluster

Ms. Maneerat Kamjornkitjakarn

Tel: 0 2271 7625, 0 2670 8888 ext. 5300

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Administration Cluster

Executive Director, Secretariat Office of the Chairman and Proceedings Bureau

Mr. Kajornsak Tananont

Tel: 0 2670 8888 ext. 2002

Executive Director, Secretariat Office of the Commissioners and the Secretary-General Bureau

Mrs. Suwannee Jiaranuchat

Tel: 0 2670 8888 ext. 2222

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Executive Director, General Administration Bureau
Major Komet Prateepthong

Tel: 0 2271 7660, 0 2670 8888 ext. 6100

Fax: 0 2290 5147

Executive Director, Public Relations Bureau

Mr. Worapong Nipakornphan

Tel: 0 2670 8888 ext. 2399

Fax: 0 2290 5241

Executive Director, Internal Audit, Performance Appraisal and Anti-Corruption Bureau

Colonel Sommas Samranrat

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Fax: 0 2271 4637

Executive Manager, Research and Development Fund Bureau

Mr. Niphon Jongwichit

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2

Major Performance of the NBTC in the Year 2020



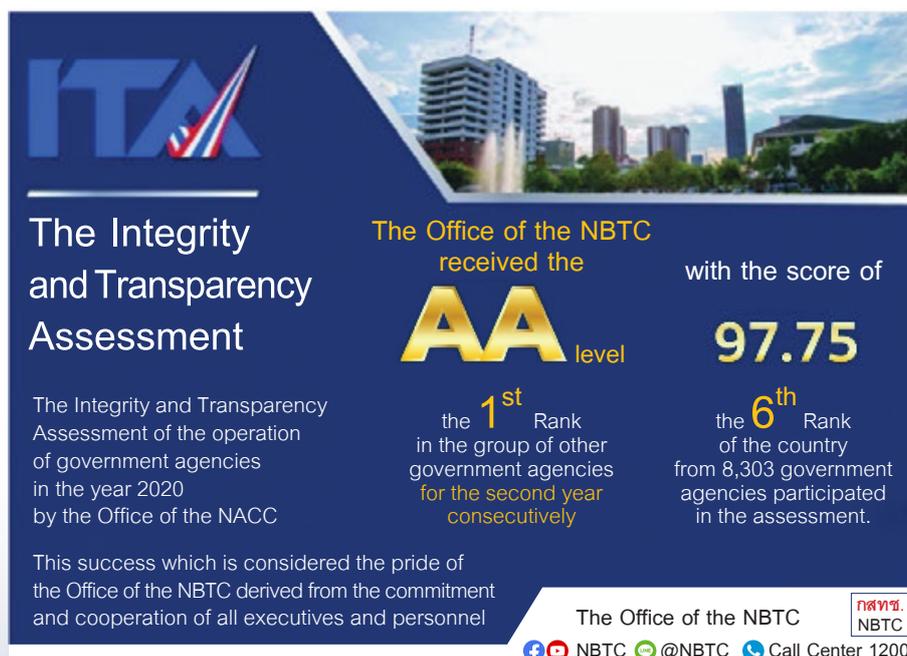
Strategy and Organization Management

The NBTC has emphasized the importance of driving the strategy of Improving the organization to ensure good governance and become a high performance in sustainable fashion, so as to achieve the goal of developing the Office of the NBTC towards the “NBTC Digitalization”, and driving the goal of the National Strategy in Public Sector Rebalancing and Development to be transparent, misconduct and corruption free, and having carried out its mission by aiming at the achievement and public interest, effectively responded to the public demand with responsive, fast, and convenient service with transparency, along with strengthening its digital capability for a sustainable national development. The important achievement in the year 2020 are as follows:

1. The integrity and transparency assessment (ITA) of the operation

The NBTC has set its policy on performing duties with integrity under the good governance and the good corporate governance principle as well as announced the 4-year Plan for a Good Governance Promotion B.E.2561 - 2564 (2018 - 2021) since the year 2018 onwards. In 2020, the NBTC has set the policy on improving the Integrity & Transparency Assessment (ITA) of the operation of the Office of the NBTC from the year 2019, which the Office of the NBTC received the score of assessment in the A level with the score of 94.71, in order to be in the AA level. As a result, the Office of the NBTC had received high score of integrity and transparency assessment for the operation as government agency

in the year 2020 in the AA level with the score of 97.75, which was the 1st rank in the group of other government agencies, for the second year consecutively and the 6th rank of the country from 8,303 government agencies participated in the assessment. It is absolutely a fruitful success that brought pride to the NBTC and the Office of the NBTC. The NBTC has thus set the policy in 2021 to maintain the standard of the integrity and transparency assessment of the operation of the Office of the NBTC in the AA level and improve a sustainable operation by developing values and organization culture on performing duties with integrity and good governance continuously including having supported and collaborated with all related parties in the prevention and anti-corruption.



The infographic features a dark blue background with a white and red diagonal stripe. On the left, the ITA logo is displayed. The main text is in white and yellow. A photograph of a modern building is shown in the upper right corner. At the bottom, there are social media icons and contact information.

ITA

The Integrity and Transparency Assessment

The Integrity and Transparency Assessment of the operation of government agencies in the year 2020 by the Office of the NACC

The Office of the NBTC received the **AA** level with the score of **97.75**

the **1st** Rank in the group of other government agencies for the **second year consecutively**

the **6th** Rank of the country from 8,303 government agencies participated in the assessment.

This success which is considered the pride of the Office of the NBTC derived from the commitment and cooperation of all executives and personnel

The Office of the NBTC

กสทช. NBTC

Facebook: NBTC, Instagram: @NBTC, Call Center: 1200



2. Developing the Office of the NBTC towards a digital office

In 2020, the NBTC has established an important policy on “developing the Office of the NBTC towards a digital office” as a policy that must be accomplished. The Office of the NBTC has therefore formulated a 3-year strategic plan to develop the Office towards the digital office or “NBTC Digitalization” B.E.2563 - 2565 (2020 - 2022) focusing on the development of “People”, “Process”, “Information”, and “Digital Technology” by enhancing knowledge and understanding, shifting employees mindset to be open minded and embrace changes and ready to be a part of consistently significant changes. The Pain point survey on the need and requirement of employees and people (User Centric) was also conducted to support the design of the digital office and to response to the requirement of people as much as possible. This included the selection of technology to be applied for work processes optimization, the amendment or revision of related laws or regulations so that the development of the Office to become the

digital office can be done actually. In 2020, the NBTC has carried out the NBTC Service Portal Project which is expanded from the One Stop Service Project so that people are able to apply for e-licence and information service related to the telecommunications, broadcasting, and television services via electronic system in which the information will be automatically retrived from the database of the Office of the NBTC and related organizations through the Linkage Center and the service is available at the Office of the NBTC at anytime and anywhere. The NBTC Service Portal is considered an important starting point of the road to fully become digital office in the future. **The NBTC has also been selected to be awarded as the government agency to receive the Digital Government Awards in 2020 (DG Awards 2020) ranked 6th from all 1,926 government agencies having promoted and supported the development of digital government who has developed the organization to become a digital government in high level in order to be a good model for other government agencies.**



3. The Efficient Budget Management of the Office of the NBTC in the Fiscal Year 2020.

In 2020, the NBTC has prepared a surplus budget with the revenue collected in the amount of 9,129.539 million baht while the budget expenditure in the year 2020 was prepared for totally 6,548.329 million baht. The result of the budget expenditure of the operation of the Office of the NBTC was 6,124.720 million baht and the NBTC had already submitted money to the Digital Economy and Society Development Fund according to Section 24 (4) of the Digital Development for Economic and Social Development Act B.E.2560 (2017) based on cash basis accounting in the amount of 1,364.984 million baht. It is expected that the Office of the NBTC will submit more money as state revenue for 1,639.835 million baht.

4. The Allocation Money of the Broadcasting and Telecommunications Research and Development Fund for the Public Interest (BTFFP).

In 2020, the NBTC had approved the allocation of the Fund in accordance with the fund's objectives as proposed by the Fund Management Committee; that is, the Type 1 grant and Type 2 grant for 75 projects at the amount of 869.540 million baht, the Type 2 grant in case of making agreements with government agencies at the amount of 298.750 million baht, the Type 3 grant according to the NBTC's policies at the amount of 4,567.010 million baht (included the support on healthcare for fighting the COVID-19 pandemic for 642.550 million baht) and the Type 4 grant to support the Thai Media Fund in the year 2020 at the amount of 500.000 million baht. Also, the NBTC has prepared the Broadcasting and Telecommunications Research and Development Fund for the Public Interest 4-Year Action Plan B.E.2563 - 2566 (2020 - 2023), which is in line with the direction of national development according to the National Strategy, Spectrum Management

Master Plan, Broadcasting Master Plan, and Telecommunications Master Plan in order to drive the mission of the BTFFP Fund for the effectiveness and concrete results. In addition, the follow-up and evaluation were carried out on the implementation of the granted projects to ensure the utilization in each area and to encourage the future research which can be divided into policy utilization¹, academic utilization², and social/community development utilization³ as follows:

1) **Policy utilization** such as (1) the project to study and develop human resources to improve operations and develop surveillance tools for cybersecurity for small enterprises at the community level in which the study of risk analysis and cybersecurity implications has been conducted for small enterprises at the community and local level. The result of the study can be further developed in research to set standards for determining stability performance in cybersecurity by stipulating standardized measures for use and inspection; (2) the project to raise public awareness about cyber threats and crimes by providing more channels to enhance knowledge of people through digital media that is easy to understand and create a virtual learning center for people to gain knowledge and understanding and be more aware of cyber threats. This makes it possible to reduce the problem of cyber threats and lead to the economic benefits social safety and the stability of the country in the future.

2) **Academic utilization** such as (1) the project to research and develop frequency signal quality testing set for radio broadcasting along the border areas with a view to developing a prototype system for testing the quality of frequency signal which can be portable and installed along the border areas, and to develop information systems and import frequency signal quality data from the frequency monitoring

¹ Policy utilization means to apply knowledge gained from researches for decision-making in management and formulation of important policies/measures/guidelines for the development in relevant areas.

² Academic utilization means to publish the result or knowledge gained from researches in academic journals or disseminate or present to meetings and conferences at national or international levels.

³ Social/community development utilization means to apply knowledge gained from researches to the knowledge transfer for the targeted groups in forms of trainings, distribution of manuals, dissemination and publications, vouchers, websites, etc.



along the border areas. This provides people living along the border areas with information on frequency signal quality which can reduce complaints (2) the project to improve the quality of education in rural areas through the use of digital technology in order to enhance teaching and learning level and management of educational institutions. The project implementation resulted in a prototype product of the Digital Administration system which is a new technology and a prototype for other educational institutions to continue the further research. In addition, The research results have also been published in international academic journals and international symposium which will help enhance knowledge and develop skills of relevant personnel in applying digital technology for further educational development.

3) Social/community development utilization

such as (1) the project to develop a prototype of technology to improve the quality of a distance emergency medical services in rural areas through high-speed digital networks. The results of the project will enable people living in the areas to use and access to quality and prompt services, enhance medical personnel more professional skills through digital technology, provide technology to support the mobile telemedicine consultation system and a cloud-based medical knowledge management system (2) the project to study research and development on the

provision of an audio description service during or around the broadcasting time which will provide the disabled with an opportunity to access, perceive, and utilize reports of broadcasting and television services as equal as the general public.

5. Social contribution

The NBTC has carried out various activities and projects to support and help the society from natural disasters, floods, storms, and the COVID-19 pandemic, which had affected the economy and livelihoods of the people. Those activities are such as:

- Volunteer activities for the public benefit on “Have and Share” to donate bags of kindness to help people who have suffered from the impact of the COVID-19 pandemic on the occasion of Her Majesty Queen Suthida Bajrasudhabimalalakshana’s Birthday Celebration.

- Having supported the operation of relevant agencies to cope with the Molabe Typhoon by assigning Sailom Center, the Office of the NBTC to be prepared 24 hours a day to coordinate and provide information with radio amateurs and volunteers including having urged all operators to maintain the quality of signal and the mobile phone network in the areas affected by such storms as well as preparing the maintenance team and power supplies to be fixed in case of a failure of electricity so that people can use the mobile phone service effectively.



- Instructing telecommunication operators to monitor and prepare for helping people who are affected by the Sinlaku Storm that causing flooding and flash floods in many areas. This included maintaining the communication network and monitoring the quality of mobile phone signal and communication equipment in disaster areas as well as solving problems to enable the use of communication for people in the area as soon as possible.

- Having prepared for relevant persons in case of disasters or emergencies, such as 1) cooperating with the Department of Disaster Prevention and Mitigation, Ministry of Interior, to organize a workshop on “Preparation for Situations in case of Disasters or Emergencies” (Simulation Model) with a view to raise awareness of the Radio Amateur Society of Thailand, Citizen Network Radio, foundations, rescuers, broadcasting operators, and telecommunications operators on the preparedness

and be able to help people in time. 2) cooperating with Ministry of Digital Economy and Society, Department of Disaster Prevention and Mitigation, to organize a workshop on “the rehearsal for the plan to use spectrum in the joint communication coordination between government agencies and the public in case of emergencies and disasters” in Kanchanaburi in order to provide knowledge about emergency and disaster preparedness plans and to simulate real-life disaster situations at Sane Phong Village, Lai Wo Sub-district (Disaster Area), Lai Wo Subdistrict Administrative Organization (Frontal Commanding Center), Khao Mai Daeng (Repeater Test Point) and Makmai Resort (Joint Commanding Center), and the communication testing in each point had been done via radio communication in the VHF band of 161.200 MHz (contact between government agencies).



Spectrum Management

The NBTC had carried out important missions in the spectrum management by setting policies on the spectrum management to be in accordance with the advancement of changing technology and technology convergence as well as driving the implementation to achieve the goals of the Spectrum Management Master Plan. The achievements of the operation will enable Thailand to have adequate spectrum to meet the demand and be in line with international. Besides, the NBTC had reduced the limitations in the use of spectrum to increase a new model of spectrum use and prepare the spectrum that supports 5G/IoT technology to bring Thailand into a real digital society according to the government's policy. In 2020, the achievements were as follows:

1. Setting policy in spectrum management

1.1 Having prepared guidelines for the improvement of the spectrum use in the frequency band of 3500 MHz to support the 5G technology because of its proper qualification in both network coverage and data transmission capacity. The spectrum allocation in the frequency band of 3500 MHz will lead to the installment of mobile telecommunication networks that support 5G technology, the important infrastructure for the country development. The NBTC Meeting No. 19/2020 on 28 October 2020 had approved the guidelines for the improvement of the spectrum use in the aforementioned frequency band and assigned to be proceeded as follows:

(1) Terminating the spectrum use in the frequency band of 3400 - 3700 MHz for fixed satellite service from 11 September 2021 onwards.

(2) The consideration shall not be made for the issuance of licenses to make and import signal receiving antennas in the satellite service (low noise block down converter - LNB) including other related equipment and install terrestrial satellite stations using the spectrum in the frequency band of 3400 - 3700 MHz starting from the date that the NBTC had approved the resolution onwards.

However, to prepare the requirements according to the draft NBTC Notification on Technical Standards of Television Receive-Only (TVRO) in the C-Band, the Office of the NBTC shall comply with the

Guard Band test results of the field operation to avoid any impact on viewing as well as to provide appropriate and sufficient spectrum for the use in the International Mobile Telecommunications (IMT) service and 5G technology in the frequency band of 3500 MHz.

(3) Terminating the delivery of new satellite networks, agreements with additional foreign satellites, and licensing to use foreign satellite channels to provide domestic services using the frequency band of 3400 - 3700 MHz for fixed satellite service since the date that the NBTC had approved the resolution onwards

(4) Improving the Spectrum Roadmap for Mobile Communication in Thailand in part of the spectrum assignment in the frequency band of 3500 MHz for the international mobile telecommunications service to be in accordance with the time frame for the improvement of the use of spectrum in the frequency band of 3500 MHz and the time frame of the implementation under measures for frequency interference prevention and measures to reduce the impact from the improvement of the use of spectrum in the frequency band of 3500 MHz.

(5) The field trial/test for the case of spectrum sharing between the International Mobile Telecommunications Service, 5G technology and other services in the frequency band of 3500 MHz has been scheduled for a period of 8 months, starting from 1 January 2021 onwards.



1.2 Revising the NBTC Notification on the Spectrum Management Master Plan B.E.2562 (2019)

in part of Appendix A (Details of the frequency specified for use in the broadcasting and television services, telecommunications service, and other services), Appendix B (Guidelines for the spectrum refarming, Guidelines for spectrum refarming for reallocation and Guidelines for improving spectrum utilization B.E.2562 - 2566 (2019 - 2023)) and the National Table of Frequency Allocations B.E.2562 (2019) in order to support the provisions on convergence, implementation under the plan and the time frame for the enactment of the Royal Decree, according to Section 30 of the Act on the Organization to Assign the Spectrum including the obligations under the Radio Regulation 2020. The revised Notification had already been published for a public consultation during 2 June - 17 July 2020.

2. Having coordinated on frequency management along the border areas and the notification of the use of spectrum in Thailand to the International Telecommunication Union (ITU) and neighboring countries.

The NBTC has continuously held the Joint Technical Committee Preparatory Meeting on the Radio Frequency Coordination and Allocation along the Border Area (JTC) with neighboring countries annually as well as coordinated with the regulatory bodies of the neighboring countries to solve problems on the frequency interference. However, due to the outbreak of COVID-19 pandemic which had impacts on the organization of international conferences in 2020, the normal format of meetings have been reduced and the online meetings had been used for the coordination for resolving problems of frequency interference as well as supporting the co-use of frequencies in different bands between Thailand and neighboring countries as follows:

2.1 The 3rd Joint Technical Committee Preparatory Meeting on the Radio Frequency Coordination and Allocation along the Border Area Thailand - Myanmar (JTC-3) during 14 - 16 January 2020 in Bagan City, Republic of the Union of Myanmar. The meeting reached an important agreement on

the problem resolution of frequency interference in the frequency band of 850 MHz, determination of common parameters in the frequency band of 900 MHz, 1800 MHz, and 2100 MHz, consideration of proposals for the spectrum in the frequency band of 2600 MHz, and determination of the common use frequencies in case of disasters and emergencies, including information exchange for station use in radio and television broadcasting services.

2.2 The international coordination for notifying the change of spectrum use after the network improvement for supporting the spectrum in the frequency band of 700 MHz as follows:

(1) Coordinating with Lao People's Democratic Republic (Lao PDR) for 56 frequencies in 17 stations on 28 September 2020.

(2) Coordinating with Cambodia for 9 frequencies in 4 stations on 28 September 2020.

(3) Coordinating with Malaysia for 6 frequencies in 3 stations on 8 October 2020.

(4) Notifying the International Telecommunication Union (ITU) to cancel the use of frequencies for the analog television service (Analog TV) of the Thai Television Channel 3 (Bangkok Entertainment Company Limited) for 2 stations (2 programs) and notifying the improvement of the use of frequencies for the digital terrestrial television service after the spectrum refarming in the frequency band of 700 MHz for 147 stations (292 programs). The notification of the frequency use and frequency usage cancellation in Thailand to the International Telecommunication Union (ITU) and neighboring countries shall enhance the organizations or countries to be notified of the frequency use in Thailand and also prevent the frequency interference from the use of the same frequency.

2.3 The Special Meeting with Ministry of Posts and Telecommunications (MPT), Lao PDR, and mobile phone service providers of both countries in online form on 13 July 2020 and 8 October 2020 to determine the parameters for the frequency coordination in the frequency band of 2600 MHz along the Thai-Laos border areas.



2.4 Coordinating with Telecommunication Regulator of Cambodia (TRC) to monitor and resolve problems on frequency interference in the frequency band of 133.1 MHz and 123.5 MHz used for air traffic control of Aeronautical Radio of Thailand Ltd., which has been interfered by the broadcasting in Cambodian language of radio stations in Cambodia.

2.5 Setting standards of the coordination process within the Office of the NBTC and between the Office of the NBTC and external agencies to monitor and solve problems of frequency interference along the border areas of Thailand and neighboring countries, organizing meetings to discuss and enhance understanding the problem solving process and frequency interference along the border areas of Thailand and neighboring countries.

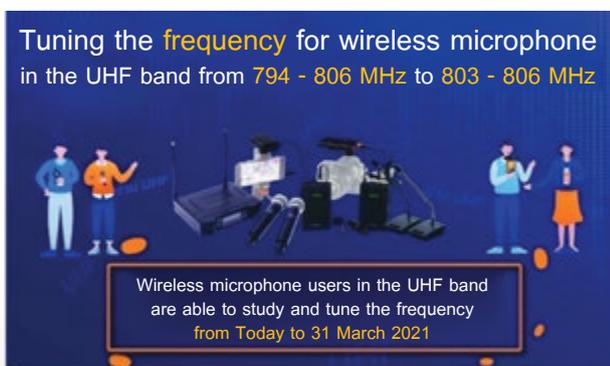
2.6 Frequency registration along the border areas of Thailand and neighboring countries which Thailand has notified the registration made with Malaysia, Lao PDR, and Cambodia for 343, 860 and 7 registrations respectively, and received the registration made by Malaysia for 1,031 registrations.

3. Setting criteria for the efficient use of spectrum without interfering with each other.

The NBTC has studied and analyzed the data on the use of spectrum for the broadcasting, television, and telecommunications services in order to formulate a policy on spectrum use management for the utmost benefit to the country and the public as well as developing notifications, criteria for proper use of the spectrum and the consistency with the current spectrum use as follows:

3.1 Formulating three NBTC Notifications regarding Radio Frequency Plan and Criteria for Maritime Mobile Service consisting of the (draft) NBTC Notification on Radio Frequency Plan for Maritime Mobile Service in the Frequency Band of 2170 - 26175 MHz, the (draft) NBTC Notification on Radio Frequency Plan for Maritime Mobile Service and Maritime Mobile-Satellite Service in the Frequency Band of 156 - 162.05 MHz and Maritime Mobile Service in the Frequency Band of 450 - 470 MHz, and the (draft) NBTC Notification on Criteria for the Spectrum Use for Maritime Mobile Service. Those notifications had already been published for public consultation during 12 June - 29 July 2020 and the NBTC Meeting No. 20/2020 on 11 November 2020 also had the resolution to acknowledge the results of the public consultation on the said (draft) notifications.

3.2 Having prepared for the migration of wireless microphone service from the frequency band of 794 - 803 MHz in order to support the use of International Mobile Telecommunications (IMT) service in the frequency band of 700 MHz in April 2021 by conducting a data survey on import and distribution of wireless microphones in the frequency band of 794 - 806 MHz and having discussed with the importers and distributors of wireless microphones as well as promoting the adjustment of the frequency for wireless microphone continuously in the form of videos and infographics via online media of the Office of the NBTC to raise awareness of the adjustment of the frequency for wireless microphone, frequency tuning method and usage to check the frequency tuning guideline including asking for cooperation from relevant agencies to check if their wireless microphones are being used in the said frequency band, and if so, they should be adjust to the frequency band of 803 - 806 MHz within 31 March 2021.





3.3 A Study on the possibility of expanding the spectrum in the frequency band of 920 - 925 MHz, which is a highly popular frequency for the use of developing of new communication technology due to the proper technical characteristics and a variety of technologies that have been developed to use such frequencies. In addition, there is a continuous growth in the use of Internet of Things (IoT) technology in this band of frequency, therefore, to support the new technology (IoT), the NBTC therefore, has studied and analyzed the spectrum usage data in the frequency band of 920 - 925 MHz and the related adjacent frequencies of both Thailand and abroad, the regulation of other countries, the expansion of the frequency use in the frequency band of 920 - 925 MHz to cover general use, the use of software to simulate and analyze the possibility of interference in different scenarios to find the most appropriate amplification range and technical parameters for the improvement of the relevant regulation in the future, spectrum demand from stakeholders, new technology development trend and related limitations, advantages, and disadvantages, in order to prepare the policy guidelines for spectrum management in the frequency band of 920 - 925 MHz and the consideration to amend relevant rules and regulations to be suitable for future use. According to the study, however, it was found that under suitable technical conditions, there is a possibility to additional expand the use of frequency in the frequency bands of 918 - 920 MHz and 925 - 928 MHz in a general use licensing type without causing interference to the existing systems being used in adjacent frequencies and having not got severely affected by the existing system as well.

3.4 A study on the preparation of spectrum sharing criteria for TV White Space after the migration of radio and television transmissions from analog to digital system by terminating the use of all analog systems. The digital television broadcasting system enables more efficient use of the frequency per channel than analog system and it needs lower amount of frequency to support the radio and television signal transmission system. As a result, some frequencies and some areas designated for the television service are not being used and may be used for communication in other services, **which is called the “TV White Space”**. To maximize the efficiency of the spectrum utilization, the NBTC therefore has conducted a study on a feasibility and guidelines for the use of TV White Space, which consists of application guidelines, regulation guideline, domestic and international case studies, technical conditions and legal readiness, along with the results of opinion surveys from stakeholders which were found that three guidelines are recommended for the use of TV White Space in Thailand as follows: (1) the use of TV White Space is not allowed; (2) the allocation shall be made only one frequency channel to one agency; and (3) the frequency shall be assigned for the general use. Each guideline has different advantages and disadvantages. The report of this study result will be used for the consideration of determining the NBTC’s policy on the use of TV White Space, including the use of spectrum in the manner of dynamic spectrum access mutual benefit, which may be one of the ways to optimize the spectrum usage in Thailand in the future.



Satellite Service Management

The NBTC has carried out the mission of satellite service management in accordance with Section 4 and Section 27 of the Act on Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment (No.2) B.E.2562 (2019) with the power and duties to formulate the Plans for Managing the Right to Access Satellite Orbit, implementing the Plans for Managing the Right to Access Satellite Orbit, supporting the operation of government to acquire satellites or obtain rights to access satellite orbits, operating to acquire and maintain the right to use satellite orbit which is a national treasure, and operating to exercise such right for the utmost benefit to the nation and the people. The achievements obtained from the management of the communication satellite service shall affect the development of the country in supporting various industrial sectors having demand for telecommunication services, television service, and satellite communication services. Nowadays, satellite manufacturers have developed communication satellite technology to have greater potential and capacity for data communication including the provision of internet via satellite which is able to serve through the High-Throughput Satellites (HTS) and the Low Earth Orbit (LEO) satellite systems which can support high-volume data transmission and data transmission requiring very low transmission delay so that all areas can use high speed internet even in remote areas where telecommunication systems have not reached. In 2020, the accomplishment are as follows:

1. Setting policies and implementation on satellite service

1.1 Having issued three NBTC Notifications relevant to the satellite service management which have become effective since 19 February 2020 as follows:

(1) The NBTC Notification on Satellite Orbital Right Management Plan B.E.2563 (2020) which is in accordance with the National Digital Economy and Society Development Plan and Policy B.E.2561 - 2580 (2018 - 2037) and complied with the Radio Regulations of the International Telecommunication Union and international obligations so that Thailand shall have the right to access the satellite orbit and be protected against frequency interference for the use of Thailand.

(2) The NBTC Notification on Criteria and Licensing Procedure to Obtain the Right to Use Satellite Orbits in order to determine the criteria and procedures for granting the rights to access satellite orbit.

(3) The NBTC Notification on Criteria and Procedure to License Foreign Satellite to Provide Domestic Service to determine criteria and procedure for licensing to use the foreign satellite signal channel for domestic provision of commercial service.

1.2 Having prepared the (draft) NBTC Notification on Criteria and Procedure for Satellite Orbital License Package

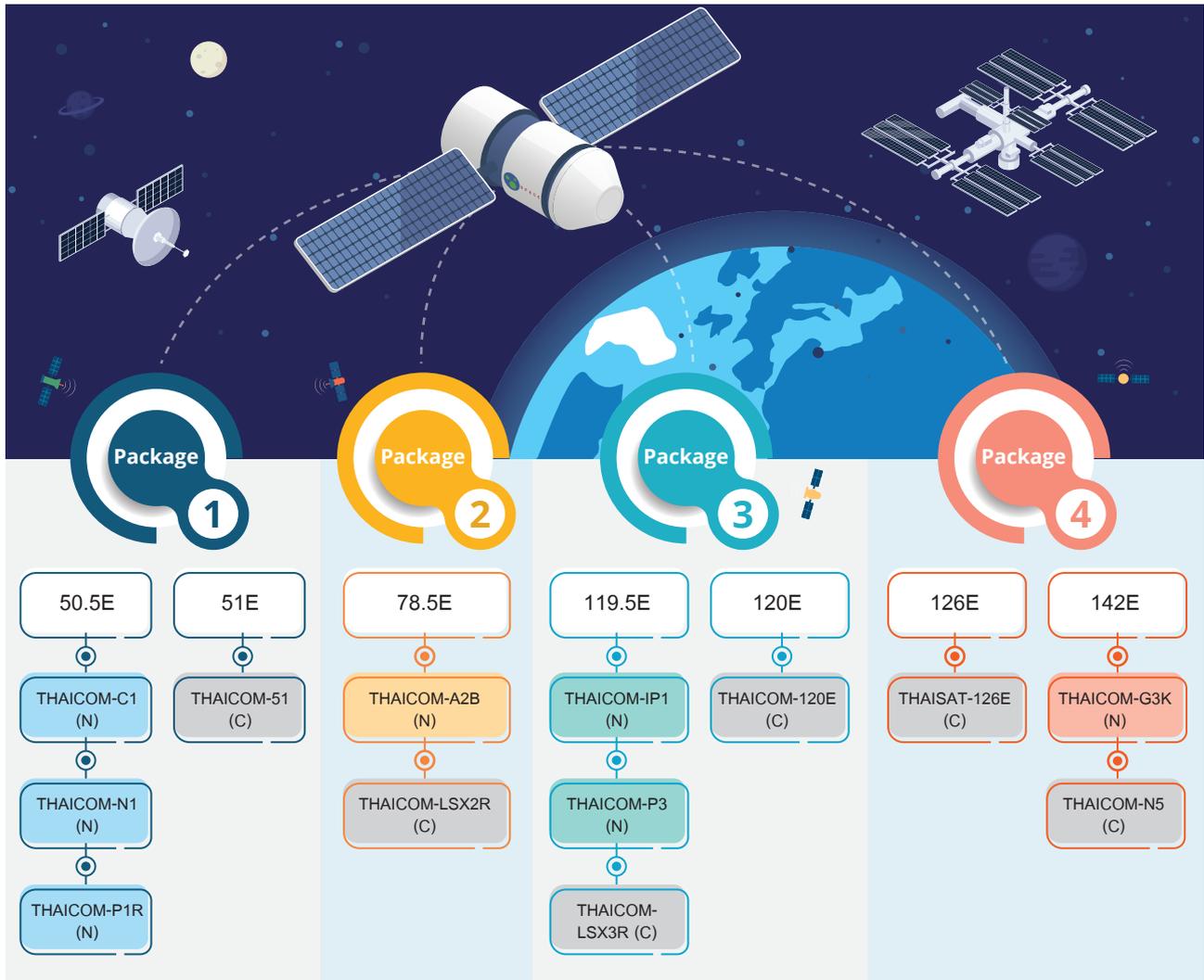
which is the operation under Article 9.4 and 9.5 of the NBTC Notification on Satellite Orbital Right Management Plan B.E.2563 (2020). The Notification prescribes that in the case that the right to access satellite orbit in primary and final steps which the granted license of the existing licensee is about to expire or has ended or no licensee is granted of the right before the Satellite Orbital Right Management Plan has become effective, the NBTC shall arrange the satellite network filings that fall under the above-mentioned case in packages as appropriate and feasible both in terms of technical and business and it may consist of more than one satellite network filing and the NBTC shall provide a selection process of agencies or satellite operators of Thailand for exercising the right under the said satellite network filing which the NBTC has arranged all rights to access the satellite orbit, or so-called "Satellite Network Filing" that Thailand possesses, both the primary and final right, into 4 package according to the orbital slot, totally 13 networks, as follows:

Package 1 consists of satellite orbit at 50.5 degrees East (THAICOM-C1, THAICOM-N1 and THAICOM-P1R networks) and satellite orbit at 51 degrees East (THAICOM-51 network).

Package 2 consists of satellite orbit at 78.5 degrees East (THAICOM-A2B and THAICOM-LSX2R networks).

Package 3 consists of satellite orbit at 119.5 degrees East (THAICOM-IP1, THAICOM-P3 and THAICOM-LSX3R networks) and satellite orbit at 120 degrees East (THAISAT-120E network).

Package 4 consists of satellite orbit a 126 degrees East (THAISAT-126E network) and satellite orbit at 142 degrees East (THAICOM-G3K and THAICOM-N5 networks).



N = Notification, C = Coordination

2. Licensing the right to use satellite network for Non-Geostationary Orbit (NGSO)

In 2020, the NBTC has granted license for existing satellite network users of the Non-Geostationary Orbit (NGSO) as appeared in Appendix D, annexed to the NBTC Notification on Criteria and Licensing Procedure to Obtain the Right to Use Satellite Orbits to 5 agencies (5 satellite network filing) to obtain the

primary right to access satellite orbit and 1 agency (1 satellite network filing) to obtain the final right to access satellite orbit according to the Transitional Provisions Article 39 of the NBTC Notification on Criteria and Licensing Procedure to Obtain the Right to Use Satellite Orbits. Details are shown in Table 1.

Table 1 : Licensees to obtain the right to access satellite orbit

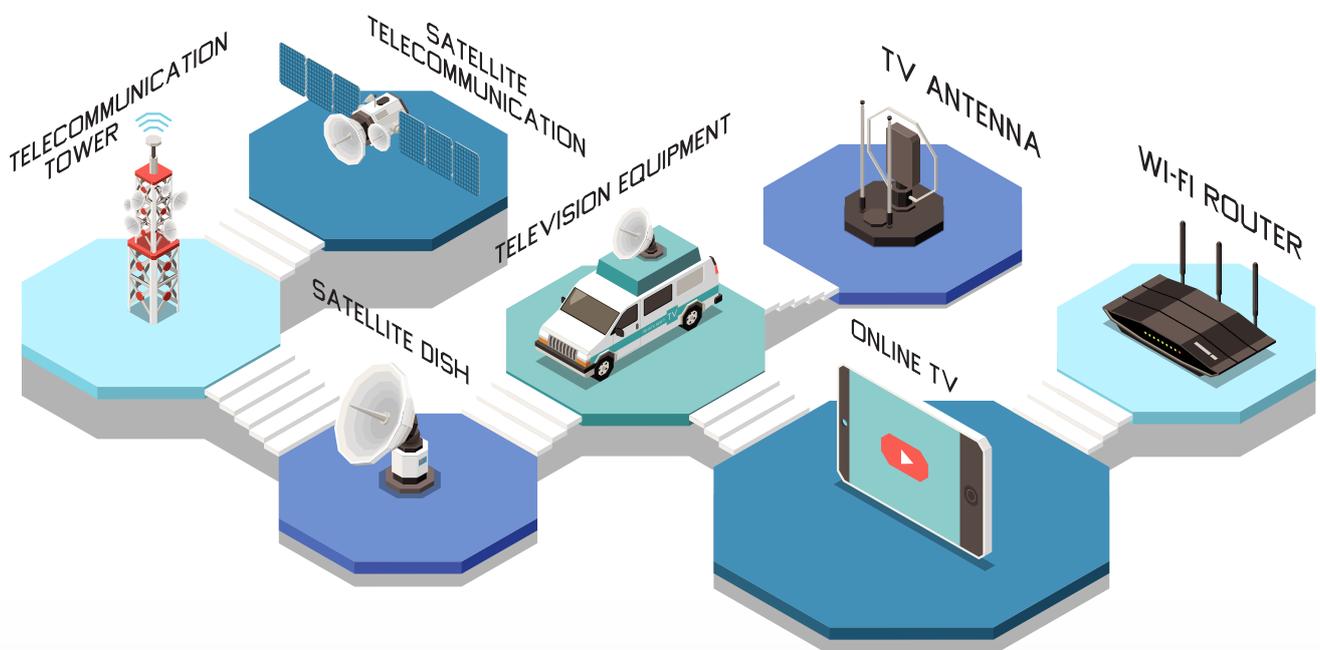
No.	Satellite orbit position	Satellite network filing	Licensing evidence (granted date)	Agencies
1	Non-Geostationary Orbit	THEOS2 (NGSO)	S1/02/3/2020/A (19 February 2020)	Geo-Informatics and Space Technology Development Agency (Public Organization)
2	Non-Geostationary Orbit	JAISAT-1 (NGSO)	S1/03/4/2020/A (19 February 2020)	The Radio Amateur Society of Thailand under the Patronage of His Majesty the King
3	Non-Geostationary Orbit	BCCSAT-1 (NGSO)	S1/04/5/2020/A (19 February 2020)	Bangkok Christian College
4	Non-Geostationary Orbit	THAI IOT (NGSO)	S1/05/6/2020/A (19 February 2020)	Royal Thai Air Force (Navaminda Kasatriyadhiraj Royal AirForce Academy)
5	Non-Geostationary Orbit	RTAFSAT (NGSO)	S1/01/2/2020/A (19 February 2020)	Royal Thai Air Force (Directorate of Communications and Electronics Royal Thai Air Force)
6	Non-Geostationary Orbit	THEOS (NGSO)	S1/02/7/2020/N (19 February 2020) (ended 18 February 2035)	Geo-Informatics and Space Technology Development Agency (Public Organization)



3. Licensing the Use of Foreign Satellite for temporary period which can be divided into 2 cases as follows:

3.1 Having granted a license to **Thaicom Public Company Limited to use foreign satellite transponders according to the Satellite Management Plan of Thaicom 5 in Emergency Case** since the Thaicom 5 satellite was discharged on 26 February 2020 which is an urgent case that may affect the public interest, causing the public to be unable to watch TV programs transmitted via the Thaicom 5 satellite. The NBTC thus granted permission for the temporarily use of foreign satellite transponders from KTSat8, Measat3, Measat3A, APstar7 and Chinasat 12, for totally not exceed 5.50 transponders from 15 January 2020 to the end date of the contract for operating the domestic communication satellite service (10 September 2021) in order to provide the substitute communication satellite orbit service under the said contract.

3.2 Having granted a license to **CAT Telecom Public Company Limited to use ASIASAT5 transponder temporarily for a period of 6 months** (or until 28 March 2021), according to Section 27 (14/2) of the Act on the Organization to Assign Radio Frequency B.E. 2553 (2010) and its amended in conjunction with Article 16 (2) (2.10) of the NBTC Notification on Criteria and Procedure to License Foreign Satellite to Provide Domestic Services for providing communication satellite orbit service to other operators and the public continuously.



Regulation on Telecommunications Services

The NBTC has driven the implementation under the government policy and the National Strategy, especially the enhancement of competitiveness, and the Telecommunications Master Plan No. 2 B.E.2562 - 2566 (2019 - 2023) to raise the development of telecommunication infrastructure to drive the sustainable national economy and digital society. The important achievements are such as the spectrum auction in the frequency band of 700 MHz, 2600 MHz, 26 GHz to be used for 5G service will support a number of connection and applications stably, enable the continuity of communication through the internet, and support the enhancement of economic competitiveness and social policies, such as expanding opportunities of digital services to cover and meet the needs of consumers, encouraging investment in telecommunication networks and employment, applying 5G technology in the development of innovations, creating opportunities of people on career development, supporting the development of the areas in Eastern Economic Corridor (EEC), developing tools and equipment to support the work of medical personnel and medical treatment, increasing industrial productivity with artificial intelligence technology, developing agricultural technology, and educational development of children, youth, and people, etc. In 2020, the achievements are as follows:

1. Arrangement of 5G Spectrum Auction

Having arranged the spectrum auction in the frequency band of 700 MHz, 2600 MHz, and 26 GHz on 16 February 2020 with 5 bidders participating in the auction. The results of the spectrum auction of those three frequency bands was totally 100,521.178 million baht (excluding VAT), which can be divided

into the spectrum auction in the frequency band of 700 MHz for 51,460 million baht, the spectrum auction in the frequency band of 2600 MHz for 37,433.889 million baht, and the spectrum auction in the frequency band of 26 GHz was 11,627.289 million baht. Details are as follows:

Result of spectrum allocation in the frequency band of 700 MHz, 2600 MHz and 26 GHz

	700 MHz (2x5 MHz/set)	2600 MHz (10 MHz/set)	26 GHz (100 MHz/set)	Total (Baht)	
	1 Set 17,154,000,000 Baht 10 MHz (733 - 738/ 788 - 793 MHz)	10 Set 19,561,000,000 Baht 100 MHz (2500 - 2600 MHz)	12 Set 5,345,000,000 Baht 1200 MHz (25.2 - 26.4 GHz)	42,060,000,000 Baht	Total revenue from spectrum allocation 700 MHz 51,460,000,000 Baht 2600 MHz 37,433,888,888 Baht 26 GHz 11,627,288,889 Baht 100,521,177,777 Baht
	2 Set 34,306,000,000 Baht 20 MHz (738 - 748/ 793 - 803 MHz)	-	-	34,306,000,000 Baht	
	-	9 Set 17,872,888,888 Baht 90 MHz (2600 - 2690 MHz)	8 Set 3,576,888,888 Baht 800 MHz (24.3 - 25.1 GHz)	21,449,777,776 Baht	
	-	-	4 Set 1,795,000,000 Baht 400 MHz (26.4 - 26.8 GHz)	1,795,000,000 Baht	
	-	-	2 Set 910,400,001 Baht 200 MHz (26.8 - 27.0 GHz)	910,400,001 Baht	
					Remarks: the above revenue has excluded VAT



1) **The result of spectrum auction in the frequency band of 700 MHz** which was divided into 3 sets of 2 x 5 MHz is as follows: there were 2 winning bidders, namely (1) Advanced Wireless Network Company Limited, the winning bidder for 1 set of 2 x 5 MHz in the frequency range of 733 - 738 MHz, paired with 788 - 793 MHz with a total auction price of 17,154 million baht (excluding VAT) and (2) CAT Telecom Public Company Limited the winning bidder for 2 sets of 2 x 10 MHz in the frequency range of 738 - 748 MHz paired with 793 - 803 MHz with a total auction price of 34,306 million baht (excluding VAT).

2) **The result of spectrum auction in the frequency band of 2600 MHz** which was divided into 19 sets of 10 MHz is as follows: there were 2 winning bidders, namely (1) Advanced Wireless Network Company Limited, the winning bidder for 10 set of 100 MHz in the frequency range of 2500 - 2600 MHz with a total auction price of 19,561 million baht (excluding VAT) and (2) True Move H Universal Communication Company Limited, the winning bidder for 9 set of 90 MHz in the frequency range of 2600 - 2690 MHz with a total auction price of 17,872.889 million baht (excluding VAT).

3) **The result of spectrum auction in the frequency band of 26 GHz** which was divided into 27 sets of 100 MHz is as follows: there were 4 winning bidders, namely (1) True Move H Universal Communication Company Limited the winning bidder for 8 sets of 800 MHz in the frequency range of

24.3 - 25.1 GHz with a total auction price of 3,576.889 million baht (excluding VAT) (2) Advanced Wireless Network Company Limited, the winning bidder for 12 sets of 1200 MHz in the frequency range of 25.2 - 26.4 GHz with a total auction price of 5,345 million baht (excluding VAT) (3) TOT Public Company Limited, the winning bidder for 4 sets of 400 MHz in the frequency range of 26.4 - 26.8 GHz with a total auction price of 1,795 million baht (excluding VAT) and (4) DTAC Trinet Company Limited, the winning bidder for 2 sets of 200 MHz in the frequency range of 26.8 - 27.0 GHz with a total auction price of 910.400 million baht (excluding VAT).

The NBTC Meeting (Special Meeting) No.1/2020 on 19 February 2020 has the resolution to approve the result of the spectrum auction in the frequency band of 700 MHz, 2600 MHz, and 26 GHz. In 2020, some winning bidders had paid the auction fee according to the conditions set forth in the first installment, for totally 6,900.204 million baht (including VAT) as follows:

(1) **Frequency band of 2600 MHz** Advanced Wireless Network Company Limited paid for the first installment at the amount of 2,093.027 million baht (including VAT) on 21 February 2020 and True Move H Universal Communication Company Limited paid the first installment at the amount of 1,912.399 million baht (including VAT) on 16 March 2020, totally 4,005.426 million baht.



(2) **Frequency band of 26 GHz** DTAC Trinet Company Limited paid at the amount of 974.128 million baht (including VAT) on 21 February 2020, TOT Public Company Limited paid at the amount of 1,920.650 million baht on 30 October 2020, totally 2,894.778 million baht.

2. Organization and Installing the overhead telecom and broadcast cables underground

The NBTC has taken into account the safety of the people and supported the implementation of government's policy to change the aerial cable system to the underground cable system to improve the scenery of the country by having continuously organized the overhead telecom and broadcast cables and bringing them underground since 2016 onwards. In 2020, the Installation of the overhead telecom and broadcast cables underground had become one of the important policies of the NBTC that must be accelerated as well as promoting and regulating operators to improve the laying of overhead telecom and broadcast cables on the electricity poles in order to ensure safety of lives and properties of people, building beautiful scenery and encouraging telecommunication infrastructure sharing for the utmost benefit of the nation including integrating cooperation with relevant agencies on such operation.

2.1 Organizing of overhead telecom and broadcast cables

Having prepared the Plan to organize the overhead telecom and broadcast cables B.E.2563 - 2564 (2020 - 2021) in which 69 routes are determined in the Metropolitan Electricity Authority area, for a total distance of 759.10 kilometers, and 3,891 routes in the Provincial Electricity Authority area, for a total distance of 7,864.542 kilometers, consisting of the Northern region, for 264 routes, the Northeast region for 1,642 routes, the Central region for 731 routes, and the South region for 1,254 routes, covering the organizing of all overhead telecom and broadcast cables throughout the country.

In 2020, the organizing of the overhead telecom and broadcast cables in the pilot route of the Metropolitan Electricity Authority was completed in 8 routes, namely Nak Niwat Road,

Ratchaphruek Road, Sala Thammasop Road, Petchaburi Road, Puttharaksa Road, Theparak Road, Tiwanon Road, and Kanchanaphisek Road, for a total distance of 69.8 kilometers; while the organizing of the overhead telecom and broadcast cables in the Provincial Electricity Authority area was completed in 3,891 routes (accounting for 100%). Due to the COVID-19 pandemic, the government has issued measures for employees to work from home to reduce the spread of such disease, the Office of the NBTC therefore had required the Metropolitan Electricity Authority and the Provincial Electricity Authority to postpone the cutting and removing of overhead telecom and broadcast cables according to the Plan to organize the overhead telecom and broadcast cables and the plan for installing the overhead telecom and broadcast cables underground to ensure the orderly of the use of communication system and to reduce the risk of the spread of the COVID-19 pandemic. For the year 2021, the NBTC will set a plan to organize the overhead telecom and broadcast cables which the operation will be divided into phases and published on the website of the Office of the NBTC.

2.2 Installing overhead telecom and broadcast cables underground

Having coordinated with telecommunication operators on bringing the overhead telecom and broadcast cables underground to ensure the orderly of the overhead telecom and broadcast cables. In the year 2020, the overhead telecom and broadcast cables were completely brought underground for 3 main routes with a total distance of 34.44 kilometers as follows:

(1) The route for installing the overhead telecom and broadcast cables underground on the projects around Chitralada Villa Royal Residence, with a distance of 4.77 kilometers consists of Ratchawithi Road (from Pichai Road to Sawankhalok Road), Sawankhalok Road (from Ratchawithi Road to Si Ayutthaya Road), Si Ayutthaya Road (from Ratchadamnoen Nok Avenue to Rama V Road) and Rama V Road (from Sukhothai Road to Luk Luang Road).

(2) The route for installing the overhead telecom and broadcast cables underground in the Metropolitan Electricity Authority area, with a distance of 3.31 kilometers, consists of Prachan Road (Na Phra That Road: from Na Phra Lan Road to the entrance of Thammasat University) Khaosan Road Landscape Improvement Project (Khaosan Road: from Tanao Road to Chakrabongse Road) in front of PEA Headquarters Office (Ngamwongwan Road: from Phong Phet Intersection to Vibhavadi Road) Rak Khlong Khu Mueang Doem Chaloen Phrakiat Project (Rachini Road: from Mon Bridge to Pak Khlong Talat and Asadang Road: from Mon Bridge to Pak Khlong Talat) and Pracharat Road (From Soi Pracharat 19 to Nonthaburi Pier).

(3) The route for installing the overhead telecom and broadcast cables underground in the Provincial Electricity Authority area, with a distance

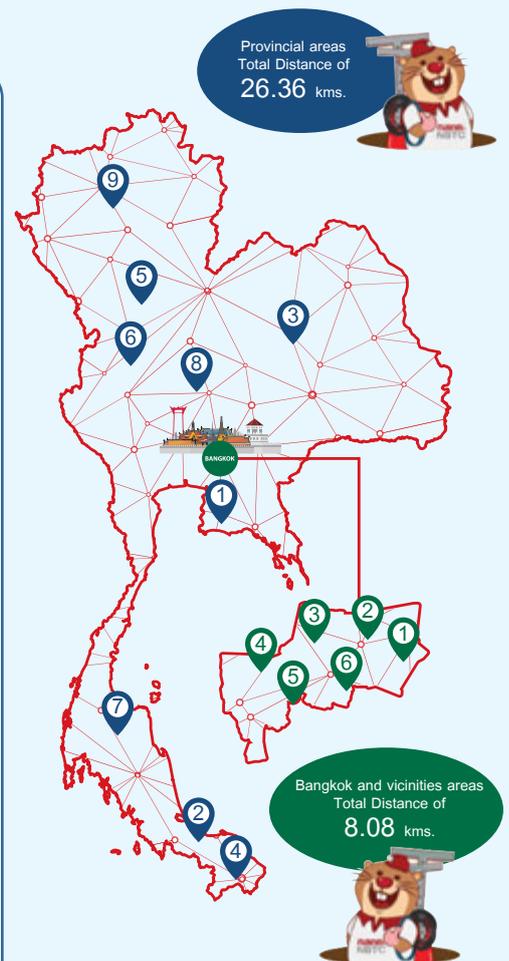
of 26.36 kilometers consists of Chonburi Province (North Pattaya Road), Songkhla Province (Hat Yai Municipality, Thammanoonwithi Road), Nakhon Ratchasima Province (Ratchadamnoen Road), Yala Province (Yala Center Hospital Intersection to Railway Market Intersection), Sukhothai Province (Sukhothai Historical Park Route), Kamphaeng Phet Province (Kamphaeng Phet Historical Park Route), Surat Thani Province (Koh Samui, Chaweng Road, from the front of Kasikorn Bank Chaweng 3 to the First Hotel Intersection), Phra Nakhon Si Ayutthaya Province (Chikun Road: Ratchapradit Sathan Temple Intersection to Ayutthaya Island Intersection and Si Sanphet Road: from U-Thong Road to Naresuan Road) and Chiang Mai Province (Suthep Road: from the front door Faculty of Medicine, Chiang Mai University side to the front door of the Faculty of Medical Technology, Chiang Mai University).

NBTC

Result of the Installation of Overhead telecom and broadcast cables underground of the Office of the NBTC in 2020

Province	Routes	Distance (km.)
1 Chonburi	North Pattaya Road	1.00
2 Songkhla	Hat Yai Municipality, Thammanoonwithi Road	1.00
3 Nakhon Ratchasima	Ratchadamnoen Road (LOT 1.1)	1.20
4 Yala	Yala Center Hospital Intersection to Railway Market Intersection	2.50
5 Sukhothai	Sukhothai Historical Park	8.80
6 Kamphaeng Phet	Kamphaeng Phet Historical Park	4.00
7 Surat Thani	Koh Samui, Chaweng Road, from the front of Kasikorn Bank Chaweng 3 to the First Hotel Intersection	3.00
8 Phra Nakhon Si Ayutthaya	Chikun Road (Ratchapradit Temple Intersection to Ayutthaya Island Intersection)	1.70
	Pa Thon Road (Ayutthaya Island Intersection to Khlong Tho Road)	1.60
	Si Sanphet Road (U-Thong Road Intersection to Naresuan Road)	1.30
9 Chiang Mai	Suthep Road : from the front door Faculty of Medicine, Chiang Mai University side to the front door of the Faculty of Medical Technology, Chiang Mai University.	0.26

Project	Routes	Distance (km.)
1 Prachan Road	Na Phra That Road (from Na Phra Lan Road to the entrance of Thammasat University)	0.90
2 Khaosan Road Landscape Improvement Project	Khaosan Road (from Tanao Road to Chakrabongse Road)	0.80
3 In front of PEA Headquarters Office	Ngamwongwan Road (from Phong Phet Intersection to Vibhavadi Road)	0.20
4 Nonthaburi	Pracharat Road (from Soi Pracharat 19 to Nonthaburi Pier)	0.26
5 Rak Khlong Khu Mueang Doem Chaloen Phrakiat Project	Rachini Road (from Mon Bridge to Pak Khlong Talat)	0.55
	Asadang Road (from Mon Bridge to Pak Khlong Talat)	0.60
6 Projects around Chitralada Palace	Ratchawithi Road (from Pichai Road to Sawankhalok Road)	1.20
	Sawankhalok Road (from Ratchawithi Road to Sri Ayutthaya Road)	1.90
	Sri Ayutthaya Road (from Ratchadamnoen Nok Road to Rama V Road)	0.80
	Rama V Road (from Sukhothai Road to Luk Luang Road)	0.87



Total distance of the Installation of Overhead telecom and broadcast cables underground **34.44** kilometers



3. Provision of National Single Emergency Number Service

Having implemented according to the Cabinet's resolution to provide a national single emergency number service to integrate the receipt of notification of all emergencies which is in the responsibility of several agencies by using a single number 191. The NBTC has issued the NBTC Notification on the Telecommunication Numbering Plan and the NBTC Notification on Criteria for the Telecommunication Numbers Allocation and Management which have been published in the Royal Gazette and become effective since 21 January 2020. In addition, the NBTC also had its resolution in the Meeting No. 8/2020 on 13 May 2020 to allow the Royal Thai Police to use a short 3 - digit telephone number 191 to support the use of national emergency telephone missions.

4. Promotion and Support of 5G Technology Application

Having collaborated with agencies in several sectors to drive the implementation of 5G strategy of Thailand to be most useful to the National Digital Economy and to support the National 5G Driving Committee, consists of the Prime Minister as the Chairman, 3 Deputy Prime Ministers, 10 Ministers from related Ministries, 8 Executives from relevant agencies, namely the Secretary-General of the NBTC, Secretary-General of the Eastern Economic Corridor of Thailand Commission, Secretary-General of the Office of the National Economics and Social Development Council, Governor of the Bank of Thailand, Chairman of the Board of Directors of the Thai Chamber of Commerce and Board of Trade of Thailand, Chairman of the Thai Bankers' Association, Chairman of the Digital Council of Thailand, and Chairman of the Federation of Thai Industries, and 5 qualified persons appointed by the Chairman of the Committee as the members of the committee, including the Permanent Secretary of Ministry of Digital Economy and Society, Deputy Secretary-General of the NBTC and Secretary-General of the National Commission for the Digital Economy and Society as the Secretary of the Committee. In 2020, the NBTC had promoted and supported the application of 5G technology as follows:

4.1 Having collaborated with the Office of the National Commission for the Digital Economy and Society on the development of a pilot project to extend the utilization of 5G in Thailand in the short term to present to the National 5G Driving Committee and the Committee Meeting No. 1/2020 on 14 August 2020 had its resolution to approve the implementation of the pilot project to extend the utilization of 5G in Thailand in short term as follows:

1) The 5G Pilot Project on Digital Agriculture consisting of 2 sub-projects; (1) the 5G Pilot Project on Digital Agriculture at Pha Mi Training Center, Doi Tung District, Chiangrai Province, and (2) the 5G Pilot Project on Digital Agriculture at the Roi Jai Rak Project, Mae Ai District, Chiangmai Province. Also, Ministry of Digital Economy and Society by CAT Telecom Public Company Limited in cooperation with the Mae Fah Luang Foundation under royal patronage and related agencies have been assigned to be responsible on the project implementation.



2) The Smart Hospital Pilot Project which the NBTC in the collaboration with the Faculty of Medicine, Siriraj Hospital, Mahidol University and Huawei Technology (Thailand) Company Limited has initially implemented the prototype of 5G and Critical Technology application in Siriraj Hospital, the first in Thailand, in order to improve new forms of public health services and upgrade Thai medicine to the 5G era by applying world-class technology and innovation to drive medical and public health service. In 2020, a pilot project on Unmanned Smart Car has been implemented in a trial for transporting medical supplies and medical equipment to the

recipient instead of using human to reduce contacting and increase the safety of medical personnel, as well as facilitating the recipient and sender on reducing transportation costs, lightening workload of medical personnel so that they are able to assign personnel and manage time for inspection and taking care of patients. In the next phase, appropriate technology will be applied more in medical service leading to the prototype of the smart hospital.

4.2 Having established guidelines for promoting investment in 5G infrastructure and related measures for investment promotion. The NBTC had organized meetings to brainstorm opinions on the guidelines for promoting investment in 5G infrastructure and measures for investment promotion with related sectors such as the Revenue Department, the Office of the Eastern Economic Corridor of Thailand Commission, the Office of the Board of Investment of Thailand,

Federation of Thai Industries, Chamber of Commerce of Thailand, the Digital Council of Thailand, and other agencies on 28 September 2020 at VIE Ballroom, VHotel Bangkok, M Gallery, Phayathai Road, Bangkok.

4.3 Having cooperated with the Bank of Thailand to study the availability of the industry to implement 5G technology in Thailand and its impact on the economy to be used in the preparation of policy recommendations to extend the concrete use of 5G as soon as possible.

4.4 Having granted licenses to use spectrum for 5G trail/testing to telecom operators and authorized a specific regulatory area (Sandbox Area), which is the area where the NBTC has set specific guidelines for licensing and regulating the use of spectrum to support the innovation development and testing and to promote and support the application of 5G technology. Details are shown in Table 2.

Table 2: Statistic of the Authorization of a Specific Regulatory Area (Sandbox Area)

No.	Licensees	Frequency band	Date of license granted and expired		Regulatory areas
			Date of license granted	Date of license expired	
1	Chulalongkorn University	Frequency band of 700 MHz (703 - 803 MHz) Frequency band of 900 MHz (920 - 925 MHz) Frequency band of C-Band (3300 - 3800 MHz) Frequency band of 5 GHz (5850 - 5925 MHz) Frequency band of 26 GHz (24.30 - 26.80 GHz) Frequency band of 28 GHz (27.0 - 29.5 GHz) Frequency band of Millimeter Wave (57 - 76 GHz and 81 - 86 GHz)	11 December 2019	10 December 2024	In the education, public sector and commerce of Chulalongkorn University, Pathumwan District, Bangkok.
2	Kasetsart University, Sriracha Campus	Frequency band of 26 GHz (24.30 - 26.80 GHz) Frequency band of 28 GHz (26.5 - 29.5 GHz) Frequency band of 2400 MHz (2400 - 2500 MHz)	11 December 2019	10 December 2024	4 th floor of Building 23, Faculty of Engineering Sriracha and 5 th floor of Building 26, Faculty of Science Sriracha, Sriracha District, Chonburi Province



No.	Licensees	Frequency band	Date of license granted and expired		Regulatory areas
			Date of license granted	Date of license expired	
3	Prince of Songkla University	Frequency band of 700 MHz (703 - 803 MHz) Frequency band of 900 MHz (920 - 925 MHz) Frequency band of 2300 - 2310 MHz and 2370 - 2400 MHz Frequency band of S-Band (3.1 - 3.3 GHz) Frequency band of C-Band (3.4 - 4.2 GHz and 5.85 - 6.6625 GHz) Frequency band of X-Band (9.5 - 9.8 GHz) Frequency band of Ku-Band (10.95 - 12.75 GHz and 13.75 - 14.10 GHz) Frequency band of 26 GHz (24.25 - 26.80 GHz and 27.0 - 27.5 GHz)	8 April 2020	7 April 2025	Area of Prince of Songkla University, Kho Hong Subdistrict, Hat Yai District, Songkhla Province
4	WHA Eastern Industrial Estate Company Limited (EIE)	Frequency band of 700 MHz (703 - 803 MHz) Frequency band of 1800 MHz (1750 - 1785 MHz and 1845 - 1880 MHz) Frequency band of 2300 MHz (2300 - 2310 MHz and 2370 - 2400 MHz) Frequency band of 26 GHz (24.3 - 26.8 GHz)	27 May 2020	26 May 2025	Office buildings and the surrounding area, which is a green parking area including roads within the industrial estate
5	Eastern Seaboard Industrial Estate (Rayong) Company Limited (ESIE)	Frequency band of 700 MHz (703 - 803 MHz) Frequency band of 1800 MHz (1750 - 1785 MHz and 1845 - 1880 MHz) Frequency band of 2300 MHz (2300 - 2310 MHz and 2370 - 2400 MHz) Frequency band of 26 GHz (24.3 - 26.8 GHz)	27 May 2020	26 May 2025	Plaza 1, Plaza 2, Office building and road inside the estate



No.	Licensees	Frequency band	Date of license granted and expired		Regulatory areas
			Date of license granted	Date of license expired	
6	WHA Eastern Seaboard Industrial Estate Company Limited (WHA ESIE1)	Frequency band of 700 MHz (703 - 803 MHz) Frequency band of 1800 MHz (1750 - 1785 MHz and 1845 - 1880 MHz) Frequency band of 2300 MHz (2300 - 2310 MHz and 2370 - 2400 MHz) Frequency band of 26 GHz (24.3 - 26.8 GHz)	27 May 2020	26 May 2025	Plaza 3 and the road inside the industrial estate
7	Digital Economy Promotion Agency (DEPA)	Frequency band of C-Band (3400 - 3600 MHz)	26 August 2020	25 August 2025	Digital Economy Promotion Agency Head Office, Ladprao Hill Building, G Floor, Reception Area, 2 nd Floor, 3 rd Floor, 4 th Floor, 5 th Floor, 7 th Floor, 8 th Floor, Chatuchak District, Bangkok

5. Telecommunications Number Management for the Provision of Internet of Things (IoT) Service

Having issued the NBTC Notification on Telecommunications Numbering Plan and the NBTC Notification on Criteria for Telecommunication Number Allotment and Management published in the Royal Gazette and have become effective since 21 January 2020 in order to improve both Notifications, which have become effective since 8 May 2014, to be in line with changing telecommunication market situation and to ensure that the telecommunication numbers allocation and management have been done efficiently, fairly, worthily and sufficient to meet the demand, the services have been provided on free and fair competition basis as well as promoting the telecommunication number management process

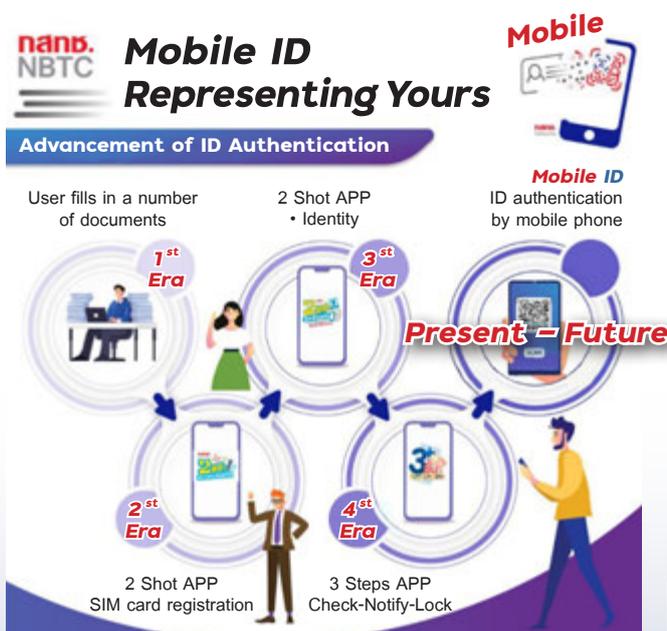
in accordance with the technology development and E-Form of telecommunication numbers management. The Notifications have prescribed that telecommunication numbers shall be allocated for Internet of Things (IoT) services to identify IoT users, which will help classifying the nature and types of services and devices used in telecommunication services. The Office of the NBTC has prepared the criteria and methods for managing and storing information about the use of telecommunications numbers for the provision of IoT system service in order to set guidelines for authentication and identification of service users and to protect the rights of service users, security, public interest and social safety, which have already been approved by the NBTC Meeting No.23/2020 on 23 December 2020.

