

ANNUAL REPORT

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BHUTAN INFOCOMM & MEDIA AUTHORITY

འབྲུག་བརྟན་དོན་བརྒྱུད་འབྲེལ་དང་བརྟན་དབང་འཛིན།



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ANNUAL REPORT
2021-22

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VISION

"To be premier Information, Communications and Media Regulator"

MISSION

"To foster an environment for fair and sustainable competition, stimulate innovation, encourage investment, ensure that all Bhutanese have access to quality ICT & Media services at affordable prices founded on the principles of Gross National Happiness"

OUR CORE VALUES



DIRECTOR'S FOREWORD

Bhutan InfoComm and Media Authority (The Authority) is pleased to share the annual report for the financial year 2021-2022. We are presenting with the hope that this report will be informative and provide a comprehensive view of the works undertaken by the Authority in fulfilling the mandates towards being an enabler of efficient ICT service delivery in the country.

Although the year has again been disrupted with frequent lockdowns, restrictions and working from home due to the pandemic, we have been fortunate under the leadership of His Majesty and the guidance of the government for being able to deliver most of our annual planned activities.

Due to the pandemic and adoption of remote working methods, the requirement of internet connectivity was felt dearly by every walks of life and the Authority had worked tirelessly towards providing reliable connectivity at affordable rates. Going forward, the sixth Rural Connectivity Programme (RCP) is under progress and four villages in Dagana have been connected with 4G data and 2G voice cellular mobile network. The remaining villages under RCP-VI and the supplementary list are expected to be connected by the end of 2022. While mobile broadband has reached 90% of our population, the fixed internet connectivity at homes remains negligible. Therefore, the Authority is working with telcos how fixed broadband at homes can be facilitated through right of ways and reduction of tariffs. In the coming year, we are hopeful that the home internet connection increases at least by 30 percent and after the proposed reduction of per mbps tariff by 50 percent.

The IT enabled services like Over The Top (OTT) platform is offering the much needed digital platform for the local content producers. The three licensed OTT platforms provided job opportunities for creative industries during the peak pandemic period by offering alternative outlets without boundaries. The Authority is proud to be associated with these new service providers by facilitating its growth and contribution to the economy.

The commercial deployment of 5G technology in 2021 by both the telcos is expected to transform the fixed wireless internet services and promote internet of things (IoT). We are hopeful that the 5G cellular users will gradually increase and assist in decongesting the 4G network capacity thus by enhancing the Quality of Services. Further with this new cellular technology we are optimistic that more use case applications would emerge resulting in new business avenues and more employment opportunities for Bhutanese.

As we move on, the Authority is determined to provide better digital connectivity since both the telecom operators' licenses will be renewed for another term with a new set of terms and conditions. And BICMA remains committed to playing the catalytic role of promoting newer and better technologies to make our lives easier and productive.



(Jigme Wangdi)

Director

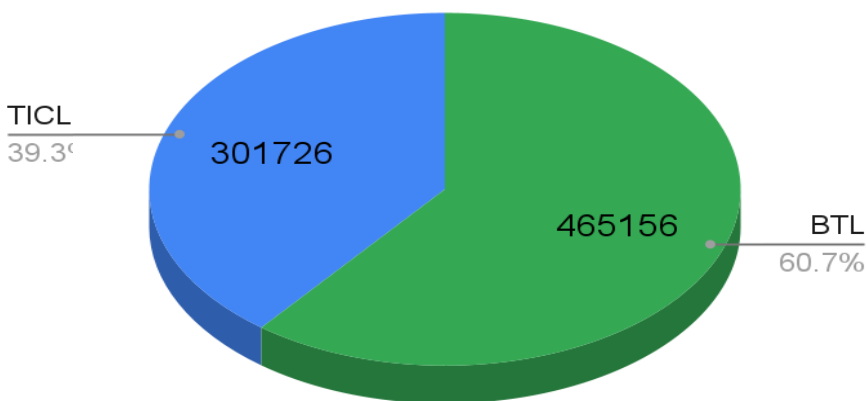
A. ICT AND MEDIA SECTOR AT A GLANCE

1. ICT Sectors

1.1 Mobile Subscribers and its Market Share

- Total Subscribers: 766,882
- Service Providers: Bhutan Telecom Limited (BTL) and Tashi InfoComm Limited (TICL).

Fig.1: Mobile Subscribers and its Market share

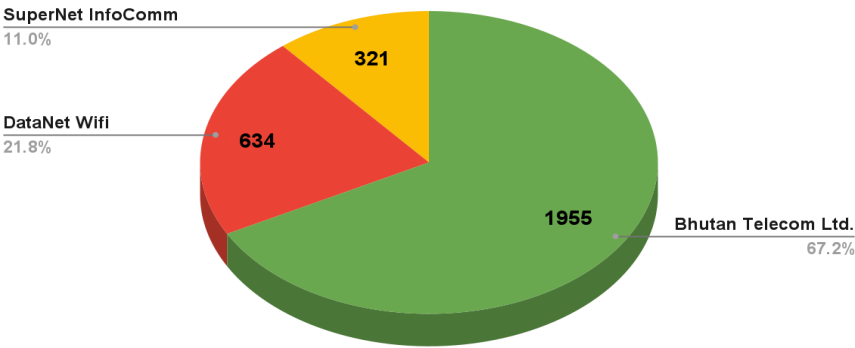


1.2 Fixed Telephone Subscribers

- Total Subscribers: 19,763 (Decrease by 10% as compared to 2020-2021)
- Service provider: Bhutan Telecom Limited

