



Pakistan
Telecommunication
Authority

Annual Report

2019



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2019



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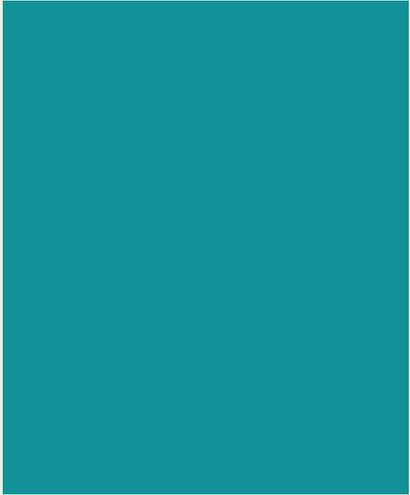
Pakistan Telecommunication Authority

Pakistan Telecommunication Authority Annual Report 2019

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1. Pakistan Telecommunication Authority-Annual Report 2019

I. Title



PTA's VISION

“Create a fair regulatory regime to promote investment, encourage competition, protect consumer interest and ensure high-quality ICT services”





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The Authority



Maj Gen Amir Azeem Bajwa (R)

Chairman PTA



Mr. Muhammad Naveed

Member (Finance)



Dr. Khawar Siddique Khokhar

Member (Compliance and Enforcement)



Chairman's message

We are living in a time of extraordinary technological advancements which has brought us at the cross-roads of innovation in computing and communications. New technologies such as 5G, the Internet of Things (IoT), Artificial Intelligence (AI) and Big Data Analytics etc. are reshaping the social and economic fabric of our society and changing our lives. In this wave of technological progress, the Pakistan Telecommunication Authority (PTA) is at the forefront of the digital revolution by supporting innovation through a transparent, collaborative and adaptive regulatory approach.

Our regulatory approach is to support and stimulate innovation that benefits the citizens and the economy. We aim to improve quality and standards; promote competition and ensure that the market works effectively for consumers and enhance the overall investment environment. Protecting consumers, both people and businesses, is at the core of PTA's mandate and vision. The accessibility of mobile services and maintaining standards in service delivery is a priority for PTA so that consumers receive the best possible broadband and phone services at affordable rates.

Our objective remains strengthening the Government of Pakistan's (GoP) vision of a Digital Pakistan by enabling and promoting the latest communication technologies for the people of Pakistan. One of our key regulatory initiatives is the Device Identification Registration and Blocking System (DIRBS) which is aimed to restrict the presence of non-standard and illegally imported mobile devices on the telecom networks. It is also aimed to facilitate legitimate device importers and mobile device users, and to provide a secure communication ecosystem. Moreover, it is also creating opportunities for local manufacturing and innovations, thereby spurring economic development.

As we enter an age of unprecedented data exchange, our growing reliance on digital technology demands ever-greater vigilance against cyber-attacks and keeping on-line spaces secure for all. PTA is cognizant of this fact and is tackling the issues of protection and privacy by collaborating with national and international stakeholders. This is the time to foster public-private partnerships and help generate unique ideas through coordinated efforts and convert them into tangible results.

We must also imagine the possibilities, challenge assumptions about the capabilities of current and future technologies, and account for obstacles along the path to digital transformation. Digital financial inclusion, smart cities, secure and reliable connectivity in remote and marginalized areas, and efficient Information and Communications Technology (ICT) infrastructure are just a few areas where PTA is working with the policy makers and the industry to achieve the 'Digital Pakistan' goal.

I wish to acknowledge the trust and confidence of our country's leadership in our abilities to support Pakistan's digitalization. I would like to acknowledge the continuous support and focused policy initiatives by MoIT&T and Cabinet Division to spur the growth of digital technologies. The Authority Members, the team at PTA and colleagues from the industry have made PTA and the telecom sector stand tall in the economy in these challenging times. We look forward to the leadership's continued guidance and support for the telecom community.

Maj Gen Amir Azeem Bajwa (R)

Chairman
Pakistan Telecommunication Authority

Executive summary



The fiscal year 2018-19 was a challenging year for Pakistan's economy. However, despite the economic slowdown, Pakistan's telecom sector continued its journey of growth while providing quality services at affordable rates to the public. The World Economic Forum ranked Pakistan among the top countries in terms of telecom services affordability. The regulator kept playing its role prudently in the digital transformation of the country, while supporting the economy by improving legal imports of mobile devices through its Device Identification Registration and Blocking System (DIRBS), spurring local manufacturing, minimizing grey markets, extending financial services to citizens, providing high Quality of Service (QoS) and enhancing accessibility.

Mobile services continued to lead the sector by providing reliable and affordable connectivity. Mobile sector showed a steady growth in subscribers on its networks and increased subscriber base to 163.5 million at the end of FY 2018-19, showing a year-on-year growth of 7%. We have a total teledensity of 77.7% where the main contribution is by the mobile sector with penetration crossing 76.4%. Pakistan has over 44,000 cell sites covering the length and breadth of the country and PTA encourages sharing of resources like infrastructure. Broadband has taken the country by storm and growth in both subscription and usage has been the rapid. Today, we have a total broadband subscriber base of 76.3 million, the number of users of the technology is even larger owing to Wi-Fi hotspots, Worldwide Interoperability for Microwave Access (WiMax), Digital Subscriber Lines (DSL), Fiber to the Home (FTTH), etc. This translates into a broadband

penetration of over 36.18% calculated on a single-subscription basis. Data usage over broadband networks was 2,545 PB for FY 2018-19 from 1, 207 PB in FY 2017-18 showing a year-on-year growth of 113%. In order to account for the country's ever-growing data usage, the capacity of networks has been increased, and today, our total international bandwidth crosses 1.7 TB. Local manufacturing has been kick-started and Pakistan produced over 11.7 million handsets in 2019. Commercially imported legal handsets for the same period stood at 16.3 million. While looking at the financial side of the sector, telecom contributed over PKR 95.8 billion this year to the national exchequer in terms of taxes, duties and levies. This shows a 37% decrease in the contribution owing to the suspension of taxes on telecom services by the Honorable Supreme Court of Pakistan for the period of 10 months (13 June 2018 to 24 April, 2019). This

contribution to the national kitty is in addition to the revenue generated by PTA through license renewal fee of approximately USD 1.3 billion of which 50% has already been deposited in national coffers. Telecom sector revenues grew by 12.9% and total revenues stood at PKR 552 billion in FY 2018-19. The main contributor to revenue remained the mobile sector with total revenues crossing PKR 444 billion, followed by Fixed Local Loop (FLL) and Wireless Local Loop (WLL) services at PKR 69 billion. The sector retained investments and in FY 2018-19 received USD 636 million from all market players. The sector received USD 236 million FDI inflow during the year. Two major operators with foreign ownership have declared huge profits at the group level internationally from their operations in Pakistan.

The sector's achievements and milestones are due to the regulatory regime being followed by the Authority with a very objective vision of creating fair play in the market for telecom consumers, operators and other stakeholders. Rapid growth in mobile data traffic and consumer demand for an enhanced mobile broadband experience have led the regulator to the introduction of the fifth generation of mobile technology (5G). PTA has initiated work on it and 5G tests and trials have already started. Three cellular mobile licensees Telenor Pakistan, China Mobile Pakistan (CMPak) and Pakistan Mobile Company Limited (PMCL) were due for renewal in 2019. In this regard, 50% (USD 688 million) of total amount of license renewal fee has already been received by PTA. License renewal is under process with enhanced terms and conditions in line with Pakistan's and the industry's long-term interests. PTA has also initiated the process of spectrum re-farming in collaboration with the Frequency Allocation Board (FAB) for efficient spectrum utilization. The process of formulation of an Administrative Incentive Pricing (AIP) framework for the microwave spectrum for new and existing assignments is also underway. A regulatory framework for Over-the-Top (OTT) services in Pakistan is being developed in-house with the objective of managing OTT services smoothly in Pakistan. PTA has also established a framework for a Computer Emergency Response Team (CERT) for the telecom sector.

PTA has successfully launched DIRBS in the reported year and very encouraging results have been witnessed in terms of evaporating grey market, substantial decrease in illegal/counterfeit devices, significant drop in snatching/theft of devices and increased

revenue to the government. With the implementation of DIRBS, an increase in uptake of smartphones is also experienced in the local market whereby there is a growth of 29% in 4G device registration only in 2019 and it is expected that in coming year this number will be doubled, showing a gradual migration from 2G to 4G devices. This migration trend is also driving the local companies to increase the production of smartphone devices in the country.

Affordable telecom services remained a focus area for the regulator. In this regard, PTA issued a determination under which Mobile Termination Rates (MTRs) have been reduced from PKR 0.90 to PKR 0.80 in the current year and will be further reduced to PKR 0.70 next year. Today, we have average prices of PKR 2.4/minute on a standard prepaid package of mobile services (on net/off net). Similarly, the average price for mobile broadband services hovers around PKR 60/GB. In order to ensure that there are no anti-competitive activities, PTA also conducted a billing verification survey in Karachi and Islamabad. Survey results showed that Cellular Mobile Operators (CMOs) were charging as per advertised tariffs.

In order to implement financial inclusion, PTA is facilitating the Asaan Mobile Account (AMA) scheme under the National Financial Inclusion Strategy (NFIS) aimed at bringing the lower-income bracket population into formal financial services. Telcos already possess a wide network for financial services across the country in collaboration with branchless banks. Today, we have over 46.1 million mobile financial accounts (m-wallets) and a network of over 437,182 mobile banking agents in 2019. Currently, there are over 1,309 million annual mobile banking transactions (3.6 million daily transactions) with an annual volume of over PKR 4.5 trillion, PKR 12.3 billion worth of daily transactions which is an extraordinary number when compared with traditional banking. Mobile operators are playing a vital role in this success. Telco-partnered banks are the main players in mobile banking with 87% market share in m-wallet accounts and 68% in active agents at the end of December 2019. PTA's initiative for the biometric verification of Subscriber Identity Modules (SIMs) has played a pivotal role in the growth of m-wallets in Pakistan as the financially excluded population could open m-wallets remotely using Unstructured Supplementary Services Data (USSD) channels through Biometric Verification System (BVS) devices installed at agent locations.

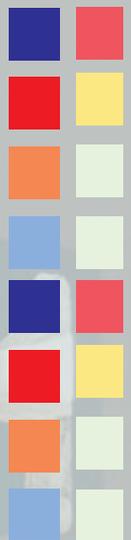
Consumer rights protection continues to be top priority area for PTA. In this endeavour, PTA recently launched its first-ever on-line Complaint Management System (CMS). PTA is also receiving complaints of telecom users via the Federal Ombudsman and the Prime Minister's Citizen Portal. During the reported period, PTA received a total of 68,673 complaints, out of which 99% were successfully addressed. It is worth mentioning that in the review of Pakistan Citizen Portal (PCP) by PM office, PTA stood first for the highest number of resolved complaints and highest satisfaction level of complainants. In order to protect consumers from illegal and fraudulent messages (SMSs), PTA has reviewed its existing regulations and floated a consultation paper on the issue for taking input of all stakeholders. In the light of inputs from the stakeholders, PTA will put in place a mechanism for addressing the issue proactively. PTA identified and blocked more than 824,000 websites/URLs containing pornographic content, including child pornography. To curb the menace of child pornography, PTA acquired a list of 2,384 websites from Interpol and blocked their access in the country.

While fulfilling its commitment as a socially responsible sector, CMOs, under the instruction of PTA, participated in the national cause of funds collection for the construction of the Diامر-Bhasha and Mohmand Dams through Short Messaging Services (SMS). In collaboration with the Pakistan polio eradication programme, PTA has taken an initiative to put an end to propaganda videos against polio vaccination by blocking/removing such videos from Pakistani viewership.

As a proactive regulator, PTA always remains engaged in the promotion and proliferation of digital services. However, there are still gaps and regulatory challenges in this rapidly changing ICT landscape that need to be addressed to transform people's lives. To this end, PTA took an initiative this year of assessing its internal and external processes for ease of doing business in telecom sector. For ensuring availability and accessibility to the latest technologies and services, the introduction of 5G is a priority for PTA. Supporting national security efforts is also a focus and will further reinforce these efforts for curbing illegal SIMs and grey telephony. Our engagement with the revenue authorities for tax rationalization in the ICT and telecom sector will continue so that improved tax structures can encourage further investment and job opportunities. Modern cyber challenges before the regulator call for enhanced security measures, data protection and a holistic cyber strategy. PTA aims to strengthen its relationship with social media platforms and other global Internet agencies to keep the Internet safe and secure for all users. Our engagement with the International Telecommunication Union (ITU), Commonwealth Telecommunications Organization (CTO), South Asia Middle East and North Africa (SAMENA), Telecommunications Council, Asia-Pacific Telecommunity (APT), South Asian Telecommunication Regulator's Council (SATRC) and other global and regional telecom agencies in future will be further enhanced and focused. With all these endeavours at the Authority, we look forward to a 'Digital Pakistan'.

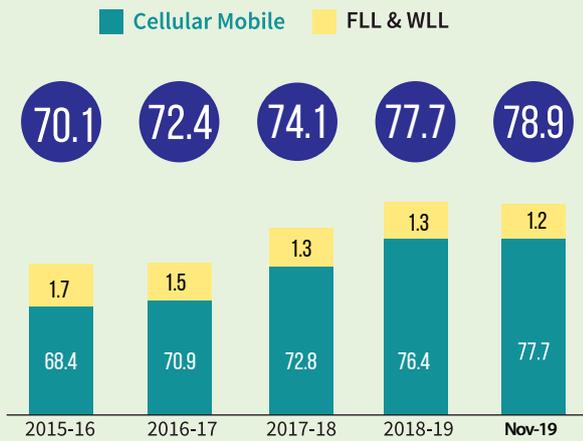
59.12,42
35.64,50656.8,0,0,0,0,30
115.94,67905.07,0,0,0,0,30
38.9,0,0,0,0,30

Telecommunications market statistics

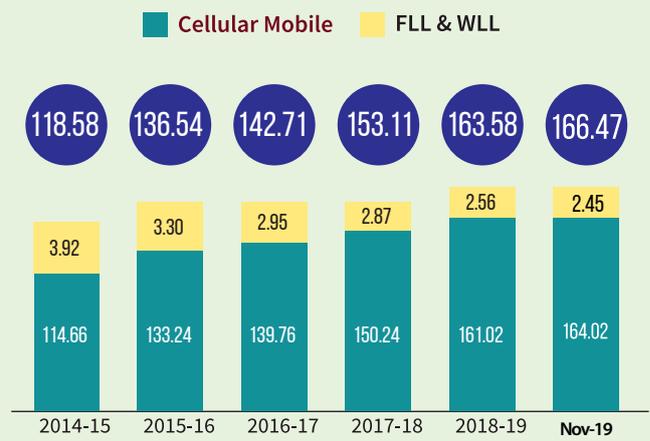


Telecommunications market statistics

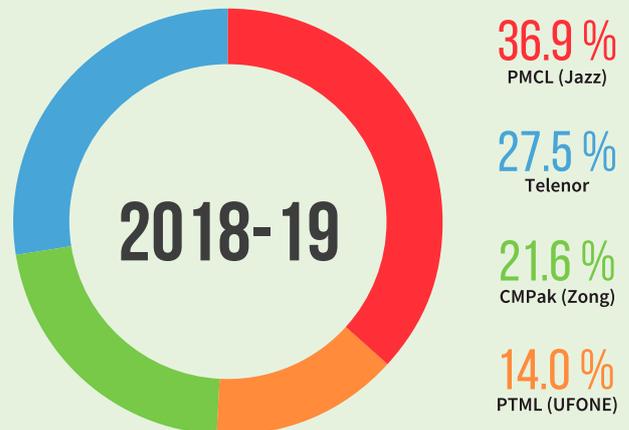
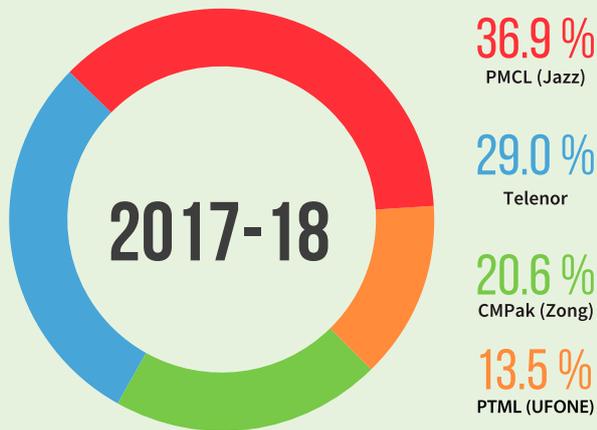
Teledensity (%)



Cellular mobile & local loop subscribers (million)



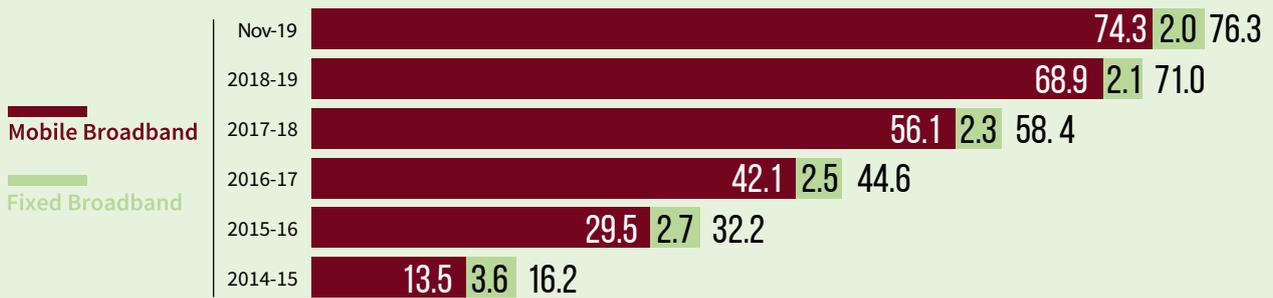
Cellular mobile subscriber share (%)



Broadband penetration (fixed and mobile) (%)



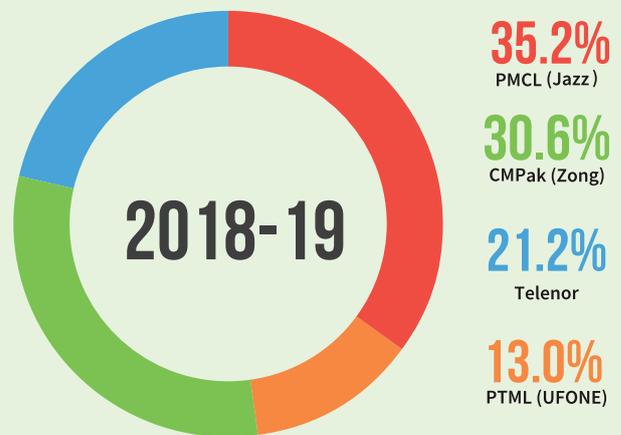
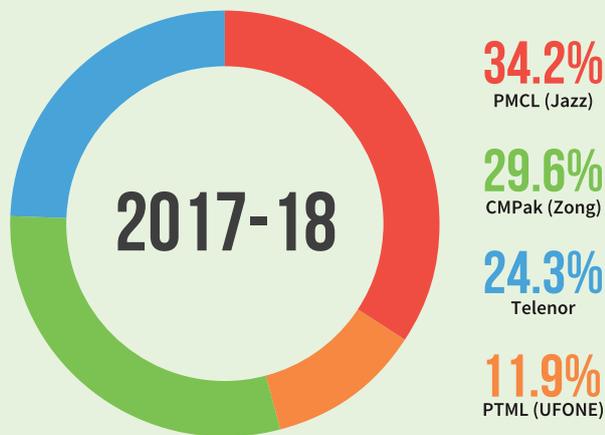
Broadband subscribers (million)



Mobile broadband penetration (%)



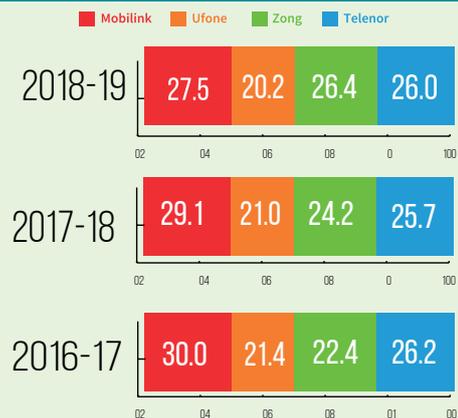
Mobile broadband subscriber share (%)