6. Consumer Protection in Telecommunications Service

The NBTC has set a policy to promote and establish a mechanism to work in cooperation with various sectors for protecting consumers in telecommunications service including expanding and developing digital technology for effective consumer protection, strengthening consumers, supporting the operation to protect consumer's rights, society and public benefit as well as supporting the telecommunications operation to be more efficient and effective which will bring benefits to the public and the general public. The significant performance in 2020 are as follows:

6.1 The development of a system for identity verification and authentication by electronic identity cards on mobile phones (Mobile ID) which is an important policy to promote the determination of standards and processes for digital individual identification and verification by utilizing the mobile phone subscriber registration database with the identity system of telecommunication industry in order to increase the safe and secure way and promoting new innovations for accessing to electronic transactions of the people or agencies both public and private sectors and protecting personal information which will also promote the government policy on the

use of Digital ID as well. The project has already been developed and trialed an initial system in cooperation with Advanced Wireless Network Company Limited (AIS) and Bangkok Bank Public Company Limited. However, in order to continue and apply the service provision to the public with convenience and safety, the NBTC has therefore extended the cooperation to other government agencies and private sectors, namely: Department of Provincial Administration, Department of Land Transport, Social Security Office, Revenue Department, CAT Telecom Public Company Limited, Thailand Post Company Limited, True Move H Universal Communication Company Limited and CP All Public Company Limited. In addition, the NBTC has arranged a memorandum of cooperation with mobile service providers who have been granted the license for the Type-3 telecommunications business operation, namely: TOT Public Company Limited and DTAC TriNet Company Limited, to promote the "Mobile ID" system to be conveniently and thoroughly. Moreover, the Deposit Protection Agency, the Stock Exchange of Thailand and National Credit Bureau Company Limited have joined the cooperation to support identity verification and authentication by the "Mobile ID" system.



6.2 Promoting the consumer awareness and right protection in the use of telecommunications service and strengthening the people through the following activities:

(1) The activities to enhance knowledge of the public on consumer rights in telecommunications service and protection of personal information from the use of telecommunication services in order to enhance knowledge and understanding of the attendees on consumer rights in telecommunication service and realizing the rights that they have according to the law and knowingly of telecommunication services for a total of 5 activities in Nakhon Pathom, Chanthaburi, Kalasin, Phetchabun, and Trang.

(2) The activities to raise awareness of the youth to promote learning about consumer rights in telecommunication service at the secondary-education level and tertiary-education level to enhance knowledge and understanding as well as to support them in playing a role in the knowledge transfer on consumer rights in the use of basic telecommunication services and be able to use channels for receiving complaints on the use of telecommunications service appropriately and correctly and disseminate the knowledge widely, which have been conducted continuously since the year 2014 onwards. In 2020, a total of 8 activities were organized in Bangkok, Khon Kaen, Maha Sarakham, Surat Thani, Chiang Mai and Pattani.

(3) Having disseminated knowledge of consumers' rights in telecommunications service through the Out of Home media to enhance knowledge and understanding of people in different areas throughout the country on consumer rights in telecommunications service and be able to use telecommunications service such as mobile phones, fixed-line, public telephone and internet knowingly, correctly and appropriately as well as being able to protect their rights from the use of telecommunication services and disseminate to other people in their family and their own communities.

7. Supporting the expansion of broadband network to be covered.

In 2020, the NBTC has taken action to support the government's policy on the expansion of mobile phone network and broadband internet service to cover all villages in Thailand and reduce disparities in the access to basic telecommunication services to be universal, equal and fair in both spatial and social dimensions and improve the quality of life of the general public, teachers, students, the elderly, the patients, and the target groups living in the border, rural and remote areas as well as increasing the country's competitiveness and supporting the restructure of economy and society to move towards Thailand 4.0 era as follows:

7.1 The project on the provision of mobile phone signal and broadband internet service in the border areas (Zone C+) for 3,920 villages by providing public Wi-Fi service in the villages, broadband internet service at schools, broadband internet service at Sub-district Health Promoting Hospitals, public internet service center (USO Net) and installing mobile phone signal coverage modifier. The operation is divided into 3 phases; Phase 1 Network expansion and equipment installation for one year in 2 parts consisting of the provision of broadband internet service and the provision of mobile service; Phase 2 Provision of service continuously for 5 years, Phase 3 Delivery of service equipment after the service period (60 days). It is currently in the process of Phase 2, with 85 percent progress in the project implementation.





7.2 The project on the provision of broadband internet service in the remote areas (Zone C) for 15,732 villages by providing a public Wi-Fi service in the villages, broadband internet service at schools, broadband internet service at Sub-district Health Promoting Hospitals, public internet service center (USO Net) and school internet room (USO Wrap). The operation is divided into 3 phases; Phase 1 Procurement of equipment, installation, and readiness testing before providing service within 300 days; Phase 2 Provision of service continuously for 5 years (60 months); Phase 3 Delivery of service equipment after the service period (60 days). It is currently in the process of Phase 2, with 85 percent progress in the project implementation.

7.3 Implementation according to the action plan for developing skills on digital literacy towards the digital society under the Second Universal Basic Telecommunications and Social Services Plan B.E.2560 - 2564 (2017 - 2021) with the view to support and promote the development of ICT knowledge skills of not less than 500,000 people in order to support the development towards the digital society. Thus, It is a reason and necessity to undertake the project to hire a consultant to study and design a curriculum for developing IT skills and knowledge towards the digital society in the mission of universal basic telecommunications services and social services. The project is divided into 2 phases: Phase 1 Studying and designing for developing digital literacy skills towards the digital society in the mission of universal basic telecommunication and social services, and Phase 2 Conducting training courses on “Developing digital literacy skills towards the digital society” for the target group of not less than 500,000 people with a period of 3 years of operation. It is currently under the process of Phase 1, which is expected to be completed and able to provide the training according to the curriculum and the format obtained from the study and curriculum design from 2021 onwards.

8. Having established a mechanism to work in cooperation with various sectors for the development and regulation of telecommunications service

In 2020, the NBTC has established a mechanism to work in cooperation with various sectors under the arrangement of memorandum of cooperation as follows:

8.1 Having cooperation with the Friend in Need (of “PA”) Volunteers Foundation, Thai Red Cross Society and 7 network partners to implement the project on the installation of an automated telemetry station consisting of the Office of the NBTC, Department of National Parks, Wildlife and Plant Conservation, Forest Department, Department of Provincial Administration, Department of Local Administration, Provincial Electricity Authority, and the Institute of Water Resources Information (Public Organization) on 24 February 2020 to level up the sustainable flood prevention by installing 510 automated telemetry stations in the risk areas of disasters to measure the climate data and rainfall and automatically transmits long-distance data in order to prepare and be able to cope with the situation may be occurred quickly and in a timely manner. In 2020, “the project on the installation of an automated telemetry station to measure climate data, rainfall and water levels in upstream forest areas” has been implemented under the Memorandum of Cooperation and it is currently in the process of setting up some telemetry stations.

8.2 Having cooperation with the Department of Airports for the study and provision of service via 5G telecommunications network on 24 June 2020 to study and promote the use of 5G technology for building a Smart Airport Ecosystem in order to apply innovation and 5G technology to facilitate passengers and service users in the airport, such as applying innovation and 5G technology to control, prevent, mitigate the impact of the COVID-19 pandemic situation as well as building confidence of passengers, tourists and citizens in travelling.



8.3 Having cooperation with the Tourism Authority of Thailand (TAT) to build confidence of people and tourists on the tourism industry of Thailand after the COVID-19 pandemic situation has eased, including extend the results of the Project on Amazing Thailand Safety & Health Administration (SHA) to enterprises related to the Thai tourism industry. Such project is a cooperation between Ministry of Tourism and Sports by TAT and Ministry of Public Health by the Department of Disease Control, Department of Health, Department of Health Service Support and government agencies and the private sector in the tourism industry. The NBTC has cooperated with all mobile service providers in sending short messages broadcasting (SMS Broadcasting) and providing travel SIM card at all international airports of Thailand to tourists and the public to disseminate news and raise awareness and understanding, which will lead to the awareness of practice of people and tourists in traveling safely.

8.4 Having collaboration with the Telecommunications Association of Thailand under the Royal Patronage (TCT) and 9 leading telecommunication service providers, namely: Advanced Wireless Network Co., Ltd., DTAC TriNet Company Limited, and True Internet Corporation Company Limited, TOT Public Company Limited, CAT Telecom Public Company Limited, Symphony Communication Public Company Limited, CS Loxinfo Public Company Limited, United Information Highway Company Limited, and Triple T Broadband Public Company Limited, to establish the Thailand Telecommunication Computer Emergency Response Team (TTC-CERT) to be the center for information exchange regarding cyber threats of the telecommunications industry and to strengthen the security in dealing with cyber threats in the telecommunications including promoting the development of telecommunication service to be international standardization as well as being able to raise awareness and confidence of customers and users in using services. The research and development has been granted of the financial support by the BTFP Fund.





9. The Important Development of rules and regulations regarding licensing and regulation of telecommunications service and radiocommunications service such as :

9.1 The NBTC Notification on Licensing Criteria and Method for Telecommunications Service, publishing in the Royal Gazette on 19 March 2020 which is the revision of the criteria and method for licensing telecommunications service to be in accordance with current situation in order to facilitate and reduce the burden on telecommunication operators by having consolidated 14 notifications related to the licensing of telecommunications business operation to only one notification and consolidated 11 telecommunications business licenses and internet service licenses to 3-type of telecommunications business licenses as required by the Telecommunications Business Act B.E.2544 (2001) in reviewing the requirements that may be unreasonably burdensome for licensees to comply with and improve the license application process and the licensing period to be in accordance with the Telecommunications Business Act B.E.2544 (2001).

9.2 The NBTC Notification on Criteria and Condition for the Licensing to Use Spectrum for Unmanned Aircraft (Drone) for the general Use, publishing in the Royal Gazette on 26 June 2020 which is the revision of the criteria and method for the licensing to use spectrum for unmanned aircraft (drone) for the general use in order to facilitate the public to be able to use the unmanned aircraft for the general use with the view to playing as a hobby, for entertainment, for sports, to report incidents or traffic, for photography or film making, for movie action or television show, for research and development or other purposes. The notification requires that people who possess drones for use shall have a duty to register drones within 30 days from the date of possession of the drone. Those who are obliged to register a “drone” include drone owners and general users, foreign tourists who have brought drones to use in Thailand, people who use drones for temporary mission such as film shooting, shows, etc., and all government agencies except the security agencies.





Regulation on Broadcasting and Television Services

The NBTC has driven the operation according to the Government's Policy, National Strategy and the Broadcasting Master Plan by taking into account the efficient use of resources and giving importance to the development of the national television service to be appropriate with the changing context and technology. The operation has been focused on the development of radio broadcasting business in order to raise the business operation standard including the development of services provision and regulation towards a digital transformation through the adoption of digital technology for the most efficient services and the achievement in protecting consumers from being exploited, receiving fair services, promoting people's right and freedom to be able to equal access and utilize a variety of information, and increasing alternative choices for receiving services and accessing to essential basic information constantly as well as promoting and developing a sustainable broadcasting and television industries. The achievement in 2020 are as follows:

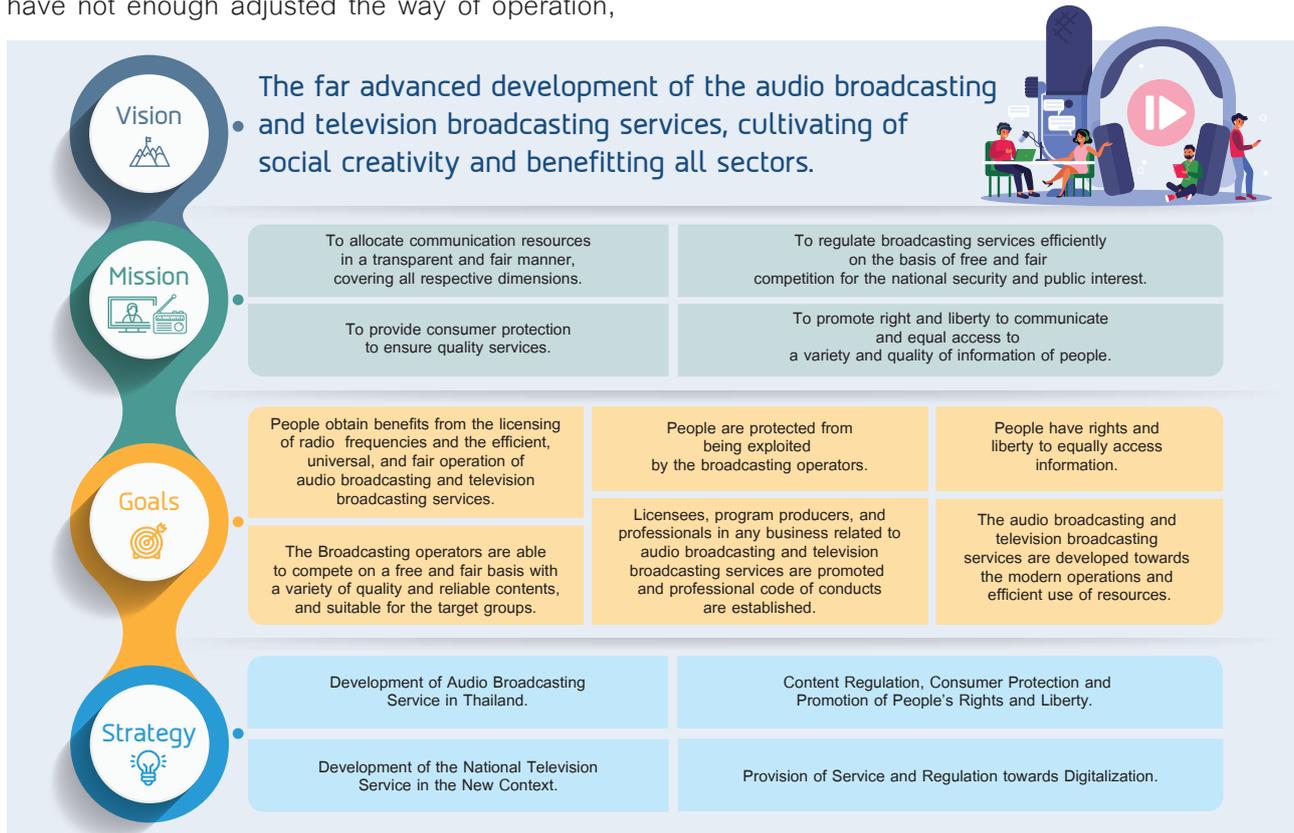
1. Formulation of the Second Broadcasting Master Plan B.E.2563 - 2568 (2020 - 2025)

Having formulated the Second Broadcasting Master Plan B.E.2563 - 2568 (2020 - 2025) according to the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment, Section 27 (1) and Section 49 through the participation process and the public consultation (focus group) of stakeholders such as radio operators, television operators, consumers, scholars in journalism, government agencies, security agencies, etc., including organizing public hearings. It has also taken into account the change of ecosystem of the industry as well as the consistence with the laws, national policies and plans such as the National Strategy, Master Plans under the National Strategy, National Reform Plan, including National Digital Economy and Society Development Plan and Policy. The Master Plan has been published in the Royal Gazette on 19 August 2020 and become effective from 20 August 2020 onwards.

The direction of the Second Broadcasting and Master Plan focuses on the development of radio broadcasting services in order to raise the business operation standard, provide more options for people to continuously receive and access to basic essential information. The direction also focuses on the development of the national television service to be appropriate with the changing context and technology by taking into account the most efficient use of the resources, as well as the content regulation, protecting consumers from being exploited and to receive fair services, promoting people's rights and freedom to have equal access and utilize a variety of information, by improving the provision of services and the regulation towards a digital transformation through the adoption of digital technology for the most efficient service and regulation. The strategic issues and guidelines for implementation that are linked to the vision and mission which will lead to the goals to ensure that the operation of the NBTC is for the utmost benefit of the public, state security and public interest as required by laws as well as promoting and developing the broadcasting and television services for sustainable development.

The Second Broadcasting Master Plan will be effective for 5 years which is a period that the national broadcasting and television services need a clear paradigm shift under the changing dynamics resulting from technology, emerging of new media, and new communication channels are provided for audiences and listeners so that they can use as an alternative to accessing information more convenient and faster than the existing channels. Therefore, if the operators have not enough adjusted the way of operation,

they would be in a difficult situation. In addition, in the dimension of government or regulatory bodies, it is necessary to adapt themselves to be in line with the government's policy in adopting digital technology to facilitate the people for a faster service. This Second Broadcasting Master Plan thus focuses on the adaption of radio broadcasting and television services and the adoption of digital technology with the following vision, mission, goals and 4 strategies:



2. Regulation on Broadcasting and Television Services

2.1 Regulating the digital terrestrial television service

1) The Improvement of the digital terrestrial television network (MUX) to support the spectrum refarming in the frequency band of 700 MHz to be used in telecommunications service

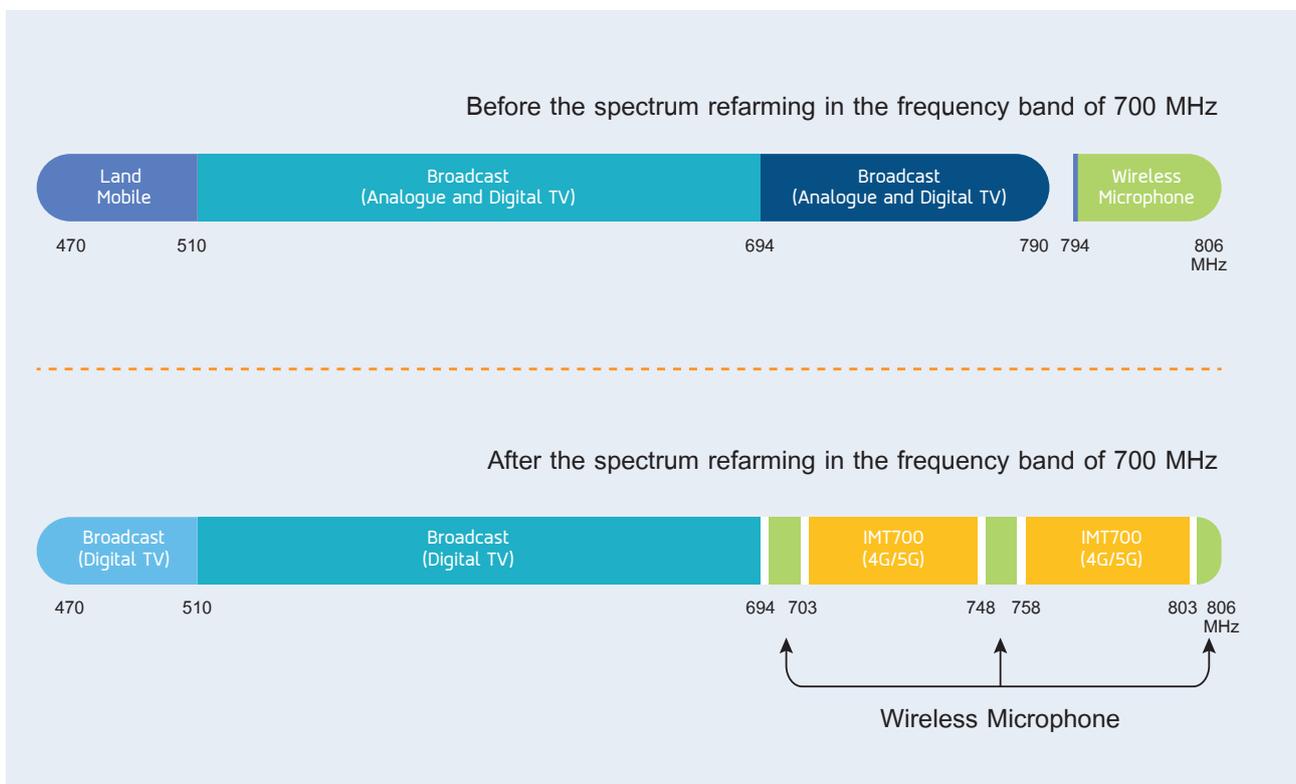
The NBTC has refarmed the spectrum in the frequency band of 700 MHz; that is, the spectrum refarming from digital terrestrial television service in some part to re-assign for the International Mobile Telecommunications (IMT) service which relies on 4G/5G technology with the main objective of using the spectrum to be worthwhile and for the utmost benefit for the country's development.

The spectrum refarming has been conducted in according to the Order of the Head of National Council for Peace and Order No. 4/2019 on Measures to Solve the Problems of Television and Telecommunications Services and the process of the spectrum refarming is implemented in accordance with international guidelines by adjusting the frequency usage for the television service of Thailand from the original frequency band of 510 - 790 MHz to 470 - 694 MHz as detailed in Picture 1. The spectrum refarming in the frequency band of 700 MHz has been assigned to telecom service providers in order to provide the 4G/5G service from 15 January 2021.

The digital terrestrial television network operators must therefore complete network improvements and frequencies adjustment before adopting the spectrum in the frequency band of 700 MHz to provide telecommunications service. These operations are in line with the National Strategy Plan on National Competitiveness Enhancement and the Master Plan under the National Strategy on Infrastructure, Logistic and Digital System.

The spectrum assignment in the frequency band of 700 MHz for the development of 4G/5G technology is considered a development focusing on the distribution of internet signal to be universal, and cover all areas and bring benefits to the people and related sectors. That means there must be an internet network to support the work which is sufficient to meet the demand both in terms of speed and signal coverage.

Picture 1 : Status of the spectrum usage in the frequency band of 700 MHz



The NBTC has prepared the Implementation Plan for the Digital Terrestrial Television Network Improvement to support the spectrum refarming in the frequency band of 700 MHz to be used for telecommunications service which included

the follow-up of the operation of the digital terrestrial television network improvement to support the spectrum refarming in the frequency band of 700 MHz to be used for telecommunications service. Details are as shown in Table 3 and Picture 2.

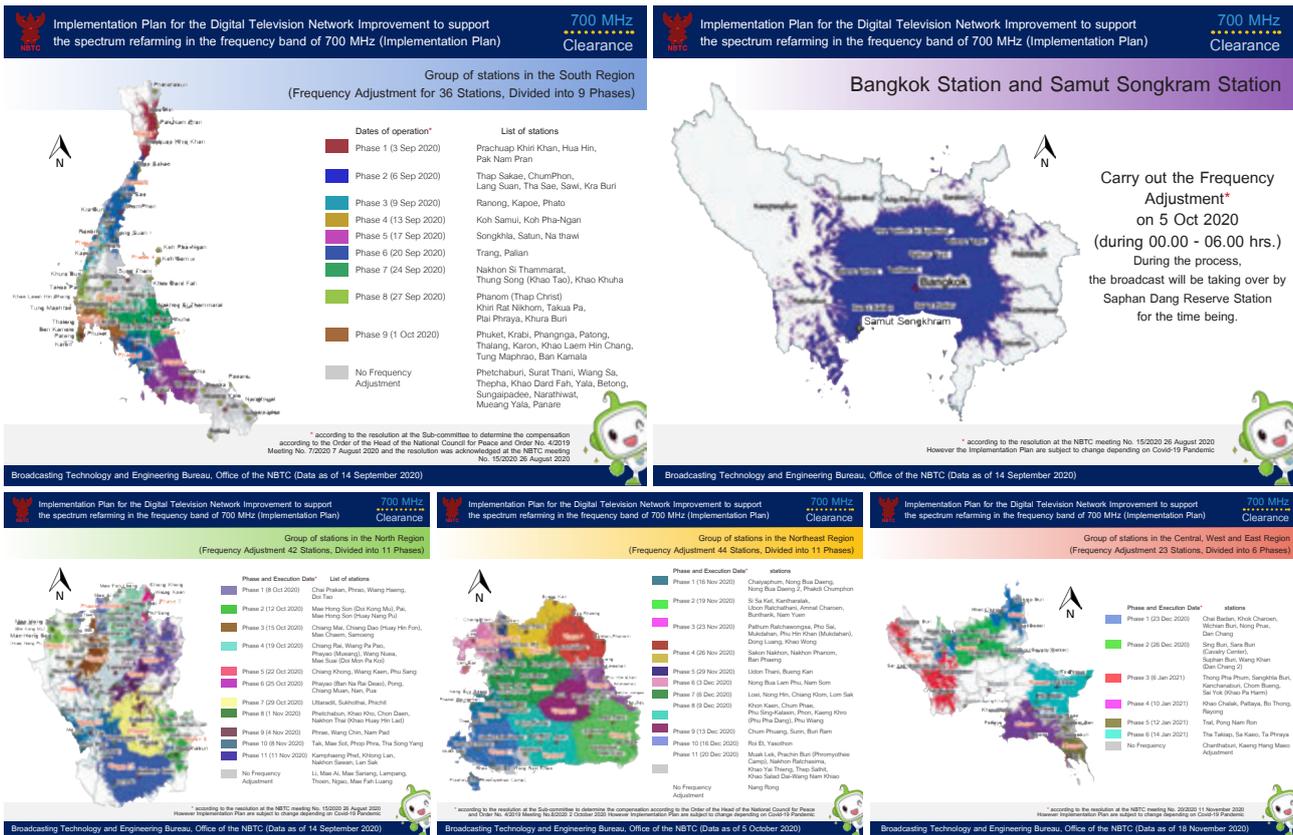
Table 3: Implementation Plan for digital terrestrial television network improvement to support the spectrum refarming in the frequency band of 700 MHz to be used for telecommunications service

Group of stations	Duration for improving operation	Status
Stations in the South Region	2 September - 2 October 2020	Completed
Bangkok Station and Samut Songkram Station	4 - 5 October 2020	Completed
Stations in the North Region	7 October - 12 November 2020	Completed
Stations in the Northeast Region	15 November - 21 December 2020	Completed
Stations in the Central, West, and East Region	22 December 2020 - 15 January 2021	Completed

Remarks: Data as of 14 January 2021

Source: Broadcasting Technology and Engineering Bureau, Office of the NBTC

Picture 2: Implementation Plan for digital terrestrial television network improvement to support the spectrum refarming in the frequency band of 700 MHz to be used for telecommunications service



At present, the NBTC has completed the improvement of digital terrestrial television network according to the implementation plan for digital terrestrial television network improvement to support the spectrum refarming in the frequency band of 700 MHz to be used for telecommunications service of

totally 147 stations. Details are as shown in Picture 3 including having published the technical information relating to the digital terrestrial television network improvement to support the spectrum refarming in the frequency band of 700 MHz on website: <https://700.nbt.go.th>.

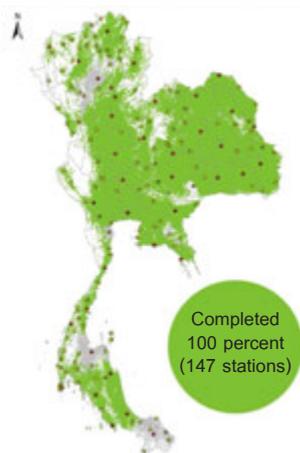
Picture 3: Overall status of digital terrestrial Television network improvement to support the spectrum refarming in the frequency band of 700 MHz



Overall status of digital terrestrial television network improvement to support the spectrum refarming in the frequency band of 700 MHz

700 MHz

Clearance



Operation completed 100 percent
Frequency adjustment completed for 147 stations

Progress of network improvement	
Stations	Operation result
Stations in the South Region	completed for totally 36 stations
Bangkok Station and Samut Songkram Station	completed for totally 2 stations
Stations in the North Region	completed for totally 42 stations
Stations in the Northeast Region	completed for totally 44 stations
Stations in the Central, West, and East Region	completed for totally 23 stations

Remarks: Data as of 14 January 2021

Source: Broadcasting Technology and Engineering Bureau, Office of the NBTC

2) Having resolved problems on the viewing of the digital terrestrial television due to the improvement of the digital terrestrial television network to support the spectrum refarming in the frequency band of 700 MHz.

For the spectrum refarming in the frequency band of 700 MHz, network service licensees and facilities service licensees for providing the digital terrestrial television services must improve or modify equipment or adjust services which may have affected on the digital terrestrial TV viewers for being unable to view digital terrestrial television services in some areas. The Office of the NBTC has therefore set up the center for resolving problems arising from the improvement of the digital terrestrial television network to support the spectrum refarming in the frequency band of 700 MHz and provided the Call Center hotline number 020 700 700. During 3 September - 31 December 2020, there were 20,366 inquiries, most of which were the inquiries about digital TV and satellite/cable TV reception, followed by a problem resolution through suggesting people to tune the receiver equipment. In the case that

the Call Center agent was unable to resolve problems for the affected people, he/she will coordinate with the digital terrestrial television network operators to take field operation to assist the people. Accordingly, there are 19,518 problems that could be successfully solved by Call Center agents and 848 problems were passed to the network operators through the coordination to take field operation to assist people.

In addition, the NBTC had followed-up and monitored the operation of network service providers in solving problems of viewing the digital terrestrial television of those who got affected by the network improvement. The operation of network service providers on problem solving will be done according to the area of responsibility by considering the network service provider who is able to assist people in the area as quickly and conveniently as possible in order to solve problems in a timely manner. The operation also included problem solving over the phone, change of the receiver antenna and tuning signal receiver/adjusting the position or direction of antenna. Details are as shown in Table 4.

Table 4: Problem-resolving on the viewing of the digital terrestrial television

Responsible entities	Number of complaints	Completed operation		In process	
		Number	Percent	Number	Percent
Royal Thai Army	367	355	96.73	12	3.27
MCOT Public Company Limited	201	194	96.52	7	3.48
Public Relations Department	17	17	100.00	-	-
Thai Public Broadcasting Service	209	208	99.52	1	0.48
Call Center (People called to end the complaints due to TV programs can be viewed)	54	54	100.00	-	-
Total	848	828	97.64	20	2.36

The NBTC had disseminated the information on the improvement of digital terrestrial television network to support the spectrum refarming in the frequency band of 700 MHz through 3 channels, which are On Air broadcasting through radio broadcasting stations and digital terrestrial television stations by the radio and television service providers free of charge, Online through online media channels which can be divided into website (<https://700.nbtc.go.th>), Google (to search for keywords related to digital TV), YouTube (to disseminate video clips showing content about the plan for spectrum adjustment in the frequency band of 700 MHz, website Pantip.com by advertising and posting topics about the plan for spectrum adjustment in the frequency band of 700 MHz, Facebook by Influencers and the NBTC's Line Official (@NBTC), and On Ground through the provision of public transport, broadcasting, including public relations of messages concerning the improvement of digital terrestrial television network to support the spectrum refarming in the frequency band of 700 MHz to cover all areas for public relations in the community areas which is an effective direct communication to the target group, the public relations through local administrative organizations in each region to disseminate information to the public effectively,

preparing officers to take field operation in the area to check and resolve problems may be arisen after the signal improvement to assist and provide accurate information to the public as well as the production and preparation of public relations materials in the form of advertising signs and documents, etc., for publicizing information to people before improving the signal to cover all areas.

3) The operation on measures for compensation, recompense or remuneration for those who got affected by the spectrum refarming in the frequency band of 700 MHz.

For the payment of compensation, recompense or remuneration for network service licensees and facilities service licensees for the provision of digital terrestrial television service (licensees), who got affected directly by the recall of the spectrum in the frequency band of 700 MHz, with the duty to modify or adjust the television network equipment according to Article 12 (2) of the Order of the Head of National Council for Peace and Order No. 4/2019 on Measures to Solve the Problems of Television and Telecommunications Services, dated 11 April 2019, the Sub-committee to determine the methods and conditions for compensation according to the Order of the Head of the National Council

for Peace and Order No. 4/2019, has its resolution in the Meeting No. 1/2020 as follows: (1) approved the criteria for reviewing the payment plan for compensation, recompense or remuneration for the direct impacts of the spectrum refarming in the frequency band of 700 MHz (2) approved the practical guideline for disbursement of compensation, recompense or remuneration for the direct impacts of the spectrum refarming in the frequency band of 700 MHz; and (3) approved the payment plan for the disbursement of compensation, recompense or remuneration from the direct impacts of the spectrum refarming in the frequency band of 700 MHz of the licensees consisting of Thai Public Broadcasting Service, MCOT Public Company Limited, Royal Thai Army and Public Relations Department, by assigning the Office of the NBTC to carry out

the disbursement orderly, transparent and be in accordance with relevant laws, regulations, and criteria. The total amount under the payment plan of all 4 licensees was 756,994,491 baht which included the expenses in case that the licensees must solve problems of the digital terrestrial television viewing for people who got affected by the spectrum refarming in the frequency band of 700 MHz such as equipment and receiver tuning fees of the people who got affected by the modification or adjustment of the television network. As of 31 December 2020, the licensees had requested for disbursement under the payment plan for totally amount of 375,700,321.20 baht, or accounting for 49.63 percent of the budget framework according to the payment plan. Details are as shown in Table 5.

Table 5: Budget framework of compensation, recompense or remuneration for the direct impacts from the spectrum refarming in the frequency band of 700 MHz

Name of entities	Budget framework under the payment plan (baht)	The amount requested for disbursement	
		Baht	Percent
Thai Public Broadcasting Service	254,055,374	95,829,498.50	37.72
MCOT Public Company Limited	217,853,010	156,004,715.70	71.61
Royal Thai Army	157,910,287	66,890,287.00	42.36
Public Relations Department	127,175,820	56,975,820.00	44.80
Total	756,994,491	375,700,321.20	49.63

Remarks: Data as of 31 December 2020

4) The feasibility study of digital terrestrial television broadcasting for testing or trial operation in Thailand via 4K technology which is a new interesting technology in television business and being studied or tested in various countries so that the spectrum can be used worthily and beneficially.

The study also support the second Broadcasting Master Plan, the strategy on the development of the National Television Service in the new context with the goal to provide an opportunity for trail operation of new technology in television service. In addition, the study has been done on



technology and technical standards related to 4K technology in terms of video and audio and the operation of foreign country to find a technical feasibility approach that is suitable for the Thai context including having tested/trialed the broadcasting with 4K on DVB-T2 system via cable (no frequency propagation) on 10 September 2020 and calculating for the appropriate and necessary parameters for TV broadcasting with 4K technology based on the current status of program channel broadcasting through the digital terrestrial television network. Besides, a survey was also conducted on digital terrestrial television broadcasting with 4K technology from relevant agencies and a focus group consultation meeting was held to gather comments of stakeholders in the television industry and related parties on 28 October 2020. Also, the Office of the NBTC had prepared a study result report with recommendations on further operating approaches and published on the website of the Office of the NBTC, as well as setting up a drafted roadmap for the test/trial operation of digital terrestrial television broadcasting with 4K technology to support the operations within the year 2021 - 2022.

2.2 Regulating the compensation rates of frequency-used digital terrestrial television network rental

Having prepared the (draft) NBTC Notification on Calculation Standard of the Compensation Rates of Frequency-used Digital Terrestrial Television Network Rental so that the network licensees can use as a standardized guideline for calculating the rate of the network rental and to enable the transparency of financial support of network rental on the entire remained licensing period to provide digital television service of the Office of the NBTC according to the Order of the Head of National Council for Peace and Order No.4/2019 on Measure to Solve Problems in the operation of Television and Telecommunications Business, consistent with the cost of service provision and in accordance with the provisions of the Act on the Organization to Assign Radio Frequency B.E.2553 (2010) and its amendments and the Broadcasting Business Act B.E.2551 (2008) which stipulate that the collection

of compensation fee for the use or connection of the network must be reasonable and fair to the network owner and the licensee requesting to use or connect to the network and there must be equality between all licensees, taking into account the public interest and the burden of consumers, consistency with service provision costs, worthiness and an efficient resources allocation. As of 31 December 2020, it is in the process of public consultation. In the past, the rental rate for the network that the network operator charged from the service user (channel) was calculated by using the same guideline as the draft Notification mentioned above.

2.3 Having adjusted regulatory processes to be in line with the changing industry ecosystem

The NBTC has recognized the importance of adjusting regulatory processes to be in line with the changing industry ecosystem due to the rapid advancement of technology whether factors arising from the expansion of broadband networks or the available of 4G/5G service provision that allow people to universal access broadband internet which causing a state of digital disruption and having affected the television and broadcasting industry around the world, including Thailand especially the emergence of radio or television broadcasting services through other network that is not broadcasting or television networks (Over the Top: OTT). **The NBTC has continued to study the guidelines for promotion and regulation to be in accordance with the changing industry context and in line with the Second Broadcasting Master Plan in the strategy on the development of National Television Service in the new context. In 2020, research studies were conducted under the project to study the effects of OTT on broadcasting and television services and guidelines for promotion and regulation in order to obtain up-to-date information for the preparation of recommendations, the formulation of policies and guidelines for regulation as well as promoting Thai broadcasting and television services to be effective and in line with the changing industry context for the benefit of the media industry and society as a whole. The research studies covered the following issues: 1) The impact of OTT services on**



Thai traditional broadcasting and television services, society in terms of consumer behavior, culture, and Thai economy 2) the context of current laws, policies and guidelines for media regulation in Thailand 3) the context of foreign laws, policies, and guidelines for regulating OTT services; and 4) the success factors of producing and presenting program content through OTT services. The data collected will be used for developing guidelines for promotion and regulation in the future. On 23 November 2020, a meeting was held to disseminate the results of the study to those involved. In addition, a seminar on “OTT in the New Digital Economy” was held on 17 November 2020 to exchange views and opinions of domestic and foreign scholars and entrepreneurs to be a guideline for establishing regulatory rules and regulations on OTT service to suit the changing technology and to create equality between TV operators and OTT service providers.

2.4 Regulation on radio broadcasting service

Having issued the NBTC Notification on Radio Frequency Plan for Digital Broadcasting Service for Testing or Trial Operation and published in the Royal Gazette which become effective since 15 December 2020. It is prepared for the use of spectrum in digital broadcasting service for testing or trial operation after the termination of radio and television broadcasting in the analog system. This radio frequency plan is consistent with the Second Broadcasting Master Plan, the strategy on development of Audio broadcasting service in Thailand, and National Digital Economy and Society Development Plan and Policy, the strategy on develop countrywide high-efficiency digital infrastructure. One of the goals of the strategy is to establish the digital television and radio broadcast networks with countrywide coverage by providing digital radio service. The important content consists of frequency, signal transmission, signal reception, network, spectrum usage conditions, and a table of radio frequency plans for digital broadcasting services for testing or trial operation which are the determination of radio frequency band of 174 - 230 MHz, the use of broadcasting or television facilities considered by the suitability of economics and engineering,

requirement of the use of the Digital Audio Broadcasting (DAB) system with MPEG-4 HE AAC v2 or DAB+ Audio coding, determination of 10 pilot areas, namely: Bangkok, Pattaya, Si Racha, Chiangmai, Khon Kaen, Nakhon Ratchasima, Nakhon Si Thammarat, Phuket, Hua Hin, and Songkhla which each area has 3 networks, divided into 1 National Network and 2 Local Networks and the determination of the technical characteristics of the radiocommunications station in the pilot areas as necessary to prevent frequency interference and provide flexibility in testing and trial operation as well as the use of radio frequency blocks allocation of national and local networks.

2.5 Regulation on competition in broadcasting and television service

Having signed the Memorandum of Understanding (MOU) on the regulation of competition in broadcasting, television, and telecommunications services with the Office of Trade Competition Commission (OTCC) on 22 September 2020 to strengthen cooperation in regulating competition among government agencies and enhance the efficiency of regulation, reduce problems, obstacles, and duplication of regulation in order to meet the rapid changes of technology. The operational guidelines and activities under the MOU such as cooperation in policy coordination of senior management, dissemination and publicity of knowledge about trade competition, exchange of information, personnel exchange, academic information, law enforcement considerations in trade competition issues, cooperation in the international forum, etc.

2.6 Law enforcement

Having enforced laws on broadcasting operators and television operators both in the part of business licensees and those who are not licensed to operate the business by warning, filing complaint and alleging against the police, or search and arrest for prosecution in order to regulate the use of radio frequency without interference and to ensure that the business operation be in accordance with relevant notifications and criteria. The results of legal action against business operators are shown in Table 6.

Table 6: Legal action

Type	Action taken					
	Waiting for results		Preparing for prosecution		Completed	
	Number (issues)	Number (stations/place)	Number (issues)	Number (stations/place)	Number (issues)	Number (stations/place)
Broadcasting service	22	47	5	6	15	26
TV signal reception	2	2	1	1	2	2

Remarks: Data as of 1 January - 31 December 2020

3. Consumer Protection in Broadcasting and Television Service

In 2020, the NBTC had carried out activities to protect consumers in the broadcasting and television services in term of the regulation on the actions which are considered to exploit consumers, strengthening consumers and public media literacy, promoting and protecting the rights of persons with disabilities to access or recognize and utilize television programs as well as developing guidelines regarding consumer protection in the broadcasting and television services. The processes of the main dimensions consist of 1) prevention by building knowledge and understanding of operators to reduce actions which are considered to be the exploitation of consumers 2) suppression by regulating actions which are considered to be the exploitation of consumers through the proactive monitoring process and receiving complaints for the efficient consideration and regulation 3) promotion and strengthening consumers to participate in every process of regulation and 4) promotion of access to information of people with disabilities and the underprivileged. It was found that most digital terrestrial television operators have provided services to promote the access or awareness and utilization of the television service as required by laws. The important contents are as follows:

3.1 Regulation on the actions which are considered to exploit consumers in the broadcasting and television services

Having regulated the actions which are considered to be an exploitation of consumers in the broadcasting and television services in areas of the advertisement of food, drugs and health products and others via the following channels: 1) digital terrestrial television 2) non-frequency used television (satellite TV and cable TV) and 3) broadcasting service (commercial service). The operation has been done continuously by focusing on the follow-up and monitor the broadcast of programs or advertisements that may be the actions considered to be the exploitation of consumers.

3.2 The integrated collaboration to resolve problems on the advertisement of food, drugs, and health products which are considered to be an exploitation of consumers in the broadcasting and television services.

Having integrated collaboration with relevant organizations, consisting of the Food and Drug Administration (FDA), Office of the Consumer Protection Board (OCPB), the Royal Thai Police (RTP), and the Ministry of Digital Economy and Society, to resolve problems on the advertisement of food, drugs, and health products which are considered to be an exploitation of consumers in the broadcasting



and television services to drive the implementation under the Memorandum of Understanding (MOU) on regulating the illegal advertisement of food, drugs, and health products or the actions which are considered to be an exploitation of consumers in the broadcasting and television, and telecommunications services which has been continued since the year 2019. In 2020, the relevant organizations have

jointly monitored illegal food and drugs content broadcasting on digital terrestrial television, satellite television, cable TV and radio whether in the central and provincial areas and the Office of the NBTC Region 1 - 4 had continuously monitored, followed-up and investigated the broadcasting of programs or advertisement of the broadcasting and television operators as detailed in Table 7.

Table 7: Operation on investigation of illegal content against food and drugs law in 2020

Operation	Digital terrestrial television	Non-frequency used television	Broadcasting service
Having monitored and found that licensees broadcasted advertisements that are considered to be the exploitation of consumers in the broadcasting and television services	1 licensee, 4 cases	20 licensees, 35 cases	936 licensees, 1940 cases
Licensees that the Food and Drug Administration (FDA) / Provincial Public Health Office considered guilty	1 licensee, 4 cases	20 licensees, 35 cases	739 licensees, 1485 cases
Issuing orders to temporarily suspend the advertisement	1 licensee, 1 order	18 licensees, 20 orders	289 licensees, 289 orders
Issuing orders to suspend the actions which are considered to be the exploitation of consumers in the broadcasting and television services	-	4 licensees, 5 orders	130 licensees, 130 orders
Having monitored and found the advertisements which are considered to be the exploitation of consumers in the broadcasting and television services for the second times	-	1 licensee, 2 cases	18 licensees, 29 cases
Issuing orders to temporarily suspend the advertisement (second times)	-	1 licensee, 1 order	2 licensees, 2 orders
Issuing orders to fine in case of violation of the order to exploit consumers in the broadcasting and television services according to Section 31 of the Act on the Organization to Assign the Radio Frequency (the order to suspend the action that is considered to be the exploitation of consumers)	-	1 licensee, 1 order	2 licensees, 2 orders
Issuing orders to fine according to Section 37 of the Broadcasting Business Act (the order to fine in case of advertising that seriously affect public health)	-	-	5 licensees, 5 orders



The NBTC had also organized meetings to enhance the understandings about the advertisement of food, drugs, and health products that shall not to be the actions which are considered to be the exploitation of consumers on 5 November 2020 participated by the staff who are responsible for the selection and monitoring of advertisement of government agencies who are licensed to operate broadcasting service according to Section 83 of the Act to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) for totally 70 participants in order to enhance knowledge and understanding on laws relating to health products as well as laws, regulations, and provisions related to the regulation of the broadcasting business operation so that they can operate legally which will be useful in protecting consumers in the broadcasting and television services. In addition, the NBTC has established a regulatory information system and developed a channel for coordination through information technology to shorten the process operation period consisting of the information about licensees, the facts about actions that are considered to be the exploitation of consumers, progress of administrative actions to licensees, that the NBTC had carried out the regulation under the regulatory guidelines for regulating the actions that are considered to be the exploitation of consumers such as the operation according to the cooperation mechanism between the Office of the NBTC in the headoffice, the Regional Office of the NBTC, Food and Drug Administration (FDA), and Provincial Public Health Office in regulating the advertising of food, drugs and health products. These agencies have coordinated and sent information among themselves on a regular basis.

3.3 Developing a licensing channel and facilitating communications

(1) Having issued the NBTC Notifications on Criteria and Method for license application submission in the broadcasting and television services by electronic means to support the use of the electronic license application submission system (e-BCS system) via the internet to enable and facilitate the submission of license renewal, information change

and submission of documents to be more convenient, faster and to support the government sector in being responsive to the needs of people easily, quickly, and with transparency which is in line with the National Strategy in Public Sector Rebalancing and Development as well as the Second Broadcasting Master Plan, Strategy on Provision of Service and Regulation towards Digitalization which aims to apply digital technology in the broadcasting licensing system. The Notification has been published in the Royal Gazette No. 137 Special Section, 189 D, on 14 September 2020. The Office of the NBTC had organized workshops and trainings on the use of the electronic license application submission system (e-BCS system) to provide knowledge about the system for television operators, broadcasting licensees (trial operation) and broadcasting and television network service providers, personnel of the Regional Office of the NBTC and the Sub-regional Office of the NBTC and related persons, so that they understand and can access the system use process and submission of application for license renewal via the internet system. This will reduce the burden of licensees either duration and travel expenses.

(2) Having provided a LINE Official Account of the Office of the NBTC (@NBTC) for facilitating the transmission of information, news or press releases to radio broadcasting operators, television operators and telecommunications operators including the general public. In 2020, LINE Thailand had organized the “LINE Thailand Awards 2020” for the “most” excellent proactive innovation brand on the LINE platform, which the Office of the NBTC was nominated in the brand category where stickers are the most popular for government agencies and received the award of “Best Sponsored Stickers in public sector” (the free download stickers) on 8 October 2020.





3.4 Developing the strength of consumers and enhancing knowledge, understanding and media literacy as follows:

(1) Developing the strength of consumers including enhancing knowledge, understanding and knowing of consumers in the broadcasting and television services to be able to protect their rights, which is the mission under the Broadcasting Master Plan and in line with the National Reform Plan in Mass Communication, Information Technology aiming to enhance people to be knowingly through various processes. The NBTC has enhanced knowledge and understanding to the people including issues concerning the advertisement of food, drugs, and health products by organizing activities for consumer protection, building consumer networks in the broadcasting and television service and providing various communication channels such as field operation activities, website: <http://bcp.nbtc.go.th/>, Social Media, Facebook: <https://www.facebook.com/con.rights>, Infographic, and video media, and promoting the participation of consumer networks in activities/forum on consumer protection in the broadcasting and television services where consumer networks in each region participated in the event, proposing comments and participating in various ways such as Participatory Action Research (PAR) Workshops in the Broadcasting and Television Services in the year 2020 in the North region: Chiangmai province, the Northeast region: Udon Thani province, Central region: Samut Songkhram province, the East region: Chonburi province, and the South region: Songkhla province. The purpose of the workshop is to encourage participation at the level of knowledge and cooperation exchange between consumer networks, broadcasting and television operators, regulators, and relevant government agencies both in the central and regional areas.

(2) Having continuously coordinated with the parties to the radio-television media consumer network and regulatory agencies involved in the regulation of the broadcasting and television services, along with the development of understanding and promotion of the participation of the consumer network in the broadcasting and television services by establishing a mechanism of participation

at the level of knowledge exchange between consumer networks, broadcasting and television operators and related regulators/government agencies along with providing trainings to enhance knowledge and understanding about consumer rights in the broadcasting and television services to develop and enhance capabilities at the level of leaders/network leaders and the general public level to cover the regional and national levels as well as promoting participation in being a network for following up, watching, notifying information/complaints in the broadcasting and television services and be able to further transfer to leaders of the consumer network.

(3) Developing and enhancing capabilities of people in media literacy which are the implementation of the project to develop tools for developing people's learning skills related to broadcasting and television services for knowledgeable use by studying information from various sources both domestic and international to develop tools for improving people's learning skills and preparing the course on "the development of people's learning skills in the broadcasting and television services for knowledgeable use" to be used in teaching and learning at the secondary level and the general public level including creating channels and disseminating information about the protection of consumer rights in the broadcasting and television services in various forms through various communication channels, such as organizing campaign activities on radio-television media literacy in cooperation with network parties in the areas, creating media in form of infographic, video media and radio spots to be disseminated through Website, Social Media, Facebook, etc., as well as to be used as teaching media of educational institutions and network parties to drive the work of consumer protection.

3.5 Promoting and protecting the rights of people with disabilities and the underprivileged to access or recognize and utilize programs of the broadcasting and television services

through organizing activities to promote and protect the rights of people with disabilities and the underprivileged to access or recognize and utilize television programs equally to general public as follows:



(1) Having regulated the business operation according to the NBTC Notification on Promotion and Protection of the Rights of the People with Disabilities to Access or Recognize and Utilize Television Programs by following-up the results of the provision of television services that provide interpretation services, closed caption or audio description in the year 2019 and the NBTC had considered to issue warning orders to 9 licensees to proceed in compliance with the Notification on Promotion and Protection of the Rights of the People with Disabilities to Access or Recognize and Utilize Television Programs. In addition, the trainings had been held to enhance the knowledge of digital broadcasting and television operators for providing closed caption or audio description services so that the people with disabilities are able to access information on 20 February 2020 in Bangkok.

(2) Having studied and prepared proposal to the preparation of criteria under the Notification on Promotion and Protection of the Rights of the People with Disabilities to Access or Recognize and Utilize Television Programs by formulating the Notification on Promotion and Protection of the Rights of the People with Disabilities to Access or Recognize and Utilize Television Programs (No. 3) which is the amendment of Article 5 and Article 6 of the first Notification on the issue concerning the proportion of the provision of interpretation, closed caption or audio description services and the classification of television service type into public service and commercial service and counting the rebroadcast period of the service provision which has been published in the Royal Gazette, No. 137, Special Section, 60 D, dated 16 March 2020. The amendment of the Notification is in line with the current business operation context and needs of people with disabilities. The digital terrestrial television operators have already provided television services with interpretation, closed caption or audio description services according to the proportion specified in the Notification since August 2020.

(3) Promoting the rights of people with disabilities or the underprivileged to access information by organizing the public hearing meeting to gather opinions from organizations of each type of disability, related professional organizations on the provision of suitable services so that the operators can hear the opinions from each organization of disability for providing suitable services according to basic measures and promoting measures to meet the needs on 4 November 2020 at the Office of the NBTC.

(4) Building knowledge and understanding about the rights to know and utilize information of the people with disabilities such as

- Having cooperated with the Department of Empowerment of Persons with Disabilities, Ministry of Social Development and Human Security, Graduate School, Suan Dusit University, Rajasuda College, Mahidol University and the National Association of Thai Sign Language Interpreters a 72 - hour Training Course on Being a Sign Language Interpreter for Television Services, Class 2, for 4 sessions, from July to August 2020 in Bangkok which participated by 55 sign language interpreters.

- Having collaborated with the National Association of the Deaf in Thailand to organize trainings to raise awareness on the rights to communicate of people with disabilities (hearing) to access or recognize and utilize television service, the 1st training during 21 - 23 August 2020 in Bangkok, the 2nd training during 4 - 5 September 2020 in Bangkok, to prepare the readiness of members of the association to have knowledge to access or recognize and utilize television service and have understanding and aware of the right to communicate in the television service.

- Having cooperated with the Thailand Association of the Blind to organize a training on Quality Assessment of Audio Description Service during 16 - 18 December 2020 to enhance knowledge and understanding of relevant organizations (Thailand Association of the Blind) and the Blind group to be able to assess the quality of audio description service in digital terrestrial television programs.



3.6 Developing criteria and management regarding consumer protection in the broadcasting and television services to protect the rights and liberties of consumers from being violated or taken advantage by the broadcasting and television operators to be in line with the convergence technology. It is currently under study for preparing policy recommendations on the development of such consumer protection criteria and providing opportunity for broadcasting and television operators to give comments and recommendations to the Meeting of the Sub-Committee on Consumer Protection in Broadcasting and Television Services for the development of service provision, program or advertising broadcasting and does not take any action that is considered to be the exploitation of consumers as well.

3.7 Regulation on quality of service and rate of service

Having regulated the quality of service of broadcasting and television services by issuing the NBTC Notification on the Action which is considered to be the Exploitation of Consumers in the Broadcasting and Television Services B.E.2555 (2012) and the NBTC Notification on Standards for Subscription Television Service Contracts B.E.2556 (2013) which stipulates in principle that service providers are obliged to provide subscription television services in accordance with characteristics, types, conditions, standards and quality of services as agreed in the contract and must inform consumers of the details of the standards and quality of such services including rate of services so that the customers know and use the information for decisions making when making contract and choosing the right service. In case of the change in standards and quality of the service, the service provider is obliged to notify the subscriber in writing not less than 30 days prior to the change. In the case that the quality of services is lower than those specified in the original contract, the service provider must take remedial action or reduce the service fee or waive the service fee to the subscriber fairly. For the case that the service provider has charged higher than the rate agreed in the contract, the service provider is obliged to prove the facts to verify the correctness, and in case that the service

charge exceeds the amount incurred from the actual use of the service, the service provider must refund the difference of the service fees charged in excess to the subscriber within 30 days from the date of ending of the facts.

In such cases, the NBTC had considered the issues related to the quality of service and service rates both at the policy level and the complaints received. In 2020, some service users were affected by the change in the provision of satellite television service in which the Thaicom 5 satellite using for transmitting signals had technical difficulties, therefore, the service must be used via Thaicom 8 satellite instead, and it had affected the signal receiving system and equipment of the subscriber (77 complaints received). However, the impact from such cases may occur to a wide range of satellite television service users. Therefore, the NBTC had considered to solve problems in overall by requiring service providers and business operators to jointly provide measures of compensation and remedy for users depending on the context and action of each service provider, such as change of the signal receiving equipment for the subscriber with a subscription fee by some service providers, supply of equipment for users at a special price, or providing opportunity to cancel the service and receive compensation, etc. In addition, the NBTC had considered solving problems concerning quality of services and rate of services such as resolving problems so that users are able to view TV programs in accordance with the terms of the contract, verifying inaccurate billing, delay of equipment deposit refund, etc., prescribing in the NBTC Notification on Standards of Contract for the Provision of Subscription Television Service B.E.2556 (2013) which the service user's problem had been considered individually. The problem solving also included the consideration on the improvement of service provision in overall.

4. Promotion and development of business operation

4.1 Promoting business operation

In 2020, the NBTC had carried out activities to promote the broadcasting and television business operation as follows:



(1) Supporting the quality broadcasting operators for community service

The NBTC Meeting No. 11/2020 on 24 June 2020 had the resolution to approve the plan to support the broadcasting operators for community service according to the NBTC Notification on Criteria for the Promotion of the Well-prepared Community and the Support of the Quality Broadcasting Operators for Community Service. B.E.2560 (2017) which determines the period for operators to submit a request for being supported within 60 days from 3 August 2020 to 1 October 2020. It is currently in the process of verification and amendment of the supporting documents of 14 business operators submitting applications.

(2) Studying and developing a model of broadcasting operators for the public interest which is in accordance with the Broadcasting Master Plan which prescribing important strategies for the access to information of the people, promoting and supporting the radio broadcasting operation. Therefore, it requires the body of knowledge from experts to develop models for broadcasting operators both in the category of the public service and the community service to be used as the benchmark for evaluating and selecting the radio station model for the greatest benefit to the public. The project is currently in the process.

(3) Adjusting the annual contribution remittance rate to the Broadcasting and Telecommunications Research and Development Fund for Public Interest. The NBTC Meeting No. 6/2020 on 8 April 2020 had the resolution to approve the NBTC Notification on Criteria and Methods for Annual Contribution Remittance to the Broadcasting and Telecommunications Research and Development Fund for Public Interest of the Radio or Television Broadcasting Licensee (No.2) to be appropriate with the current economic situation and the regulation of the broadcasting and television services and not to put the unreasonably burden on the radio or television broadcasting licensees or service user by cancelling the Annex of the Annual Contribution Remittance Rate

to the Fund attached to the NBTC Notification on Criteria and Methods for Annual Contribution Remittance to the Broadcasting and Telecommunications Research and Development Fund for Public Interest of the Radio or Television Broadcasting Licensee dated 10 November 2016 and replacing by the Annex of the Annual Contribution Remittance Rate to the Fund attached to this NBTC Notification in which the rate shall be calculated from the revenue incurred in the accounting period from 2019 onwards. The adjustment of the remittance rate to the Fund according to this Notification is a reduction to be equal to the remittance rate of the license fee according to the NBTC Notification on License Fee of the Broadcasting or Television Services (No.3) to be in the same direction.

(4) Having considered the Support on Popularity Surveys

According to the Order of the Head of National Council for Peace and Order No. 4/2019 on Measures to Solve Problems of Television and Telecommunications Services, dated 11 April 2019, the Office of the NBTC shall consider the allocation of money for the survey of the popularity of television program channels to support the digital television industry to the central organization formed by the composition of licensees to use spectrum for the provision of digital terrestrial television services. Later on, the Office of the NBTC has issued the Notification on Criteria, Method and Condition for Allocating Money to Support the Survey of the Popularity of Television Program Channels to Support the Digital Television Industry (No.2) on 27 September 2019 requiring that the central organization wishing to apply for financial support according to the Notification shall submit a request in writing to the Office of the NBTC within 1 year from the effective date of the Notification on 27 September 2019 There was only one operator who submitted a letter requesting for financial support on the survey of the popularity of the television program channels to support the digital television industry project according to the Notification; that is the Digital Television Association (Thailand), and it is currently under consideration by the Office of the NBTC.



4.2 Developing personnel and enhancing knowledge and understanding for the development of broadcasting and television services as follows:

(1) In 2020, the development of personnel in the broadcasting and television services are such as

- Organizing workshop for lecturers the announcers course in the broadcasting and television broadcasters (Train the Trainer) so that the lecturers have knowledge and understanding of the course content in the same direction with the utmost benefit. The trainings were held twice with 100 participants attended the trainings.

- Organizing the Training to develop skills for those who have passed the announcers course in the broadcasting and television services to promote and support the training course on announcers in the broadcasting and television services and to develop Thai language skills for personnel in the broadcasting and television services and related persons to be accurate according to the orthography as well as to create a collaboration network between the announcers, MCs, moderators in the broadcasting and television services and the Office of the NBTC and related persons for 3 times and the training was participated by 90 participants.

- Organizing the Announcer Camp to enhance the potential of personnel in the broadcasting and television services to become announcers, MCs, moderators with professional skills, standards, professional ethics, and most importantly responsibility to the public interest. The trainings were held for 2 sessions attended by 80 participants.

(2) In 2020, the NBTC had enhanced knowledge and understanding for the development of broadcasting and television services such as

- Workshop on financial accounting for the quality broadcasting operators for community service who have been granted of financial support. The Office of the NBTC had organized a workshop on financial accounting for the quality broadcasting operators for community service who have been granted of financial support on 25 February 2020 at the Office of the NBTC. The workshop was participated by radio broadcasting operators for trial operation,

category of community service, who have been granted of financial support by the BTFF Fund according to the NBTC Notification on Criteria for Promoting the Well-prepared Communities and Supporting the Quality Broadcasting Operators for Community Service B.E.2560 (2017), for totally 8 stations.

- Organizing Training on news production and presentation in the digital age to enhance knowledge and skills for personnel in the broadcasting and television services to be able to keep up with the context of changing technology. The trainees will gain knowledge about local investigative news production processes in the digital media age, identity creation, storytelling in the digital media landscape, news production by smartphone technology (MOJO), digital media literacy, editing with application editing, and real practice of investigative news production including works presentation in video clip format as well as exchanging experiences with famous lecturers. The trainings were participated by reporters/announcers, station executives, program producers, technical officers, public relation officers, and YouTubers for totally 192 participants, and also held in 4 regional areas, which are Ubon Ratchathani, Songkhla, Rayong, and Nan.

- Organizing Training project to enhance knowledge and understanding about laws and criteria for regulating the broadcasting service for operators, government agencies and the general public in the year 2020 to enhance knowledge and understanding of laws and criteria for regulating the broadcasting service, roles and powers and duties in regulating the broadcasting service of the NBTC as well as exchanging opinions and experiences in the regulation among each other. The trainings were organized in 4 regional areas, which are Songkhla, Phrae, Chonburi, and Sisaket and participated by 640 participants.