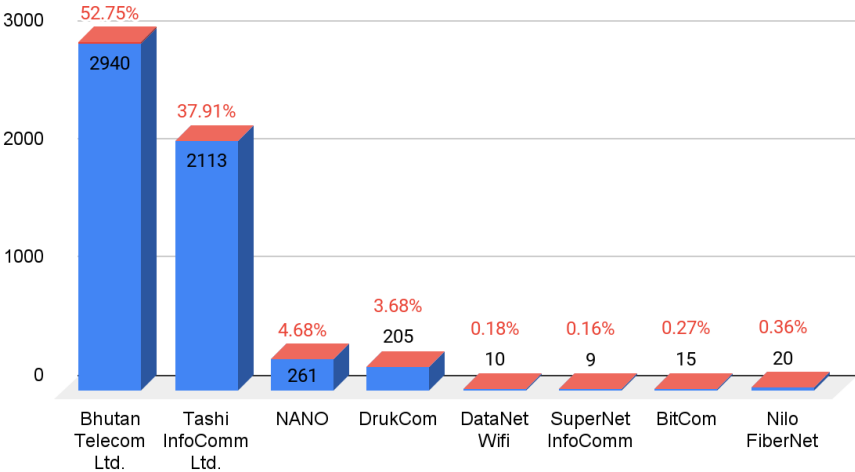
1.3 Fixed Broadband Service Provider and its Market Share

Fig.2: Fixed Broadband Service Providers



1.4 Internet Leased Line Service Providers

Fig.3: Internet Leased Line Service Providers



2. Media and Broadcasting Sector

2.1 Newspapers

Newspaper	Frequency
Bhutan Times	Weekly
Bhutan Today	Weekly
Business Bhutan	Weekly
Gyalchi Sarshog	Weekly
Kuensel	Daily
The Bhutanese	Weekly
The Journalist	Weekly

2.2 FM Radio Stations

FM Broadcast	Type	Coverage
BBS Radio	Commercial	Nation Wide
Centennial Radio		Thimphu
Kuzoo FM		Nation Wide
Radio Valley		Thimphu
Yiga Radio		Thimphu
Edi Community Radio	Community	Dechen Pelrithang, Gelephu, Sarpang
KYD 91.1 Community Radio		Khothakpa, Yalang, and Denchi, Pemagatshel
Lhop Community Radio		Lotokuchu, Samtse
CST Campus Radio	Campus	College of Science and Technology
JNEC Campus Radio		Jigme Namgyel Engineering College
Rigzhung Lungta		College of Language and Culture Studies
Sherig FM		Samtse College of Education
Sherubtse Campus Radio		Sherubtse College

2.3 Television Broadcasting Stations

Television Broadcaster	Channel
Bhutan Broadcasting Service	BBS 1 <ul style="list-style-type: none">• Breaking News and Current Affairs
	BBS 2 <ul style="list-style-type: none">• Entertainment and Educational Programmes
	BBS 3 <ul style="list-style-type: none">• Educational programs for all age-groups with the tagline “Learn Something”

3. Cable Television (CATV) Operators

A total of 92 Cable Television Operators are licensed across the country. Out of 92, 69 Local Cable Operators (LCOs) were connected to MSOs (Multi Service Operators) and sourced signals from MSOs. The details are provided in Annexure 1.

B. REFLECTION OF THE ACTIVITIES

During the Financial Year 2021-2022, the Authority implemented the following major activities:

1.1. Regulatory Frameworks:

1.1.1. Formulation of New Regulatory Frameworks:

In keeping with the advancement and its technology and to protect ICT and Media consumers, the Authority developed the following regulatory frameworks:

a. *Rules and Regulations for Television Broadcasting Service*

The Rules and Regulations for Television Broadcasting Service has been developed to assist the Authority on licensing and regulating Television Broadcasting Services in Bhutan. It will not only enhance the quality of television services but also facilitate all the television services in the country towards healthy development of the sector. Moreover, it will also provide standard guidelines for licensing and broadcasting quality television services in the country.

b. *Band plan for services in 2.3 GHz band 40 TDD for LTE*

With the increase in the demand for mobile broadband services it is critical to enhance its Quality of Services (QoS) delivered to the customers. Network densification through deploying more mobile networks is one of the solutions to enhancing the mobile broadband QoS. However, owing to the limited land space, especially in urban areas, has significantly posed challenges to the telecom operators in expanding their mobile broadband networks. The other alternatives in solving such issues is through enhancing the network capacity by issuing more frequency spectrum to the telecom operators. Since the 2.3GHz has been unutilized in the country, the Authority considered making use of unutilised frequencies to enhance the capacity of mobile broadband services.

Therefore, the Authority in consultation with the stakeholders has formulated the 2.3GHz (Band 40) frequency band plan and the 40MHz of 2.3GHz has been allocated to Bhutan Telecom Limited for the trial deployment of 4G (LTE-TDD) services in Bhutan.

c. *Guideline on licensing of OTT services*

Information and Communication technology is developing at a faster rate with rapid penetration of mobile broadband internet and smartphones across the world. With such trends, numerous digital platforms have been created where digital services and contents nowadays are being delivered to the people using the public internet as a medium. One such popular digital platform is OTT (Over-the-Top) services which have supplemented the traditional telecommunication services. The additional features and functionality of OTT over traditional telecommunication services has attracted millions of OTT consumers around the world and transformation and widening of the communication ecosystem has taken place to greater extent where OTTs have played a vital role in strengthening global digital connectivity and providing social and economic benefits to its consumers.

The objective of the guideline for licensing of OTT services is to provide clarity on licensing requirements of OTT services, guide the applicants while applying for the license (ICT service license), facilitate the quality of OTT services and enhance the data protection of consumers and the content through licensing requirements.

1.1.2. *Review of Existing Rules:*

a. *Rules and Regulations for Publications*

The new Rules and Regulations for Publication came into effect from 13th May 2022 repealing the old Rules and Regulations for Publication 2019. This revised Rules provides some major changes such as:

- i. Three categories of Publication House Licenses to be issued:
 - a. Book Publication House License (for publishing books only).
 - b. Periodical Publication House License (for publishing periodicals such as magazines, journals, and newsletters).
 - c. Newspaper Publication House License (for publishing newspapers only).
- ii. It has been made mandatory for all newspapers to be incorporated as a company with the Company Registry Authority.
- iii. All publications of government agencies are hereby exempted from registration with the Authority for distribution.

b. *New Rules and Regulations on Universal Service Fund (USF)*

The Rules and Regulations Governing the Establishment and Administration of the USF came into effect from 1st October 2021 repealing the old USF Rules 2019. Policy directive of the ministry has been made mandatory for usage and disbursement of the USF in the new Rules.