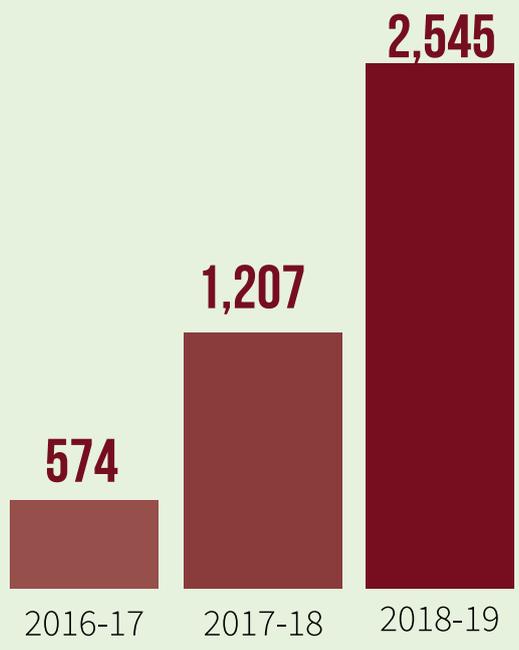
Cellular mobile cell sites



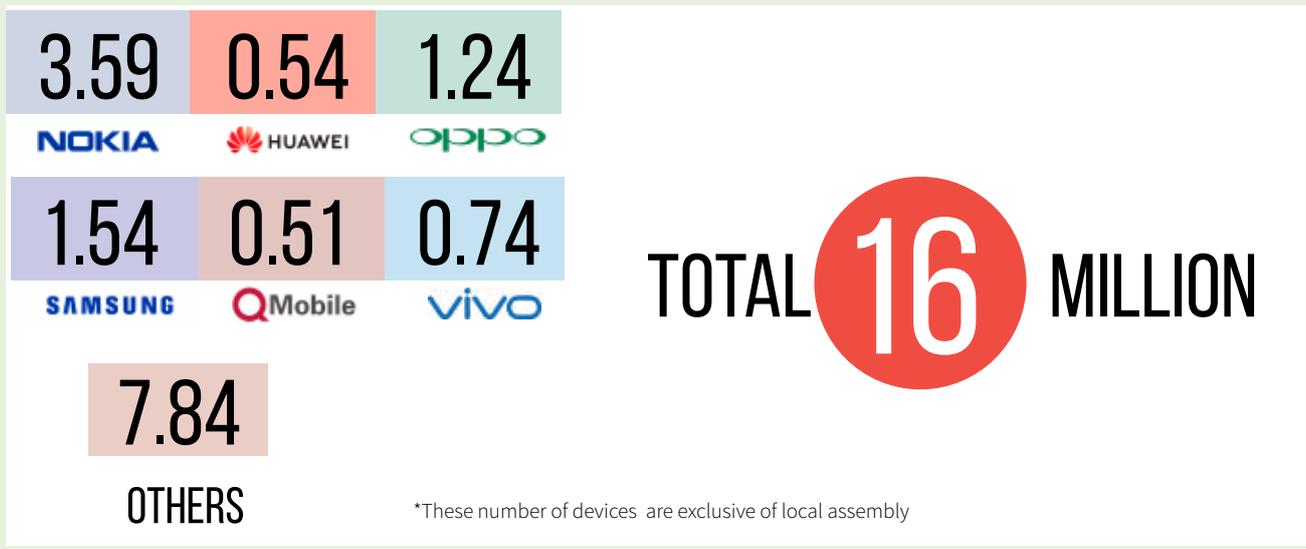
Cellular mobile cell sites share by operator (%)



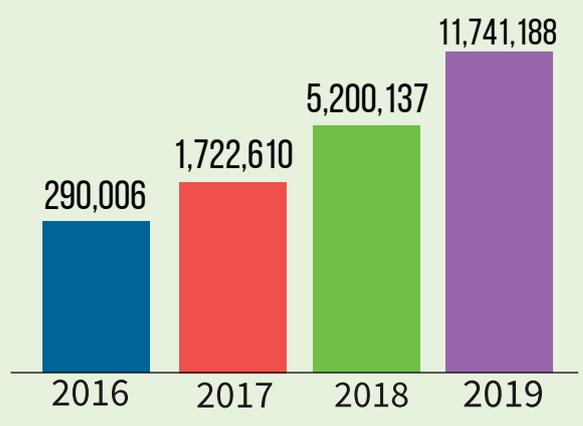
Cellular mobile data usage (petabytes)



Commercial device imports through DIRBS by brands during FY 2019 (million)*

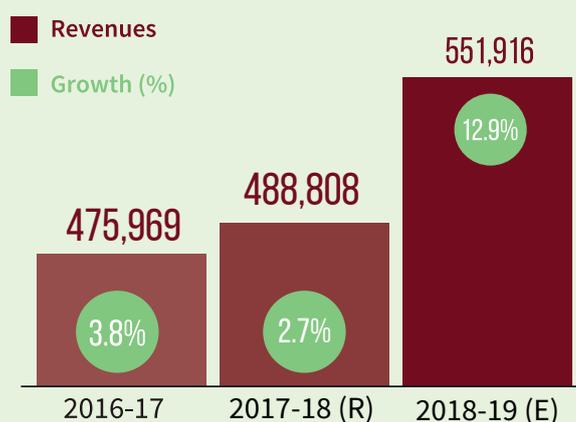


Locally assembled mobile devices*



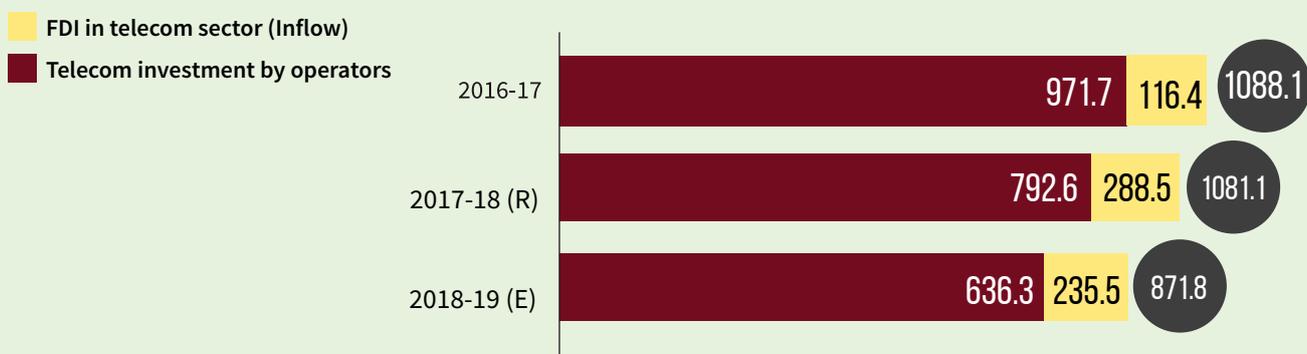
*Registered through PTA CoC

Telecom revenues (million PKR)



R = Revised E = Estimated

Telecom investment (million USD)



R = Revised E = Estimated

Telecom contribution to the exchequer (billion PKR)

Period	GST	PTA deposits	Others	Total
2016-17	46.20	33.13	82.10	161.43
2017-18 (R)	48.18	10.10	85.00	143.28
2018-19 (E)	26.29	17.38	52.09	95.76

Note: 2018-19 decline in GST and other is due to the suspension of taxes by Supreme Court of Pakistan from 13 June, 2018 to 24 April, 2019

R = Revised E = Estimated

Number of licenses issued during FY 2019

License Name	License Issued	Commencement Issued
Class Value Added Services	81	49
Local Loop	15	15
Long Distance and International	1	3
Telecom Infrastructure Provider	3	0
Telecom Tower Provider	2	1
Wireless (VHF,UHF)	65	NA
Aircraft (Mobile Station)	13	NA
Amateur (Revalidation)	39	NA
Inmarsat	2	NA



Significant developments

Significant developments



Chairman, PTA meeting with Edotco Pakistan Private Limited (EPPL) delegation
01 February, 2019

Secretary, Cabinet Division visit to PTA
25 April, 2019



Chairman, PTA meeting with Ms. Tenzin Norbhu, Head of Connectivity and Access Policy, Facebook
16 April, 2019



SUPARCO delegation visit PTA
18 April, 2019

Farewell to officers completing their service at PTA, 10 April ,2019



PTA and GSMA Centre of Excellence (CoE) signing ceremony, 02 July, 2019



Country study tour of the 46th Common Training Programme held at PTA, 05 April, 2019



International training course by PTA & GSMA on “5G: The Path to the Next Generation”.
3–4 July 2019



PTA hosted the 19th meeting of the South Asian Telecom Regulators Council (SATRC) in collaboration with APT, 13–15 December, 2018 in Islamabad.



International training on Advanced Spectrum Management for Mobile Telecommunications,
22-23 November, 2018



Workshop on “Future Prospects of 5G and Smart Cities in Pakistan: Digital Vision, Infrastructure Challenges and Role of Stakeholders” held at PTA,
08 February, 2019



Islamia University of Bahawalpur students' visit to PTA,
13 February, 2019

Workshop on “DNS Abuse and Misuse” held at PTA,
06 February, 2019

One-day training on the land revenue Act, 1967 and allied matters held at PTA,
30 July, 2018



01

Regulatory
initiatives

Regulatory initiatives



Key regulatory activities

As regulator of Pakistan's telecom sector, PTA strives to establish a competitive, fair, progressive, consumer-oriented and business-friendly regulatory environment in the country. The sector is playing a pivotal role in Pakistan's economy as it is contributing directly and indirectly to employment generation, financial inclusion, attracting investment, providing innovative opportunities, and contributing considerably to the national kitty. PTA took several measures to provide the latest technology to citizens to help realize the government's vision of a Digital Pakistan. The Authority's activities during the period under review have been detailed in the following pages.

Framework for testing and development of future technologies like 5G

The rapid growth in mobile data traffic and consumer demand for an enhanced mobile broadband experience has led to an increasing emphasis on the upcoming Fifth Generation of Mobile Technology (5G). It is projected that this technology will operate in a highly heterogeneous environment and provide ubiquitous connectivity for a wide range of devices,

new applications and use cases. A stakeholder consultation session was held on 29 November, 2018 pursuant to the GoP policy directive for the introduction and trials of future wireless networks in Pakistan. A draft framework was made available on PTA's website and 5G trials have already been conducted by CMPak on August, 2019 & Jazz on January, 2020.

CMOs' license renewal 2019

GoP issued policy directive on 09 May, 2019 for renewal of Cellular Mobile License of three operators i.e. Telenor, Jazz and CMPak setting per MHz renewal price for frequency spectrum in 900 MHz and 1800 MHz as USD 39.5 million and USD 29.5 million, respectively. CMOs filed cases at IHC, however the cases were actively pursued by PTA and as a result the three CMOs have now deposited 50% of respective renewal fee amounting to total of USD 687.8 million equivalent to approx. PKR 107.6 billion. In addition to receipt of renewal fee, the renewal process has ensured continuity of services by the major cellular operators in Pakistan.

Device identification registration & blocking system (DIRBS)

It is a well-known fact that developing countries have a big market for smuggled, stolen and fake devices. Telecom consumers often buy such handsets and are unaware of the source. This unwanted situation puts the innocent buyers at risk, impacts security and causes considerable losses to the national exchequer, due to tax evasion. To curb this menace, PTA has established Device Identification Registration & Blocking System (DIRBS) and successfully implemented it on 15 January, 2019 in collaboration with the Federal Board of Revenue (FBR) and Cellular Mobile Operators. This system is enabled to register all devices on Pakistani networks after paying applicable duties and taxes. The system is facilitating mobile importers in Pakistan as it is integrated with WEOC system of FBR which is capable of online registration and payment of duties and taxes. PTA is utilizing all possible communication channels, including the electronic, print and social media to facilitate device registration and ease of mechanisms for doing

Handset registration

USSD: *8484#

Website: <https://dirbs.pta.gov.pk>

E-mail: typapproval@pta.gov.pk

Helpline:

0800 555 55



business. PTA introduced three mechanism for ease of registration processes: via its website, USSD code and through franchises/service centers of mobile operators across Pakistan.

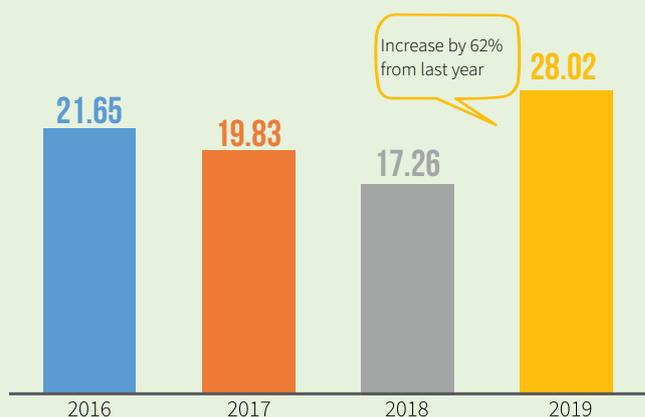
The project has successfully achieved following results:

- Registration of compliant devices on Pakistani networks, encourage import via formal channels and help tax revenues.
- Discouraging mobile theft (reported IMEI devices can be easily blocked), thereby helping improve law and order; capable to block non-compliant, counterfeit devices, stolen reported and duplicate devices.
- Providing consumers with a tool to check a device IMEI's status via SMS, app stores and PTA's website.
- A total of 42 million IMEIs have been blocked through DIRBS since its launch. Out of these 42 million, 28.2 million IMEIs are blocked due to non-payment of tax/duties and 14 million IMEIs are blocked as they were non-standard/fake devices.

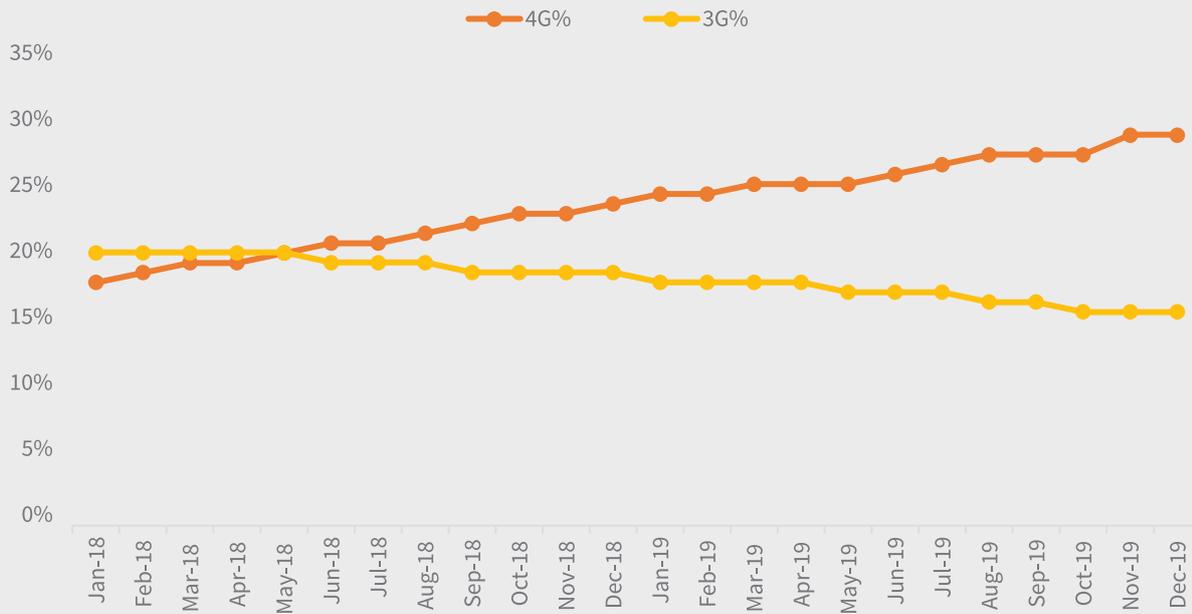
Imports of mobile devices by individuals remained an untapped area to collect applicable taxes prior to system introduction. A total of 1,597,388 individuals have registered their devices during January – December 2019 out of which 668,209 registered through the FBR baggage rule exemption and others 929,179 registered after the payment of FBR custom duties. Tax collected on import of individual mobile devices during Jan-Dec 2019 stood at PKR 2.91 billion.

Commercial imports and local assembled devices have increased tremendously after the launch of DIRBs in January 2019. Benchmark analysis for 12 months from previous year shows an increase of approximately 62% in total quantity.

Commercial imports & local assembled mobile devices (million)



Smart phones registration (%)



The trends shows that 4G mobile devices have seen a growth from 16% (2018) to 31% (2019). 3G mobile devices trend shows that it dropped from 19% (2018) to 13% (2019) and 2G devices trend dropped from 64% (2018) to 56% (2019). The smartphone uptake trend clearly shows that mobile subscribers are migrating to 4G smartphones and it is expected that 4G devices utilization shall be doubled by next year.

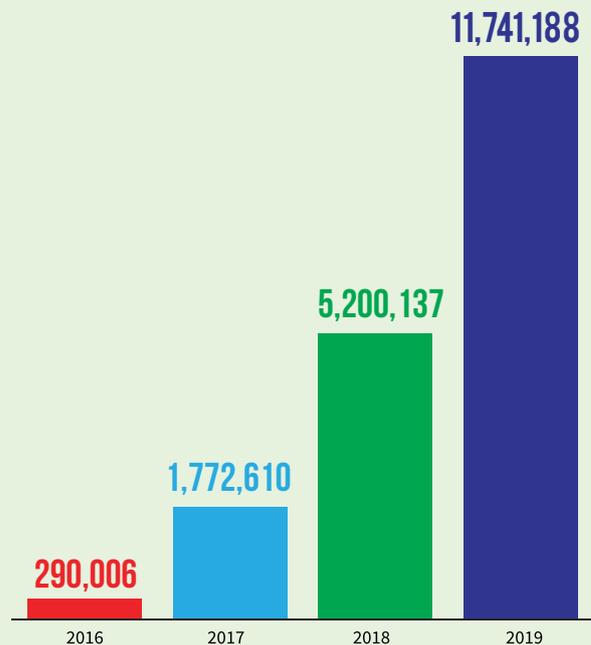
We expect that DIRBS will be helpful in combating street crimes, especially mobile snatching and non-compliant devices. Results have been very encouraging since the launch of DIRBS. This has increased government revenue and created a deterrent to informal imports. In 2018, FBR collected PKR 22.4 billion from commercial imports of mobile devices. With introduction of DIRBS, the estimated revenue as collected and reported by FBR during Jul-Dec 2019 (first 6 months) was PKR 28.3 billion. It is projected that this number will be doubled in next 6 months.

Local assembly of mobile handsets

In order to encourage local assembly, PTA is facilitating local assemblers in setting up plants for assembly of mobile handsets in Pakistan. So far, 29 companies have been given formal permission for local manufacturing and assembly. Currently, there are 11.74 million locally assembled devices in 2019 that have been registered via PTA’s DIRBS.

While looking at numbers of locally assembled devices till December 2019, it shows over 126% increase in last one year. In the year 2019, there were 11.74 million locally manufactured/assembled devices registered in comparison to 5.2 million locally assembled and registered devices last year. Locally assembled devices include over 70,000, 4G phones in 2019. This initiative has created approximately 3,200 jobs in the market and enabled young professionals to gain skills in this highly specialized field.

Local assembly via PTA Coc for finished device 2016-19



Telecommunication licensing framework

The GoP issued the Telecommunication Policy in 2015, which provides a comprehensive framework and roadmap for the regulatory and policy environment for Pakistan's telecom sector. In compliance with the Telecom Policy 2015, PTA initiated the process of hiring a consultant to review the existing licensing regime and prepare a new licensing framework, including license renewals. Accordingly, an RFP to this effect was finalized and advertised in June 2019 in local and international newspapers. Finalization of licensing framework is under process.

Retail tariff for mobile services

Mobile Termination Rates (MTRs) play a critical role in driving retail tariffs, especially for off-net calls. In view of the changing market structure of the cellular mobile segment and considering that the last change in MTR was made in 2010, a review of the existing MTR @ PKR 0.90/min was required in Pakistan. Based on comments, hearing and meetings, the Authority decreased the MTR for all types of calls local, long-distance and international incoming calls terminated on mobile networks from other mobile networks or fixed networks from PKR 0.90 to PKR 0.80 on 01 January, 2019. This rate will be further decreased to PKR 0.70 in 2020. Subsequently, the MTR will be reviewed in the coming years in line with international best practices. We expect that it will help to keep tariffs low for consumers.

Restoration of taxes on cellular mobile services

The honorable Supreme Court of Pakistan suspended sales tax, withholding tax and service charges in June 2018 on the pre-paid reload/recharge and usage. CMOs' implemented the order of honorable Supreme Court in letter and spirit and stopped deducting taxes (GST / FED and WHT) and services charges from pre-paid consumers. Resultantly, pre-paid subscribers got 100% balance (i.e. Rs. 100 upon recharge of Rs. 100). However, the same taxes were restored by apex court on 24 June, 2019, resultantly, CMOs started levying taxes on their packages. After restoration of taxes, it was observed that due to competition in the market, some CMOs reduced their mobile data tariff and did not pass on the impact of taxes to their consumers.