- Organizing workshop to enhance knowledge and understanding of the broadcasting operators for trial operation in regional areas in the year 2020 in order that the broadcasting operators for trial operation in regional areas have



an adequate and necessary knowledge for the operation. A total of 6 meetings were held from July - November 2020 in Chiang Rai, Sukhothai, Udon Thani, Prachinburi, Phetchaburi and Songkhla, with a total of 334 participants.

4.3 Quality development of the broadcasting and television business operation

(1) Having conducted a study research for the assessment of the efficiency and achievement of the broadcasting and television operation in the year 2020 which is the implementation of the First Broadcasting Master Plan, Strategy on the Quality of Service Development, and in line with the Second Broadcasting Master Plan, Strategy on the Development of Radio Broadcasting Service in Thailand in promoting and supporting radio broadcasting operators to be able to raise the standard to be accepted. The study research focused on the assessment of the efficiency and the achievement of radio broadcasting operation in all types to acknowledge problems, obstacles and guidelines for policy recommendations to promote and develop the quality of service operations, aiming to study and research groups of radio broadcasting operators and other related parties. The data of sample group was distributed according to the type of licensees, the operational objectives, and region, and systematically random in each hierarchy. The Office of the NBTC in collaboration with the Thailand Productivity Institute has been in the process of researching the changing conditions of the radio broadcasting business, adaptation of the high-frequency radio stations, businesses, the public, and communities, along with proposing a framework for the assessment of efficiency and achievement of business operations. In addition, the NBTC had organized the focus group meeting attended by representatives of business operators and related people in the broadcasting industry to gather comments and opinions on issues such as analysis of the needs of listeners that are the listeners' behavior, program types, technology and platforms in broadcasting service, funding sources, including requirements for

being supported or promoted by the Office of the NBTC in order to secure the radio broadcasting service of Thailand to be able to adapt to changing environmental environment. The comments and opinions obtained from questionnaires and the focus group meetings will be collected and used for preparing the final report.

(2) Having prepared a professional development plan in the broadcasting and television services to raise the standards in the broadcasting and television services to be accepted. In 2020, the study was conducted on researches both domestic and international, the assessment of the efficiency and achievement of the broadcasting and television services in the past years, best practices as well as studying the international professional development plans in broadcasting and television services to prepare a 5 - year professional development plan for personnel in the industry to have knowledge and understanding and be able to adapt to changes, be accepted by relevant sectors. In addition, a questionnaire had been prepared to collect information about the need for professional development in various areas of licensees and professionals in the broadcasting and television services, and distributed to different regions as well as organizing focus group meetings in 5 regions consisting Chonburi, Khon Kaen, Nakhon Si Thammarat, Chiang Mai, and Bangkok, to hear comments and opinions of operators in the broadcasting service (high-frequency radio, commercial, public, community), television service both frequency-used and non-frequency used, including the group of mass communication professionals, Professional Association for Mass Communication, and educational institutions to gather opinions and suggestion to prepare the professional development plan in the broadcasting and television services which leads to the effective implementation and a suitable model for the target group.



International Activities in Broadcasting, Television, and Telecommunications Services

The NBTC had carried out international activities in the broadcasting, television and telecommunications services as the Administration of Thailand through the cooperation with the International Telecommunication Union under the specified framework of authority in the year 2020 as follows:

1. Having operated as the Member of the ITU Council of the International Telecommunication Union in the 1st ITU Council 2020 during 9 - 19 June 2020 and the 2nd ITU Council 2020 during 16 - 20 November 2020 in form of virtual meetings. The meetings considered key issues related to the International Telecommunication Union (ITU) Strategic Plan, Work Plan, Budget and Human Resources Plan, the 2021 - 2024 Action Plan and ITU's Internal Affairs Management, and other important issues according to the agenda. Thailand has been elected as a Member of the ITU Council for more than 10 consecutive terms and the Office of the NBTC as the Administrative Bureau of the Thai government had actively performed duties in the ITU Council and participated in the consideration of telecommunications policy formulation and planning including the ITU management. However, the term of office will expire in 2022 and the ITU has set the election of ITU Council Members for the term of office during the year 2022 - 2026 (B.E.2566 - 2569) and the Office of the NBTC is currently in the process of proposing the matter to the NBTC Meeting for consideration and approval in principle of applying for the position of ITU Council Member in Asia and Australasia Region for another term in order to further propose to the Cabinet for consideration and approval for Thailand to apply for the position of ITU Council Member for the above-mentioned agenda.

2. The World Standardization General Assembly (WTSA)

2.1 Having established a working group for the APT Preparatory Meeting for the World Telecommunication Standardization Assembly 2020 (WTSA-20) and the World Telecommunication

Standardization Assembly 2020 (WTSA-20) to follow up the results of the regional preparatory meetings related to the WTSA-20, as well as studying details of the proposals of the Asia-Pacific Telecommunity member countries in order to analyze the data and prepare proposals of the Thai delegation to the Assembly.

2.2 Having proposed the amendment of the Resolution No.88 to present a draft Thailand's contributions on the Proposed Modification to WTSA-16 Resolution 88 on International Mobile Roaming with an issue focusing on driving the use of Over-the-Top (OTT) more widely to be another choice for consumers and to push for a reduction in service rates of International Mobile Roaming (IMR) through marketing mechanisms. The meeting agreed on the draft contribution with the view that IMR and OTT are the important issues and that the Office of the NBTC has played a key role in pushing these issues up in several forums previously. Later on, the 4th APT Preparatory Meeting for the WTSA during 16 - 20 November 2020 had the resolution to approve Thailand's proposal. The proposed contribution for amendment on Resolution 88 will therefore be pushed forward and further presented to the World General Assembly on Telecommunications Standards (WTSA) 2022.

3. The World Telecommunication Development Conference (WTDC)

3.1 Having established a preparatory working group for the World Telecommunication Development Conference to support the Asia-Pacific Telecommunity Preparatory Meeting and the World Telecommunication Development Conference (WTDC) to be held during 8 - 19 November 2021



at Addis Ababa, Federal Democratic Republic of Ethiopia. The working group is responsible for studying information on the proposals of APT member countries to analyze data for the drafting of Thailand's proposals for the WTDC-21, including presenting information on relevant issues that are useful in preparing position and recommendations for the Thai delegation to propose to the WTDC-21 as well as attending the virtual meetings under important ITU Framework such as Telecommunication Development Advisory Group (TDAG), Telecommunication Development Advisory Group Working Group (TDAG-WG), etc.

3.2 Having established a working group on ICT Development Index (IDI) to have responsibility on collecting telecommunication statistical data and coordinating with relating entities on the development of indicators ranking of telecommunications development of Thailand as well as attending the 11th Meeting of the Expert group on Household Indicators (EGH) and the 8th Meeting of the Expert Group on Telecom/ICT Indicators (EGTI) in 2020 through virtual meetings during 14 - 18 September 2020 to review problematic indicators and consider new indicators and relevant key issues and the ITU will propose the matter to the next ITU Council of the International Telecommunication Union for considering guidelines, improving of indicators and dissemination of IDI rankings of member countries in the following year.

4. The 20th Global Symposium for Regulators (GSR) Goes Digital in 2020

Attending the 20th Global Symposium for Regulators (GSR) Goes Digital in 2020 during 1 - 3 September 2020 through virtual meeting and having discussed and summarized the principles of collaboration on digital transformation under the topic of "The gold standard for digital regulation", including the focus on the importance of infrastructure development to bridge the digital divide, the access to infrastructure and services on applications that enable people in remote areas to have equal access to services, the security of using internet and applications, as well as the investment in infrastructure for providing 5G services.

5. The ITU World Telecommunication/ ICT Indicators Symposium (WTIS)

Attending the 17th ITU World Telecommunication/ ICT Indicators Symposium (WTIS) in the year 2020 through virtual meeting during 1 - 3 December 2020 under the main topic "Toward an Inclusive Digital Society" and having proposed issues for discussion on the indicators which are the role of digital society during the COVID-19 pandemic, building a digital society, bridging gaps and inequalities to access the digital society, and the existing ICT indicators including the use of data and indicators for the benefit of accessing the digital society and achieving the SDGs goals. In addition, the meeting presented the Handbook from the last EGTI meeting which some content has been adjusted and the Handbook can further be used in conjunction with the ITU Academy in 2021.

6. Collaboration with ITU Regional Office

6.1 Having coordinated with the International Telecommunication Union (ITU) on the relocation of the ITU Regional Office in Asia-Pacific Region (ITU-RO/ASP) to the Office of the NBTC, Region 1 (Central) in order to reduce the area rental cost which the Cabinet Meeting on 21 April 2020 had the resolution to approve the relocation of the ITU-RO/ASP. It is currently in the process of operation according to the plan and scheduled to be completed in 2022.

6.2 Having collaborated with the ITU Regional Office to host and/or co-host the related meetings such as Girls in ICT Day 2020 of the International Telecommunication Union through virtual meeting on 17 August 2020, which is an annual celebration event and a global campaign to empower and encourage women to apply technology to their careers including taking on roles as leaders in the information and technology industry, women leaders and experts in academic institution and government representatives. Also, students are invited to participate and share inspiring experiences and success stories in their pursuit of educational or career opportunities in the IT and IT sector, etc.





The Operation to Support the Government's Policies Implementation

The NBTC has set important policies on the spectrum management and regulation on the broadcasting, television, telecommunications, radiocommunications, and communication satellite services in accordance with the National Plans and Policies and the Government Policies to develop the communication service of the country to keep up with technology and to drive Thailand towards the digital age as well as pushing forward important actions to help people and the nation to overcome various crises. In 2020, **the NBTC had supported the Government's Policies and measures in preventing, controlling, solving problems and mitigating the impact of the Covid-19 pandemic** with the following achievements:

1. Measures to support the use of telecommunications service to mitigate the impact of COVID-19 pandemic by providing free 10 GB of data for mobile broadband internet service and increasing fixed broadband internet speed up to 100 Mbps free of charge in order to support people to be able to use additional 10 GB of mobile broadband internet per person per month for 30 days during 10 - 30 April 2020. Moreover, the NBTC had supported the user of fixed broadband internet with the speed less than 100 Mbps to be able to use fixed broadband internet with more speed for 30 days starting from 10 April 2020. For the case of ADSL/VDSL/Copper service, the NBTC had instructed service providers to increase internet speed up to the highest speed, and in the case of FTTH service, the service providers shall increase the internet speed up to 100 Mbps for users automatically in which the users need not to register for obtaining the right to increase the speed of fixed broadband internet service. For the cost, the NBTC will deduct from the revenue to be allocated to the BTFP Fund to be further used for the provision of basic universal telecommunication services of the service providers.

2. Measures to assist people by offering the use of mobile phone services free of charge for 100 minutes on all networks during 1 - 15 May 2020, which 1 service user will receive 1 right per 1 service provider for a period of 45 days from the date the right is requested and confirmed by the service provider. The NBTC had received cooperation from service providers without requesting for the financial support

for any operation and there are more than 12,666,003 numbers had been pressed by people to get the right and passed the specified conditions.

3. Measures to assist telecommunications licensees and broadcasting licensees who got effects by COVID-19 pandemic as follows:

3.1 Having issued the Office of the NBTC Notification on Criteria and Measures for Regulating Safety on Human Health from the Use of Radiocommunications Equipment, Article 12.5 in the situation of COVID-19 pandemic in order to prevent the epidemic of the disease including facilitating the people and preventing them from violating the prescribed laws.

3.2 Having issued the Office of the NBTC Notification on Radiocommunications License Operation and Conducting the Training Courses and Examination to receive a certificate of radiocommunications officer in the situation of COVID-19 pandemic in order to prevent the epidemic of the disease and facilitate radiocommunications license applicants and participants to the training courses/ examinations to receive a certificate of radiocommunications officer.

4. Measures to assist the broadcasting, television, and telecommunications licensees for the payment of annual fees and remittance or allocation of revenue to the Broadcasting and Telecommunications Research and Development Fund for Public Interest by issuing the NBTC Notification on the payment of annual fees and remittance or allocation of revenue to the Broadcasting and Telecommunications Research and Development Fund for Public Interest of the




The government and the NBTC Offer additional **10 GB** of mobile internet for Thai people (1 person, 1 right) free for 30 days.

- ▶ Check and subscribe from 10 - 30 April 2020
- ▶ By dialing ***170*** followed by **13-digits ID number #** then press Call (for existing number registered before 31 March 2020 only)
- ▶ After receiving confirmation SMS the internet can be used for 30 days

** For people with Thai nationality only
** Juristic person are not eligible*

Check and subscribe, press

*** 1 7 0 *** (13 digits of ID number) # 




The government and the NBTC increase home internet speed for Thai people up to **100 Mbps** (1 person, 1 right) free for 30 days.

- No registration required internet speed will be increased by service providers from 10 April 2020 onwards, free for 30 days.
- For ADSL and copper cable users, the speed will be maximum increased up to the highest performance of the device.
- For fiber users, if the current speed is less than 100 Mbps, the speed will be increased up to 100 Mbps.

In case the user has multiple rights, only one right will be granted. Users can notify directly to service provider to receive the rights

* For people with Thai nationality only
** Juristic person are not eligible

In cooperation with     




The government and the NBTC in cooperation with 6 mobile operators offer free **100 minutes** voice call to the people.

- ▶ All mobile networks, subscription period during 1 - 15 May 2020
- ▶ By dialing ***170*** followed by **13-digits ID number # Call** (The use start immediately after receiving confirmation SMS, valid for 45 days)

*This right is for all Thai people.
**1 right per 1 mobile network (all mobile networks)
***Juristic person are not eligible

In cooperation with     

broadcasting, television, and telecommunications licensees who got effects by the Covid-19 pandemic which has been published in the Royal Gazette on 28 May 2020 and come into force on the next day.

The measures are to alleviate the burden and assist licensees who are obliged to pay annual license fees and submit an annuity or revenue allocation to the Broadcasting and Telecommunications Research and Development Fund for Public Interest. For those who are obliged to pay annual license fees for the broadcasting, television or telecommunications business for the fiscal year 2019, annual remittances or revenue allocation to the Broadcasting and Telecommunications Research and Development

Fund for Public Interest for the accounting period 2019 and telecommunications number fees between 26 March 2020 and 30 June 2020, the payment can be made as follows:

(1) The telecommunications number fees shall be paid at 50 percent of the amount to be paid within the specified period according to the relevant NBTC Notifications and the rest can be paid within 15 August 2020 or as specified by the NBTC.

(2) The annual license fees and annual remittances or revenue allocation to the Broadcasting and Telecommunications Research and Development Fund for Public Interest can be paid as follows:



- Licensees who have revenues from the licensed business operation of all licenses of each service in the accounting period 2019 for not exceeding 1,000 million baht, the payment must be completed by 15 August 2020 or as specified by the NBTC.

- Licensees who have revenues from the licensed business operation of all licenses of each service in the accounting period 2019 more than 1,000 million baht, the payment of 50 percent of the amount due shall be made within 15 days from the due date and the rest must be paid within 15 August 2020 or as specified by the NBTC.

5. Temporary trial or testing of digital terrestrial television transmissions to promote education and learning for the public interest to support the learning of youth and families in COVID-19 pandemic, including to prepare for supporting the education and learning after the pandemic situation has subsided. The NBTC Meeting No.8/2020 on 13 May 2020 had a resolution to allow the Thai Public Broadcasting Service (Thai PBS) to use the spectrum for temporary trial or testing according to the Active Learning TV (ALTV) Project and approve the use of spectrum in broadcasting service for temporary trial or testing via the national digital terrestrial television network of Thai PBS according to the NBTC Notification on Radio Frequency for Digital Terrestrial Television Service (Amendment Version B.E.2562 (2019)) and to broadcast in Standard Definition (SD) for 1 channel using the service provision number 4 for a period of not more than 6 months, in which the broadcasting has begun on 1 July 2020. In addition, the NBTC Meeting No.23/2020 on 23 December 2020 has its resolution to extend the licensing period to use the spectrum for a temporary trial or testing under the Active Learning TV (ALTV) Project for another 6 months from the expiration date of the license (from 1 January 2021 to 30 June 2021).

6. Having proceed to provide channels for education consisting of channels for basic education, channels for distance learning, and channels for vocational education of the Ministry of Education, which the NBTC Special Meeting No.5/2020 on 30 April 2020 had a resolution to approve the Ministry

of Education to use the spectrum for temporary trial or testing under the digital terrestrial television transmission trial project for education through broadcasting in Standard Definition (SD) for 17 channels, and the NBTC Meeting No. 8/2020 on 13 May 2020 had a resolution to approve the determination of channels for basic education, channels for distance learning, and channels for vocational education of the Ministry of Education and the channels numbers shall be arranged from channel number 37 onwards. Those channels have already broadcasted on 16 May 2020.

7. Exemption of the type approval of technical standards for radio broadcasting operators (trial operation) during the announcement of emergency situation is as follows:

7.1 Having issued the Office of the NBTC Notification on Exemption of the technical standards testing for radio broadcasting operators (trial operation) during the announcement of emergency situation to exempt the technical standards testing which are the technical standards testing of radio transmitter and the measurement of spurious emission of stations for the license renewal or the submission of additional technical documents to support the license renewal during the announcement of emergency situation

7.2 Having issued the Office of the NBTC Notification on Cancellation of the Exemption of the technical standards testing for radio broadcasting operators (trial operation) during the announcement of emergency situation which proscribing that the exemption of the technical standards testing for radio broadcasting operators (trial operation) shall be ended upon the amendment or repeal of laws or orders relating to travel restrictions in the Kingdom. After the laws or orders relating to travel restrictions in the Kingdom have been amended or repealed, the NBTC therefore has announced the cancellation of the Office of the NBTC Notification on the Exemption of the technical standards testing for radio broadcasting operators (trial operation) during the announcement of emergency situation which being effective from 16 July 2020 onwards. At present, the laws or orders relating to travel restrictions in the Kingdom have already been amended or repealed.

3

Major Performance of the Office of the NBTC in the Year 2020



Management of the Office of the NBTC

The NBTC has focused on managing the organization according to the good governance policy continuously in order to drive the strategy on Improving the organization to ensure good governance and become a high performance organization in a sustainable fashion, creating a working culture based on good governance and encouraging personnel of the Office of the NBTC to perform their duties in good faith and take public interest as priority, as well as promoting a strategic working culture and setting the priority to the development of personnel's capabilities to drive operations to achieve the goals according to the vision of the Office of the NBTC, Being a leading organization in the ASEAN regulating and developing communications business for sustainable national development, and the NBTC policy to promote the Office of the NBTC towards the digital Office "NBTC Digitalization". The achievements in 2020 are as follows:

1. **Creating a working culture based on good governance and encouraging personnel of the Office of the NBTC to perform their duties in good faith and take public interest as priority.**

The NBTC has realized and given importance to the operation in order to drive the prevention and suppression of corruption and misconduct in the public sector which is an important policy of the country according to the National Strategy and it has been determined as a strategy of the Office of the NBTC for personnel to take as a target in performing their duties. Also, the annual action plan to promote good governance has been prepared as well as organizing activities to enhance knowledge and participation in morality and transparency of the Office of the NBTC. This is to ensure people of the duty performance on the good governance principle. In 2020, the Office of the NBTC had been assessed from the external stakeholders in the External Integrity and Transparency Assessment (EIT) in the A level which indicates that the Office of the NBTC has a good image for the people or service recipients and people have confidence in the quality of operations that are transparent, the information is clearly disclosed to the service recipients, and there is no benefit to friends or contrary to the public interest.





In addition, the Office of the NBTC has issued the Notification of the Office of the National Broadcasting and Telecommunications Commission Re: Intent of Integrity on the Organizational Management of the Office of the National Broadcasting and Telecommunications Commission in the year 2020, such as the duty performance, exercise of power, quality of communication, disclosure of information, etc., in order to create an anti-corruption culture, raising the good governance level in the management of all sectors, and reform the entire system of anti-corruption, prevention and suppression processes constantly. Also, a Working Group on Data Good Governance of the Office of the NBTC has been set up for the management and integration of public sector data and the work to be consistent and linked to each other securely, safely, and with good governance which will lead to the development of important information systems of the public sector for the benefit of the determination of criteria and methods to link, exchange, and integrate information of the public agencies systematically.

2. Raising the result of the Integrity and Transparency Assessment (ITA) of the operation of the Office of the NBTC towards the AA Level

Having participated in the ITA 2020 and been awarded a shield of honor in the Integrity and Transparency Assessment in the operation of government agencies in the fiscal year of 2020 (ITA Awards) which received the highest score, being the 1st rank in the group of other government agencies with a score of 97.75 in the AA level and the 6th rank of the country from 8,303 government agencies participated in the assessment.

3. Decentralization of service provision to the Regional Office of the NBTC

A working group has been established to determine guidelines on decentralization of service provision to the Regional Office of the NBTC in order to implement important policies on the decentralization of service provision from the Office of the NBTC Head office to the Regional Office of the NBTC in a concrete manner which will enable the Office of the NBTC to facilitate services to the people

in wider areas, while people will also be offered with convenience, reduction of time and cost on traveling to the Office of the NBTC Head office in Bangkok.

4. The development of the Office of the NBTC towards a digital office “NBTC Digitalization”

The Office of the NBTC had been awarded the Digital Government in 2020 (DG Awards 2020) which is the award given to government agencies that have developed the organization towards the digital government in high level in order to be a good model for other government agencies. The award is a result of the commitment of the Office of the NBTC’s personnel to jointly drive the implementation of key policies in the development of the Office of the NBTC toward a digital office continuously since 2018. Also, the working group to drive the development of the Office of the NBTC towards a digital office has been set up to drive the operation to achieve goals of developing a model and working system to become an efficient digital office and lead to the successful achievement on the mission operation of the Office of the NBTC concretely in raising the level of working process, the availability of laws and regulations related, and the well-prepared of personnel to step toward a digital office which will be useful to the response to people’s needs and the ability to adapt to the rapidly changing global context nowadays.





In 2020, the Office of the NBTC has improved some substantial working process, such as the development of the CRM system of the Call Center 1200, the development of the NBTC IT Service Desk system to assist in receiving requests and problems on the service use, the development of information management systems for monitoring and regulating the use of spectrum, etc. The result received from this operation can help reducing papers use, reducing time and process of resources usage efficiently, having data storage systematically and facilitating the operation. In addition, several activities were conducted to drive the success of the goals, such as organizing the Digital Agents meetings regularly, organizing trainings for personnel to enhance understanding and prepare for the readiness to become a digital organization, the creative use of technology to help increase efficiency in the work management, the integration of cooperation between units within the organization and outside the organization, and upgrade the provision of service by taking the needs of the people as the center which is in line with the National Digital Economy Development Plan and Policy to achieve the goal of transforming into digital government.

5. The operation on risk management and internal control of the Office of the NBTC

The Office of the NBTC has set up the Internal Control Assessment Committee, comprising knowledgeable and expertise experts from external agencies to determine guidelines for internal control assessment of the Office of the NBTC and prepare an annual report on internal control assessment of the Office of the NBTC according to Section 79 of the Fiscal Discipline Act B.E.2561 (2018) and the Ministry of Finance Guideline regarding Standard and Practical Guideline for Internal Control for Government Agencies B.E.2561 (2018) as well as setting up the Risk Management Committee consists of the administration and personnel of the Office of the NBTC who have knowledge and understanding about strategy preparation and risk management to carry out the operation on risk management of the Office of the NBTC and to prepare a risk management

plan of the Office of the NBTC according to Section 79 of the Fiscal Discipline Act B.E.2561 (2018) and the Ministry of Finance Guideline regarding Standards and Practical Guideline for Risk Management for Government Agencies B.E.2562 (2019) which an internal audit, internal control, and risk management shall be provided.

6. The constant improvement of the quality work systems towards the ISO 9001:2015 international standards.

Having continuously developed the quality work systems aiming to meet international standards so that all units under the Office of the NBTC are able to apply the quality work standards towards the ISO 9001:2015 international standard to the operation improvement. In 2020, the operation has been taken in 10 bureaus under the Administration Cluster, the Regional Affairs Cluster, the Telecommunications Cluster, and the Broadcasting Cluster. However, digital technology has played a role nowadays, leading to a rapid development and changes, and as a result, all sectors must adapt to the emerging changes. Therefore, the raising of the organizational development is a must to be accelerated in order to promote and support a sustainable development of the country. The Office of the NBTC has thus studied the guidelines for developing a Quality Management System which is suitable for the organization from the criteria for developing organization management quality of the public and private sectors, both in terms of framework and standard on quality control such as the Public Sector Management Quality Award 4.0 (PMQA 4.0), Thailand Quality Award (TQA), State Enterprise Assessment Model (SE-AM), etc., in order to bring such Quality Management System to analyze, compare, and propose recommendations on the appropriate Quality Management System for the Office of the NBTC.

7. Having continually instilled the awareness of caring the environment into personnel of the Office of the NBTC

The Office of the NBTC has continually instilled the awareness of caring the environment into personnel through the campaign on reducing the use of plastic bags within the Office of the NBTC to reduce the environmental pollution by focusing on reduce, refrain from, and stop the use of plastic bags and to use reusable containers and cloth bags instead of plastic bags, the campaign on proper sorting of waste in each category for cleanliness and safety. Also, in 2020, the Office of the NBTC has established the Energy Management Working Group to carry out the operation on energy conservation to be accomplished and be in accordance with the energy conservation policy and energy management methods of the Office of the NBTC including raising awareness of personnel of the Office of the NBTC to use energy worthily and participate in the improvement of the efficient use of energy resources of the organization continually and appropriately as well as announcing a policy on wastewater management to encourage personnel to participate in wastewater management operation in the organization for the utmost efficiency which is considered as one of the duties in the operation.



8. Developing the potential of personnel of the Office of the NBTC and transferring knowledge to relevant personnel

Having given the importance to the development of personnel's potential to drive the mission of the Office of the NBTC by promoting development of knowledge, skills, and competencies so that they can apply to their work effectively through providing standardized training courses which are suitable with the position and competence of the officers in each type, developing the potential of personnel to be proficient upon the mission and to have expertise in thinking and strategic analysis, as well as having carried out activities to push forward the development of personnel's potential, such as organizing activities to enhance the strategic working culture for personnel of the Office of the NBTC, encouraging personnel to realize and be developed of strategic thinking skills systematically, being able to apply tools to assist the formulation of efficient working strategies, organizing activities on knowledge sharing to brothers and sisters, having conducted the NBTC Knowledge Management Project (NBTC KM DAY) which is an annual operation as well as delegating executives and employees of the Office of the NBTC who have competent knowledge and expertise to be speakers for external agencies such as Military School of the High-Level Commissioned Officers, Graduate School of Communication Arts and Management Innovation, National Institute of Development Administration, etc.



The Follow-up and Monitoring the use of spectrum in Broadcasting, Television, and Telecommunications Services

The Office of the NBTC has its duties in managing spectrum and regulating the use of spectrum in broadcasting, television, and telecommunications services to be efficiently with no interference including the follow-up and monitoring the use of spectrum, in which the Office of the NBTC Region 1 - 4 and the NBTC Sub-region office all 21 sub-regions have been carried out the operation on following-up and monitoring the use of spectrum in the broadcasting, television, and telecommunications services to be properly and in accordance with the Radiowave Propagation Standard of the International Telecommunications Union (ITU), comprising the monitoring of radio frequency interference and handling complaints about the use of the spectrum, monitoring the unauthorized use of frequencies, searching, arresting, and prosecuting offenders under the Radiocommunications Act B.E.2498 (1955) and Section 53 of the Broadcasting Business Act B.E.2551 (2008) who have used, installed, traded radiocommunications equipment without permission, monitoring the frequency propagation to be in accordance with the standard on safety of electromagnetic radiation to human health. In 2020, the achievements are as follows:

1. Monitoring the possession of radio frequency

Having monitored the possession of radio frequency to control the use of radio frequency to be in accordance with the criteria, provisions, and conditions authorized by the Office of the NBTC and established a database of radio frequency possession to be used for the effective assignment of frequency whether in the case of new frequencies allocation, sharing frequency allocation, refarming of unused frequency, and being used as a primary information for the investigation of unauthorized frequencies and using the information for analysis and extension of the monitor of radio frequency possession and further suppression of the actions of the violators under

the requirements of the ISO 9001:2008. The Office of the NBTC Region and the NBTC Sub-region Office have monitored the annual radio frequency possession as follows:

(1) Having monitored the possession of radio frequencies for aeronautical radio navigation from the frequency band of 108 - 137 MHz, which is scheduled to monitor 24 hours every day; and as the frequencies used for aeronautical navigation are the essential frequencies for communication in aeronautical service because it concerns the safety of most people, it is therefore considered the frequency to be monitored regularly for preventing and resolving problems of interference on aeronautical radionavigation promptly, precisely, and accurately.

(2) Having monitored radio frequency according to the plan which are divided into different frequencies that must be monitored each day but the operation must be carried out on the same day and time by all NBTC Sub-region office who have the monitoring equipment both in type of fixed and remote control system.

(3) Having monitored the possession of frequencies according to the requests.

2. Monitoring of the radio frequency emission standard

Having monitored the radio frequency emission standard to control radio frequency emission to be in accordance with the standards and conditions prescribed in the license of the Office of the NBTC and the technical measurement service of radio frequency emission as requested, or having coordinated with both domestic and international agencies by complying with the requirements of ISO 9001:2008 and ITU recommendations, which are Frequency Measurement, Bandwidth, Field Strength, and Spurious Emissions measurement. Details are as shown in Table 8.

Table 8: Parameters for monitoring standard of frequency emission

Type of stations	Parameters to be monitored
1. Mobile phone base stations/Radiocommunications station	<ul style="list-style-type: none"> • Frequency Tolerance • Bandwidth • Unwanted Emission • Heights of antenna
2. High Power Radio/Television broadcasting master stations 3. Radio broadcasting stations for trial operation 4. Television stations for trial operation	<ul style="list-style-type: none"> • Frequency Deviation Limits • Unwanted Emission • Frequency Tolerance • Bandwidth • Field Strength • Heights of antenna

In 2020, the Office of the NBTC had monitored the frequency emission of mobile phone base stations, radiocommunications stations, radio broadcasting

stations for trial operation, high-frequency radio broadcasting master stations, and television stations. Details are as shown in Table 9.

Table 9: Monitoring result of standard of frequency emission in 2020 classified by the Office of the NBTC Region

Organization	Number (station)	Type of station				Monitoring result		
		Mobile phone base stations/radiocommunications	Radio broadcasting stations for trial operation	High-frequency radio broadcasting master stations	Television stations (MUX)	Meet the standard	Fail to meet the standard	Unable to monitor
Region 1	1,444	11	1,109	119	205	1,212	78	154
Region 2	1,354	-	1,101	116	137	1,188	151	15
Region 3	1,518	-	1,082	112	324	1,450	42	26
Region 4	1,202	-	661	136	405	1,058	39	105
Total	5,518	11	3,953	483	1,071	4,908	310	300

Remarks: Data as of December 2020

The reason that the monitoring result of the standard of frequency emission of radio broadcasting stations and television stations do not meet specified criteria is because there was an unwanted emission, frequency deviation, and out-of-bandwidth emission which exceed the specified standard. Therefore, the Office of the NBTC had required operators to resolve problems and improve the transmitters to be further

in accordance with the specified standards. However, in the case of stations that were unable to monitored, which found that those stations had already terminated broadcasting or the notification of the station location was different to the license, the Office of the NBTC had already investigated and notified the relevant complainants.

3. Monitoring and resolving radio frequencies interference

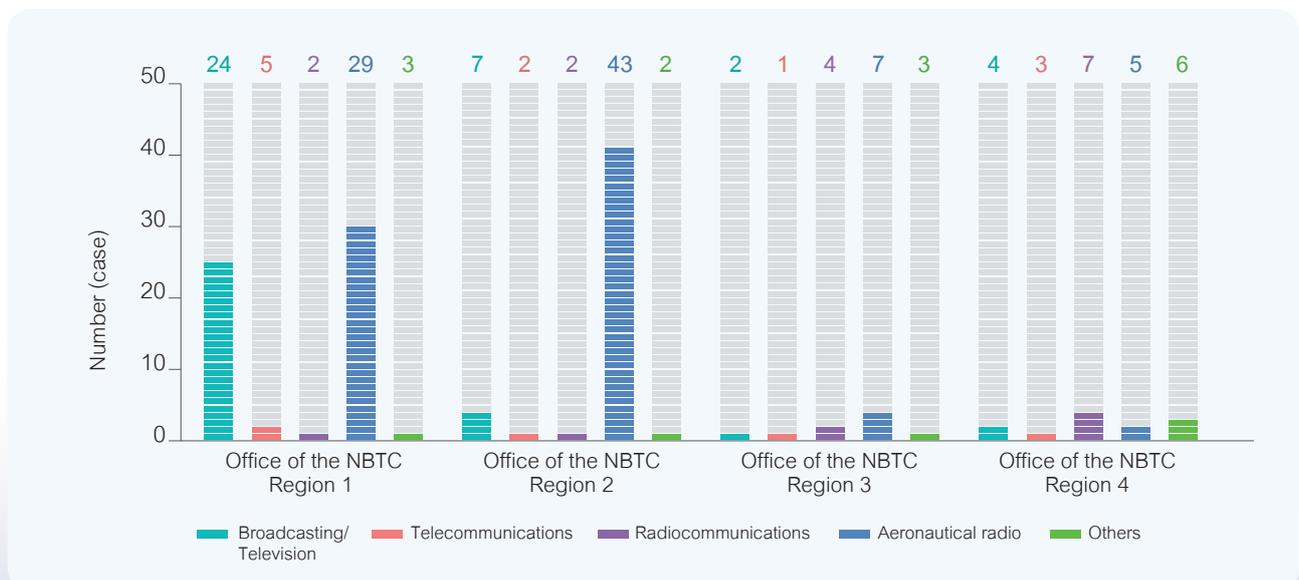
Having monitored and surveilled the spectrum use, as well as solving problems on frequency interference notified by public agencies, private sectors, people, and operators in broadcasting, television and telecommunications services. In 2020, the Office of the NBTC had received complaints on frequency interference from the spectrum use in various services, which are the broadcasting service, telecommunications service,

radiocommunications service, and aeronautical radio service (AEROTHAI) through various channels such as telephone, fax, letters, and Call Center 1200 for totally 161 cases in which the aeronautical radio service received the highest complaints for 84 cases, followed by the broadcasting service for 37 cases, radiocommunications service for 15 cases, other issues (electronic devices) for 14 cases, and telecommunications service for 11 cases, respectively. Details are as shown in Table 10 and Chart 1.

Table 10: Statistics on the number of complainants from the spectrum use in various services in 2020 classified by the Office of the NBTC Region

Service \ Organization	Office of the NBTC				Total (case)	Interference ended	Percentage of success of interference ended (%)
	Region 1	Region 2	Region 3	Region 4			
Broadcasting/television	24	7	2	4	37	37	100
Telecommunications	5	2	1	3	11	11	100
Radiocommunications	2	2	4	7	15	15	100
Aeronautical radio	29	43	7	5	84	84	100
Others (electronic device)	3	2	3	6	14	14	100
Total (case)	63	56	17	25	161	161	

Chart 1: Statistics on the number of complainants from the spectrum use in various services in 2020 classified by the Office of the NBTC Region





The aeronautical radio service has still been filed the highest complaints on frequency interference for 67 complaints due to the main reason of spurious emission of radiocommunications transmitters which failed to meet technical standards prescribed by the NBTC Notification on Criteria for the Regulation of Radio Broadcasting Service for Trial Operation B.E.2556 (2013) and its Amendment (No.2) B.E.2559 (2016) which led to the faultily function of radiocommunications transmitters. In 2020, the NBTC has the resolution to exempt technical standards testing consisting of technical standards testing of radio broadcasting transmitters and the spurious emission measurement of stations during the restriction period of travelling in the Kingdom, which therefore, may be the reason of faultily function of the radiocommunications transmitters.

Also, the secondary reason of the frequency interference may come from the intermodulation product which resulted from the broadcasting of radio broadcasting stations for trial operation whether in the nature of the spurious emission, the use of co-channel frequencies for 16 complaints, or the background noise that the interference emission arises from high-voltage equipment, spectrum intermodulation for 1 complaint, totally 84 complaints. All of the above causes had result in the same frequency band between the interference frequency and the frequency band for aircraft navigation, the frequencies used for controlling air traffic, and the radio frequency for instrument landing system which made the communication in the aeronautical radio service inefficient and may lead to flight accidents. Details are as shown in Chart 2 and 3.

Chart 2: Statistics on the number of the causes of interference on aeronautical radio in 2020

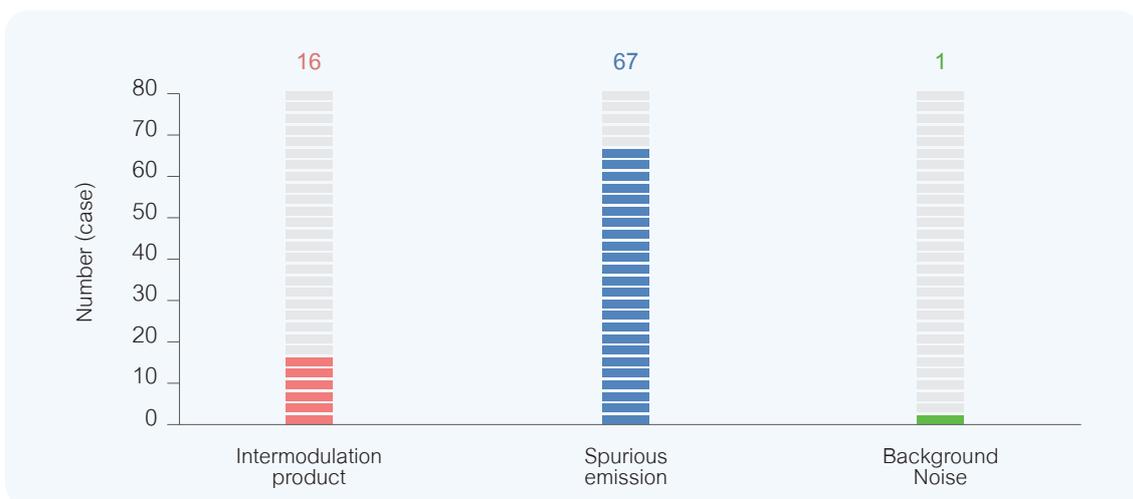
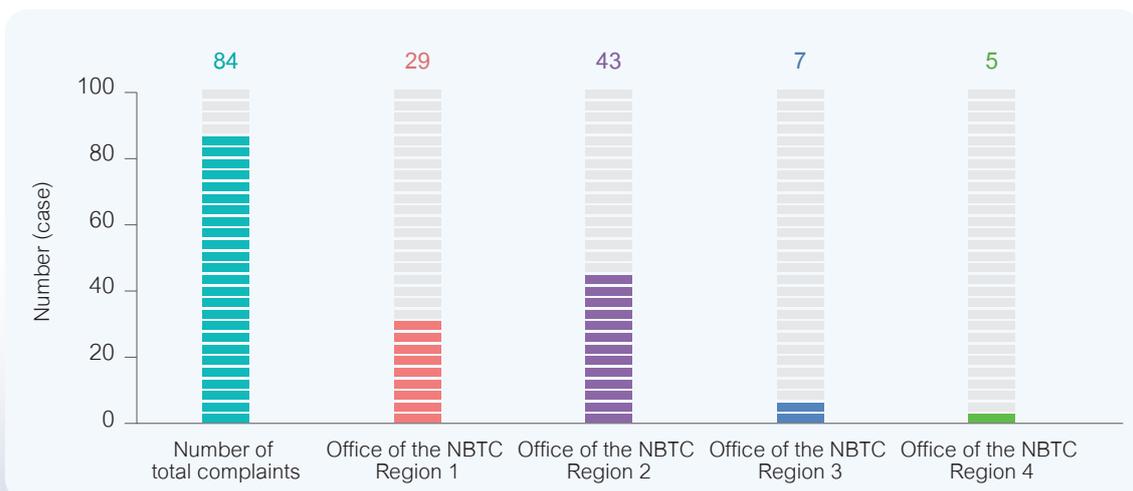


Chart 3 : Statistics on the number of complaints on aeronautical radio interference in 2020 classifies by the Office of the NBTC Region



4. Monitoring the unauthorized frequency

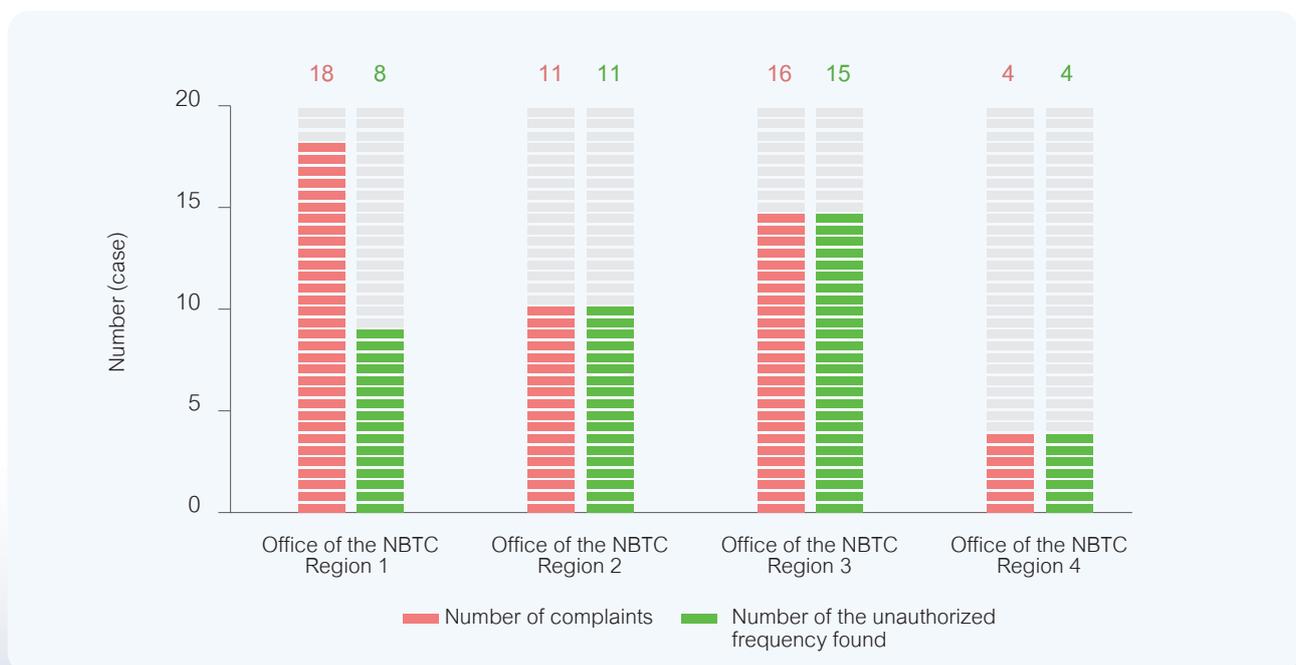
Having monitored the unauthorized frequency and unlicensed radiocommunications stations according to the provisions of the International Radio Regulation and the Radiocommunications Act B.E.2498 (1955) to ensure the rightfully use of radio frequency. In 2020, the Office of the NBTC Region and the NBTC Sub-region office had monitored

and surveilled the use of spectrum including the cases notified by the people, public and private agencies for totally 49 cases and found that there were 38 cases of unauthorized frequency use which can be divided into 13 cases of frequency in broadcasting/television services and 25 cases of frequency in radiocommunications service. Details are as shown in Table 11 and Chart 4.

Table 11: Monitoring results on unauthorized frequency in 2020 classified by the Office of the NBTC Region

Organization	Number of complaints (case)	Number of the unauthorized frequency found (case)	Number of the unauthorized frequency found Classified by type of service	
			Broadcasting/ Television services	Radiocommunications service
Office of the NBTC Region 1	18	8	2	6
Office of the NBTC Region 2	11	11	2	9
Office of the NBTC Region 3	16	15	7	8
Office of the NBTC Region 4	4	4	2	2
Total (cases)	49	38	13	25

Chart 4: Monitoring results on unauthorized frequency in 2020 classified by the Office of the NBTC Region



5. Search and arrest according to the laws

Having operated on the search and arrest and taken legal process on the offenders against the Radiocommunications Act B.E.2498 (1955) and Section 53 of the Broadcasting Business Act for the unauthorized use, installation, trade of radiocommunications equipment in cooperation with

military and police officers. In 2020, the Office of the NBTC found offenders and submitted to the inquiry officers for prosecution for totally 59 cases which can be divided into the broadcasting and television services for 8 cases and the radiocommunications service for 51 cases, and property in dispute found for 976 items. Details are as shown in Table 12.

Table 12: Statistics of the search and arrest of the offenders in 2020 classified by the Office of the NBTC Region

Organization	Total cases	Type of service		Number of property in dispute (items)
		Broadcasting/ Television services	Radiocommunications service	
Office of the NBTC Region 1	13	3	10	791
Office of the NBTC Region 2	6	2	4	50
Office of the NBTC Region 3	37	2	35	100
Office of the NBTC Region 4	3	1	2	35
Total (cases)	59	8	51	976

6. Regulation of safety on human health from the use of radiocommunications devices and measurement of electromagnetic radiation levels of radiocommunications stations (EMF)

Having operated on the measurement of the electromagnetic field radiation levels (EMF) of mobile phone base stations of telecommunications service providers throughout the country to be in accordance with the guidelines for regulating the safety on human health which is the important criteria prescribed as international standard. The results from

the measurement will be used for comparing with the limits of exposure to electromagnetic radiation from radiocommunications equipment that can radiate electromagnetic waves close to the head or having a distance of less than 20 centimeters from the body in normal use working position. The Specific Absorption Rate (SAR)⁴ in the frequency band of 100 kHz - 10 GHz for occupational exposure group and general public exposure group must not exceed the value according to the NTC. TS. 5001 - 2550 (EMF Safety). Details are as shown in Table 13.

⁴ 1) All SAR is an average for any 6 - minute period.

2) Average SAR for the whole body is obtained by the quotient of the total power absorbed in the body and the total mass of the body.

3) The SAR for any part only is an average per 10 grams (g) of the same cuboid - shaped tissue.

Table 13: The value according to the NTC. TS. 5001 - 2550 (EMF Safety)

1	Limits of SAR for occupational exposure group	Limits of SAR (W/kg)
	Average SAR for the whole-body	0.4
	SAR for only the head & trunk	10
	SAR for only the limbs	20
2	Limits of SAR for general public exposure group	Limits of SAR (W/kg)
	Average SAR for the whole-body	0.08
	SAR for only the head & trunk	2
	SAR for only the limbs	4

The Office of the NBTC has required that telecommunication operators having installed base stations shall display signs in order to clearly see the limits of electromagnetic radiation exposure from radiocommunications equipment of the components that can radiate electromagnetic waves close to

the head area or having a distance of less than 20 centimeters from the body in normal use working position and a fixed radiocommunications equipment with electromagnetic radiation covering a wide area according to the Standard of NTC. TS. 5001 - 2550 (EMF Safety). Details are as shown in Table 14 and 15.

Table 14: Limits of electromagnetic field strength⁵ for occupational exposure group

Frequencies	E-field strength (V/m)	H-field strength (A/m)	equivalent plane wave power density S_{eq} (W/m ²)
9 kHz - 65 kHz	610	24.4	-
65 kHz - 1 MHz	610	$1.6/f$	-
1 MHz - 10 MHz	$610/f$	$1.6/f$	-
10 MHz - 400 MHz	61	0.16	10
400 MHz - 2 GHz	$3f^{1/2}$	$0.008f^{1/2}$	$f/40$
2 GHz - 300 GHz	137	0.36	50

⁵

- 1) E-field strength means electric field strength and its unit is volts per meter (V/m).
- 2) H-field strength means electric field strength and its unit is amperes per meter (A/m).
- 3) f means the frequency and its unit is megahertz (MHz).
- 4) For frequencies between 100 kHz and 10 GHz, the S_{eq} , E^2 and H^2 is an average for any 6-minute period.
- 5) For frequencies over 10 GHz, the S_{eq} , E^2 and H^2 is an average for any $68/f^{1.05}$ -minute period in which f means the frequency and its unit is gigahertz (GHz).



Table 15: Limits of electromagnetic field strength for general public exposure group

Frequencies	E-field strength (V/m)	H-field strength (A/m)	equivalent plane wave power density S_{eq} (W/m ²)
9 kHz - 150 kHz	87	5	-
150 kHz - 1 MHz	87	$0.73/f$	-
1 MHz - 10 MHz	$87/f^{1/2}$	$0.73/f$	-
10 MHz - 400 MHz	28	0.073	2
400 MHz - 2 GHz	$1.375f^{1/2}$	$0.0037f^{1/2}$	$f/200$
2 GHz - 300 GHz	61	0.61	10

The Office of the NBTC has continuously measured the technical standards of radio frequency emission of mobile phone base stations of telecommunications operators by setting the operating plan to measure the electromagnetic radiation levels in order to regulate the safety on human health caused by the electromagnetic waves of radiocommunications equipment after the installation of radiocommunications stations effectively and be in accordance with the regulatory measures on the safety on human health from the use of radiocommunications devices and the relevant NBTC notifications.

In 2020, the Office of the NBTC had measured the EMF radiation level according to the operating plan for totally 3,341 times and the measurement according to complaints received from people in addition to the plan. In sum, the total measurement of the electromagnetic radiation was 4,944 times. The result of the measurement found that the EMF radiation level of radiocommunications stations meets the requirement of the standards. Details are as shown in Table 16.

Table 16: Plan - result of the measurement of EMF radiation in the year 2020

Measuring Organizations	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Total	
	Plan	Result	Plan	Result																						
Region 1	86	2	86	23	86	40	86	47	86	96	86	169	86	155	86	355	86	230	86	277	86	277	86	25	1,032	1,696
Region 2	84	26	84	25	85	62	86	25	93	131	93	109	94	115	94	132	94	134	94	144	95	192	95	104	1,091	1,199
Region 3	61	56	61	57	61	62	61	38	61	146	61	213	61	143	61	108	61	120	61	82	61	110	61	55	732	1,190
Region 4	30	35	30	52	30	44	30	29	30	41	48	116	48	92	48	115	48	95	48	93	48	75	48	72	486	859
Total	261	119	261	194	262	208	263	139	270	414	288	607	289	505	289	710	289	579	289	596	290	654	290	256	3,341	4,944

Remarks: Data as of January - December 2020

However, if the measurement of electromagnetic radiation is classified by operators, it was found that the electromagnetic radiation level of the operators'

radiocommunications stations (EMF) was complied with the specified standard. Details are as shown in Table 17.

Table 17: Result of the measurement of EMF radiation in 2020 classified by operators

Measuring Organizations	Operating plan in the year 2020	Operators					Result of the measurement
		AWN	DTN	TUC	CAT	TOT	
Office of the NBTC Region 1	1,032	438	196	330	382	350	1,696
Office of the NBTC Region 2	1,091	279	208	257	219	236	1,199
Office of the NBTC Region 3	732	307	271	245	205	162	1,190
Office of the NBTC Region 4	486	231	194	169	88	177	859
Total	3,341	1,255	869	1,001	894	925	4,944



Efficiency and Effectiveness of Consumers' Complaints Consideration in Broadcasting, Television, and Telecommunications Services

The Office of the NBTC has regulated the broadcasting, television, and telecommunications services in order to protect people and consumers from being exploited and provided the public an opportunity to file complaints, ask questions, including having disseminated useful information through various channels that are convenient and easy to access to keep up with the problem solving and consumer protection from being exploited and maintaining the interests of the public. The operation also includes carrying out the mediation and dispute resolution between consumers and operators, as well as developing communication channels constantly to facilitate the people. In 2020, the results were as follows:

1. Complaints receiving

The Office of the NBTC has developed and improved the efficiency of the Call Center 1200 in order to provide information service and receive complaints from people continuously and increase a variety of communications and complaint receipt channels to facilitate people, reduce communication gaps, and support new technologies/platforms which enabling people and consumers to have access to information as well as being considered and resolved of complaints as quick as possible. The channels are such as Call Center 1200 which is the main channel for providing service, fax 1200, drop call, email, NBTC 1200 Mobile Application, website <http://1200.nbtc.go.th>, social media, Facebook NBTC, Line Application @NBTC1200, and postal service, etc.

In addition, the Office of the NBTC has decentralize the services provision to the Office of the NBTC Region and the NBTC Sub-region office to be able to receive complaints of people and consumers

in different areas closely as well as establishing a collaboration network with relevant agencies to integrate the database that are the Government Contact Center "GCC 1111" Office of the Permanent Secretary, the Prime Minister's Office, and the Office of the Consumer Protection Board (OCPB) "Hotline 1166". In 2020, the Office of the NBTC has provided a link to the telecommunications license database using the juristic ID to access the central database integration system of the Office of the NBTC (NBTC Data Center) and the Office of the Consumer Protection Board (OCPB), which will lead to the development of a comprehensive consumer protection database system.

Channel for receiving complaints/inquiries from people

"Call Center 1200"

People wishing to file complaints or inquiries via Call Center 1200, please contact the following channels:

- 1. Hotline 1200
- 2. Fax 1200 press 7
- 3. Email 1200@nbtc.go.th
- 4. Website <http://1200.nbtc.go.th>
- 5. Drop Call
- 6. Facebook NBTC1200
- 7. Postal service (to report problems on the messy overhead telecom and broadcast cables) 87 Phaholyothin Soi 8, (Sallom), Samsen Nai, Phayathai, Bangkok 10400
- 8. @NBTC1200
- 9. Mobile Application NBTC1200

For the prompt resolution applications can be downloaded at...
Office of The National Broadcasting and Telecommunication Commission



In 2020, the statistics of complaints of people through the Call Center 1200 was totally 2,275 cases. The top-three issues consists of problems arising from the use of mobile phone services for 1,432 cases, including being charged for unsubscribed SMS/mobile number portability service, etc., followed by problems from the use of internet service for 458 cases, such as requesting for cancellation of the use of internet service without any fee applied, etc.,

and other issues for 175 cases. However, the statistics of complaints through the Call Center 1200 in 2020 was increased comparing to the year 2019 due to problems of television service use through the set-top box which was a result of the resolution on the improvement of digital terrestrial television network to support the spectrum refarming in the frequency band of 700 MHz. Details are as shown in Table 18.

Table 18: Complaints receiving through the Call Center 1200 of the Office of the NBTC in 2020

No.	Complaint receiving	Number (case)		Increase/(Decrease)
		2019	2020	
1	Mobile phone service, being charged for unsubscribed SMS / SMS Spam, mobile number portability service	1,398	1,432	34
2	Internet service	294	458	164
3	Unable to view TV programs through the Set-Top-Box	-	145	145
4	installation of mobile phone base stations / radiocommunications stations	127	67	(60)
5	Others such as Cable TV, inappropriate content of TV/Radio broadcasting programs, unable to use basic telephone service, etc.	186	175	(11)
Total		2,005	2,275	270

Remarks: Data as of December 2020

Source: Data Operation Center Bureau, Office of the NBTC

The statistics of the provision of inquiry service in 2020 from the people received by the Call Center 1200 was totally 48,030 cases which is decreased from the year 2019. The top-three inquiries are composed of inquiries on mobile phone service for 26,244 cases which are inquiry about the project on internet support in the situation of COVID-19 pandemic, inquiry on project of broadband internet

in border areas, inquiry on mobile phone number portability; followed by inquiries on the broadcasting service information/digital terrestrial television viewing information for 6,565 cases, and inquiries on channels for contacting telecommunication operators/broadcasting and television operators for 4,658 cases. Details are as shown in Table 19.

Table 19: Statistic of inquiries from the people received by the Call Center 1200 in 2020

No.	Complaint receiving	Number (case)		Increase/ (Decrease)
		2019	2020	
1	inquiries on mobile phone service, such as inquiry about the project on internet support in the situation of COVID-19 pandemic, inquiry on project of broadband internet in border areas, inquiry on mobile phone number portability, etc.	49,871	26,244	(23,627)
2	inquiries on the broadcasting service information/digital terrestrial television viewing information	3,380	6,565	3,185
3	inquiries on channels for contacting telecommunication operators/broadcasting and television operators	5,852	4,658	(1,194)
4	Others, such as inquiries on the procedure for a radiocommunications license application, drone registration, information on the provision of internet service, etc.	15,004	10,563	(4,441)
Total		74,107	48,030	(26,077)

Source: Data Operation Center Bureau, Office of the NBTC



and television services according to the process under the prescription of the NBTC Notification on Determination of Procedure and Duration for the Consideration of Request or Complaint in Broadcasting and Television Services and the Notification of the Office of the NBTC on the Action which is considered to be an Exploitation of Consumers in Broadcasting and Television Services B.E.2555 (2012) in which the consideration of complaints had been in line with the plan or earlier than specified period as well as having notified the complainants of the receipt of complaints, the coordination on facts and information, and the result of the operation. Also, the people and complainants are able to follow up the progress of their complaints consideration through various channels and the website provided by the Office of the NBTC. The Office of the NBTC was able to solve the problems according to the complaints in broadcasting and television service for 122 cases or accounting for 92.42 percent and 10 cases are in the process or accounting for 7.58 percent from a total of 132 cases. Having considered the complaints classified by type of service, it is found that the number

2. The efficiency and effectiveness in the consumers' complaints handling in the broadcasting, television, and telecommunications services

2.1 Complaints resolving in the broadcasting and television services

(1) Having carried out the operation on complaints relating to the action which is considered to be an exploitation of consumers in the broadcasting



of complaints in television service was 125 cases, most of them were related to the cancellation of service, changes on terms of service provision without notifying consumers in advance of not less than 30 days, non-refund of unpaid bill to consumers within 30 days as required by law such as satellite box

equipment costs, advance payment for monthly package fees, etc., the number of complaints in broadcasting service was 6 cases and the number of complaint made on the Office of the NBTC was 1 case. Details are shown in Table 20.

Table 20: Statistics of complaints concerning the action which is considered to be an exploitation of consumers in the broadcasting and television services

Type of service	Number (case)	Resolved/Ended		In process	
		Number	Percent	Number	Percent
Television service					
1. Digital terrestrial television					
1.1 Program channels	5	3	60.00	2	40.00
1.2 Devices/signal receivers	-	-	-	-	-
2. Subscription service					
2.1 Network					
2.1.1 Satellite box	117	109	93.16	8	6.84
2.1.2 Cable TV	1	1	100.00	-	-
2.2 Program channels	2	2	100.00	-	-
Total	125	115	92.00	10	8.00
Broadcasting service					
1. High power radio broadcasting master station (existing operators)	-	-	-	-	-
2. licensees for trial operation	-	-	-	-	-
2.1 Public service	-	-	-	-	-
2.2 Community service	-	-	-	-	-
2.3 Commercial service	6	6	100.00	-	-
Total	6	6	100.00	-	-
Complaint made on the Office of the NBTC	1	1	100.00	-	-
Grand total	132	122	92.42	10	7.58

Remarks: 1) Data as of 31 December 2020

2) Data as of 1 October 2018 - 30 September 2020 as the process of complaints consideration in broadcasting and television service is in accordance with the NBTC Notification on Determination of procedure and duration to be completed for considering the request or complaints in broadcasting and television services which is totally not less than 2 - 3 months.



(2) Having regulated content in the broadcasting and television services which can be divided according to main issues as follows: 1) issues related to the prohibited broadcasting program content which is considered in accordance with the legal framework of Section 37 of the Broadcasting Business Act B.E.2551 (2008) 2) issues related to the TV program rating system according to the Office of the NBTC Notification on Guidelines for Television Programs Rating System under the NBTC Notification on Criteria for Program Schedule for the Provision of Broadcasting and Television Services B.E.2556 (2013) 3) issues on failure to comply with the conditions of revenue earning of the radio broadcasting for trial operation which is considered under the framework of the NBTC Notification regarding Licensing Criteria for Radio Broadcasting Services for Trial Operation concerned 4) issues on the improper use of speech or language, such as the use of foul language, vulgarity, or excessive use of words that express personal emotions, etc., and 5) other issues that occur according to the social context, for example, urging the media to check the

accuracy of the presentation of information about the Coronavirus Disease 2019 (COVID-19), the use of graphics or animation to simulate crime scenes to accompany the news presentation, having carefulness in the presentation of content that is sensitive to international relations, etc.

All complaints regarding program schedule and program content in the broadcasting and television services were proceeded according to the process, accounting for 100 percent, in which the complaints relating to the program schedule and program content in the broadcasting and television service were resolved for 64 cases, or accounting for 91.43 percent, divided into 1) type of digital terrestrial television service for 43 cases 2) type of non-frequency used of television service (satellite and cable TV) for 5 cases, and 3) type of broadcasting service for 22 cases (type of existing radio operators for 2 cases and type of radio broadcasting for trial operation for 20 cases). There are only 6 cases in the process, or accounting for 8.57 percent from a total of 70 cases. Details are as shown in Table 21.

Table 21: Statistics of complaints on program schedule and program content

Type of service	Number (case)	Resolved		In process	
		Number	Percent	Number	Percent
Digital terrestrial television	43	38	88.37	5	11.63
Satellite TV/Cable TV	5	5	100.00	-	-
Radio (existing operators)	2	2	100.00	-	-
Radio for trial operation	20	19	95.00	1	5.00
Total	70	64	91.43	6	8.57

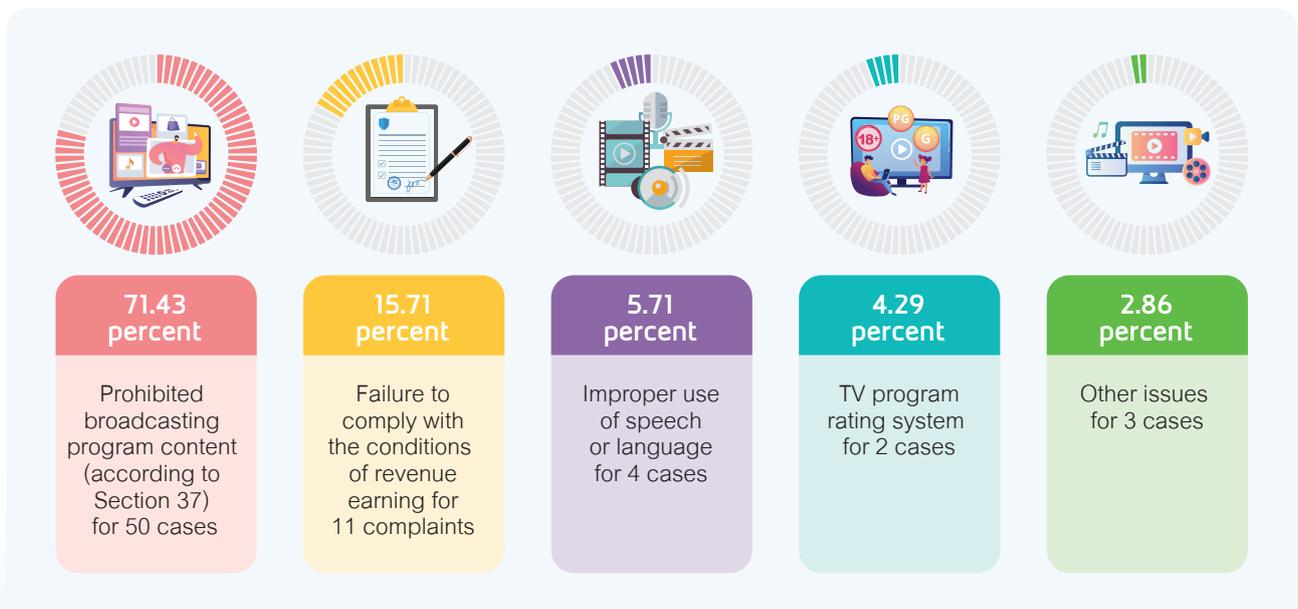
Remarks: 1) Data as of 31 December 2020

2) Is the data of complaints which were proceeded during 1 October 2019 - 30 September 2020 and in accordance with the time frame of consideration under the NBTC Notification on Determination of Procedure and Duration for the Consideration of Request or Complaint in Broadcasting and Television Services.

