PTA | Pakistan Telecommunication Authority

ANNUAL REPORT 2022

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Pakistan Telecommunication Authority

The Pakistan Telecommunication Authority has been steering Pakistan's telecommunication sector since 1996, introducing meaningful policy interventions to bring it at par with evolving global standards.

PTA's Vision

"Create a fair regulatory regime to promote investment, encourage competition, protect consumer interests, and ensure high-quality ICT services."

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Acronyms

A4AI	Alliance for Affordable Internet
AAAs	Annual Audited Accounts
AJ&K	Azad Jammu and Kashmir
AMA	Asaan Mobile Account
App	Application
ARPU	Average Revenue Per User
ARDs	Annual Regulatory Dues
BTS	Base Transceiver Stations
CapEx	Capital Expenditure
CBU	Completely Built Unit
CDN	Content Delivery Network
CDNS	Central Domain Name System
CERT	Computer Emergency Readiness Team
CMO	Cellular Mobile Operator
CMS	Complaint Management System
CSC	Consumer Support Center
CTDISR	Critical Telecom Data and Infrastructure Security Regulations
DIRBS	Device Identification, Registration, and Blocking System
DCO	Digital Cooperation Organization

ETSI	European Telecommunications Standards Institute
FAB	Frequency Allocation Board
FCF	Federal Consolidated Fund
FED	Federal Excise Duty
FLL	Fixed Local Loop
FTTH	Fiber-To-The-Home
FTTT	Fiber-To-The-Tower
G5	5th Generation
GB	Gilgit-Baltistan
GNI	Gross National Income
GoP	Government of Pakistan
GSMA	Global System for Mobile Communications Association
GST	General Sales Tax
ICT	Information and Communication Technology
IETF	Internet Engineering Task Force
IMT	International Mobile Telecommunication
IoT	Internet of Things
IP	Internet Protocol
IPv6	Internet Protocol version 6

ISP	Internet Service Provider	**OGRA**	Oil and Gas Regulatory Authority
ITU	International Telecommunication Union	**OPEX**	Operating Expenses
IXPs	Internet Exchange Points	**P2C**	Partner2Connect
KP	Khyber Pakhtunkhwa	**PCP**	Pakistan Citizen's Portal
KPIs	Key Performance Indicators	**PSEB**	Pakistan Software Export Board
LDI	Long Distance and International	**PTA**	Pakistan Telecommunication Authority
LPWAN	Low Power Wide Area Network	**QoS**	Quality of Service
LSDS	Lost/Stolen Device System	**RBS**	Radio-Based Services
LTE	Long-Term Evolution	**RBT**	Ring-Back Tone
MDM	Mobile Device Manufacturing	**RoW**	Right of Way
MISTT	Mobile Internet Skills Training Toolkit	**SATRC**	South Asian Telecommunication Regulators' Council
MoITT	Ministry of Information Technology and Telecommunications	**SBP**	State Bank of Pakistan
MoU	Memorandum of Understanding	**SM**	Social Media
NEPRA	National Electric Power Regulatory Authority	**SOC**	Security Operations Center
NFIS	National Financial Inclusion Strategy	**USSD**	Unstructured Supplementary Service Data
NGMS	Next Generation Mobile Services	**VAS**	Value-Added Services
NHA	National Highway Authority	**WLL**	Wireless Local Loop
NH&MP	National Highways and Motorway Police	**WSIS**	World Summit on Information Society
NPS	Network Performance Score	**WTDC**	World Telecom Development Conference
OFC	Optical Fiber Cable		

The Authority

Maj Gen Amir Azeem Bajwa (R) HI (M)
Chairman PTA

Mr. Muhammad Naveed
Member—Finance

Dr. Khawar Siddique Khokhar
Member—Compliance and Enforcement

Chairman's Message

The opportunities unveiled in the last couple of years for Information and Communication Technologies (ICTs) as the backbone of all economic activity, have been impacted by the Covid-19 pandemic and global economic and financial crises. The narrowed down coverage gap that the world has lately been experiencing is overshadowed by usage gap, which is not growing correspondingly at the same pace as coverage gap. In a bid to achieve the Sustainable Development Goals (SDGs), world leaders are redefining meaningful and universal connectivity through mobile broadband (4G and 5G), fixed broadband, and infrastructure sharing. Amid economic crisis, investments need to be spurred for inclusion of the excluded, resilience of the infrastructure, and adaptation to digital trends that will result in upgrade and expansion of the digital infrastructure, universal connectivity, onboarding of disadvantaged communities, uninterrupted power provision, industry profitability, attention to affordability, and stable policies. Middle mile connectivity is taking centerstage as the role of Internet Exchange Points (IXPs), data centers, and cloud computing has come into play for Internet-of-Things (IoT) services being rolled out under the 4th industrial revolution. Regulators now need to focus on improving connectivity and usage, and keep pace with rapid technological advancements.

It is my privilege to share that Pakistan has over 197 million telecom subscribers (fixed and mobile), with teledensity touching 90%. The country has 124 million broadband subscribers, with 56% penetration and usage patterns of 6.8 GB per subscriber, per month. Navigating through constraints such as inflation, currency devaluation, increased telecom taxes, import restriction, power crisis, petroleum price hikes, and non-industrial tariffs, the telecom sector has shown great resilience and still posted growth, but with rising concerns for sustaining industry profitability and investments on network expansion. During Financial Year (FY) 2021-22, the telecom sector generated record revenues of PKR 694 billion. The sector substantially contributed PKR 325.2 billion to the national exchequer, of which PKR 223 billion were in the form of taxes and the remaining PKR 102.5 billion were proceeds from Next Generation Mobile Services (NGMS) auction (PKR 30 billion) and license renewals (PKR 72 billion).

I take pride in sharing that Pakistan has leapt to an 'Advanced' level of 5th Generation (G5) regulator in the International Telecommunication Union's 2022 regulators' ranking. Moreover, the Global System for Mobile Communications Association (GSMA) has rated Pakistan as an 'emerging' telecom market—a recognition that owes itself to multiple interventions. To begin with, we introduced the Short-Range Devices (SRDs) and IoT Framework under which licenses for provision of IoT (Low Power Wide Area Network—LPWAN) services have been awarded. A massive spectrum rationalization exercise was carried out during the year under review, leading to improved spectrum efficiency that has positively impacted consumer experience. For the first time in Pakistan's history, the import volume of mobile handsets registered a decline as most of the local demand was met through indigenously manufactured products, reflecting a huge shift in consumer behaviour. Pakistan manufactured a whopping 7.24 million smartphones, resulting in the creation of skilled jobs for over 26,000 people. International Social Media (SM) platforms such as Bigo, Snack Video, and Mico were registered by the Pakistan Telecommunication Authority (PTA) under the prevailing legal framework. PTA also takes pride in having launched the country's largest 'Digital Gender Inclusion Initiative,' whereby the first-ever 'Gender Mainstreaming in ICTs' strategy is being developed. These measures are in addition to efforts aimed at increasing telecom accessibility, availability, and affordability through telecom operators.

Pakistan is confidently marching towards digital excellence. We believe that active infrastructure and spectrum sharing must also kick off. This will help pave the way for introduction of new technologies and facilitate 5G launch. PTA is focusing on national telecom equipment standards, outside plant code, in-building cabling standard, and use of the utility infrastructure to save costs. For enhanced user experience, we have planned extensive surveys and enhanced Quality of Service (QoS) standards, and are working to reduce the current tax burden on consumers.

In conclusion, I must acknowledge the all-out support extended to the telecom sector by the Government of Pakistan (GoP) as it sailed through rough tides. The policies and initiatives of the Ministry of Information Technology and Telecommunications (MoITT) constitute the mainstay of PTA's strength as we successfully regulate the sector in the best interest of Pakistan, its people, and the telecom industry. I would also like to acknowledge my team at PTA, as well as our industry colleagues, for playing a pivotal role in augmenting digitalization across Pakistan. I look forward to the political leadership's continued guidance and support for the telecom fraternity.