Similarly, CMOs also started incentivizing their subscribers by offering more on-net minutes, SMS and data bundles. PTA created awareness among consumers and issued press releases in the print media stating that "after restoration of taxes by the honourable Supreme Court of Pakistan, CMOs have not increased the rates, instead they have applied taxes on the existing tariff." Furthermore, the general public was assured that "PTA is vigilant about the rates/tariff being charged by CMOs and action will be initiated on any reported incidence of charging above the published tariff and applicable taxes."

Spectrum re-farming strategy

Ever increasing demand for radio frequency spectrum makes it vital for the government to formulate a strategy for efficient utilization of this scarce resource for long term, keeping in view rapid technology changes. Telecom Policy 2015 recommends re-farming of spectrum in cases where its current use is not in the best social and economic interests of Pakistan, it is underutilized, used inefficiently or its use is inconsistent with international allocations. PTA, in consultation with FAB & PEMRA has proposed a re-farming framework to MoIT&T. This framework aims to focus on possible options to re-farm spectrum being made available or currently in use.

Ease of doing business initiative

For ease of doing business, PTA is assessing its internal and external processes and reviewing its SOPs/guidelines for improving delivery of services to investors, licensees and consumers. For the purpose, PTA coordinated with major licensees for their feedback and to identify areas of improvement in the regulatory processes of PTA. PTA also coordinated with FAB for development of a centralized processing portal for the site clearance/ registration of BTS cases. The portal shall be made accessible to all board

members for quick disposal of the cases. Similarly, a new SOP for issuance of commencement certificate to licensees is being developed so that commencement certificates are issued quickly. Procedures for granting licenses have been improved where the application assessment will be made within a specified timeline. Similarly, online application portal is being developed for granting all kind of Class Value Added Licenses. Procedures relating to allocation of short code resources have also been improved for facilitation of its users. Spamming, Unsolicited, Fraudulent and Obnoxious Regulations 2009 have been assessed and in order to curb the menace of spamming, the regulations are being amended.

State of the art technical solution to control grey traffic

International telephony traffic brought into the country through hidden routes and terminated on local networks is termed as grey traffic. This traffic is brought in to the country on IP bandwidth and terminated on access providers' networks by re-initiating the call through mobile SIMs or other means. Grey traffic affects government levies and tax collections, as grey traffickers evade all applicable taxes and cause loss to national exchequer and this traffic also becomes a threat to national security. In past, PTA had been identifying numbers making grey calls and conducted raids on the premises where the grey systems were located. At present, grey traffic is identified through a technical system and actions on suspected cases are taken in coordination with law enforcement agencies. To counter grey traffic, telecom industry with consent of PTA decided to deploy a technical solution through which grey traffic can be identified and mitigated in near realtime. The technical solution being deployed by telecom industry is at advanced stage of deployment and is expected to be operational in the first quarter of 2020. It is expected that after operationalization of the system, grey traffic will be eliminated to a greater extent.

Right of way draft rules, 2018

Over the last few years, there have been many instances reported to PTA and MoIT&T related to Right-of-Way (RoW) disputes. These have come from telecom operators who cite undue demands from various public bodies (owners of RoW). MoIT&T began a process of consultation with all relevant stakeholders to develop a standard mechanism for addressing the long-standing issue of RoW being faced by telecom operators and has prepared draft RoW rules. PTA is actively pursuing and participating in finalizing the RoW Rules in the larger interest of the telecom sector.

Ultra-wide band devices framework

Ultra-Wide Band (UWB) is a technology for the transmission of data using techniques that cause spread of radio energy over a very wide frequency band with a very low power spectral density. The low power spectral density limits the interference potential with conventional radio systems and the high bandwidth can allow very high data throughput for communication devices, or high precision for location and imaging devices. UWB devices have vast applications in our daily lives and PTA has started to develop a framework for the use of such devices in Pakistan. Necessary consultations with relevant stakeholders have been initiated.

OTT framework

The Telecom Policy, 2015 requires PTA to develop an appropriate regulatory framework of Over-the-Top (OTT) services in consultation with the federal government and stakeholders. In this regard, a regulatory framework for OTT services in Pakistan is being developed with the objective to explore the nature of OTT telecommunication services, particularly as they relate to voice services; examine the impact of OTT services on stakeholders in the telecommunications industry; research the treatment



of OTT services by regional and international jurisdictions; and then establish a possible regulatory framework for OTT services for Pakistan.

Regulatory remedies and solutions for service provision by WLL operators

WLL service providers are facing issues in the local market as there is an increasing demand for high-speed mobile broadband networks and technological advancement in standards developed by ITU, the Institute of Electrical and Electronics Engineers (IEEE), the European Telecommunications Standards Institute (ETSI), 3rd Generation Partnership Projects 1 and 2 (3GPP) and regulatory provisions on limited mobility. To overcome the problems faced by WLL service providers, various solutions are being explored to ensure an acceptable outcome for the fixed and mobile sector within the ambit of the existing regulatory regime. In this regard, a detailed consultation was carried out with stakeholders to prepare a framework on “Regulatory Remedies and Solutions for Service Provision by WLL Operators”. The draft framework has been forwarded to MoIT&T for approval before coming into effect.

BVS devices to ensure security and integrity of SIM issuance process

PTA introduced Biometric Verification System (BVS) for mobile users in 2014. Currently, all users have been properly verified. However, PTA received complaints regarding the misuse of BVS devices. An analysis revealed that some BVS devices being used for SIM issuance were substandard and lacked certain security features. PTA took an initiative to conduct an on-ground check of BVS devices in the market for which the services of a third-party vendor were sought. Hardware and software specifications, Live Fingerprint Detection (LFD) functionality, device communication, and physical security parameters were checked during the exercise. On the basis of activity observations/recommendations, the Standard Operating Procedures (SOPs) for SIM sales and verification have been revised by PTA wherein minimum specifications of BVS devices have been laid down in addition to certain other improvements in the BVS process to minimize misuse. The same has been finalized in consultation with stakeholders and implemented successfully.



Asaan mobile account scheme

The NFIS Council approved the Asaan Mobile Account (AMA) scheme that requires the establishment of a Unified Unstructured Supplementary Services Data (USSD) platform through a Third Party Service Provider (TPSP). PTA has issued two TPSP licenses that will be instrumental in the interoperability and launch of the AMA scheme which aims to bring the large unbanked population into formal banking channels. PTA has facilitated dialogue with all parties, including CMOs, Banks & TPSPs. Pilot of AMA scheme has been launched which will be followed by commercial services.

Actions against objectionable content

One of PTA's priorities is the sanitation of the internet and removal of objectionable content. In this regard, to curb the menace of child pornography, PTA acquired a list of 2,384 websites from Interpol and blocked them. In addition to blocking websites, PTA ran a media campaign to increase the general public's awareness about the prevention of child pornography. PTA identified and blocked more than 824,000 URLs/websites containing pornographic content. However, continuous efforts are required since millions of webpages are uploaded onto the internet every day. Similarly, all well-known pornography websites have been geo-blocked in the country. PTA is cognizant of the fact that unlawful content is being accessed through VPNs, therefore over 11,000 proxy websites have been blocked as well.

PTA's public service efforts

PTA continuously involves itself in public service initiatives taken by other government organizations on a need and volunteer basis. In this regard, PTA

collaborated with the Pakistan Polio Eradication Programme to put an end to propaganda videos against polio vaccinations by blocking/removing such videos. PTA has taken up this issue with major social media/video-sharing websites, including YouTube, Facebook, Instagram and Dailymotion. It has requested them to prevent the usage of their platforms for anti-vaccine propaganda.

Similarly, PTA participated in the national cause of funds collection for the construction of the Diamer-Bhasha and Mohmand dams. It galvanized all telecom companies, mainly CMOs, to participate in the cause and help the government generate funds. In this regard, a short code (8000) was allocated and subscribers could contribute by sending an SMS for a minimum of PKR 10. As of June 2019, the telecom sector has contributed over PKR 134 million.

Election monitoring cell

An Election Monitoring Cell was established at PTA headquarters with a view to ensuring the provision of flawless end-to-end connectivity, both by CMOs and PTCL, for the smooth running of 8300 services and the Result Transmission System (RTS) and Result Management System (RMS) during the general election 2018. The tasks performed by the cell included coordination with CMOs, the National Database and Registration Authority (NADRA) and Election Commission of Pakistan (ECP) to ensure the availability of mobile services in polling stations under coverage area.

Adoption of automated digital self-care system

In order to automate customer care/complaint management services, Jazz and Telenor submitted proposals to introduce an automated self-care system for customers through Interactive Voice Response (IVR) between the hours of midnight and 8 a.m. and during gazetted holidays. After detailed meetings/presentations, PTA asked Jazz and Telenor to revise



their systems to make agent facilities available while encouraging customers to use digital self-care systems. PTA also conducted surveys of PMCL and Telenor's systems and accorded provisional approval of their systems.

Billing verification exercise

PTA carries out a regular exercise to verify and check whether CMOs are charging their customers retail tariffs according to advertised rates. Balance reloads, balance inquiries and helpline charges were also checked during the surveys. PTA conducted a billing verification survey in Karachi and Islamabad during the FY 2018-19. Results showed that CMOs were charging as per advertised tariffs.

Numbering plan

PTA has been mandated to undertake activities under Section 5 (2) (k) of the Pakistan Telecommunication (Re-organization) Act, 1996 to develop a national numbering plan. The allocation of number resources for various services is carried out under clauses 3-12 of the Numbering Allocation and Administration Regulations, 2018. The purpose of the National Numbering Plan (NNP) is to allow competing operators to configure their networks with confidence. It ensures a structured approach to the allocation of numbers that is in accordance with best international practices. Some 517 cases were processed during FY 2019.

Numbering cases processed FY 2019

S. No.	Nature	Nos
1	Allocation UAN	196
2	Allocation toll-free	39
3	Reallocation UAN	122
4	Reallocation toll-free	28
5	Permanent cancellation of UAN	64
6	Permanent cancellation of toll-free	17
7	Reallocation and restoration of UAN/toll-free after withdrawal/cancellation	51
Total cases processed		517

Public Wi-Fi

PTA recently laid down regulations on “Data Retention of Internet Extended to Wi-Fi Hotspots” which aims to expand Wi-Fi access in public places. These regulations are applicable on access providers and class licensing registration licensees with the mandate to register, maintain and retain information of person(s) using data services through Wi-Fi hotspots in public places. Public Wi-Fi hotspot owners are required to maintain a log of information of users for at least six months. We expect that service providers will be able to provide Wi-Fi services across the country in public places. This will allow users to remain connected all the time.

ICT/telecom indicators database

PTA collects telecom data from operators and compiles it into meaningful analysis and reports. PTA recently launched an ICT/telecom indicator database through an online facility. The database is a comprehensive management solution of international quality. It is a web-based application and accessible to all telecom licensees, including CMOs, FLLs, WLLs, LDIs and CVAS, etc. It allows operators to submit data online on a monthly and quarterly basis. The newly launched ICT indicator database (<https://indicators.pta.gov.pk/>) is also integrated with PTA CMS for providing an integrated view to the management relating to ICT indicators and operator-wise complaints statistics.

PTA’s engagement with Senate & National Assembly

PTA engaged extensively with standing committees on IT and telecom constituted by the National Assembly and Senate of Pakistan. Both committees are mandated to address a wide range of issues related to IT and telecom that are of national importance and public interest.

PTA attended to all concerns raised on both floors of the houses. Public representatives raised telecom issues in the form of questions, resolutions and notices. The table below depicts PTA’s engagement with both floors of the houses and standing committees over the last year. The following major issues raised by both committees were resolved and addressed accordingly:

- DIRBS-related issues;
- Issue related to QoS in different parts of the country;
- Issues related to mobile service coverage in different parts of the country;
- Blocking of unlawful and blasphemous content on the internet;
- Blocking of fake accounts being used on social media to combat the menace of cybercrime.

PTA’s engagement with both floors of the houses and standing committees

S. No.	Detail	National Assembly	Senate
1	Starred questions	11	12
2	Resolutions/motions	1	9
3	Calling attention notices	1	0
Standing Committee meetings			
4	Standing Committee on IT and Telecom	1	13
5	Standing Committee on the Cabinet	1	2
6	Standing Committee on Interior	0	7
7	Standing Committee on Delegated Legislations	0	1
8	Functional Committee on Less Developed Areas	0	1
9	Standing Committee on Kashmir Affairs	0	1

Pakistan wins ITU council seat

ITU is the United Nation's specialized agency for telecommunications. It was established for standardization and regulation of international radio & telecommunication systems. It covers all aspects of global communication such as setting standards and procedures and systems that facilitate seamless interoperability of telecom infrastructure and devices in the world. 193 states are ITU members in addition to over 800 private sector entities, and academic and research establishments. The ITU Council is the premier governing body of the union that considers policy issues, ensures smooth organizational operations, develops strategies and recommendations, approves budgets, and controls finance and expenditure. Pakistan had been an ITU Council member in 1947, 1952, 1965, 1982, 1989, 1994, 1998, 2002, 2006 and 2014.



In recognition of the country's outstanding services to ITU, Pakistan won the ITU Council seat once again during elections held at the ITU Plenipotentiary Conference from 29 October, 2018 to 16 November, 2018 in Dubai, United Arab Emirates. PTA played a key role in canvassing and lobbying for Pakistan's candidature along with MoIT&T and the Ministry of Foreign Affairs. It is also pertinent to note that Pakistan secured 155 out of 177 votes to get elected for a four year term (2019–2022). Pakistan was among



13 countries elected to this important body from the Asia and Australasia regions.

Pakistan's re-election to the ITU Council further strengthens its global position as an advanced and mature telecom/ICT market. More importantly, Pakistan has become a key member of an exclusive group within ITU that will shape the future of telecommunications/ICT.

Capacity building, awareness and education

New trends and approaches to regulation are emerging around the world to keep up with an increasing amalgamation of technologies and services. PTA recognizes this challenge and aims to equip its workforce with the necessary skills and latest tools offered by international training institutes and expert forums. PTA officers also participate in international events of significance in order to share our experience and perspective to the global audience. Effective representation is, therefore, ensured at forums such as ITU, APT, GSM Association (GSMA).

Awareness and education are also core ITU recommendations for a country's national cybersecurity strategy. Recognizing its importance, PTA has been carrying out capacity building activities aimed at cyberspace management and security.

The following is a brief set of activities undertaken for the capacity building, awareness creation and education of PTA officers, telecom professionals, etc.

PTA hosts 19th meeting of SATRC; Chairman, PTA elected as Chairman, SATRC

In collaboration with APT, PTA hosted the 19th meeting of the South Asian Telecom Regulators Council (SATRC) from 13–15 December, 2018 in Islamabad. It was one of the most successful meeting of the Council where heads of regulators, policymakers and senior officials of all member countries participated. SATRC is a sub-regional cooperation organization of telecommunication regulators operating under the umbrella of APT. SATRC was established in 1997 to discuss and coordinate on issues relating to regulations in telecommunications and ICT which are of common interest to regulators in South Asian countries. SATRC's member countries are Afghanistan, Bangladesh, Bhutan, India, Iran, the Maldives, Nepal, Pakistan and Sri Lanka. Pakistan has been a member of SATRC since its inception and actively contributes to Council proceedings.

It is a matter of honour for Pakistan that the Council unanimously elected the Chairman PTA, as its new Chairman. In his inaugural address at the 19th Council meeting, Dr. Khalid Maqbool Siddiqui, Federal Minister for MoT&T, said we are continuously working on new projects for maximum economic impact through collaboration, digitization, research and innovation in new emerging technologies within the ICT and other socio-economic sectors. Ms. Areewan Haorangsi, Secretary-General, APT said that SATRC council meetings assist the regulatory bodies of member countries in acquiring the knowledge and skills they require to address common challenges facing the region. In addition, it also promotes cooperation and dialogue between regulators and the industry to introduce best regional and international practices in member countries. The Chairman PTA, said it was an honour for Pakistan to host this key meeting. PTA has been an active SATRC member and will continue to

share its regulatory wisdom and skills with regional regulators. He said that the GoP has entrusted us with the task of providing state-of-the-art ICT services to the people of Pakistan. While creating smarter communities, PTA ensures affordable and broad-based communications access to consumers.

GSMA CoE for regional regulatory training

PTA and GSMA have agreed to establish a Center of Excellence (CoE) to offer free-of-cost training courses on emerging telecommunications and ICT topics to government and policymakers from South and Central Asia. Under the programme, PTA arranges local host facilities, such as venues and logistics, while GSMA provides tuition-free training, subject matter experts and course materials. Trainings under this collaboration will be provided free-of-cost to participants every quarter for the next two years. On the occasion of the inaugural ceremony, Chairman PTA, Maj Gen Amir Azeem Bajwa (R) expressed his gratitude to GSMA for collaborating with PTA. He said that such trainings were an excellent opportunity for the capacity building of professionals and policymakers of regional countries in cutting-edge technologies such as 5G networks.

PTA will devote all possible resources to make this CoE an exemplary model for other regions. The Chairman anticipated that senior professionals from regional countries will participate in the training programmes, providing a unique opportunity for knowledge-sharing. Speaking on this occasion, Ms. Sarah Gaffney, GSMA's Senior Director of Partnerships, emphasized partnership and collaboration with PTA to achieve mutually beneficial goals. All courses are accredited by the United Kingdom Telecommunications Academy (UKTA), an internationally recognized institute in the provision of academic, technical and vocational education in telecommunications.



Workshop on 5G: The path to the next generation

PTA and GSMA arranged a workshop on 5G and its implications at PTA headquarters on 03–04 July, 2019. The workshop was arranged under the GSMA CoE Programme. The training was conducted by Mr. Michele Zarri, Technical Director, GSMA. The course agenda focused on key differences between different generations of mobile communication systems



(2G, 3G, 4G, and 5G) and the business models being adopted by different countries. The status and techniques of spectrum management and capacity challenges were also discussed. The workshop was attended by officers from PTA, MoIT&T, FAB, USF, Ignite National Technology Fund, PEMRA and the Central Asian Cellular Forum (CACF). Chairman PTA presided over the closing ceremony and distributed certificates. In his closing remarks, Chairman said that 5G is the future of the digital revolution and we aim to



highlight its benefits and value to all stakeholders in the government.

Workshop on advanced spectrum management for mobile telecommunications

PTA and GSMA collaborated with CACF to organize a two-day International Workshop on “Advanced Spectrum Management for Mobile Telecommunications” from 22–23 November, 2018 at PTA headquarters, Islamabad. The training was attended by representatives from MoIT&T, USF, Ignite National Technology Fund, and PTA. The training sessions were conducted by Mr. Cristian Gomez, Director of Spectrum Policy and Regulatory Affairs, GSMA. The course focused on national spectrum management; spectrum harmonization; competition and spectrum policy considerations; the internet of Things; maximizing the benefits of the release of the digital dividend for society; spectrum and infrastructure sharing; and the increasing importance of Wi-Fi for mobile.