When the consideration is made on the complaints on program schedule and program content of totally 70 cases, it is found that the highest number of complaints was on the prohibited broadcasting program content issue, considering in accordance with the legal framework of Section 37 of the Broadcasting Business Act B.E.2551 (2008), such as content that is against the public order or good morals of the people, content that seriously deteriorates mental and health of people, accounting for 71.43 percent, followed by the issue on failure to comply with the conditions of revenue earning of the radio broadcasting for trial operation in category of public service and community service, considering under the framework of the NBTC Notification regarding Licensing Criteria for Radio Broadcasting Services for Trial Operation concerned, accounting for 15.71 percent, and the issue on the improper use of speech or language, such as the use of foul language, vulgarity, or excessive use of words that express personal emotions, accounting for 5.71 percent. These three issues are considered the main issues having been filed to the Office of the NBTC. Besides, there was another issue that

was a reflection of the changing social context in various areas whether the advancement of technology or the situation of COVID-19 pandemic that is happening around the world, the request for the Office of the NBTC to urge the media to check the accuracy of the presentation of information about COVID-19, the use of graphics or animation to simulate crime scenes to accompany the news presentation, having carefulness in the presentation of content that is sensitive to international relations, etc., which is accounting for 4.29 percent, and lastly, the issue on television program rating system which was considered according to the Office of the NBTC Notification on Guidelines for Television Programs Rating system under the NBTC Notification on Criteria for Program Schedule for the Provision of Broadcasting and Television Services B.E.2556 (2013), or accounting for 2.86 percent. It is noticeable that the number of complaints on the television program rating system issue related to 1) behavior and violence, 2) sexuality, and 3) language, has significantly decreased compared to the past few years. Details are as shown in Chart 5.

Chart 5: Complaints on program schedule and program content classified by issues

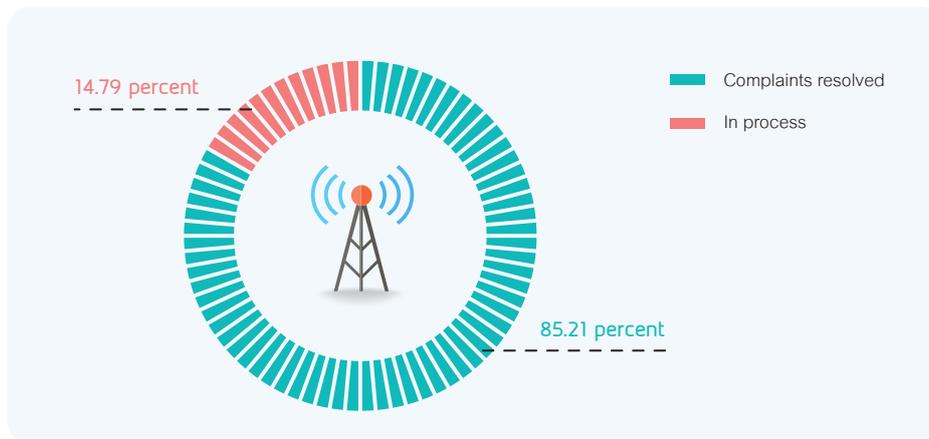


2.2 Complaints resolving in the telecommunications service

(1) Having carried out the operation on complaints in telecommunications service or those who have suffered from the provision of telecommunications service according to the process of complaint receiving and guidelines for complaints resolving such as problems on standard and

quality of service provision, billing inaccuracy, cancellation of services, add-on services, and validity of service. In 2020, the number of complaints in telecommunications service having been resolved was 1,487 cases, or accounting for 85.21 percent, and being in process for 258 cases or accounting for 14.79 percent from a total number of 1,745 cases. Details are as shown in Chart 6

Chart 6: Status of complaint resolving in telecommunications service in 2020



Having classified the complaints by type of service, it is found that the top-three type of services which received the most complaint were mobile phone service for 1,257 cases, accounting for 72.03 percent, followed by internet service for

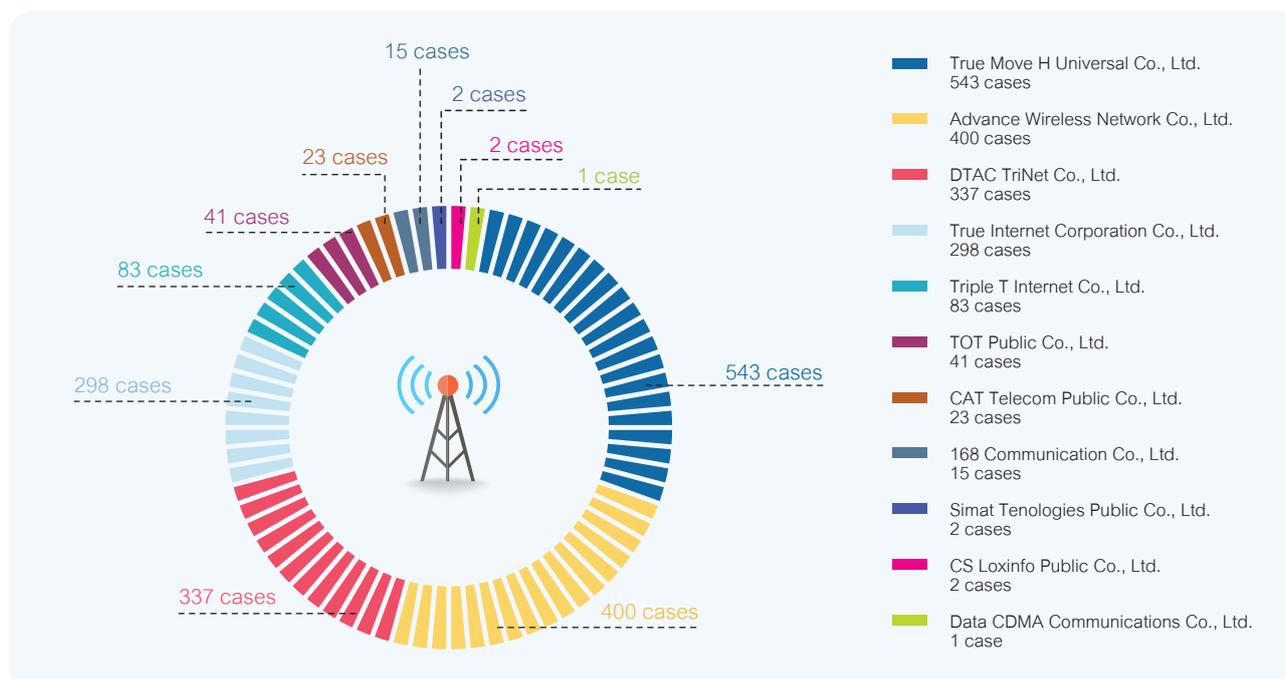
458 cases, accounting for 26.25 percent, and fixed-line service for 30 cases, accounting for 1.72 percent. Details are as shown in Table 22 and Chart 7.

Table 22: Status of complaint resolved classified by type of service in 2020

No.	Type of service	Total case	
		Number (case)	Percent
1	Mobile phone service	1,257	72.03
2	Internet service	458	26.25
3	Fixed-line service	30	1.72
Total		1,745	100.00

Remarks: Number of complaints during 1 January 2020 - 31 December 2020
Source: Telecommunications Consumer Protection Bureau, Office of the NBTC

Chart 7: Number of complaints classified by service providers



Having classified the complaints into 11 issues, the top-five issues received consisted of the issues on standard and quality of service provision for 491 cases, accounting for 28.14 percent, billing inaccuracy for 489 cases, accounting for

28.02 percent, cancellation of services for 375 cases, accounting for 21.49 percent, add-on services for 161 cases, accounting for 9.23 percent, and validity of service for 102 cases, accounting for 5.85 percent. Details are as shown in Table 23.

Table 23: Status of complaint resolved classified by issues in 2020

No.	Complaint issues	Total case		Status of complaints	
		Number of case	Percent	Resolved	In process
1	Standard and quality of service provision	491	28.14	382	109
2	Billing inaccuracy	489	28.02	429	60
3	Cancellation of services	375	21.49	340	35
4	Add-on services	161	9.23	153	8
5	Validity of service	102	5.85	77	25
6	Quality of service provision	63	3.61	51	12
7	Right of privacy and personal information	45	2.58	39	6
8	Incorrect/incomplete information provision	11	0.63	10	1
9	Other complaints	6	0.34	4	2
10	Prepaid service top up	1	0.06	1	-
11	Service accessibility	1	0.06	1	-
Total		1,745	100.00	1,487	258

Source: Telecommunications Consumer Protection Bureau, Office of the NBTC

(2) Having considered the efficiency of the compliant resolving classified by issues, it is seen that in 2020, the Office of the NBTC had resolved and ended 1,487 complaints cases out of a total number of 1,745 cases, or accounting for 85.21 percent, in which the efficiency is similar to the year 2019 that the number of complaints was 1,685 cases,

having been resolved and ended for 1,423 cases, or accounting for 85.82 percent. However, the Office of the NBTC has continued its commitment in taking action to resolve complaints of people in various issues to reach the resolution as quick as possible with more efficiently. Details are as shown in Table 24 and Chart 8.

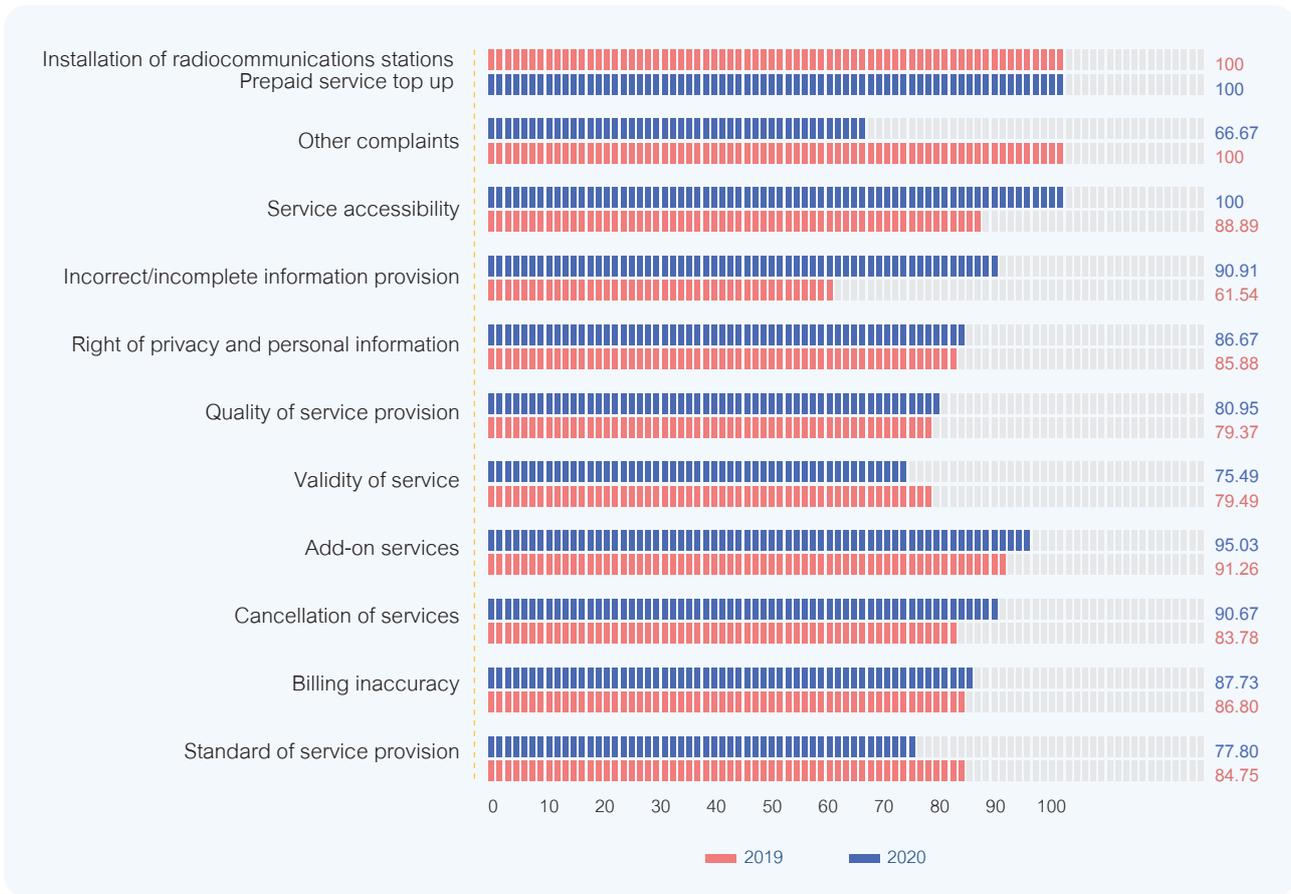
Table 24: Comparison of statistics of the efficiency of the complaints resolved between 2019 and 2020

No.	Complaint issues	In the year 2019			In the year 2020		
		Total	Resolved	In process	Total	Resolved	In process
1	Standard of service provision	531	450	81	491	382	109
2	Billing inaccuracy	303	263	40	489	429	60
3	Cancellation of services	259	217	42	375	340	35
4	Add-on services	286	261	25	161	153	8
5	Validity of service	78	62	16	102	77	25
6	Quality of service provision	63	50	13	63	51	12
7	Right of privacy and personal information	85	73	12	45	39	6
8	Incorrect/incomplete information provision	13	8	5	11	10	1
9	Service accessibility	9	8	1	1	1	-
10	Other complaints	3	3	-	6	4	2
11	Prepaid service top up	-	-	-	1	1	-
12	Installation of radiocommunications stations	28	28	-	-	-	-
Total		1,658	1,423	235	1,745	1,487	258

Source: Telecommunications Consumer Protection Bureau, Office of the NBTC



Chart 8: Percentage of complaints resolved in each issue in 2020 compared to 2019



When categorizing complaints into group of problems, it can be classified into 4 groups. The problem group that received the most complaints is complaints on service charges for 665 cases, accounting for 38.11 percent, followed by complaints

on service contract for 644 cases, accounting for 36.91 percent, complaints on service provision for 278 cases, accounting for 15.93 percent, and other complaints for 158 cases, accounting for 9.05 percent, respectively. Details are as shown in Table 25.

Table 25: Complaints resolved classified by group of problems in 2020

No.	Group of problems	Total complaints	
		Number of case	Percent
1	Complaints on service charges	665	38.11
2	Complaints on service contract	644	36.91
3	Complaints on service provision	278	15.93
4	Other complaints	158	9.05
Total		1,745	100.00

Source: Telecommunications Consumer Protection Bureau, Office of the NBTC

Management of the Broadcasting and Telecommunications Research and Development Fund for the Public Interest

In 2020, the achievement of the Broadcasting and Telecommunications Research and Development Fund for Public Interest (BTFP) under the management of the Fund Management Committee is as follows:

1. Major performance

1.1 Driving Strategic Plan. Having prepared the 4-Year Action Plan of the Broadcasting and Telecommunications Research and Development Fund for Public Interest (BTFP) B.E.2563 - 2566 (2020 - 2023) which is linked and in line with the direction of the national development under the National Strategy, National Plan, Master Plan under the National Strategy, National Economic and Social Development Plan No.12, Digital Economy and Society Development Plan, and the NBTC Master Plans consisting of Spectrum Management Master Plan, Telecommunications Master Plan, Broadcasting Master Plan, and the Universal Basic Telecommunications and Social Service Plan which has been approved by the Fund Management Committee to be enforced and published on the BTFP website in May 2020. In addition, the 4-year Action Plan of the Research and Development Fund B.E.2563 - 2566 (2020 - 2023) has been implemented by preparing the BTFP Operation Plan in 2020 to support the implementation as well.

1.2 The Fund Allocation. Having allocated fund according to the Fund's objectives for the public interest and people and to promote and support the fund under the framework as follows:

(1) The Type 1 Grant Project originating from the eligible person who requested be promoted and supported by the fund according to the Fund's objectives according to Section 52 (1) (2) and (3) of the Act on the Organization B.E.2553 (2010) and its amendment, for 41 projects at a total amount of 256.49 million baht.

(2) The Type 2 Grant Project focusing on the achievement-based according to the policies of the Fund Management Committee by determining the term of reference of projects, for 34 projects at a total amount of 613.05 million baht, including supporting the fund in case of making an agreement with government agencies at the amount of 298.75 million baht.

(3) The Type 3 Grant Projects or operations announced by the NBTC to achieve the objectives of the Fund, for 7 projects at a total amount of 4,567.01 million baht such as the project for supporting satellite signal transmission (Must Carry) in 2020 at the amount of 173.40 million baht, the project to support the audio description (AD) and the closed caption (CC) devices at the amount of 110.02 million baht, the project to support healthcare facilities and field hospitals in fighting against the COVID-19 situation at the amount of 642.55 million baht, project to support the broadcast of the Olympic Games at the amount of 280.02 million baht, the project on emergency numbers at the amount of 122.11 million baht, the project on reimbursement of the spectrum refarming at the amount of 3,235.84 million baht, and the project to support community radio at the amount of 3.08 million baht.

(4) The Type 4 Grant Supporting the operation according to the law on Thai Media Fund at the amount of 500.00 million baht.

1.3 Monetary management of the Fund

The revenue of the Fund was totally 14,322.95 million baht, which mostly received from the contribution of the broadcasting, television, and telecommunication business licensees and the spectrum auction money from spectrum refarming delivered by the Office of the NBTC at the amount of



12,653.63 million baht, interest from the fund and others at the amount of 1,669.32 million baht; however, the fund's expenditure was totally 9,076.10 million baht, which was the spending on the projects according to the Fund's objectives at the amount of 6,216.54 million baht and the other 2,859.56 million baht was lent by the Office of the NBTC for compensation paid to the digital TV licensees having requested for returning licenses prior to the specified period and others. The Fund has deposited money in national commercial banks and specialized financial institutions according to the Regulation of the Fund Management Committee regarding the collection, Expenditure, Accounting and Accounting System B.E.2555 (2012) and its amendment with an average rate of return of 0.80 percent.

1.4 Follow-up and evaluation

Having established guidelines for the follow-up and evaluation of the Fund as follows:

(1) Appointing the Sub-committee to follow-up and evaluate the Projects of Broadcasting and Telecommunications Research and Development Fund for Public Interest to follow-up and evaluate the results of the expenditures to be in accordance with the objectives of the BTFP including inviting the grantees to report the progress of the projects to the Sub-committee's meetings.

(2) Requiring the fund grantees to submit the project progress report and the expenditure report according to the period specified in the fund grant contract agreement.

(3) Appointing the committee to examine and accept the research results consisting of experts in related fields to consider results of the project implementation according to the fund grant contract agreement to be effective and achieve the project objectives as well as considering the approval of the projects' outcome delivered by grantees.

1.5 Promoting images of the BTFP

Having published and disseminated information on policies, role and duties, mission, and performance including the fund grant to support important projects and the Fund's operation through various communication channels such as television,

newspaper, online media which is a modern communications channels that enable the dissemination of information to the public in large numbers and in short time that is suitable for the open up for information of people nowadays. The public relations has been done in the form of advertorials, special interviews, press releases, news photos production, publishing on Facebook of the BTFP, as well as requesting for assistance from relevant public agencies to publicize the project to promote the production and broadcasting of program content that is beneficial to the public which have been granted by the BTFP in the year 2020.

(1) Having conducted projects to publicize information and promote images of the BTFP in the year 2020 including requesting for assistance from relevant public agencies to publicize two fund granted projects to promote the useful program content production and broadcasting to the public which have been granted by the BTFP in the year 2020 including

- 1) Project to promote the production and broadcasting of program content that is beneficial to the public
- 2) Project to promote the production and broadcasting of digital television programs for children, youth, and families.

(2) Having taken the field operation to monitor two projects funded by the BTFP for the year 2020, together with the mass media, during 5 - 7 November 2020, comprising

- 1) Project on a wireless network to identify intelligent coordinates for monitoring and surveillance natural disasters and SAR (Search and Rescue) by the Radio Amateur Society of Thailand under the Royal Patronage of His Majesty the King in Krabi
- 2) Project to expand the results of monitoring systems and equipment to assist the elderly or patients in physical therapy through communication networks for the public interest by Prince of Songkla University at Trang Hospital.

Both projects are interested by mass media and published in press releases via various media including printed media, television media, and online media. The innovation of these two projects can also be developed for further commercial use.

In addition, the BTFP had organized volunteer activities to help society in cooperation with the Fund grantees in providing sports equipment, things and appliances, and scholarships for various agencies, namely Ban Huai Kru School, Sriracha District, Chonburi province, Karunyawet Home for Persons with Disabilities Protection and Development, Chonburi province, and Chonburi School for the Deaf, Chonburi province.

2. Efficiency and effectiveness evaluation

In 2020, the efficiency and effectiveness of the BTFP's operation are as follows

2.1 Efficiency

(1) The Fund allocation to support the implementation of projects under Section 52 is efficient by achieving the specified target number of projects and being able to save costs which the BTFP had announced to promote and support

the type 1 grant in the year 2020 under the allocation budget framework of 300 million baht. There are 136 applicants for promotion and support, with a total budget request of 1,661.077 million baht which the Fund Management Committee had selected the organizations deserved to be promoted and supported including having reduced the budget to be appropriate with the amount of work by taking into account the maximum benefit of the budget expenditure, and proposed the consideration results to the NBTC for consideration and approval. In 2020, there were 41 projects of those who deserved to be promoted and supported at the allocation budget of 256.491 million baht, and the Fund Management Committee could consider reducing the budget and save for 165.284 million baht, or accounting for 40 percent. Details are as shown in Table 26.

Table 26 : Projects which have been approved by the NBTC

Unit: Million baht

No.	Project title	Budget requested for allocation	Budget approved	Project goals
1	Project on children and youth remote visitation via online system, Department of Juvenile Observation and Protection	5.133	4.441	Setting up and installing the children and youth remote visitation system in 20 places.
2	Project to develop the Artificial Intelligence potential through information networks for Thai industry	9.751	8.087	Training courses on AI and developing AI model for Thai industry for 180 students.
3	Project on Digital Marketing Training and Promotion for local communities in Lampang and nearby provinces	1.677	1.670	Training course on digital marketing for local communities for 40 students and local entrepreneurs.
4	Project to enhance knowledge of mass media in broadcasting and television services	6.828	6.335	Training course on Mass Communication Strategies in Broadcasting and Television Services for 100 high-level executives.
5	Young Content Creator Project	6.973	4.612	Training course on public program producers under the professional ethics of producing work, contesting, and publishing for 80 students.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
6	Training project to develop the potential of radiocommunications officers to establish a network of volunteer radiocommunications officers in case of disasters or emergencies	1.688	1.423	Training course to develop the potential of volunteer radiocommunications officers in case of disasters or emergencies for 200 amateur radio operators.
7	Project on the contest of New Perspective Mini Series, Devoted to Public Interest	8.832	6.271	Training course on mini series content production for the public interest for 120 students.
8	Project to develop local and regional program producers to produce documentary programs for local communication and development	8.066	5.588	Training course on local media production, organizing contest for 300 students and personnel.
9	Project on Young Mee Dee, Young Media	3.633	2.991	Training course on radio and television media production according to professional and ethical standards and organizing contest with 60 media publications for the youth for 300 participants.
10	Project to promote and raise awareness of innovation in the cultivation and production of alternative medicinal cannabis crops of the medicinal plant agriculture profession using information technology in the 5G era	12.749	6.482	Training course on e-Farming of alternative medicinal plants with 5G technology, sharing the public knowledge through online media to 360 farmers and community enterprise.
11	Project on Digital Marketing Technology Strategy Training Program to Support Thailand 4.0	1.999	1.944	Training course on digital marketing of local products for 100 students and local entrepreneurs (Upper South region).
12	Project on Development process of media innovation (Production based) to enhance preparedness skills of youths for digital communication careers (Media Lab)	3.895	1.576	Training course on media production, script writing, filming, editing for 60 students.
13	Project to develop the youth to become telecommunications and information technology innovators in the Upper Northern provincial cluster area	7.135	2.294	Training courses on the control programs programming for 320 students and youth.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
14	Project to enhance knowledge for adaptation in the digital era of broadcasting and television service	6.548	4.354	In-depth training course on OTT for 60 executives and operation officers.
15	Project on training and promoting identity building for people with disabilities to become content creators publishing via online media (Influencer)	1.870	1.520	Training course on creative influencer published on online channels for 60 people with disabilities.
16	Project on training and promoting Blockchain technology for business use	3.485	3.485	Training course on Blockchain tech start up and organizing a contest of 20 workpieces for 120 students.
17	Project on Thyroid Cancer Screening by using ultrasound image	8.651	7.252	<ul style="list-style-type: none"> • Supporting medical and public health services and also increasing opportunity to access to services of radiologists who are not based at primary care centers (Siriraj Hospital) where radiologists in rural hospitals or community doctors can access the service via mobile phone (mobile application) and/or computer (web browser). • Reducing reliance on foreign-developed software that may raise concerns about the security of analytical data, security, and may be at risk of personal information leaking of patients.
18	Project on Mobile Laboratory for Frequency Interference Monitoring for the development and testing of innovations in specific regulatory areas (Regulatory Sandbox)	10.699	10.501	<ul style="list-style-type: none"> • Having standard procedures and method for field operation of frequency interference monitoring which is in accordance with regulatory guidelines for the development and testing of innovations in specific regulatory areas preparing in a standard document. • Having mobile laboratory available for field operation of frequency interference monitoring for the development and testing of innovations in specific regulatory areas (Regulatory Sandbox). • Having mobile laboratory with international standard quality system ISO 17025 for field operation of frequency interference monitoring for the development and testing of innovations in specific regulatory areas and/or other areas.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
				<ul style="list-style-type: none"> Having test reports and analysis of the results of the field operation of frequency interference measurements in the specific regulatory areas at least 3 areas, 4 times in a period of 1 year.
19	Project to research and develop game applications to enhance capability of language learning and memory for children with Down syndrome	0.246	0.281	<ul style="list-style-type: none"> Apart from developing technology to enhance capabilities and skills in memory, language, and mathematics in the group of children with Down syndrome, the developed game applications can be used to help in teaching for teachers in special schools and the information obtained from the game applications can be used as guidelines in the planning to promote the development of language, memory, and mathematical thinking processes in this group of children.
20	Project to develop 5G standard signal channel encoding device for teaching materials and commercial extension	1.280	1.124	<ul style="list-style-type: none"> Universities that provide teaching and learning in telecommunications engineering receive the channel encoding devices and software which is modern and in accordance with 3GPP release 15 or 5G new radio standards. Teaching equipment entrepreneurs have seen guidelines for the development of teaching equipment that corresponds to the needs of universities. Telecommunications equipment entrepreneurs acquire the prototype of channel encoding devices leading to the development of new structures for use in IP or intellectual property registration.
21	Project for monitoring of internet quality & television signal quality research	8.993	6.361	<ul style="list-style-type: none"> Having a study result which consists of technical results of the internet service signal quality and the television signal quality by monitoring the signal quality from the consumer's viewing point. Having suggestions to improve internet signal quality and broadcast signals in the television service. Having a number of internet service points and television viewing points that are monitored at least 400 points.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
				<ul style="list-style-type: none"> • 80 percent of service recipients are more satisfied with the broadcast signal through the internet service and the signal quality of television service.
22	Project on the development of satellite positioning device using GNSS with Centimeter-Level Accuracy for industry	2.400	2.075	<ul style="list-style-type: none"> • Having the satellite positioning device using GNSS with RTK technique in industrial level that can be developed by Thailand which help reduce dependency on foreign-imported equipment.
23	Project on the prototype of Smart Coffee Plantation with IoT Technology, Sensors, and Artificial Intelligence to upgrade the Thai coffee industry	3.221	2.675	<ul style="list-style-type: none"> • Having IoT technology, Sensors, and digital for precise coffee cultivation that can be used to reduce costs in coffee plantations and increase quality and amount of productivity per rai. The technology adoption in pilot areas will lead to cost reduction in using resources such as water and chemicals at the level of 20 - 80 percent, with an increase in productivity by 20 - 50 percent. • Having a demonstration area for precise coffee cultivation to be as a prototype learning center for farmers to grow high quality coffee in order to expand to other coffee growing areas in Northern Thailand. • Promoting Startups that operate business in area of technology development and Smart Farm systems, sensors, automation systems for agriculture and food sector. • The birth of 50 to 100 new generation farmers in the areas of coffee planting and coffee processing in 2 trial areas (Doi Luang and Doi Saket). This project will help attract new generation workers and young people to be more interested in farming. There will be more high-quality labor in the agricultural sector, and raising the level of agriculture to be more advanced. • Adopting both pre-harvest and post-harvest technologies to coffee will enable the improvement of coffee image, research on taste, and creating a gimmick in the product, resulting in the ability to upgrade the Northern Thai Arabica coffee to the premium level, which will increase the value by 100 - 300 percent.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
24	Project to develop platform for learning, standardization, and upgrading to Industry 4.0	17.000	6.685	<ul style="list-style-type: none"> • The project will help resolve problems of accessing to information and knowledge by enhancing access to industrial experts in the implementation under the Industry 4.0 framework. • The project platform will help connect entrepreneurs with industrial experts and technology providers to create an operational ecosystem and success cases. The platform will be driven to support standards and industry insights and the population under the Industry 4.0 framework.
25	Project to design and build a SAR radar system in the S-band frequency for the detection of Foreign Object Debris in the airside area	5.908	4.843	<ul style="list-style-type: none"> • The prototype SAR radar system in the S-band frequency can be used to detect Foreign Object Debris in the airside area. It will be able to detect Foreign Object Debris as small as 10 centimeters or more and be installed and used in the airports across the country upon completion of the project.
26	i-Care Project : Virtual Mental Health Provider with Artificial Intelligence System in Remote Service	17.189	11.998	<ul style="list-style-type: none"> • Providing Mental Health Services by creating a tool for taking care of people with depression through the use of artificial intelligence technology. There is also a data security system which make people with mental health problems especially depression be able to access to services promptly, reducing limitation on resources whether human resources, time, or the economy which will be the prevention of the loss may occur from experiencing mental health problems. • In research and education : by using advanced technology, which are the theory of emotions, verbal and non-verbal communication, concepts and theories of psychotherapy and counseling, normal psychology theory, which is the application of knowledge in both disciplines by using advanced technology that has never been seen before in Thailand. This is a leap forward in development of research and innovation in mental health.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
27	Project on portable museum guide information management system for use in exhibition spaces with limited internet connection	6.038	4.539	<ul style="list-style-type: none"> • To use information technology as a tool for systematic knowledge management and increase the interest in service provision for museums which are important learning centers of the country and is a space to present knowledge in various fields transmitted from the past to the present. • Promoting a conducive environment for self-study through a mobile application called MuseumPool, and be able to access the exhibit information more conveniently. • A portable museum guide information management system will be a tool to help reduce information access restrictions on museum exhibits in areas with unstable Wi-Fi or no Wi-Fi coverage.
28	Project on platform system for multi-camera people tracking	10.253	7.793	<ul style="list-style-type: none"> • Having a prototype tool that can help the operation of polices, security officers, to automatically find the person according to the desired personality, reduce time in searching the desired information from the recorded video, improve the efficiency of police officers' operation, reduce the import of software from abroad, and acquire a tool to help calculate physical data.
29	Project to develop the provision of data privacy protection service for IoT System	5.365	3.652	<ul style="list-style-type: none"> • Being able to solve problems on production data, device measurement data, damage detection data of production equipment inside the factory leaked to outsiders, or cloud service providers can take data within the industry to process in cloud in which the processed data is not disclosed to the cloud service providers, ensuring the industrial sector confidence in the use of IoT cloud platform services that can protect data privacy.
30	Project on Development of Artificial Intelligence for body pressure measurement sheet to prevent pressure ulcers	50.000	11.951	<ul style="list-style-type: none"> • Being able to use as a device to prevent pressure ulcers in the elderly, bedridden patients, spinal injury patients, and patients at risk of pressure ulcers. • Stimulating research and development of measuring device using domestic technology and materials.





No.	Project title	Budget requested for allocation	Budget approved	Project goals
31	Project on Agricultural Management System for Community Enterprises	9.288	5.541	<ul style="list-style-type: none"> The agricultural management system will help solve major problems of Thai farmers in terms of the lack of knowledge and information that will not be able to produce agricultural products effectively, reducing market constraints by using digital technology suitable for rapidly changing conditions such as climate, consumer behavior, by focusing on community enterprises or social enterprise, by strengthening the economic foundation along with consideration of environment, safety and sustainability as well as food security in accordance with important government policies.
32	Project of Research and development on 5G intelligent medical information innovation system	23.968	14.276	<ul style="list-style-type: none"> Medical personnel, physicians and nurses have enough health information to make a diagnosis that can be significantly tracked and traced as well as providing information on health knowledge packages to the public easily, conveniently, and quickly. People are more facilitated and also be provided with personal health information that will be useful for emergency treatment and be provided with a good and appropriate health care model and approach for themselves and families. Medical research and development networks are able to study and propose appropriate health care models to groups of people and create a public care model through a medical information platform.
33	Project on Artificial intelligence program development in radiographic diagnosis	49.349	35.895	<ul style="list-style-type: none"> Enhanced reporting services from chest X-ray examination and head computed tomography. Hospitals under the Ministry of Health or public sectors that are shortage of radiologists can know the results of radiology examination accurately and quickly in the treatment of patients. service receivers or patients will have a better quality of life from accurate and effective treatment whether a chest X-ray examination or head computed tomography .



No.	Project title	Budget requested for allocation	Budget approved	Project goals
34	Project on railway crossing alert system with sound waves and vibration techniques	2.867	2.208	<ul style="list-style-type: none"> • The general public will be notified of the arrival of the train which makes the use of the route more cautious and help reduce potential accidents. • Railway service department has a notification system for the general public which is easy to install and not complicated.
35	Project on developing wireless measurement and control technology for modern agriculture to enhance knowledge and develop smart farmers	9.365	6.430	<ul style="list-style-type: none"> • Having a prototype wireless crop demand measurement technology used for accurate agricultural management and obtain appropriate crop management information. • Extending business productivity. • Farmers can reduce costs on labor and factors of production. • Farmers can reduce the likelihood of damage in the crop production process and increase productivity or the better quality of products • Replacing the import of technology from abroad. • Developing the potential of farmers to be able to use the IoT system effectively.
36	Project on the Research to develop a model to promote the new generation farmers to become digital farmers by using Essential Fundamental Digital Farming Tools and Collaborative Blended Learning Approach : the case of the agricultural production sector	8.724	8.112	<ul style="list-style-type: none"> • Farmers in the project who have knowledge and skills to apply digital technology to develop a system for cultivating plants, vegetables, and fruits on their farms to increase productivity in terms of quantity or quality and reduce production costs and be a model farmer for other farmers • Enhancing knowledge and training courses related to Smart Farm for new-generation smallholder farmers who are interested in self-improvement. It is a course that integrates the knowledge of relevant digital technology such as 4G/5G Communications Technology, Sensor Technology, Internet of Things (IoT), Artificial Intelligent and Machine Learning, Statistical Analysis, and basic knowledge of Big Data, so that the new generation farmers can study and develop themselves and use them as tools to develop their own agricultural farms. • Having essential fundamental digital farming tools that are used for training, developing and applying in agricultural farms and as a commercial model.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
37	Project on Open Hardware and Open Guideline research and development for sustainable agricultural development	6.838	4.579	<ul style="list-style-type: none"> Laying the foundation to prepare for the sustainable use of agricultural IoT equipment for farmers by preparing an Open Guideline and Open Hardware guidebook for the use of IoT devices to be able to learn and understand the use of agricultural IoT equipment, know the proper method to use the equipment and its limitations. Farmers will be able to drive the mechanism by themselves, reduce dependency on government support, as well as make it as a device that will be published for the public benefit and be an example of how to properly build agricultural IoT equipment through standardized testing in order to be a blueprint for farmers to utilize and produce equipment that has passed standard testing at a low cost.
38	Project on IoT Platform development for Forest Fire and Air Pollution Surveillance with LoRa technology	6.871	5.706	<ul style="list-style-type: none"> Having a wireless sensor network based on LoRaWAN technology. Having a disaster surveillance network system from the problem of smog and forest fires with Internet of Things technology. The public spectrum in the telecommunications service can be utilized to its fullest potential, thereby enabling spectrum resources to be utilized with maximum efficiency. Having mathematical models that can predict the moving behavior of smog.
39	Project to develop Cloud & Edge Computing Technology Development Project for Thai Industry towards Digital Era	49.201	16.618	<ul style="list-style-type: none"> The project will help solve industrial problems related to IoT and AI technologies with domestic Edge Computing technology to optimize the use of IoT and AI, resulting in faster processing speeds, reduced data transfer bottlenecks, reduced latency, and reduced centralization (decentralize) of the information to be as close to the user as possible. It also upgrades the industry 4.0 for the access to experts and the consult provide to entrepreneurs in order to utilize the Edge Computing for maximum benefits in the industry. Edge Cloud Computing enables organizations to provide IoT services with AI solutions to analyze results quickly.



No.	Project title	Budget requested for allocation	Budget approved	Project goals
40	Project to monitor brain development in learning with research-based project through Biofeedback EEG equipment and Video analytic tools	4.393	3.686	<ul style="list-style-type: none"> • Students in the target schools who completed the contemplative activity in the research-based project were assessed for their learning readiness and screened for risk assessments for self-control in early state and can prevent and enhance the development of students to be ready for learning. • Having prototypes of video analytic devices that have been tested and can be applied to surveil, monitor, assess the learning development to help students.
41	Project on Health Promotion System Development for Monks by Interdisciplinary Team and Sustainable Public Participation : Bangkok Noi Model	13.406	8.637	<ul style="list-style-type: none"> • Monks who participated in the project had the opportunity to access health services, get screened for NCDs and follow up on health information and trends. • Groups of monks who participated in the project knew their own health information. • Group of monks who participated in the project received appropriate health promotion guidelines. • Having a health care model of monks according to the principles of Dhamma Vinaya appropriately. • The study results were able to develop an innovation model system for health services and health data follow-up of monks in Bangkok Noi district. • Community and society have roles and knowledge in promoting the health of monks according to the Dhamma principles appropriately.
Total		421.775	256.491	

Remarks: Data as of 31 December 2020

Source: Research and Development Fund Bureau, Office of the NBTC

(2) Financial management

The Fund has estimated cash flows according to the Fund's monetary receipt plan and expenditure plan with obligations as necessary in the saving accounts, while the remaining funds are invested in fixed deposits of commercial banks and local financial institutions according to the investment consideration criteria prescribed by the Fund Management Committee based on credit risk and liquidity risk to assess the operating results of various banks as the criterion for selecting the bank for each investment in order to get the best return and low risk. In 2020, the Fund received an average rate of return of 0.80 percent. For the disbursement in the year 2020, the Fund had a disbursement plan of 10,727.73 million baht but the disbursement could be done at the amount of 6,271.20 million baht or accounting for

58.46 percent, lower than targeted, as the disbursement of the project on the provision of broadband internet service and mobile phone signal in border areas (Zone C+) and the project on the provision of broadband internet service and mobile phone signal in remote areas (Zone C), which are high-value projects, did not comply with the plan due to the difficulty and obstacles of the services installation, especially the problems on the access to the forest areas or restricted areas for service installation which require the approval from government agencies according to relevant laws and regulations as specified by laws before operating. It is currently in the process of discussion between the Office of the NBTC, relevant public agencies, and contract parties to seek approaches to solve the problems. Details are as shown in Table 27.



Table 27: The disbursement of the Fund compared to targets

Unit: Million baht

Type	Project title	Target	Actual disbursement	Percent
1	Project originating from the eligible person who requested be promoted and supported by the Fund according to the Fund's objectives and Section 52 (1) (2) (3) and (4) of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment	351.89	158.81	45.13
2	Projects announced by the Fund Management Committee to achieve the Fund's objectives under Section 52 (1) (2) (3) and (4) of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment and to promote and support the implementation to be in line with the government policies, Spectrum Management Master Plan, Telecommunications Master Plan, Broadcasting Master Plan, and the Universal Basic Telecommunications and Social Service Plan	593.44	227.68	38.37
3	Projects or operation according to the policies set by the NBTC	9,223.82	5,326.13	57.74
	3.1 USO projects such as USO Net in border areas, USO in remote areas	7,223.07	3,681.07	50.96
	3.2 Other projects	2,000.75	1,645.06	82.22
4	Project to support the Thai Media Fund	558.58	558.58	100.00
Total		10,727.73	6,271.20	58.46

Remarks: Due to the NBTC resolution to support money to the Type 3 Grant projects during the year 2020, therefore a project plan or implementation of the policy set by the NBTC was added in the amount of 1,137.545 million baht.

2.2 Effectiveness

(1) For the Fund's performance in 2020, the revenue of the Fund was 13,839.45 million baht, decreasing from the previous year for 1,562.26 million baht, and the expenses was 8,324.17 million baht, increasing from the previous year for 5,311.46 million baht. For the financial status of the Fund in 2020, the assets of the Fund was 78,717.54 million baht, increasing from the previous year for 11,552.44 million baht, and total liabilities was 67,438.28 million baht,

increasing from the previous year for 6,163.78 million baht. The fund is stable with a current ratio of 9.62 times, decreasing from the previous year 24.40 times and better than the accounting standard criteria that should not be lower than 1.5 times, and the debt ratio was 0.86 times, decreasing from the previous year 0.05 times and better than accounting standard criteria which should not exceed 1.5 times. Details are as shown in Table 28.

Table 28: Financial statement of the Fund comparison between 2020 and 2019

Unit: Million baht

	2020 (Not yet approved)	2019 (approved by SAO)	Increase (Decrease)	Percent
Performance				
Revenue	13,839.45	15,401.71	(1,562.26)	(10.14)
Revenue from contribution to the Fund	13,243.51	14,490.96	(1,247.45)	(8.61)
Revenue from deposit interest	532.32	884.34	(352.02)	(39.81)
Other revenues	63.62	26.41	37.21	140.89
Expenses	8,324.17	3,012.71	5,311.46	176.30
Expense for financial support	7,374.90	3,012.58	4,362.32	144.80
Depreciation and amortization	949.27	0.13	949.14	730,107.69
Revenue above (below) expense	5,515.28	12,389.00	(6,873.72)	(55.48)
Financial status				
Asset	78,717.54	67,165.10	11,552.44	17.20
Cash and cash equivalents	12,106.17	10,370.89	1,735.28	16.73
Short-term investment	42,770.18	39,258.62	3,511.56	8.94
Other current assets	14,396.44	14,475.68	(79.24)	(0.55)
Non-current assets	9,444.75	3,059.91	6,384.84	208.66
Liability	67,438.28	61,274.50	6,163.78	10.06
Current liability	7,201.75	1,884.05	5,317.70	282.25
Non-current liability	60,236.53	59,390.45	846.08	1.42
Net assets	11,279.26	5,890.60	5,388.66	91.48
Cash flow				
Cash receipts	14,322.95	10,371.48	3,951.47	38.10
Cash received from contribution to the Fund	12,653.63	8,988.83	3,664.80	40.77
Cash receipt from deposit interest	769.70	596.30	173.40	29.08
Other cash receipt	899.62	786.35	113.27	14.40
Cash disbursement	9,076.10	9,890.94	(814.84)	(8.24)
Payment for financial support	6,216.54	5,535.06	681.48	12.31
Other cash payment	2,859.56	4,355.88	(1,496.32)	(34.35)
Cash received over (less) payment	5,246.85	480.54	4,766.31	991.87
Financial ratio				
Current Ratio (times)	9.62	34.02	(24.40)	(71.72)
Debt Ratio (times)	0.86	0.91	(0.05)	(5.49)

Remarks: Data as of 31 December 2020

Source: Research and Development Fund Bureau, Office of the NBTC



(2) Projects completed in 2020 can achieve the projects objectives, and each completed project has been utilized in various fields. Details are shown in Table 29.

Table 29: Projects having been completed and utilized in various fields

(2.1) Academic utilization

Projects	Products from projects implementation	Result and impact received from projects implementation
<p>Project to study and develop personnel for improving performance and developing cybersecurity surveillance tools for small organizations at the community level.</p>	<ul style="list-style-type: none"> • Personnel in small organizations or organizations at local/community level including the general public who are involved with the organization to have awareness, knowledge, and basic understanding of cyber security. • Having a study and collection of problems, analysis of cybersecurity risk and implications for small organizations or organizations at local/community level. • Having policy recommendations and models for small organizations or organizations at local/community level to push on a systematic, integrated protection against cyber threats. 	<ul style="list-style-type: none"> • Having a clear concrete practical guideline for creating cybersecurity for personnel and relevant people in local administrative organizations appropriately and with maximum efficiency. • Local people are aware of the threats that emerging from the information network system and methods to monitor cybersecurity including ways to response to problems expected to happen with cybersecurity in the future. • Being able to extend the result for future research on setting standards for defining cybersecurity performance to be used as a measure for a standardize use and monitor.
<p>Project to raise awareness of people about cyber threats and crimes.</p>	<ul style="list-style-type: none"> • Increasing channels and methods for educating and raising public awareness of the risks from usage of cyberworld, threats, and cybercrimes. • Developing digital media that can be communicated to the general public in an easy-to-understand standardized practice to prevent threats. • Creating a virtual learning center for the general public to raise awareness of the risks on usage of Cyberworld. 	<ul style="list-style-type: none"> • The general public and society are aware and knowledgeable about prevention methods and ways to handle the dangers arising upon the use of computer and communications systems. • Having a practical guideline on cybersecurity for public agencies, private sector, operators, and educational institutions. • Reducing cyber threats which lead to the protection of economic benefits, social security, and the sustainable stability of Thailand both in the present and in the future.
<p>Project to survey the behavior on the use of 3G mobile phone service of Thai population and assessment of the 3G impact on Thai economy.</p>	<ul style="list-style-type: none"> • Assessment result of changes in consumer behavior due to 3G/4G service. • Study results of the economic impact analysis arising from the adoption of 3G, both the impact on the overall economy of the country and the impact on economy by sector. 	<ul style="list-style-type: none"> • Applying the study results to the formulation of policies to promote the utilization of 3G/4G availability in accordance with the changing consumer behaviors and resulting in maximum benefit to society as a whole. • Applying the study results for use and bringing to the consideration in terms of the technology development and utilization from the next-level technology (Next Generation Wireless System).



Projects	Products from projects implementation	Result and impact received from projects implementation
<p>A study project to suggest the use of spectrum for the development of intelligent power systems or the Smart Grid system of Thailand.</p>	<ul style="list-style-type: none"> • The results of the study and analysis of spectrum utilization for smart grid networks in foreign countries. • The study results and comparison of the technical advantages and disadvantages of spectrum utilization in different band of frequencies for the smart grid network system. • The study results on the use of frequency bands to be in accordance with the using demand of applications in the smart grid network system. • Dissemination of knowledge to related people of not less than 80 persons at least once. 	<ul style="list-style-type: none"> • Recommendations on the use of spectrum which is appropriate for Thailand's Smart Grid network.

(2.2) Policy utilization

Projects	Products from projects implementation	Result and impact received from projects implementation
<p>Project to research and develop testing set of broadcasting radio frequency signal quality along the border.</p>	<ul style="list-style-type: none"> • Research and development of a prototype system of testing set of radio frequency signal quality that can be portable and installed along the border area. • Research and development of information system to command the prototype system of testing set of radio frequency signal quality which can be commanded through the internet network. • Research and development of information system for the provision of information on frequency signal quality from frequency monitoring along the border. • Development of frequency signal quality data input from the frequency monitoring along the border towards information creation for people living along the border and telecommunications industry. 	<p>Information obtained from research and development of prototype systems and information systems and signal quality monitoring leads to the creation of information for people living along the border and telecommunication industry and complaints reduction.</p>
<p>Project to study methods for integrating frequency monitoring data.</p>	<ul style="list-style-type: none"> • A study on setting data standards for integrating frequency monitoring data to increase the efficiency of frequency monitoring. • Conducting research and development of frequency monitoring data service system through Web Application and Mobile Application for the telecommunication industry and the public. 	<ul style="list-style-type: none"> • The developed frequency monitoring data integration system can help solve problems for each brand of devices, which is currently used for measuring the same type of data but has different data storage format, to be able to store data in the same format in the same central database. This helps make it convenient to search and analyze problems, shows the overall data of all stations, and make it possible to link the data from different measuring devices. • Project research results have been published in international academic journals and international academic conferences



(2.3) Social development utilization

Projects	Products from projects implementation	Result and impact received from projects implementation
<p>Project to study, research, and develop the provision of closed captioning service at the same time as the broadcast time or near real-time captioning.</p>	<ul style="list-style-type: none"> • Developments of the provision of closed captioning services at the same time as the broadcast time or near real-time captioning which will result in the stimulation of the implementation of closed captioning services formally. • Encouraging people with disabilities, the elderly, and the underprivileged to have an equal access to information through broadcasting services same as the general public. 	<ul style="list-style-type: none"> • People with disabilities are provided with the opportunity to have an equal access or recognize and utilize programs of broadcasting and television services same as the general public. • The development of technology and knowledge body on the provision of closed captioning services at the same time as the broadcast time or near real-time captioning.
<p>Project to develop a prototype of technology that help improve the quality of remote emergency medical services in rural areas through high-speed digital networks.</p>	<ul style="list-style-type: none"> • A systematic prototype for medical consultation has been developed between central medical centers and small rural hospitals through a high-speed digital network by applying technology that is suitable for health need covering consultation, advice, or parallel treatment at the same time in case of emergency and specialize, and different time in case of non-emergency in order to increase the capacity of medical treatment. • Having studied the actual problems of the medical consultation system between central medical centers and small rural hospitals through high-speed digital networks and find concrete solutions. • Technologies have been introduced to support the medical consultation system in order to set up a concrete practical guideline to promote the adoption of digital technology to link knowledge between rural areas and central medical centers for improving medical services and stimulating its practical application in the future. Such technologies include Mobile Telemedicine system, Cloud-based Electronic Medical Record system, Cloud-based Medical Knowledge Asset system, Digital emergency medical consultation system, and consultation system using augmented reality technology. • Propose a model for developing the Medical Knowledge Asset that is linked to the Medical Emergency Consultation system, which is useful to the development and enhancement of medical personnel and nurses to have knowledge and skills in applying digital technology to the patient treatment efficiently. 	<ul style="list-style-type: none"> • Patients and local people in the areas have a direct benefit from the access to quality, convenient, and fast services. • Personnel, including doctors, nurses, new graduates in multidisciplinary in rural areas, gain more knowledge and skills both in the profession and the use of digital networks (Teleconference, Telemedicine) and also stimulating more quality research and development of knowledge body in the field of Telemedicine in the future. • Having a digital emergency medical consultation system that is workable either in emergency and non-emergency cases between central medical centers and small rural hospitals through a concrete high-speed digital network which is in accordance with the actual work that can be extended to hospitals across the country. • Learning in the form of Media Learning or E-medical teaching and learning to integrate knowledge body between rural and central areas with digital technology as the learning base.



Projects	Products from projects implementation	Result and impact received from projects implementation
	<ul style="list-style-type: none"> Applying the results of research studies to promote work in health services, the study and research according to the Memorandum of Understanding (MOU) between Naresuan University and Health Area 2 and Health Area 3 covering 10 provinces. 	
<p>Project to develop capacity and strengthen consumer networks in telecommunications service in the Northeastern region</p>	<ul style="list-style-type: none"> Having facilitator leaders at the provincial level who passed the ORID Method training course at least 3 people per province, totally 48 people who are able to extend their knowledge to others at the local level. Consumers, both at the community and educational institutions levels participating in the project and the club's leaders have knowledge and understanding, and have basic knowledge about consumer rights and consumer duties in telecommunications service. Producing three sets of Klonlam music video media to campaign in telecommunications service. Consumers and leaders are able to receive complaints when problems are found and can resolve the problems for at least 100 cases. Establishment of cooperation with regulators (Office of the NBTC Region/ NBTC Sub-region office) in driving knowledge and development of telecommunications management system. Having leaders of consumer network at the provincial level and the area level. 	<ul style="list-style-type: none"> Increase of consumer protection of telecommunications service in the targeted areas through three main operation: providing information and knowledge to consumers, complaints receipt and handling, and synthesis and presentation of issues at the policy level. Increasing the participation of civil society in the consumer protection mission in telecommunications service and the development of consumer strength in depth at the local level. Stimulating the improvement of the overall telecommunications service system from the consumers' point of view.
<p>Project on volunteer ICT learning center to share knowledge to rural remote schools via broadband internet network.</p>	<ul style="list-style-type: none"> Providing telecommunications services, information technology and education for children and youth in rural remote areas. Developing a volunteer ICT learning center with a focus on promoting and supporting children and youth to build a knowledge body, wisdom, innovation, and creativity in computers and information technology for dissemination and transfer to rural remote schools and use it as a center for learning and producing modern innovative learning media. 	<ul style="list-style-type: none"> Upgrading the quality of education, building knowledge body, wisdom, innovation, and creativity in computers and information technology in rural remote schools and promote equal access to educational services. Children and youth can utilize their free time from the use of information technology as well as instilling a volunteer spirit and public spirit to help children and youth in rural remote areas.



Projects	Products from projects implementation	Result and impact received from projects implementation
Project on Tai Thun Lom Choi TV program	Production of quality television program for Thai children containing good content and suitable for all ages. It is an infotainment program for children aged 3 - 8 that presents a way of life, Thai culture, life and nature which help promote morality, ethics, good deeds, family relationship, Thainess, Thai way of life which will be seen through stories, poems, songs, dramas, story-telling and presentations through the characters of the four-friend puppets.	<ul style="list-style-type: none"> • Children are able to learn about life, Thai culture, Thainess, and understand the beautiful Thai way of life which has committed and connected to nature and other lives, absorb and build morality and good way of life in their own way. • Cultivating awareness of children in the learning age of the value of things in nature that are deeply rooted to make them love and protect the environment, and to encourage children to love their families and perform duties appropriately to the nation and the world as well as develop themselves to be good persons either for themselves or others from their own hearts.
Project on the creation of “Tai Lang Kha Fah Mee Dao” television program for early childhood development	Production of programs with a primary target audience of early childhood in a creative and valuable way for children’s development. The content and knowledge receiving from the program can be used to improve the quality of life and build good relationships of family members.	Promote learning of the target group, who are early childhood children, in 6 areas, namely thinking system, academic, morality and ethics, social life, acceptance of differences, and family relationships
Project to enhance understanding of people with disabilities and the general public about the transition to digital television.	Production of programs to enhance knowledge and understanding of people with disabilities in the transition to digital television service and be able to utilize digital TV as well as to enable people with disabilities to have access to information of the transition and gain knowledge, understanding, and access to information through digital television equally.	Persons with disabilities are able to access information of the transition and gain knowledge, understanding and access to information through digital television services equally.
Project to promote the production and broadcasting of useful program content to the public.	Production of 30 episodes of “Luisiam” television program broadcasting on TNN Channel and online media to promote and support the production of creative, interesting, and quality program content for the public interest. It is a channel for building knowledge body in various fields such as religion, arts, and culture in which content and knowledge receiving from the program can be applied to improve quality of life sustainably.	Viewers can apply knowledge receiving from the program, especially in the areas of history, religion, arts, and culture, to improve their quality of life sustainably.



Projects	Products from projects implementation	Result and impact received from projects implementation
Project on create jobs - create careers program	Producing and broadcasting television programs containing creative contents and being useful to the public in terms of creating jobs - creating careers, for 24 episodes and providing the programs as a channel for connecting and operation coordinating with relevant agencies.	A community model for creating jobs - creating careers and connecting with relevant agencies in 24 communities.
Project for strengthening consumers in Telecommunications service, Udon Thani Province case study.	Udon Thani province has a total of 1,545 network volunteers to develop the strength of consumers in the telecommunication service in every district comprising the volunteers at community leader level of network organizations for 528 people and general consumer volunteers for 1,017 people. Also, there are district coordinators and a coordination network on the Thai Consumer Development Association website (www.tcda.or.th), Facebook (Voice Consumer) and LINE application "Telecommunications Consumer Protection Network Udon Thani".	A network is established to enhance the strength of telecommunications consumers in areas of Udon Thani Province, which will help drive and develop the economy, society, and quality of life of Udon Thani people with information technology, digital technology, and innovations, which are important factors for the success of driving Udon Thani Province to become "Udon Thani 4.0".
Project to support consumer network on strengthening consumers' in telecommunications services in the Central region	<ul style="list-style-type: none"> • Setting up the center for complaint receipt and consumer protection in telecommunications service of citizen sector, to provide more channels for consumers in the Central region to access to more services of receiving and solving complaints. • Developing the potential of the consumer network in the provincial areas of 16 provinces and the provincial network leaders in terms of technical knowledge, the knowingly to the use of telecommunication services, and the rights and duties on consumer protection in telecommunications service and be able to operate according to the goals and plans set by each province. 	<ul style="list-style-type: none"> • Having network organizations for consumer protection actively participate in the operation for protecting consumers in telecommunications service. • Consumers who use telecommunication services have more choices to exercise their rights to file complaints in an informal/ close manner (peer assist) as well as being alert and aware of the rights in telecommunications service. • Having the policy proposals for service development and benefits of telecommunications regulation.
Project on "White TV Awards"	Implementing the project on White TV Awards and considering the TV to be awarded in which participants to the project must be a licensee of digital television business operation whose program content must be produced in the country and broadcasted on a digital television station licensed by the Office of the NBTC in order to promote and support personnel in digital television service and encouraging the production of digital television programs of Thailand.	<ul style="list-style-type: none"> • Digital television operators are motivated to produce quality television programs. • Viewers receive news and useful information from digital television programs.



Projects	Products from projects implementation	Result and impact received from projects implementation
<p>Project to improve the quality of education in rural areas by using digital technology to raise the teaching and learning level and school management.</p>	<ul style="list-style-type: none"> • Research and development of the digital administration systems for the main administrative work of schools which consists of e-Office system, (Correspondence System), e-Money system (Financial and Accounting System), e-Material System (Procurement System), e-Folio System (Resume and Portfolio System), and e-Executive System (Work Tracking System for Executives). • Research and development of Digital Teaching and Learning Support System for the supporting work on teaching and learning which consists of the e-Student system (Personal Record System and Educational Results), e-Learning Management System (Learning Management System and Teaching Media), e-General Support System (General Support System for Teaching and Learning), and the Cloud Storage System (Storage System with Cloud Technology) • The e-School model is developed for the use of the Digital Administration System and the Digital Teaching and Learning Support System and be used as a model for extending the results to interested schools across the country. • Promoting the adoption of digital technology in the administration and reform the teaching and learning model of rural schools to support the 21st century (e-School). • Encouraging research and development of new tools and models for utilizing digital technology system. • Enhancing knowledge and skills of educational personnel in applying digital technology. • Seeking a model for applying digital technology to the problem-based learning (PBL) system and developing to become a Digital Learning Community of Practice. 	<ul style="list-style-type: none"> • Product model of the digital administration system (e-Office system, e-Money system, e-Material system, e-Folio system, e-Executive system): School management system is efficient, fast, saving resources and school budget. • Having new technologies, such as Digital Administration System: a model for other interested schools across the country. • Having new process (applying digital technology in the management of rural schools, applying digital technology to support teaching and learning, and the process of learning exchange in the school group (Community of Practice)): School management system is efficient, fast, saving resources and school budget, and the teaching and learning process has been developed. • Public utilization (training, technology transfer): Educational personnel are developed and have knowledge and skills in applying digital technology for education • Project research results have been published in international academic journals and international academic conferences.



(3) The implementation of the projects funded and spent by the BTFP in the year 2020 had achieved the objectives under Section 55 of the Act on the Organization B.E.2553 (2010) and its amendment and lead to the drive of the development of broadcasting, television, and telecommunications services including being a part of the linchpin for the development of Thailand in many dimensions such as economy, society, human resources development, and security as follows:

- **Economic Development Dimensions:**

The BTFP Fund has allocated funds for research and development in broadcasting, television, and telecommunications services by focusing on creating innovative applications for the adoption of 5G and digital technology to be applied in several areas such as the Project on Research and Development of 5G Intelligent Medical Information Innovative System, Project to Develop Cloud & Edge Computing Technology for Thai Industry towards Digital Era, Project on the Prototype of Smart Coffee Plantation with IoT Technology, Sensors, and Artificial Intelligence to upgrade the Thai coffee industry, Projects to develop 5G standard signal channel encoding device for teaching materials and commercial extension, etc. In addition, the fund had also been granted to other research projects which will directly benefit the economy system and the broadcasting, television, and telecommunications industry. In long term, promotion and support will help reducing dependence on foreign technologies, reducing the cost of importing technology from abroad as well as stimulating investment in the broadcasting, television, telecommunications industries and other related industries.

- **Social development dimension:**

Emphasis is placed on research and development to improve the quality of life of people in the social disadvantaged groups, such as the project on children and youth remote visitation via online system by installing a remote child visitation system in 20 detention centers to provide opportunities for parents and children to meet and talk in order to improve the quality of life and be a mental remedy for children in detention center, etc.

- **Human resource development**

dimension: It will help develop and enhance human resources capabilities in broadcasting, television, telecommunications, and information technology services, such as the Project on Digital Marketing Technology Strategy Training to support Thailand 4.0, Project to develop the Artificial Intelligence potential through information network for Thai industry, Training project to develop the potential of radiocommunications officers to establish a network of volunteer radiocommunications officers in case of disasters, the Young Content Creator Project which is a program producer course, etc.