Maj Gen Amir Azeem Bajwa (R) HI (M)

Chairman
Pakistan Telecommunication Authority

Executive Summary

Judging from the perspective of regulatory and industry developments, Pakistan's telecom sector experienced yet another productive year marked by noteworthy contributions towards the creation of a knowledge economy. During FY 2021-22, the Pakistan Telecommunication Authority (PTA) continued to focus on developing the telecom infrastructure, modernizing its regulatory framework, bridging connectivity gaps, and improving upon QoS. Extensive collaborative engagements were hence pursued with local and international partners and relevant stakeholders for synergies geared towards growth of the digital economy, modernization of the ICT infrastructure, local manufacturing of telecom devices, cyber security, digital inclusion, and exploration of

> During FY 2021-22, PTA continued to focus on developing the telecom infrastructure, modernizing its regulatory framework, bridging connectivity gaps, and improving upon QoS.

new investment avenues compatible with the 'Digital Pakistan' vision.

During the period under review, PTA continued to enforce regulatory measures supporting growth of the telecom industry. Cellular mobile licenses of two major operators—Jazz and Telenor—were renewed for another 15 years during the reported period, with enhanced coverage and QoS obligations. Spectrum in 1800 MHz was successfully rationalized for contiguous bandwidth to achieve higher efficiency. New Long Distance and International (LDI) licensing was started in Pakistan and Azad Jammu and Kashmir (AJ&K) to enhance telecom services, with a focus on infrastructure development and

international connectivity. New licensing for IoT LPWAN was also initiated to introduce automation technologies across industries and homes. As a sequel to the draft 5G Policy Guidelines issued by MoITT in December 2021, PTA proposed detailed recommendations for introduction of 5G services in the country. In addition to earlier authorizations issued to operators for 5G trials, PTA also processed Ericsson's 5G trial request, which will enable trials in mm-wave band.

For consumer facilitation, PTA engaged with Cellular Mobile Operators (CMOs) and digital media platforms to provide free on-net call facilities in the country's flood-hit areas, regulate automatic activation of Value-Added Services (VAS), and ensure both the availability of VAS information with clarity as well as removal of advertisements of illegal businesses. PTA also implemented the Central Domain Name System (CDNS) policy enforcement mechanism to ensure automated blocking of unlawful content in real-time. Nationwide mobile QoS surveys were

regularly conducted with state-of-the-art QoS testing equipment and survey results were published on the PTA website for awareness of the public and subscribers; the same were taken up with relevant CMOs to rectify shortcomings. During the period under review, 76 cities and 30 motorways, national highways, and roads were surveyed. Dedicated liaison channels were established with major SM platforms including Facebook, YouTube, TikTok, and Twitter, for efficient removal of unlawful content. In addition to regularly disseminating advisories through print media and SMSs, collaborations were made with entities including UNICEF and the Federal Ombudsman (Wafaqi Mohtasib) Secretariat Task Force, regarding online child protection; SM platforms were similarly tapped to create awareness on online harm and safe SM usage. Consumer awareness campaigns utilizing both the print and electronic media were conducted to inform subscribers about the actions they should take to protect against unsolicited and obnoxious calls and messages. These campaigns were carried out through

SMS broadcasts, newspapers, and various SM handles such as Twitter and Facebook, for maximum outreach. To further facilitate telecom consumers, PTA launched a user-friendly Complaint Management System (CMS) mobile application—'PTA CMS'—on Android (Google Play) and iOS (Apple App store). Moreover, a 'Consumer Conference 2022' was convened in Islamabad on August 25, 2022, to obtain first-hand feedback on various issues from consumers themselves. PTA and the telecom industry committed to jointly resolve core consumer issues including QoS-related snags.

An ITU-recognized G4 regulator, PTA is working to achieve 'Leading' G5 regulator status by meeting the new international benchmarks. Consumer protection and enhancement of public-private collaboration for digital transformation and socio-economic uplift constitute the mainstay of its efforts in this direction. During FY 2021-22, PTA entered into several cross-sectoral collaborations with government agencies and regulators and signed a Memorandum of Understanding (MoU) with the National Electric Power Regulatory Authority (NEPRA) and National Highways and Motorway Police (NH&MP) for provision of high-speed connectivity on highways. Similar partnerships are underway with other government agencies including Pakistan Post, Ministry of Commerce, National Highway Authority (NHA), and Oil and Gas Regulatory Authority (OGRA). Pursuant to a previous MoU signed with the State Bank of Pakistan (SBP) for financial inclusion, the soft launch of the flagship Asaan Mobile Account (AMA) scheme held in December 2021, was followed by its commercial launch in August 2022. This scheme has enabled both remote account-opening in more than 13 banks, as well as fund transfers using the SIM of any mobile operator, without the need for Internet connectivity; before this scheme, such services were offered by four banks only. Furthermore, to promote gender participation in Pakistan's socio-economic development and to achieve women's empowerment under SDG 5, PTA launched its 'Gender Inclusion in ICTs' initiative in February 2022, and collaborated with UNESCO, GSMA, the Alliance for Affordable Internet (A4AI), and the industry to reduce the digital gender gap in Pakistan, with a focus on accessibility, affordability, and acquisition of digital skills.

To meet challenges surfacing as result of the rapidly transforming telecom landscape, PTA not only introduced new regulatory frameworks, but also revised the existing ones to address market demand for introduction of advanced telecom services. To address QoS-related issues, PTA amended the QoS and Rollout Regulations for CMOs, to address consumer concerns vis-à-vis call drop, call quality, and data throughput, among others. The Broadband QoS Regulations were also amended with revised Key Performance Indicators (KPIs) as quantifiable benchmarks for determining QoS for fixed broadband services. As a sequel to the Critical Telecom Data and Infrastructure Security Regulations (CTDISR) 2020 introduced by PTA to ensure the security of telecom networks and services, MoITT issued the Cyber Security Policy in 2021. To facilitate the growth of IoT-enabled systems and operations, PTA issued a regulatory framework for SRDs and terrestrial IoT services. This framework provides a regulatory mechanism for the industry to develop the IoT ecosystem in Pakistan. During the period under review, PTA also carried out stakeholder consultations on the draft Telecom Infrastructure Sharing Framework and Spectrum Sharing Framework, which shall be issued upon formal approval by MoITT.

> Moving forward, PTA will continue to provide an enabling environment for the availability of high-quality telecom services and infrastructure across the country in a bid to bridge the digital divide.

PTA is also actively pursuing formation of the Computer Emergency Readiness Team (CERT) for the telecom industry, which is likely to be fully functional by the end of 2022. Assisted by the Pakistan Software Export Board (PSEB), the Authority launched an online portal for one-window operation of Internet Protocol (IP) Whitelisting and Virtual Private Network (VPN) registration for software houses, call centers, and freelancers. PTA also instructed all CMOs to review the security of the SS7 firewall. The Cyber Security Framework, which is based on CTDISR and defines obligations for auditors and PTA licensees, was also developed.

During the year under review, PTA also issued the Mobile Device Manufacturing (MDM) Regulations 2021, which enable companies to obtain authorization for a period of 10 years; as many as 30 authorizations have been issued so far. The regulations enforced by PTA, along with the Device Identification, Registration, and Blocking System (DIRBS), enabled a decline in the import volume of Completely Built Unit (CBU) phones in 2021 as most of the local demand was met through locally manufactured products, which touched a volume of 37 million during the period between January 2021 to June 2022, resulting in Forex savings, creation of employment opportunities, and increased investment. Prominent brands such as

Samsung have already started local manufacturing in Pakistan.

Led by the Chairman, the PTA team participated in various international events—both in-person and virtual—to highlight the growth and investment potential of Pakistan's ICT sector and to initiate international digital collaborations. Major events included the GSMA Mobile World Congress, the SAMENA Accelerator Roundtable, the World Summit on Information Society (WSIS) Ministerial Roundtable, PTA's pledges for ITU's Partner2Connect (P2C) Initiative, the South Asian Telecommunication Regulators' Council (SATRC) meeting, the PTA-A4AI agreement for digital cooperation, the GSMA-PTA agreement for gender inclusion, and the PTA-UNICEF cooperation for online child protection, among others.

billion as General Sales Tax (GST) and PKR 100 billion as Withholding Tax. PTA also deposited PKR 102.5 billion in the Federal Consolidated Fund (FCF), primarily on account of proceeds from NGMS auction and license renewals; this was PKR 53 billion more than the amount budgeted in the Federal Budget 2021-22.