Workshop on DNS abuse and misuse

In collaboration with the Internet Corporation for Assigned Names and Numbers (ICANN), PTA organized a workshop on “Domain Name System (DNS) Abuse and Misuse” on 07 February, 2019 at PTA headquarters in Islamabad. The objective was to build the capacity and skills of senior PTA technical officials, the telecom sector and other stakeholders. Participants were introduced to strategies, techniques and tools that information security professionals use to identify DNS abuses, and malicious registrations of domain names or hosting. The workshop was focused

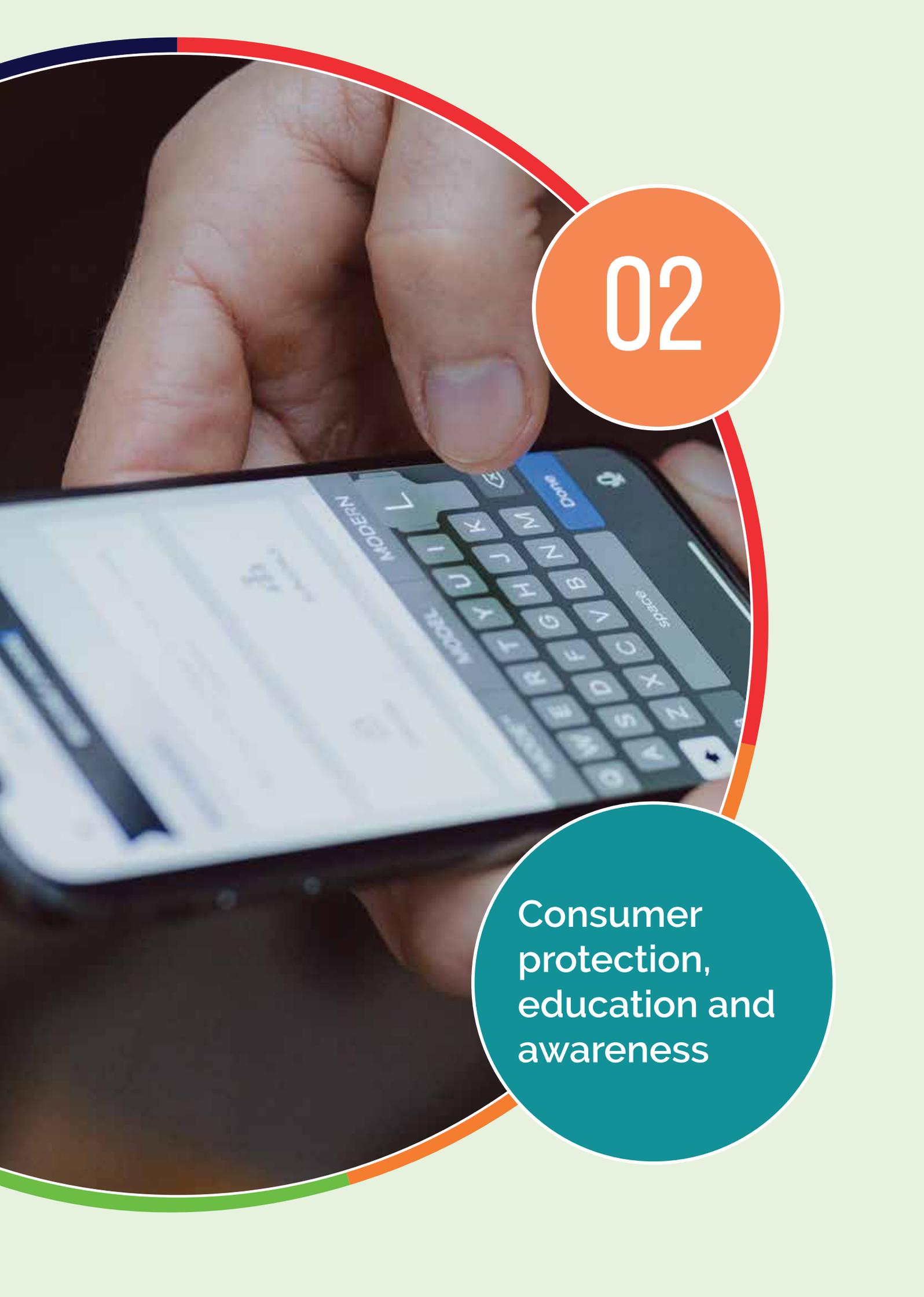


on IPs and techniques to intercept and block DNS attacks and was conducted by Mr. Fahd Batayneh, Manager for ICANN's Middle East Region.

Seminar on financial inclusion and e-commerce issues

In collaboration with the Commercial Law Development Program (CLDP) USA, PTA organized a seminar titled "Financial Inclusion and E-commerce Issues" at PTA headquarters, Islamabad. The seminar served as a platform to discuss the opportunities and challenges to helping Pakistan's digital economy. The

event was attended by representatives from MoIT&T, the State Bank of Pakistan (SBP), telecom industry, World Bank and senior PTA officials. Discussions on expanding financial inclusion in Pakistan and a proper regulatory regime to optimize fixed/mobile convergence were held during the seminar. The speakers addressed the potential and challenges of Digital Financial Services (DFS) in Pakistan, the need for robust initiatives for financial inclusion, informed decision and policymaking, and gender-neutral policies and products, with a special focus on the rural and associated value chain.



02

Consumer
protection,
education and
awareness

Consumer protection, education and awareness



The telecommunications sector has evolved over the years on the basis of the supply-side where the main focus remained market entry, licensing, access to and use of networks, interconnection, and control over retail and/or wholesale pricing. The focus on the supply-side was required so that alternate suppliers in the monopoly markets could be introduced to spur competition. However, with competition solidifying in the market, the regulator's attention has now been shifted to the demand side. This change is the need of the hour since consumers exert sustained pressure on operators to innovate, improve quality and compete in terms of prices. An informed consumer having the right kind of tools and control to choose telecom services is a satisfied consumer. Regulators around the world are now devising mechanisms, regulations and processes that can lead to a balanced market of both the supply and demand side.

Under the Telecom (Re-Organization) Act, 1996, PTA is obligated to protect consumer interests and ensure the satisfaction of telecom consumers by responding and resolving their complaints through an effective regulatory framework. Accordingly, PTA's stated vision puts consumer interest as the first priority under its agenda of a fair regulatory regime. PTA keeps introducing and upgrading its CMS, creating awareness among telecom users, and responding to the latest developments in the technology sector. The following pages explain our endeavours in protecting,

educating and creating awareness among Pakistan's telecom users.

A telecom consumers' complaint cell was established at PTA headquarters on 01 January, 2002 with the objective of providing expeditious relief to the general public, facilitating and resolving individual/group complaints against telecommunication services. Online complaint registration system had been introduced in 2005, but complaints were processed manually. With the growth of the telecom sector, especially during the de-regulation in 2004-05, the number of telecom subscribers and complaints increased exponentially. PTA, therefore, established a dedicated Consumer Protection Directorate (CPD) in September 2008 with the objective to devise effective complaints handling and analysis mechanisms. Hence, in 2009, another upgraded version of CMS was launched with improvements

Modes of lodging complaints at PTA HQs

Website: <http://www.pta.gov.pk/>

E-mail: complaint@pta.gov.pk

Toll-Free No. 0800 55 055

Fax: 051 287 8127

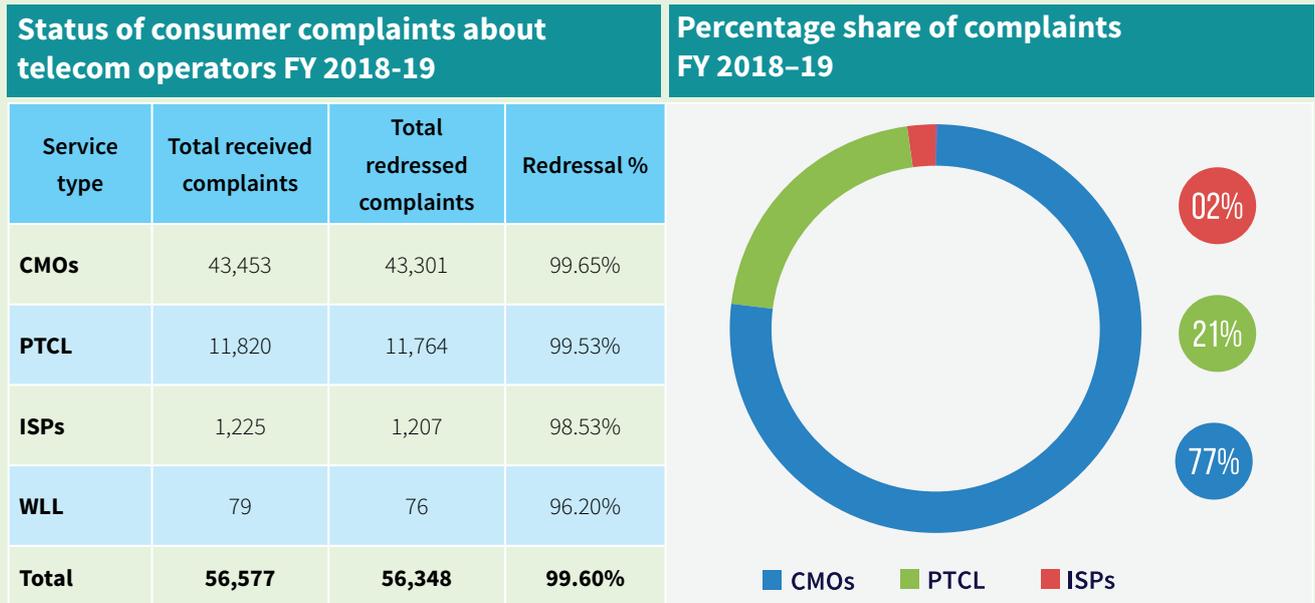
Telephone: 051 922 5325

Post: PTA HQs, Sector F-5/1, Islamabad.

in redressal mechanisms. In 2018, PTA automated the complaint redressal mechanism with the launch of a CMS that possessed advanced features such as complaint lodging, processing and redressal. Most importantly, a complaints analysis tool was introduced that assists in taking regulatory initiatives for consumer protection. The CMS is accessible to the general public through PTA’s website. PTA also offers dedicated facilities at its headquarters in Islamabad and zonal offices in Karachi, Lahore, Peshawar,

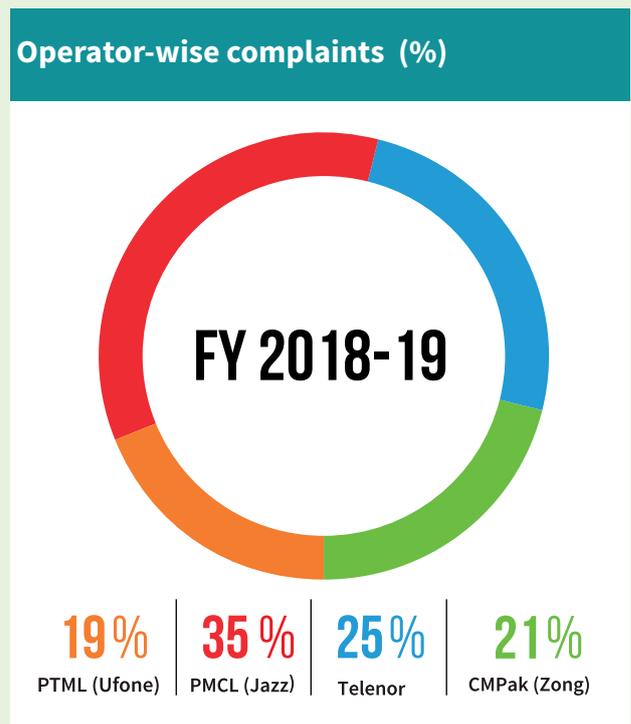
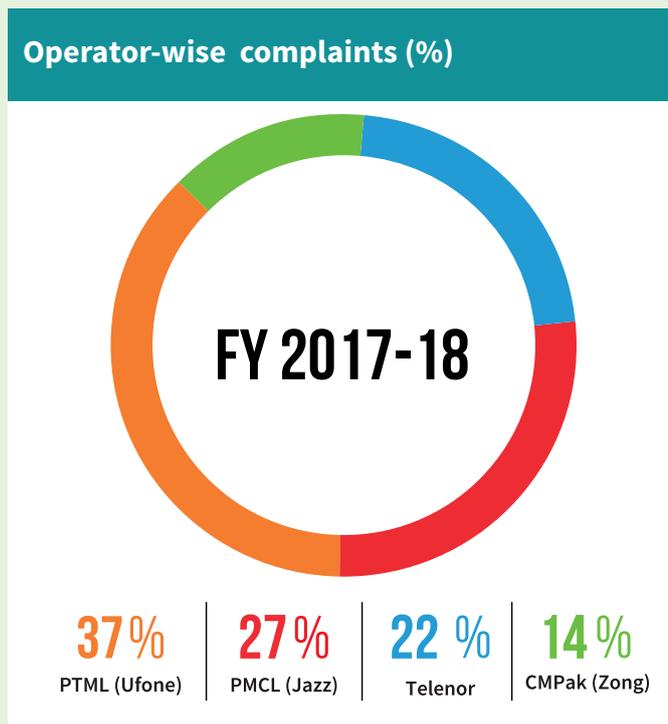
Quetta, Rawalpindi, Muzaffarabad, Multan and Gilgit-Baltistan (GB). In addition, complaints are received verbally or in writing via a toll-free number, or via fax, e-mail, website (online complaint form) and postal letters.

PTA received 56,577 complaints during the reported period. The successful redressal rate was 99.6%. Details are shown in the table and graph below.



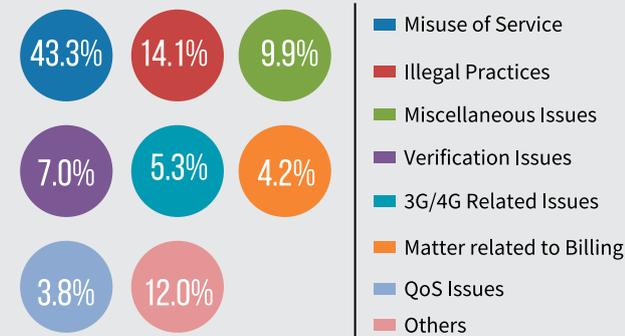
About 77% of total complaints concerned mobile services. The operator-wise share in total complaints coincides with that of the operator-wise share in

the subscribers’ base. However, Ufone’s subscriber-to-complaints ratio was higher than that of other operators.



Most of the complaints against CMOs were related to the misuse of service, illegal practices, verification issues and 3G/4G service-related issues. Faults in telephones, billing issues, poor customer service, and misuse of service were the top categories of complaints against PTCL services.

Nature-wise complaints against CMOs (%) FY 2018-19



PTA also receives complaints directly from the Wafaqi Mohtasib (Federal Ombudsman). The turnaround time for these complaints varies between 2 and 14 days, depending on the nature of the complaint (excluding irrelevant complaints). PTA received and resolved a total of 116 complaints through Wafaqi Mohtasib during the reported year.

Pakistan citizen portal

Prime Minister of Pakistan inaugurated online mobile Application named Pakistan Citizen Portal (PCP), where people can lodge complaints and concerned

departments and offices are bound to respond in the specific timeline to address their complaints. PM Office is overseeing the progress on these complaints. PTA is also receiving complaints through PCP since 12 November, 2018. To handle these complaints, a dedicated department is available and working to resolve the complaints from concerned telecom operator/licensee on top priority. Status of complaints is given Table.

Complaints received through PCP

Complaints Received	20,602
Complaints Resolved	19,387
Redressal Rate %	94.1% however 4.3% complaints are under process and 1.5% complaints are new complaints

Review of PCP by PM office

The PM office issued a report on 'Review of Pakistan Citizen Portal (PCP)' on 27 December, 2019 and PTA stood first in terms of resolving complaints among all regulators. Satisfaction level of complainants by PTA has been reported 53% among the regulatory bodies (i.e. SBP, PEMRA, etc.). Same position was also obtained by PTA in earlier assessment by PM office on 08 October, 2019. Reports and results are given below.

Review of Pakistan citizen portal as of 27-12-2019

Highest no of resolved complaints (by top 10 officers)



Sr No	Officer	Department	Resolved	Satisfied (%)
1	Chairman, Pakistan Telecommunication Authority (PTA)	Pakistan Telecommunication Authority (PTA) (Federal Govt.)	13,938	53%
2	Managing Director, SNGPL	Sui Northern Gas Pipeline Limited (SNGPL) (Federal Govt.)	87,322	46%
3	Complaint Manager, IESCO	IESCO (Federal Govt.)	26,848	43%
4	Chief Executive Officer. FESCO	FESCO (Punjab)	20,690	42%
5	Chief Executive Officer .GEPCO	GEPCO (Punjab)	13,055	42%
6	Chief Executive Officer. MEPCO	MEPCO (Punjab)	37,478	41%
7	Governor, State Bank of Pakistan	Governor, State Bank of Pakistan (Federal Govt.)	11,507	36%
8	Chief Executive Officer. HESCO	HESCO (Sindh)	12,636	34%
9	Chief Executive Officer. PESCO	PESCO (Khyber Pakhtunkhwa)	22,405	33%

Media campaigns for consumer awareness

PTA regularly runs media campaigns through the print/electronic media and SMS on key consumer issues. PTA has organized a number of consumer forums over the past years as well as media campaigns to encourage dialogue and input from industry stakeholders and consumers on issues pertaining to the telecom sector and services. PTA strongly believes that the key to consumer activism is creating awareness of citizens' telecom rights and increasing knowledge about procedures to lodge complaints and grievances.

Managing fake/fraudulent calls and SMSs

Mischievous elements and fraudsters deceive people with fake offers of prizes and rewards. PTA received a huge number of complaints from the general public regarding deceptive and fraudulent SMS/calls. One such example is fake callers pretending to be representatives of Benazir Income Support Programme (BISP). To address such issues, PTA devised a mechanism to streamline the procedures and processing of complaints. In this regard, PTA directed all CMOs to coordinate with BISP and ensure that prompt action was taken against elements involved in fraudulent communication. Telephone subscriptions/numbers verified to be involved in fraudulent SMSs reported by the office of BISP are being blocked as per applicable regulations, SOPs and PTA directives.

Similarly, people are often robbed of money through balance transfers via mobile. PTA took serious notice of this issue and directed mobile operators to ensure that balance transfer facilities are only activated after the explicit consent of mobile subscribers.

Telecom services surveys

PTA regularly carries out two types of QoS surveys to gauge the quality of services being provided by operators. These are periodic and complaint-based surveys for telecom services, both mobile and broadband.

Periodic quality of service surveys

During the period July 2018 to June 2019, a quarterly QoS survey of CMOs was carried out in Bahrain, Madyan, Kalam, Naran, Nathia Gali, Malam Jabba, Peshawar, Quetta, Ziarat, Lodhran, Multan, Mirpur Khas, Badin, Dera Ismail Khan, Peshawar, Larkana, Nawabshah, Shikarpur, Jacobabad, Sahiwal, Bhakhar and Jhang. They were conducted jointly with CMOs using a NEMO automated QoS tool. Voice, Data and SMS quality was checked against various standard parameters.

The performance of CMOs' data services was checked by measuring two Key Performance Indicators (KPIs), i.e. User Data Throughput & RSCP for 3G and RSRP for 4G. It was found that the user data 'throughput' of 3G and 4G services were higher than the benchmark values of 256 Kbps and 2 Mbps, respectively. The signal strength (RSCP) of 3G and 4G networks has been observed to be greater than the -100 dBm threshold value.

User data throughput

This KPI defines user data rate (internet speed) to be provided by NGMS operators to mobile users across the coverage areas.

Signal Strength

This refers to Received Signal Code Power (RSCP) for 3G and Received Signal Receive Power (RSRP) for 4G. It is power measured by a receiver on a particular physical communication channel. It is used as an indication of signal strength, as a handover criterion, in downlink power control, and to calculate path loss.

The performance of CMOs' voice services was checked by measuring KPIs like network down time/network accessibility, grade of service, service accessibility, call connection time, call completion ratio, end-to-end speech quality and session abnormal release rate. Network accessibility is the opposite of network down time and its value was found to be greater than the threshold value of 99% (of all mobile operators). All mobile operators are meeting the threshold value of grade of service and the criteria for service accessibility. They are also following the benchmark of call connection time of 6.5 seconds. End-to-end Speech Quality/Mean Opinion Score (MOS) was found to be above the threshold value of 3 (for all CMOs). Inter system handover of circuit-switched voice of all mobile operators was above the threshold value

of 98%. To summarize, the voice and data QoS of all CMOs in Pakistan is above average.

Survey to check Jazz and Telenor's automated call centres

In order to automate customer care services, PMCL (Jazz) and Telenor submitted their proposals to PTA to introduce automated self-care system for customers through IVR during night time and gazetted holidays. After evaluation, PTA provided provisional approval to both operators to automate their systems for an initial period of three months, with an option to talk to their call agents as well. PTA conducted a survey upon expiry of the provisional period to assess performance of the automated self-care system and based on survey results, operators were given directions to improve their services. Surveys were also carried out from October 2018 to January 2019 to reassess the system and after satisfactory survey results, PTA allowed digital self-care systems of Jazz and Telenor for a period of one year. Further extension will be granted after satisfactory results of the system.

Facilitating telecom consumers via social media

Social media is the most modern medium to interact with the public, and serves as a robust outreach tool to disseminate information. Pakistan Telecommunication Authority (PTA) has social media presence on three major social media platforms: Facebook, Twitter and YouTube. PTA's social media presence is being used effectively, not only to inform users/consumers about various different telecom policies/ developments but also to seek feedback regarding regulatory decisions.

PTA regularly publishes press-releases/updates, public awareness messages and informational videos on its social media pages regarding its initiatives

and services. The objective is to help bridge the gap between the PTA and the public. It is leveraging social media in its public awareness campaigns to raise awareness and engagement about DIRBS, blocking of stolen IMEIs, Biometric Verification System (BVS), and grey trafficking among others.

Social Media is also an effective medium to approach PTA, as consumers report their problems through social media and PTA takes action against these complaints. Based on instant consumer feedback, PTA accordingly shapes and reshapes its policies. Messages/Comments/Tweets regarding DIRBS, BVS and Quality of Service etc. are also addressed for information and awareness in real time.