- **Security dimension:**

Focusing on applying digital technology for the security of life and property, such as the project to develop the provision of data privacy protection services for IoT system, Project on the IoT Platform development for Forest Fire and Air Pollution Surveillance with LoRa technology, the Project on railway crossing alert system with sound waves and vibration techniques, etc.

3. Operating guideline framework in the year 2021

3.1 Goals on policies and strategies driving

In 2021, the Fund Management Committee has set the operational goals to push forward the Fund's policies and strategies as follows:

(1) Driving the 4-Year Action Plan of the Broadcasting and Telecommunications Research and Development Fund for Public Interest B.E.2563 - 2566 (2020 - 2023) and the operation plan of the Fund in the year 2020 to achieve the goals as specified.

(2) Setting up a budget framework and the fund allocation timeframe in 2021, guidelines for procurement of durable articles in projects funded by the Research and Development Fund for grantees who are not government agencies to comply with in order to provide flexibility for the grantees with transparency and accountability which make the use of the Fund worthwhile, including having reviewed and improved the Fund allocation process, such as regulations, announcement, the Fund grant contracts, to be in line with the Fund Management Committee's policy on working proactively.

3.2 Goals of the Fund's monetary allocation

The NBTC has agreed and approved the budget framework and guideline for monetary allocation in the year 2021 as proposed by the Fund Management Committee under the budget framework of 1,600.00 million baht. Details are as shown in Table 30.

Table 30: The Fund's budget framework and guideline for monetary allocation in the year 2021

No.	The Fund's monetary allocation framework in the year 2021	Amount (million baht)
1	Project Type 1 Project or activity originating from the eligible person requested be promoted and supported by the Fund	400.00
2	Project Type 2 Project prescribed and announced by the Fund Management Committee 2.1 Project focusing on the achievement-based according to the policies of the Fund Management Committee (Strategic Grant) - Broadcasting and television service - Telecommunications service - Spectrum management and satellite service - Research and Development 2.2 Continual projects (by having agreement with the granted agencies)	700.00 670.00 200.00 200.00 70.00 200.00 30.00
3	Project Type 3 Projects or operations prescribed and announced by the NBTC to achieve the objectives of the Fund	-
4	Project Type 4 Supporting the operation according to the law on Thai Media Fund according to Section 52 (5) of the Act	500.00
Total		1,600.00

3.3 Goal on follow-up and evaluation of efficiency of the Fund's expenditure

The BTFP has its goals to improve the management system continuously to be more effective and secure than the previous year by managing and maintaining the Fund's monetary to be more growth and secure, the development of rules and regulations related to the operation such as practical guidelines for project management and applying information technology to facilitate the operation of the Research and Development Bureau and the Fund grantees.

It will also enhance the potential of personnel of the Research and Development Bureau to be ready to work in accordance with the BTPF's policies and plans to achieve the goals, both skills and experiences in policy and plan analysis, project analysis and evaluation, finance and accounting, management of research and intellectual property, and foreign languages, as well as promoting the public relations on the BTPF performance, the research granted by the BTPF, and information which will be useful to the society and image of the BTFP to be more widely known.

4

Report on Market Situation and Competition in Broadcasting, Television, and Telecommunications Services in the year 2020



Market Situation and Competition in Broadcasting and Television Services

1. Market situation of television service in 2020

The year 2020 was a year that many situations occurred both the situation of the COVID-19 pandemic and the result continuing to the request for the return of business licenses of the 7 channels⁶ which has resulted in changes in the television market situation in terms of audience ratio, advertising value and viewing behavior. Details are as follows:

1.1 The proportion of digital terrestrial television viewers in 2020

Having considered the proportion of digital terrestrial television viewers (classified by channel category) in 2020⁷, it was found that the channels receiving the highest proportion of viewers were those classified in the High-Definition category (66.89 percent), followed by channels in the Standard-Definition category (27.88 percent),

channels in the news and documentary category (3.71 percent) and channels in the public category (1.72 percent). It was also found that the channel category that has significant change in the proportion of digital terrestrial television viewers comparing to the previous year is the High-Definition category which was a 5.06 percent increase of the proportion of viewers while the Standard-Definition category was a 3.63 percent decrease in the proportion of viewers. However, for those channels in the public category and the news and documentary category, it was found a slight change of the proportion of viewers which was 0.04 percent increase in the public category while the proportion of viewers of the news and documentary category was 0.54 percent decrease, as detailed in Table 31.



⁶ 7 channels requesting to terminate broadcasting sorted by date of termination of broadcasting consisted of (1) Spring News, Bright TV and Spring 26 which terminated the broadcasting on 16 August 2019 (2) Voice TV which terminated the broadcasting on 1 September 2019 (3) MCOT Family which terminated the broadcasting on 16 September 2019 (4) Channel 3 Family and Channel 3 SD which terminated the broadcasting on 1 October 2019

⁷ Channels in the Children, Youth and Family Category which had already been terminated the broadcasting are excluded.

Table 31: Proportion of viewers (classified by channel category) during 2019 - 2020

Channel category	2019 (Percent)	2020 (Percent)	Percent of change comparing the year 2020 to 2019
Public channels	1.68	1.72	0.04
News and documentary channels	4.25	3.71	-0.54
Standard-Definition channels	31.51	27.88	-3.63
High-Definition channels	61.83	66.89	5.06
Children, youth and family channels	0.73	0.00	-0.73

Source: AGB Nielsen Media Research

It was noted that the proportion of viewers in the category of channels that had terminated broadcasting in 2019 which consist of the news and documentary category and the Standard-Definition category are likely to decrease in 2020, while the proportion of viewers in the public and the High-Definition categories, the categories that have not requested to return licenses in 2019, is increased in 2020 in overall. From the above information, it can be said that the proportion of viewers of channels that had terminated broadcasting in 2019 are not likely to spread to other channels in the same category, it was found that viewers were more likely to switch to viewing channels in other categories instead.

1.2 Advertising value of terrestrial television service in 2020

The advertisement value of terrestrial television service in 2020 was totally 61,662.46 million baht which can be categorized to the advertising of public channels at the amount of 1,306.15 million baht, the news and documentary channels at the amount of 1,585.76 million baht, Standard-Definition channels at the amount of 18,283.31 million baht and the High-Definition channels at the amount of 40,487.24 million baht. Details are shown in Table 32.

Table 32: Advertising value of terrestrial television service during 2019 - 2020

Chanel category	2019 ⁸		2020 ⁹	
	Amount (Million baht)	Percent	Amount (Million baht)	Percent
Public channels	4,225.82	6.21	1,306.15	2.12
Children, youth and family channels	385.34	0.57	-	-
News and documentary channels	1,903.09	2.79	1,585.76	2.57
Standard-Definition channels	17,937.69	26.36	18,283.31	29.65
High-Definition channels	43,593.30	64.07	40,487.24	65.66
Total	68,045.24	100.00	61,662.46	100.00

Source: AGB Nielsen Media Research

⁸ From October 2019 onwards, the database of advertising value of terrestrial television is the data collection of existing 18 channels having continued the operation without collecting data from channels that have returned licenses and terminated broadcasting.

⁹ In 2020, there is no information on terrestrial television advertising value of channels in category of children, youth and family as Channel 3 Family and MCOT Family had returned licenses and terminated broadcasting in 2019.

Having considered the advertising value of terrestrial television channels in 2020 comparing with the advertising value in 2019, it is found that there is a decrease of approximately 6,382.78 million baht or decreasing approximately 9.38 percent. The category of channels with the largest percentage of advertising revenue declines¹⁰ is the public category which the revenue was decreased for 2,919.67 million baht or decreasing approximately 69.09 percent, followed by the news and documentary category which the revenue was decreased for 317.33 million baht or decreasing approximately 16.67 percent, and the High-Definition channels category which the revenue was decreased for 3,106.06 million baht or decreasing approximately 7.13 percent. The Standard-Definition channels category is only one that a proportion of revenue has a slight increase in advertising revenue of approximately 345.62 million baht or increasing approximately 1.93 percent.

Having considered the proportion of advertising value of each category in 2020 comparing to 2019, it is found that the proportion of advertising value of the Standard-Definition channels and the High-Definition channels categories increased approximately 3.29 percent and 1.59 percent respectively, while the proportion of advertising value of the news and documentary channels and the public channels categories decreased approximately 0.22 and 4.09 percent respectively.

If the consideration had been made deeply to the quarters of 2020 compared to 2019, it was found that the advertising revenue in 2020 decreased in every quarter except in the first quarter which the advertising value increased by approximately 391.78 million baht, or increasing about 2.49 percent. However, from the second quarter to the fourth quarter of 2020, the advertising value tends to decrease in every quarter especially in the second quarter where the advertising value decreased sharply for 5,059.73 million baht or decreasing for approximately 29.10 percent compared to the same quarter of the previous year. The details are shown in Table 33. During the second quarter of 2020, it was the period of COVID-19 pandemic and the government had a policy to lockdown the country to prevent and stop the spread of the virus. The advertising value however has begun to increase in the third quarter when the government had relaxed measures and announced the release of the lockdown.



Table 33: Advertising value during 2019 - 2020 (quarterly)

Unit: Million Baht

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2019	15,703.45	17,386.39	17,092.98	17,862.42
2020	16,095.23	12,326.66	15,839.18	17,401.39
Changes (increase/(decrease))	391.78	(5,059.73)	(1,253.80)	(461.03)
Proportion of change (percent)	2.49	- 29.10	-7.34	- 2.58

Source: AGB Nielsen Media Research

¹⁰ Channels in the Children, Youth and Family Category which had already been terminated the broadcasting are excluded.



From the above information, it can be seen that in the year 2020 the advertising value tends to decline significantly compared to the previous year which is a result of the COVID-19 pandemic, and it affected companies and advertising agencies on the reduction of advertising budget especially during the government's announcement of the country's lockdown in the second quarter. However, when considering the proportion of advertising value of each category in 2020 compared to 2019, it can be seen that the proportion of advertising value of the Standard-Definition channels and High-Definition channels had increased of approximately 3.29 percent and 1.59 percent respectively which partly due to the termination of the broadcasting of the 7 TV channels in 2019, causing a greater proportion of the advertising value to be spread out to channels in these categories.

Having considered trends from both the advertising value and the viewers' proportion in digital terrestrial television in 2020 compared to 2019, it can be concluded that the termination of the broadcasting of the 7 channels have not effected in an increase in the advertising value of digital terrestrial television in the same category, except for the Standard-Definition channel category that the advertising value increases slightly. The overall picture is consistent with the direction of change in the viewers' proportion where the termination of the broadcasting does not affect

the viewers' proportion of other channels in the same category. In addition, due to the impact of the COVID-19 pandemic, the total advertising value of digital terrestrial television in overall of 2020 decreased by 9.38 percent comparing to the advertising value in 2019.

Although the overall advertising value of the year 2020 is likely to decrease, however, the consideration is made on the proportion of advertising value, it was found that the Standard-Definition category and the High-Definition category have an increase of the advertising value of approximately 3.29 percent and 1.59 percent respectively which may be affected by the distribution of advertising amount of money from the original channels that had terminated broadcasting to the channels in these two categories. Unlike the distribution of the viewers' proportion which has no increase in the Standard-Definition channel category but the public channel category and the High-Definition channel category instead.

1.3 Advertising value on cable/satellite TV in 2020

The value of advertising on cable/satellite TV in 2020 was totally 1,515.82 million baht, decreasing from the previous year for approximately 750 million baht, or accounting for approximately 33 percent from the year 2019. This represents the trend of less money on advertising to be distributed to cable/satellite TV channels. Details are as shown in Chart 9.

Chart 9: Advertising value on cable/satellite TV programs during 2019 - 2020



Source : AGB Nielsen Media Research

1.4 TV program viewing behavior in 2020

From daily television viewing data (average per month) in all networks¹¹ in the year 2020¹² it was found that viewers across the country tended to spend more time watching TV programs by 5.37 percent compared to the second quarter. As for digital TV viewers in 2020 compared to 2019, the amount of time viewers spent on viewing increased in every quarter which accounted for 1.81 percent (Q1), 6.94 percent (Q2), 1.80 percent (Q3), and 2.68 percent (Q4) respectively. It is also found from monthly information that digital TV viewers spent the most time

on viewing in April and October 2020 for 4 hours and 2 minutes, and 3 hours and 58 minutes respectively in average. This behavior was similar to the TV viewing in all networks in which the viewers also spent the most time on viewing in that same month¹³. During the New Normal era in the third quarter, however, viewers spent less time in average on viewing television programs than the previous period. This may be a result of the government's announcement of relief measures¹⁴ and people have returned to work in the offices and lived more outside the house. Details are as shown in charts 10 and 11.

Chart 10: Time spent on daily TV viewing (average per month) in all networks nationwide



Source: AGB Nielsen Media Research

¹¹ It is the viewing of digital terrestrial television and cable and satellite television of viewers across the country (Source : AGB Nielsen Media Research)

¹² The Coronavirus Disease 2019 (COVID-19) pandemic has started since the beginning of the year 2020, when the 1st infected people had been found in Thailand in mid-January 2020 and continued affecting. However, the analysis of TV viewing behavior will be divided into 4 main periods consisting of Quarter 1 (January - March 2020), which is the period before the outbreak of COVID-19 pandemic, Quarter 2 (April - June 2020), which is the clearly period of the occurred pandemic of COVID-19 according to the report of the Department of Disease Control reporting that the total number of infected people has exceeded 1,000 people, Quarter 3 (July - September 2020), the period where people have adapted the lifestyle into the temporary New Normal era, and Quarter 4 (October - December 2020), the period where people have adapted the lifestyle into the Next Normal era.

¹³ TV viewers of all networks spent the most time on viewing in April and October 2020 in average of 4 hours 26 minutes, and 4 hours 18 minutes, respectively

¹⁴ During the Quarter 3 of 2020, the Coronavirus Disease Epidemic Situation Administration Center announced the Relief Measures in phase 4 and phase 5.

Chart 11: Time spent on daily TV viewing (average per month) in digital TV nationwide



Source: AGB Nielsen Media Research

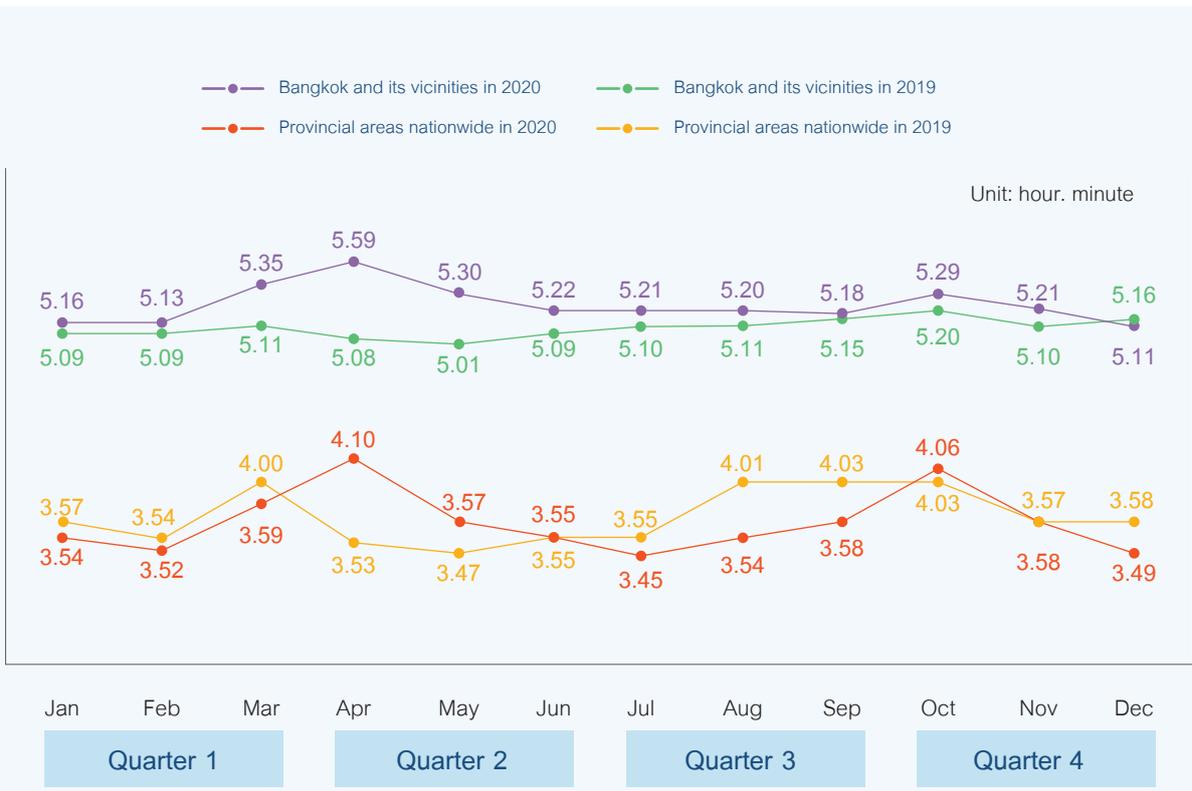
It is evident that the duration of TV viewing in the second quarter of 2020 increased significantly both in the TV viewing from all networks and the TV viewing in digital system only, meanwhile the second quarter period was the same period as the COVID-19 pandemic and the period where agencies had applied the work from home measure on their employees to respond to the government guidelines and policies in preventing and blocking the spread of the virus.

It is interesting that when comparing daily television viewing (average per month) by area, it was found that the average viewing time (both viewing in all television networks and digital TV) in the Bangkok and its vicinities areas is significantly higher than the provincial areas. It also found that during the second quarter of 2020, the duration of viewing in the Bangkok and its vicinities areas increased by more than 10 percent comparing to the same period of 2019. (10.13 percent for all television networks and 10.51 percent for digital TV) However, the viewing duration in the provincial areas increased only 4.33 percent for all television networks and 5.34 percent for digital TV viewing.

Having considered the monthly in-depth data, it was found that in April 2020, viewers of all television networks spent more time on viewing television significantly where in the Bangkok and its vicinities areas the viewers had spent times in an average of 5 hours and 59 minutes, while the viewers in the provincial areas had spent times in an average of 4 hours and 10 minutes. Likewise, the digital TV viewers also spent more time on viewing significantly during the same period. The viewers in the Bangkok and its vicinities areas had spent times in an average of 5 hours and 25 minutes (April 2020), while the viewers in the provincial areas had spent times in an average of 3 hours and 57 minutes in April 2020. Details are as shown in Charts 12 and 13.



Chart 12: Time spent on daily TV viewing (average per month) in all networks divided by area



Comparing changes between 2020 and 2019 (percent)

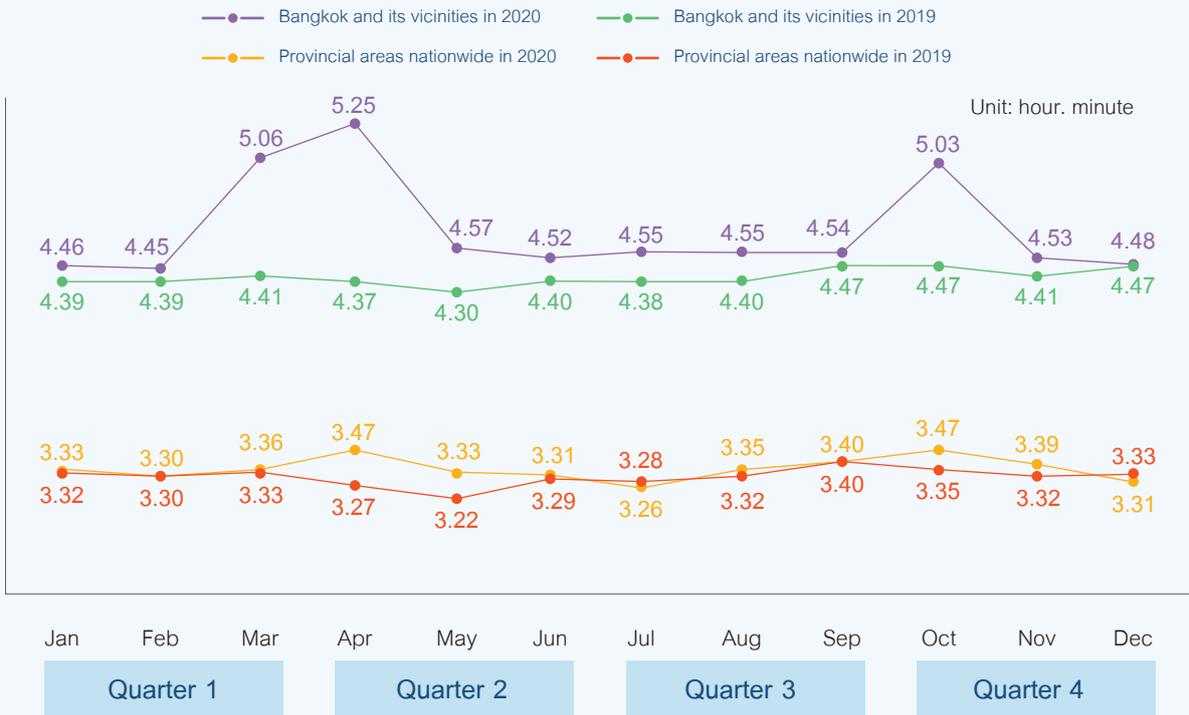
	Bangkok and its vicinities	Provincial areas nationwide
Q1	↑ 3.88	↓ -0.25
Q2	↑ 10.13	↑ 4.33
Q3	↑ 2.24	↓ -2.93
Q4	↑ 1.90	↓ -0.42

Average viewing in Bangkok and its vicinities (Jan - Dec 2020)
5 hours and 25 minutes

Average viewing in Provincial areas nationwide (Jan - Dec 2020)
3 hours and 57 minutes

Source: AGB Nielsen Media Research

Chart 13: Time spent on spent on daily TV viewing (average per month) in digital system divided by area



Comparing changes between 2020 and 2019 (percent)

	Bangkok and its vicinities	Provincial areas nationwide
Q1	↑ 4.29	Q1 ↑ 0.61
Q2	↑ 10.51	Q2 ↑ 5.34
Q3	↑ 4.61	Q3 ↑ 0.52
Q4	↑ 3.51	Q4 ↑ 2.82

Average viewing in Bangkok and its vicinities (Jan - Dec 2020)
4 hours and 57 minutes

Average viewing in Provincial areas nationwide (Jan - Dec 2020)
3 hours and 36 minutes

Source: AGB Nielsen Media Research

From the TV viewing data in 2020, it can be concluded that viewers tend to spend more time viewing television and it is likely to increase in April and October due to the public’s interest and monitoring of news about the situation of the COVID-19 pandemic and the situation of political protest. However, during the New Normal era in the fourth quarter, the television viewing is likely to decrease because of the measure of relief of the government. As a result, people are able to work at the offices and spend more time

outside home. Besides, it is found that people in several provincial areas are likely to decrease viewing television significantly in the fourth quarter, in which one of the main reason is from the unfavorable weather conditions such as heavy rain, or natural disasters including floods. As a result, the duration of television viewing of viewers in provincial areas tends to decrease more than the duration of television viewing of people in Bangkok and its vicinities areas.



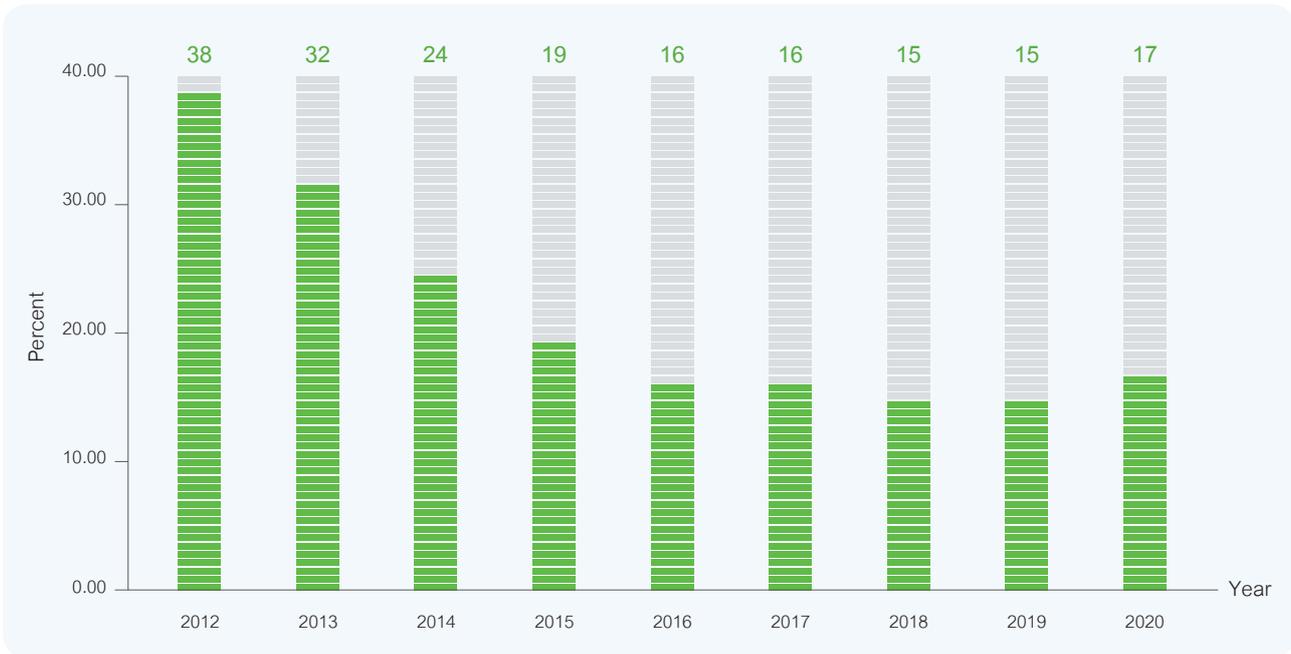
2. Market situation of broadcasting service in 2020

2.1 Proportion of access to radio listening in all channels in 2020

From the survey of Thai people from 12 years and over who listen to the 40 high power radio broadcasting stations in FM system (87.5 MHz - 107.0 MHz) in all channels such as

radio receivers, mobile phones, and computers in Bangkok and its vicinities areas, it is found that in 2020 the access rate to radio listening in all channels was accounted for 17 percent of the country's population, increasing approximately 2 percent from the previous year. Details are as shown in Chart 14.

Chart 14: Proportion of access to radio listening in all channels during 2012 - 2020



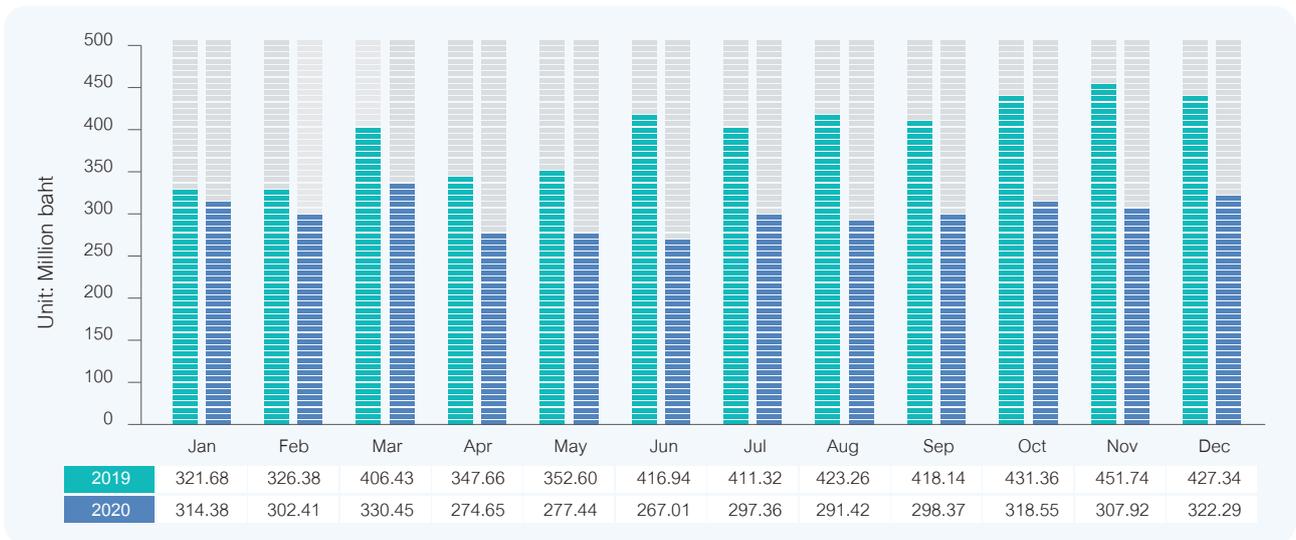
Source: AGB Nielsen Media Research

2.2 Advertising value in the broadcasting service in 2020

The advertising value via the 36 high power radio broadcasting stations in FM system in Bangkok and its vicinities (88.0 - 91.5, 93.0 - 103.5, and 104.5 - 107.0 MHz) in 2020 was 3,602.25 million baht. However, when the comparison was

made to the year 2019, it is found that the advertising value in 2019 was approximately 4,734.85 million baht, which is higher than the advertising value in 2020 for 1,132.60 million baht or accounting for 24 percent. Details are as shown in Chart 15.

Chart 15: Advertising expenses via the high power radio broadcasting stations in FM system in Bangkok and its vicinities during 2019 - 2020



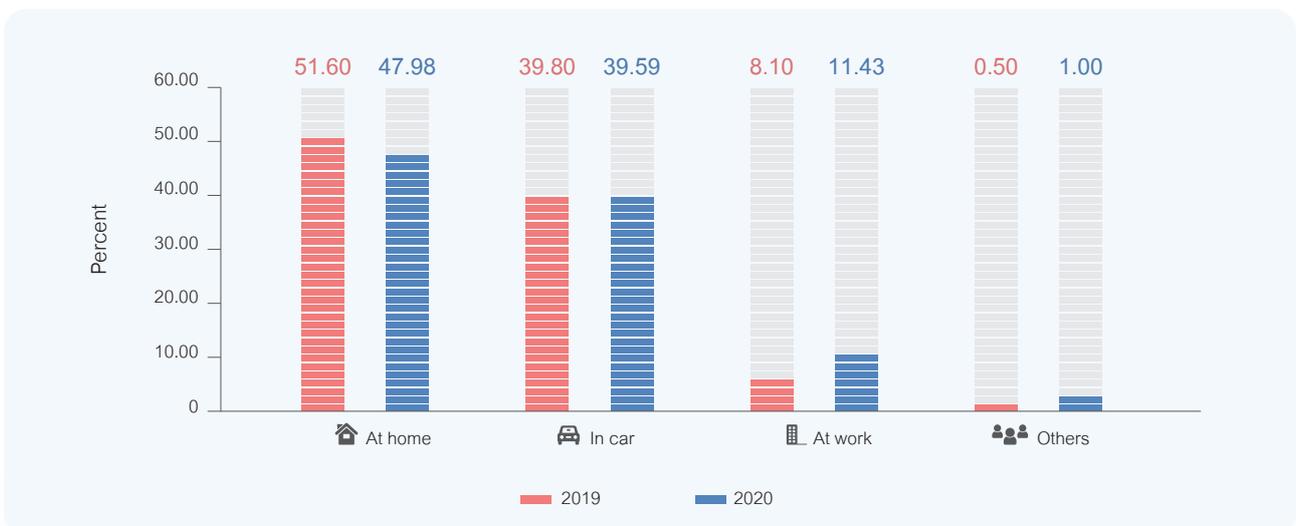
Source: AGB Nielsen Media Research

2.3 Radio Listening Behavior¹⁵ in 2020

From the radio listening behavior data, it is found that in 2020 most people like to listen to the radio at home (47.98 percent), followed by listening to the radio in car (39.59 percent), listening at work (11.43 percent), and others (1 percent).

It was also found that the majority of people prefer listening to the radio via radio receivers (70.67 percent), followed by listening via mobile phones (27.56 percent), via computers (1.57 percent) and others (0.20 percent). Details are as shown in Chart 16 and 17.

Chart 16: Radio Listening Behavior classified by venue during 2019 - 2020

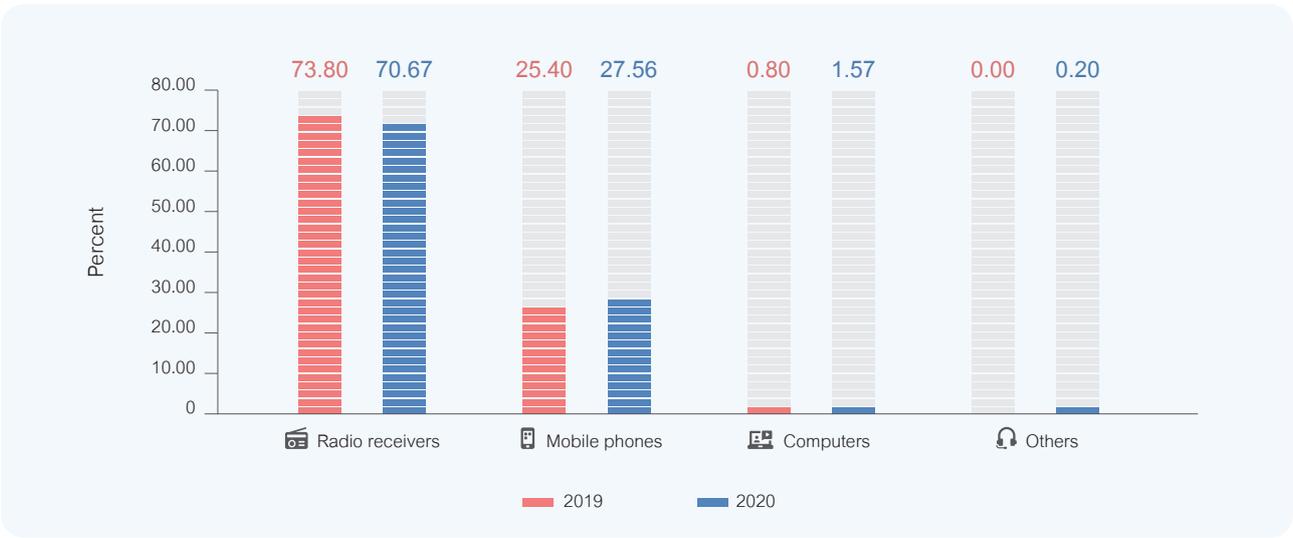


Source: AGB Nielsen Media Research

¹⁵ the survey of Thai people from 12 years and over who listen to the 40 high power radio broadcasting stations in the FM system (87.5 MHz - 107.0 MHz) in all channels such as radio receivers, mobile phones, and computers in the Bangkok and its vicinities areas.



Chart 17: Radio listening behaviors classified by listening devices during 2019 - 2020



Source: AGB Nielsen Media Research

Having compared the radio listening behavior in 2020 to the previous year, it is found that the radio listeners are more likely to listen to the radio at work

as well as the increasing tendency of radio listening via mobile phones and computers.



Market Situation and Competition in Telecommunications Service

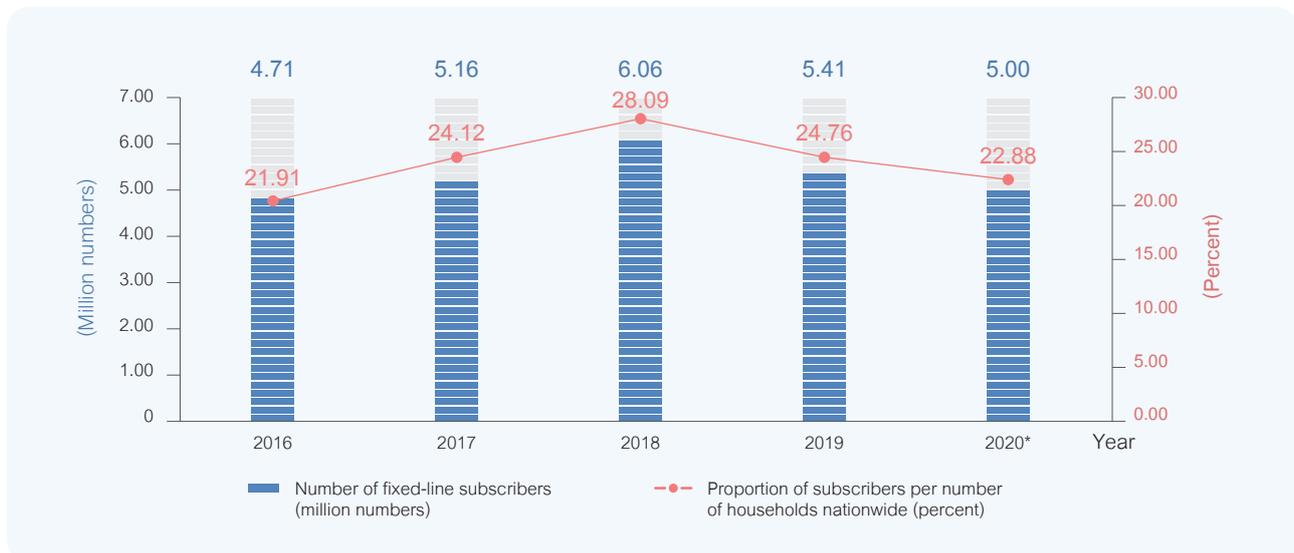
Major telecommunications market situation can be divided into 3 categories: fixed-line service; mobile service and internet services as follows:

1. Market of fixed-line service

The number of fixed-line subscribers in the market of fixed-line service of Thailand in 2020 was approximately 5 million numbers, decreasing 7.65 percent when compared to the year 2019 and the proportion of the fixed-line subscribers per the number of households was 22.88 percent. The market share of fixed-line service in 2020 was estimated to be occupied by TOT Public Company Limited (TOT) for 65.66 percent, as it is the incumbent in the market with the main reasons that the nature of the fixed-line

business requires a high amount of investment which leads to a natural monopoly, followed by True Internet Corporation Company Limited (TICC) for 27.14 percent and CAT Telecom Public Company Limited (CAT) for 2.77 percent, respectively. The entry to competition of new service providers still have some limitations under the terms of the contract and it made the commercial investment analysis for fixed-line service unworthily, along with the full saturation of the market and changes of service users' behavior to the use of services that can be substituted with other technologies to achieve communication objectives for reasons of convenience and lower cost of service rates. Details are as shown in Charts 18 and 19.

Chart 18: Number of fixed-line subscribers during 2016 - 2020*

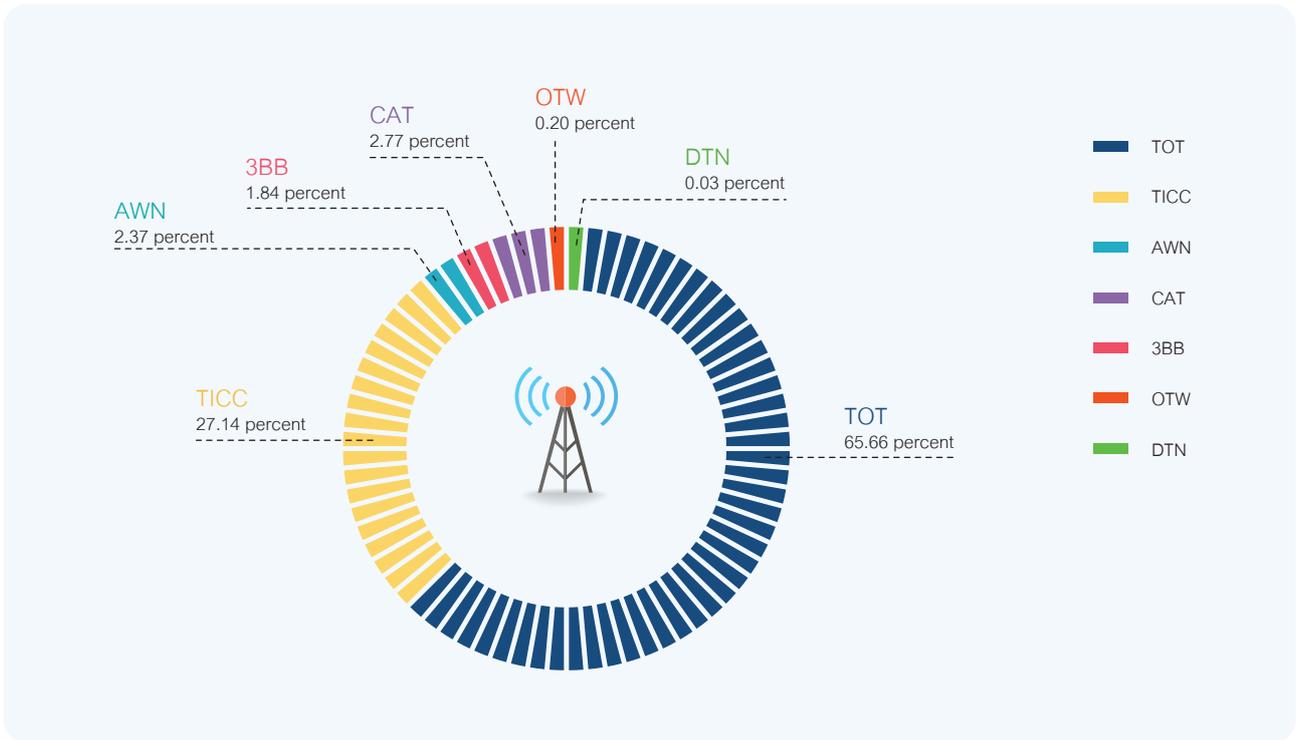


Remarks: * Preliminary based on annual figure

Source: Numbering Management Bureau, Office of the NBTC



Chart 19: Market share of fixed-line service classified by operators¹⁶ in 2020*



Remarks: * Preliminary based on annual figure
 Source: Numbering Management Bureau, Office of the NBTC

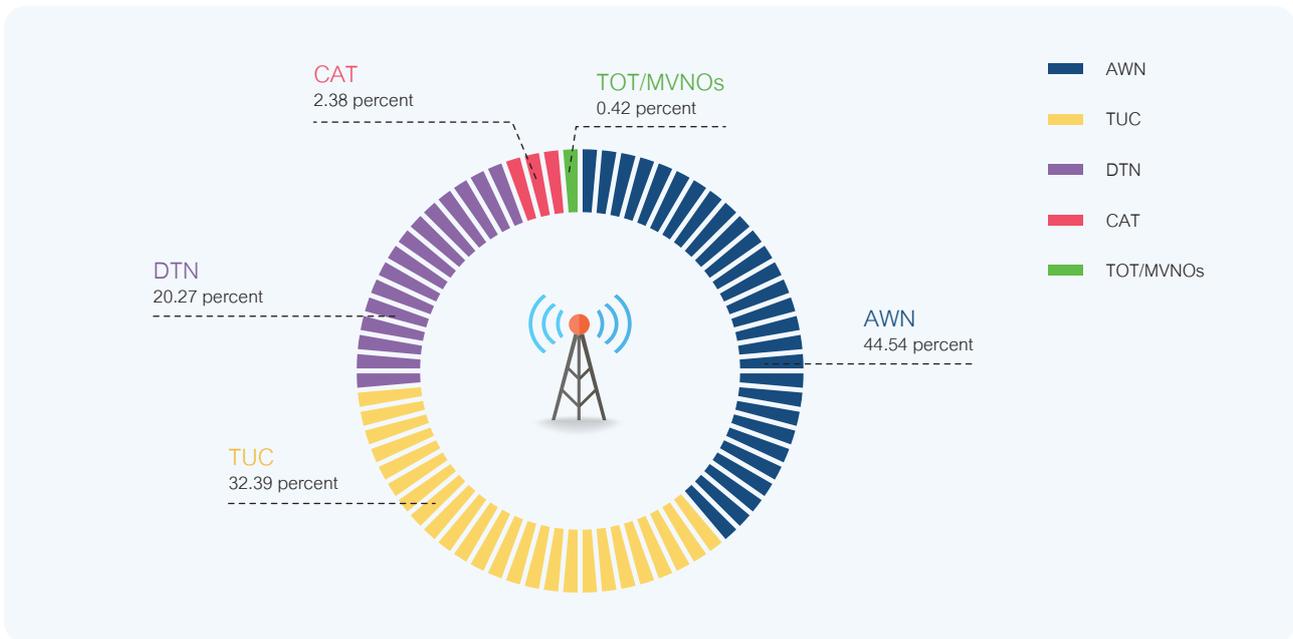
2. Market of mobile service

The number of mobile subscribers in the year 2020 was approximately 116.29 million numbers or decreasing 10.28 percent comparing to the year 2019. Having compared the number of mobile subscribers to 100 inhabitants, the penetration rate was 170.70 percent and when considering the market share of mobile service in 2020, it is found that Advance Wireless Network Company Limited (AWN)

held the largest market share of 44.54 percent, followed by True Move H Universal Communication Company Limited (TUC) who held the market share of 32.39 percent, increasing when compared to the year 2019 which was 31.99 percent. Details are as shown in Chart 20. The HHI value of the mobile service market in 2020 was approximately 3,449, increasing from the year 2019 which was 3,418.

¹⁶ Advance Wireless Network Company Limited (AWN), Triple T Broadband Public Company Limited (3BB), CAT Telecom Public Company Limited (CAT), DTAC TriNet Company Limited (DTN), Otaro World Corporation Company Limited (OTW), TOT Public Company Limited (TOT), True Internet Corporation Public Company Limited (TICC)

Chart 20: Market share of mobile service providers in 2020*



Remarks: * Preliminary based on annual figure

Source: Telecommunications Policy and Resources Management Bureau, Office of the NBTC

3. Market of internet services

At present, the internet service of Thailand are provided in various channels and most internet users have used the services through mobile broadband service platform and fixed broadband service platform.

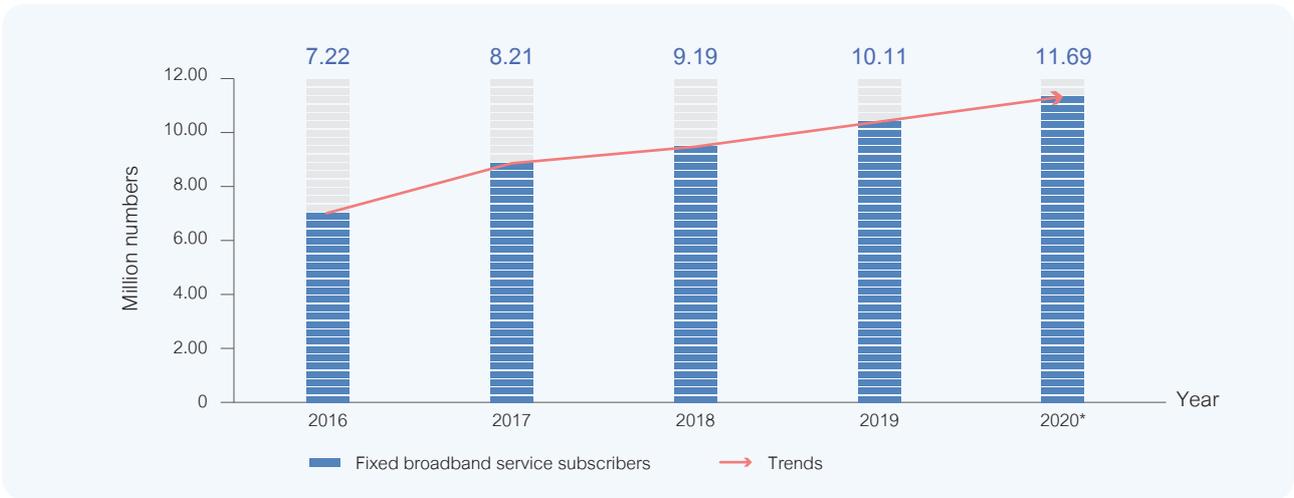
3.1 Fixed Broadband service

Nowadays, the market of narrowband internet service is about to disappear from the internet service market such as Dial-up technology, and the broadband service can be connected to several technologies by switching from technology in the group of xDSL (Digital Subscriber Line) to technology of FTTP (Fiber to the Premises). In 2020, the number of fixed broadband service subscribers was increased to 11.69 million subscribers, or increasing

15.61 percent when compared to the year 2019. When considering the accessibility, it is found that the proportion of the number of fixed broadband service subscribers was 17.17 subscribers per 100 inhabitants or 53.37 households that have subscribed to the service per 100 households throughout the country. For the market share of fixed broadband service in 2020, it is found that True Internet Company Limited held the largest market share of 36.10 percent, followed by Triple T Broadband Company Limited (3BB) who held the market share of 29.93 percent, details are as shown in Chart 21 and 22. The HHI value in 2020 was dropped to 2,696 when compared to the previous year which was 2,794.



Chart 21: Number of fixed broadband service subscribers during 2016 - 2020*



Remarks: * Preliminary based on annual figure

Source: Telecommunications Policy and Resources Management Bureau, Office of the NBTC

Chart 22: Market share of fixed broadband service during 2016 - 2020*



Remarks: * Preliminary based on annual figure

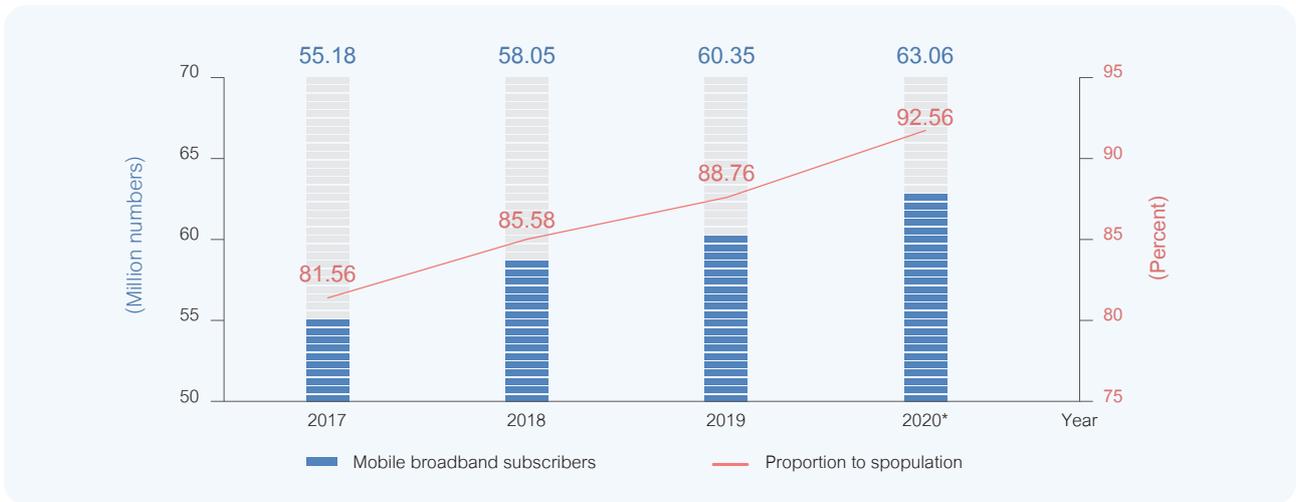
Source: Telecommunications Policy and Resources Management Bureau, Office of the NBTC

3.2 Mobile broadband service

The number of mobile broadband service subscribers was approximately 63.06 million numbers, increasing 4.49 percent when compared to the year 2019 with the access rate to the population of 92.56 percent. Having considered the market share in 2020, it is found that Advance Wireless Network Company Limited (AWN) had the largest proportion of

45.76 percent, followed by True Move H Universal Communication Company Limited (TUC) with the proportion of 30.20 percent, and DTAC TriNet Company Limited (DTN) with the proportion of 21.26 percent. Details are as shown in Chart 23 and 24. For the HHI value, it is likely to increase from 3,417 in 2019 to 3,461 in 2020.

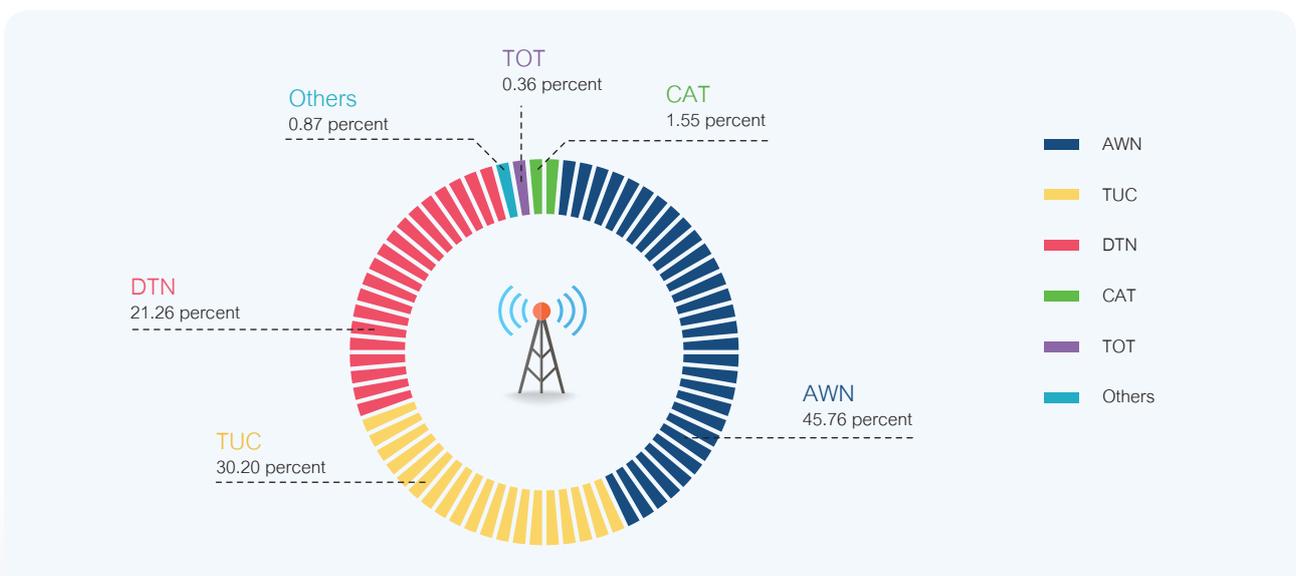
Chart 23: Number of mobile broadband service subscribers during 2017 - 2020*



Remarks: * Preliminary based on annual figure

Source: Telecommunications Policy and Resources Management Bureau, Office of the NBTC

Chart 24: Market share calculated by the subscribed numbers for mobile internet service in 2020*



Remarks: * Preliminary based on annual figure

Source: Telecommunications Policy and Resources Management Bureau, Office of the NBTC



The Observation on the Action in the Nature of Dominance in Broadcasting, Television, and Telecommunications Services which has Impacted the Benefits of the State and People

1. Broadcasting and television services

The NBTC has revised and abolished the NBTC Notification on Determination of Characteristics and Regulatory Measures for Mergers, Cross-shareholdings and Dominance in Broadcasting Service with the objective of easing the criteria and reducing procedures comply to the said notification by issuing the NBTC Notification on Regulatory Measure on Mergers in Broadcasting Services, publishing in the Royal Gazette on 20 August 2018. For the broadcasting services dominance, it has been specified in Chapter 2 Business dominance by persons having mutual Interests which is prescribed that if there is any action in a manner of the business domination, either directly or indirectly, done by persons having mutual interests that may result in a monopoly, reduction, or restriction of competition, the NBTC may have an order to determine a special measure to prevent the action which is considered a monopoly or a cause to unfair competition. In 2020, however, there has not yet evidence of any licensees involving in the action in a manner of the broadcasting business domination, either direct or indirect, which may result in a monopoly, reduction, or restriction of competition.

2. Telecommunications service

In 2020, the NBTC was informed of the business mergers between the licensees within the same group of companies for 1 case, which is the merger between ALT Telecom Company Limited and Smart Infranet Company Limited on 4 August 2020 by notifying the intention to buy-sell assets between companies in the group and restructure the business operation as well as having complied to Article 6 of the NBTC Notification on Telecommunications Regulatory Measure and Business Mergers (the business mergers between the licensee who is a company within the group or affiliated company or a business merger between the controlling party and the licensee that is a company within the group or affiliated company).

In addition, the Office of the NBTC is in the process of consideration of a business merger between CAT Telecom Public Company Limited and TOT Public Company Limited to become the National Telecom Public Company Limited according to the Cabinet resolution dated 14 January 2020, where TOT Public Company Limited and CAT Telecom Public Company Limited have informed the agenda of the business merger registration on 7 January 2021.



Quality of Service and Telecommunications Service Rates that are Important to the People

The NBTC had regulated business operation, set up standard of quality of telecommunications service provision, regulated the structure of service rates in order to protect service users to receive the quality service at fair price. The important achievement in 2020 are as follows:

1. Regulation on quality of service provision

Having followed-up and monitored the quality of telecommunications service provision to be in line with the specified notifications continuously, as well as set up and revised the notification concerning the determination of the standards of quality of telecommunications service provision which is the combination of the NBTC' Notification Regarding the Standard and Quality of Voice Service and the NBTC Notification Regarding the Standard and Quality of Data Service for mobile telecommunications network, as well as having added indicators for quality of telecommunications services (data service) through fixed telecommunications networks to be in accordance with the changing technology in the current situation and to protect service users who deserve quality services. In 2020, the NBTC has monitored the quality of telecommunications service provision according to the NBTC Notification on Standard of Quality of Telecommunications Service Provision, published in the Royal Gazette on 25 October 2019 and become effective since

1 January 2020 by requiring the licensees to provide telecommunications service according to the standards of quality of service provision attached to the Notification¹⁷ and the service quality indicators must be measured and reported to the Office of the NBTC on a quarterly basis. In addition to monitoring the quality of service by gathering information from service providers, the Office of the NBTC has also directly monitored and measured the service quality of operators and re-examined in case the service does not meet the telecommunications service quality standards. The monitoring will be taken regularly and annually and additional monitoring will be carried out upon the complaints receipt from consumers. Moreover, the NBTC has collaborated with the operators in conducting an investigation of the complaints received. The results of the follow-up and monitoring on the quality of service according to the standards are as follows:

1.1 Monitoring the quality of telecommunications service provision from the report on the test of quality of service provision submitted by telecommunications operators

(1) The quality of telecommunications service provision via fixed telecommunications network consists of fixed-line service and public payphone service. It is found that, in the third quarter of 2020, the quality of telecommunications services provided by all service providers has met the specified standards

¹⁷ The quality of service parameters are shown in Appendix of the NBTC Notification on Standard of Quality of Telecommunications Service Provision, published in the Royal Gazette on 25 October 2019, No.136, Special Section 265 D, consisting of

- 1) Telecommunications service through fixed telecommunications network means a telecommunications network that provides a fixed service through the copper network or fiber optic network or a combination of both types of networks, consists of fixed-line services, public payphone services and data telecommunications services, in which the quality of service parameters are specified as follows: (1) general quality of service parameters (2) voice quality of service parameters and (3) data quality of service parameters.
- 2) Telecommunications service through mobile telecommunications network means a telecommunications network that provides a service through the frequency-used for telecommunications service in land mobile service, in which the quality of service parameters are specified as follows: (1) general quality of service parameters (2) voice quality of service parameters and (3) data quality of service parameters.



which represents the efficiency of service provision whether in terms of telecommunications network, availability of repair service, or accuracy and convenience in contacting.

(2) The quality of telecommunications service provision via mobile telecommunications network in which at the third quarter of 2020, 8 telecommunications service providers via mobile telecommunications network¹⁸ had reported on the measurement result of quality of service provision to the Office of the NBTC, consisting of 5 service providers who have their own networks and 3 Mobile Virtual Network Operators (MVNO), who are required to comply with the Notification of the Office of the NBTC on Guidelines for Quality of Service Parameter Measurement and Surveillance Areas, Report Format and Dissemination of the Quality of Service Parameters Measurement Results to the Office of the NBTC. From the monitoring, it is found that 7 service providers were able to provide services with quality that met the specified standards, and 1 service provider which is CAT Telecom Public Company Limited had provided services during January 2020 with the quality that failed to meet the specified standards such as “the response time for accessing customer-service call center” which can be measured at 72.07 seconds, exceeding the target value specified by the notification; that is, the response time for accessing customer service call center must be less than 60 seconds.

In such case, the Office of the NBTC had issued a letter No. Sor Tor Chor 2407/12580.12 dated 8 May 2020 requesting CAT Telecom Public Company Limited to report on the case that the quality of service parameters failed to meet the standard criteria and

provide guidelines for resolving problems and improvement, and CAT Telecom Public Company Limited had already reported to the Office of the NBTC clarifying the cause of the problem as well as proposing a guideline for improvement in which the CAT Telecom Public Company Limited has conducted the Broadcast IVR to reduce the number of incoming calls or redial calls from users. In addition, CAT contact center has coordinated with relevant agencies to solve the problems until the system can be used normally. From such operations, it is found that the quality of service measurement results in the third quarter of 2020 met the specified standards.

In 2020, the Office of the NBTC had issued the Notification on Guidelines for Quality of Service Parameter Measurement and Surveillance Areas, Report Format and Dissemination of the Quality of Service Parameters Measurement Results and parameters Level of Quality of Service for the Dissemination of the Results of Quality of Service Indicator which published in the Royal Gazette on 19 February 2020, prescribing the guidelines for measuring quality of service parameters and report formats for telecommunications services through fixed telecommunications networks and the guidelines for measuring quality of service parameters and surveillance areas for telecommunications services through mobile telecommunications networks (mobile phone). As of the third quarter of 2020, surveillance areas for telecommunications services via mobile telecommunications networks have been set for licensees to measure data quality parameters (RTT, FTP, HTTP) in the areas, as shown in Table 34.

¹⁸

- 1) Five mobile telecommunications network licensees are (1) CAT Telecom Public Company Limited (2) True Move H Universal Communication Company Limited (3) DTAC TriNet Company Limited (4) Advance Wireless Network Company Limited, and (5) TOT Public Company Limited
- 2) Three Mobile Virtual Network Operators (MVNO) are (1) Loxley Public Company Limited (2) Loxley Mobile Company Limited, and (3) The White Space Company Limited

Table 34: Surveillance areas for telecommunication services via mobile telecommunications network in 2020

Areas	Venues to be measured (as of Quarter 2 of 2020)	Venues to be measured (as of Quarter 3 of 2020)
Surveillance areas in regional areas	To be measured in the South region - Main and secondary routes in the regional area - Routes in the community areas (within the same district)	To be measured in the Central and East regions - Main and secondary routes in the regional area - Routes in the community areas (within the same district)
Surveillance areas in Bangkok and its vicinities	Routes in Bangkok and its vicinities	Routes in Bangkok and its vicinities
	Surveillance areas: 1. Suvarnabhumi Airport 2. Don Mueang Airport 3. Bangkok Bus Terminal (Chatuchak) 4. Bangkok Bus Terminal (Borommaratchachonnani Road) 5. Bangkok Bus Terminal (Ekkamai) 6. Bangkok Railway Station (Hua Lamphong)	Other community areas: 5 areas (Community areas means tourist attractions, parks, department stores, universities, etc.)