Moving forward, PTA will continue to provide an enabling environment for the availability of high-quality telecom services and infrastructure across the country in a bid to bridge the digital divide. In the year ahead, PTA will focus on QoS and coverage by ensuring a yearly increase in average download speed to 4 Mbps for 4G, and achieving 3% additional population coverage every year in each province, with the objective of making high-quality broadband services accessible to the population. Other priorities

Broadband Subscribers — **124 million**
56% Broadband Penetration

Biometrically Verified SIMs/Subscribers — **194 million**

Annual Growth of Data Usage — **31%**
(of 8,970 Petabytes)

Telecom Industry's Contribution to National Exchequer — **PKR 325.2 billion**
(Deposited)

Telecom Revenues — **PKR 694 billion**
(FY 2021-22)

Despite slow economic growth and inflationary pressures, key metrics reflected stable growth of Pakistan's telecom sector during FY 2021-22. As of today, there are over 194 million biometrically verified SIMs/subscribers, with mobile coverage of over 90% of the population. Broadband subscribers have also crossed the 124 million mark, reflecting 56% broadband penetration; 3G and 4G mobile signal coverage is available to more than 78% of the population; and annual mobile broadband data usage has touched 8,970 petabytes, showing an annual growth of 31%. The expanding usage of telecom services enabled the telecom industry to achieve an all-time high revenue of PKR 694 billion during FY 2021-22. Tax collection by the industry touched PKR 223 billion, including PKR 77

include industry profitability, digital inclusion with security, infrastructure and spectrum sharing, and standardization and indigenization of telecom manufacturing. Aligned to the government's 5G roadmap, PTA will also work with the industry and other stakeholders to provide detailed recommendations on 5G rollout in Pakistan. To support 5G, we need to increase the percentage of Fiber-To-The-Tower/Site (FTTT/FTTS). Other technological developments and innovations for broadband proliferation such as Wi-Fi 6E for enhanced latency Augmented and Virtual Reality (AR/VR) etc., will also be facilitated. Furthermore, PTA will augment its ongoing efforts for national and international collaborations to achieve the 'Leading' G5 regulator status, and to proactively implement the 'Digital Pakistan' vision.

Picture Gallery

Representatives of Joyo Technology Pakistan Pvt. Ltd. (Snack Video) and BIGO Service Pakistan Pvt. Ltd. (BIGO Live, Likee) got their companies registered with PTA at a signing ceremony held on January 14, 2022. These social media technology companies are the first to have obtained registration certificates from PTA, as required under the 'Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules, 2021.' The ceremony was attended by Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Finance PTA, Mr. Muhammad Naveed, and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar.

The Secretary General for Digital Cooperation Organization, Ms. Deemah Al-Yahya, visited the PTA Headquarters on November 18, 2021, for an interaction with Chairman PTA, Maj Gen Amir Azeem Bajwa (R). Enhancement of cooperation in the field of ICTs, growth of digital economy, and efforts to advance the 'Digital Pakistan' vision were the key agenda items of the meeting.

Director of Office and UNESCO Representative in Pakistan, Ms. Patricia McPhillips, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), on February 10, 2022. The two sides shared views on areas of mutual interest with a focus on reducing gender gap in the availability and use of ICT services to Pakistan's female population.

Chief International Officer of Saudi ICT infrastructure company, 'TAWAL,' Mr. Emmanuel Leonard, and CEO of Pakistani telecom infrastructure operator, 'AWAL Telecom,' Mr. Akbar Shaukat, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), at the PTA Headquarters on February 8, 2022. The meeting focused on the establishment of ICT infrastructure services in the country under the Telecom Tower Provider license, among other related matters.

On August 10, 2022, PTA authorized Lucky Motors Corporation Limited to establish a mobile device manufacturing plant of Samsung in Karachi. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Finance PTA, Mr. Muhammad Naveed, and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, among others, were present on the occasion to witness the presentation of authorization documents.

The Ambassador of China to Pakistan, His Excellency Mr. Nong Rong, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), on November 8, 2021. The meeting featured an exchange of views on matters of mutual interest including investment opportunities, enhanced collaboration in the field of ICTs, and prospects for foreign investment in Pakistan's fast-growing telecom sector. Both sides agreed to work on further expansion of bilateral collaboration.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), presenting a memento to Group CEO of VEON, Mr. Kaan Terzioğlu, during a meeting held at the PTA Headquarters on November 25, 2021. Member Finance PTA, Mr. Muhammad Naveed, Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, and CEO Jazz, Mr. Aamir Ibrahim, also attended the meeting. How Jazz plans to enhance connectivity, bridge the digital gender divide, and improve the digital infrastructure, were the key discussion points.

Director Middle East and Asia, Starlink, Mr. Ryan Goodnight, and Head of Global Site Acquisition, Mr. Ben Macwilliam, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), and Executive Director of the Frequency Allocation Board, Brig Tahir Ahmed Khan (R), at the PTA Headquarters on December 13, 2021. The two sides discussed matters pertaining to provision of satellite broadband connectivity in Pakistan, and Starlink's plans to connect the country to their global network.

The dismissal of a petition by the Islamabad High Court paved the way for renewal of the license of Jazz, which was due since 2019. In this context, PTA hosted a license signing ceremony on October 18, 2021. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Finance PTA, Mr. Muhammad Naveed, and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, attended the ceremony, among others.

Minister of State and Chairman, Board of Investment (BOI), Mr. Muhammad Azfar Ahsan, along with Secretary BOI, Ms. Fareena Mazhar, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), at the PTA Headquarters on December 2, 2021. The meeting featured discussions on a variety of subjects, with a focus on availability of new investment opportunities in Pakistan's telecom and allied sectors.

Head of Public Policy-Emerging Markets and Global CSR, TikTok, Ms. Helena Lersch, along with her team, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), on November 3, 2021. The purpose of the meeting was to develop consensus on a mutually acceptable mechanism for provision of safe, lawful, and informative content to Internet users in Pakistan.

A group photograph of participants of a workshop organized by PTA and GSMA on October 25, 2021. The activity was organized to explore the benefits of digital identity for consumers and businesses to advance the digital transformation agenda in Pakistan. Senior officers of PTA, as well as representatives of mobile operators and Infobip—a global cloud communications platform—benefitted from the workshop.

The Ambassador of Sweden to Pakistan, His Excellency Mr. Henrik Persson, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), on January 27, 2022. Bilateral investment and business opportunities for Swedish companies in Pakistan's ICT sector was a key area of discussion, which concluded with an emphasis on working towards enhancement of cooperation between Sweden and Pakistan, particularly in the ICT sector.

Vice President of Huawei Middle East, Mr. Shunli Wang, and CEO Huawei Pakistan, Mr. Mark Meng, met Chairman PTA, Maj Gen Amir Azeem Bajwa (R), at the PTA Headquarters on January 6, 2022. The two sides discussed matters related to development of the ICT sector in Pakistan, as well as proposals for development of innovative digital solutions to accelerate progress towards 'Digital Pakistan.'

The Ambassador of the Kingdom of Norway to Pakistan, His Excellency Mr. Per Albert Ilsaas, called on Chairman PTA, Maj Gen Amir Azeem Bajwa (R), at the PTA Headquarters on March 18, 2022. The two sides discussed matters of mutual interest, and resolved to work together for expansion of collaboration in the field of ICTs. Emerging investment opportunities for Norwegian technology companies in view of the 'Digital Pakistan' vision were also discussed.

To promote collaboration in areas of mutual benefit, PTA signed separate MoUs with NH&MP and NEPRA on May 19, 2022, and September 12, 2022, respectively. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, attended the ceremonies.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), convened two meetings with the leadership of Agence Française de Dévelopment (AFD) Group on May 9, 2022, and June 6, 2022. The meetings featured a discussion on investment and partnership opportunities in telecom infrastructure, and an assessment of digital transformation in Pakistan.

To accelerate gender inclusion in ICTs for the digital empowerment of women, PTA organized a unique event in Islamabad on February 22, 2022, with Special Assistant to the Prime Minister on Social Protection and Poverty Alleviation, Dr. Sania Nishtar, as the chief guest. The event was attended by Secretary MoITT, Dr. Muhammad Sohail Rajput, Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Finance PTA, Mr. Muhammad Naveed, Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, CEOs of Jazz, Telenor, and PTCL Group, representatives of CMPak (Zong), Ufone, SCO, and Huawei Pakistan, as well as parliamentarians and members of international organizations and the civil society.