Moreover, the input received on PTA's social media pages has also helped in understanding the followers and tracking the overall sentiment, and pulse of the public. Using social media has enabled PTA to assess the reach and effectiveness of its campaigns, and has given PTA the outlook of a progressive organization.

PTA's social media Channels

Facebook : www.facebook.com/PTAOfficialPK/

Twitter: @PTAofficialPK

YouTube: PTA Official_PK





03

Telecom services in AJK and GB

Telecom services in AJK and GB



Azad Jammu and Kashmir (AJK) and Gilgit Baltistan (GB) remained underprivileged with regard to telecom services for a very long time. The GoP, therefore, made plan to improve civilian telecom needs in the area in 1976 by establishing the Special Communications Organization (SCO) under the Pakistan Army’s supervision. The Army’s facilitation was required because of tough terrain, difficult accessibility and LoC sensitivities. Today, SCO works as a public sector organization under MoIT&T. It is mandated to develop, operate and maintain all telecom services in AJK and GB. Until 2005, SCO remained the only service provider in AJK and GB. However, when the disastrous earthquake of 2005 struck, AJK and GB were the worst-hit areas. All communication links went down, so the GoP requested all private CMOs to respond to the emergency by moving infrastructure into the earthquake-hit areas.

In 2006, the government decided to formally award existing CMOs in Pakistan, permission to operate mobile cellular services in AJK and GB. This was done after the AJK Council adopted the Pakistan Telecommunication (Re-organization) Act, 1996. In 2008, the government opened the telecom market further for competition in AJK and GB. Licenses were awarded for LDI, FLL, WLL and CVAS, thus providing services and operator choices to the people of AJK and GB.

Telecom development and growth

Today, all four CMOs and SCO provide services in AJK and GB. Total teledensity stands at 70.0% with mobile penetration reaching 68.8%. SCO, PTCL and Skytel are providing fixed-line and broadband services in the region. It is obvious from the double-digit mobile penetration rate, CMOs are aggressively expanding their operational area in the region. However, fixed-line services are provided by SCO, PTCL and Skytel only, so fixed-line penetration is relatively low.

Fixed mobile and total teledensity in AJK & GB

— Fixed Teledensity %
 — Mob Teledensity %
 — Total Teledensity %



Fixed line services

Over the years, SCO has developed an extensive information technology and telecom infrastructure, including the laying of over 4,800 km of Optical Fibre Cable (OFC) networks across the entire region, focusing equally on the provision of telecom facilities to urban and rural areas. Today, the organization provides Public Switched Telephone Networks (PSTNs), Wireless Local Loops (WLLs), Cellular Mobile Services (GSM), Broadband Internet (DSL), Digital Cross Connects (DXX), LDI, Domestic Private Leased Circuits (DPLCs) and Co-Location facilities to the people of AJK and GB and other operators in the area. The total number of SCO, PTCL & Skytel basic telephony (FLL & WLL) connections in AJK & GB stands at 65,833 by end of June 2019. The trend is expected to improve after deployment of the Multi-Service Access Node (MSAN) project by SCO in major cities of AJK and GB which is currently under process.

Fixed line (FLL & WLL) subscribers in AJK and GB



Mobile cellular services

Mobile services in AJK and GB have been expanding and subscriber numbers have been on the rise since

the sector was deregulated in 2005–06. Previously, when SCO launched its cellular services under the brand name, SCOM in 2004, it was the sole mobile service provider. Today, Telenor Pakistan is leading CMO in the area with subscribers of 1.69 million, followed by SCO with a total of 1.25 million subscribers in 2018–19. SCOM provides network coverage both in rural and urban terrain in nearly 450 major cities, towns and villages.

All other operators are targeting mainly major cities in AJK and GB. An operator-wise comparison of subscribers and cell sites is given below:

Cellular subscribers in AJK and GB

Operator	2016-17	2017-18	2018-19
Mobilink	388,424	363,972	379,453
Telenor	1,659,052	1,754,537	1,695,198
Zong	614,206	664,651	927,653
Ufone	192,190	200,128	205,807
SCO	704,235	1,281,160	1,256,780

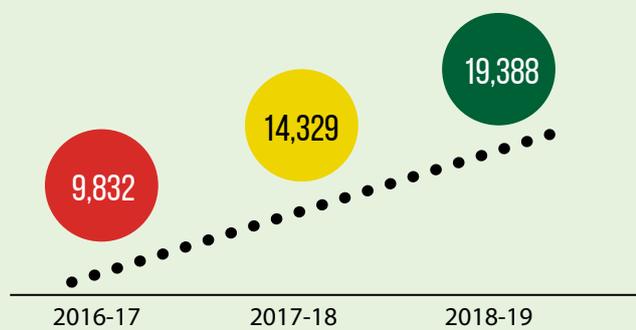
Cell sites in AJK and GB

Operator	2016-17	2017-18	2018-19
Mobilink	289	267	262
Telenor	442	443	468
Zong	338	338	389
Ufone	157	158	157
SCO	190	220	252

Broadband services

People in AJK and GB have been benefiting from broadband services for some time now, although fixed broadband could not grow as rapidly as mobile broadband. However, DSL services have a fair share in broadband service subscription in the region. Under the brand name, SNET, SCO provides broadband internet access via DSL, Wi-Fi and fibre optic cables across AJK and GB. Fixed broadband subscribers, reported by SCO, stood at 14,329 in 2018. The corresponding figure for the FY 2019 is

Fixed broadband subscribers



19,388. Fixed broadband penetration with respect to the population stood at 0.36%. However, it is expected that after the adoption of Gigabit Passive Optical Network (GPON)/MSAN technology, broadband penetration will increase further. As reported by SCO, mobile broadband services are also being provided by the company in AJK and GB. It is expected that mobile broadband subscriber numbers will increase once all operators formally start providing Next Generation Mobile Services (NGMS) services to the area.

SCO is going to deploy FTTH (Fiber to the Home) system to enable its users in AJ&K and GB towards Gigabit broadband services in 2020. The project will allow SCO to retain its fixed line subscribers as well as offer top of the line broadband services. The project is designed for 36,000 FTTH subscribers in Phase 1 and another 40,000 in Phase 2. FTTH is being widely adopted by various operators in Pakistan (PTCL, Transworld, Nayatel, Optix etc). Expansion of triple play services via FTTH will provide the quality internet linkage to outside world and will improve pace of development in the social, education, tourism, commercial and economic sector.



Optical fibre cable network under CPEC

SCO has taken a lead in connecting Pakistan and China through the Pakistan-China OFC project which has recently been completed under the China-Pakistan Economic Corridor (CPEC) programme. This is the only ICT project planned and executed under the ambit of CPEC. Under this project, SCO has deployed approximately 820 km of OFC from Rawalpindi to Khunjerab to establish the first-ever land-based connection with China. SCO is in the process of establishing connections with all three Chinese operators



(China TelecomGlobal, China Mobile International and China Union) at the Khunjerab border. The project has diversified geostrategic, socio-economic and strategic dimensions. One of the project’s major achievements is the provision of end-to-end connectivity to transport traffic from China to international destinations transiting through Pakistan. SCO has signed an interconnect agreement with PTCL for the purpose. Routing transit traffic for China is expected to bring large revenues not only for SCO, but also for the GoP. The Pak-China OFC project has gained global recognition due to its routing/management of transit traffic from one of the world’s largest economies. The link has been commissioned and is successfully carrying trial traffic from China to Europe. On completion of the stability and trial period, higher volumes are expected to be carried via this link for which interfaces are being established with Chinese operators. The project was a difficult one due to geographical constraints (landslides, glacial terrain, and limited deployment corridors), extreme weather and logistical issues. However, it was successfully deployed and made operational within the stipulated time period.

Mobile money

People across Pakistan are being facilitated by mobile money services via different platforms and the requirement of going to a bank or Financial Institution (FI) or having a formal bank account has disappeared. Telenor Pakistan introduced mobile money services in 2008 across Pakistan. Today, it is serving AJK and GB with agents across major cities. Jazz Cash is also serving some cities in GB, whereas SCO’s S-Paisa is providing mobile financial services across the region and Pakistan. It is worth mentioning that S-Paisa collaborated with J-Cash of JS Bank Ltd.

Telenor, Jazz and SCO are providing services, including utility bill payments and cash transfers without the need for formal bank accounts. Customer can send or receive five transactions per day against one Computerized National Identity Card (CNIC) number and can send/receive up to PKR 50,000 per month. Mobile money is changing the lives of people in this region and bringing with it social and economic growth.

Corporate social responsibility projects in AJK and GB

Telecom is playing a significant role in the region and contributing positively to the social uplift of AJK and GB. Telecom operators are making efforts to facilitate and help people in AJK and GB. Details are given below:

Special Communication Organization

As the largest operator with a considerable geographic footprint in the region, SCO considers helping the local community as its corporate social responsibility. In this regard, the organization carries out different events of public interest in addition to celebrating local and national events. During the reported period, the organization carried out projects like its cleanliness campaign in AJK and GB, tree plantation campaign, and created internship opportunities for students in local universities. SCO planned a painting and photography competition in AJK and GB in March 2019 for the students of schools,

colleges and universities to provide an opportunity for local youth to express the beauty of their area under the theme “My Land, My People”. SCO has also planned to present these paintings in an exhibition at the Pakistan National Council of the Arts (PNCA). It is now in the process of establishing a technical training institute in Gilgit for 1,200 students. In January 2019, the Government of Gilgit allotted land at Minawar and construction of the training institute is in progress.

Telenor

Through a “Safe Internet and School Outreach Programme” Telenor Pakistan carried out comprehensive capacity building and awareness sessions at local schools to help children understand online risks. These sessions also enhanced the knowledge of project staff, teachers, school management council members and parents for child protection. Telenor Pakistan also engages with broader stakeholders, including relevant government departments, civil society and media to sensitize them to the importance and effective use of online safety guidelines.



04

Cyberspace
management

Cyberspace management



The internet has become the nucleus of personal, corporate and social communication around the world. While the world has embraced the use of the internet, various threats and challenges in cyberspace are becoming increasingly prominent. The internet is, by default, decentralized and borderless and this core feature also enables anyone with skills and conviction to intrude upon and disrupt communication. Cyber-attacks are a real threat with monetary and social implications on a national and international scale. ITU estimates that 51.2% of the global population, or 3.9 billion people, were using the internet by the end of 2018. However, the global average cost of a data breach was up by 6.4% in 2018. The projected cost of cybercrime by the end of 2019 is an estimated USD 2 trillion. There have been fewer ransomware attacks, but personal data and critical infrastructure breaches are on the rise. This is the reason that 91% of countries have some form of cybercrime legislation (Source: ITU Cyber Security Index, 2018).

Pakistan's cyberspace is equally prone to the benefits and threats of the internet. What is unique to Pakistan is its large youth population. As reported by the United Nations Development Programme (UNDP), Pakistan's youth population was the highest ever in 2018. Sixty-four percent of our total population is below the age of 30 and 29% are aged 15–29 years. The impact of youth and the transition of cyberspace from a service facilitator to a critical national component adds

motivation for keeping our cyberspace secure and safe from internal and external threats. Therefore, the government has made extensive efforts to promulgate effective, fair and strict legislation to counter cyber threats and safeguard citizens' digital rights.

Digital landscape

The introduction of 3G/4G services in 2014 proved to be a game changer in ushering the internet revolution. We are a progressive society with enthusiasm for technology and awareness. Pakistan's operational international bandwidth has increased over seven times to 1.7 Tbps in 2018 from 220 Gbps in 2014. Connectivity is established through the following submarine cables/landlink:

- **Sea-Me-We-3: Design capacity of 480 Gbps**
- **Sea-Me-We-4: Design capacity of 1.28 Tbps**
- **Sea-Me-We-5: Design capacity of 24 Tbps**
- **I-ME-WE: Design capacity of 3.86 Tbps**
- **AAE-1: Design capacity of 40 Tbps**
- **TW1: Design capacity of 1.28 Tbps**
- **PAK-CHINA OFC: Design capacity of 4Tbps**

We currently have a total of 76.3 million internet users which translates into over 36.18% internet penetration.

Monthly social media usage frequency in Pakistan			
percentage			million
 Active users	 79%	 21%	
 Active users	 67%	 33%	
 Active users	 82%	 18%	
 Active users	 56%	 42%	
 Registered users	 83%	 17%	

Source: Each platform's advertising tools, January 2019/Hootsuite.

Active social media users in Pakistan w(%)			
			
Every day	At least once per week	At least once per month	Less than once per month
83%	31%	8%	3%

Source: Google consumer barometer, January 2019/Hootsuite.

Most visited websites

S. no	Website	Category	Monthly traffic (million visits)	Time per visit	Pages per visit
1	youtube.com	Television and video	92.3	31 mins & 27 sec	14.5
2	google.com	Search	75.5	12 mins & 36 sec	12.0
3	google.com.pk	Search	51.1	11 mins & 18 sec	7.4
4	facebook.com	Social media	46	17 mins & 45 sec	14.3
5	yahoo.com	News	8.5	8 mins & 1 sec	6.4
6	whatsapp.com	Communication	8	2 mins & 39 sec	2.1
7	wikipedia.org	Reference	6.6	4 mins & 16 sec	2.8
8	daraz.pk	Shopping	5.7	6 mins & 46 sec	7.4
9	twitter.com	Social media	5.3	11 mins & 19 sec	7.8
10	live.com	E-mail	4.9	10 mins & 2 sec	9.1

Source: ALEXA/Hootsuite.



Cyberspace legislation

The last few years have witnessed substantial efforts in strengthening the legal framework pertaining to cyberspace. The primary aim is to make cyberspace a safe place for internet users, in particular children and women, as well as to secure our digital boundaries. Telecom infrastructure is the platform for digital communication, including the internet. Therefore, PTA has played a key role in the formulation of cyber-related legislation, as given below:



Prevention of Electronic Crimes Act (PECA), 2016

Different government bodies and operators were addressing consumer complaints related to cyberspace as per their own set of measures. However, there was an imminent need to provide a national law that could address all cyber issues effectively. Therefore, the GoP formulated the 'Prevention of Electronics Crimes Act, (PECA) 2016' through stakeholder consultations.

PECA contains the following salient features:

- Introduction and definition of offences and punishments pertaining to electronic crimes;
- Protection of information systems and data, prevention of electronic forgery & fraud and identify theft;
- Cyber-terrorism is also covered to prevent hate speech, terrorism and proscribed elements;
- Child pornography;
- Cyber stalking where women are often the victim;
- Spamming and spoofing.
- Establishment law and designation of a law enforcement agency that investigates offences under PECA.
- The FIA's Cybercrime Wing, the National Response Centre for Cyber Crime (NR3C), has been designated as an investigation agency under PECA.
- For action against unlawful online content, PTA has been given the power to remove or block internet content violating the glory of islam or the integrity, security or defence of Pakistan, public order, decency or morality, or in relation to contempt of court, or commission of or incitement to an offence under this Act.
- The establishment or designation of a forensics laboratory for investigating evidence related to offences under PECA.
- Recognizing the borderless nature of electronic crimes, provisions for encouraging and carrying out international cooperation are also covered.
- The Federal Government may also constitute one or more Computer Emergency Response Teams (CERTs) for responding to cyber-attacks.

Data protection bill, 2018

Data protection is one of the highest priority areas in cyber-governance around the world. It covers the use of data while protecting an individual's

privacy, preferences and their personally identifiable information. The most well-known piece of legislation on the subject is the European Union's General Data Protection Regulation (GDPR) that was implemented on 25 May, 2018. GDPR requires business processes

that handle personal data to be designed and built with consideration of the principles and provide safeguards to protect data. It mandates the use of the highest-possible privacy settings so that datasets are not publicly available without explicit, informed consent, and cannot be used to identify a subject without additional information.

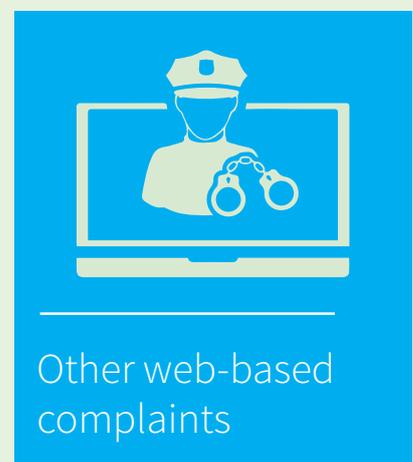
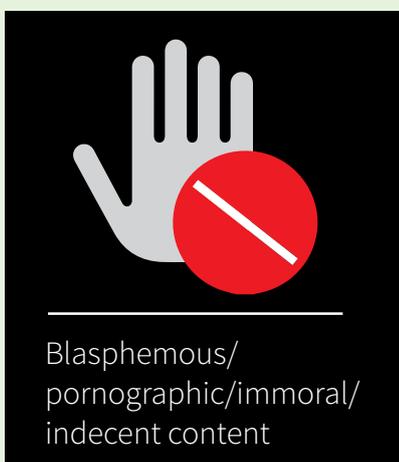
Recognizing the importance of data protection and privacy issues, MoIT&T tabled the Data Protection Bill, 2018 that aims to provide insight and control to the user in terms of storage, processing and use of personal data by placing obligations on data controllers. Some of its most important aspects are as under:

- It applies to any person/company established in Pakistan or that uses equipment in Pakistan to process data;
- The data controller must inform the user in writing of the purpose for which data is being stored and processed;
- Data controllers cannot disclose data to a third party without user consent;
- When processing personal data, data controllers must take practical steps to protect personal data from loss, misuse, modification, unauthorized or accidental access or disclosure;
- The Federal Government must establish a Commission for Personal Data Protection (CPDP) which shall be a corporate body having perpetual succession which can sue and be sued in its own name. It should enjoy operational and administrative autonomy;
- The commission is responsible for enforcing the protection of personal data and must entertain complaints, seek information from data controllers in respect of data processing, and impose penalties for non-compliance and non-observance of data security practices;
- Any aggrieved person may file a complaint before the commission against any violation of personal data protection rights;
- Anyone who processes or causes to be processed, disseminates or discloses personal data in violation of the provisions of this Act, will be punished with fines up to PKR 3,000,000. In the case of a subsequent unlawful processing of personal data, imprisonment for a term not exceeding one year may also be awarded with or without the fine;
- In case the offence committed relates to sensitive data, the offender may be punished with fines up to PKR 5,000,000;
- Anyone who fails to adopt the security measures that are necessary to ensure data security in violation of the provisions of this Act and any rules made thereunder will be punished with fines up to PKR 1,000,000.

Cyber security initiatives

Telecom infrastructure is the backbone for digital Pakistan. The successful and continued availability of telecom services and the protection of user personal data is a priority for the PTA. Recognizing the sensitivity and the role of PTA in harnessing challenges of the cyberspace, PTA remains to be a

E-mail addresses for reporting objectionable content to PTA



content-complaint@pta.gov.pk

reportchildporn@pta.gov.pk

complaint@pta.gov.pk

mainstream organization in the drafting of a cyber governance policy and data protection bill. Further to its role in establishing the legal framework for cyber management in Pakistan, PTA has undertaken the following initiatives in the field of cyber security:

Baseline framework for establishing telecom sector CERT

A Computer Emergency Response Team (CERT) is an expert group that handles computer security incidents and performs disaster response operations in case of a cyber-emergency. CERTs are referred to as 'Computer Emergency Readiness Teams' and 'Computer Security Incident Response Teams' (CSIRTs). According to ITU, 56% of governments around the world had established CERTs/CSIRTs by the end of 2018. Keeping in view its importance, a framework for setting up a telecom sector CERT has been prepared by PTA and submitted to the GoP. Salient features include:

- The identification and designation of critical telecom infrastructure and data;
- The formation of a CERT by PTA with the telecom sector as its constituency;
- The issuance of directions to PTA licensees to implement security frameworks/regulations and the setting-up of their internal CERTs;
- Ensuring coordination between the PTA, telecom industry and other national and sectoral CERTs.



It is expected that the PTA CERT will formally start operations in 2020 after fulfilling all procedural and administrative formalities.

Issuance of advisories/alerts

Until the formal launch of the telecom CERT, PTA is actively performing activities normally carried out by a CERT. In this connection, advisories and alerts related to cyber threats are being issued to telecom operators. Messages targeting telecom users to ensure their security are also published on PTA's website. PTA's advisory classifications are shown in the graph.

Snapshot of advisory message published on PTA's website



Cyber threat analysis

Cyber threats are increasing rapidly, especially advanced persistent threats which have affected many industries and organizations globally. These attacks are mostly directed at privileged accounts for various operators. Pakistan’s telecom sector recently witnessed a rise in such attacks. PTA has analysed the root cause of these threats and suggested remedial measures to counter them. It has also worked with the telecom industry to improve the security posture of Pakistan’s telecom industry and proposed several security steps.