Source: Telecommunications Technology and Standard Bureau, Office of the NBTC

However, due to the situation of the COVID-19 pandemic in Thailand, there has been a postponement of the provision of inter-provincial mass transit system service either domestic or international systems, including land, rail, marine and air in order to prevent and inhibit the spread of the COVID-19 pandemic as well as recommendations were proposed to avoid entering areas prone to the COVID-19 pandemic. Four mobile telecommunication licensees; namely, CAT Telecom Public Company Limited, Advanced Wireless Network Company Limited, DTAC TriNet Company Limited and True Move H Universal Communication Company Limited had submitted a letter to the Office of the NBTC requesting for refraining from taking operation to measure the quality of data telecommunications services parameters in Bangkok and its vicinities in the following surveillance areas as follows: Suvarnabhumi Airport, Don Mueang Airport, Bangkok Bus Terminal (Chatuchak), Bangkok Bus Terminal (Borommaratchachonnani Road),

Bangkok Bus Terminal (Ekkamai), and Bangkok Railway Station (Hua Lamphong). After consideration, the Office of the NBTC had a letter No. Sor Tor Chor 2407/c5056.09 dated 4 June 2020 agreeing that the four mobile telecommunication service licensees can be refrained from operating the quality of service measurements at surveillance areas in Bangkok and its vicinities as requested. (TOT Public Company Limited has not requested for the refrain and submitted data normally). For the measurement in other areas in the second quarter of 2020, the quality of service measurement shall be operated in accordance with the Notification of the Office of the NBTC on Guidelines for Quality of Service Parameter Measurement and Surveillance Areas, Report Format and Dissemination of the Quality of Service Parameters Measurement Results and Parameters Level of Quality of Service for the Dissemination of the Results of Quality of Service Indicators as planned.

1.2 Monitoring the quality of service provision by the Office of the NBTC

Having monitored and tested the quality of mobile services provided by 5 operators consisting of CAT Telecom Public Company Limited, TOT Public Company Limited, Advance Wireless Network Company Limited, DTAC Trinet Company Limited, and True Move H Universal Communication Company Limited. The results are as follows:

(1) The test result of quality of voice service both the successful call ratio and the drop call rate in case of a phone call within the network of the same operator at the third quarter of 2020 found that the quality of voice service of all service providers has met the specified standards; that is, the success call ratio was 99.95 percent which is higher than the required target (not less than 90 percent) and the drop call rate was 0.00 percent which is higher than the required target (not greater than 2 percent). Details are as shown in Table 35.

Table 35: Test result of quality in case of a phone call within the network of the same operator in 2020

Quality of service parameters	Required target	Test results in case of a phone call within the network of the same operator		
		Quarter 1	Quarter 2	Quarter 3
Successful call ratio	≥90.00 percent	99.94	99.95	99.95
Drop Call Rate	≤2.00 percent	0.00	0.01	0.00

Remarks: The tests had been done in 13 areas consisting of the Office of the NBTC Region 1 (Central), NBTC Sub-region office 14 (Prachinburi), NBTC Sub-region office 16 (Ratchaburi), the Office of the NBTC Region 2 (Northeast), NBTC Sub-region office 21 (Roi Et), NBTC Sub-region office 22 (Ubon Ratchathani), NBTC Sub-region office 31 (Lampang), NBTC Sub-region office 32 (Tak), NBTC Sub-region office 33 (Phitsanulok), the Office of the NBTC Region 4 (South), NBTC Sub-region office 43 (Nakhon Si Thammarat), NBTC Sub-region office 44 (Surat Thani), and the Office of the NBTC Headoffice (Sailom)

Source: Telecommunications Enforcement Bureau, Office of the NBTC

(2) The test result of quality of voice service both the successful call ratio and the drop call rate in case of a phone call across network of different operator at the third quarter of 2020 found that the quality of voice service of all service providers has met the specified standards; that is, the success call

ratio was 99.14 percent which is higher than the required target (not less than 90 percent) and the call drop rate was 0.01 percent which is higher than the required target (not greater than 2 percent). Details are as shown in Table 36.



Table 36: Test result of quality in case of a phone call across network of different operator in 2020

Quality of service parameters	Required target	Test results in case of a phone call within the network of different operator		
		Quarter 1	Quarter 2	Quarter 3
Successful call ratio	≥90.00 percent	99.54	99.38	99.14
Drop Call Rate	≤2.00 percent	0.03	0.03	0.01

Remarks: The tests had been done in 13 areas consisting of the Office of the NBTC Region 1 (Central), NBTC Sub-region office 14 (Prachinburi), NBTC Sub-region office 16 (Ratchaburi), the Office of the NBTC Region 2 (Northeast), NBTC Sub-region office 21 (Roi Et), NBTC Sub-region office 22 (Ubon Ratchathani), NBTC Sub-region office 31 (Lampang), NBTC Sub-region office 32 (Tak), NBTC Sub-region office 33 (Phitsanulok), the Office of the NBTC Region 4 (South), NBTC Sub-region office 43 (Nakhon Si Thammarat), NBTC Sub-region office 44 (Surat Thani), and the Office of the NBTC Headoffice (Sailom)

Source: Telecommunications Enforcement Bureau, Office of the NBTC

(3) The test results of quality of telecommunications service (data service) in all FTP success ratio subjected to specified criteria, FTP success ratio, and HTTP success ratio found that

the quality of data service of all service providers has met the specified standards. Details are shown in Table 37 and 38.

Table 37: Test results of quality of data service provision on 3G technology in 2020

Quality of service parameters		Required target	Test results on 3G technology		
			Quarter 1	Quarter 2	Quarter 3
FTP Download	FTP success ratio subjected to specified criteria	≥0.750 Mbps	7.74	7.96	8.34
	FTP success ratio	≥80 percent	99.45	98.42	98.49
FTP Upload	FTP success ratio subjected to specified criteria	≥0.300 Mbps	4.19	4.29	4.28
	FTP success ratio	≥70 percent	99.65	99.03	97.29
HTTP	HTTP success ratio	≥90 percent	99.68	99.44	98.58

Remarks: The test had been done in 13 areas consisting of NBTC Sub-region office 11 (Samut Prakarn), NBTC Sub-region office 12 (Chantaburi), NBTC Sub-region office 15 (Phra Nakhon Si Ayutthaya), the Office of the NBTC Region 2 (Northeast), NBTC Sub-region office 23 (Nakhon Ratchasima), NBTC Sub-region office 24 (Udon Thani), the Office of the NBTC Region 3 (North), NBTC Sub-region office 34 (Chiangrai), NBTC Sub-region office 35 (Nakhon Sawan), the Office of the NBTC Region 4 (South), NBTC Sub-region office 41 (Yala), NBTC Sub-region office 45 (Chumporn), and the Office of the NBTC Headoffice (Sailom).

Source: Telecommunications Enforcement Bureau, Office of the NBTC

Table 38: Test results of quality of data service provision on 4G technology in 2020

Quality of service parameters		Required target	Test results on 3G technology**		
			Quarter 1	Quarter 2	Quarter 3
FTP Download	FTP success ratio subjected to specified criteria	≥2.5 Mbps	26.28	27.79	23.95
	FTP success ratio	≥80 percent	99.55	99.37	99.18
FTP Upload	FTP success ratio subjected to specified criteria	≥0.5 Mbps	12.92	13.01	11.43
	FTP success ratio	≥70 percent	99.81	99.74	98.48
HTTP	HTTP success ratio	≥90 percent	99.66	99.60	99.33

Remarks: The test had been done in 14 areas consisting of the Office of the NBTC Region 1 (Central), NBTC Sub-region office 13 (Suphanburi), NBTC Sub-region office 14 (Prachinburi), NBTC Sub-region office 16 (Ratchaburi), NBTC Sub-region office 21 (Roi Et), NBTC Sub-region office 22 (Ubon Ratchathani), NBTC Sub-region office 25 (Nakhon Phanom), NBTC Sub-region office 31 (Lampang), NBTC Sub-region office 32 (Tak), NBTC Sub-region office 33 (Phitsanulok), NBTC Sub-region office 42 (Phuket), NBTC Sub-region office 43 (Nakhon Si Thammarat), NBTC Sub-region office 44 (Surat Thani), and the Office of the NBTC Headoffice (Sailom).

** The test results were an average of 3 service providers, namely Advanced Wireless Network Company Limited, DTAC TriNet Company Limited and True Move H Universal Communication Company Limited.

Source: Telecommunications Enforcement Bureau, Office of the NBTC

In addition to the testing of the quality of mobile phone service of 5 operators at the Office of the NBTC Headoffice (Sailom), the Office of the NBTC Region, and the NBTC Sub - region, the NBTC had also operated the tests as follows:

- The testing of quality of mobile service according to the standards by conducting the tests according to the annual plan on fixed network in 25 provinces and mobile network in 72 provinces as well as the tests conducted upon 81 complaints.
- The testing of quality of mobile service according to the usage characteristics of users on LTE-Advanced technology or higher in 74 provinces.
- The testing of quality of mobile service according to special missions assigned on the occasion of His Majesty King Bhumibol Adulyadej the Great Memorial Day at Sanam Luang, Bangkok, during 9 - 14 October 2020.

2. Regulation on telecommunications service rate

The NBTC had regulated telecommunication service rate, the determination of the structure of service rate to be fair for users, and regulated mobile service rate in the frequency band of 2100 MHz, 1800 MHz, and 900 MHz to be in line with the licensing conditions along with reviewing the rate of telecommunications license fee to be suitable with market environment and promoted mobile service users to be served with cheaper service tariff as follows:

2.1 Rate of fixed - line service

Currently, there are 8 fixed - line operators, namely Amnax Company Limited (AMX), Advanced Wireless Network Company Limited (AWN), Triple T Broadband Company Limited (3BB), CAT Telecom Public Company Limited (CAT), DTAC TriNet Company Limited (DTN), Otaru World Corporation Company Limited (OTW), TOT Public Company Limited (TOT), and True Internet Corporation Company Limited (TRUE).

In the third quarter of 2020, the number of fixed-line subscribers was totally 5,103,147 numbers, which has been declining constantly due to a result of decreased demand for services and the substituted service by other types of telecommunication services, left only the service users who still see the importance of fixed-line service in terms of business operation, reserving for the use in house, for an emergency use, and for internet use via fixed-line network.

2.2 Rate of mobile service

Currently, there are 9 mobile service providers in Thailand which can be divided into 5 mobile network operators (MNO) consisting of Advanced Wireless Network Company Limited (AWN), DTAC TriNet Company Limited (DTN), True Move H Universal Communication Company Limited (TUC), and service providers which are state enterprises, owned by the Ministry of Finance, namely CAT Telecom Public Company Limited (CAT) and TOT Public Company Limited (TOT).

There are also 3 mobile virtual network operators (MVNO), which are service providers with no license to use the frequency and without own infrastructure and/or essential networks for providing mobile phone services, and 2 service providers under the service provided by DTN Company Limited and AWN Company Limited (Sub brand), namely FINN Mobile and GOMO by AIS.

Having considered the average rate of mobile phone service of the 5 major operators, it is found that the rates of voice service, SMS, MMS, and internet service in 2020 decreased comparing to the average service rate in 2019 which accounted for 8.15 percent, 10.66 percent, 17.95 percent, and 26.25 percent, respectively. Details are as shown in Table 39 and 40.



Table 39: Average service rate of mobile phone service in the third quarter of 2020

Rate of service	Voice service (baht/minute)	SMS (baht/message)	MMS (baht/message)	Internet service (baht/MB)
Reference rate according to the Single Rate Notification	0.60	0.89	2.33	0.16
Average service rate in 2019 ¹⁹	0.56	0.78	2.36	0.17
Average service rate in 2020 ²⁰	0.51	0.69	1.93	0.13
Rate of changes (%) comparing between an average service rate, in the year 2019 and 2020	-8.15	-10.66	-17.95	-26.25
Rate of changes (%) comparing between the year 2020 and the reference rate	-14.45	-21.92	-17.26	-21.43

Remarks: Average service rate of 5 major operators

Source: Telecommunications Tariff Bureau, Office of the NBTC

Table 40: Proportion of the number of sale promotional campaign being offered in the market for promotions that the service is charged by the actual usage in second and minute²¹

Proportion of the number of sale promotional campaign (percent)	Minute	Second
The year 2019 ²²	43.90	56.10
The year 2020 ²³	35.02	64.98
Rate of changes (%)	-20.22	15.83

Source: Telecommunications Tariff Bureau, Office of the NBTC

2.3 Having prepared the (draft) Order of the Office of the NBTC on Prohibition of Service Fees Collection in Telecommunications Services from Users in Different Rates for the Same Nature or Type of Telecommunications Services (additional) in order to amend the NTC Order No. 19/2010 on Prohibition of Service Fees Collection in Telecommunication Services

from Users in Different Rates for the Same Nature or Type of Telecommunication Services to be more appropriate. This is because today's technology can be developed to create awareness among users about the difference between the use of mobile service within the same network (on - net) and the use of mobile service across network (off - net).

¹⁹

Information on weighted average service rate based on the number of sales promotion campaign of service providers in Quarter 3 of 2019.

²⁰

Information on weighted average service rate based on the number of sales promotion campaign of service providers in Quarter 3 of 2020.

²¹

Proportion of the number of sales promotion campaign being charged in seconds and minutes is the data in Quarter 3 of 2019 and Quarter 3 of 2020.

²²

Proportion of the number of sales promotion campaign being charged in seconds and minutes is the data of 3 service providers namely AWN, TUC, and DTN.

²³

Proportion of the number of sales promotion campaign being charged in seconds and minutes is the data of 5 service providers namely AWN, TUC, DTN, CAT, and TOT.



Besides, to ensure that the regulation on service fees collection in telecommunication service is in accordance with the current situation, being fair for service users and service providers by taking into account the public interest as a priority, service users also have a variety of choices and meet the needs of service users to receive promotional sales campaign with the most suitable rates for their use, and to promote free and fair competition which leads to the efficient use of telecommunication resources and cost management. The draft Order had already been presented and opened to comments in the public hearing during 1 - 30 December 2020.

2.4 Regulation on International Telephone Service Rate

At present, the basic telephone operators and mobile operators play a role as international phone service providers. There are two types of technologies that support international telephone services; that are 1) International Direct Dialing (IDD) which users can choose to call directly

from mobile phones by dialing out the prefix number same as calling from a basic telephone without agent support, and 2) International Direct Dialing in economical rate, where users can make international calls at an economical rate.

At present, there are 6 major service providers in the international telephone market consisting of CAT Telecom Public Company Limited (CAT), TOT Public Company Limited (TOT), DTAC TriNet Company Limited (DTN), Advance Wireless Network Company Limited (AWN), AIN Globalcom Company Limited (AIN), and True Move H Universal Communication Company Limited (TUC). Those international telephone service providers have provided international telephone service through dialing the prefix number to make international calls in the IDD system for 11 numbers. In addition, CAT has offered telephone service via internet network or VOIP for domestic calls and international calls under the CAT 2 Call Plus service in which users can dial out via mobile applications. Details are as shown in Table 41.

Table 41: International telephone service providers

No.	Service providers	Active number	
		IDD	IDD in economical rate
1	CAT Telecom Public Company Limited (CAT)	001, 009	CAT 2 Call Plus
2	TOT Public Company Limited (TOT)	007, 008, 108 ²⁴	-
3	DTAC TriNet Company Limited (DTN)	004	00400
4	Advance Wireless Network Company Limited (AWN)	003	00500
5	AIN Globalcom Company Limited (AIN)	005	-
6	True Move H Universal Communication Company Limited (TUC)	006	-

Source: Numbering Management Bureau, Office of the NBTC

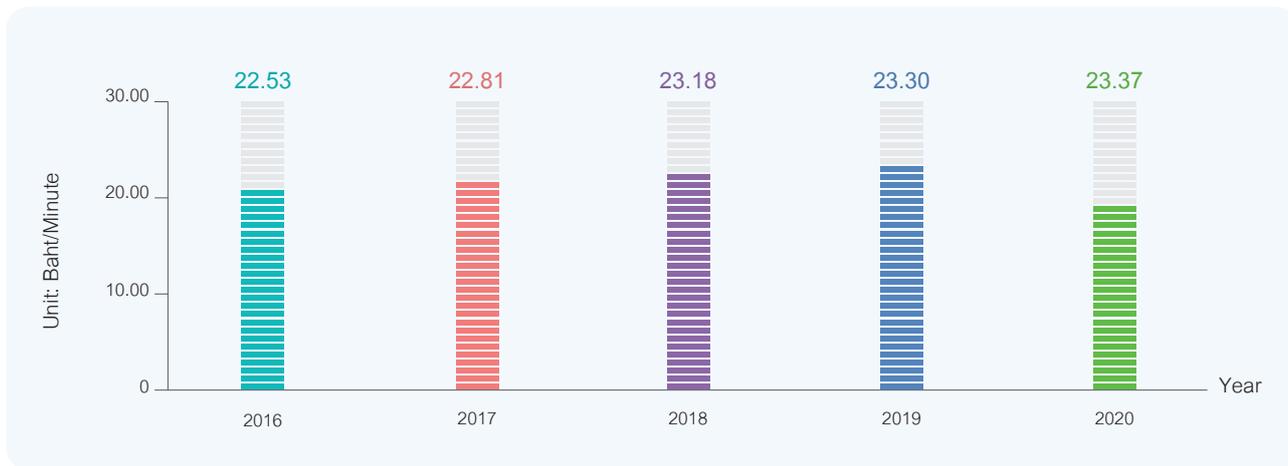
²⁴ Rates of international telephone service of TOT Public Company Limited, Code 108, are the same service rate as Code 007. Currently the service is only available for international calls originated from abroad (Malaysia only) to Thailand.



The average rates of international telephone service²⁵ are likely to increase slightly. In 2020, the average rates of international telephone service was 23.37 baht per minute, increasing 0.28 percent from the year 2019. If the consideration is made on calling to the destination countries in each region

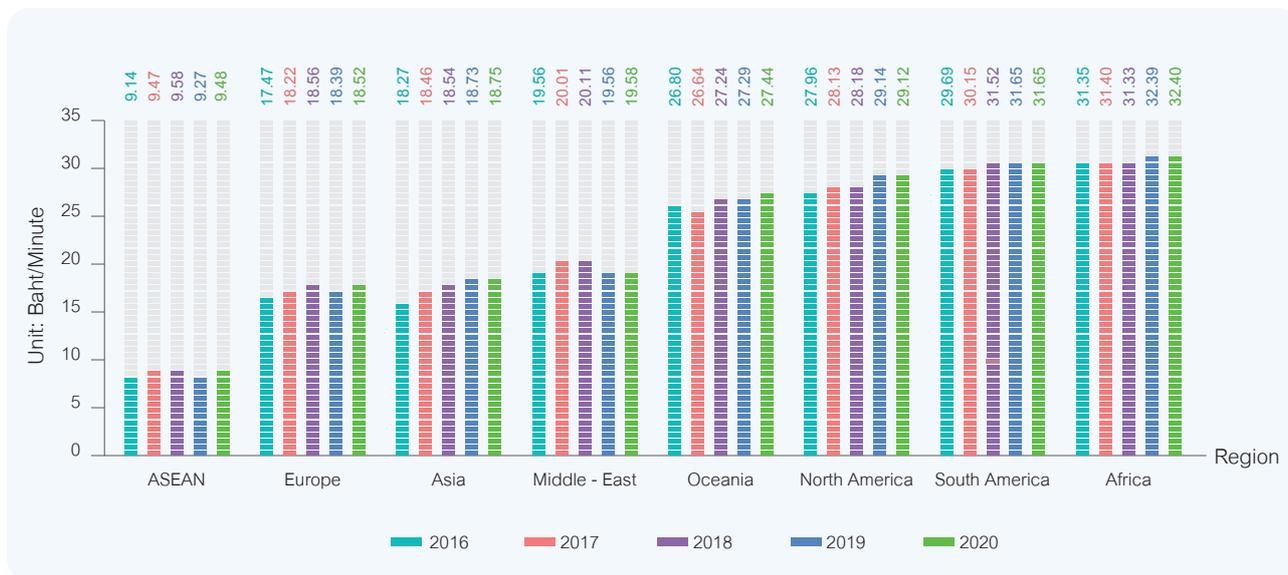
in 2020, it is found that ASEAN countries have the lowest service fee with an average rate of 9.48 baht per minute, followed by Europe (18.52 baht per minute), Asia (18.75 baht per minute), Middle East²⁶ (19.58 baht per minute) and Oceania (27.44 baht per minute), as shown in Charts 25 and 26.

Chart 25: Average rate of international telephone service during 2016 - 2020



Source: Telecommunications Tariff Bureau, Office of the NBTC

Chart 26: Average rate of international telephone service classified by region



Source: Telecommunications Tariff Bureau, Office of the NBTC

²⁵ International telephone service rates were the lowest rates offered by each service provider at the time and the average rate of service was the average rates inclusive of IDD services as of 2020.
²⁶ The service rates in Asia exclude the Middle East and ASEAN countries.

2.5 Regulation on international mobile roaming

Currently, there are 3 types of international mobile roaming services: Pay per Use, Tourist SIM, and Flat Rate. Each type of service charge being offered is varied according to different factors such as destination country, usage volume, data speed, service period, etc., which, as a result, provides users with a variety of choices and users can choose a sale promotional programs that suit their needs. The rates of roaming services charge for the year 2020 consisting of rate of the pay per use, Tourist SIM, and Flat Rate international roaming service charge, was collected from the data of international roaming rate of 3 major service providers, namely AWN Group, TUC Group, and DTN Group. The service charge for pay per use international roaming service and

Tourist SIM international roaming service can be classified into 6 services: Domestic Calls, Call back to Thailand, Calls to Third Country, Call Receiving, Short Message Service, and Data services as follows:

(1) Pay per Use

In 2020, the average of Pay per Use international roaming service charges for each service type are likely to increase from 2019 as mobile service providers had submitted additional data on roaming rates (originally, the Office of the NBTC collected data on roaming rates via service providers' websites) which, as a result, made the number of countries used in the calculation of average roaming rates increased when compared to the previous quarter. This results in an increase in the overall average roaming charges. Details are as shown in Table 42.

Table 42: Pay per Use international roaming service charge in 2020

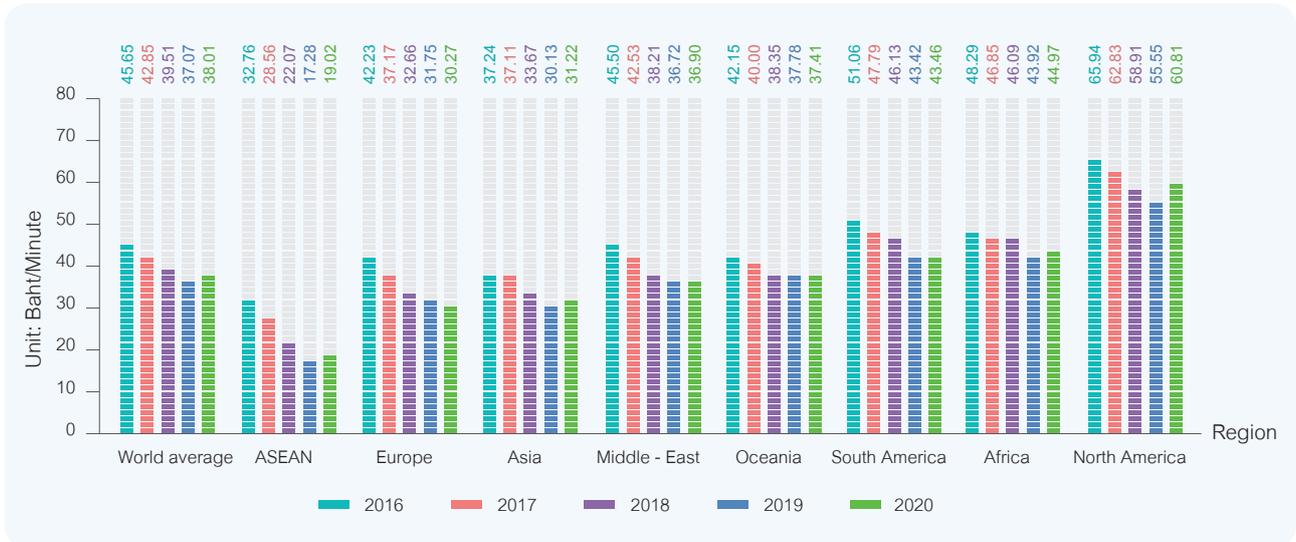
Pay per Use international mobile roaming service charge	Rate of services		
	AWN	TUC	DTN
Domestic calls	11 - 250 baht/minute	6 - 75 baht/minute	12 - 105 baht/minute
Call back to Thailand	32 - 310 baht/minute	6 - 75 baht/minute	30 - 375 baht/minute
Call to third country	40 - 350 baht/minute	6 - 75 baht/minute	40 - 375 baht/minute
Call receiving	26 - 190 baht/minute	6 - 75 baht/minute	25 - 185 baht/minute
Short Message Service	6 - 40 baht/message	6 - 11 baht/message	12 baht/message
Data service	0.06 - 0.9 baht/KB	0.01 - 0.45 baht/KB	0.3 - 0.85 baht/KB
Number of countries where roaming is available	215 countries	185 countries	185 countries

Source: Telecommunications Tariff Bureau, Office of the NBTC

- Rates of domestic call service will be charged when the user makes a call to the local number of his/her country of residence abroad.

The average service fee of domestic call rates in 2020 was 38.01 baht per minute, increasing 2.52 percent when compared to the previous year. Details are shown in Chart 27.

Chart 27: Rates of domestic call service during 2016 - 2020

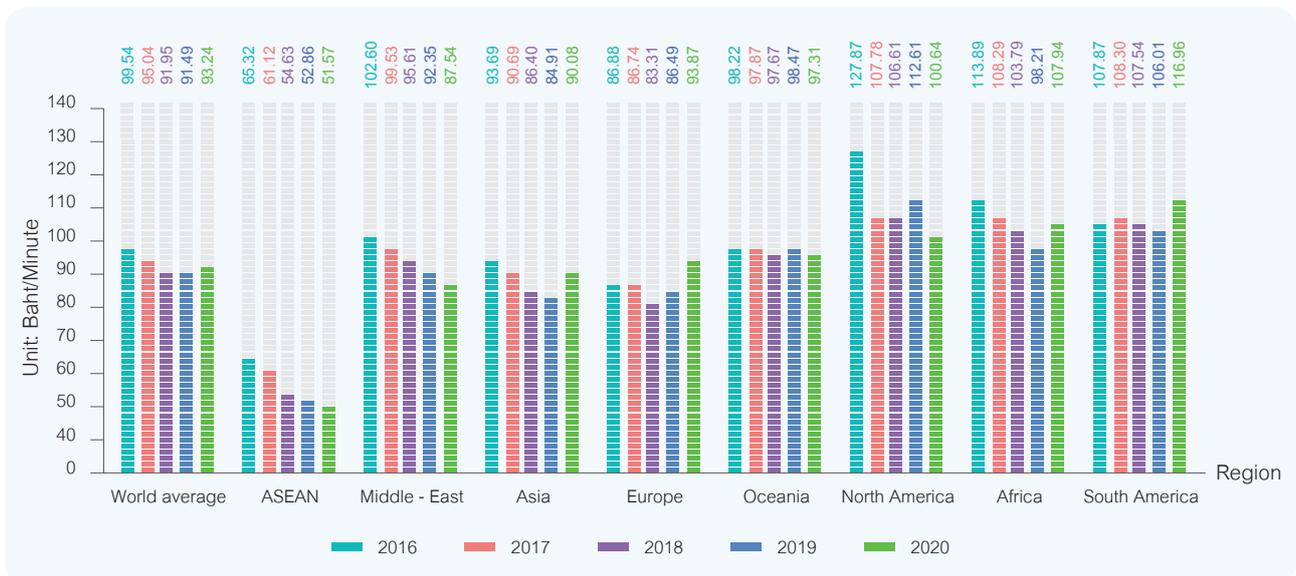


Source: Telecommunications Tariff Bureau, Office of the NBTC

• Rates of call back to Thailand service will be charged when the service user is abroad and make a call back to Thailand. The average

service fee rates in 2020 was 93.24 baht per minute, increasing 1.91 percent when compared to the previous year. Details are as shown in Chart 28.

Chart 28: Rate of call back to Thailand service during 2016 - 2020

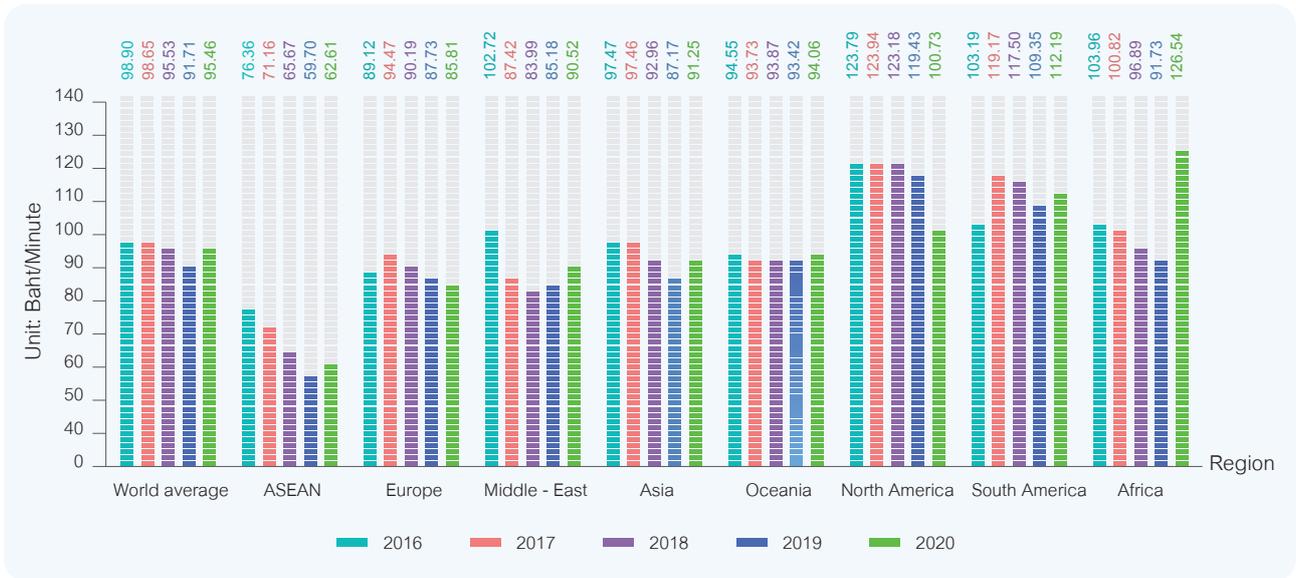


Source: Telecommunications Tariff Bureau, Office of the NBTC

• Rates of call to third country service will be charged when the user calls to the number of other destination countries (which is not their own country and the country of residence at that time).

The average rate of calls to third country service in 2020 was 95.46 baht per minute, increasing 4.09 percent when compared to the previous year. Details are as shown in Chart 29.

Chart 29: Rates of call to third country service during 2016 - 2020

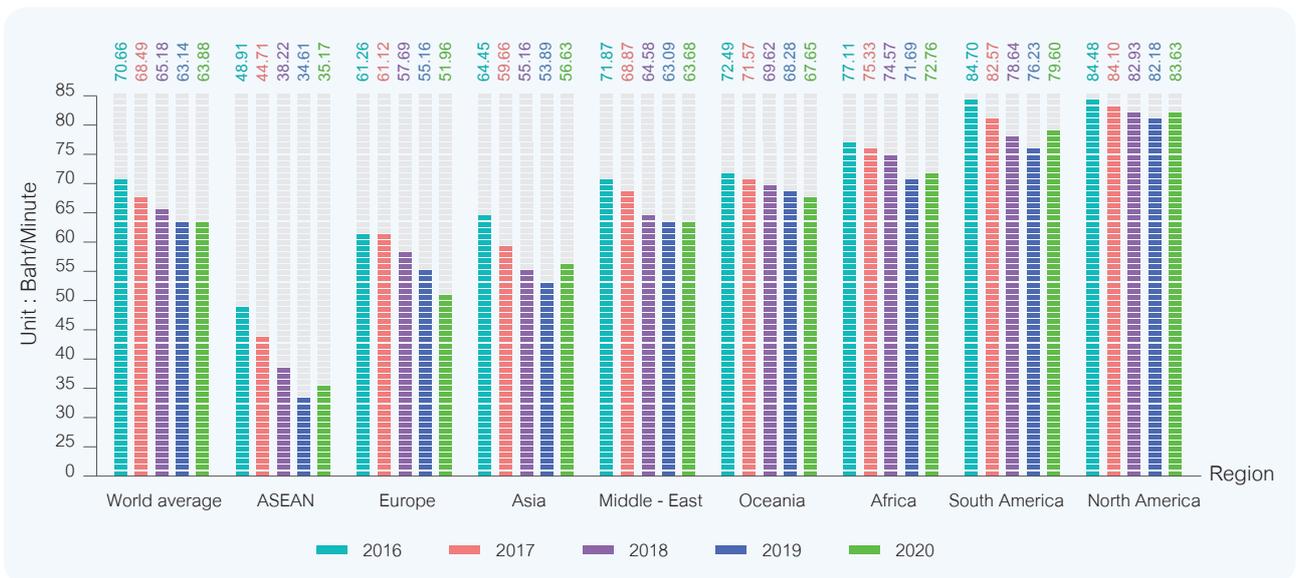


Source: Telecommunications Tariff Bureau, Office of the NBTC

• Rates of call receiving service will be charged when the user receives calls while being abroad. The average call receiving service rate in

2020 was 63.88 baht per minute, increasing 1.17 percent when compared to the previous year. Details are as shown in Chart 30.

Chart 30: Rate of call receiving service during 2016 - 2020



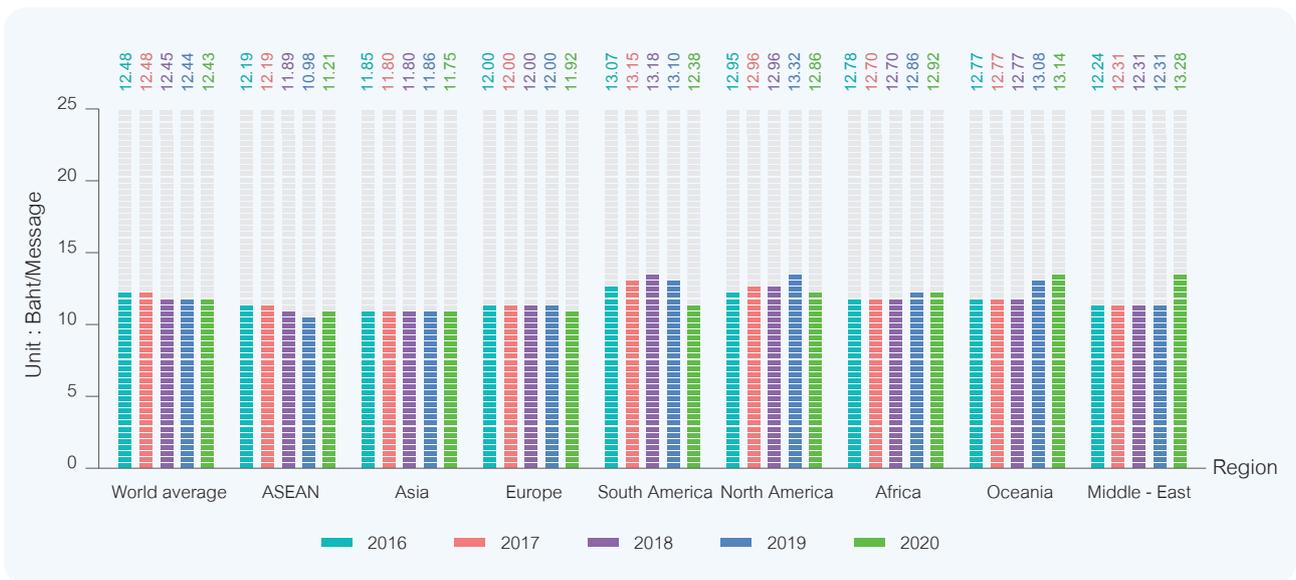
Source: Telecommunications Tariff Bureau, Office of the NBTC



- SMS service rates when users are abroad, the average SMS service fee in 2020 was 12.43 baht per message. The average SMS service rates are stable when compared to the year 2019, showing data service rates in different continents. At present, users are increasingly using smartphones, as a result, the demand for mobile

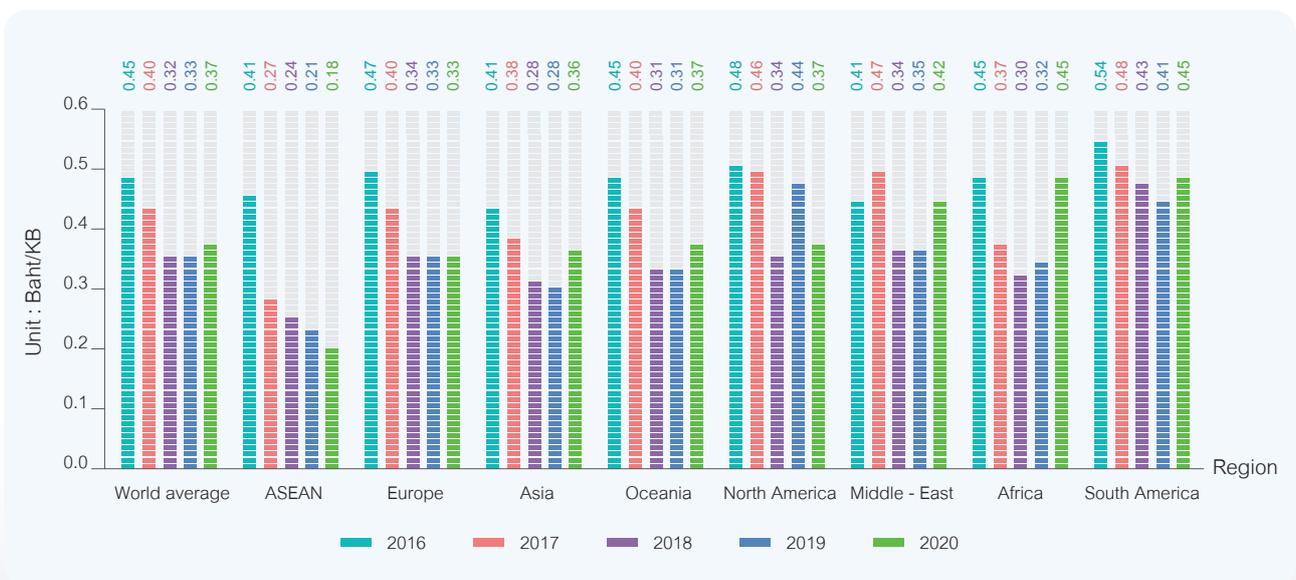
broadband service has also increased. The average data service rate in 2020 was 0.37 baht per KB, increasing 10.31 percent from the year 2019. However, data roaming services are only available in some countries due to limitations of infrastructure in some countries that supports mobile broadband services. Details are as shown in Chart 31 and 32.

Chart 31: Rates of Short Message Service (SMS) during 2016 - 2020



Source: Telecommunications Tariff Bureau, Office of the NBTC

Chart 32: Rates of data service during 2016 - 2020



Source : Telecommunications Tariff Bureau, Office of the NBTC



(2) Service charge in Flat Rate and Tourist SIM

All countries in the ASEAN region have an international roaming service charged in Flat Rate or Tourist SIM which is accounted for 100 percent, while the African region has the least countries ratio of Flat Rate or Tourist SIM which was 16.67 percent, 12.96 percent, and 38.89 percent for calling service, SMS, and data roaming service,

respectively. Most continents have offered roaming service either in Flat Rate or Tourist SIM more than 50 percent. Having classified by type of service, it is found that the proportion of data roaming service charged in Flat Rate or Tourist SIM was higher than calling service and SMS in all regions; while calling service and SMS have a similar proportion of service charge in Flat Rate or Tourist SIM. Details are as shown in Table 43.

Table 43: Number of countries that offered an international roaming service with Flat Rate or a Tourist SIM classified by region and ratio of countries that offered an international roaming service with Flat Rate or a Tourist SIM classified by region

Region	ASEAN	Africa	Asia	Europe	North America	South America	Oceania	Middle East
Unit : Number of areas and countries with Flat Rate or Tourist SIM (all areas and countries with IMR service)								
Call Service	9(9)	9(54)	18(24)	56(61)	27(37)	8(15)	10(19)	9(13)
SMS Service	9(9)	7(54)	18(24)	50(61)	26(37)	8(15)	10(19)	9(13)
Data Roaming Service	9(9)	21(54)	21(24)	57(61)	33(37)	14(15)	13(19)	9(13)
Unit : percent								
Call Service	100.00*	16.67	75.00	91.80	72.97	53.33	52.63	69.23
SMS Service	100.00*	12.96	75.00	81.97	70.27	53.33	52.63	69.23
Data Roaming service	100.00*	38.89	87.50	93.44	89.19	93.33	68.42	69.23

Remarks: International roaming service in ASEAN is excluded Thailand
 Source: Telecommunications Tariff Bureau, Office of the NBTC

Trend in Broadcasting, Television, and Telecommunications Industries in 2021

1. Trends in Broadcasting and Television Industries in 2021

The advancement of internet technology today has an effect on the change of behavior of Thai people in watching television and listening to radio programs. In the past 3 - 4 years, the consumers' needs to watch television programs and listen to radio programs (content) through internet and mobile applications (Over the Top Platform : OTT) have been increased as they can watch and listen in anywhere at any time across various devices. This provides consumers with more options to listen and watch the programs. Unlike the provision of television and broadcasting services that are broadcast through traditional channels that consumers have to watch and listen according to the program schedule.

The emergence and growth of the OTT platform in Thailand have not only changed the television viewing behaviors of the people, but also the environment for terrestrial television business operation. Most operators have begun to adjust their service provision in order to mainly meet the needs of consumers by expanding channels for content service provision to online platforms and applications. In addition, some operators have developed and produced program content to reach the target both Thai people and foreigners.

Although OTT technology has influenced the digital television industry and changed the people's behavior in viewing television programs, in 2020, however, it is found that viewers are more likely to watch digital television programs especially in the second quarter of 2020, which the tendency of time spent on watching television has changed more clearly than the time spent in the same period of 2019, with a change of up to 6.94 percent. Such period of time was during the COVID-19 pandemic and people spent most of their time at home in response to the government's policy on "stop disease, for the nation". The radio media has also become more popular during the New Normal with approximately 13.88 million listeners in June 2020. The behavior of watching television programs and listening to radio programs during the past few years clearly reflects that the broadcasting and television services still remain important and attractive to consumers among the current internet technology stream that plays a role in people's daily lives. However, amid the challenges of technology trends that affect the traditional business operation of broadcasting and television service providers. What is needed in the near future is the integration of operators in Thailand to drive Thai content to be able to compete in the international market. In this case, the government or regulatory body can play an important role in promoting and driving the creation of good quality content which will help build a strong content base for Thai operators.



2. Trends in telecommunications industry in 2020

The NBTC had held the multiband auction comprising the spectrum in the frequency band of 700 MHz, 2600 MHz, and 26 GHz in February 2020 which was successfully completed, and it enables the NBTC to allocate more spectrum for telecommunications services to the industrial sector of 2,960 MHz. Currently, the total volume of frequencies to be allocated for telecommunications is totally 3,220 MHz which will support the development of telecommunication infrastructure of Thailand. Thailand is also the first country in the Southeast Asian region who launch 5G for commercial services. At present, telecommunications licensees have accelerated the development of 5G network construction to cover the areas according to the specified auction conditions and they are competitive to develop new services which will benefit consumers and economy in overall.

Nowadays Thailand has 98.72 percent of telecommunication network coverage. In the past few years, there has been a dramatic change in the development of telecommunication services from the 4G era (Connecting People) to the 5G era (Connecting Everything). Recently, Thailand was ranked 29th in the world in terms of the country's comparative competitiveness from economic and telecommunications indications of IMD's World Competitiveness Ranking 2020 with the strengths in technological infrastructure. In terms of mobile broadband, it was ranked 4th in the world and the mobile broadband service rate was ranked 2nd in ASEAN. This reflects the availability of a comprehensive and efficient telecommunication infrastructure that enhance the country's competitiveness, achieve the government's policy to drive the country towards Thailand 4.0 or the Industry 4.0 era.

The uncertainty of the COVID-19 pandemic which may continue to the year 2021 has resulted in a slowdown in economic recovery and investment in the telecommunication industry. It is, however, expected that the volume of internet usage will be increased steadily and competition in the telecommunication

market is still highly competitive. Therefore, one important factor that the NBTC and the Office of the NBTC shall focus on is the assessment of the ecosystem readiness for entering the 5G era in order to be used for planning policies to promote the creation of an environment conducive to telecommunication business operation.

The telecommunication industry in 2021 has a tendency to grow continuously from the year 2020, with a supported factor by consumer behavior and Work From Home trends that result in increased use of internet services, Private sector investment in the construction of telecommunication networks for the provision of services on the 5G spectrum, and the government policy encouraging private companies to apply 5G technology in their business operation makes the volume of internet usage increase steadily because of the behavior of service users who consume more information via smartphones in order to perceive news, watch movies, listen to music, search for information, and do more online transactions. As a result, the use of mobile broadband services has increased. There is also a factor that stimulates internet usage from the situation of COVID-19 pandemic in the year 2020, which has driven both government and private sectors to adjust a new way of working by reducing traveling to work at the organization and working from home; whereas in the education sector, teaching and learning was conducted via online system. Such adjustment has led to a trend of more use of communication technology for work or study. Internet Service Providers have expanded their provision of fixed broadband services. The changes of behaviors and lifestyle, therefore, is expected to be a supporting factor to the telecommunication industry to grow more.

To provide 5G technology service, operators will have to invest more in building networks to support the 5G spectrum received from the auction, such as the spectrum in the high frequency band of 26 GHz used for supporting industries which has a low coverage rate. Therefore, they need to invest more in terms of towers and communication lines. On the other hand, operators in various industrial sectors

may change equipment, machinery, factory systems, and invest in new technologies to support the 5G technology upon the receipt of financial support and tax privileges from government agencies. However, the cost of 5G service provision is very high and the demand for 5G is likely to be limited, service providers may thus plan to choose network investment areas and target customers groups in order to make it worthwhile for investment.

In competition, there has already been a high competition in the telecommunications service retail market in recent years. Although the quality of service and data speed increases, but the service rate,

on the other hand, has comparatively declined continuously. As a result, the average income per month per number of mobile operators has dropped. Major operators still consist of Advanced Wireless Network Company Limited (AWN), True Move H Universal Communication Company Limited (TUC), DTAC TriNet. Company Limited (DTN), TOT Public Company Limited (TOT) and CAT Telecom Public Company Limited (CAT), in which the latter two are being in the merger process to become the National Telecom Public Company Limited (NT). For wholesale services market, it continues to grow with more volume of data usage.



5

Budget Management in the Year 2020



The Performance on Budget Expenditure of the Office of the NBTC in 2020

In 2020, the Office of the NBTC had operated according to the Action Plan and the budget expenditure in 2020 for totally amount of 6,548.329 million baht. The overall performance on budget expenditure of the Office of the NBTC under the workplans (routine works) and projects in the year 2020 as of 31 December 2020 at the amount of 6,124.720 million baht or accounting for 93.53 percent which can be divided into the budget expenditure for missions of the NBTC and the Office of the NBTC (routine works) at the amount of 3,493.898 million baht or accounting for

92.83 percent, expenditure for projects at the amount of 1,156.522 million baht or accounting for 93.52 percent, central budget at the amount of 538.490 million baht or accounting for 88.38 percent, expenditure for the operation of the Performance Follow-up and Evaluation Committee at the amount of 100.810 million baht or accounting for 97.42 percent, and contribution to the Fund as required by law at the amount of 835.000 million baht or accounting for 100.00 percent. Details are as shown in Table 44.

Table 44: The overall performance according to the workplan and budget expenditure in the year 2020

Unit: Million Baht

No.	Items	Fiscal year of 2020		
		Plan	Result	Percent
1	Budget expenditure for missions of the NBTC and the Office of the NBTC	3,763.920	3,493.898	92.83
2	Expenditure for projects	1,236.642	1,156.522	93.52
3	Central budget	609.292	538.490	88.38
4	Expenditure for the operation of the Performance Follow-up and Evaluation Committee	103.476	100.810	97.42
Total (1 - 4)		5,713.329	5,289.720	92.59
5	Contribution to the Fund as required by law	835.000	835.000	100.00
Total (1 - 5)		6,548.329	6,124.720	93.53

Source: Strategic and Budget Bureau, Office of the NBTC

Having compared the operating results according to the action plan and budget expenditure in the year 2020 to 2019, it is found that the budget expenditure can be spent more efficiently as in the year 2019 the operating results and budget expenditure is accounted

for 90.46 percent and in the year 2020 the operating results and budget expenditure is accounted for 93.53 percent of the budget received, which is increased from the previous year. Details are as shown in Table 45 and Chart 33

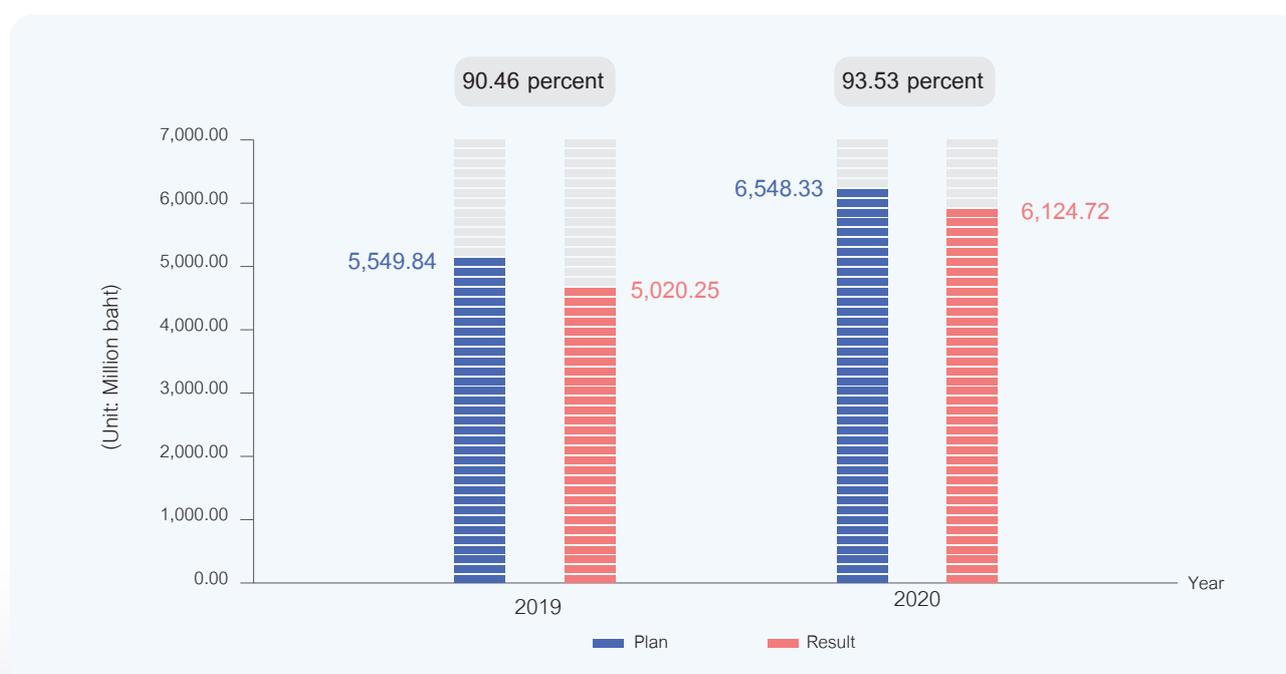
Table 45: Comparison of plan-result according to the workplan and budget expenditure between the year 2019 and 2020

Unit: Million Baht

No.	Items	Fiscal year of 2019			Fiscal year of 2020		
		Plan	Result	Percent	Plan	Result	Percent
1	Budget expenditure for missions of the NBTC and the Office of the NBTC	3,840.394	3,494.898	91.00	3,763.920	3,493.898	92.83
2	Expenditure for projects	1,455.723	1,286.242	88.36	1,236.642	1,156.522	93.52
3	Central budget	43.716	29.114	66.59	609.292	538.490	88.38
4	Expenditure for the operation of the Performance Follow-up and Evaluation Committee	-	-	-	103.476	100.810	97.42
Total (1 - 4)		5,339.837	4,810.254	90.08	5,713.329	5,289.720	92.59
5	Contribution to the Fund as required by law	210.000	210.000	100.00	835.000	835.000	100.00
Total (1 - 5)		5,549.837	5,020.254	90.46	6,548.329	6,124.720	93.53

Source: Strategic and Budget Bureau, Office of the NBTC

Chart 33: Comparison of performance according to the workplan and budget expenditure between the year 2019 and 2020



Source: Strategic and Budget Bureau, Office of the NBTC



WWAZ	▲	+111.51	▲	+90
TVRZ	▲	+92.21	▲	+83
TTAW	▲	+87.14	▲	+62
CCAD	▲	+131.94	▲	+12
HAEW	▼	+74.68	▼	+62
UJAS	▲	+94.71	▲	+61
RRAP	▼	-77.01	▼	-52

Financial Statements of the Office of the NBTC in the Year 2020

The Office of the National Broadcasting and Telecommunications Commission
Financial Statement
As of 31 December 2019

	Notes	Unit: Baht	
		2020	2019
Assets			
Current Assets			
Cash and cash equivalents	6	35,130,223,910.12	10,096,286,029.12
Short-term investment	7	385,392.95	381,197.26
Receivables from fees	8	9,871,313.01	14,695,950.44
Accrued revenue - current portion	9	37,546,689,541.31	67,069,169,262.07
Remaining supplies	10	6,829,208.36	2,241,628.46
Prepaid expenses	11	35,722,696.39	37,502,714.44
Receivables from spectrum and radiocommunications rental		26,583,652.25	26,608,193.60
Revenue to be remitted to Ministry of Finance according to the temporary protection measure	26	603,806,875.00	603,806,875.00
Other current assets	12	<u>400,698,700.45</u>	<u>466,674,167.34</u>
Total current assets		<u>73,760,811,289.84</u>	<u>78,317,366,017.73</u>
Non-current Assets			
Bank deposit with obligation	13	651,199,908.54	505,673,867.74
Long-term investments	14	223,810,624.47	220,276,543.81
Accrued revenue	9	173,634,570,999.14	117,573,633,000.00
Plant and equipment - net	15	1,892,820,021.93	1,475,341,199.23
Financial lease assets - net	16	292,453,607.08	286,830,318.10
Intangible assets - net	17	<u>335,275,665.85</u>	<u>218,612,168.24</u>
Total non-current assets		<u>177,030,130,827.01</u>	<u>120,280,367,097.12</u>
Total assets		<u>250,790,942,116.85</u>	<u>198,597,733,114.85</u>

Notes to financial statements are an integral part of these financial statements

The Office of the National Broadcasting and Telecommunications Commission
Financial Statement
As of 31 December 2020

	Notes	Unit: Baht	
		2020	2019
Liabilities and Equity			
Current Liabilities			
Creditors and notes payable	18	520,409,160.81	557,992,925.05
Deferred revenue	19	76,084,723.73	94,684,164.41
Estimated Current liabilities for employee benefit	20	34,847,250.00	34,005,830.00
State revenue in transit to the Treasury - current portion	21	40,905,315,005.53	62,793,792,805.76
Output tax on spectrum auction in transit - current portion	22	2,212,560,440.29	4,432,983,307.43
Contribution to the Digital Economy and Society Development Fund - current portion	23	3,850,779,189.98	2,420,077,606.87
Financial lease liabilities - current portion	24	99,754,409.94	90,419,307.12
Revenue received according to the temporary protection measure	26	603,806,875.00	603,806,875.00
Compensation, Recompense or Remuneration Liabilities according to the Order of the Head of NCPO	27	5,514,341,549.46	3,785,521,426.46
Other current liabilities	28	1,962,834,583.76	262,399,688.73
Total current liabilities		55,780,733,188.50	75,075,683,936.83
Non-current Liabilities			
Estimated non-current liabilities for Employee benefit	20	1,262,245,003.00	959,535,096.00
Spectrum and radiocommunications equipment rental held in trust		26,583,652.25	26,608,193.60
State revenue in transit to the Treasury	21	117,091,589,881.60	104,946,855,000.00
Output tax on spectrum auction in transit to the Treasury	22	11,359,270,999.94	7,691,733,000.00
Contribution to the Digital Economy and Society Development Fund	23	4,403,233,933.33	4,935,045,000.00
Revenue from spectrum reforming in transit to the BTFP	25	27,174,007,110.32	-
Financial lease liabilities of long term debts - net	24	199,160,378.97	199,687,326.88
Spectrum auction payment guarantee deposit		8,000,000,000.00	-
Other non-current liabilities	29	86,054,849.33	88,643,076.51
Total non-current liabilities		169,602,145,808.74	118,848,106,692.99
Total liabilities		225,382,878,997.24	193,923,790,629.82
Equity			
Capital		198,325,867.44	198,325,867.44
Revenue above (below) cumulative expenses		25,209,737,252.17	4,475,616,617.59
Total equity		25,408,063,119.61	4,673,942,485.03
Total liabilities and equity		250,790,942,116.85	198,597,733,114.85

Notes to financial statements are an integral part of these financial statements

The Office of the National Broadcasting and Telecommunications Commission
Financial Performance Statement
For the year ended 31 December 2020

	Notes	Unit: Baht	
		2020	2019
Revenue from operations			
Revenue from spectrum auction	30	92,912,047,787.50	20,676,036.99
Revenue from state-enterprises under Section 84 Paragraph Three	31	2,004,549,395.58	147,655,942.02
Revenue from licensing fee and licenses	32	5,675,391,605.74	5,081,182,369.59
Revenue from numbering fee	33	3,343,621,217.11	3,892,100,989.69
Revenue from the Research and Development Fund	34	499,006,521.11	-
Other revenues	35	158,192,015.27	196,382,380.28
Total revenues		104,592,808,542.31	9,337,997,718.57
Operating expenses			
Compensation, Recompense or Remuneration according to the Order of the Head of NCPO	36	934,435,041.20	3,755,403,060.75
Expense on state revenue to be remitted to the Treasury	37	40,831,332,914.97	213,854,790.76
Expenses of the auction	38	30,214,513,638.55	24,063,582.02
Contribution to the Digital Economy and Society Development Fund	23	2,849,460,656.52	1,342,602,452.08
Human resources expenses	39	1,723,694,818.55	1,527,907,707.69
Pension expenses	40	342,534,144.69	106,091,894.40
Remuneration	41	32,131,250.00	37,652,207.73
Current expenses	42	1,422,969,629.82	1,480,226,344.66
Supply expenses	43	49,261,034.12	52,794,225.79
Utilities expenses	44	81,856,370.17	76,920,490.26
Depreciation and amortization	45	633,802,015.63	610,239,375.03
Financial support for Education, Research and Development	46	937,892,477.00	361,856,907.35
Expenses for promoting and supporting the R&D Fund's objectives		625,000,000.00	730,000,000.00
Contributions to the Edtech Fund		210,000,000.00	10,000,000.00
Other expenses	47	72,286,045.65	128,866,882.84
Total expenses		80,961,170,036.87	10,458,479,921.36
Revenues above (below) expenses before financial cost		23,631,638,505.44	(1,120,482,202.79)
Financial cost		12,081,654.05	5,583,539.73
Revenues above (below) expenses for the year		23,619,556,851.39	(1,126,065,742.52)

Notes to financial statements are an integral part of these financial statements

The Office of the National Broadcasting and Telecommunications Commission
 Statement of Changes in Equity
 For the year ended 31 December 2020

	Equity	Revenue above (below) cumulative expenses	Total	Unit: Baht
Outstanding balance as of 31 Dec 2018 - according to the statement reported	198,325,867.44	4,022,652,924.90	4,220,978,792.34	
Cumulative effect of accounting error from prior year	-	-	-	
Outstanding balance as of 31 Dec 2018 - adjusted trial balance	198,325,867.44	4,022,652,924.90	4,220,978,792.34	
Revenue to be remitted to the Treasury	-	1,579,029,435.21	1,579,029,435.21	
Revenue above (below) expense for the period	-	(1,126,065,742.52)	(1,126,065,742.52)	
Outstanding balance as of 31 Dec 2019	198,325,867.44	4,475,616,617.59	4,673,942,485.03	
Outstanding balance as of 31 Dec 2019 - according to the statement reported	198,325,867.44	4,475,616,617.59	4,673,942,485.03	
Cumulative effect of accounting error from prior year	-	-	-	
Outstanding balance as of 31 Dec 2019 - adjusted trial balance	198,325,867.44	4,475,616,617.59	4,673,942,485.03	
Revenue to be remitted to the Treasury	-	(2,885,436,216.81)	(2,885,436,216.81)	
Revenue above (below) expense for the period	-	23,619,556,851.39	23,619,556,851.39	
Outstanding balance as of 31 Dec 2020	198,325,867.44	25,209,737,252.17	25,408,063,119.61	

Notes



The Office of the National Broadcasting and Telecommunications Commission
Notes to Financial Statements
For the year ended 31 December 2020
(Unit: Million baht, except as being specified)

1. General Information

The Office of the National Broadcasting and Telecommunications Commission or “the Office of the NBTC” is a juristic person, having a status of a state agency, established by virtue of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment (the Act on the Organization 2010 and its amendment) to have powers and duties in regulating and developing the broadcasting, television, and telecommunications services for the National Broadcasting and Telecommunications Commission, called in short “the NBTC” who has set up policies, criteria, procedures, conditions, fees, and other rules in matters related to spectrum management, licensing and frequency usage regulation, broadcasting, television and telecommunications business operation, telecommunications numbering usage, telecommunications network interconnection or access, prevention of monopoly or unfair competition, consumer protection, and provision of the broadcasting, television and telecommunications universal service. Also, a Fund shall be established under the Office of the NBTC, namely the “Broadcasting and Telecommunications Research and Development Fund for the Public Interest”, called in short “the Research and Development Fund”.

The Headoffice of the Office of NBTC is located at 87 Soi 8 (Sai Lom), Phaholyothin Road, Sam Sen Nai, Phayathai, Bangkok 10400.

The revenue of the Office of the NBTC shall be under Section 65 of the Act on the Organization B.E.2553 (2010) as follows:

- (1) Spectrum license fees and business license fees under Section 42 paragraph two and Section 45 paragraph three.
- (2) Revenues or benefits accrued from the conduct of duties of the NBTC and the Office of the NBTC.
- (3) Revenues derived from the Office of the NBTC’s property.
- (4) Money and property donated to the Office of the NBTC in accordance with the regulation set forth by the NBTC for the operation of the Office of the NBTC.
- (5) Subsidies from the government.