Key Metrics

Teledensity (Percentage)

☐ Mobile ☾ Fixed Σ Total

2017-18	2018-19	2019-20	2020-21	2021-22	Sept. 2022
72.8	76.4	78.8	84.2	88.3	88.0
1.3	1.3	1.1	1.1	1.2	1.2
Σ 74.1	Σ 77.7	Σ 79.9	Σ 85.3	Σ 89.5	Σ 89.2

Subscribers–Mobile and Fixed (Million)

☐ Mobile ☾ Fixed Σ Total

	2017-18	2018-19	2019-20	2020-21	2021-22	Sept. 2022
Total (Σ)	Σ 154.4	Σ 165.0	Σ 171.1	Σ 186.8	Σ 197.2	Σ 196.7
Fixed	2.9	2.7	2.5	2.6	2.6	2.6
Mobile	151.5	162.3	168.6	184.2	194.6	194.1
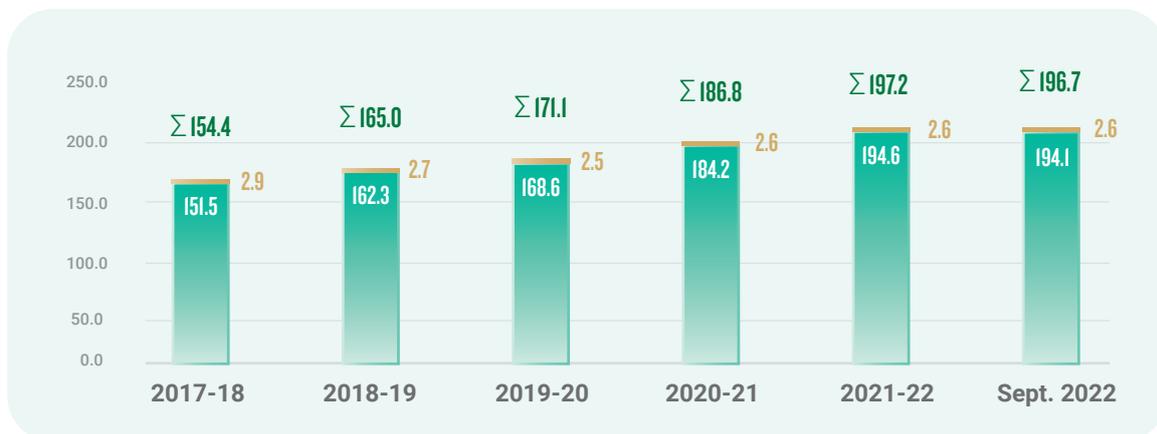
Mobile Subscribers' Share (Percentage; Sept. 2022)
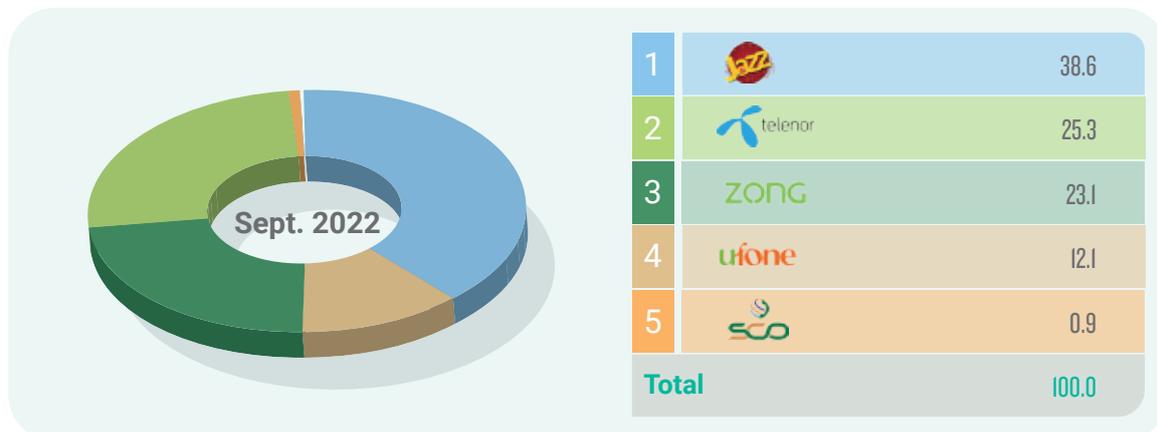
Sept. 2022

1	Jazz	38.6
2	telenor	25.3
3	ZONG	23.1
4	ufone	12.1
5	SCO	0.9
Total		**100.0**

Broadband Subscribers–Mobile and Fixed (Million)

 Mobile Fixed Σ Total

Period	Mobile	Fixed	Total
Sept. 2022	120.6	3.0	Σ 123.6
2021-22	115.8	3.0	Σ 118.8
2020-21	99.9	2.8	Σ 102.7
2019-20	81.7	2.1	Σ 83.8
2018-19	69.4	2.1	Σ 71.5
2017-18	56.5	2.3	Σ 58.7

Broadband Penetration–Mobile and Fixed (Percentage)

 Mobile Fixed Σ Total

	2017-18	2018-19	2019-20	2020-21	2021-22	Sept. 2022
Total	Σ 28.1	Σ 33.8	Σ 38.5	Σ 46.9	Σ 53.9	Σ 56.0
Mobile	27.0	32.8	37.5	45.6	52.6	54.6
Fixed	1.1	1.0	1.0	1.3	1.3	1.4
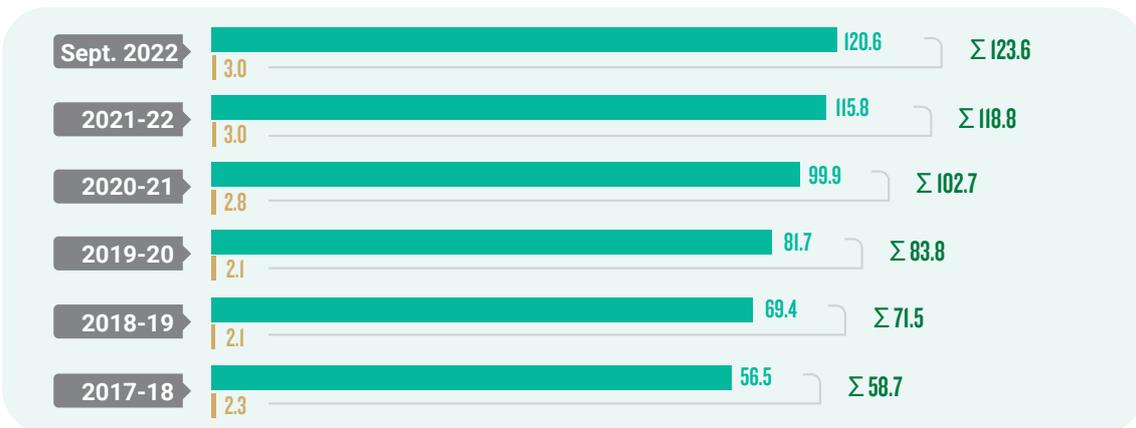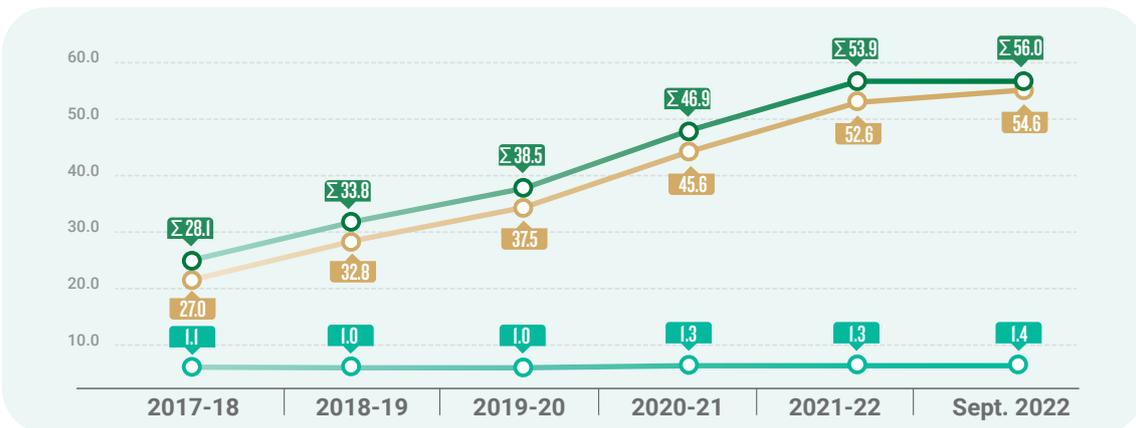
Cellular Mobile Subscribers–Male and Female (Million)