1.2 *New Licenses/Certificates/Permits Issued*

A total of 117 licenses/certificates/permits were issued by the Authority during the financial year 2021-2022.

Sl. no	Licenses/Certificates/Permits	Numbers
1	Cable TV Services license	2
2	Entertainment Permit (TV Reality show)	5

Sl. no	Licenses/Certificates/Permits	Numbers
3	Radio Communication Apparatus License	13
4	Spectrum License	2
5	Type Approval Certificate	9
6	Amateur License	4
7	Satellite Phone	2
8	Certificate of book registration	73
9	Printing Press license	3
10	Publication House license	1
11	Over the Top (OTT) License	2
12	Internet Service Provider license	1
	TOTAL	117

1.3 Verification of Telecommunication Towers EMF (Electromagnetic Field Radiation)

In order to ensure that electromagnetic field emission exposure from all Cellular Base Transceiver Stations (BTS) are safe, the Authority carried out the measurement of EMF exposure from BTS stations in the country. The Authority has completed the EMF exposure measurement of 118 towers during the financial year 2021-2022 as mentioned in the table below:

Sl. No	Dzongkhag	Number of Towers Monitored	Remarks
1	Zhemgang	15	All the measured towers were found safe and within the permissible range
2	Pemagatshel	12	
3	Lhuentse	23	
4	Haa	10	
5	Thimphu	49	
6	Paro	9	

The measurement of EMF exposure is carried out based on the safety standards recommended by the International Commission on Non-ionizing Radiation Protection (ICNIRP).



EMF Monitoring

1.4 Radio Spectrum Monitoring

Radio Spectrum Monitoring is a process of observing the radio frequency spectrum usage to realize its efficient utilization and to minimize the radio frequency interference. The two types of radio frequency monitoring systems are based on the fixed and mobile radio monitoring systems. The Authority has one fixed radio

monitoring station at Tsirang (Rakshedrangra) and one handheld spectrum monitoring system using Spectrum Analyzer.

The Authority carried out monthly radio spectrum monitoring from the regional fixed monitoring station in Tsirang. Besides, the Authority also carried out mobile radio spectrum monitoring in Thimphu and Paro Dzongkhag. Around 35 canceled Radio Communication Apparatus licenses and 8 canceled Radio spectrum licenses were monitored in Thimphu and Paro respectively. Through these monitoring, an unauthorized radio spectrum user was found and imposed a penalty accordingly.

The Authority also carried out the monitoring of the 5G spectrum occupancy in Paro in order to ensure that no out-of-band spectrum transmission by 5G mobile services.



Spectrum Monitoring

1.5 Quality of Mobile Service

In order to ensure mobile service consumer satisfaction, the Authority monitored the Quality of Data and Voice Services on a

regular basis based on the monthly Operational Support System (OSS) generated report.

The parameters used to determine the Key performance indicator (KPI) of the voice and data service of the mobile communication network are:

1. Packet Drop Rate: measured as a percentage of packets dropped with respect to packets sent.
2. Data Throughputs: measurement of the speed of data upload or download.
3. Call Drop Rate: measured as a percentage of calls dropped with respect to the total number of calls made.
4. Call Setup Time: measurement of the overall length of time required to establish a circuit-switched call between users.

Based on the QoS drive tests conducted during the third nationwide lockdown, the two telecom operators were issued regulatory sanctions of fines for not fulfilling the required benchmarks of mobile quality of services. The results were also shared with the telecom operators for further improvement and rectification.

Furthermore, the Authority also carried out highway mobile network monitoring for four (4) national highways along Trongsa-Zhemgang, Lhuentse-Mongar, Punakha-Gasa and Tsirang-Dagana national highways. The test results were shared with the two telecom operators so that they can plan and work towards improving their mobile coverage.

The Authority in line with the Quality of Service monitoring and to have a proper platform for mobile broadband users to lodge their grievances on the issues of mobile QoS is developing mobile applications to have tests evidently. This mobile app

will be handy for the user and can serve both the purposes to measure the QoS of mobile services as well as function as the crowd-sourcing platform to enable the users to share their mobile network QoS results to the Authority.

1.6 Tariff Monitoring

One of the important functions of the Authority is to protect consumers of ICT and Media services, among others, the rates charged for, and the quality of ICT services provided. The ICT services are provided by the ICT Service Providers to the customers as per the approved rates and tariffs. It is important to monitor and verify whether the Service Providers provide and abide by the approved rates and tariffs. Therefore, the Authority carried out quarterly assessments of the tariff implementation by the Service Providers, especially the Telecom Services and published the report quarterly on the website for public reference.

The assessment mainly verified and validated whether the Service Providers are providing the following services to the customers as per the tariff rates approved by the Authority:

- a. Mobile voice call and Short Message Service (SMS) charges implementation (assessment of whether the Service provider charges the voice calls and SMS as per the approved tariff rate).
- b. Mobile data allocation (assessment of whether the subscribed data volumes are provided as per the approved package/tariff rate).

From the tariff monitoring, it was observed that both the telcos are providing their voice and data services to the customers as per the tariff rates approved by the Authority.

1.7. KPI Firmware Integration

In order to monitor the mobile voice and broadband quality of services, the Authority has a monitoring drive test device and tools called SwissQual Qualipoc free-rider III and its result Generating Software called NQDI (Network Quality Data Investigator) which was purchased from Rohde and Schwarz (manufacturer) in February 2018.

However, the previous mobile handsets which were procured in 2018 were of Android version 7 and these handsets frequently hang up due to end of support from the manufacturer. Moreover, the firmware also had to be upgraded to enable compatibility in monitoring. To solve these issues, the Authority upgraded the mobile devices with android version 12 and the firmware was upgraded. The upgraded firmware provided greater monitoring features, scalability and efficiency. The firmware was upgraded at the cost of Nu. 1,390,879.00 with the funding support from RGoB.

1.8. Radiocommunication Interference Monitoring

The Authority has assessed and mitigated Radiocommunication interference and presented effective methods to identify and resolve the interference before, during and after its occurrence. The Authority received a couple of radio communication interference issues.