PTA has also actively worked with hosting providers to counter attacks on Pakistani websites.

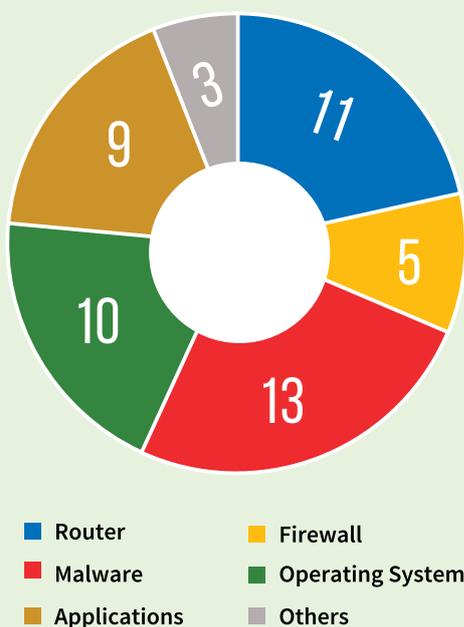
Threat intelligence sharing

PTA has actively collaborated with the industry in threat intelligence sharing. It coordinated with the industry to share details about cyber attacks encountered within networks so that others can also protect their networks based on the intelligence.

Cyber security awareness sessions

PTA is well-aware of the importance of end-user awareness. It, therefore, arranged several sessions on cyber security awareness so that end-users can protect themselves from threats by adopting best practices on passwords, information sharing and social media usage.

Number of advisories issued by PTA



PTA prepared and placed several infographics on its website for the general public. These infographics show easy steps to secure social media usage and personal security. They include information on mobile and password security, and Facebook and WhatsApp security.

As part of its public awareness campaign, PTA supported the Pakistan School on Internet Governance (PKSIG) in Quetta, where PTA’s speakers were deputed to deliver lectures on end-user security.

Deployment of internet exchange points

The Telecom Policy, 2015 mandated PTA to establish Internet Exchange Points (IXPs) in consultation with all stakeholders to lower internet bandwidth costs and improve the quality of internet service due to drastic decrease. Prior to IXP in the latency of locally hosted website traffic, local internet traffic was also going through international bandwidth, causing extra costs and high latency. After the introduction of IXP in Islamabad, the local traffic of participant Internet Service Providers (ISPs) remains local. Therefore, the requirement and cost of additional bandwidth has decreased drastically.

PTA played a lead role in forming consensus amongst all IXP stakeholders. The consultation process began in 2015 with a productive session through the Asia-Pacific Network Information Centre (APNIC) and the Internet Society (ISOC). A series of meetings were conducted amongst all IXP stakeholders and comprised the telecom regulator (PTA), ISPs, mobile phone operators and academia. PTA also arranged

an IXP workshop in Islamabad for the capacity building of ISPs and mobile phone operators. It was conducted by leading resources from ISOC and the Network Start-up Resource Center (NSRC), Mr. Philip Smith and Ms. Jane Coffin, respectively.

As a result of due deliberation, the Higher Education Commission (HEC) was selected as a neutral and independent venue for hosting IXP. With HEC's cooperation, nine operators PTCL, Telenor, Nayatel,



Wateen, Cybernet, WorldCall, Pakistan Education & Research Network (PERN), Multinet and Wi-tribe laid fibre at HEC, Islamabad and exchanged traffic with each other. The aggregate traffic reached 16 Gbps during peak hours without any financial burden on the ISPs.

After successfully launching IXP operations in Islamabad in 2017, PTA coordinated with ISPs in Karachi to terminate their traffic at the neutral location of HEC, Karachi. PTA also arranged capacity building workshops through ISOC for Karachi based IXPs to facilitate the configuration process.

PTA and HEC's efforts led to the second IXP in Pakistan in mid-2019 in Karachi with logistic and technical support from ISOC. Currently, seven ISPs (Cybernet, Multinet, Wateen, Connect, GCS, PERN and Satcomm) have become part of Karachi IXP and several other major ISPs and mobile operators are in the process of joining Karachi IXP, especially PTCL and Telenor. Local traffic and QoS for local websites are expected to improve after these large service providers join the Karachi IXP.

The Pakistan IXP will pave the way for local content and local website hosting, due to high-quality local infrastructure.

Cyber security capacity building

As per ITU's cyber security guidelines, capacity building is one of the most important pillar of cyber security and PTA has arranged several workshops on the topic through leading resources for the benefit of



the telecom industry, government sector, academia and other stakeholders. PTA arranged the following sessions during 2019:

Workshop on SS7 and diameter security through Delta Tech

In collaboration with Delta Tech and Future Technologies, PTA organized a workshop on "SS7 and Diameter Security" for traditional telecom services and 4G services at the National Incubation Centre (NIC), Islamabad to raise security awareness among licensees and relevant stakeholders.

Participants were introduced to strategies and advanced techniques to proactively counter security attacks on the SS7 and diameter protocols, which are used for traditional telecom and 4G services, respectively. The workshop was conducted by Mr. Jimmy Jones from Positive Technologies who possesses considerable technical experience of telecom security tools at the international level.

Workshop on cyber defence essentials

PTA is also pursuing the improvement of local website hosting infrastructure and the local cloud in Pakistan. This will pave the way to storing local data within the country and securing it from external threats.

RapidCompute is a leading local cloud provider. PTA arranged a workshop on local website hosting and cyber defence essentials. The workshop included details of several threats, their countermeasures and comparisons with foreign hosting of critical websites.

Pakistan Telecommunication Authority

05

SEND MONEY

UTILITY BILLS

CNIC TRANSFER

BANK ACCOUNT

WITHDRAWAL

CASH DEPOSIT

Financial
inclusion

Financial inclusion



Enabling financial inclusion in Pakistan

Rapidly developing digital financial technologies via mobile phones provide an opportunity to offer financial services efficiently and at a much lower cost, while providing access to wider segments of society. Over the years, PTA has successfully partnered with the Financial Regulator, Fintechs, Mobile Operators and International Development Agencies to tap this opportunity to improve lives and strengthen development.

With a light touch and progressive regulatory framework, the arrangements between mobile operators and banks have revolutionized the provision of banking services to the unbanked and poor in the country with over 46 million mobile financial accounts (m-wallets) and a network of over 437,182 mobile banking agents. In contrast, there are just 13,692 conventional bank branches.

Currently, there are over 1,309 million annual mobile banking transactions (3.6 million daily transactions) with an annual volume of over PKR 4.5 trillion (PKR 12.3 billion worth of daily transactions), which is encouraging. Mobile operators have played a vital role in this success, which was never foreseen by

the traditional banking sector. Two telco-partnered banks, Mobilink Microfinance Bank (Jazz Cash) and Telenor Microfinance Bank (EasyPaisa) are the main players in the mobile banking market with a 86.5% market share in m-wallet accounts and 68% in active agents at the end of December 2018. PTA's initiative for the biometric verification of SIMs has played a pivotal role in the growth of m-wallets in Pakistan. It allowed the financially excluded population to open m-wallets remotely through USSD channels and BVS devices installed at agent locations.

PTA is an active player in the implementation of the National Financial Inclusion Strategy (NFIS) which was launched by the GoP in 2015. Under NFIS, PTA and SBP are working with stakeholders to launch an integrated platform/interoperable solution. This will allow any person with a basic mobile phone to swiftly open a digital transaction account through a USSD code from anywhere, at any time with any bank from any mobile operator's network. To facilitate the further proliferation of mobile banking in Pakistan, SBP and PTA have also signed a Memorandum of Understanding (MoU) and developed an appropriate regulatory framework for the technical implementation and interoperability of mobile banking. This regulatory framework has ensured facilitation to all existing one-to-one arrangements of mobile operators and banks. Furthermore, PTA

has issued licenses to Fintechs/TPSPs to play a catalyst role to provide technical services for the interoperability of innovative digital solutions for financial inclusion. To this end, PTA has facilitated the technical integration of Mobile Operators, Fintechs and Banks.

The fast proliferation of 3G/4G services, with a current base of 74.3 million mobile broadband subscribers, has also opened up opportunities for advanced digital payments and e-commerce. The enabling regulatory framework and prosperous DFS market in Pakistan have also attracted FDI and international partnerships. For example, Ant Financial Services Group (“Ant Financial”), with its technology in Alipay, the world’s largest digital payment platform, has reached a strategic partnership agreement with Telenor in Pakistan where Ant Financial will invest USD 184.5 million for a 45% stake of Telenor’s EasyPaisa to further develop mobile payment and DFS. Furthermore, Alipay/Ant financial and Telenor have launched an innovative blockchain-based remittance service in Pakistan. Such partnerships will strengthen future digital payment platforms and inclusive financial services to individuals and small business in Pakistan.

Access to financial services is critical for inclusive growth, poverty reduction and women empowerment. However, a considerable portion of the population is still financially excluded. To rectify this, continuous collaborations between Fintechs, Mobile Operators and Banks with ample support and facilitation from the financial and telecom regulators will pave the way for innovative solutions and access to underserved markets in new ways.

NFIS targets by 2023

The GoP launched National Financial Inclusion Strategy (NFIS), 2015 to tackle financial exclusion given that just 16% of the adult population had a bank account. The strategy’s objective was to build momentum and push forward reforms to achieve universal financial inclusion in an integrated and sustained manner. It further aimed at achieving inclusive economic growth through enhanced access to finance and the deposit base, the promotion of Small and Medium Enterprises (SMEs), and easy and affordable access to finance to farmers and other low-income groups. In 2018, GoP has renewed commitments under NFIS and set following

headlines targets to be achieved in 2023: enhancing the usage of digital payments (65 million active digital transaction accounts); enhancing the deposit base (Deposit-to-GDP ratio to 55%); promoting SME finance (extending finance to 700,000 SMEs; 17% of private sector credit); increasing agricultural finance (serving 6 million farmers through digital solutions; enhancing annual disbursement to PKR 1.8 trillion); and enhancing the share of Islamic Banking (25% of the banking industry; increasing Islamic Banking branches to 30% of the banking industry).

It is envisioned under NFIS that the implementation of the five-year plan can translate into the creation of 3 million new jobs and additional exports of USD 5.5 billion through SMEs’ enhanced access to finance. The SBP is the lead agency implementing NFIS. PTA is a member of the NFIS governing council and is working with the SBP to tackle regulatory bottlenecks.

Efforts to promote digital payments in Pakistan

Technological advancements have changed banking dynamics across the world. Digital payments are trending upward in Pakistan, given its high cell-phone penetration, high internet usage, enabling regulations, and multiple branchless banking operators. Currently, the share of e-banking channels, i.e. Real-Time Online Branches (RTOB), ATMs, E-commerce, Internet, Mobile Phones and Call Centres/IVR banking in total transactions processed is 8%. The majority of these transactions are focused on person-to-person (P2P)/P2B/B2P payments. In order to enhance the usage of digital payments to the next level and create a behavioural shift towards DFS adoption, there is a need to develop a digital payments ecosystem along with a range of retail payment services that allow people to make payments digitally from anywhere at any time. Furthermore, the digitalization of government payments and receipts would provide a boost to achieving this objective as currently, 16% of government payments and receipts are digitized.

The list of actions to achieve the headline target of 65 million active digital transaction accounts is given in the table below. It shows specific targets to be met by 2023.

List of actions to enhance usage of digital payments		
Objective	Action	Target by 2023
Digitization of government departments and facilitate Government-to-Person (G2P), P2G, G2B and B2G payments	<p>Government to formulate a strategy for the digitization of all government departments: processes and rules to technically and operationally enable G2P, P2G, G2B and B2G payments.</p> <ul style="list-style-type: none"> • Creation of transformation centre at PM Office • Back-end digitization of Government Departments • Digitalization of government payments and receipts 	100% digitalization of government payments and receipts along with back end automation
Expanding digital access points for improving access to formal financial services	Digitization of Pakistan Post for provision of financial services on fast track basis to leverage its rural distribution network	Digitalization of Pakistan Post and CDNS and double the access points
	Digitization of Central Directorate of National Savings (CDNS) <ul style="list-style-type: none"> • Automation of 163 branches 	
	Development of a Micro-Payment Gateway (MPG) for retail payments in a cost-effective and efficient manner	
Operationalization of Asaan Mobile Account (AMA) Scheme to improve access to digital transaction accounts and drive usage	Devise a strategy for the opening of USSD channels of CMOs for all banks and adopt a market-based pricing structure for USSD sessions	65 million active transactional accounts of which 20 million will be owned by women
	Currently, NADRA is providing 7 data fields on account opening of Branchless Banking (BB) accounts at PKR 10 per request. NADRA may also provide the following additional fields: <ul style="list-style-type: none"> • CNIC issuance date • Father's name to meet Electronic Credit Information Bureau (e-CIB) requirements in case of digital credit 	
	Mandatory interoperability among all type of accounts (conventional as well as branchless banking) for enhancing the access and usage of wallets among masses	
	Design a plan to expand merchant acceptance points	
	Pakistan Television Corporation and Radio Pakistan to run Asaan Mobile Account Scheme media campaign on prime time as public service messages	

Source: State Bank of Pakistan

Various organisations have been tasked by the GoP to achieve these objectives through specific actions and to promote digital banking solutions for the underserved and in hard-to-reach areas through various measures, including tax incentives. These include the Prime Minister's Office, Ministry of Finance,

Controller General of Accounts (CGA), Accountant General Pakistan Revenues (AGPR), FBR, SBP, PTA, Ministry of Postal Services, Central Directorate of National Savings (CDNS), Ministry of Information & Broadcasting, Karandaaz, CMOs and Banks.

Kissan digital portal for agriculture financing

An MoIT&T led committee has been constituted for the Kissan Digital Portal for agriculture financing to implement and execute the project. Provincial IT Boards, Land Record Authorities and the Ministry of National Food Security & Research are committee members. Provincial IT boards will develop an information portal for farmer registration and provincial land authorities will integrate provincial Land Record Management Information Systems (LRMIS) with the information portal. Provincial agriculture departments are mobilizing farmers to register in the portal for various support services, including financial services, government subsidized schemes, agriculture insurance and farm advisory, etc. Banks will facilitate farmer mobilization by providing bank access to the Kissan Digital Portal for approaching potential farmers for agriculture financing, introducing e-loan applications for agriculture loans, and promoting agriculture loan products through the electronic and print media, and mobile text/WhatsApp messages.

AMA scheme implementation

Under the aforementioned NFIS targets, the government has proposed an Asaan Mobile Account (AMA) scheme with the objectives to provide an easy, swift, secure and cost-effective channel for accessing financial services with complete interoperability among operators and FIs. PTA and SBP jointly worked under the regulatory framework of the technical implementation of mobile banking and interoperability, 2016 to achieve the broader objectives of financial inclusion and implementation of the AMA scheme. Currently, interconnection

arrangements among CMOs, TPSPs and banks have been finalized, the scheme is in pilot phase and we expect that AMA scheme will be launched shortly.

Innovation for financial inclusion

The financial inclusion of a huge unbanked population with low levels of digital literacy calls for homegrown solutions to complex issues that recognize local culture, people's trust in banking, and their saving habits. SBP, Ministry of Finance, MoIT&T, PTA and private organizations are making efforts towards innovative local solutions to broaden financial inclusion in the country.

In this regard, the SBP took the lead and launched an Innovation Challenge Facility (ICF) in May 2018 with the aim of developing local solutions for digital financial services and products. This was done by supporting financial service providers, financial technology providers and institutions to develop new, or expand on existing digital financial products, services and delivery platforms, that will improve the access, usage and quality of formal financial services for people living at the bottom of the pyramid. Funding assistance came from the UK Department for International Development (DFID).

Some of the areas in which ICF is working include transactional banking; G2P and P2G payments; development and integration with TPSPs; e-commerce; interoperability; digital lending; supply chain digitization; digitization of microfinance institutions' payments; digitization of international remittances, etc. For the purpose, SBP sought proposals from both FIs and non-financial players, and constituted a comprehensive evaluation mechanism for the proposals received under ICF. A high-profile evaluation committee drawing representation from SBP, PTA, DFID and private sector experts has been constituted to review the proposals. A total of 30 proposals were received as of 30 June, 2019. The committee approved four proposals for grants. These approved proposals are focusing on the supply-chain digitization of corporate and retail payments for supply-chain financing, the development of a cloud-based Branchless Banking (BB) ecosystem, e-commerce platform for farmers, and easy tax filing modules for SMEs. The grantee institutions are beginning implementation of their projects after completing contracting formalities. The supply chain project aims to improve farmers, distributors, and



retailers by digitizing the supply chain. The cloud-based broadband ecosystem will provide an enabling environment for aspiring FIs through an enhanced level of hosting for farmer services. Similarly, the third project is an e-commerce platform which aims to create a fully managed, integrated agriculture e-commerce platform, allowing farmers to buy quality inputs such as fertilizer, pesticides, weedicides, micronutrients, seeds, etc. This marketplace can also be used to rent farm machinery and other seasonal equipment from different vendors. The last project funded under this ICF was to develop easy to use tax filling modules for SMEs to allow the documentation

and construction of financial statements, and hence, gain access to much-needed finances.

Status of DFS in Pakistan

Mobile financial services are picking up in Pakistan, given the government's efforts to prioritize financial inclusion and initiatives taken by respective Government departments/organizations and the private sector.

A significant development has been observed in key financial inclusion indicators through Branchless

Key financial inclusion indicators (calendar year)							
Indicators	2013	2014	2015	2016	2017	2018	2019
No. of BB agents	125,027	204,073	301,823	359,806	405,671	425,199	437,182
No. of active BB agents	100,813	159,500	232,637	210,581	192,741	177,350	189,991
No. of accounts	3,475,458	5,414,655	15,322,171	19,964,900	37,260,215	47,164,779	46,103,017
Deposits as on year end (million PKR)	2,639	6,668	8,827	11,717	21,139	23,678	28,770
No. of transactions during the year (thousands)	191,877	278,353	374,541	478,480	647,615	901,519	1,309,254
Value of transactions during the year (million PKR)	802,697	1,352,516	1,872,452	2,169,541	2,804,008	3,668,811	4,504,780
Average size of transactions (PKR)	4,183	4,859	4,999	4,534	4,260	4,069	3,445
Average daily transactions	525,689	762,611	1,026,140	1,310,905	1,946,100	2,469,915	3,636,814
Average deposit in accounts	759	1,231	576	587	567	502	649
Active accounts	1,607,749	2,333,780	6,241,579	9,799,620	19,259,427	19,785,502	24,529,731

Source: State Bank of Pakistan.

/Mobile Banking in Pakistan. Total deposits and transactions have shown tremendous growth in the last five years where transaction numbers reached 1.3 billion and deposits reached PKR 28.8 billion in 2019. However, the average transaction size and average deposit in accounts do not show great change. The reason could be a trust deficit and usage by end users, but daily average transaction numbers have increased by about 379% in the last five years. This indicates the spread of financial services at the bottom of the pyramid.

Mobile wallet accounts and the number of agents in Pakistan have shown a growth of 751% and 114%, respectively in the last five years. However, the challenge for active mobile accounts is still there as

Pakistan had 46.1 million m-wallet accounts as of December 2019, out of which only 24.5 million (53%) were active accounts.

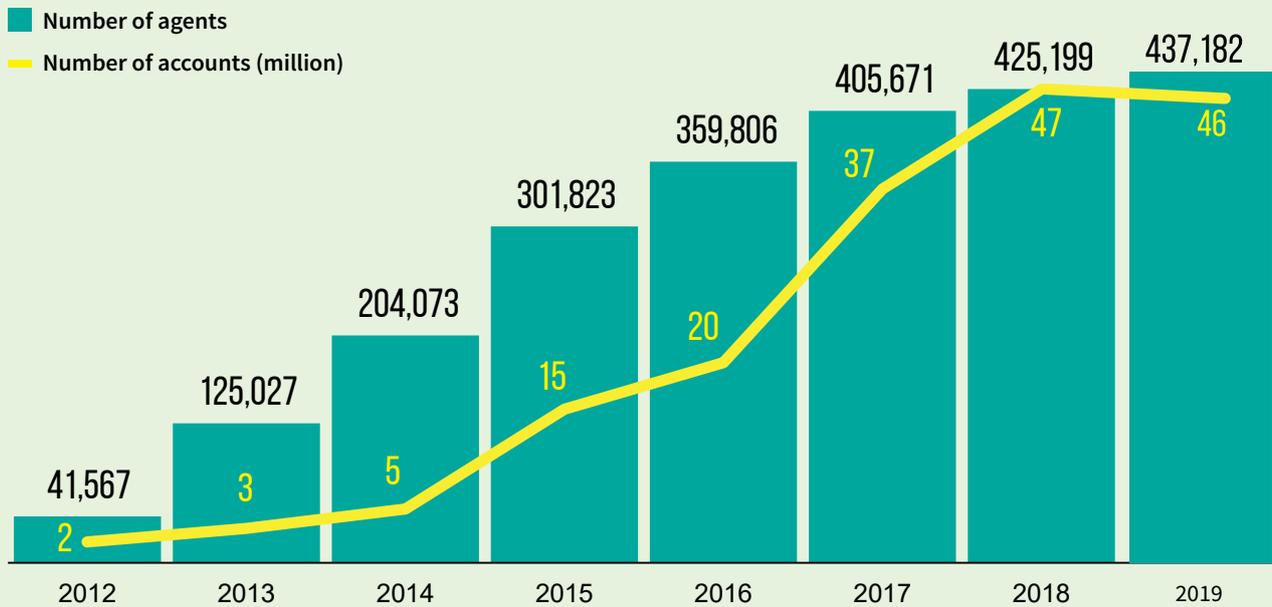
Telenor and Jazz are the leading operators in terms of mobile banking accounts and the total transactions. As of December 2018, about 86.5% of mobile banking accounts were held by the banks owned by these two operators.