	Jazz	Ufone	ZONG	Telenor	Total
2021-22	Σ 75.5 (F 24.8 / M 50.7)	Σ 23.3 (F 5.7 / M 17.6)	Σ 44.2 (F 10.5 / M 33.7)	Σ 50.0 (F 11.2 / M 38.8)	Σ 192.9 (F 52.1 / M 140.8)
Sept. 2022	Σ 75.0 (F 20.9 / M 54.1)	Σ 23.5 (F 5.6 / M 17.9)	Σ 44.8 (F 10.7 / M 34.1)	Σ 49.2 (F 11.1 / M 38.1)	Σ 192.5 (F 48.3 / M 144.2)
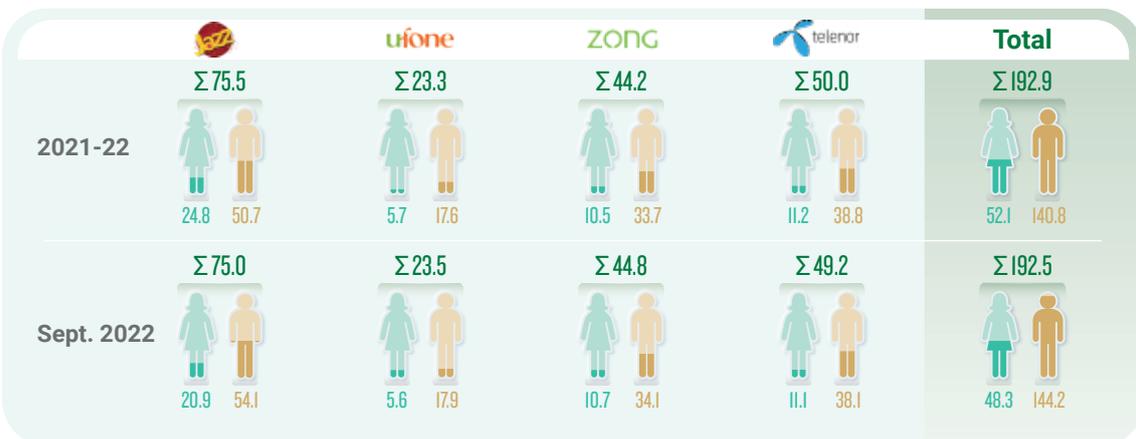
Note: SCO Mobile Subscribers (Male and Female) not available

Mobile Broadband Subscribers–Male and Female (Million)

	Jazz	Ufone	Zong	Telenor	Total
2021-22	Σ 44.0 / 10.3 / 33.7	Σ 12.9 / 3.2 / 9.7	Σ 32.1 / 7.4 / 24.7	Σ 25.4 / 5.5 / 19.9	Σ 114.4 / 26.4 / 88.0
Sept. 2022	Σ 45.9 / 11.0 / 34.9	Σ 13.9 / 5.2 / 8.7	Σ 33.5 / 7.8 / 25.7	Σ 25.8 / 5.9 / 19.9	Σ 119.1 / 29.9 / 89.2
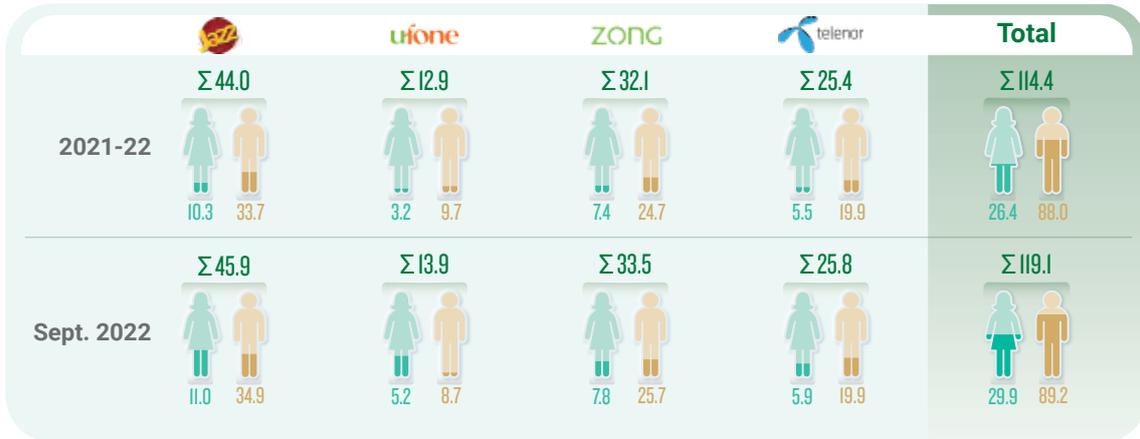
Note: SCO Mobile Broadband Subscribers (Male and Female) not available

Share of Mobile Broadband Subscribers (Percentage)

Zong · Ufone · Jazz · SCO · Telenor

	2021-22	Sept. 2022
SCO	1.2%	1.2%
Ufone	11.2%	11.6%
Telenor	21.9%	21.4%
Zong	27.7%	27.8%
Jazz	38.0%	38.0%

Cellular Mobile Cell Sites

2G · 3G · 4G

2020-21: 2G 48,958 | 3G 43,161 | 4G 40,097
2021-22: 2G 52,565 | 3G 45,303 | 4G 48,172
2017-18: 2G 42,119 | 3G 32,983 | 4G 20,056
2018-19: 2G 45,171 | 3G 38,228 | 4G 30,618
2019-20: 2G 47,251 | 3G 42,306 | 4G 36,764
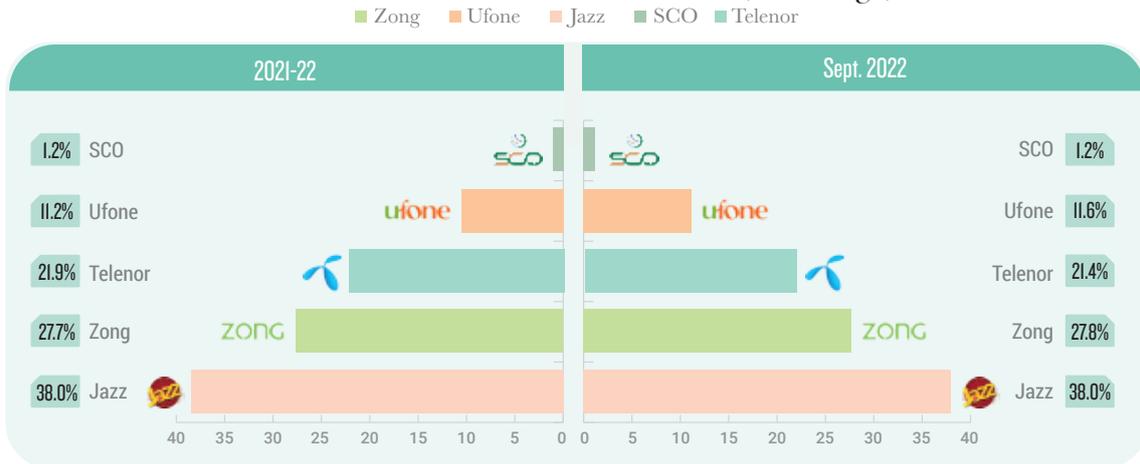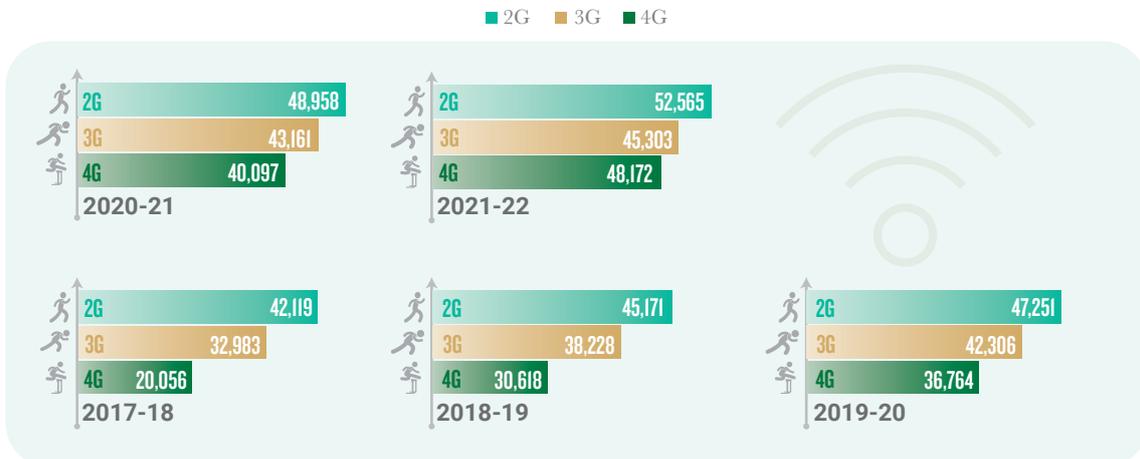
Teledensity in AJ&K and GB–Mobile and Fixed (Percentage)