The radio handsets of Norbuling Central School faced radio interference from other users. The Authority carried out interference monitoring and resolved the interference by assigning a new frequency to Norbuling Central School.

The Cable Television Operators and the Multi Service Operators faced radio interference in their C Band satellite receivers affecting the television signal quality. The Authority carried out the interference monitoring and found that the interference were caused due to 5G signal transmission. This interference was

resolved after requiring the Cable Television Operators and MSO to change their LNB frequency range of satellite receivers away from the assigned 5G frequency band.

1.9 Installation of Ku-band dish for BBS channel reception in rural areas

The Authority in collaboration with the Department of Information and Media (DoIM) initiated the project of connecting the rural households without BBS service, through installation of Ku band satellite dish. The Authority has licensed seven (7) Ku band installation permit holders to install Ku band dishes in rural areas. Since 2021, a total of 13461 Ku band satellite dishes have been installed and provided with BBS services to the rural villages which do not have cable television services. The 4930 number of dishes were installed during the financial year July 2021 to June 2022. Having access to BBS services is essential and important for the people residing in remote parts of the country to access important national information especially during the pandemic situations.

1.10 Rural Communication Programme (RCP)

1.10.1 RCP Phase VI

The RCP Phase VI commenced in March 2021 and through this phase, 483 households under 66 villages in 10 Dzongkhags will be connected with 2G (voice) and 4G (data) mobile communication services.

As of date, the Telcos has completed and commissioned the mobile network connectivity for Tshangkha Gewog Center, Tshangkha MSS, Upper Gelechu, Lower Gelechu and Gungpa Sumchu under Dagana Dzongkhag, which has been verified by the Authority. The Authority will continue to verify the mobile network connectivity in the planned areas as and when the completion reports are received from the Telcos. The RCP phase VI is planned to be completed in September 2022.



BICMA official during site verification in Dagana

1.10.2. RCP Phase VI Supplementary 1

Pursuant to the directives of the Ministry of Information and Communications, the Project Implementation Agreement (PIA) was signed between the Authority and Tashi InfoComm Limited on 24th September 2021, to provide 2G and 4G connectivity in Lau and Shingphel Villages under Boomdeling Gewog in Trashiyangtse Dzongkhag, as Supplementary-1 to the RCP Phase VI, which is currently ongoing.

The total cost of the project is over Nu. 33.5 Million of which over Nu. 32.3 Million will be provided as a subsidy from the Universal Service Fund (USF). The project is expected to be completed in September 2022.



Signing of PIA with TICL

1.10.3. Verification of Unconnected Villages

As per the Database maintained by the Authority, the officials of the Authority carried out physical verification of mobile network connectivity of unconnected villages under Bumthang, Haa, Wangdue Phodrang, Sarpang, Dagana, Samtse and Punakha Dzongkhags. After verification, it was found that a total of 76 households in 15 villages were unconnected in these Dzongkhags.

The details of the findings are provided in Annexure 2.

The remaining households without mobile network connectivity under nine Dzongkhags will be physically verified within the next financial year and will be covered in the next RCP phase as per priority and budget availability.



BICMA officials with Sernyagang Tshogpa during verification in Samtse

1.11 Online Licensing System

Since licensing is one of the important tools for regulation, there is a need for an efficient and effective online licensing system to enhance public service delivery and to ensure a reliable licensing

system and database. Therefore, for this financial year, the development of the Online Licensing System was initiated. The development phase is still ongoing and expected to complete in the first quarter of the financial year 2022-2023.

1.12 Complaints handled

The Authority received and resolved a total of 47 formal complaints including 34 complaints for CATV services, and 6 complaints for mobile voice and data services in the financial year 2021-2022. The Authority also caters to other forms of complaints such as social media to improve the services. The details on the complaints are provided in Annexure 3.

C. STUDIES UNDERTAKEN

1. 5G and its benefits to Bhutanese

With the announcement of soft 5G launch by the two telecom operators, it has become the center of criticism by the public. Hence a study on 5G and its advantages was carried out to make the public understand how 5G will have a greater impact on mobile services as well as helping advance IoT and AI technologies in the country in the long run.

The Authority published this document in the Kuensel issue dated 16th October, 2022.

2. Digitization of Analog Cable Television

The digitization of the cable television system was initiated in 2019 with the objective of establishing transparency and accountability in the industry besides providing quality viewing. The Local Cable Operators (LCOs) in Thimphu first started its

transit from analogue to digital and gradually made mandatory for all the LCOs across the country after the establishment of the Multi-Service Operators (MSOs) that provides digital feed to the LCOs in the country. The digitization of the CATV is expected to be completed by the end of 2022. As of June 30th 2022, more than 60 LCOs have connected to the digital feed with the integration of the two key systems (CAS and SMS) to have control over the programme and manage the subscriber's information. It is expected that with the complete digitization of the CATV system, there will be drastic improvement in the quality of the service and revenue generation to the government through a transparent subscriber database.

The document was published in Kuensel dated 18th November, 2021. The document was also translated in Dzongkha and was published in Gyakchi Sarshog dated 2nd January, 2022.

3. Sunsetting of Fixed Line Telephone Service

Since there has been a decreasing trend in the number of fixed line telephone service usage globally (1,229 million users in 2011 to 884 million users in 2021), the Authority felt that there is also a need to study the trend of fixed line telephone service usage in the country. From the study carried out on the usage trend of fixed line telephone service and its sunsetting need by the Authority, it has been found that there is a decreasing trend in the number of fixed line usage in the country from 27420 users in 2011 to 20236 users in 2022. However, it was found that it is not feasible to completely sunset the fixed line telephone services instantly owing to the need for fixed line services especially for business entities. The study also includes details on the situation in other countries and alternative technologies such as IP phones that could potentially serve the similar purpose of fixed line telephone and replace fixed line telephone service in Bhutan in the future.