The annual volume of m-banking transactions is PKR 4.5 trillion, PKR 12.3 billion worth of daily transactions. CMO partnered banks (Telenor, Askari, Jazz, UMFB) had a 89.7% market share in total transactions through BB and 87% market share in total accounts.

Jazz owns more active accounts (44.6%) than the total account share (34.1%). In terms of transactions, Jazz is the market leader, i.e. it has the largest share (60.3%) of transactions in the market. Jazz is also market leader with a market share of 40.7% in value of

transactions, followed by Telenor (36.2%). Similarly, CMO partnered banks have 82.2% market share of active agents compared to 69% market share of total agents.

Mobile wallet accounts and number of agents*

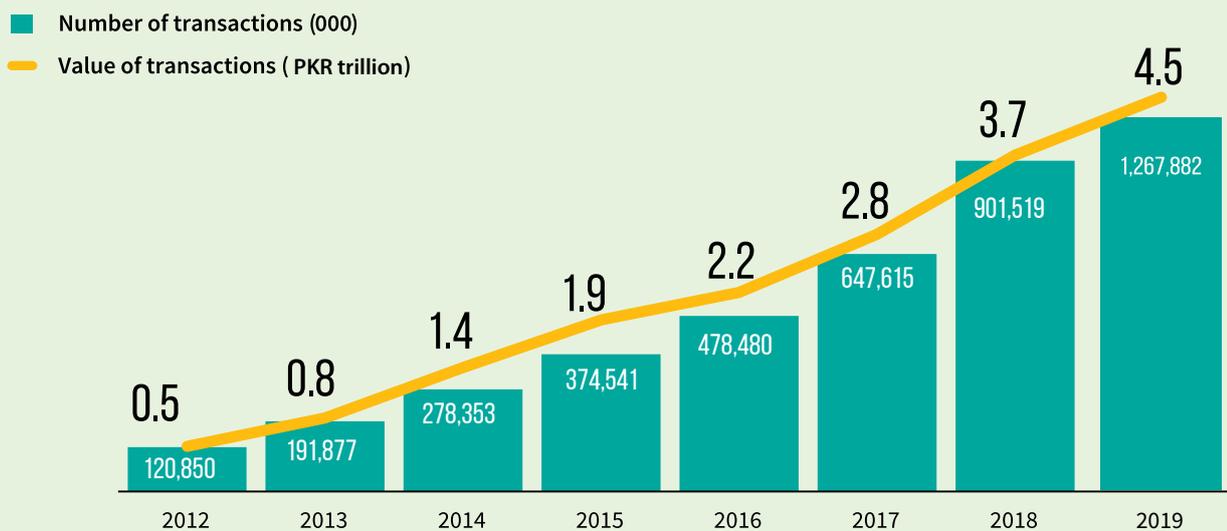


*As of 31st December

Note: Number of accounts slightly declined in 2019 due to closure of dormant / inoperative accounts

Source : State Bank of Pakistan

Number and value of transactions*



*Calendar year

Source : State Bank of Pakistan

06

Future
road map



Future road map



Pakistan's telecom sector has achieved immense success under the continuous patronage of the Government of Pakistan. The successful launch and rapid uptake of mobile broadband services has opened up new arrays of digital services, mobile applications and business opportunities for citizens. As the regulator of the telecom sector, PTA has been actively engaged for promotion and proliferation of digital services in the country. However, there are still gaps and regulatory challenges that need to be addressed in order to transform the social and economic lives of the people of Pakistan. ITU has recognized PTA efforts by declaring it the only regulator in South Asia that has reached the G4 level of ITU's ICT regulatory tracker. (source: ITU's global ICT regulatory outlook report, 2018).

Broadband proliferation and innovations for manufacturing and the facilitation of SMEs are on the top of the agenda of current government which seeks to incentivize linkages between academia, research institutions and industry to improve technology and innovation, and strengthen e-governance in service delivery. PTA will take the government's agenda forward to achieve sustainable growth in the country by creating more skilled manpower and fostering competition in the telecom sector. PTA's regulatory ambit necessitates the implementation of

GoP policies in true letter and spirit. Therefore, PTA is devotedly carrying out responsibilities assigned under the Telecom Policy, 2015 and Digital Pakistan Policy, 2018.

State of the art technology & services-5G

One of PTA's major work areas is the provision of robust, reliable and high-quality telecom infrastructure that serves as the nucleus of ubiquitous connectivity for digital services. PTA strives to expand existing telecom networks and bridge the digital divide and gender gap, particularly in broadband technology across the country. Keeping in view the global transitional phase of yet another generation of mobile communication, PTA has been working vigorously on smooth adoption and up gradation of currently available 4G services to 5G services in Pakistan. In this regard, PTA has started to offer trial permissions to operators to develop, test and try 5G applications. During 5G trials, the networks will be tested for various 5G based use cases. PTA will ensure timely regulatory actions for provision of commercial 5th generation networks based services to consumers in accordance with the policy directions of GoP. PTA will also identify enhanced roll-out and QoS obligations. PTA has established

a working group of telecom service providers, industrial partners, vendors, academia and research institutes for reviewing, analysing & conducting 5G tests and identify various use cases for 5G to achieve the overall vision of connected and smart Pakistan.

Spectrum availability for growing data demands

The mobile data traffic in Pakistan has increased over 400% in last 2 years (1.75 Gb/user/month in 2018 from 0.34 Gb/user/month in 2016) and it is forecasted that Pakistan will experience further growth in data traffic over the next five years. 5G test and trials have already been started in Pakistan and GoP has identified 2600, 3500 MHz and millimeter wave bands for the trial purpose. Between now and 5G commercial launch, operators will be looking for spectrum to support the growth of data traffic as well as to offer faster LTE speeds through available techniques like carrier aggregation. PTA and FAB will adopt more spectrum for IMT advanced services as globally identified for Region-3 by ITU during WRC-19.

Spectrum strategy for Pakistan telecom sector

The spectrum strategy includes plan for existing spectrum allocation audit, terms of re-allocation of existing spectrum to legacy licensees, new spectrum bands to be made available; consequential requirements for spectrum re-farming, spectrum to be auctioned, with an indication of approximate timescales, spectrum to be subject to Administrative Incentive Pricing (AIP); and spectrum to be subject to spectrum trading and/or other market mechanisms and anticipated longer term developments. Keeping in view the above, a spectrum master plan has been prepared covering future roadmap for spectrum allocation as well as spectrum-related policy reviews that are anticipated to take place between 2020 and 2023, which in the future will also be assisting in formulating the 3-year rolling spectrum strategy.

PTA is in the process of preparing a detailed Spectrum Sharing Framework (SSFW). Spectrum trading and sharing enables efficient and economical spectrum use that results in maximizing social and economic benefits derived from the use of this scarce resource. An AIP framework for microwave spectrums for new

and existing assignments is required to be in place. PTA is therefore, preparing a detailed AIP framework with an appropriate charging mechanism for the microwave spectrum that will ensure efficient and economic use of scarce resources as per international best practices.

Spectrum re-farming strategy is also underway in consultation with PEMRA and FAB based upon best international practices. The re-farming strategy will ensure the reassignment of frequencies to uses with greater social and commercial benefits that are attainable from the prevailing assignment of those frequencies. Spectrum to be re-farmed will be identified in the rolling spectrum strategy.

From passive to active infrastructure sharing

In order to mitigate the delays incurred in procuring rights of way for new infrastructure, implement cost savings, and reducing environmental impact, in the telecoms industry, there is a strong requirement of passive and active infrastructure sharing. Under the infrastructure sharing regime; all licensees may share infrastructure on mutually agreed commercial terms and licensees with significant market power in a relevant market are obliged to share infrastructure on fair and non-discriminatory terms where practical. Infrastructure sharing involves mutualizing part of the infrastructure of a mobile network between two or more mobile operators. However, Infrastructure sharing (passive and active) will be provided based on the regulations and guidelines established by PTA, in consultation with Federal Government (MoIT&T), on the principles of neutrality, non-discrimination and equal access. The guidelines will take account of established international best practices.

Automated system for measuring QoS

Provision of the best QoS to end consumer always remain high on PTA agenda and efforts will continue in coming years. PTA will acquire latest state of the art monitoring equipment which will not only enable PTA to conduct simultaneous surveys across the country but also help to gauge the services based upon latest technologies like LTE, VoLTE and 5G.



Managing cyber space and local content

The proliferation of the internet and digital services also triggers new kinds of challenges to the regulator in the form of cyber security, data protection, hate speech, unlawful content, etc. PTA carries out cyber vigilance and actively pursues blocking and removing of online content which is unlawful under the Prevention of Electronic Crimes Act. However, it requires educating the society and creating awareness about internet usage. Educational institutions can play important role in this regard. PTA has planned seminars and workshops to create awareness in addition to developing a curriculum for internet education. Awareness of the general public will continue through the print and electronic media. PTA is also in process of deploying technical solutions to identify and block unlawful content at a faster pace. Currently, PTA is facing difficulties with social media platforms for the blocking of objectionable content. Social media platforms are entertaining PTA requests to block content in accordance with their own community guidelines. To improve working arrangement with social media and create realization of Pakistani Laws, PTA intends to engage them through Memorandum of Understanding (MoU). Efforts will be made to incorporate the provisions in their artificial intelligence systems so that adequate cooperation is extended by these social media platforms.

Establishing call center to serve consumers

The facilitation of telecom consumers is regulator's prime responsibility and PTA continues to upgrade its complaint management system to manage increasing number of complaints. Currently, PTA receives complaints via e-mails, calls, SMSs & social media and now plans to establish consumer relationship management services (Call Centre Services) to ease complaint registration. The project is expected to enhance consumer service and efficiency through the use of call center, ticketing/case management system with well defined escalation path. It will provide a common point of origin for all service requests. The project will also redesign business processes wherever deems necessary. The call center will be commercially ready for provision of professional services by February 2020.

Taking a rationalized approach to telecom sector taxes

PTA is of the view that Pakistan's ICT sector is overburdened with taxes that need to be rationalized. It will continue to engage with revenue authorities for tax rationalization in the ICT and telecom sector to encourage further investment and job opportunities. The constituents of the fourth industrial revolution such as artificial intelligence, the Internet of Things, blockchains and big data

hold the key to a prosperous digital future. However, impediments like non-availability of latest technology and networks can be removed only through increased investments from financial comfort of operators. High taxes on operators as well as consumers are therefore required to be brought down for not only increased investments but also to increase the usage of telecom services in the country.

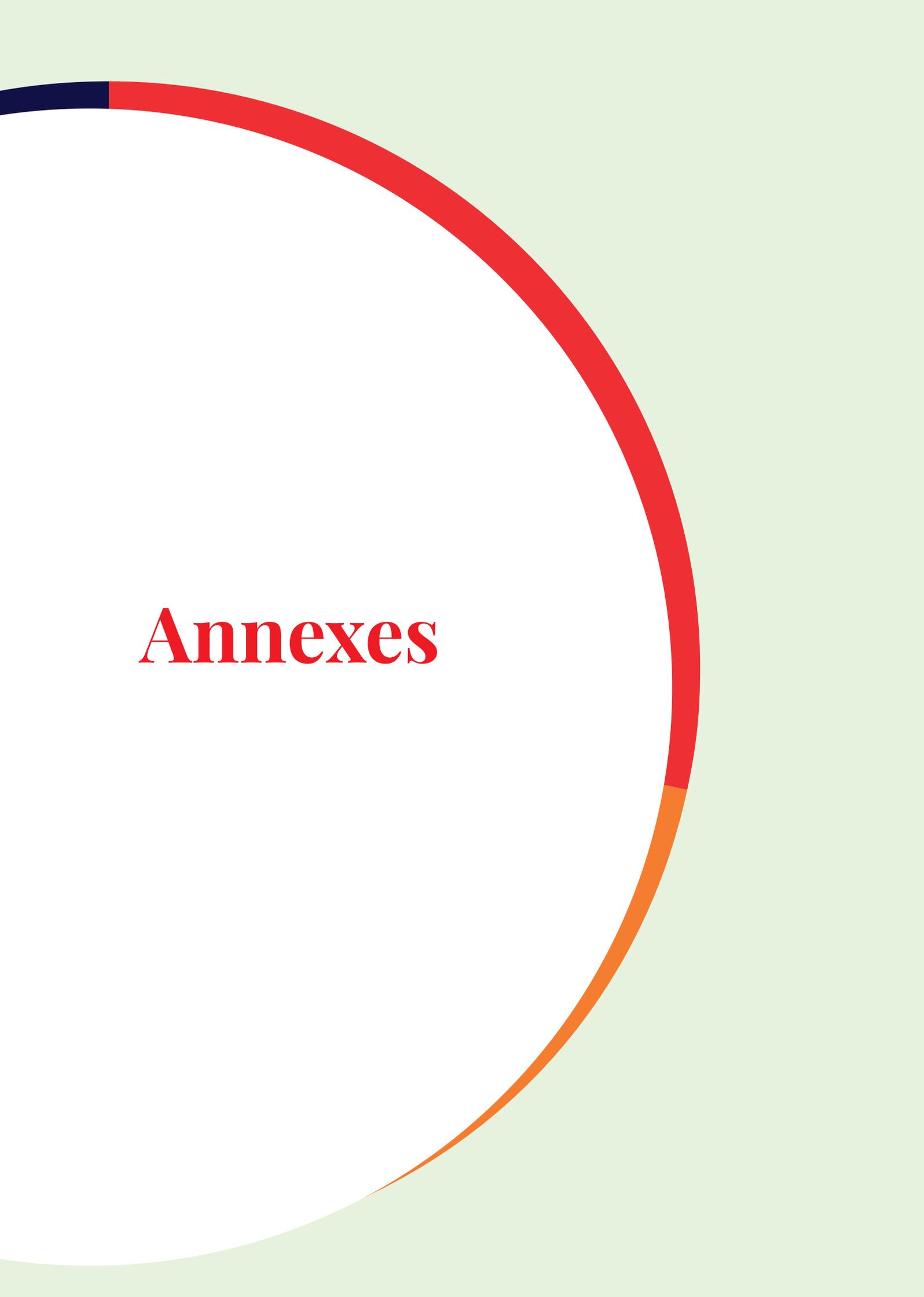
Capacity building

The shortage of skilled manpower is a major constraint to the ICT sector's growth in Pakistan. Collaboration with leading universities is on the agenda so that the gap can be filled with the availability of skilled manpower in the domestic market. Furthermore, it is imperative to develop amicable professional relationships with global institutions like ITU, CTO, SAMENA and regional think tanks like APT, SATRC and GSMA to gain knowledge and share experiences through collaborations. PTA has geared up to host major international events in the coming years that will not only project our success of the telecom sector to the international community, but also pave the way to exchange of knowledge. With the changing trends and emerging technologies, it is essential for the regulator to expand its team to cater to the evolving market and keep the employees abreast of technological changes and advancements. We have, therefore, evolved a cutting-edge HR intensive strategy that aims to hire additional key resources to fulfill the increasing internal requirement of

manpower which will help cater to the sector's ever growing demands. Capacity building is also the prime focus of the organization, where HR at all levels are trained on the latest technological trends, both in-house training and outsourced programs. Training plans for the entire organization are made based on personal / professional requirements, keeping in view needs of the organization.

ITU G5: The 5th generation collaborative regulations

After G4-Integrated Regulations, ITU has developed the concepts of "Collaborative Regulation" and "G5-the 5th Generation Regulation". The G5 benchmark identifies policy and implementation shortcomings in pursuit of Sustainable Development Goals (SDGs), and points to how collaborative regulation can remedy them. While working on collaborative regulations there is a need to define the foundation, platforms and mechanisms for working with other sector regulators. The 5th generation regulations will help to unlock investment that supports innovation, job creation and digital transformation. PTA is poised to play its role in digital transformation of Pakistan by virtue of introducing supportive regulations for the proliferation of new technologies like IoT and 5G in different verticals like agriculture, education, transportation, industries, environment, health, etc.



Annexes

**PAKISTAN TELECOMMUNICATION AUTHORITY
INCOME AND EXPENDITURE STATEMENT
FOR THE YEAR ENDED JUNE 30, 2019**

	Note	2019 Rupees	2018 Rupees
Revenue	20	12,768,441,051	30,920,956,185
Expenditure			
General and administrative expenses	21	1,672,731,041	1,048,970,949
provision for doubtful fee receivable/ (Reversal of provision)	15.3	49,050,496	(596,207,587)
Audit fee		840,000	800,000
Financial charges		8,744	6,973
		(1,722,630,281)	(453,570,335)
		11,045,810,770	30,467,385,850
Other income	22	1,535,051,457	1,750,469,661
Provision for tax refund due from government	18	(5,636,596,438)	-
Surplus for the year before taxation		6,944,265,789	32,217,855,511
Less: Provision for taxation	23	(1,356,123,619)	(8,158,980,659)
Net surplus for the year transferred to due to Federal Consolidated Fund		5,588,142,170	24,058,874,852

The annexed notes 1 to 26 form an integral part of these financial statements.

**PAKISTAN TELECOMMUNICATION AUTHORITY
STATEMENT OF CASH FLOWS
FOR THE YEAR ENDED JUNE 30, 2019**

	Note	2019 Rupees	2018 Rupees
CASH FLOWS FROM OPERATING ACTIVITIES			
Surplus for the year before taxation		6,944,265,789	32,217,855,511
Adjustments for:			
Depreciation	12	46,609,737	31,872,570
Amortization of Intangible Asset		653,727	-
Provision/(reversal of provision) for			
- accumulating compensated absences		1,477,611	876,636
- employee's gratuity scheme obligation		122,559,974	72,098,867
- pension obligation		102,647,343	13,895,079
- post-retirement medical benefit		144,520,014	36,879,560
- doubtful fee receivable	15.3	49,050,496	(596,207,587)
Profit on bank deposits	22	(291,583,437)	(646,271,353)
Markup on NGMS license	22	(1,205,329,203)	(1,079,524,773)
Gain on sale of property and equipment	22	(20,857,594)	(8,626,194)
		5,894,014,457	30,042,848,316
Changes in working capital			
Decrease/(Increase) in current assets			
Fees receivable		(26,015,699)	610,854,860
Advances, deposits, prepayments and other receivable		4,236,676	(2,254,657)
Receivable from operators on behalf of AJK and GB Council		7,560,630	(7,560,630)
Increase/(decrease) in current liabilities			
Unearned revenue		-	1,022,000,000
Accrued and other liabilities		254,852,058	(186,313,378)
Payable to AJK & GB Council		63,725,453	84,009,651
		304,359,118	1,520,735,846
Cash generated from operations		6,198,373,575	31,563,584,162
Contributory provident fund payable		48,786,119	51,992,475
Long-term payable to AJK and GB Council		6,214,438	(46,195,437)
Loans and advances		(36,321,495)	(1,296,772)
Income taxes paid		(2,005,113,131)	(12,129,340,310)
Accumulating compensated absences encashed		(1,477,611)	(33,200,714)
Gratuity, pension and post-retirement medical benefits paid		(75,626,697)	(12,905,042)
Net cash generated from operating activities		4,134,835,198	19,392,638,362
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchases of property and equipment		(62,199,872)	(94,780,396)
Purchases of Intangibles		(4,190,235)	-
Profit on bank deposits received		608,915,154	466,123,066
Markup on ISF of NGMS License received		1,039,396,972	1,055,093,436
Proceeds from sale of property and equipment		21,071,119	8,647,199
Net cash generated from investing activities		1,602,993,138	1,435,083,305
CASH FLOWS FROM FINANCING ACTIVITIES			
Contribution to Federal Consolidated Fund (FCF):			
- Payment made to Frequency Allocation Board		(764,111,202)	(761,608,964)
- Transfers made to FCF		(17,377,627,628)	(14,900,592,604)
- Federal excise duty paid / adjusted during the year		-	(2,230,082,150)
- Balance transferred to FCF from Puplic account		(808,991,324)	-
Movement in Public Account		6,506,794,246	186,403,019
Net cash used in financing activities		(12,443,935,908)	(17,705,880,699)
Net (decrease)/ increase in cash and cash equivalents		(6,706,107,572)	3,121,840,968
Cash and cash equivalents at beginning of the year		10,815,113,405	7,693,272,437
Cash and cash equivalents at end of the year	19	4,109,005,833	10,815,113,405

The annexed notes 1 to 26 form an integral part of these financial statements.