76.8	80.2	91.2	100.5	105.1	105.1
2017-18	2018-19	2019-20	2020-21	2021-22	Sept. 2022

Cellular Subscribers in AJ&K and GB (Million)

4.3	4.5	5.1	5.6	5.9	5.9
2017-18	2018-19	2019-20	2020-21	2021-22	Sept. 2022

Mobile Data Usage (Petabytes)

1,262	2,493	4,510	6,855	8,970
2017-18	2018-19	2019-20	2020-21	2021-22

Mobile ARPU/Month (PKR)

| 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 |

219.1   238.3   213.9   215.2   220.2
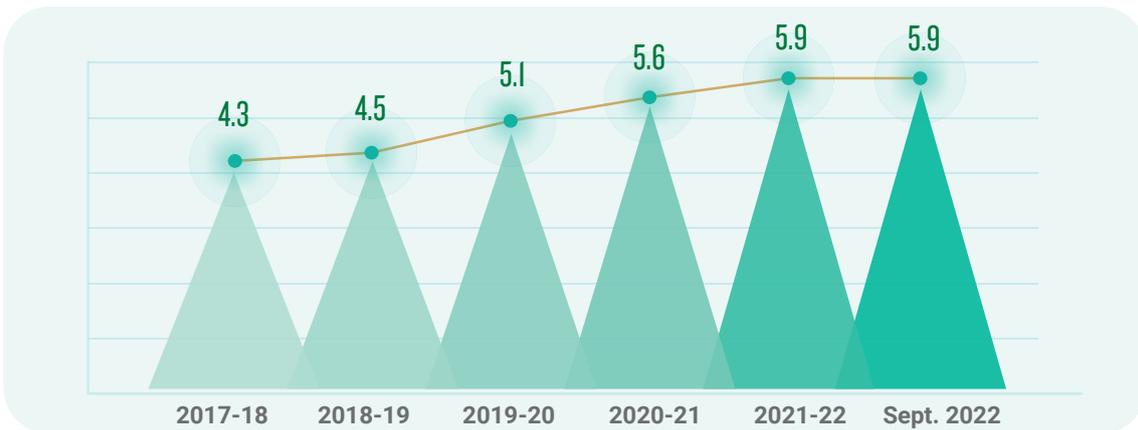
Telecom Revenues (PKR Billion)

| 540 | 606 | 597 | 651 | 694 |
| 2017-18 | 2018-19 | 2019-20 | 2020-21 (R) | 2021-22 (P) |

P: Provisional   R: Revised

Telecom Investment (US$ Million)

| 1,132 | 840 | 1,394 | 1,336 | 2,073 |
| 2017-18 | 2018-19 | 2019-20 (R) | 2020-21 (R) | 2021-22 (P) |
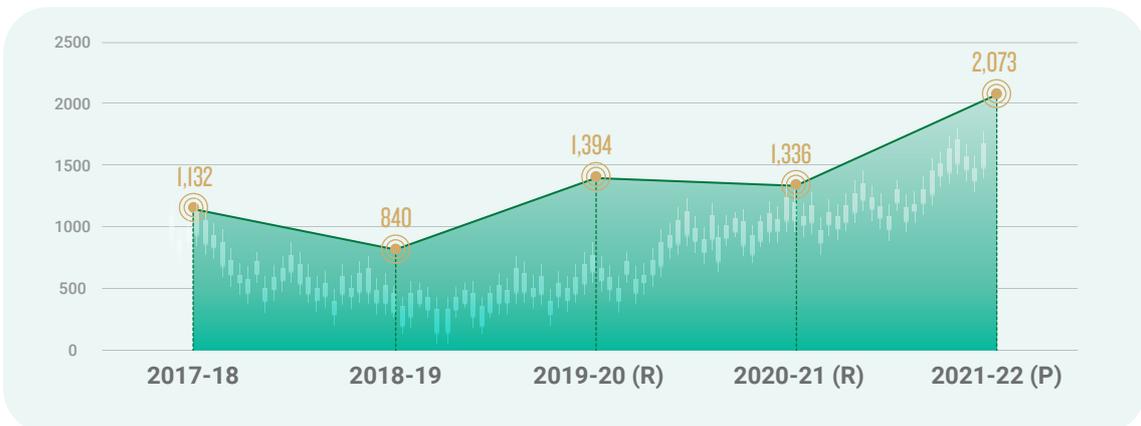
P: Provisional   R: Revised

Telecom Sector's Contribution to Exchequer (PKR Billion)

- 2017-18: 162.8
- 2018-19: 115.5
- 2019-20: 291.9
- 2020-21 (R): 225.8
- 2021-22 (P): 325.2

P: Provisional   R: Revised

FDI Inflow in Telecom (US$ Million)

- 2017-18: 289
- 2018-19: 236
- 2019-20: 763
- 2020-21: 202
- 2021-22: 168
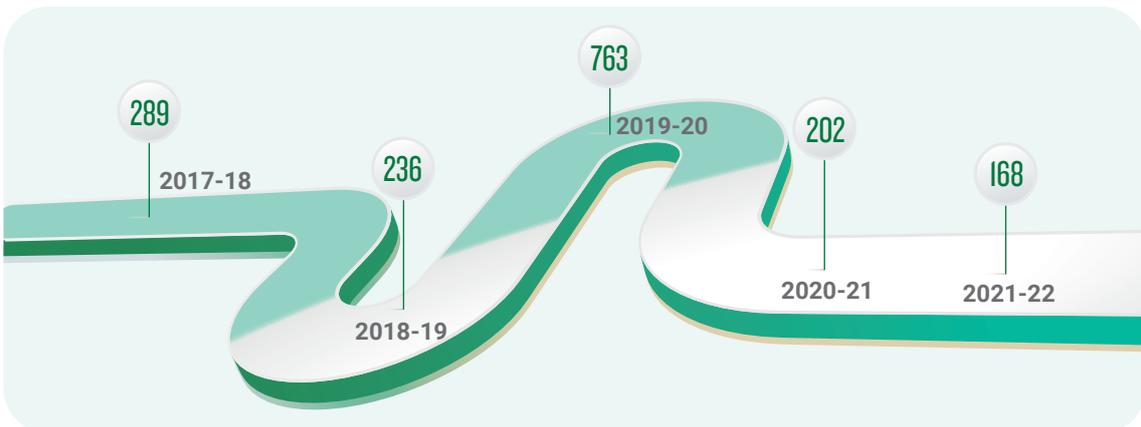
Source: State Bank of Pakistan

Commercial Import Vs. Manufacturing Trends (Million)

Commercial / Locally Manufactured

Year	Commercial	Locally Manufactured
2016	21.36	0.29
2017	18.11	1.72
2018	12.07	5.20
2019	16.28	11.74
2020	24.51	13.05
2021	10.26	24.66
2022 (Jan.-Sept.)	1.24	16.70

Mobile Devices: Locally Manufactured (Million)

■ 2G　■ Smart Phones　■ Total

	2019	2020	2021	2022 (Jan.-Sept.)
Smart Phones	0.12	2.06	10.06	7.24
Total	11.74	13.05	24.66	16.70
2G	11.62	10.98	14.60	9.46
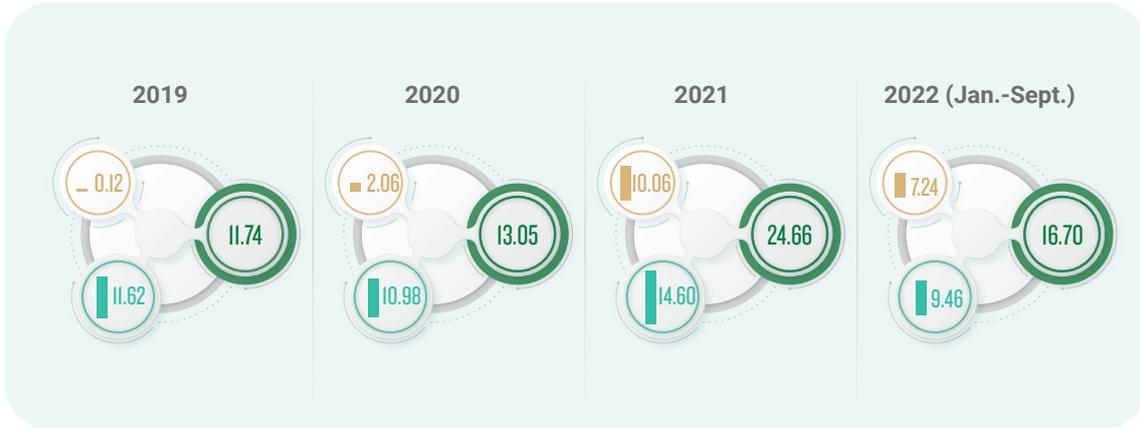
Mobile Devices: Locally Manufactured Top 10 Brands (Million)