4. 5G Patch Release and Compatibility Phones

In order to derive the 5G benefits at the user end, there is a need for a compatible user handset and the 5G technology requires additional components to be added to the handset to access the necessary spectrum to produce 5G speeds and characteristics. Any phone handsets, unless built specifically for 5G connectivity will not be able to access a 5G network. The software patch release for any model of mobile handset with the operator's network is one of the requirements to enable handset's compatibility with the network. However, it has been a challenge for the mobile operators in Bhutan to enable the compatibility of their 5G networks in all the mobile handsets since the mobile manufacturers need to release the software patch for each model of phone. Therefore, the study was carried out by the Authority exploring the reasons for the need for patch release for phones to be compatible with telco's 5G network.

5. Long Range Wi-Fi

Long-range WiFi networks are low-cost, unregulated point-to-point network connections, as an alternative to other fixed wireless, cellular networks or satellite internet access that can help improve internet connection throughout customer premises. The Authority carried out the study on how the long range point to point Wi-Fi network can facilitate larger coverage and sharing of wireless networks. The study also highlights the technical working details and associated costs involved for the setup.

6. Internet of Things (IoT) and eSIM

An eSIM is a SIM card that is embedded in a mobile device and can connect a user to any operator offering eSIM services. Since the eSIM technology has been emerging and rapidly being deployed for the operation especially for IoT devices, the Authority felt the need to study the eSIM technology and its associated regulatory

aspects. From the study carried out it was found that the eSIM works the same way as a traditional SIM card, but users don't need a physical SIM card to use it. The eSIM enables IoT solution designers to build devices that best meet customer-centric needs, rather than working around a particular SIM size and shape, or specific carrier network requirements. The study also shows that although it may not be implemented at present in the country but due to an increased urgency to enable all IoT devices to connect to the network in future, it is definite that such technologies and services will replace the traditional SIM cards.

7. Broadband internet services from Low Earth Orbit (LEO) satellite

The study on broadband internet services from LEO satellite is to understand the revolution of satellite technology especially the LEO constellation technology and to have an overview on the policy and regulatory aspects on adoption of LEO constellations for broadband internet services. The study report also highlights on the revolution of conventional GEO satellite to the high throughput satellite (HTS) GEO satellite and status of deployment of HTS GEO satellite in Asia and Pacific region and the opportunity it can offer to us.

The low earth orbiting satellites were mostly used for earth observation, spy, remote sensing and other military and scientific missions but now LEO satellites have been focused on commercial deployments especially for global broadband internet connectivity. LEO constellations are expected to provide identical coverage for the service area under the constellation's footprint and they could potentially offer a uniform pricing model anywhere in the world. LEO constellation satellites have a combined advantage of high-capacity and shorter-term (and, therefore, more competitive) contracts which could rapidly decrease satellite bandwidth costs globally.

D. TRAINING UNDERTAKEN

As per request made by the Ministry of Information and Communications to the Embassy of India, Thimphu, to request Telecom Regulatory Authority of India (TRAI) for possible capacity building support for the officials of BICMA, TRAI consented to the request and provided training for the BICMA officials. Since capacity building is crucial for BICMA officials for building in-house expertise and for regulatory purposes, the Authority further discussed with the regulatory agencies in neighboring countries to explore areas of possible collaboration and assistance in capacity development. To this, the TRAI and the Communications Authority of Maldives (CAM) provided two more training sessions for BICMA officials during the financial year. The training was conducted free of cost.

Sl. no	Training On	Means of Training	Date	Trainer
1	Capacity Development on 5G Spectrum Planning and Technology Implementation	Virtual	26th - 30th July, 2021	Telecom Regulatory Authority of India (TRAI)
2	Regulations in Telecom Services and Tariff		10th - 11th March, 2022	
3	Implementation Experience on Mobile Number Portability		18th April 2022	Communications Authority of Maldives (CAM)



Virtual Training by TRAI to BICMA

E. STAKEHOLDER ENGAGEMENT

The Authority carried out the following consultation meetings pertaining to ICT and Media's various issues, and for feedback and comments from the stakeholders:

Details on consultations held:

Sl. no	Consultation held with	Discussion subject	Outcome
1	MolC, DoIM, DiTT, NFC, and MCB	Discussion on the Rules & Regulation for TV Broadcasting service	Inputs and suggestions from all stakeholders have been incorporated and Rules have been finalized
2	Bhutan Broadcasting Service Corporation Ltd.	Discussion on the Rules & Regulation for TV Broadcasting service	

Sl. no	Consultation held with	Discussion subject	Outcome
3	Bhutan Telecom Limited and Tashi Infocomm Limited	Cable Television satellite receiver interference with 5G signals	Temporarily shutdown 5G testing sites of telcos and informed cable operators to change the LNB waveguide (3.4 to 4.2 GHz) of signal reception. The above has been achieved and interference resolved.
4	MSO's and LCO's	5G signal Interference with the Cable Television Operators	Cable operators changed the LNB waveguide (3.4 to 4.2 GHz) of signal reception which was the major source of interference.
5	Royal Bhutan Police	Discussion of Future Land Mobile Radio Interference Solutions	RBP shared the usage of frequencies of their Land Mobile handsets and accordingly BICMA took note of and assigned only different frequencies to commercial purposes. And the RBP to inform any changes in usage of frequencies to avoid future interference.
6	Tashi Infocomm Limited	Imposing Regulatory sanction due to poor KPI's during current lockdown	Shared the plans of network upgradation/rectification which will solve the current issues. Also shared the issues of telecom site acquisition in Thromdes, which was later addressed by the Authority with thromdes.
7	Bhutan Telecom Limited	Imposing Regulatory sanction due to poor KPI's during current lockdown	

Sl. no	Consultation held with	Discussion subject	Outcome
8	Bhutan Telecom Limited and Tashi Infocomm limited	Implementation of Mobile Number Portability and Accounting Separation	<p>Since the implementation of the MNP in the country could be different compared to other countries, it was decided to conduct further study on cost analysis of MNP implementation in the country.</p> <p>Furthermore, Since it is difficult for the two Telcos to submit audited Accounting Separation Reports, it has been decided that the two telcos will submit two reports respectively i.e. Audited Financial Statements prepared using BAS and Unaudited reports prepared as per Accounting Separation Rules and Regulations.</p>
9	ISPs (BTL, TICTL, NANO, Nilo FiberNet, DataNet Wifi, SuperNet InfoComm, DrukCom)	Familiarization on Rules and Regulations for Licensing and Operation of ISP in Bhutan	ISPs were sensitized and familiarized on new ISP Rules and Regulations for the future implementations.