Revenues of the Office of the NBTC under (1) and (2) after deducting by expenditures for efficient operation of the Office of the NBTC, necessary burden costs, and money allocated for the Fund under Section 52, the Edtech Fund under the law on national education and Digital Economy and Society Development Fund under the law on digital economic and society development, the rest shall be remitted as the state revenue.

2. Criteria for financial statement preparation

2.1 The financial statements have been prepared in accordance with the Public Sector Accounting Policies and Standards B.E.2561 (2018) prescribed by Ministry of Finance which included the accounting principles and policies for public sector according to the public sector accounting standards and accounting policies, and listed in the financial statements under the public sector financial statement presentation according to the letter of the Comptroller General’s Department, the most urgent, No. MF 0410.3/C.357 dated 15 August 2018.

The financial statements are recorded on the accrual basis except those specifically stated in other accounting policies.

The financial statement of the Office of the NBTC had included accounting entries occurring in both the headoffice and regional departments. This is considered an agency that prepared reports according to the public sector accounting standards.



2. Criteria for financial statement preparation (continued)

2.2 The financial statements had excluded the accounting entries of the Broadcasting and Telecommunications Research and Development Fund for the Public Interest which has been established under the Act on the Organization B.E.2553 (2010) and its amendment in accordance with the letter of Ministry of Finance No. MF 0410.2/C.2 dated 28 January 2019 on practical guidelines for the financial statements preparation for public sector stipulating that while the Public Sector Accounting Standard No. 35 on Consolidated Financial Statement has not yet become effective, the consolidated financial statements shall be prepared by having included the financial statements of the entities under control that are required by law to prepare a separate financial statements in the same financial statement without eliminating intercompany transactions and the significant intercompany transaction shall be shown in the notes to financial statements. However, The consolidated financial statements are intended to be used for administration and therefore does not have to be submitted to the Office of the Auditor General of Thailand.

The financial statement of the Fund for the year ended 31 December 2020 and 2019 which was excluded this financial statements is detailed as follows:

	2020	2019
Financial statements		
Assets		
Cash and Cash Equivalents	12,106.18	10,370.89
Accrued revenue - current portion	8,111.17	9,486.07
Short-term investment	42,770.18	39,258.62
Current assets	6,285.27	4,989.61
Plant and equipment - net	1.07	1.79
Infrastructure assets - net	9,443.68	3,058.12
Total assets	78,717.55	67,165.10
Liabilities and Equity		
Short-term creditors	7,199.70	1,882.90
Current liabilities	2.05	1.14
Long-term creditors	3,089.50	-
Deferred income contributed to the Fund	56,884.12	59,125.12
Non-current liabilities	259.91	265.34
Total liabilities	67,438.28	61,274.50
Net assets/equity	11,279.27	5,890.60
Equity	2,926.32	2,926.32
Revenue above (below) accumulated expenses	8,352.95	2,964.28
Net total assets/equity	11,279.27	5,890.60



2. Criteria for financial statement preparation (continued)

	2020	2019
Comprehensive Profit and Loss Statement		
Revenues		
Revenue from contribution to the Fund	13,241.36	14,490.25
Other revenues	598.09	911.46
Total revenues	13,839.45	15,401.71
Expenses		
Expense for promoting and supporting the Fund's mission	1,679.36	1,569.71
Expenses for spectrum auction payment	352.00	1,123.17
Expenses according to the USO plan	1,659.90	319.70
Expenses for supporting the utilization of spectrum	3,683.64	-
Depreciation and amortization	949.27	0.13
Total expenses	8,324.17	3,012.71
Revenues over expenses - net	5,515.28	12,389.00

3. The new public sector accounting standards and public sector accounting policies and the revised public sector accounting standards and public sector accounting policies

Ministry of Finance has announced the new public sector accounting standards and public accounting policies as follows:

Having become effective on or after the accounting period of 1 January 2020:

Public sector accounting principles and policies

Accounting standards No.1	on Financial Statement Presentation
Accounting standards No.3	on Accounting policies, change of accounting forecast and errors
Accounting standards No.5	on Loan costs
Accounting standards No.12	on Inventory
Accounting standards No.13	on Lease agreement
Accounting standards No.14	on Situation after reporting period
Accounting standards No.16	on Real property for investment
Accounting standards No.17	on Land, plant and equipment
Accounting standards No.31	on Intangible assets
Accounting standards No.23	on Revenue from unchanged transaction
Accounting policies	on Investment fund

The management believes that the above-mentioned new public sector accounting standards and public accounting policies will not have any significant impact on the financial statements in the period it is applied.



4. Summary of important accounting policies

1. Cash and Cash Equivalents

Cash and cash equivalents comprise of cash on hand, deposits held at call with banks and cash in bank accounts in classification of less than and 3-month fixed-term account.

2. Short-Term Investment

Short-term investment is the cash in bank accounts in classification of 3-month fixed-term account from the date of acquisition but no longer than 12 months.

3. Fee Receivables

Fee receivables are shown by estimated net value receivable after deducting the doubtful debts which is estimated from reviewing of outstanding balances at the end of accounting periods.

Allowance for doubtful accounts will consider from the doubtful receivables, estimated by the amount of outstanding balance at the end of the accounting period based on payment history, current debtors' financial status and the situation of legal action against the debtors including the percentage rate according to the debt's age of the balance at the end of accounting periods. Doubtful account will be recognized in the statement of comprehensive income and will be considered as an integral part of the expenses.

The age of fee receivables can be analyzed in the following rate:

- Outstanding fee receivables for not later than 180 days, estimated allowance for doubtful accounts at a rate of 0 percent.
- Outstanding fee receivables between 181 - 365 days, estimated allowance for doubtful accounts at a rate of 25 percent.
- Outstanding fee receivables between 366 - 730 days, estimated allowance for doubtful accounts at a rate of 50 percent.
- Outstanding fee receivables overdue more than 730 days, estimated allowance for doubtful accounts at a rate of 75 percent.
- Fee receivables that are in the legal proceedings, estimated allowance for doubtful accounts at a rate of 100 percent.

4. Accrued income

Accrued income refers to the annual license fee revenue, calculating from the revenue from the business operation taken in the accounting period of the licensee. The payable will be made once a year, within one hundred and fifty days from the end of the accounting period according to the NBTC Notification on Broadcasting Business License Fee B.E.2555 (2012) and the NBTC Notification on Telecommunications Business License Fee including the revenue from spectrum auction according to Section 42 and 45 of the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment, the Announcement of the National Council for Peace and Order No.80/2014, the Order of Head of the National Council for Peace and Order No.76/2016, and the Order of the Head of the National Council for Peace and Order No.9/2018.

5. Receivables of spectrum and radiocommunications equipment rental

The receivables of spectrum and radiocommunications equipment rental are the receivables that the Office of the NBTC collected from debtors on behalf of the Ministry of Finance. The entry will be recorded in double with the spectrum and radiocommunications equipment rental receivables account. When the amount is paid by the debtors, the recorded entry of spectrum and radiocommunications equipment rental receivables account will be transferred to the account of state revenues in transit to the Treasury - the radiocommunications equipment rental and violation fees.



4. Summary of important accounting policies (continued)

6. Plant and equipment

6.1 Assets owned by the authority, plant and equipment having shown by cost price deducted by accumulated depreciation and losses result from accumulated impairment.

Cost price includes direct costs associated with acquisition of assets, the cost of construction that the property constructed by the authority itself including the cost of materials, direct labor and other direct costs related to the supply of assets so that those assets are in the right place and ready to be used, and estimation of demolition costs, the removal and restoration of the location of the assets which is an obligation arising from the acquisition or use of the assets.

The components of each building and equipment which are varied and different in the use must be recorded separately from each other.

Profits or losses on disposals of plant and equipment are the difference between net returns receiving from the disposals and accounting value of plant and equipment. The net amount will be recognized as income or expense in profits or losses.

6.2 Leased assets, the leases that an authority may take the risks and remuneration of possessing the leased assets which can be classified into financial lease, plant and equipment acquired through financial lease contracts are recorded as assets by current value of the minimum amount to be paid according to the lease contract, depending on less amount may be, deducted by the accumulated depreciation and losses from accumulated impairment.

The rentals paid will be classified into finance expenses and deduction from the liabilities under the lease contract to ensure that the rate of interest, when compared to the outstanding liabilities in each period, is a fixed rate. Finance expenses will be directly recorded on profits or losses.

Costs incurred afterward

The cost of replacing components will be recognized as a part of the accounting value of the item of plant and equipment. If there is a possibility that the authority will get the future economy-based benefits from that item and be able to reliably measure the cost value of the item, the replaced component will be deleted from the account by the accounting cost value incurred in the regular maintenance of plant and equipment and will be recognized on profits or losses upon the occurrence.

Depreciation is calculated by using a straight line basis over the estimated useful lives as follows:

Type of Assets	Estimated Useful Lives (Year)
Plant and its improvement	5 - 20
Electrical and radio equipment	5
Computer equipment	3
Vehicles equipment and transportation	8
Office supplies and others	2 - 15

Criteria for the Recognition of Plant and Equipment

- 1997 - 2002
 - Equipment to be recognized as assets must have historical cost from purchasing or acquisition at price per unit, set, or group not less than 30,000 baht.
 - Equipment that purchased or acquired before the year 1997 shall not be estimated for the price but must be recorded in the Asset Control Registration.



4. Summary of important accounting policies (continued)

- 2003 - 2007 - Equipment to be recognized as assets must have historical cost from purchasing or acquisition at price per unit, set, or group not less than 5,000 baht, and be classified according to the durable articles standard account of the Office of the NBTC without having amended the existing criteria.
- 2008 - 2018 - Equipment to be recognized as assets must have historical cost from purchasing or acquisition at price per unit, set, or group not less than 10,000 baht, and be classified according to the durable articles standard account of the Office of the NBTC without amended the existing criteria.
- 2019 - Equipment to be recognized as assets must be classified according to the durable or normal condition and having a long service life, not depleted, unwastedful or unchanged in a short time.
- 2020 - Equipment to be recognized as assets must have historical cost from purchasing or acquisition at price per unit, set, or group not less than 10,000 baht according to the durable or normal condition and having a long service life, not depleted, unwastedful or unchanged in a short time.

7. Intangible Asset

Intangible assets will be recorded by cost after deducting accumulated amortization and allowance for impairment losses.

The amortization is calculated by using the straight line method according to the estimated useful lives of the intangible assets.

Criteria for the recognition of intangible assets

- 2010 - 2013 Intangible assets of computer program to be recognized as assets must have its value of not less than 50,000 baht.
- 2014 - 2018 Intangible assets of computer program to be recognized as assets must have its value of not less than 30,000 baht.
- 2019 Intangible assets of computer program to be recognized as assets must have its value of not less than 20,000 baht.
- 2020 Intangible assets of computer program to be recognized as assets must have its value of not less than 10,000 baht.

8. Deferred income

The revenue from spectrum auction for the provision of digital TV services will be recognized as deferred income based on the actual costs of each period in relation to provide people with a comprehensive digital television broadcasting service. The unrecognized income will be shown as liabilities in the deferred income account.

9. Estimated liabilities

Estimated liabilities will be recognized when the Office of the NBTC has a current legal liability or incurred as a result of past events and there is a clearly possibility that economic benefits shall be used for paying the liabilities as well as being able to estimate the amount of liabilities reliably. The estimated liabilities will be considered on cash flows discounting to be paid in the future by using the current market discount rate in order to reflect the amount that may be assessed in the current market, which varies to time and risk to liabilities. Any increase in the estimated liabilities due to elapsed time is recognized as a finance cost.





4. Summary of important accounting policies (continued)

10. Surplus to be remitted as state revenue

Revenue or benefits accrued from the operation under powers and duties of the NBTC and the Office of the NBTC in any year which had been received in a year after deducting the efficient operating expenses of the Office of the NBTC, other necessary burdens, contributions to the Funds according to Section 52, the Edtech Fund under the law on National Education and the Digital Economy and Society Development Fund under the Law on Digital Economy and Society Development, the rest must be remitted as state revenue. In addition, the Office of the NBTC will take remaining cash balance from necessary obligations expenses in the previous years in which the operation could not be completed within 2 years remitted as the state revenue including any program or project that has already been budgeted but has not paid or committed within that fiscal year, the program or project shall be folded and the Office of the NBTC shall remit the budget for such program or project as state revenue.

11. The revenue from spectrum auction for IMT service in the frequency band of 900 MHz and 1800 MHz after deducting the cost of the auction preparation including interests must be remitted as state revenue according to the Act on the Organization B.E.2553 (2010), Section 45 Paragraph One.

12. License fees for the use of spectrum for the provision of digital television services, in category of national commercial services in the 1st installment, shall be remitted to the Research and Development Fund. However, the fee in part of a minimum price will be used for supporting the public to access to the digital television services thoroughly to be in accordance with to the NBTC Notification on Criteria, Procedures and Conditions for the Spectrum Auction for the Provision of Digital Television Services, in Category of National Commercial Services B.E.2556 (2013) and Section 53 (2) of the Act on the Organization B.E.2553 (2010).

However, the revenue from the license fees for the use of spectrum for the provision of digital television services, in category of national commercial services, after deducting the expenses, must be remitted as state revenue according to the Announcement of the National Council for Peace and Order No.80/2014. Besides, prior to the effective date of the Notification, if the revenue from the license fees have not yet been remitted to the Research and Development Fund after deducting the expenses, it must be remitted as state revenue within 15 days starting from the effective date of this Notification according to the Order of the Head of National Council for Peace and Order No.76/2016 regarding Measures for Promoting Broadcasting, Television and Telecommunications Business Operation for the Public Benefit. This includes the Order of the Head of National Council for Peace and Order No.9/2018 regarding Measures to Mitigate the Impacts on Radio Broadcasting Service and Television Business Operators by having suspended the payment of the license fees for the use of spectrum which shall not exceed three years and the licensee shall pay the interests on the due date of the license fee payment in each instalment to the Office of the NBTC at the same rate of the interest rate policy prescribed by the Financial Policy Committee, Bank of Thailand and the Order of the Head of National Council for Peace and Order No.4/2019 on Measures to Solve Problems of Television and Telecommunication Business Operation by having exempted the payment of license fee for the use of spectrum according to the criteria, procedures and conditions prescribed by the Office of the NBTC.

13. Employee Benefits

The Office of the NBTC is not subject to the Labour Protection Act, Labour Relations Act, Social Security Act, and Compensation Act. The Office of NBTC has its regulations regarding employee benefits as follows:



4. Summary of important accounting policies (continued)

13.1 Short-term employee benefits

Liabilities estimation of short-term employee benefits are recognized without discounted cash flows and recognized as an expense in the profit and loss statement when the employees work for the organization and liabilities are recognized at the amount expected to be paid for the special remuneration payment to employees and benefits in the form of short-term cash or legal obligations or inferred obligations to be paid as a result of the employee's work in the past and this obligation can be reasonably estimated.

13.2 Employee benefits after retirement

1) Project on contributions

The Office of the NBTC has set up a provident fund for employees to be a welfare and to support the saving, which is a characteristic of the defined contribution plan, in accordance with the Regulation of the Office of the National Telecommunications Commission (NTC) on Provident Fund of Employees of the Office of the National Telecommunications Commission B.E.2549 (2006). The assets of the provident fund have been separated from the assets of the Office of the NBTC and managed by the external fund manager. The said provident fund receives saving money from employees and contributions from the Office of the NBTC and the contributions to the provident fund are recorded as expenses in the profit and loss statement for the period in which the transaction occurred.

2) Project on pension benefit

The Office of NBTC has obligated to pay compensation to employees upon their retirement in accordance with the NBTC Regulation regarding Employees' Pension and Welfare after Retirement B.E.2555 (2012) and the compensation is considered as the project on pension benefit.

Liability estimation of employee benefits under the project on pension benefit will be recognized in the financial statement by the current value of the obligation at the end of the reporting period. The obligation is calculated by using the estimated discount method by an independent insurance actuator every year.

The liability incurred during the transition period which are caused by the difference of benefit obligation and liability in the balance sheet for the project on pension benefit according to the old accounting policy as of the date the accounting policy has been changed, the Office of the NBTC will recognize through the full amount of retained earnings by using backward adjustment method.

The profits and losses from the estimation under the actuarial science principle will be recognized in other comprehensive income.

The past service costs will be recognized in full amount in the profits or losses statement as soon as the project is adjusted or reduced in size or when the Office of the NBTC recognizes the cost of the related project adjusted.

14. Revenue recognition

The Office of the NBTC had recognized the revenues in each type as follows:

- Revenue from the spectrum auction, Section 41 Paragraph Two, and Section 45 Paragraph Two under the Organization Act B.E.2553 (2010) and its amendment has been recognized on an accrual basis according to the content of relevant agreements.
- Revenue from the spectrum remuneration for radiocommunications service has been recognized on an accrual basis.
- Revenue from license fees under the Radiocommunications Act has been recognized upon the approval of application.
- Revenue from business license fee has been recognized on an accrual basis.
- Revenue from numbering fee has been recognized monthly on an accrual basis.



4. Summary of important accounting policies (continued)

- Revenue from license fees for spectrum transfer has been recognized upon the approval of application.
- Revenue from application fee has been recognized according to revenue category of the application upon the receipt of application.
- Revenue from 1 Por Nor Radio Broadcasting Station, has been recognized monthly on an accrual basis.
- Revenue from other fees has been recognized upon the receipt of forms.
- Revenue from interest receivables has been recognized on proportion of time basis.
- Other revenues apart from the above-mentioned revenues has been recognized on an accrual basis.

15. Revenue of state-enterprises according to Section 84 Paragraph Three

The revenue of state-enterprises according to Section 84 Paragraph Three of the Act on the Organization B.E.2553 (2010) prescribing that when three years have lapsed after the day on which this Act has come into force, the state enterprises' revenues, which are derived from the undertakings under the authorization, concession of contract according to Paragraph Two that the state enterprises operated under the law on private participation in state undertaking whether the undertaking is in whole or in part, shall be subtracted by the expenses of business license fees calculated from income base which is generated from the authorization, concession or contract, expenses for supporting the provision of universal basic telecommunications and social services in accordance with the government policies and Section 50 in part of calculating from income base which is generated from the authorization, concession or contract, and expenses incurred from the operation associated with the authorization, concession or contract as prescribed by the Ministry of Finance and remitted to the NBTC, upon which it shall transfer the said money to the state treasury.

16. The revenue from services provision on behalf of the state is the revenue under the NBTC Notification on Measure for Temporary Protection of Users in the case of Termination of the Licensing, Concession or Contract for Provision of Mobile Phone Service B.E. 2556 (2013), Article 7.

During the protection period, the service provider shall be the recipient for the revenue payment of service provision on behalf of the state by having receivable account separated specifically, and shall report the amount of revenue and interests which has deducted the cost of network usage, telecommunications numbering fees, cost of management expenses and other cost of expenses that are needed to the provision of services. The rest shall be examined by the Office of the NBTC before being remitted as state revenue.

17. The contribution for education, research and development

The contribution for education, research and development has been recognized as an expense when it is approved to be paid to the right holder. The unpaid money to be delivered back within the period will be deducted from the total expense of the contributions. If the money were delivered after the year of disbursement, it will be recorded as unpaid and return revenue of the contribution for education, research and development showing as other non-operating revenue. These guidelines include the expense with similar items.

18. The expenditure for the management of the Research and Development Fund

The expenditure for the management of the Research and Development Fund, such as the asset for the Fund management, personnel expenses, meeting remuneration for the committees, expense of public relations activities, expense for organizing meetings, material cost for the Fund management, cost for public utilities, etc., shall be disbursed by the Office of the NBTC according to the Regulation of the Research and Development Fund.

19. Important accounting estimation, assumption and discretion

The Office of the NBTC prepares accounting estimation and discretion for accounting transactions continuously based on past experience and other factors, including expectations of future events that are believed to be reasonable in the circumstances at the time and assumptions related to future events as follows:

4. Summary of important accounting policies (continued)

Allowance for doubtful accounts of debtors: the Office of the NBTC has set an allowance for doubtful accounts to reflect the impairment of debtors which relates to the estimation of loss resulting from the debtor's inability to pay. The allowance for doubtful accounts is a result of the Office of the NBTC's assessment of future cash inflows which is based on past experiences of collection laws, press for payment, reputation and default of debts payment.

Depreciation and amortization used in the operation which shows in the statement of comprehensive income is the cost incurred from plant and equipment. The finance lease assets and intangible assets will be depreciated over the useful life of the asset by using the straight-line method. The Office of the NBTC assesses the useful life at the acquisition date based on past experience relating to identical or similar assets together with consideration of expected technological changes or other changes. Every year, the Office of the NBTC will consider deactivating assets and residual values to evaluate the need to change the useful life of the assets and the depreciation rate of actual useful life of the assets may differ from the estimated useful life of the Office of the NBTC. The regular review of useful life in the future, therefore, may affect the amortization period of the asset.

The assets impairment of the Office of the NBTC will be done through the assessment of indications that the assets may be impaired. If such an indication exists, the Office of the NBTC will test the asset's impairment and determine its recoverable value through conducting a survey of market and business conditions related to indications that an asset may be impaired. The Office of the NBTC will recognize an impairment loss on an asset when the accounting value of the asset exceeds its expected value to be received.

5. Reclassification of transaction category

The comparative figures in the 2019 financial statements have been reclassified to conform to the classification and transaction presentation of the 2020 financial statements based on the presentation of public sector's financial reports to comply with the criteria and procedures prescribed by the Ministry of Finance.

	Previously reported	Reclassified	Revised
Financial statement As of 31 December 2019			
Cash and cash equivalent	20,467.23	(10,370.95)	10,096.28
Short-term investment	39,259.01	(39,258.62)	0.39
Fee Receivables	15.94	(1.24)	14.70
Accrued revenue - current portion	76,059.88	(8,990.72)	67,069.16
Remaining supplies	-	2.24	2.24
Plant and equipment - net	1,477.13	(1.79)	1,475.34
Project assets - net	3,058.12	(3,058.12)	-
Creditors and Note payables	1,912.37	(1,354.38)	557.99
Output tax on spectrum auction in transit - current portion	4,387.70	45.28	4,432.98
Current liabilities estimation on Must Carry project	365.49	(365.49)	-
Current liabilities estimation on Mux project	163.15	(163.15)	-
Loans for compensation, recompense or remuneration according to the Order of the Head of NCPO	-	3,785.52	3,785.52
Other current liabilities	308.71	(46.31)	262.40
Deferred income	59,322.36	(59,322.36)	-
Other non-current liabilities	156.74	(68.10)	88.64
Revenue above (below) accumulated expenses	10,366.22	(5,890.60)	4,475.62

5. Reclassification of transaction category (continued)

	Previously reported	Reclassified	Revised
Comprehensive Profit and Loss Statement For the year ended 31 December 2019			
Revenue from spectrum auction	1,143.85	(1,123.17)	20.68
Revenue from the Research and Development Fund	12,664.19	(12,664.19)	-
Other revenues	1,080.75	(884.37)	196.38
Human resources expense	1,630.26	(102.35)	1,527.91
Pension expense	-	106.09	106.09
Compensation expenses	-	37.65	37.65
Current expense	-	1,480.23	1,480.23
Materials expense	-	52.79	52.79
Operating expense	1,703.30	(1,703.30)	-
Depreciation and amortization	610.37	(0.13)	610.24
Contribution to promote and support the Research and Development Fund's objectives	3,012.58	(2,282.58)	730.00
Other expenses	-	128.87	128.87

6. Cash and Cash Equivalents

	2020	2019
Cash	0.11	0.28
Petty cash	0.50	0.48
Cheque for deposit	2,504.90	1.00
Bank deposit		
Current account	144.20	114.94
Bank deposit account	32,454.04	6,911.88
Fixed deposit account (3-month term deposit)	26.47	3,067.71
Total	<u>35,130.22</u>	<u>10,096.29</u>

	2020	2019
Cash and Cash Equivalents consist of		
Cash from the revenue gained under Section 65 (1 - 2)	4,835.92	7,743.34
Cash and cash equivalents from the revenue gained under Section 65 (3 - 5)	126.35	189.98
Cash and cash equivalents from guarantee deposits, and others	<u>30,167.95</u>	<u>2,162.97</u>
Total	<u>35,130.22</u>	<u>10,096.29</u>

7. Short-term investment

	2020	2019
Fixed deposit account (3 - 12 month term deposit)	0.39	0.38
Total short-term investment	<u>0.39</u>	<u>0.38</u>
Short-term investment consist of		
short-term investment from deposit	<u>0.39</u>	<u>0.38</u>
Total	<u>0.39</u>	<u>0.38</u>

8. Fee Receivables

	2020	2019
Receivables from remuneration of radio frequency	0.03	0.09
Receivables from numbering fee	804.00	801.56
Receivables from business license fee	85.89	30.92
Receivables	<u>29.02</u>	<u>29.02</u>
Total	918.94	861.59
Less doubtful accounts	<u>(909.07)</u>	<u>(846.89)</u>
Net total	<u>9.87</u>	<u>14.70</u>

Aging analysis of unpaid accrued receivables

All types of fee receivables of the Office of the NBTC can be categorized as follows:

	2020	2019
Unpaid debts less than 180 days	0.95	2.52
Unpaid debts more than 180 days but less than 365 days	1.28	2.09
Unpaid debts more than 365 days but less than 730 days	4.84	34.04
Unpaid debts more than 730 days	22.16	793.88
Legal disputes	<u>889.71</u>	<u>29.06</u>
Net total	<u>918.94</u>	<u>861.59</u>

The numbering fee receivables as of 31 December 2020 and 2019 for 804.00 and 801.56 million baht respectively have included the numbering fee receivables of True Move Company Limited since 1 March 2014 to 31 December 2015 for 647.29 million baht and surcharge for 141.13 million baht and the total was 788.42 million baht but True Move refuses to pay the numbering fee to the Office of the NBTC with the reason that the company must comply to the NBTC Notification on Measures for Protecting Users in Temporary Period in case of Termination of the Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) in which the said Notification has limited True Move's rights in taking benefits from the inactivate numbers and it gave the company the burden for bearing the telecommunications numbering fees. Therefore, True Move is able to include the telecommunications numbering fees in the cost which will be deducted from the operating revenue. It has thus requested the Office of the NBTC to consider the exception of all telecommunications numbering fees since 16 September 2013 (starting from the date of the concession terminated) onwards. However, for the telecommunications numbering fees from 16 September 2013 to 28 February 2014 at the amount of 190.97 million baht that already paid to the Office of the NBTC, True Move has submitted a letter to the Office of the NBTC requesting for the refundable fees.

Later on, the Telecommunications Commissions (TC) had the Resolution in the Meeting No.12/2014 dated 7 May 2014 disagreed to approve the request for the exception of telecommunications numbering fees of True Move and the Meeting No.26/2014 dated 14 October 2014 agreed to assign the Office of the NBTC to take legal processes, and on 31 August 2015 the Office of the NBTC had already submitted the case to the attorney of the Office of Civil Litigation for further proceeding against True Move according to the Undecided Case No. 490/2016 which is in the process of the court to determine the end date of facts finding. However, the Office of the NBTC was the defendant on the claim for damages arising from the compliance to the Notification on Measure for Protecting Users in Temporary Period in case of Termination of the Concession or Contract for

8. Fee Receivables (continued)

Mobile Phone Service Provision B.E.2556 (2013) in the case that the expense is higher than the plaintiff's income and requesting for the refund of the telecommunication number fees already paid by the plaintiff according to the Undecided Case No. 2013/2015, with the capital of 16,265.06 million baht in which the Administrative Court has ordered to include the Undecided Case No. 1712/2016 and the Undecided Case No. 2392/2018, and is in the process of preparing additional clarifications on other issues.

9. Accrued revenue

	2020	2019
Current portion		
Accrued revenue from spectrum auction in the frequency band of 1800 MHz	6,693.39	6,693.39
Accrued revenue from spectrum auction of Digital TV	402.32	627.02
Accrued revenue from spectrum auction in the frequency band of 900 MHz	20,331.71	54,800.26
Accrued revenue from business license fee	4,474.81	4,948.50
Accrued revenue from spectrum auction in the frequency band of 700 MHz	5,644.46	-
Total current portion	<u>37,546.69</u>	<u>67,069.17</u>
Current portion of long-term debts		
Accrued revenue from spectrum auction in the frequency band of 900 MHz	89,472.54	109,804.25
Accrued revenue from spectrum auction in the frequency band of 1800 MHz	-	6,693.38
Accrued revenue from spectrum auction of Digital TV	1,075.99	1,075.99
Accrued revenue from spectrum auction in the frequency band of 700 MHz	47,037.20	-
Accrued revenue from spectrum auction in the frequency band of 2600 MHz	36,048.84	-
Total current portion of long-term debts	<u>173,634.57</u>	<u>117,573.62</u>
Total	<u>211,181.26</u>	<u>184,642.79</u>

The accrued revenue from spectrum auction in the frequency band of 900 MHz as of 31 December 2020 and 2019 at the amount of 109,804.25 and 164,608.51 million baht respectively, and the accrued revenue from spectrum auction in the frequency band of 1800 MHz as of 31 December 2020 and 2019 at the amount of 6,693.39 and 13,368.77 million baht, the accrued revenue from spectrum auction in the frequency band of 700 MHz as of 31 December 2020 at the amount of 52,681.66 million baht, the accrued revenue from spectrum auction in the frequency band of 2600 MHz as of 31 December 2020 at the amount of 36,048.84 million baht, the licensees have brought the payment deposit from spectrum auction as of 31 December 2020 at the amount of 8,000.00 million baht and the Letters of Guarantee issued by the financial institution in type of commercial bank under the Financial Institutions Business Act B.E.2551 (2008), to guarantee the payment for the remaining amount of an accrued income from the spectrum auction according to the NBTC Notification. However, the Head of National Council for Peace and Order has the Order No. 4/2019 on Measures to Solve Problems on Television and Telecommunications Business Operation dated 11 April 2019, Article 6 Paragraph Two, which stipulated that the Office of the NBTC shall consider dividing the payment of all spectrum auction



9. Accrued revenue (continued)

in the frequency band of 900 MHz that the licensees have to pay to ten installments per year equally, starting from the year the licensee has been granted of the license according to the Order of Notification, and after the Office of the NBTC has divided the money from spectrum auction into the installments from the year 2020 onwards, the installments to be paid in the year 2020 shall include the compensation of the previous installment.

For the accrued revenue from spectrum auction of Digital TV as of 31 December 2020 and 2019 at the amount of 1,478.31 and 1,703.01 million baht respectively which is the revenue from the spectrum auction for the provision of digital television service in the category of national commercial service for 24 licenses, the Office of the NBTC received the payment of 22 licenses and already remitted the revenue to Ministry of Finance according to the National Council for Peace and Order Announcement No. 80/2014 regarding the Additional Amendment to the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services. However, for the revenue from the spectrum auction of 2 licenses which the Office of the NBTC has not yet received the payment for 1,005.60 million baht and value-added tax of 70.39 million baht, totally outstanding amount of 1,075.99 million baht.

The licensees have brought the Letters of Guarantee issued by the financial institution in type of commercial bank under the Financial Institutions Business Act B.E.2551 (2008), to guarantee the payment for license fees to use the spectrum in which the Supreme Administrative Court had issued an order affirming the order of the Administrative Court to suspend any action on the execution under the letter of guarantee of commercial banks until the judgment has been made or otherwise provided by the order according to the Order No.450/2017 dated 23 May 2017 and the Office of the NBTC is the defendant in the case that the government officials acted unlawfully due to the regulation of the transition to digital television signal transmission system has not been complied to the law and Master Plan. In addition, the withdrawal of the license according to the Resolution of the Broadcasting Commission (BC) with a capital of 749.88 million baht is under the consideration of the Supreme Administrative Court.

On 20 December 2016, the Head of National Council for Peace and Order has the Order No. 76/2016 regarding Measure for Promoting the Broadcasting, Television and Telecommunications Business Operation for the Public Benefit to extend the payment period of license fee to use the spectrum in the remaining amount plus interest of the amount to be paid at the interest rate set by the Monetary Policy Committee of Bank of Thailand, and on 23 May 2018 the Head of National Council for Peace and Order has the Order No.9/2018 on Measures to Mitigate the Impacts on Broadcasting and Television Business Operators to suspend the payment of license fee to use the spectrum which shall not exceed 3 years and the licensees shall pay the interests at the interest rate set by the Monetary Policy Committee of Bank of Thailand. However, the Head of National Council for Peace and Order had the Order No.4/2019 on Measures to Solve Problems on Television and Telecommunications Business Operation dated 11 April 2019 Article 12 (1.1) to waive the license fee for the use of spectrum to be paid for the last two installments of the price exceeding the minimum price or the starting price according to the Notification.

The accrued income of revenue from business license fee as of 31 December 2020 and 2019 at the amount of 4,474.81 and 4,948.50 million baht respectively, is the revenue that the Office of the NBTC charged from the operators in the progressive rate of revenue from the operation of telecommunications business type 1 - 3 according to the NBTC Notification on Telecommunications License Fees and the Revenue from Broadcasting and Television Business Operation according to the NBTC Notification on Broadcasting License Fees in which the operators shall pay those amount within 150 days starting from the end of the accounting period.



10. Remaining supplies

	2020	2019
Remaining supplies	6.83	2.24
<u>Less</u> Allowance for supply devaluation	-	-
Total	6.83	2.24

11. Prepaid expenses

	2020	2019
Prepaid expense on land rental	6.44	6.44
Other prepaid expenses	29.28	31.06
Total	35.72	37.50

12. Other Current Assets

	2020	2019
Suspended input tax	68.36	53.42
Revenue Department Receivables	-	40.78
Advance loans receivable	1.22	1.96
Accrued interest	1.63	4.64
Advance payment	315.20	351.25
Other current assets	14.29	14.62
Total	400.70	466.67

Loan receivable	Undue balance	Overdue balance less than 15 days	Overdue balance over 15 days	Total
2020	1.22	-	-	1.22
2019	0.91	1.05	-	1.96

13. Bank deposits with obligation

	2020	2019
Special savings account	651.20	505.67
Total	651.20	505.67

The bank deposits with obligations at the amount of 500 million baht are deposits in a commercial bank with an obligation to maintain the deposits for employee's housing loan.

14. Long-term Investment

	2020	2019
Fixed account deposits over 12 months	223.81	220.28
Total	223.81	220.28

15. Plant and equipment

31 December 2020

Items	Building and its improvement	Electrical and radio equipment	Computer equipment	Vehicles and transportation equipment	Office supplies and others	In process activity	Total
Cost value							
Bring forward at the beginning of period	892.96	2,218.92	955.42	185.38	389.27	381.86	5,023.81
Increase during the period	16.17	181.26	91.02	13.50	22.74	932.35	1,257.04
Decrease during the period	(4.96)	(146.47)	(217.92)	(1.79)	(22.34)	(402.50)	(795.98)
Balance at the end of period	904.17	2,253.71	828.52	197.09	389.67	911.71	5,484.87
Accumulate amortization							
Bring forward at the beginning of period	605.93	1,548.91	904.78	170.81	318.04	-	3,548.47
Increase during the period	27.94	305.75	55.36	5.13	29.79	-	423.97
Decrease during the period	(3.09)	(136.21)	(217.25)	(1.79)	(22.05)	-	(380.39)
Balance at the end of period	630.78	1,718.45	742.89	174.15	325.78	-	3,592.05
Book value							
As of 31 December 2020	273.39	535.26	85.63	22.94	63.89	911.71	1,892.82
As of 31 December 2019	287.03	670.01	50.64	14.57	71.23	381.86	1,475.34

15. Plant and equipment (continued)

31 December 2020

Items	Building and its improvement	Electrical and radio equipment	Computer equipment	Vehicles and transportation equipment	Office supplies and others	In process activity	Total
Cost value							
Bring forward at the beginning of period	875.85	1,955.02	946.32	185.34	376.36	118.94	4,457.83
Increase during the period	19.61	269.16	26.83	0.04	18.20	526.82	860.66
Decrease during the period	(2.50)	(5.26)	(17.73)	-	(5.29)	(263.90)	(294.68)
Balance at the end of period	892.96	2,218.92	955.42	185.38	389.27	381.86	5,023.81
Accumulate amortization							
Bring forward at the beginning of period	580.06	1,319.83	873.87	165.93	293.47	-	3,233.16
Increase during the period	26.78	234.31	48.64	4.88	29.77	-	344.38
Decrease during the period	(0.91)	(5.23)	(17.73)	-	(5.20)	-	(29.07)
Balance at the end of period	605.93	1,548.91	904.78	170.81	318.04	-	3,548.47
Book value							
As of 31 December 2019	287.03	670.01	50.64	14.57	71.23	381.86	1,475.34
As of 31 December 2018	295.79	635.19	72.45	19.41	82.89	118.94	1,224.67

16. Financial lease assets

	31 December 2020		
	Computer equipment	Vehicles and transportation equipment	Total
Capital cost			
Bring forward at the beginning of period	235.32	136.59	371.91
Increase during the period	74.31	24.78	99.09
Decrease during the period	(20.45)	(21.78)	(42.23)
Balance at the end of period	<u>289.18</u>	<u>139.59</u>	<u>428.77</u>
Less Accumulated amortization			
Bring forward at the beginning of period	(38.30)	(46.78)	(85.08)
Increase during the period	(65.29)	(24.29)	(89.58)
Decrease during the period	20.45	17.89	38.34
Balance at the end of period	<u>(83.14)</u>	<u>(53.18)</u>	<u>(136.32)</u>
Book value			
As of 31 December 2020	<u>206.04</u>	<u>86.41</u>	<u>292.45</u>
As of 31 December 2019	<u>197.02</u>	<u>89.81</u>	<u>286.83</u>

	31 December 2019		
	Computer equipment	Vehicles and transportation equipment	Total
Capital cost			
Bring forward at the beginning of period	60.21	76.02	136.23
Increase during the period	187.67	61.82	249.49
Decrease during the period	(12.56)	(1.25)	(13.81)
Balance at the end of period	<u>235.32</u>	<u>136.59</u>	<u>371.91</u>
Less Accumulated amortization			
Bring forward at the beginning of period	(22.48)	(25.08)	(47.56)
Increase during the period	(28.38)	(22.83)	(51.21)
Decrease during the period	12.56	1.13	13.69
Balance at the end of period	<u>(38.30)</u>	<u>(46.78)</u>	<u>(85.08)</u>
Book value			
As of 31 December 2019	<u>197.02</u>	<u>89.81</u>	<u>286.83</u>
As of 31 December 2018	<u>37.73</u>	<u>50.94</u>	<u>88.67</u>

17. Intangible asset

	Bring forward	During the period		Balance
	As of 1 Jan 2020	Increase	Decrease	As of 31 Dec 2020
Computer programs	1,363.96	602.34	(306.89)	1,659.41
<u>Less Accumulated amortization</u>	<u>1,145.35</u>	<u>275.69</u>	<u>(96.91)</u>	<u>1,324.13</u>
Total	<u>218.61</u>	<u>326.65</u>	<u>(209.98)</u>	<u>335.28</u>

17. Intangible asset (continued)

	Bring forward As of 1 Jan 2020	During the period		Balance As of 31 Dec 2020
		Increase	Decrease	
Computer programs	1,244.60	124.81	(5.45)	1,363.96
Less Accumulated amortization	936.15	214.65	(5.45)	1,145.35
Total	308.45	(89.84)	-	218.61

18. Creditors and Notes Payable

	2020	2019
Creditors	269.82	556.74
Credit card payable	-	0.16
Cheque payment	250.59	1.09
Total	520.41	557.99

19. Deferred revenue

	2020	2019
Advance remuneration for radiocommunications	59.10	70.07
Advance numbering fee	8.06	6.74
Others	8.92	17.87
Total	76.08	94.68

20. Estimated Liabilities for Employee Benefit

Project on Pension Benefit

According to the NBTC Regulation regarding the Employees' Pension and Welfare after Retirement B.E.2555 (2012), the Office of the NBTC has a burden to pay benefits upon retirement of employees, the employee who has been ordered to leave the job without guilty, or death, and the employee who has worked for the Office of the NBTC at least one year including the employee who resigns without guilty and has received permission from the authorized person to put into position and appoint or the assigned person, and must have worked for the Office of the NBTC at least three years, the employees shall receive the regular pension paid by calculating from the duration of being served the organization multiply by last salary.

In case that any employee get harm or sick due to operating duties, they also have the right to receive extra pension at 24 times of the last salary and if the employee died prior to be paid of the extra pension, they shall receive 30 times of the last salary.

The Office of the NBTC has provided a bank account of the pension fund to be as source of money for employees' pension and assistance after retirement. The source of money of the pension fund is derived from the initial fund allocated from the annual budget expenditure, interests of the pension fund and other money. In the case that the pension fund is insufficient to be paid for the eligible employees in any year, the Office of the NBTC shall disburse the employees' pension from the central budget of the Office of the NBTC in that year.

20. Estimated Liabilities for Employee Benefit (continued)

The present value of liabilities estimation for employee benefits to be paid is as follows:

	2020	2019
Estimated Current liabilities for employee benefits	34.85	34.00
Estimated Non-current liabilities for employee benefits	1,262.24	959.54
Present value of the liabilities estimation for employee benefits	<u>1,297.09</u>	<u>993.54</u>

Changes of the present value of liabilities estimation for employee benefits for the year ended 31 December are as follows:

	2020	2019
Liabilities estimation for employee benefits at the beginning of the period	993.54	907.27
<u>Increase</u> Cost of benefits that is recognized in the statement of comprehensive profits and losses	340.60	104.10
<u>Less</u> Employees' benefit being paid	(37.05)	(17.83)
Liabilities estimation for employee benefits at the end of the period	<u>1,297.09</u>	<u>993.54</u>

Expenses recognized in the earnings statement for the year ended 31 December are as follows:

	2020	2019
Current service cost	129.55	78.99
Current service cost from reassessment of obligations in 2020	191.05	-
Net interest of liabilities estimation for the net defined employee benefits	20.00	25.11
Total	<u>340.60</u>	<u>104.10</u>

The main assumption used in the estimation according to actuarial science principle is as follows:

Main assumption	Range of age	Percent per year	
		2020	2019
1. Discount rate		0.51 to 2.77	1.76 to 3.94
2. Inflation rate		2.0	-
3. Rate of salary raise	less than 40 years	8.0	8.0
	from 40 years to less than 55 years	6.0	6.0
	from 55 years	4.0	4.0
4. Employee turnover rate	less than 30 years	3.0	3.0
	from 30 years to less than 55 years	1.0	1.0
	from 55 years	0.0	0.0
5. Mortality rate			

The assumption related to the future mortality rate has been derived from Thai Mortality Ordinary Table 2017 (TMO2017) with an improvement in the mortality rate of 3.0 percent per year.

20. Estimated Liabilities for Employee Benefit (continued)

The sensitivity of the main assumption

The changes in each assumption involved in the actuarial science estimation that may be reasonably possible at the end of the reporting period. The results of the sensitivity analysis of the impact assumption on obligations under the project of defined benefits as of 31 December are as follows:

	Impact assumption on obligations under the project of defined benefits				
	Change of assumption Percent	Increase of assumption Million baht		Decrease of assumption Million baht	
		2020	2019	2020	2019
Discount rate	1.00	(155.77)	(114.96)	186.13	137.70
Expected rate of salary raise	1.00	179.19	143.51	(152.27)	(121.86)
Employee turnover rate	20.00	(6.82)	(4.91)	6.98	4.98
Improvement of mortality rate	1.00	0.63	0.24	(0.70)	(0.26)

The estimated risks involved with the project of benefits under the discount method of each unit are: the difference between the actual rate of salary raise, employee turnover rate and mortality rate and the assumptions used such as the rate of salary raise is higher than expected and the employee turnover rate is lower than expected, which will cause losses according to the actuarial science. In addition, the current economic situation may cause the discount rate to be higher or lower, which is used to measure the fair value of liabilities. This project of benefits has no specific risk for the Office or risk for investment since it is a project without the establishment of a fund.

The analysis of the maturity of non-discounted employee benefits payment from the year 2020 onwards is as follows:

	Current portion Million baht	Current portion of long term debts (1 - 3 yrs.) Million baht	Current portion of long term debts (exceed 3 yrs.) Million baht	Total Million baht
As of 31 December 2020				
Liabilities estimation of employee benefits	34.85	86.07	5,087.20	5,208.12
Total	34.85	86.07	5,087.20	5,208.12

21. State Revenue in Transit to the Treasury

	Bring forward As of 1 Jan 2020	During the period		Balance As of 31 Dec 2020
		Deferred transit Increase/ decrease	Remitted	
Current portion				
Radiocommunications equipment rental and violation fees	2.01	0.01	(2.01)	0.01
Fines	11.61	5.54	(13.19)	3.96
Revenue from spectrum auction in frequency band of 900 MHz	50,129.16	18,439.96	(43,825.35)	24,743.77
Revenue from spectrum auction in frequency band of 1800 MHz	5,332.34	5,318.93	(15.16)	10,636.11
Revenue from Digital TV spectrum auction	2,228.12	27.48	(1,642.12)	613.48
Revenue from spectrum auction in frequency band of 2600 MHz	-	616.44	(611.12)	5.32
Revenue from spectrum auction in frequency band of 26 GHz	-	2,279.03	(2,252.92)	26.11
Revenue from the beautiful numbers auction	180.45		(180.25)	0.20
Revenue from state-enterprises according to Section 84	-	2,004.55	-	2,004.55
Revenue from 1 Por Nor Radio Station	98.60	27.30	(98.60)	27.30
Surplus to be remitted as state revenue in 2018	2,800.58	-	(2,800.58)	-
Surplus to be remitted as state revenue in 2019	2,010.92	499.00	(2,010.92)	499.00
Surplus to be remitted as state revenue in 2020	-	2,345.51	-	2,345.51
Total current portion	62,793.79	31,563.75	(53,452.22)	40,905.32
Current portion of long-term debts				
Revenue from spectrum auction in frequency band of 700 MHz	-	30,353.53	-	30,353.53
Revenue from spectrum auction in frequency band of 900 MHz	98,624.08	(18,430.64)	-	80,193.44
Revenue from spectrum auction in frequency band of 1800 MHz	5,317.18	(5,317.18)	-	-
Revenue from Digital TV spectrum auction	1,005.60	-	-	1,005.60
Revenue from spectrum auction in frequency band of 2600 MHz	-	5,539.02	-	5,539.02
Total current portion of long-term debts	104,946.86	12,144.73	-	117,091.59
Total	167,740.65	43,708.48	(53,452.22)	157,996.91



21. State Revenue in Transit to the Treasury (continued)

	Bring forward As of 1 Jan 2020	During the period		Balance As of 31 Dec 2020
		Deferred transit Increase/ decrease	Remitted	
Current portion				
Radiocommunications equipment rental and violation fees	0.64	1.74	(0.37)	2.01
Fines	10.32	6.07	(4.78)	11.61
Revenue from spectrum auction in frequency band of 900 MHz	11,448.47	50,119.81	(11,439.12)	50,129.16
Revenue from spectrum auction in frequency band of 1800 MHz	20,217.38	5,326.21	(20,211.25)	5,332.34
Revenue from Digital TV spectrum auction	1.69	2,237.69	(11.26)	2,228.12
Revenue from the beautiful numbers auction	147.65	33.58	(0.78)	180.45
Revenue from state-enterprises according to Section 84	-	147.66	(147.66)	-
Revenue from service provision on behalf of the state	-	603.81	(603.81)	-
Revenue from 1 Por Nor Radio Station	95.20	52.52	(49.12)	98.60
Surplus to be remitted as state revenue in 2017	2,524.80	-	(2,524.80)	-
Surplus to be remitted as state revenue in 2018	2,800.58	-	-	2,800.58
Surplus to be remitted as state revenue in 2019	-	2,010.92	-	2,010.92
Total current portion	<u>37,246.73</u>	<u>60,540.01</u>	<u>(34,992.95)</u>	<u>62,793.79</u>
Current portion of long-term debts				
Revenue from spectrum auction in frequency band of 900 MHz	148,729.40	(50,105.32)	-	98,624.08
Revenue from spectrum auction in frequency band of 1800 MHz	10,634.35	(5,317.17)	-	5,317.18
Revenue from Digital TV spectrum auction	16,856.60	(15,851.00)	-	1,005.60
Total current portion of long-term debts	<u>176,220.35</u>	<u>(71,273.49)</u>	<u>-</u>	<u>104,946.86</u>
Total	<u>213,467.08</u>	<u>(10,733.48)</u>	<u>(34,992.95)</u>	<u>167,740.65</u>



22. Output Tax on Spectrum Auction in Transit

	2020	2019
Current portion		
Spectrum auction in the frequency band of 900 MHz	1,330.11	3,630.34
Spectrum auction in the frequency band of 1800 MHz	437.89	437.89
Digital TV spectrum auction	26.32	41.02
Spectrum auction in the frequency band of 700 MHz	369.26	-
Accrued income - Telecommunications service	48.98	312.51
Accrued income - Broadcasting service	-	11.22
Total current portion	<u>2,212.56</u>	<u>4,432.98</u>
Current portion of long-term debts		
Spectrum auction in the frequency band of 900 MHz	5,853.34	7,183.46
Spectrum auction in the frequency band of 1800 MHz	-	437.88
Digital TV spectrum auction	70.39	70.39
Spectrum auction in the frequency band of 700 MHz	3,077.21	-
Spectrum auction in the frequency band of 2600 MHz	2,358.33	-
Total current portion of long-term debts	<u>11,359.27</u>	<u>7,691.73</u>
Total	<u><u>13,571.83</u></u>	<u><u>12,124.71</u></u>

23. Contribution to the Digital Economy and Society Development Fund

	Bring forward As of 1 Jan 2020	During the period		Balance As of 31 Dec 2020
		Deferred transit Increase/ decrease	Remitted	
Revenue to be remitted under Section 65	371.87	1,357.57	(1,436.15)	293.29
Spectrum auction in the frequency band of 900 MHz	1,109.89	570.95	-	1,680.84
Spectrum auction in the frequency band of 1800 MHz	938.32	938.33	-	1,876.65
Spectrum auction in the frequency band of 2600 MHz	-	108.61	(108.61)	-
Spectrum auction in the frequency band of 26 GHz	-	405.81	(405.81)	-
Total current portion	<u>2,420.08</u>	<u>3,381.27</u>	<u>(1,950.57)</u>	<u>3,850.78</u>
Spectrum auction in the frequency band of 900 MHz	3,996.72	(570.96)	-	3,425.76
Spectrum auction in the frequency band of 1800 MHz	938.33	(938.33)	-	-
Spectrum auction in the frequency band of 2600 MHz	-	977.47	-	977.47
Total current portion of long-term debts	<u>4,935.05</u>	<u>(531.82)</u>	<u>-</u>	<u>4,403.23</u>
Total	<u><u>7,355.13</u></u>	<u><u>2,849.45</u></u>	<u><u>(1,950.57)</u></u>	<u><u>8,254.01</u></u>

23. Contribution to the Digital Economy and Society Development Fund (continued)

	Bring forward As of 1 Jan 2020	During the period		Balance As of 31 Dec 2020
		Deferred transit Increase/ decrease	Remitted	
Revenue to be remitted under Section 65	147.76	1,346.65	(1,122.54)	371.87
Spectrum auction in the frequency band of 900 MHz	602.63	1,106.51	(599.25)	1,109.89
Spectrum auction in the frequency band of 1800 MHz	0.67	937.65	-	938.32
Total current portion	751.06	3,390.81	(1,721.79)	2,420.08
Spectrum auction in the frequency band of 900 MHz	5,106.60	(1,109.88)	-	3,996.72
Spectrum auction in the frequency band of 1800 MHz	1,876.65	(938.32)	-	938.33
Total current portion of long-term debts	6,983.25	(2,048.20)	-	4,935.05
Total	7,734.31	1,342.61	(1,721.79)	7,355.13

The contribution to the Digital Economy and Society Development Fund as of 31 December 2020 and 2019 at the amount of 8,254.01 and 7,355.13 million baht is in accordance with the Digital Development for Economic and Social Act B.E.2560 (2017) Section 24, in which the Office of the NBTC has allocated from the revenue from the spectrum assignment and the revenue of the Office of the NBTC at the rate of 15 percent starting from 25 January 2017 onwards.

24. Financial Lease Liabilities

	31 December 2020		
	Less than 1 year	1 - 5 years	Total
Total minimum amount to be paid under the lease contract	111.33	215.65	326.98
Interest under the deferred lease/ financial lease contract	(11.58)	(16.49)	(28.07)
Current value of minimum amount to be paid under the lease contract	99.75	199.16	298.91

	31 December 2019		
	Less than 1 year	1 - 5 years	Total
Total minimum amount to be paid under the lease contract	102.22	213.81	316.03
Interest under the deferred lease/ financial lease contract	(11.80)	(14.12)	(25.92)
Current value of minimum amount to be paid under the lease contract	90.42	199.69	290.11

25. Revenue from spectrum refarming in transit to the BTFP

The suspense revenue from spectrum calling to the BTFP as of 31 December 2020 at the amount of 27,174.01 million baht, which can be divided into the revenue from spectrum refarming in transit to the BTFP in current portion at the amount of 4,529.00 million baht, and revenue from spectrum refarming in transit to the BTFP in current portion, the portion of long-term debts at the amount of 22,645.01 million baht, is the money that shall be delivered to the Broadcasting and Telecommunications Research and Development Fund for the Public Interest according to the spectrum refarming ratio for auction under the NBTC Notification on Criteria and Procedures for spectrum Licensing for International Mobile Telecommunications Service in the Frequency Band of 700 MHz, 1800 MHz, 2600 MHz and 26 GHz and its amendment. The BTFP will pay such money for compensation, recompense or remuneration of the spectrum refarming according to the Act on the Organization B.E.2553 (2010) and its amendment.

26. Revenue received according to the temporary protection measure

The revenue from the temporary protection measure as of 31 December 2020 and 2019 at the amount of 603.81 and 603.81 million baht is the revenue from the provision of service on behalf of the state in 2019 for 603.81 million baht which was the remittance of minimum income from the provision of mobile phone service in the frequency band of 1800 MHz and 850 MHz during the users' protection period according to the NBTC Notification on Measure for Protecting Users in Temporary Period in case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013), Article 7 prescribing that during the protection period, the service providers shall have responsibility to receive payment of revenue from the provision of services on behalf of the state by having separated accounts of payment receipt specifically, and reporting the amount of revenue and its incurred interests which have already been deducted the cost of network usage and telecommunications numbering fees, the expense cost of management, and other necessary costs to service provision, the rest amount of revenue shall be audited by the Office of the NBTC before further remitting as state revenue. However, the service provider has disputed the order of the Office of the NBTC on the remittance of the said revenue and is in the process of filing a lawsuit with the Administrative Court.

The Office of the NBTC had already remitted the revenue from the provision of service on behalf of the state received from the service providers at the amount of 603.81 million baht as the state revenue by showing transaction as the revenue remitted to the Ministry of Finance under the temporary protection measure.

27. Compensation, recompense or remuneration liabilities according to the Order of the Head of NCPO

Compensation, recompense or remuneration liabilities according to the Order of the Head of NCPO as of 31 December 2020 and 2019 at the amount of 5,514.34 and 3,785.52 million baht respectively is the money borrowed from the BTFP for the operation according to the Order of Head of National Council for Peace and Order No. 4/2019 on Measures for Resolving Problems on Broadcasting and Telecommunications Business Operation in the Payment of compensation, recompense or remuneration to those affected by the spectrum refarming.

28. Other current liabilities

	2020	2019
Accrued expenses	977.02	249.87
Withholding tax payable	10.48	6.26
Creditors - the Revenue Department	965.47	-
Other current liabilities	9.86	6.27
Total	<u>1,962.83</u>	<u>262.40</u>



29. Other non-current liabilities

	2020	2019
Contract guarantee deposits	54.81	75.29
Performance guarantee	8.93	12.00
Security deposit	0.50	0.56
Trust money for the monument construction	0.39	0.38
Other trust money	21.42	0.41
Total	<u>86.05</u>	<u>88.64</u>

30. Revenue from spectrum auction

	2020	2019
Revenue from spectrum auction for television service provision	20.76	20.68
Revenue from spectrum auction in the frequency band of 700 MHz	52,752.00	-
Revenue from spectrum auction in the frequency band of 2600 MHz	37,433.89	-
Revenue from spectrum auction in the frequency band of 26 GHz	2,705.40	-
Total	<u>92,912.05</u>	<u>20.68</u>

31. Revenue from the state-enterprises under Section 84 Paragraph Three

The revenue of the Office of the NBTC from the state-enterprises under Section 84 Paragraph Three for the year ended 31 December 2020 and 2019 at the amount of 2,004.55 and 147.66 million baht respectively, is the revenue from those who have legally been allocated spectrum for telecommunications service on the date the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and its amendment has become effective. After three-year period, the state-enterprises shall remit the revenues deriving from the undertakings under the granted authorization, concession or contract according to Paragraph Two which operated under the law regarding private joint venture or operation in the public service either in whole or in some part, by deducting the expenses and the rest shall be remitted to the NBTC.

32. Revenue from licensing fee and licenses

	2020	2019
Revenue from radiocommunications frequency remuneration	128.36	143.39
Revenue from license fee according to Radiocommunications Act	208.10	205.76
Revenue from telecommunications business license fee	5,070.38	4,441.11
Revenue from broadcasting service (trial operation)	37.05	36.81
Revenue from television business license fee	219.12	159.77
Revenue from drone business operation license fee	1.03	-
Revenue from satellite orbit access license fee	0.01	-
Revenue from license fees under Section 70	8.06	19.10
Revenue from other fees-telecommunications service	-	57.00
Revenue from other fees-broadcasting service	3.28	18.24
Total	<u>5,675.39</u>	<u>5,081.18</u>



33. Revenue from numbering fee

	2020	2019
Revenue from the auction of beautiful numbers	-	44.21
Revenue from numbering fee	3,343.62	3,847.89
Total	<u>3,343.62</u>	<u>3,892.10</u>

34. Revenue from the Research and Development Fund

The revenue from the Research and Development Fund for the year ended 31 December 2020 at the amount of 499.00 million baht is a subsidy for the cost of the general satellite television broadcasting services, remaining from the closing of the BTFP's account according to the Resolution of the BTFP Committee Meeting No. 12/2020 on 29 October 2020 which had already been remitted as the state revenue in the whole amount.

35. Other revenues

	2020	2019
Revenue from 1 Por Nor Radio Station	30.07	56.95
Interest receivable	65.01	127.79
Other revenues	63.11	11.64
Total	<u>158.19</u>	<u>196.38</u>

36. Compensation, recompense or remuneration according to the Order of the Head of NCPO

	2020	2019
Compensation from the return of license to use spectrum for Digital TV	345.24	3,755.40
Compensation of MUX	589.20	-
Exemption of the revenue from spectrum auction of Digital TV	-	12,635.80
Expense on state revenue from spectrum auction of Digital TV to be remitted to the Treasury	-	(12,635.80)
Total	<u>934.44</u>	<u>3,755.40</u>

37. Expense on state revenue to be remitted to the Treasury

	2020	2019
Revenue from spectrum auction in the frequency band of 900 MHz	9.33	14.49
Revenue from spectrum auction in the frequency band of 1800 MHz	1.76	9.03
Revenue from spectrum auction for Digital TV	27.48	9.09
Revenue from the state-enterprises under Section 84 Paragraph Three	2,004.55	147.66
Revenue from beautiful numbers auction	0.20	33.58
Revenue from spectrum auction in the frequency band of 700 MHz	30,353.53	-
Revenue from spectrum auction in the frequency band of 2600 MHz	6,155.46	-
Revenue from spectrum auction in the frequency band of 26 GHz	2,279.02	-
Total	<u>40,831.33</u>	<u>213.85</u>



38. Expenses of the auction

	2020	2019
Expenses for arrangement of spectrum auction in the frequency band of 900 MHz	-	13.89
Expenses for arrangement of spectrum auction in the frequency band of 1800 MHz	-	4.43
Expenses for arrangement of spectrum auction in the frequency band of 2600 MHz	30,174.34	-
Expenses for arrangement of spectrum auction in Multiband frequency	40.17	-
Expenses for arrangement of beautiful numbers auction	-	5.74
Total	30,214.51	24.06

39. Human Resources Expenses

	2020	2019
Employees' salaries	1,045.00	1,020.08
Extra remuneration for employees	207.65	193.37
Remuneration for the NBTC	19.37	19.37
Monthly remuneration	144.57	69.17
Medical expense	150.54	108.29
Fringe benefits	68.61	35.98
Provident Fund	87.82	81.65
Total	1,723.56	1,527.91

40. Pension Expenses

	2020	2019
Retirement pension	340.60	104.10
Medical expense	1.93	1.99
Total	342.53	106.09

41. Remuneration

	2020	2019
Meeting remuneration	32.13	33.41
Other remuneration	-	4.24
Total	32.13	37.65



42. Current Expenses

	2020	2019
Expenses for domestic travel	3.09	41.05
Rental cost	143.87	138.22
Maintenance cost	342.74	329.47
Payment for contract services	247.00	223.36
Expenses paid for guests' reception	3.26	4.93
Expense for organizing ceremonious events	20.55	41.22
Taxes and fees	21.61	17.94
Expenses for trainings and seminars	26.48	122.27
Expenses for training registration	-	10.29
Expense for public relations activities	221.83	256.24
Expenses for meetings arrangement	24.37	63.81
Expenses for radiocommunications equipment calibration	9.96	6.02
Expenses for hiring consultants	327.45	180.31
Donation and charity	0.09	1.12
Other current expenses	0.84	0.49
Expenses for traveling abroad	29.83	43.49
Total	1,422.97	1,480.23

43. Supply Expenses

	2020	2019
Supply	40.11	49.96
Supply and durable articles under standards	9.15	2.83
Total	49.26	52.79

44. Utilities Expenses

	2020	2019
Electricity	34.60	34.07
Water	1.10	1.15
Office telephone usage	1.93	3.99
Mobile phone usage	19.20	16.28
DSTV service	0.07	0.07
Internet service	21.89	16.51
Postal service	3.07	4.85
Total	81.86	76.92



45. Depreciation and Amortization

	2020	2019
Depreciation - Building and its improvement	25.23	26.78
Depreciation - Electrical and radio equipment	261.27	234.31
Depreciation - Computer equipment	50.76	48.64
Depreciation - Vehicles and transportation	4.58	4.88
Depreciation - Office supplies and others	23.90	29.77
Depreciation - Financial lease contract	91.01	51.21
Total Depreciation	<u>456.75</u>	<u>395.59</u>
Amortization - Computer programs	177.05	214.65
Total Amortization	<u>177.05</u>	<u>214.65</u>
Total Depreciation and Amortization	<u><u>633.80</u></u>	<u><u>610.24</u></u>

46. Financial support for education, research and development in broadcasting, television, and telecommunications services

	2020	2019
Financial support for education, research and development	930.75	345.21
Expense for supporting education scholarship	7.14	16.65
Total	<u><u>937.89</u></u>	<u><u>361.86</u></u>

47. Other expenses

	2020	2019
Net profit (loss) from asset disposal	8.98	0.09
Profit (loss) from financial lease contract cancellation	1.12	(0.12)
Doubtful liabilities	62.19	128.90
Total	<u><u>72.29</u></u>	<u><u>128.87</u></u>

48. Report of state revenue

	2020	2019
State revenue being collected		
State revenue - apart from tax	43,708.48	5,117.52
Total state revenue being collected	<u>43,708.48</u>	<u>5,117.52</u>
Less state revenue drawing back from the Treasury	-	-
State revenue allocated under the law	<u>-</u>	<u>-</u>
Total net state revenue being collected	43,708.48	5,117.52
State revenue in deferring to the Treasury at the beginning of the period	167,740.65	213,467.08
State revenue to be delivered to the Treasury	<u>(53,452.22)</u>	<u>(34,992.95)</u>
State revenue in deferring to the Treasury	157,996.91	183,591.65
Adjust state revenue in deferring to the Treasury	<u>-</u>	<u>(15,851.00)</u>
Net state revenue transaction	<u><u>157,996.91</u></u>	<u><u>167,740.65</u></u>
State revenue - apart from tax		



48. Report of state revenue (continued)

	2020	2019
Radiocommunications equipment rental and violations	0.01	1.74
Fines	5.54	6.07
Revenue from spectrum auction in the frequency band of 900 MHz	9.32	14.49
Revenue from spectrum auction in the frequency band of 1800 MHz	1.75	9.04
Revenue from Digital TV spectrum auction	27.48	2,237.69
Revenue from spectrum auction in the frequency band of 700 MHz	30,353.53	-
Revenue from spectrum auction in the frequency band of 2600 MHz	6,155.46	-
Revenue from spectrum auction in the frequency band of 26 GHz	2,279.03	-
Revenue from beautiful numbers auction	-	33.58
Revenue from state-enterprises according to Section 84	2,004.55	147.66
Revenue from service provision on behalf of the state	-	603.81
Revenue from 1 Por Nor Radio Station	27.30	52.52
Surplus to be remitted as state revenue in 2019	499.00	2,010.92
Surplus to be remitted as state revenue in 2020	2,345.51	-
Net total	43,708.48	5,117.52

49. Major disputes and lawsuits

1. Disputes and Lawsuits that the Office of the NBTC was the plaintiff consisted with a total capital of 4,792.84 million baht consisted of

1.1 The Office of the NBTC was the plaintiff for the offence of breach of contract for the radio broadcasting station rental in the frequency of 98.5 MHz and demanded a payment for damages according to the Undecided Case No. 9278/2015 (the Undecided Case No. 4800/2010, the Decided Case No. 4067/2011) with capital of 42.07 million baht which is in the process of investigating the debtor's assets to carry out the execution.