2020		2021		Jan.-Sept. 2022	
QMobile	3.45	itel	4.40	itel	2.14
E-TACHI	2.15	VGO TEL	3.17	VGO TEL	1.67
VGO TEL	1.63	Infinix	3.00	vivo	1.49
Infinix	1.29	vivo	2.76	Infinix	1.45
G'FIVE	1.23	TECNO	2.06	NOKIA	1.21
CALME	1.07	E-TACHI	1.90	OPPO	1.11
TECNO	0.60	QMobile	1.68	Samsung	1.07
QQMEE	0.38	CALME	1.17	QMobile	0.94
itel	0.34	G'FIVE	0.92	TECNO	0.2
Club Mobile	0.22	QQMEE	0.86	E-TACHI	0.90

Mobile Devices on Pakistan's Network

■ 2G　■ Smat Phones

	2018	2019	2020	2021	2022 (Sept.)
2G	41%	44%	48%	52%	56%
Smat Phones	59%	56%	52%	48%	44%
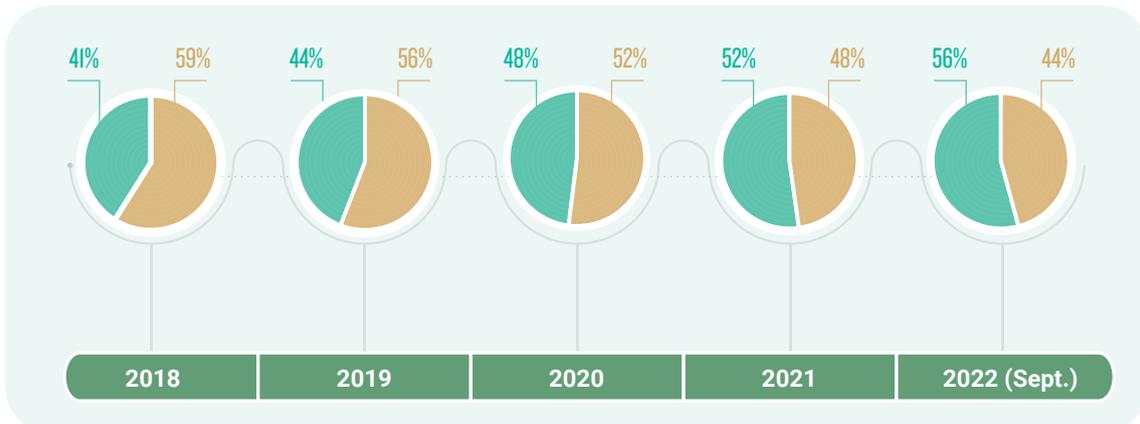
Note: Smart Phones include 3G, 4G, and above

International Bandwidth Usage (Tbps)

■ Maximum　■ Average　■ Minimum

June 2022 — 2.9 / 2.3 / 1.5

July 2022 — 3.0 / 2.3 / 1.5

Aug. 2022 — 3.8 / 3.19 / 0.8

Sept. 2022 — 3.6 / 2.2 / 1.3

Feb. 2022 — 1.2 / 2.6 / 2.14

March 2022 — 1.1 / 2.7 / 1.84

April 2022 — 0.8 / 2.0 / 1.85

May 2022 — 0.8 / 2.7 / 2.17

Mobile Wallet Agents

- 2017-18: 405,571
- 2018-19: 421,053
- 2019-20: 445,181
- 2020-21: 534,460
- 2021-22: 637,231
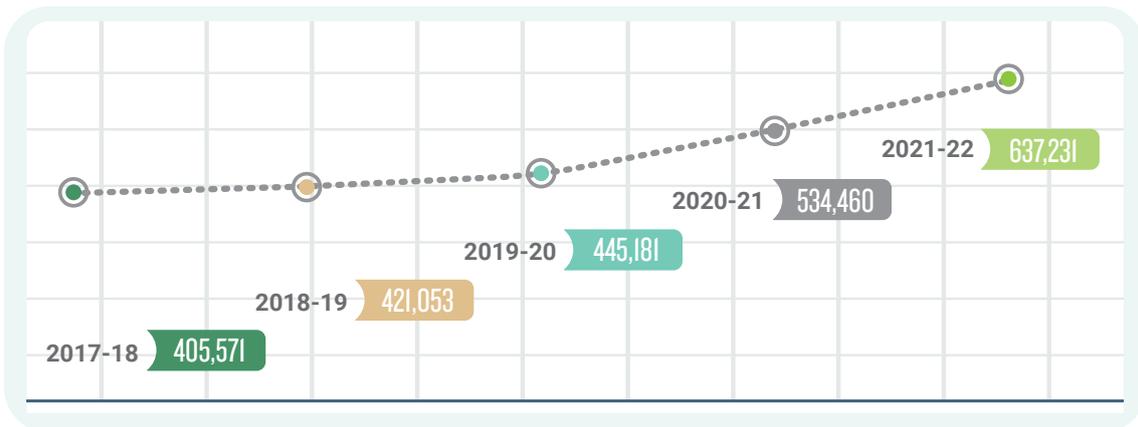
Mobile Wallet Accounts (Thousands)

- 2017-18: 39,246
- 2018-19: 35,731
- 2019-20: 52,522
- 2020-21: 74,621
- 2021-22: 88,549

ICT Governance

ICT Governance

Pakistan is widely recognized as an emerging ICT market in the global arena due to incredible telecom-related developments that have propelled a boost in the country's telecom indicators at a time when the digital revolution is rapidly unfolding. ICTs are doubtlessly the single most important enabler of a knowledge society and digital economy. World over, telecom regulators are constantly evolving, upgrading, and aligning with modern regulatory frameworks and efficient regulatory governance to stay relevant in today's competitive digital environment.

Recognizing the need to embrace the modern regulatory regime, PTA allows no compromises when adopting consumer-centric approaches, promoting ease-of-doing-business for its licensees, and assisting the government for mutual gains. With connectivity and infrastructure development as its core priorities, PTA is regulating in a hybrid environment with merged physical and digital boundaries. In doing so, it is utilizing both conventional as well as contemporary regulatory tools, initiatives, and procedures essential for Pakistan's transition from an emerging to a developed digital market. Key regulatory interventions made during FY 2021-22 are detailed below.

Relief and Restoration of Telecom Services in Flood-Affected Areas

The torrential monsoon rains that lashed Pakistan during the period under review triggered the worst 'super floods' in the country's history. Leaving one-third of the land area inundated, the natural disaster wreaked havoc on human life, property, infrastructure, livestock, and livelihoods, leading to an unprecedented humanitarian emergency. Like all sectors, telecom infrastructure and services in the flood-stricken districts also faced the brunt. Services were totally disrupted because of colossal infrastructural damages. Moreover, systems in some areas were completely washed away, and communication blackouts were experienced. Rising to the crisis, PTA and the industry have been working 24/7 for earliest possible restoration of telecom services.

A summary of the disaster response and recovery efforts being made by the telecom sector is presented below.

Restoration of Telecom Infrastructure

Soon after the communication breakdown, PTA initiated restoration of the telecom infrastructure including Base Transceiver Stations (BTSs) and Optical Fiber Cable (OFC) and the effort is continuing unabated since mid-August 2022. The field teams of PTA, in collaboration with its 12 zonal and regional offices across the country, have been extensively coordinating with telecom operators, as well as the civil and military authorities, for restoration and revival of the damaged infrastructure.

As many as 3,386 sites went down on August 28, 2022. Despite various allied issues including inaccessibility to damaged sites, unavailability of commercial power, equipment damages, and the challenge of fuel delivery for generators due to submersion, the relentless efforts of PTA and telecom operators for restoration of connectivity enabled a decline in the number of non-functional sites to 100, which constitute 0.19% of the total sites across the country.