Annex 2: Total telecom revenue (million PKR)

Year	2015-16	2016-17	2017-18 (R)	2018-19 (E)
CMO	345,537	367,530	382,410	445,652
FLL, WLL and CVAS	81,400	78,439	75,382	73,837
LDI	32,309	29,969	31,016	32,428
Total	459,246	475,938	488,808	551,916

Estimated figures based on three quarters' growth

Annex 3: Telecom investment (million USD)

Year	2015-16	2016-17	2017-18 (R)	2018-19 (E)
Cellular	656.1	801.9	568.1	406.1
LDI	8.9	16.6	24.6	18.2
LL	54.0	153.2	199.9	210.9
Total	719.0	971.7	792.6	635.3

Annex 4: Foreign direct investment (million USD)

Financial year	Description	Telecommunications
2014-15	Inflow	948.0
	Outflow	882.2
	Net FDI	65.7
2015-16	Inflow	377.9
	Outflow	131.1
	Net FDI	246.8
2016-17	Inflow	116.6
	Outflow	207.4
	Net FDI	-90.8
2017-18 (R)	Inflow	288.5
	Outflow	188.4
	Net FDI	100.1
2018-19 (P)	Inflow	235.5
	Outflow	331.1
	Net FDI	-77.6

R = Revised E = Estimate P = Provisional

Source: State Bank of Pakistan

Annex 5: Telecom contribution to the exchequer (billion PKR)

Period	GST	PTA deposits	Others	Total
2014–15	45.77	7.0	73.49	126.26
2015–16	44.25	34.11	81.82	160.18
2016–17	46.20	33.13	82.10	161.43
2017–18 (R)	48.18	10.10	85.00	143.28
2018–19 (E)	26.29	17.38	52.09	95.76

Annex 6: Cellular mobile subscribers

Year	PMCL (Jazz)	PTML (Ufone)	CMPak (Zong)	Telenor	Warid	Total
2013–14	38,768,346	24,352,717	27,197,048	36,571,820	13,084,823	139,974,754
2014–15	33,424,268	17,809,315	22,102,968	31,491,263	9,830,620	114,658,434
2015–16	39,118,521	19,833,670	25,251,329	38,020,771	11,017,174	133,241,465
2016–17	52,470,638	18,397,981	28,084,677	40,804,820	-	139,758,116
2017–18	55,469,118	20,314,686	30,890,633	43,564,216	-	150,238,653
2018–19	59,470,721	22,616,449	34,713,311	44,221,147	-	161,021,628

R = Revised E = Estimate

Note: Warid merged with PMCL (Mobilink) under the name, PMCL (Jazz).

Annex 7: NGMS (WCDMA/HSPA & LTE etc.) subscribers

Operator	CMPak (Zong)		PMCL (Jazz)		Telenor		PTML (Ufone)		Warid	Total
	3G	4G/LTE	3G	4G/LTE	3G	4G/LTE	3G	4G/LTE	LTE	
2013–14	417,814	-	425,992	-	895	-	539,376	-	-	1,384,077
2014–15	2,898,094	105,128	3,656,345	-	4,162,616	-	2,570,283	-	106,211	13,498,677
2015–16	5,988,197	680,620	8,919,218	-	8,371,991	-	5,223,096	-	347,132	29,530,254
2017–18	9,267,411	7,353,105	14,830,050	4,376,394	10,511,774	3,115,119	6,630,766	-	-	56,084,619
2018–19	8,513,297	12,658,298	13,105,991	11,116,722	8,174,090	6,461,948	7,015,450	1,886,342	-	68,932,138

LTE = Long-term evolution, NGMS = Next generation mobile services

Annex 8: Broadband subscribers by technology

Technology	Mobile BB	DSL	EvDO	WiMax	HFC	FTTH	3G, 4G, LTE (fixed)	Total
2013–14	1,384,077	1,352,057	1,861,118	530,889	37,011	14,848	-	5,180,000
2014–15	13,498,677	1,352,886	1,349,843	488,990	43,220	19,180	-	16,752,796
2015–16	29,530,254	1,353,723	1,084,367	183,181	43,167	25,665	-	32,220,357
2016–17	42,084,032	1,532,852	706,763	162,953	51,077	49,056	-	44,586,733
2017–18	56,084,619	1,590,623	410,859	100,967	61,479	67,716	23,551	58,339,814
2018–19	68,932,138	1,614,418	256,816	252,912	54,854	102,370	28,440	71,241,948

BB = Broadband, DSL = Digital subscriber line, EvDO = Evolution-data optimized, WiMax = Worldwide interoperability for microwave access, HFC = Hybrid fibre-coaxial, FTTH = Fibre to the home, LTE = Long-term evolution

Annex 9: Fixed local loop subscribers

Year	PTCL	NTC	Nayatel	WorldCall	Multinet	Wise Com	Total
2015-16	2,658,538	114,772	47,112	1,977	0	795	2,823,194
2016-17	2,457,949	114,772	55,378	955	13,154	785	2,642,993
2017-18	2,375,509	116,333	60,742	3	15,207	765	2,568,559
2018-19 (P)	2,301,881	156,285	57,669	3	20,719	765	2,537,322

P= Provisional

Annex 10: Local assembly manufacturing /players for telecom devices in Pakistan and AJK				
S. no.	Local assembly players	Brand	Address	Operational status
1	GFive Pvt. Ltd	Gfive	T-22/A, New Industrial Area, Mirpur, AJK	Operational
2	Foxxcom Pvt. Ltd	Calme, Kenxinda	22-km, Ferozpur Road, Gajumata Stop, Rohinala, Near Nadir Chowk, Lahore	Operational
3	Sanmeng Tech Pvt Ltd	Sanmeng	17, Lawrence Road, Lahore	Operational
4	JW Tech Pvt. Ltd	Haier	Office no. 301, Mega Tower, Main Boulevard, Gulberg II, Lahore	Not operational
5	Digicom Trading (Pvt) Ltd	Qmobile	Suite no. 302, third floor, The Forum, Clifton, Karachi	Not operational
6	Mobo Mobiles Pvt. Ltd	Mobo, Kechaoda	Mansoor Arcade, 3 Temple Road, Lahore (updated)	Operational
7	United Communications	Voice	Plot no. 2,190/A, Pir Elahi Bux Colony, Karachi	Not operational
8	Ophone	Ophone	29, Main Hall Road, Lahore	Not operational
9	Club International Pvt. Ltd	Club	Ahmed Mansion 1, Hall Road, Lahore	Operational
10	Mobi Wind Technology Pvt. Ltd	Itel and Mobiphone	Office no. 26, Sherjeet Building, Mecload Road, Lahore	Operational
11	SSH Telecom Pvt. Ltd	Vgo Tel	Plot no. ST 4/1, Sector 23, Korangi Industrial Area, Karachi	Operational
12	Biz Master Trading (Pvt) Ltd	Qmobile	Dehri Watan check post, Deayar Hashim, Sukasin, district/tehsil Bhimber, AJK	Operational
13	Qingdao Tech Pvt. Ltd	Haier	78-D/1, eighth floor, Ashiana Shopping Centre, Main Boulevard, Gulberg-III, Near Liberty Chowk, Lahore	Not operational
14	M/s Smart Link Technologies	Xiaomi	Building no. 91, Block A, Opposite Model Town Park, Lahore	Operational
15	Three Biz Telecom	Me-Mobile	G1, Akhtar Plaza, Saddar, Rawalpindi	Operational
16	Trevor Trading Pvt Ltd	QMobile	232-A/232-B, Old Industrial Area, Mirpur, AJK	Operational
17	Winfirst Pvt Ltd	Calme, Kenxinda	Plot no. T-27, New Industrial Area, Mirpur, AJK	Operational
18	Obsession Communication (Pvt.) Ltd	IPro	Industrial Area Hadbast Mouza, They Panju, Near Allah-ho Chowk, Pull Rohi Nala, Opposite Aurora Factory, Lahore	Not operational
19	Deploy Pvt. Ltd	XCell	46-C, second floor, 11th Street, Jami Commercial, DHA Phase VII, Karachi	Not operational
20	Bellco Trading Company Pvt. Ltd	E-tachi	Khewat no. 25 (844 and 1,649), Khatooni no. 373-374, 1,111-2,048, Khasra no. 605/1, Main Mouza, Raiwind, Lahore	Operational
21	Innovation Gresso (Pvt.) Ltd.	Gresso	Plot no. 83/A, Sector E-4, Mirpur, AJK	Operational
22	Pole Communication (Pvt.) Ltd.	Hello Tech	Water Land Park Road, Saggian Bypass Road, Nain Sukh, Lahore	Operational
23	Transsion Tecno (Pvt.) Ltd.	Infinix	Plot no. 36, Sector 24, Korangi Industrial Area, Karachi	Not operational
24	New Rabia Enterprises	Sonic and IPro	440, Star City Mall, fourth floor, Agha Khan-III Road, Saddar, Karachi	Not operational
25	Dignified Technology (Pvt.) Ltd	QQMEE	Plot no. 3A, sector F/3, part 3, Mirpur, AJK	Not operational
26	Infotech Trading (Pvt.) Ltd	Qmobile	New Industrial Area, Mirpur, AJK	Not operational
27	Rawdas (Pvt). Ltd	-	Plot # 13 E, Sector D/3, Allama Iqbal Road, Mirpur AJK, Pakistan	Operational

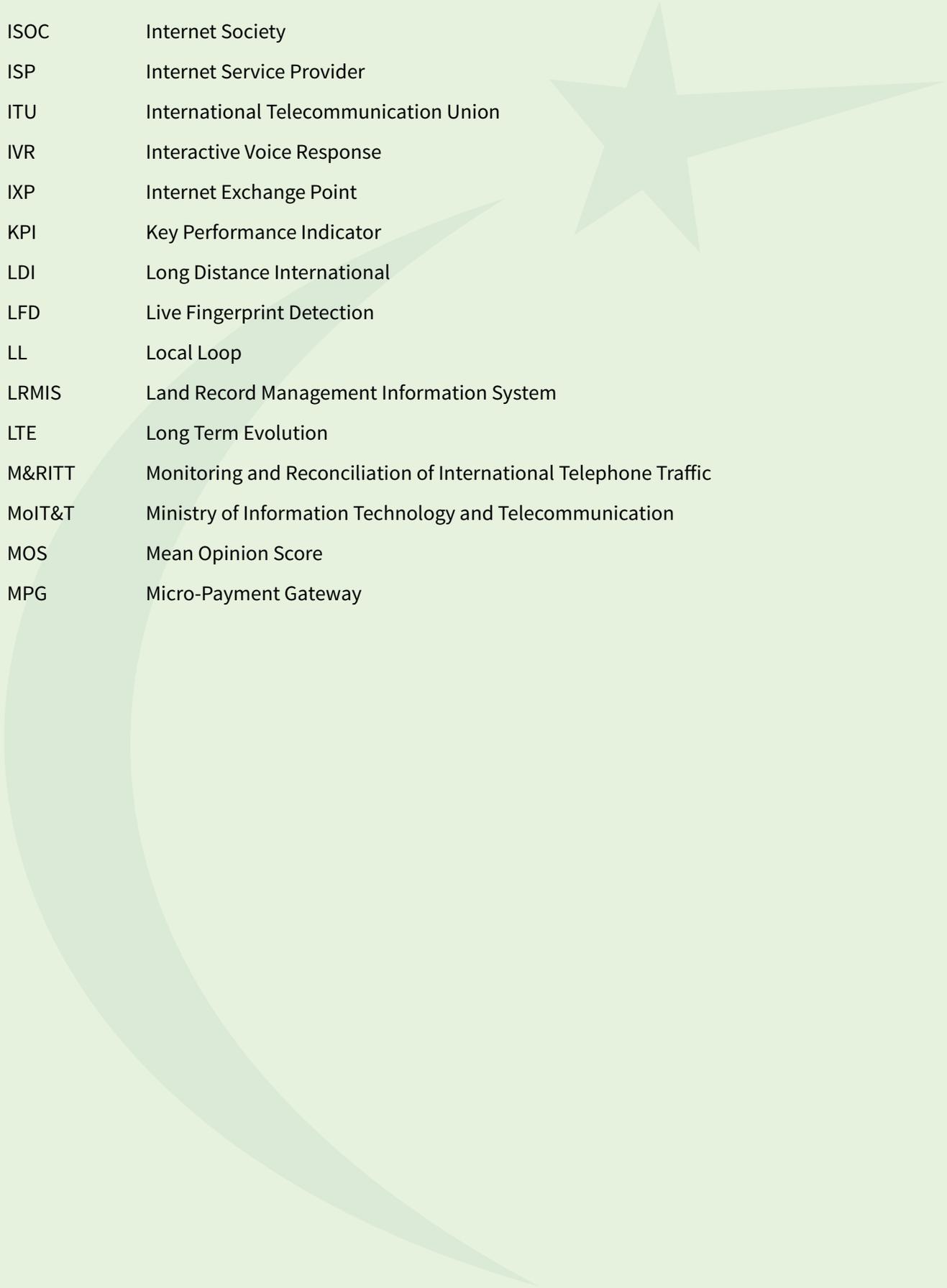
Acronyms and Abbreviations



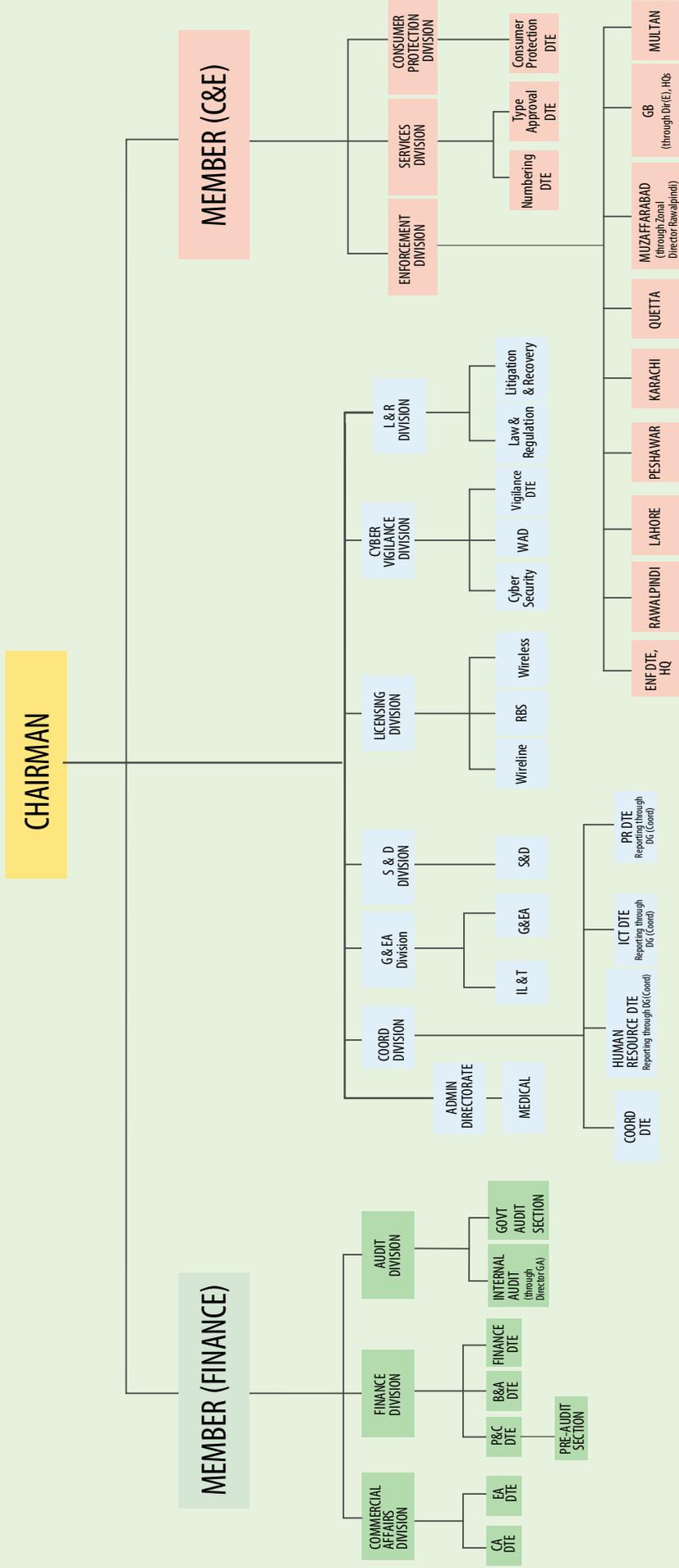
3GPP	3rd Generation Partnership Project
3GPP2	3rd Generation Partnership Project 2
4G	Fourth Generation of Mobile Technology
5G	Fifth Generation of Mobile Technology
AGPR	Accountant General Pakistan Revenues
AIP	Administrative Incentive Pricing
AJK	Azad Jammu and Kashmir
AMA	Asaan Mobile Account
APNIC	Asia-Pacific Network Information Centre
APT	Asia-Pacific Telecommunity
BB	Branchless Banking
BISP	Benazir Income Support Programme
BVS	Biometric Verification System
CACF	Central Asian Cellular Forum
CDNS	Central Directorate of National Savings
CERT	Computer Emergency Response Team
CGA	Controller General of Accounts
CGPC	Cyber Governance Policy Committee
CII	Critical Information Infrastructure
CLDP	Commercial Law Development Program (USA)
CMO	Cellular Mobile Operator
CMPak	China Mobile Pakistan
CMS	Complaint Management System
CNIC	Computerized National Identity Card
CoC	Certificate of Compliance
CoE	Centre of Excellence
CPD	Consumer Protection Directorate
CPDP	Commission for Personal Data Protection
CPEC	China-Pakistan Economic Corridor
CSIRT	Computer Security Incident Response Team
CTO	Commonwealth Telecommunications Organisation
CVAS	Class Value Added Services
DFID	Department for International Development (UK)

DFS	Digital Financial Services
DIRBS	Device Identification Registration and Blocking System
DNS	Domain Name System
DPLC	Domestic Private Leased Circuit
DSL	Digital Subscriber Line
DXX	Digital Cross Connect
e-CIB	Electronic Credit Information Bureau
ECP	Election Commission of Pakistan
EDGE	Enhanced Data GSM Environment
ETSI	European Telecommunications Standards Institute
EvDO	Evolution-Data Optimized
FAB	Frequency Allocation Board
FBR	Federal Board of Revenue
FDI	Foreign Direct Investment
FED	Federal Excise Duty
FI	Financial Institution
FLL	Fixed Local Loop
FTTH	Fibre -to-the-Home
FY	Fiscal Year
G2P	Government-to-Person
GB	Gilgit-Baltistan
GDPR	General Data Protection Regulation
GoP	Government of Pakistan
GPON	Gigabit Passive Optical Network
GPRS	General Packet Radio Service
GSMA	GSM Association
GST	General Sales Tax
HEC	Higher Education Commission
HFC	Hybrid Fibre-Coaxial
HSPA	High-Speed Packet Access
ICANN	Internet Corporation for Assigned Names and Numbers
ICF	Innovation Challenge Facility
ICT	Information and Communications Technology
IEEE	Institute of Electrical and Electronics Engineers
IMEI	International Mobile Equipment Identity

IMF	International Monetary Fund
IP	Internet Protocol
ISOC	Internet Society
ISP	Internet Service Provider
ITU	International Telecommunication Union
IVR	Interactive Voice Response
IXP	Internet Exchange Point
KPI	Key Performance Indicator
LDI	Long Distance International
LFD	Live Fingerprint Detection
LL	Local Loop
LRMIS	Land Record Management Information System
LTE	Long Term Evolution
M&RITT	Monitoring and Reconciliation of International Telephone Traffic
MoIT&T	Ministry of Information Technology and Telecommunication
MOS	Mean Opinion Score
MPG	Micro-Payment Gateway



PTA Organogram



C&E : Compliance & enforcement
Coord : Coordination
CA : Commercial affairs
DTE : Directorate
DG : Director general
EA : Economic affairs
Enf : Enforcement
GA : Government audit
G&EA : Government & external affairs
ILT : International liaison & training
RBS : Radio based services
S&D : Strategy & development



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