F. HUMAN RESOURCE

1. Current Staff Strength

The total staff strength of the Authority as of June 2022 is 32 (15 male and 17 female).

2. Civil Service Award and Promotion

On 12th December 2021, the following officials were awarded and promoted:

- a. Mrs. Chencho Om, Dy. Chief Legal Officer received the Bronze Medal for 10 years of dedicated service to the nation.
- b. Mrs. Kiba Lhaden promoted to Dy. Chief Program Officer, and
- c. Mr. Sonam Tobgay promoted to Dy. Executive Engineer



Recipient of Civil Service Award and Promotion

3. New Appointment

During the year the following officials has joined the Authority as regular employee:

Sl. no	Name	Designation	Division
1	Mr. Phul Tika Rai	Sr. Communication Technician	Spectrum Management Division
2	Mr.Thubten Jamtsho	Communication Officer	Spectrum Management Division

Sl. no	Name	Designation	Division
3	Mr. Tshering Penjor	Communication Officer	Social Affairs Division
4	Mr. Tshering Dorji	Asst. Info & Media Officer	Social Affairs Division
5	Ms. Jangchuk Dema	Asst. Program Officer	Market & Competition Division
6	Mrs. Ugyen Dema	Communication Officer	Market & Competition Division



Director with the new recruits

4. Resignation

During the same year, the following officials resigned voluntarily from the civil service:

1. Mr. Chabilal Adhikari, Sr. ICT Associate
2. Mr. Kinley, Account Assistant
3. Mrs. Sithar Choden, Administrative Assistant

G. REVENUE GENERATION

The Authority collected a total revenue of Nu.107,929,804 during the financial year 2021-2022 and following are the details:

Sources of Revenue	Amount Collected (Nu)	Total (Nu)
CaTV License	107,734,714 (License fees) 195,090 (Penalties)	107,929,804
Internet Service Provider License		
MSO License		
Telecom Operator's License (USF)		
OTT License		
Spectrum License		
Apparatus License		
Type Approval		
Amateur License		
Rural TV Dish Installation		
VSAT		
QoS Penalty		
Satellite Phone Permit		
Book Registration Certificate		
Individual/House Publishing Permit		
Printing Press License		
FM Radio License		

H. WAY FORWARD

1. Enhanced communication Services

To ensure access to safe, reliable and affordable communication services, the Authority plans to carry out the following activities:

- Develop and formulate the Quality of Service Standards for mobile voice and broadband communication services which the service providers will be required to comply with.
- Monitor and improve the quality of mobile services, both voice and data (4G and 5G) to meet the minimum Quality of Service Standards.
- Continue monitoring and certification of communication towers for Electromagnetic Field (EMF) radiation compliance.
- Monitor and validate the status of mobile connectivity for the designated villages/places connected through RCP VI.
- Verify the status of mobile connectivity for the unconnected households for inclusion in the future RCP Programmes.

2. Effective spectrum monitoring equipment procured

The Authority is responsible for effectively managing the scarce and limited radio frequency spectrum resources. In order to ensure the effective and efficient use of limited radio frequency spectrum resources, the spectrum monitoring is essential. The spectrum monitoring helps to identify network quality issues, identify sources of harmful frequency interference, track illegal radio frequency transmission, avoid incompatible usage, provide spectrum monitoring data to enable evidence-based spectrum management and assign spectrum effectively. Spectrum monitoring in particular is important for ensuring that the technical parameters and standards for telecommunication and radiocommunications

systems are adhered to the required technical standards. It is therefore essential that appropriate spectrum monitoring tools and equipment is available with the Regulator.

However, currently the Authority does not have required spectrum monitoring equipment to carry out its regulatory roles and enforcement. Therefore, the Authority intends to procure the required frequency spectrum monitoring equipment in the coming financial year. The equipment will consist of an automatic direction finder spectrum monitoring equipment and the fixed spectrum monitoring equipment. These monitoring equipment will be specifically used for frequency interference hunting and address frequency interference issues in the country. The frequency monitoring equipment is also intended to monitor the frequency occupancy and any out-of-band emissions from the frequency spectrum users in the country.

3. Digitized Local Cable Operators (LCOs)

Currently the cable television industry in the country is undergoing digitization. The digitization effort of the Authority has been a good progress with the institution of two crucial systems (CAS and SMS) in two Multi- Service Operators(MSO) and more than 70 out of 92 local cable operators (LCOs) sourcing digital signals from the MSO. It is expected that the digitization of the cable industry in the country will be completed by the end of next FY-2022-2023 with all the LCOs sourcing digital feeds from MSOs and integrating to CAS and SMS. With the digitization, the sensitization on digital CATV, Rules and Regulations on CATV and verification of digitization became major activities to the Authority. Therefore, the Authority shall make a sensitization program on the mentioned subject as well as on online licensing system for the efficient and effective service delivery of the Cable Television Service.

ANNEXURES

Annexure 1: List of Cable Television Operators and Subscribers

Sl. no	Dzongkhag	Total no. of Cable Operators	Number of LCO connected to MSO	Total no. of Subscribers
1	Bumthang	4	4	1885
2	Chukha	5	4	3337
3	Dagana	4	2	723
4	Gasa	1	1	187
5	Haa	1	1	1050
6	Lhuntse	2	2	215
7	Monger	8	7	1072
8	Paro	4	4	2038
9	Pemagatshel	5	3	948
10	Punakha	4	4	912
11	Samdrup Jongkhar	7	2	1612
12	Samtse	6	4	2568
13	Sarpang	10	7	2684
14	Thimphu	4	4	34284
15	Trashigang	7	7	2059
16	Trashiyangtse	2	2	775
17	Trongsa	4	1	766
18	Tsirang	3	3	775
19	Wangdue	6	6	1841
20	Zhemgang	5	1	484
	Total	92	69	59,440

Annexure 2: The findings from the verification of unconnected villages (mobile network connectivity) carried out during the financial year