1.2 The Office of the NBTC was the plaintiff for the offence of breach of contract for 1 Por Nor radio broadcasting station rental and demanded a payment for damages according to the Undecided Case No. 17794/2014 (the Undecided case No. 6024/2009, the Decided Case No. 1935/2011) with capital of 53.13 million baht which the Supreme Court had sentenced the defendant to pay.

1.3 The Office of the NBTC was the plaintiff for the offence of the remittance of revenue from the provision of mobile phone service in the frequency band of 1800 MHz in the consumer protection period starting from the effective date of the Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) until the ending date of service provision of mobile phone service in the frequency band of 1800 MHz according to the Undecided Case No. 1228/2016 with capital of 3,637.64 million baht and according to the Undecided Case No. 1441/2016 with capital of 950.56 million baht and was the defendant according to the Undecided Case No. 2392/2018 and 2399/2018 respectively. The case is in the process of consideration of the Central Administrative Court.

1.4 The Office of the NBTC had requested for the settlement of the bankruptcy case according to the Undecided Case No. 811/2002 (the Decided Case No. 755/2002) with capital of 9.20 million baht in which the Central Bankruptcy Court had ordered the case to be closed.

1.5 The Office of the NBTC was the plaintiff for the offence of breach of contract for radiocommunications device rental according to the Undecided Case No. 2618/2006 (the Decided Case No. 646/2007) with capital of 7.93 million baht which is in the process of investigating the debtor's assets to carry out the execution.



49. Major disputes and lawsuits (continued)

1.6 The Office of the NBTC was the plaintiff for the offence of unpaid annual license fees according to the Undecided Case No. 2730/2019 with the capital of 27.13 million baht which is in the process of consideration of the Court of Appeals.

1.7 The Office of the NBTC was the plaintiff for the offence of unpaid annual license fees according to the Undecided Case No. 2731/2019 (the Decided Case No. 4952/2019) with the capital of 65.18 million baht which is in the process of investigating the debtor's assets to carry out the execution.

2. Disputes and Lawsuits that the Office of the NBTC was the defendant with capital of 129,645.37 million baht consisted of

2.1 The Office of the NBTC was the defendant for the offence in relations to the dispute on administrative contract according to the Undecided Case No. 701/2017 (the Undecided Case No. 1370/2015, the Decided Case No. 1911/2017) with the capital of 9.32 million baht which is under consideration of the Supreme Administrative Court on the appeal.

2.2 The Office of the NBTC was the defendant for the offence in relations to placing an order for setting the daily administrative fine at 80,000 baht due to the plaintiff failed to collect data and details of prepaid mobile phone users which is considered a violation of the NTC Notification on Criteria for Telecommunications Numbers Allocation and Management B.E.2551 (2008), Articles 38 and 96, according to the Undecided Cases No. 780/2016 (the Undecided Case No. 1867/2011, the Decided Case No. 188/2016) with capital of 34.96 million baht in which the Supreme Administrative Court has determined the ending date of fact findings on 27 October 2020 according to the Undecided Case No. 510/2016 (the Undecided Case No. 818/2013, the Decided Case No. 448/2016) with capital of 23.60 million baht in which the Supreme Administrative Court has determined the ending date of fact findings on 25 August 2020, and according to the Undecided Case No. 1607-1608/2015 (the Undecided Case No. 1859/2011, 3117/2012, the Decided Case No. 2579-2580/2015) with capital of 94.56 million baht which is in the process of determination of ending date of fact findings of the Supreme Administrative Court.

2.3 The Office of the NBTC was the defendant for the offence in relations to the issuance of the order for setting the daily administrative fine at 100,000.00 baht due to the plaintiff has defined the usage duration for prepaid mobile phone services which is considered a violation of the NTC Notification on Standard of Contract for the Provision of Telecommunications Service B.E.2549 (2006), Article 11, according to the Undecided Case No. 173/2017 (the Undecided Case No. 75/2013, the Decided Case No. 1071/2017) with capital of 24.40 million baht in which the Court has determined the ending date of fact findings on 6 January 2020 according to the Undecided Case No. 660/2016 (the Undecided Case No. 56/2013, the Decided Case No. 717/2016) with capital of 24.00 million baht in which the Court has determined the ending date of fact findings on 31 March 2020, and according to the Undecided Case No. 1720/2016 (the Undecided Case No. 55/2013, the Decided Case No. 2168/2016) with capital of 23.30 million baht in which the Supreme Administrative Court has determined the date for the first trial on 29 September 2020 with no audience and the Court is in the process of having appointment notice of judgment hearing.

2.4 The Office of the NBTC was the defendant for the offence in relations to the issuance of the Order of the Secretary-General of the NBTC for setting the daily administrative fine at 140,000.00 baht and according to the TC's Resolution in the Meeting No. 13/2015 on 30 June 2015 and the judgment on the Undecided Case No. 100/2018 (the Undecided Case No. 1927/2015, the Decided Case No. 510/2018) with capital of 58.94 million baht which the Supreme Administrative Court has determined the ending date of fact findings on 7 July 2020, and according to the Undecided Case No. 53/2019 (which was the Undecided Case No. 1933/2015 and the Decided Case No. 2464/2018) with capital of 62.72 million baht which having submitted a plea on the appeal of the four defendants on 11 and 15 October 2019 and the Court has determined the ending date of fact findings on 11 August 2020.



49. Major disputes and lawsuits (continued)

2.5 The Office of the NBTC was the defendant for the offence in relations to unlawful conduct by a state administrative agency or state officials in case of issuance of the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013), and the NBTC Notification on Users Protection in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision according to the Order of the NCPO No. 94/2014 regarding the Suspension of Operation under the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services. The plaintiff has demanded the defendants to share liabilities or cover for a payment of 24,291.86 million baht with interest at the rate of 7.5 percent per year to the plaintiff according to the Undecided Case No. 1651/2015 which is in the process of determination of ending date of fact findings and the defendant has filed an objection to the plaint for explaining additional facts and the request for revising the plaint on 30 June 2020 and 2 July 2020.

2.6 The Office of the NBTC was the defendant for the offence in relations to the request for damages payment caused by the operation of the plaintiff under the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) in the case that the cost of expenditure is higher than income and demanding for the reimbursement of telecommunications numbering fees that the plaintiff has already paid at the amount of 190.97 million baht according to the Undecided Case No. 2013/2015 with capital of 16,265.06 million baht in which the Administrative Court has the order to consolidate the Undecided Case No. 1712/2016 and the Undecided Case No. 2392/2018 and it is in the process of preparing additional explanation on other issues.

2.7 The Office of the NBTC was the defendant for the offence in relations to the issuance of the order to the plaintiff to deliver the revenue from the provision of service according to the Measure for Protecting Users in Temporary Period according to the Undecided Case No. 1997/2015 with capital of 627.64 million baht, which is in the process of determination of ending date of fact findings of the Administrative Court.

2.8 The Office of the NBTC was the defendant for the offence in relations to the issuance of the order for setting the daily administrative fine at 210,000.00 baht on the plaintiff until the plaintiff has already submitted the completed report of accounting separation in telecommunications services in 2012 under the NBTC Notification on Criteria and Methods for the Preparation of the Report of Accounting Separation in Telecommunications Services according to the Undecided Case No. 215/2018 (the Undecided Case No. 59/2016, the Decided Case No. 1517/2018) with capital of 22.89 million baht which having submitted a plea on 11 April 2019 and the Supreme Administrative Court has determined the ending date of fact findings on 16 June 2020.

2.9 The Office of the NBTC was the defendant for the offence in relations to the disputes on revenue and expenditures in the temporary period for users protection under the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) and the NBTC Notification on Protecting Users in Temporary Period in Case of the Termination of Concession or Contract according to the Order of National Council for Peace and Order No. 94/2014 regarding the Suspension of Operation under the Act on the Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services according to the Undecided Case No. 741/2016 with capital of 5,778.00 million baht, which having filed an objection to the plaintiff's request for revising the plaint and the request at the end of the plaint of the 1st defendant, the 2nd defendant and the 3rd defendant on 14 July 2020.



49. Major disputes and lawsuits (continued)

2.10 The Office of the NBTC was the defendant for the offence in relations to unlawful conduct by a state administrative agency or state officials in case that the TC Meeting No. 32/2015 on 2 December 2015 had its Resolution to assign the universal service obligation on the plaintiff based on the revenue from telecommunications business operation (after cost deduction) of telecommunications licensees at the rate of 4 percent per year according to the Undecided Case No. 14/2019 (the Undecided Case No. 1545/2016 and the Decided Case No. 2342/2018) with capital of 86.96 million baht which both the plaintiff and the defendant had appealed and submitted a plea on 3 October 2019. The Court has determined the ending date of fact findings on 29 July 2020 and the Supreme Administrative Court has determined the date to consider the case for the first time on 8 September 2020.

2.11 The Office of the NBTC was the defendant for the offence in relations to issuing an order for setting compulsory administrative measures due to the plaintiffs was unable to completely provide the Mobile Number Portability service within the specified period according to the Undecided Case No. 792/2011 (413/2015) with capital of 13.50 million baht and according to the Undecided Case No. 105/2015 (the Undecided Case No. 793/2011, the Decided Case No. 1991/2014) with capital of 13.50 million baht which the Court has determined the ending date of fact findings on 28 April 2020.

2.12 The Office of the NBTC was the defendant for the offence in relations to the disputes of unlawful conduct by a state administrative agency or state officials (the Order which requiring the payment of unpaid telecommunications service fees with interest and surcharge) according to the Undecided Case No. 439/2008 (1122/2010) with capital of 747.42 million baht which the Court had already dismissed the case in 2020.

2.13 The Office of the NBTC was the defendant for the offence in relations to the disputes of unlawful conduct by a state administrative agency or state officials (the unlawful Order which requiring the payment of special telecommunications number fees) according to the Undecided Case No. 123/2015 (the Undecided Case No. 397/2011, the Decided Case No. 2112/2015) with capital of 656.51 million baht. The Court has determined the ending date of fact findings on 20 August 2019 and the Supreme Administrative Court has determined the date for the first trial on 26 January 2021. According to the practical guideline of Ministry of Interior, the writ that is frivolous, not complicated, and that without arranging the hearing will not impair justice is not necessary for the tribunal to hold the hearing proceeding.

2.14 The Office of the NBTC was the defendant for the offence in relations to unlawful conduct by a state administrative agency or state officials (requesting for the revoke of the NTC Notification on Criteria for Mobile Number Portability Service, the Order of the Secretary-General of the NTC prescribing that the plaintiff must provide the mobile number portability service, and the Order for setting the administrative fine in case that the plaintiff failed to carry out the provision of mobile number portability service) according to the Undecided Case No. 445/2015 (the Undecided Case No. 777/2011, the Decided Case No. 517/2015) with capital of 13.50 million baht which the Court has determined the ending date of fact findings on 24 March 2020, and according to the Undecided Case No. 778/2011 (430/2015)) with capital of 13.50 million baht which the Court has determined the ending date of fact findings on 20 January 2020.

2.15 The Office of the NBTC was the defendant for the offence in relations to the disputes of unlawful conduct by a state agency or state officials and the violation of the administrative authorities or government officials resulting from the execution of legal power (requesting for the revoke of the Resolution of the NBTC Meeting No. 8/2010 on 2 April 2010 revoking the order for setting daily compulsory administrative measures at 166,666.67 baht) according to the Undecided Case No. 894/2014 (Case of the Central Administrative Court No.1113/2010, the Decided Case No. 1177/2014) with capital of 13.50 million baht which the Court has determined the ending date of fact findings on 28 April 2020.

49. Major disputes and lawsuits (continued)

2.16 The Office of the NBTC was the defendant for the offence in relations to placing an order for setting the daily administrative fine at 20,000 baht due to the plaintiffs failed to sign the telecommunications network access contract which is considered a violation of the Telecommunications Business Act B.E.2544 (2001) Section 26 and Section 64 according to the Undecided Case No. 1065/2012 (the Undecided Case No. 1033/2010, the Decided Case No. 1178/2012) with capital of 59.72 million baht which the Court has determined the ending date of fact findings on 5 November 2020 and it is in the process of consideration of the Court on the provisional petition before judgment.

2.17 The Office of the NBTC was the defendant for the offence of the remuneration of use of telecommunications equipment and telecommunications network in the users protection temporary period under the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) according to the Undecided Case No. 918/2015 with capital of 24,117.04 million baht, which having filed an objection to the plaintiff's request for revising the plaint and the request at the end of the plaint of the 1st defendant on 30 June 2020 and the 2nd defendant and the 3rd defendant on 2 July 2020.

2.18 The Office of the NBTC was the defendant for the offence in relations to the TC Meeting No. 32/2015 on 2 December 2015 that had its resolution to approve the assignment of the universal service obligation (USO) on the telecommunications licensees type 2 with having own network, and type 3 according to the Undecided Case No. 8/2019 (the Undecided Case No. 1524/2016, the Decided Case No. 2340/2018), No. 9/2019 (the Undecided Case No. 1522/2016, the Decided Case No. 2338/2018), No. 18/2019 (the Undecided Case No. 1523/2016, the Decided Case No. 2329/2018), No. 17/2019 (the Undecided Case No. 1549/2016, the Decided Case No. 2343/2018), No. 12/2019 (the Undecided Case No. 1540/2016, the Decided Case No. 2341/2018), No. 11/2019 (the Undecided Case No. 1551/2016, the Decided Case No. 2345/2018), No. 10/2019 (the Undecided Case No. 1550/2016, the Decided Case No. 2344/2018), No. 19/2019 (the Undecided Case No. 1484/2016, the Decided Case No. 2337/2018) with capital of 4 percent of the revenue from telecommunications business operation (1 January 2011 - 30 May 2012) and the Undecided Case No. 13/2019 (the Undecided Case No. 1459/2016, the Decided Case No. 2336/2018) with the capital the plaintiff has already paid at the amount of 1,845.06 million baht. Both the plaintiff and the defendant have submitted an appeal and a plea on 3 October 2019 and the Central Administrative Court has determined the date to consider the case for the first time on 8 September 2020 which is currently in the process of determination of the date to hear the judgment, and according to the Undecided Case No. 182/2018 (the Decided Case No. 1789/2020), No. 183/2018, 119/2018, 174/2018, 175/2018, 161/2018, 270/2018, 176/2018 and 181/2018 with capital of 4 percent of the revenue from telecommunications business operation (1 January 2011 - 30 May 2012) with an additional amount equal to the sum of the unpaid amount multiply by the loan interest rate of MLR+2, which is in the process of determination date of fact findings and the date to hear the judgment.

2.19 The Office of the NBTC was the defendant for the offence in relations to the request for the delivery of the revenue from the provision of mobile phone service in the frequency band of 900 MHz in the temporary period of users protection under the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) and its amendment according to the Undecided Case No. 175-176/2020 (the Undecided Case No. 661/2017, the Undecided Case No. 736/2017, the Undecided Case No. 802-803/2020) with capital of 7,221.00 million baht, which is in the process of consideration of the Supreme Administrative Court.

49. Major disputes and lawsuits (continued)

2.20 The Office of the NBTC was the defendant for the offence in relations to placing a resolution and/or an order for setting the daily administrative fine at 1,239,538.88 baht due to the violation or failure to comply with the NTC Notification on Criteria of Mobile Number Portability and the practical guideline condition on the portability of mobile phone service providers according to the Undecided Case No. 1361/2017 with capital of 21.07 million baht, in which additional testimony has already been submitted to the Court on 15 November 2018.

2.21 The Office of the NBTC was the defendant for the offence in relations to placing a resolution and/or an order for setting the daily administrative fine at 169,244.00 baht due to the violation or failure to comply with the NTC Notification on Criteria of Mobile Number Portability and the practical guideline condition on the portability of mobile phone service providers according to the Undecided Case No. 1370/2017 with capital of 7.33 million baht which additional testimony has already been submitted to the Court on 30 April 2019.

2.22 The Office of the NBTC was the defendant for the offence in relations to placing a resolution and/or an order for setting the daily administrative fine at 5,400,591.64 baht due to the violation or failure to comply with the NTC Notification on Criteria of Mobile Number Portability and the practical guideline condition on the portability of mobile phone service providers according to the Undecided Case No. 306/2020 (1283/2015) and the Undecided Case No. 307/2020 (1357/2017) with capital of 221.42 million baht, which is in the process of preparing a plea and will be due on 13 January 2021.

2.23 The Office of the NBTC was the defendant for the offence in relations to the breach of duty or delay on duty in the transition to digital TV according to the Undecided Case No. 1539/2015 (the Decided Case No. 1884/2019) with capital of 1,875.86 million baht which is in the process of consideration of the Court.

2.24 The Office of the NBTC was the defendant for the offence in relations to placing the Order to revoke the license for broadcasting business operation according to the Undecided Case No. 1163/2015 (159/2019) with capital of 15.00 million baht which is in the process of consideration of the Court.

2.25 The Office of the NBTC was the defendant for the offence in relations to the request for damages arising from the operations under the NBTC Notification on Measure for Protecting Users from 1 November 2015 to 3 December 2015 according to the Undecided Case No. 1712/2016 with capital of 709.65 million baht which is in the process of determination of ending date of fact findings of the Court.

2.26 The Office of the NBTC was the defendant for the request of withdrawing the NBTC's resolution on the payment of the administration fee for the extension of the license of radio broadcasting (trial operation) according to the Undecided Case No. 195/2019, with capital of 42.59 million baht, which is in the process of consideration the Court.

2.27 The Office of the NBTC was the defendant for the offence in relations to the disputes relating to the NBTC's resolution in the Meeting No. 20/2018 on 31 October 2018 approving the criteria and results of the consideration of the network usage of the plaintiff for the provision of mobile phone service in the frequency band of 900 MHz during the temporary period of protecting consumer under the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013), according to the Undecided Case No. 1775/2019 with capital of 5,564.87 million baht, which the testimony has already been submitted to the Central Administrative Court on 29 December 2020.

2.28 The Office of the NBTC was the defendant for the offence in relations to the breach of duty in being unable to regulate the transition to digital TV to be accordance with the law and the Master Plan according to the Undecided Case No. 652/2016 (the Undecided Case No. 108/2018, the Decided Case No. 452/2018) with capital of 36,767.00 million baht which is in the process of consideration of the Supreme Administrative Court.

49. Major disputes and lawsuits (continued)

2.29 The Office of the NBTC was the defendant for the dispute regarding the request to withdraw the NBTC's resolution on the approval to submit revenues from the provision of mobile phone service in the frequency band of 1800 MHz under the NBTC Notification on Measure for Protecting Users in Temporary Period in Case of the Termination of Concession or Contract for Mobile Phone Service Provision B.E.2556 (2013) according to the Undecided Case No. 2399/2018 with capital of 241.88 million baht which the testimony has already been submitted to the Court on 6 November 2019.

2.30 The Office of the NBTC was the defendant for the dispute regarding the issuance of license to install radio station on the Deed No. 5106 in Bangkok. The plaintiff has already paid for the capital at the amount of 1,845.06 million baht but not yet paid for an additional amount equal to the sum of the unpaid amount multiply by the loan interest rate of MLR+2 in which the testimony and the additional testimony have already been submitted on 22 April 2019 and 5 July 2019 respectively.

50. Report of the budget expenditure status

Report of the budget expenditure status in the fiscal year 2020 (as of 31 December 2020)

Items	Net budget after transfer switching	Reserved money for overlapped disbursement (money reservation)	Disbursed	Balance
Expenditure for the operation of the NBTC and the Office of the NBTC	3,763.92	329.02	3,164.88	270.02
Expenditure for projects	1,236.64	767.68	388.84	80.12
Central budget	609.29	0.84	537.65	70.80
Expenditure for the operation of the Performance Follow-up and Evaluation Committee	103.48	70.59	30.22	2.67
Total	5,713.33	1,168.13	4,121.59	423.61

Reserved money for overlapped disbursement in the year 2019 (as of 31 December 2020)

Items	Reserved money for overlapped disbursement (net)	Disbursed	Balance
Expenditure for the operation of the NBTC and the Office of the NBTC	521.11	516.09	5.02
Expenditure for projects	504.12	466.23	37.89
Total	1,025.23	982.32	42.91



50. Report of the budget expenditure status (continued)

Reserved money for overlapped disbursement in the year 2018 (as of 31 December 2020)

Items	Reserved money for overlapped disbursement (net)	Disbursed	Balance
Expenditure for projects	84.88	75.40	9.48
Total	84.88	75.40	9.48

Report of the budget expenditure status in the fiscal year 2019 (as of 31 December 2019)

Items	Net budget after transfer switching	Reserved money for overlapped disbursement (money reservation)	Disbursed	Balance
Expenditure for the operation of the NBTC and the Office of the NBTC	3,840.39	521.11	2,973.79	345.49
Expenditure for projects	1,455.72	504.13	782.11	169.48
Central budget	43.72	-	29.11	14.61
Total	5,339.83	1,025.24	3,785.01	529.58



Internal Audit Report of the Office of the NBTC in the Fiscal Year 2020



Internal Audit Report of the Office of the NBTC in the Fiscal Year 2020

According to the Order of the National Broadcasting and Telecommunications Commission (NBTC) No. 41/2015, dated 6 May 2018, appointing the Internal Audit Committee for 5 persons consisting of:

- | | |
|---------------------------------|-----------|
| (1) General Kamol Saenissara | Chairman |
| (2) Mr. Wallop Nitatkanchananon | Committee |
| (3) Mr. Somyos Sriwanich | Committee |
| (4) Mr. Atthawut Vikitsreth | Committee |
| (5) Mr. Weerapong Kriengsinyos | Committee |

However, General Kamol Saenissara had vacated the office upon having attained the age of seventy years on 28 January 2019 due to the prohibition of qualification under Section 7A(2) of the Act on Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunications Services B.E.2553 (2010) and Mr. Weerapong Kriengsinyos had resigned from the post on 27 May 2015, therefore 3 committees have remained in the office at present which is in accordance with the law and Regulation of the NBTC regarding Internal Audit B.E.2554 (2011).

The Internal Audit Committee has operated under its powers and duties under Section 3 of the NBTC Regulation regarding the Internal Audit B.E.2554 (2011) with its policy focusing on the operation based on the good governance principle, good internal auditing system, and independent operation under its powers and duties without intervention from the NBTC, the Office of the NBTC, or any other departments.

The operation under its powers and duties and responsibilities of the Internal Audit Committee in 2020 had been focused on the preventive audit and providing advice for the improvement of a systematic working under the good governance including giving the importance on the follow-up of issues found at risk and having impacts on the performance of the NBTC and the Office of the NBTC regularly. The Internal Audit had organized 12 meetings in which

the executives, officials of the relevant bureaus, and the auditors were invited to attend the meetings as appropriate.

The important operation can be summarized as follows:

1. Having reviewed the efficiency and appropriateness of risk management of each operating which may have significant impact on the Office of the NBTC including continuously followed up the appliance to the risk management plan, as well as proposing suggestions for the most efficient risk management.

2. Having reviewed the assessment of the internal control of the Office of the NBTC including the efficiency and effectiveness of the functional operation of each bureau of the Office of the NBTC, as well as proposing suggestions for the improvement constantly.

3. Having reviewed the operating system in all areas under the good governance and to ensure the compliance with the laws, regulations, rules, orders prescribed by the NBTC, and the operational standard that can make the operation achieve targets, objectives and be in line with the NBTC's policies.

4. Having reviewed the correctness and accountability of the financial report of the Office of the NBTC by reviewing accounting entry, financial statement, as well as discuss on the operation on accounting, finance, and procurement with the officers of the Office of the Auditor General of Thailand (auditor) and relevant officials.

5. Having reviewed and evaluated the performance of the Office of the NBTC in areas of accounting, finance and procurement, as well as proposing recommendations for the improvement on deficiencies and the development for the most efficient. Including the follow-up of the progress of the improvement of each bureau according to the suggestion on the flaws found.



6. Analyzing and evaluating the efficiency, cost savings, and worthiness of resources usage by verifying the implementation and evaluation of the projects expenditure of the Office of the NBTC as well as providing recommendations for improvement for the future project implementation.

7. Reviewing the strategic plan of the Office of the NBTC, annual audit plan, and long-term audit, the compliance with the plan, and the inspection results, as well as proposing recommendations and following up the improvement according to the internal audit report in the significant issues in order to encourage the good governance and the sufficient internal controls. The committee has focused on the independence and integrity of operation in which the audit officers have no conflict of interest in the auditing work, the support and development of the work by applying the information technology system to enhance the effectiveness of the auditing work.

The Internal Audit Committee is of the view that the overall operation of the Office of the NBTC in the year 2020 had been in line with the good governance, transparency, risk management and internal controls without any deficiencies or significant irregularities. In addition, the preparation process of financial reports

had been complied with the generally accepted accounting standards with the appropriateness, as well as the reliable and sufficient disclosure of information on financial reports.

The Internal Audit Committee has also followed the operation of the office of the NBTC and proposed observations and recommendations to the Management and the operating units in a frank and fair manner, and prepared the report of auditing and recommendations submitted to the NBTC in every 180 days for the improvement of the Office of the NBTC, as well as followed-up the result of the improvement upon the recommendations for the most efficient of the performance.

In addition, the current environment has changed a lot especially the application of digital to the management and operation and the Office of the NBTC should therefore become the advance organization and the leader in applying digital to the management and operation. Thus the Office of the NBTC should accelerate the improvement and integration of management system and apply the automation system and artificial intelligence to enhance the effectiveness and efficiency of the organization.

(Mr. Wallop Nitatkanchananon)
Internal Audit Committee

6

Workplan and Budget Expenditure Plan in the Year 2021



4K

1. Important Workplan in the Year 2021

The NBTC and the Office of the NBTC have set the operating policy for regulating broadcasting, television and telecommunications services in 2021 as follows:

1. Preparing for the spectrum auction in the frequency band of 3500 MHz by taking into account those who got affected, the provision of measures to prevent interference on spectrum sharing amongst the international mobile telecommunication and other services, formulation of the criteria for spectrum auction in the frequency band of 3500 MHz.

2. Satellite Orbital License Packages.

3. Proceeding on the enactment of a royal decree under section 30 of the Act on the Organization to Assign Radio Frequency (No.3) B.E.2562 (2019) and proposing a royal decree to encourage the convergence and the efficient use of spectrum.

4. Accelerating the improvement of the digital terrestrial television network (MUX) to support the recall of the spectrum in the frequency band of 700 MHz as planned.

5. Establishing the National Spectrum Monitoring Center.

6. Accelerating the formulation of the criteria and technical guidelines to support digital TV broadcasting with 4K technology.

7. Implementing the regulatory guillotine relating to the broadcasting and television services to be suitable with the industry's ecosystem.

8. Implementing campaigns to create good content, reduce bullies by encouraging the media to become a school of society.

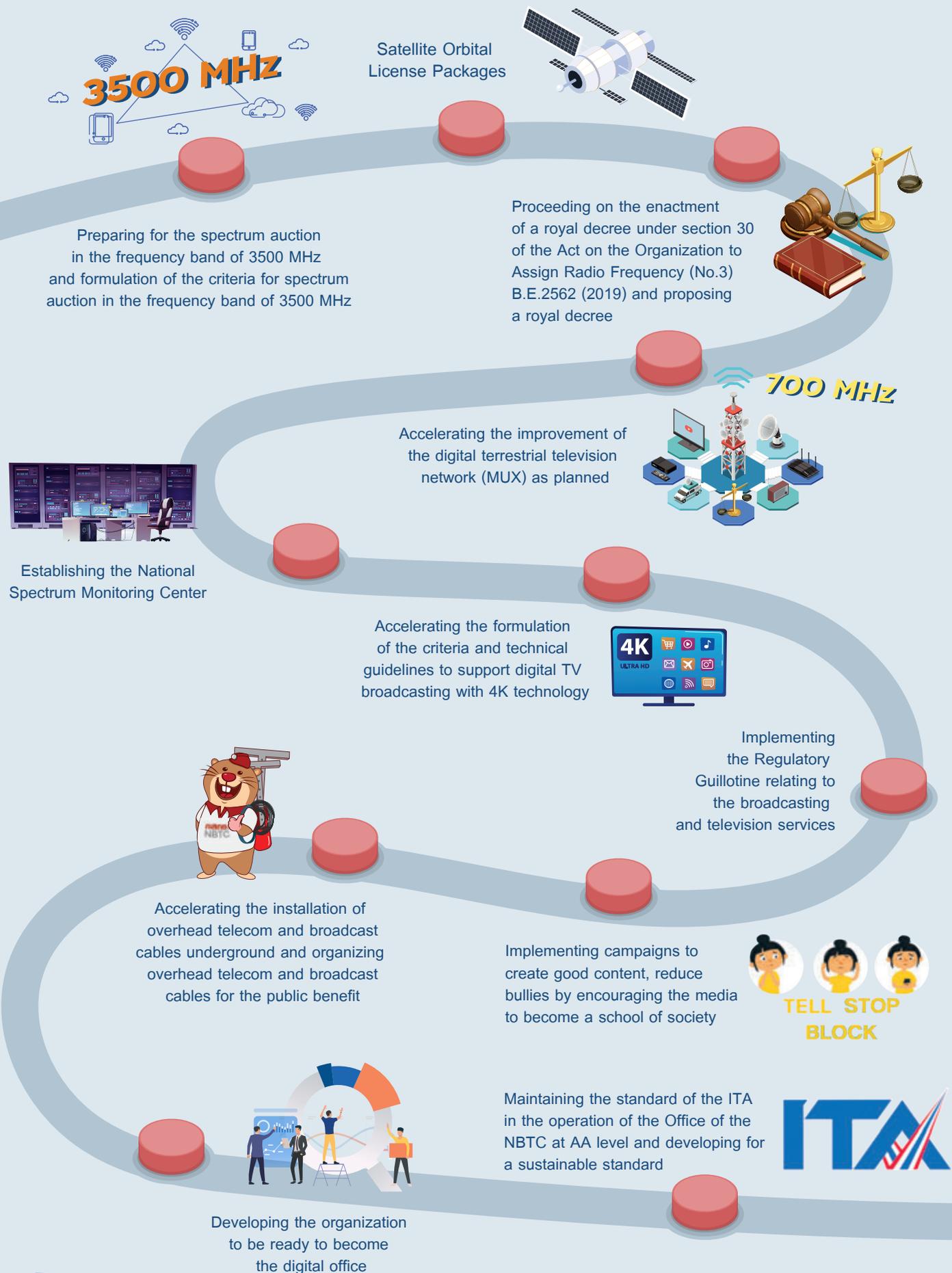
9. Accelerating the installation of overhead telecom and broadcast cables underground and organizing overhead telecom and broadcast cables for the public benefit.

10. Developing the organization to be ready to become the digital office.

11. Maintaining the standard of the Integrity and Transparency Assessments (ITA) in the operation of the Office of the NBTC at AA level and developing for a sustainable standard.



Important Workplan in the Year 2021



2. Budget Expenditure Plan in the Year 2021

In 2021, The NBTC had the resolution in the NBTC Meeting No.19/2020 on 28 October 2020 approving the allocation of budget expenditure in the year 2021 of the Office of the NBTC at the amount of 6,509.434 million baht, as necessary and appropriate in accordance with the government's policy, National Strategies and national plans at various levels,

such as the National Plan regarding Economic and Social Development, and aiming to drive the 11 important urgent policies of the NBTC and support missions under the strategies of the NBTC Master Plan and the Strategic Plan of the Office of the NBTC. Details are as shown in Table 46.

Table 46: Budget Expenditure Plan of the Office of the NBTC in the year 2021

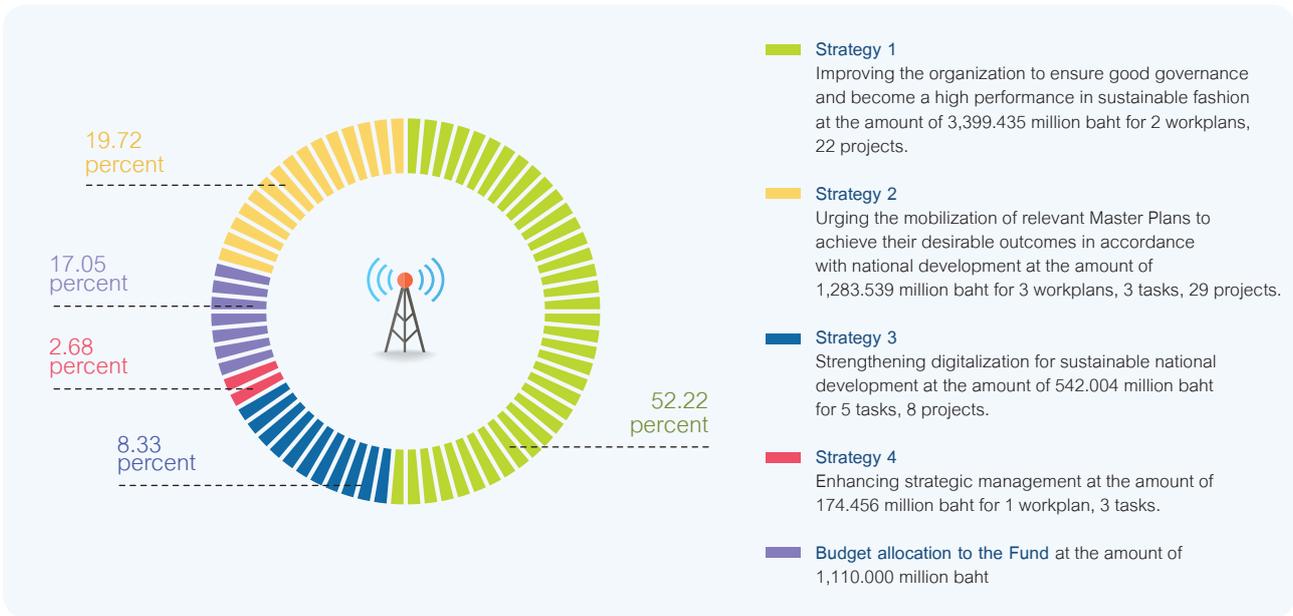
No.	Details	Amount (Million baht)
1.	Budget Expenditure of the Office of the NBTC	5,399.434
1.1	Expenditure for the operation of the NBTC and the Office of the NBTC	3,858.719
	Personnel expenses	1,758.945
	Expenses for organization management and administration	1,452.414
	Expenses for durable articles, land and construction	212.273
	Other expenses	435.087
1.2	Expenditure for projects	1,248.703
1.3	Central budget	188.980
1.4	Expenditure for the operation of the Performance Follow-up and Evaluation Committee	103.031
2.	Budget allocation to the Fund	1,110.000
2.1	The Broadcasting and Telecommunications Research and Development Fund for the Public Interest	1,100.000
2.2	Edtech Fund	10.000
Total (1 - 2)		6,509.434

Source: Strategic and Budget Bureau, Office of the NBTC

The budget expenditure plan of the Office of the NBTC for the year 2021 at the amount of 5,399.434 million baht which can be classified according to the strategic plan of the Office of the NBTC No.2

B.E.2561 - 2564 (2018 - 2021) consists of workplans (routine works) and projects excluding money allocated to the Fund. Details are as shown in Chart 34 and Table 47.

Chart 34: The budget expenditure plan in the year 2021 classified by strategies



- **Strategy 1** : Improving the organization to ensure good governance and become a high performance in sustainable fashion, having been allocated for totally 3,399.435 million baht to drive the Office of the NBTC to become the sustainable good governance and high performing organization, leveling up the management process to international standards, developing the work system to be a digital office as well as managing personnel for excellence, and driving administration workplans, strategic and internal affair workplans for totally 2,576.930 million baht and the project operating budget of 22 projects in the amount of 822.505 million baht.

- **Strategy 2** : Urging the mobilization of relevant Master Plans to achieve their desirable outcomes in accordance with national development, having been allocated for totally 1,283.539 million baht to drive the mission in spectrum and satellite management and the efficient management of the

national communication resources, regulate the broadcasting, television, and telecommunications services in a free and fair manner for totally 906.609 million baht and the project operating budget of 29 projects in the amount of 376.630 million baht.

- **Strategy 3** : Strengthening digitalization for sustainable national development, having been allocated for totally 542.004 million baht to drive the mission in supporting the development of broadcasting, television and telecommunications services to be sustainable through enhancing the capability in research and development of broadcasting, television, and telecommunications services for public interest in order to bridge and utilize the digital divide, building cybersecurity for people as well as building network of cooperation with related sectors in the amount of 492.436 million baht and the project operating budget of 8 projects in the amount of 49.568 million baht.



- **Strategy 4** : Enhancing strategic management, having been allocated for one program and 3 tasks consisting of the action plan for the performance follow-up and evaluation of the NBTC and the Office of the NBTC, the task on personnel capacity development in policy and strategic analysis, the task on supporting the missions of the Internal Audit Committee and the Performance Follow-up and Evaluation Committee, and the task on supporting the mission to develop the strategic management

process of the Office of the NBTC for totally 174.456 million baht, to drive the mission on enhancing mutual understanding and awareness of strategic management success factors in order to integrate the drive of strategies towards the systematic development goals which will be good for the national development, the development of the follow-up and evaluation system, building a strategic work culture as well as the personnel development in policy and strategy to gain expertise.

Table 47: Projects under the strategies in the year 2021

Unit: Million Baht

No.	Details	Budget in 2021
Strategy 1: Improving the organization to ensure good governance and become a high performance in sustainable fashion for 22 projects		
1	Project on the analysis to determine the manpower and the manpower plan of the Office of the NBTC	3.393
	Total budget	5.786
	Budget received in 2020	2.394
	Budget proposed for 2021	3.393
2	Project for the construction of new office building of the Office of the NBTC	681.324
	Total budget	2,743.000
	Budget received in 2019	685.750
	Budget received in 2020	534.133
	Budget proposed for 2021	681.324
	Budget committed to 2022	841.793
3	Project for the construction of an auditorium building of the Office of the NBTC, Region 2	12.400
	Total budget	21.080
	Budget received in 2020	8.680
	Budget proposed for 2021	12.400
4	Project for the construction of the office building of the Office of the NBTC, Region 3	35.970
	Total budget	66.000
	Budget received in 2020	19.800
	Budget proposed for 2021	35.970
	Budget committed to 2022	10.230



No.	Details	Budget in 2021
5	Project for the improvement of landscape architecture with other constructions, of NBTC Sub-region Office (Chiang Rai)	9.760
	Total budget	30.500
	Budget proposed for 2021	9.760
	Budget committed to 2022	20.740
6	Project for the improvement of landscape architecture with other constructions	7.275
	Total budget	12.400
	Budget proposed for 2021	7.275
	Budget committed to 2022	5.125
7	Project on NBTC Scholarship program 2017 for NBTC Officials (Master/Doctoral Degree in Thailand)	0.150
	Total budget	6.921
	Budget received in 2017	1.400
	Budget received in 2018	2.800
	Budget received in 2019	2.250
	Budget received in 2020	0.200
	Budget proposed for 2021	0.150
	Budget committed to 2022	0.121
8	Project on NBTC Scholarship program 2017 for General Public (Master Degree Overseas)	0.050
	Total budget	23.330
	Budget received in 2017	0.300
	Budget received in 2018	0.240
	Budget received in 2019	22.240
	Budget received in 2020	0.500
	Budget proposed for 2021	0.050
9	Project on NBTC Scholarship program 2018 for NBTC Officials (Master/Doctoral Degree in Thailand)	0.100
	Total budget	7.050
	Budget received in 2018	1.400
	Budget received in 2019	2.800
	Budget received in 2020	2.250
	Budget proposed for 2021	0.100
	Budget committed to 2022	0.100
	Budget committed to 2023	0.400



No.	Details	Budget in 2021
10	Project on NBTC Scholarship program 2019 for NBTC Officials (Master Degree Overseas)	1.000
	Total budget	7.000
	Budget received in 2019	3.000
	Budget received in 2020	3.000
	Budget proposed for 2021	1.000
11	Project on NBTC Scholarship program 2020 for NBTC Officials (Master Degree in Thailand)	1.550
	Total budget	2.500
	Budget received in 2020	0.775
	Budget proposed for 2021	1.550
	Budget committed to 2022	0.175
12	Project for the development of community and communication application system within the Office of the NBTC	8.000
	Total budget	20.000
	Budget received in 2020	12.000
	Budget proposed for 2021	8.000
13	Project on Single Point Data Searching System	7.000
	Total budget	20.000
	Budget proposed for 2021	7.000
	Budget committed to 2022	13.000
14	Project on NBTC Service Portal	4.595
	Total budget	15.316
	Budget proposed for 2021	4.595
	Budget committed to 2022	10.721
15	Project to improve the efficiency of electronic documentation system of the Office of the NBTC	5.148
	Total budget	17.161
	Budget proposed for 2021	5.148
	Budget committed to 2022	12.013
16	Project to enhance the efficiency of durable articles management system with RFID technology	9.347
	Total budget	9.347
	Budget proposed for 2021	9.347



No.	Details	Budget in 2021
17	Project to develop the advance payment system and follow-up of medical expenses reimbursement for the Office of the NBTC	3.212
	Total budget	10.707
	Budget proposed for 2021	3.212
	Budget committed to 2022	7.495
18	Project to prevent attacks on the website of the Office of the NBTC at networking level	3.000
	Total budget	17.827
	Budget received in 2020	2.827
	Budget proposed for 2021	3.000
	Budget committed to 2022	6.000
	Budget committed to 2023	6.000
19	Project to improve and enhance efficiency of the accounting and financial management system, income management system, and asset and procurement management system	10.449
	Total budget	29.855
	Budget received in 2020	11.942
	Budget proposed for 2021	10.449
	Budget committed to 2022	7.464
20	Project on the Central Database Integration of the Office of the NBTC	13.500
	Total budget	13.500
	Budget proposed for 2021	13.500
21	Project on SMS and NBTC Yellow pages management system of the Office of the NBTC	1.249
	Total budget	1.249
	Budget proposed for 2021	1.249
22	Project to hire consultant and develop the process to support the compliance to the Personal Data Protection Act B.E.2562 (2018) (PDPA Compliance)	4.033
	Total budget	8.065
	Budget proposed for 2021	4.033
	Budget committed to 2022	4.033
Strategy 2: Urging the mobilization of relevant master plans to achieve their desirable outcomes in accordance with national development for 29 projects		
1	Project to Study trend and Satellite service model in the future and develop guideline for satellite service regulation in Thailand	2.283
	Total budget	4.565
	Budget proposed for 2021	2.283
	Budget committed to 2022	2.283



No.	Details	Budget in 2021
2	Project on illegal detection system of radio and television broadcasting in regional level	28.449
	Total budget	94.950
	Budget received in 2019	19.002
	Budget received in 2020	38.004
	Budget proposed for 2021	28.449
	Budget committed to 2022	9.495
3	Project to enhance the efficiency and stability of the Automated Spectrum Management System (ASMS)	7.963
	Total budget	13.272
	Budget proposed for 2021	7.963
	Budget committed to 2022	5.309
4	Project to supply 26 monitoring and direction finding mobile vehicles	147.821
	Total budget	328.490
	Budget received in 2020	49.274
	Budget proposed for 2021	147.821
	Budget committed to 2022	131.396
5	Project to supply 4 remote control monitoring station	47.600
	Total budget	56.000
	Budget received in 2020	8.400
	Budget proposed for 2021	47.600
6	Project to supply and develop a mobile licensing vehicle of the Regional Office of the NBTC	9.750
	Total budget	15.000
	Budget received in 2020	5.250
	Budget proposed for 2021	9.750
7	Project for development of analysis and integration of radio frequency monitoring data system	5.449
	Total budget	9.907
	Budget received in 2020	4.458
	Budget proposed for 2021	5.449
8	Project to monitor the frequency propagation of mobile phone towers by using drones	6.000
	Total budget	10.000
	Budget received in 2020	4.000
	Budget proposed for 2021	6.000



No.	Details	Budget in 2021
9	Project to supply 4 sets of the 100 MHz real time bandwidth spectrum analyzer in the frequency band of 10 MHz - 42 GHz with equipment	2.138
	Total budget	14.252
	Budget proposed for 2021	2.138
	Budget committed to 2022	12.115
10	Project to supply 4 sets of scanning receiver and locating transmitter station with equipment	7.000
	Total budget	28.000
	Budget proposed for 2021	7.000
	Budget committed to 2022	21.000
11	Project to purchase 25 sets of antenna for Shoulder held Spectrum analyzers in the frequency band of 5 kHz – 26.5 GHz	9.002
	Total budget	45.010
	Budget proposed for 2021	9.002
	Budget committed to 2022	36.008
12	Project to store and integrate the remote system for monitoring and controlling monitoring stations	1.339
	Total budget	8.925
	Budget proposed for 2021	1.339
	Budget committed to 2022	7.586
13	Project to study the impact of frequency propagation on the signaling system of rail transport for regulatory purposes of the Office of the NBTC	5.504
	Total budget	9.174
	Budget proposed for 2021	5.504
	Budget committed to 2022	3.670
14	R & S control Center Nestor BSM for Fix Station Monitoring (5 sensors)	22.780
	Total budget	30.452
	Budget proposed for 2021	22.780
	Budget committed to 2022	7.672
15	Project to study an in-depth analysis of regulatory guidelines in the new technology era	3.493
	Total budget	5.821
	Budget received in 2020	2.329
	Budget proposed for 2021	3.493



No.	Details	Budget in 2021
16	Project to develop guidelines for promoting competition in the television industry through co-production measures for television programs	3.620
	Total budget	6.034
	Budget received in 2020	2.414
	Budget proposed for 2021	3.620
17	Project on the survey and data analysis of digital platform service providers in Thailand	4.299
	Total budget	14.328
	Budget proposed for 2021	4.299
	Budget committed to 2022	10.029
18	Project on the DTTB Network Monitoring on Service Availability Phase 2	1.612
	Total budget	8.060
	Budget proposed for 2021	1.612
	Budget committed to 2022	6.448
19	Project on digital radio trial broadcasting DAB+	10.000
	Total budget	10.000
	Budget proposed for 2021	10.000
20	Project to develop the technical standard inspection management system of radio broadcasting transmitter	2.724
	Total budget	2.724
	Budget proposed for 2021	2.724
21	The project to survey the behavior on the use of mobile phone services through online applications (Year 2)	6.290
	Total budget	8.990
	Budget received in 2020	2.700
	Budget proposed for 2021	6.290
22	Project on Geographic Information System (GIS) for the national telecommunication cables network	11.640
	Total budget	19.400
	Budget received in 2020	7.760
	Budget proposed for 2021	11.640
23	Project to study for the determination of model and criteria of licensing to use spectrum in the frequency band of 1800 MHz, 3500 MHz, and 28 GHz under the cooperation between the Office of the NBTC and Chalmers University of Technology, Sweden	7.000
	Total budget	7.000
	Budget proposed for 2021	7.000



No.	Details	Budget in 2021
24	Project to develop a working assistance system on the right of way for the input of communication network map database: laying communication cables	4.492
	Total budget	8.983
	Budget proposed for 2021	4.492
	Budget committed to 2022	4.491
25	Project to improve the database of telecommunication service area and cover the population of Thailand for the regulation according to the spectrum auction conditions (Phase 2)	3.067
	Total budget	3.067
	Budget proposed for 2021	3.067
26	Project to hire for producing equipment to prevent violations of laying communication cables	3.000
	Total budget	3.000
	Budget proposed for 2021	3.000
27	Project to hire consultant to study and review procedure, methodology, and cost models for accounting separation report in response to revision of telecommunication services and changing environment	5.175
	Total budget	5.750
	Budget received in 2020	0.575
	Budget proposed for 2021	5.175
28	Project to develop and improve the telecommunication numbering data management system Phase 4	4.500
	Total budget	4.500
	Budget proposed for 2021	4.500
29	Project on license management system phase 2	2.641
	Total budget	2.641
	Budget proposed for 2021	2.641
Strategy 3: Strengthening digitalization for sustainable national development for 8 projects		
1	Project to develop a system for collecting revenue from USO fees according to the Notification regarding revenue collection to be used for the provision of universal basic telecommunication services and social services	1.700
	Total budget	1.700
	Budget proposed for 2021	1.700



No.	Details	Budget in 2021
2	Project to hire for checking and analyzing network security and information technology systems	2.310
	Total budget	2.888
	Budget proposed for 2021	2.310
	Budget committed to 2022	0.578
3	Project on the cooperation on royal news production and the live broadcast of the royal ceremonies and state ceremonies for the provision of broadcasting or television services.	15.000
	Total budget	15.000
	Budget proposed for 2021	15.000
4	Project on application development to promote the access to the public television	5.920
	Total budget	5.920
	Budget proposed for 2021	5.920
5	Project to improve the system of Electronic Program Guide (EPG) services	2.970
	Total budget	2.970
	Budget proposed for 2021	2.970
6	Project on Electronic Thai Sign Language Communication System	4.748
	Total budget	4.748
	Budget proposed for 2021	4.748
7	Project to develop and improve the mobile phone users data management system for maintaining the right to use mobile number (3-tier application) Phase 3	3.000
	Total budget	3.000
	Budget proposed for 2021	3.000
8	Project to develop the verification and authentication system through electronic identification cards on mobile phones ("Mobile ID") Phase 2	13.920
	Total budget	13.920
	Budget proposed for 2021	13.920

7

Problems and Obstacles in
Broadcasting, Television,
and Telecommunications
Businesses Operation
which are Important to
the People



5G

1. Technology Convergence

At present, the broadcasting, television and telecommunications businesses operation have been influenced by technology convergence, which creates a convergence of broadcasting, television and telecommunications services in various forms such as provision of television services through telecommunication networks, etc. It is therefore necessary to consolidate 3 relevant laws: namely, the Broadcasting Business Act B.E.2551 (2008), the Telecommunications Business Act B.E.2544 (2001) and the Radiocommunications Act B.E.2498 (1955) so that there shall have regulatory guidelines which are appropriate and in accordance with technological convergence. To properly integrate such laws, the Office of the NBTC therefore has the Order

No.413/2020 appointing the working group to study and prepare a proposal for the amendment and revision of the laws used to regulate broadcasting, television and telecommunications services, dated 28 April 2020, with the powers and duties to study and prepare proposals for the amendment and revision of to the laws used to regulate the broadcasting, television and telecommunications services including drafting laws by taking into account technology convergence, licensing, and business regulation to ensure clarity in practice and utilization of communication resources. The working group is now in the process of studying and preparing proposal for the amendment and revision of laws.



2. Changes of the industry ecosystem

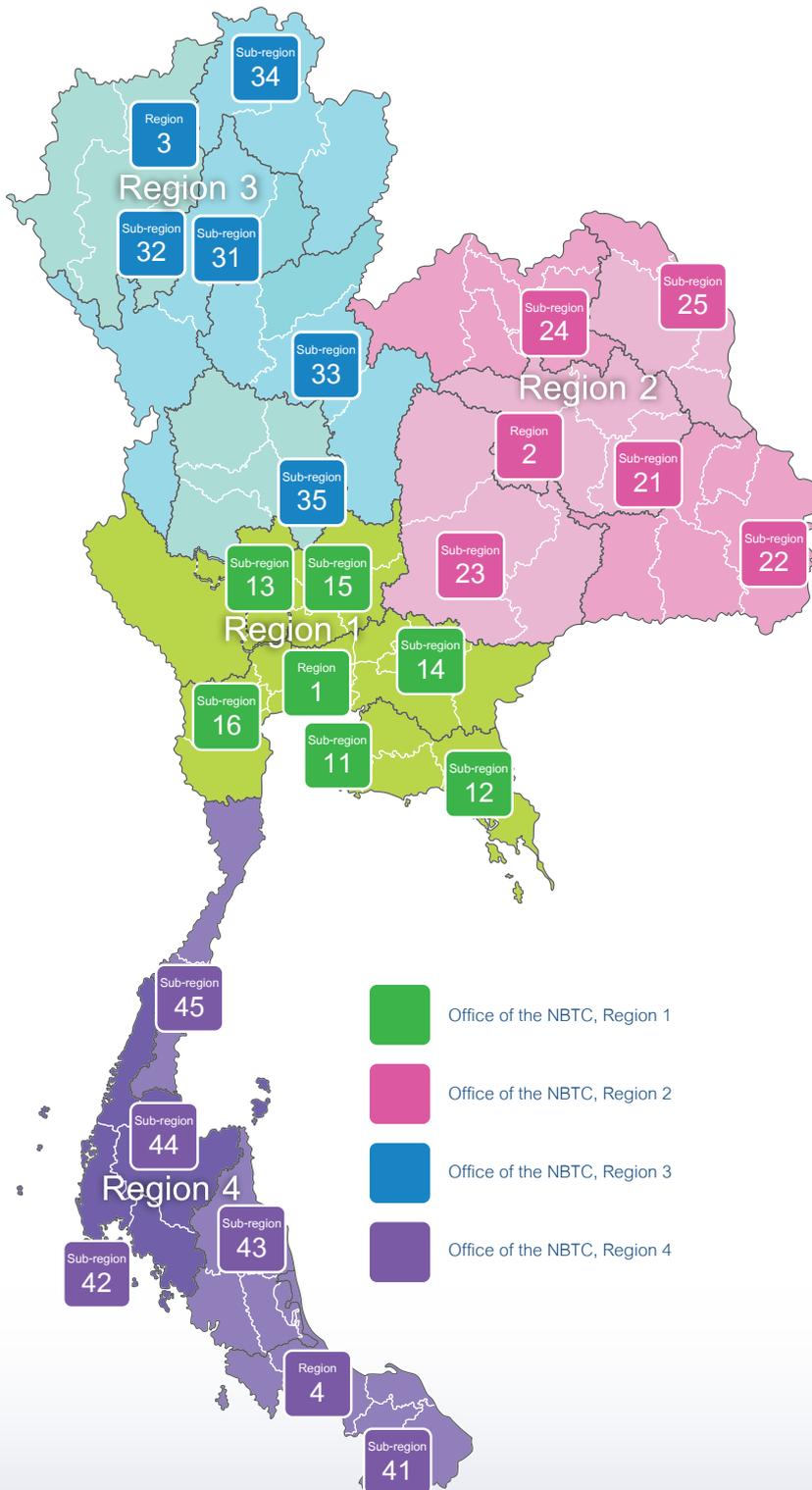
Due to the rapid advancement of technology nowadays, which can be seen from the growth of the internet being as part of our daily lives, consumer behaviors have changed to consume more contents through online platforms. The provision of broadcasting or television services through a network other than the broadcasting network (Over the Top: OTT) is in particular, which can meet the needs of consumers because programs can be viewed or listened in anywhere at any time through a variety of devices such as Smartphone, Tablet, Laptop, etc. As a result, the OTT services are likely to become the increasing popular channels for broadcasting and television services. However, the OTT services in Thailand are not currently under the same regulation as broadcasting and television services and this leads to an inequality in business operations and competition including the regulation of contents that affect the security of the state and are contrary to the public order or good morals of the people, etc. The NBTC has recognized the importance of this matter and thus has taken steps to find ways to promote more fair competition by conducting the studies of relevant information to be used as a basis for preparing policy recommendations for the regulation and promotion of the broadcasting and television services as well as regulating businesses under the new media landscape, whether the study of the OTT impact on the broadcasting and television services, the impact on society, culture and economy; or the study of foreign regulatory guidelines to be applied to the context of Thailand, etc. The NBTC has determined that the development of national television service shall be appropriate with the new context as one of the strategies under the second Broadcasting Master Plan in order to achieve the adjustment of the regulatory process in accordance with the changing industry ecosystem and competition.

3. The impact of the COVID-19 pandemic

According to the government's 5G implementation plan, which aimed at pushing 5G technology to play a role in the manufacturing industry first, the NBTC has set licensing conditions that the licensees shall provide telecommunication networks that cover the Special Economic Promotional Zone according to the Eastern Special Development Zone Act (Eastern Economic Corridor - EEC) for not less than fifty percent of the area within 1 year from the licensing date, and shall provide telecommunication networks that cover the areas of economic center city for not less than fifty percent of the total population in each province within 4 years from the licensing date. After that, the implementation will take place in the transportation, agriculture, and medical and public health industries. However, due to the outbreak of the COVID-19 pandemic, the 5G technology implementation plan to develop other industries has been postponed as all operators have been severely affected by the economy and investment. However, to keep up with the current situation, the NBTC has accelerated the adoption of 5G technology in the medical and public health industries, which is 2 - 3 years earlier than expectation, and will accelerate 5G technology for the development of other industries when the epidemic situation of COVID-19 began to unravel.



Location and Area of Responsibility of the Regional offices of the NBTC



- Office of the NBTC, Region 1
- Office of the NBTC, Region 2
- Office of the NBTC, Region 3
- Office of the NBTC, Region 4

Region 1 Office of the NBTC, Region 1 (Central)
Responsibilities under the jurisdiction include :

- Sub-region 11** NBTC Sub-region Office (Samut Prakan)
Area of responsibility : Samut Prakan, Bangkok, Nonthaburi, Pathum Thani
- Sub-region 12** NBTC Sub-region Office (Chanthaburi)
Area of responsibility : Chanthaburi, Trat, Rayong, Chonburi
- Sub-region 13** NBTC Sub-region Office (Suphan Buri)
Area of responsibility : Suphan Buri, Kanchanaburi, Sing Buri, Chainat
- Sub-region 14** NBTC Sub-region Office (Prachinburi)
Area of responsibility : Prachinburi, Nakhon Nayok, Chachoengsao, Sa Kaeo
- Sub-region 15** NBTC Sub-region Office (Phra Nakhon Si Ayutthaya)
Area of responsibility : Phra Nakhon Si Ayutthaya, Ang Thong, Lopburi, Saraburi
- Sub-region 16** NBTC Sub-region Office (Ratchaburi)
Area of responsibility : Ratchaburi, Phetchaburi, Samut Sakhon, Samut Songkhram, Nakhon Pathom

Region 2 Office of the NBTC, Region 2 (Northeast)
Responsibilities under the jurisdiction include :

- Sub-region 21** NBTC Sub-region Office (Khon Kaen)
Area of responsibility : Roi Et, Maha Sarakham, Khon Kaen, Kalasin
- Sub-region 22** NBTC Sub-region Office (Ubon Ratchathani)
Area of responsibility : Ubon Ratchathani, Sisaket, Surin, Amnat Charoen, Yasothorn
- Sub-region 23** NBTC Sub-region Office (Nakhon Ratchasima)
Area of responsibility : Nakhon Ratchasima, Buriram, Chaiyaphum
- Sub-region 24** NBTC Sub-region Office (Udon Thani)
Area of responsibility : Udon Thani, Nong Khai, Nong Bua Lamphu, Loei
- Sub-region 25** NBTC Sub-region Office (Nakhon Phanom)
Area of responsibility : Nakhon Phanom, Sakon Nakhon, Mukdahan, Bueng Kan

Region 3 Office of the NBTC, Region 3 (North)
Responsibilities under the jurisdiction include :

- Sub-region 31** NBTC Sub-region Office (Lampang)
Area of responsibility : Lampang, Phrae, Tak
- Sub-region 32** NBTC Sub-region Office (Lamphun)
Area of responsibility : Lamphun, Chiang Mai, Mae Hong Son
- Sub-region 33** NBTC Sub-region Office (Phitsanulok)
Area of responsibility : Phitsanulok, Phetchabun, Uttaradit, Sukhothai
- Sub-region 34** NBTC Sub-region Office (Chiang Rai)
Area of responsibility : Chiang Rai, Nan, Phayao
- Sub-region 35** NBTC Sub-region Office (Nakhon Sawan)
Area of responsibility : Nakhon Sawan, Kamphaeng Phet, Uthai Thani, Phichit

Region 4 Office of the NBTC, Region 4 (South)
Responsibilities under the jurisdiction include :

- Sub-region 41** NBTC Sub-region Office (Yala)
Area of responsibility : Yala, Pattani, Narathiwat, Songkhla, Satun
- Sub-region 42** NBTC Sub-region Office (Phuket)
Area of responsibility : Phuket, Phang Nga, Krabi
- Sub-region 43** NBTC Sub-region Office (Nakhon Si Thammarat)
Area of responsibility : Nakhon Si Thammarat, Trang, Phatthalung
- Sub-region 44** NBTC Sub-region Office (Surat Thani)
Area of responsibility : Surat Thani, Ranong
- Sub-region 45** NBTC Sub-region Office (Chumphon)
Area of responsibility : Chumphon, Prachuap Khiri Khan

**Office of The National Broadcasting
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