Dzongkhag	Gewog	Chiwog	Village	Total HHs	Connected HHs	Unconnected HHs
Dagana	Tashiding	Gangab	Rangatar	3	0	3
	Khibisa	Gipsa	Menchuna	12	11	1
Punakha	Chubu	Ngoedroobchu	Khyimchena	8	2	6
	Kabisa	Sirigang_Wakoo Damchhi	Tshetednang	17	15	2
		Heyloog_Tong-zhoognang	Heyloog	12	7	5
			Remi	5	3	2
			Tongzhu	12	0	12
	Talo	Talo	Talo	57	56	1
		Nobgang	Nobgang	39	37	2
Sarpang	Chhudzom	Dragchu	Hungrelthang	21	19	2
	Gakidling	Meanchulam	Dapgoan	4	0	4
	Senggye	Sangaythang	Wangchuck-lingka	23	0	23
Samtse	Norbugang	Dramzegang_Medgang	Norbugang	44	42	2
		Tsherigang- Lambi-lamjosa	Lambi	17	9	8
	Phunt-sho-pelri	Nyonpaling	Satergang	38	35	3

Annexure 3: Details of complaint received and resolved by the Authority

Sl. no	Nature/ Subject of Complaints	Findings	Action Taken
1	Monopole near residential area	Bhutan Telecom's monopole installed near the complainant's residence at Tashiling Roundabout road, Gelephu	<ul style="list-style-type: none"> - The Authority informed the complainant on the review made on the data collected from BTL and Gelephu Thromde. - The Authority issued a letter to BTL directing not to install any sector antenna on the monopole directly facing the complainant's building and to inform the Authority as soon as the installation is completed so that the Authority will carry out EMF emission monitoring and certification and also inform the complainant of the same.
2	DTH installation in Cable reached areas	Ku-band DTH installed in the complainants cable service area (Norgay Gang and Tendruk)	<ul style="list-style-type: none"> - The Authority issued a letter to the Gewog for the strict compliance of the rule that states that it is prohibited to use DTH in cable reached areas on 17th May 2022. - The Authority informed the Gewog Authorities verbally not to allow installation of Ku band DTH in cable reached areas and also informed the Ku-band permit holder on the same
3	Error in the volume of data package	No error was found in data volume received when topping up and the data volume posted on the website	<ul style="list-style-type: none"> - Clarified him on the approved package via email, whereupon the Authority cross checked the tariff approval record approved by the Authority for the said package (Nu. 799) and found it matches with the one posted by BTL in their website. - However, we let him know if he still thinks the BTL has posted differently in any of their official pages including social media, to provide us with the evidence so that the Authority can pursue to question BTL

Sl. no	Nature/ Subject of Complaints	Findings	Action Taken
4	DTH installation in Cable reached areas	Concern on Ku-band DTH installation which might enter his cable service area (Dogar Gewog)	<ul style="list-style-type: none"> - The Authority issued a letter to the Gewog for the strict compliance of the rule that states that it is prohibited to use DTH in cable reached areas on 3rd May 2022. - The Authority informed the Gewog Authorities verbally not to allow installation of Ku band DTH in cable reached areas and also informed the Ku-band permit holder on the same
5	Unauthorized KU-Band free Air dish suppliers in Sakteng Gewog	Concerns on unauthorized KU-Band free Air dish suppliers and installation in the gewog	<ul style="list-style-type: none"> - The Authority issued a letter to the Dzongkhag Administration to coordinate the removal of Dish TV services in Cable Reached Areas on 28th April 2022 and to sensitize the public.
6	DTH damaging Cable TV Market	Concerns on DTH installation which hampers the market for Cable TV	<ul style="list-style-type: none"> - The Authority issued a letter to the Dzongkhag Administration to coordinate the removal of Dish TV services in Cable Reached Areas on 28th April 2022 and to sensitize the public.
7	Poor mobile network speed	Poor mobile Internet speed (B-mobile) towards evening and night at the complainant's residence at Olakha, Thimphu.	<ul style="list-style-type: none"> - The Authority conducted network speed test monitoring using Ookla app for indoor and outdoor at complainant's area and also conducted KPI drive test around the area of complaint during peak and off-peak hours. - It was found that the mobile internet speed is below the benchmark at the complainant's residence. - Therefore, the Authority issued a letter to BTL on 17th May 2022 to carry out field testing and optimisation in the area.

Sl. no	Nature/ Subject of Complaints	Findings	Action Taken
8	Poor call setup and internet speed	Poor call and internet service in Langpa and Nubgang village of Samar Gewog, Haa Dzongkhag	<ul style="list-style-type: none"> - The Authority requested the OSS report from the two Telcos and was reviewed accordingly - The Authority conducted verification of the mobile network in the mentioned areas - The Authority sought feedback from the telcos for the poor connectivity - The Authority recommended to include the affected areas in the next RCP (Rural Communications Project), if telcos cannot build additional towers with their internal budget - The action taken report was submitted to MP Sangbaykha, Haa
9	Poor internet speed	Poor internet speed in the area (Getting only 3G coverage even though a 4G tower has been installed)	<ul style="list-style-type: none"> - The Authority informed in writing to BTL about the network issues faced by one of its subscribers in Jigmecholing on getting only 3G(H+) coverage in an area where a 4G tower has been installed. - Received response through mail from BTL saying that LTE700 has been installed at Jigmecholing and the user's device may not be supporting LTE 700. - It was found after interacting with the complainant through email that his phone doesn't support LTE band 28 (700MHz) and therefore his phone is not able to receive 4G signal. Since the problem was associated with the complainant's phone and not due to the operator's network quality, the complainant was informed to either change the device or switch to a different operator's network (Tashi Cell) as Tashi cell has 1800 MHz tower in the area.

Sl. no	Nature/ Subject of Complaints	Findings	Action Taken
10	Poor internet speed and call reception	Network Quality of Service issues during fourth Lockdown	<ul style="list-style-type: none"> - The Authority carried out field monitoring in Thimphu Thromde - It was found that the Quality of Service of both the operators did not fulfill the required benchmarks - The Authority imposed Regulatory sanctions of penalty fines - The Telecom operators also optimized certain networks to decongest the traffic
11	Frequency interference	Radio frequency interference in the frequency assigned to the Nobuling Central School.	<ul style="list-style-type: none"> - The Authority carried out frequency monitoring to find the interference source. - The officials found that the interference was caused by the radio signals of Thimphu Police Traffic Division. - The officials visited the Traffic Division office and notified the interference issues. - The Authority also held a meeting with the Traffic Division of Royal Bhutan Police on the frequency assignment of Royal Bhutan Police nationwide and decided that those frequencies assigned to RBP will not be issued to the public. - The Nobuling Central School was assigned with the new frequency which does not have the interference.

Sl. no	Nature/ Subject of Complaints	Findings	Action Taken
12	Handsets incompatible with the new BTL tower installed	Issues with the new LTE cell tower in New Doksum Throm. BTL has installed the LTE tower of 700MHz and the public complained that their handsets are incompatible with the new frequency.	<ul style="list-style-type: none"> - The Authority contacted the ICTO, Trashiyangtse and the BTL officials and confirmed that the new tower constructed is of 700MHz. - The Authority sent the letter to BTL vide BICMA/SMD/2021-2022/1012 dated 31st December 2021 directing BTL to furnish the following: <ul style="list-style-type: none"> (i) share the information on number of user being latched to the said cell tower, (ii) carry out the customer advocacy on the network deployed and compatible handsets availability to the public and, (iii) the status of any other remedial measures taken on the above complaint. - The Authority also sent a letter to TICL vide no. BICMA/SMD/2021-2022/1013 asking if TICL has a 4G LTE tower in new Doksum town.
13	Interference in C band	Complaint on interference in their C band satellite television signals. It was assumed that the interference may have been caused due to 5G signals testing of telecom operators.	<ul style="list-style-type: none"> - The monitoring was done in their network office and the signal was interfered by 5G trial testing by the both Bhutan Telecom and Tashi Infocomm limited and the C band frequency also falls on the 5G frequencies. - The CATV operators and MSO were called for a meeting and discussed that their LNB frequencies should move away from the 5G frequencies. - The matter is resolved to change the LNB by the Cable operators which do not fall on 5G frequencies.

Complaint received and resolved for cable television services

Sl. No.	Mode of complaint received	Subject of Compliant	Action Taken
1	Phone call	Disconnection of cable line at end of the every month	- Directed LCO to verify and resolve the issue.
2	Google form	Constantly loss of signal	- Directed LCO to verify and resolve the issue.
3	Phone call	Charges of STB	- Issued directives to LCO.
4	Mail	Poor customer service and service	- Sought explanation from LCO and sent directives. - Made follow up visit to the site.
5	Letter	Unfair opportunity to distribute CATV services at PHPA -I colony	- Sent a letter to PHPA-I. - Visited the site and done follow up works
6	Letters	Unfair and unethical business practices	- Issued directives to LCOs. - And visited the site.
7	Phone call	Distribution of Ku band in the CATV reached area	- Issued directives to Gewog gup. - Followed by inspection and issued a letter to remove the Dish TV.
8	Mail	STB deactivated	- Directed LCO to rectify the issue.
9	Phone call	Disconnection of line	- The issue was forwarded to the concerned LCO and confirmed to be resolved through the complainant through the phone call.
10	Phone call	No signal	- Directed LCO to rectify the issue.
11	Phone call	No signal	- Directed LCO to rectify the issue. - Facilitated LCOs for movement pass.
12	Phone call	No signal	- The issue was forwarded to the concerned LCO and resolved immediately.
13	Phone call	No signal	- The case was immediately forwarded to the concerned LCO and resolved the issue.
14	Phone call	No signal	- Directed concerned LCO to resolve the issue.

Sl. No.	Mode of complaint received	Subject of Compliant	Action Taken
15	Phone call	No signal	- The issue was forwarded to concerned CS and resolved.
16	Google form	No signal	- Directed LCO to resolve the issue.
17	Phone call	No signal	- Directed LCO to resolve the issue.
18	Phone call	No signal	- The case was forwarded to the concerned LCO.
19	Phone call	Difficult getting Movement permit of technician during lockdown	- The Authority contacted the local government of Sarpang Dzongkhag and resolved the issue.
20	Phone call	No signal	- The case was forwarded to LCO and rectified the issue.
21	Phone call	No signal	- Directed LCO to rectify the issue and resolve it.
22	Phone and email	No signal	- The Authority contacted both the complainant and LCO. - The LCO was directed to rectify the issue.
23	Facebook messenger	DTH/Pay channel in cable reached areas	- The Authority issued a letter to Gewogs as requested.
24	Google form	No signal	- The issue was forwarded to concerned LCO and directed to rectify the issue.
25	Letter	Poor CATV signal	- The issue was forwarded to the concerned LCO and resolved.
26	Letter	Cable wire laid across the private property	- The monitoring team from MCD visited the site, identified the cable wires of cable operators and directed them to rectify the issues.
27	Google form	No signal	- The issue was found due to the payment dues, the complainant was asked to clear the dues with LCO to avail the service.
28	Facebook messenger	Cable lines across the road	- The issue was forwarded to concerned LCO and directed to rectify the issue.

Sl. No.	Mode of complaint received	Subject of Compliant	Action Taken
29	Mail	Poor signal	<ul style="list-style-type: none"> - The issue was forwarded to concerned LCO and directed to rectify the issue.
30	Google form	Erratic and poor signal	<ul style="list-style-type: none"> - The official from the Authority also made a site visit. - The Authority issued directives to rectify the issues as soon as there is a complaint and to make a prompt response to the complaints.
31	Google form	No signal	<ul style="list-style-type: none"> - The issue was forwarded to the concerned service provider and directed the LCO to rectify the issue.
32	Facebook messenger	No signal	<ul style="list-style-type: none"> - Done follow-up calls and resolved them.
33	Google form	No signal	<ul style="list-style-type: none"> - The Authority directed the concerned service provider to resolve the issue.
34	Facebook messenger	No signal	<ul style="list-style-type: none"> - The Authority directed the concerned LCO to immediately rectify the issue. - The follow up is done with the complainant.



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