Currently, 13 sites in five districts of Balochistan and 87 sites in 12 districts of Sindh are non-functional. Stagnant flood water, damaged equipment, and prolonged power outages are some of the notable obstacles to relief and repair operations. However, other operational sites in the vicinity are guarding against communication blackouts in the affected districts. To further augment the restoration

Telecom teams busy in restoration of infrastructure devastated in the wake of floods in Balochistan.

of telecom services, four PTA teams were deployed to visit the affected towers and BTSs. These teams visited 283 BTS sites in 26 districts and assisted with expeditious restoration of non-operational sites with the support of relevant local administrations, Pakistan Army, and concerned CMOs.

The calamity also damaged the OFC network (primarily laid by PTCL and Wateen) in the flood-affected areas of Balochistan and Sindh alongside the National Highway, N-25. Connectivity breakdowns were resultantly experienced due to more than 120 cuts in the fiber network. The teams of both the operators initiated emergency response, with PTA facilitating boat access to the affected sites and ensuring adequate security cover. Collaborative regulator-industry efforts resulted in 100% backhaul fiber optic connectivity within the shortest possible time.

Due to temporary disruption of digital financial services, PTA offered alternative communication channels for the government to provide financial aid to beneficiaries of the Benazir Income Support Programme (BISP) in far-flung areas of Balochistan including Loralai, Musa Khel, Lasbela, and Khuzdar, among others. In this context, PTA established four satellite links in collaboration with Pakdatacom; several telecom signal amplifiers provided by PTA in the affected areas are now operational, ensuring connectivity and verification of Billing Validation Service for disbursement of funds to affectees.

Assistance to Government's Relief Efforts

Soon after the Prime Minister's appeal for contributions towards the Flood Relief Fund 2022, PTA activated 9999 short code on August 26, 2022, to receive donations from telecom consumers. As many as 1,514 million SMSs were disseminated to mobile subscribers across the country, apprising them of the fund and how they can contribute to it, using the short code. An amount of approximately PKR 16 billion was thus collected.

On July 5, 2022, PTA activated a Ring-Back Tone (RBT) alerting over 138.65 million mobile subscribers to adopt safety measures during monsoon and floods. Assisted by NH&MP, PTA issued travel advisories to people traveling to and from the flood-affected areas. As many as 84.5 million SMSs containing latest information on the flood situation in specific areas were disseminated. These travel advisories saved travelers from unnecessary inconvenience on routes damaged by the catastrophe. The 911 emergency service short code launched in April 2022 for nationwide reporting of any emergency was also made available for reporting of flood-related emergencies. Over 155 million SMSs were sent to make mobile subscribers aware of the availability of 911 services in flood-affected areas.

Beginning August 28, 2022, all CMOs started offering free voice calls to facilitate their respective mobile subscribers in 59 flood-affected areas. These calls were primarily on-net; however, Jazz and Ufone offered free minutes for calling on PTCL fixed line numbers. The CMOs absorbed the financial impact of this facilitation as a Corporate Social Responsibility (CSR) initiative.

Free Minutes for Flood-Affected Mobile Subscribers		
	On-net	**PTCL**
Jazz	50	50
Telenor	*Unlimited	-
Zong	20 Daily	-
Ufone	15 Daily	15 Daily

*10 Free On-net Minutes from September 2, 2022

Licensing and Spectrum Management

Renewal of Cellular Mobile Licenses

In pursuance of policy directives issued by GoP, PTA renewed one cellular license of Telenor on December 10, 2021; two cellular licenses of Pakistan Mobile Communications Limited (Jazz) were also renewed in separate signing ceremonies held on October 18, 2021, and April 12, 2022. The renewed licenses contain enhanced terms and conditions for coverage and QoS, as established at the Spectrum Auction 2021. The licenses have been renewed against a total fee of US$ 935.4 million, of which approximately US$ 629.6 million have already been paid by the two operators on account of renewal fee, plus applicable markup. The remaining amount will be cleared as per the annual instalment plan.

Representatives of PTA and Jazz at a signing ceremony marking renewal of the latter's mobile license. Three similar signing ceremonies for Jazz and Telenor were held in all. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Finance PTA, Mr. Muhammad Naveed, and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, attended the ceremonies, among others.

Spectrum Rationalization for Pakistan and AJ&K

In line with the August 4, 2021 policy directive issued by GoP for spectrum auction in Pakistan, PTA, in consultation with the Frequency Allocation Board (FAB) and all CMOs, successfully completed rationalization of 1800 MHz band in February 2022. All CMOs in Pakistan—Jazz, CMPAK, Telenor and Ufone—have rationalized the spectrum for contiguous bandwidths. The activity, which was completed in a professional, systematic, and phased manner, has enabled CMOs to use the assigned spectrum with greater operational efficiency, enabling capacity boosting through carrier aggregation, thereby improving consumer experience. Moreover, corresponding to the August 11, 2021 policy directive issued by GoP for spectrum auction of NGMS in AJ&K, PTA—in consultation with FAB and all CMOs—successfully completed the rationalization of 1800 MHz band in October 2021.

LDI Licensing

LDI licenses in Pakistan were resumed in the light of market assessment and demand for new licenses. Accordingly, PTA initiated the acceptance of LDI license applications during the period under review. In response, nine applications were received for Pakistan and two for AJ&K and Gilgit-Baltistan (GB). Currently, there are 15 LDI operators in Pakistan, and 14 in AJ&K and GB. The initiative will ensure provision of better services to consumers in a highly competitive environment.

Introduction of IoT LPWAN License

In pursuance of the Rolling Spectrum Strategy 2020-2023 and the IoT Framework, PTA achieved a milestone by introducing the IoT LPWAN license. This license facilitates the introduction of automation technologies in different industries and homes. Both to encourage operators and to fuel business promotion in this pivotal segment of the national economy, the IoT LPWAN license is available at a nominal initial license fee of PKR 100,000. Operators are allowed to operate in the 433.05-434.79 MHz and 920-925 MHz frequency bands on sharing basis while ensuring the protection of primary services operational in adjacent frequency bands. PTA received license applications from various companies with innovative use case and application, and after due assessment and scrutiny, issued IoT licenses to four companies in September 2021.

Besides the shared use of frequency spectrum, applicants also have the prerogative to apply for licenses to use exclusive frequency spectrum for IoTs. PTA has authorized CMOs and other local access providers to offer IoT services through their exclusively assigned frequencies under the respective license conditions; no new license will be required from PTA in such cases. The introduction of IoT services in the digital ecosystem will promote investment opportunities and enhance the digital infrastructure and services in Pakistan.

Introduction of 5G

While many developed countries have deployed 5G technology, Pakistan is beset with challenges in offering the said services. To begin with, 5G handset penetration in the Pakistani market is a major impediment; the percentage of 5G-supported handsets in the country is less than 1%. Similarly, low OFC penetration, fewer potential use cases, lower tower density, increasing inflation, low Average Revenue Per User (ARPU), and rising Operating Expenses (OPEX) such as increase in the prices of fuel and electricity, coupled with high taxation, are some of the key factors that can potentially impact 5G launch.

During the period under review, PTA initiated the process for efficient utilization of 5G spectrum, timely launch of the commercial 5G ecosystem, and improved mobile broadband services by sharing comprehensive input on the draft 5G Strategic Plan and Policy Guidelines with MoITT in December 2021. The draft policy guidelines have been uploaded on the MoITT website for stakeholder consultations. PTA evaluated the stakeholder feedback and is currently in the process of suggesting further improvements. Meanwhile, PTA also processed Ericsson's 5G trial request which, in addition to low and mid bands, will also conduct a trial in mm-wave band.

Regulatory Initiatives

Branchless Banking: Asaan Mobile Account Scheme

PTA joined hands with SBP to launch the AMA scheme, which aims to induct the unbanked population into mainstream banking services. In this context, PTA made concerted efforts to complete integration and agreements between banks, third-party service providers, and CMOs. After a soft launch in December 2021, the scheme was commercially launched on August 11, 2022, enabling customers of all four mobile operators to open bank accounts and conduct financial transactions on 13 AMA on-boarded banks. Resultantly, AMA accounts have already crossed the 5 million mark.

A significant segment of the population in Pakistan does not have access to banking services. However, with the launch of AMA, ubiquitous financial services will now be available and accessible to a huge market of over 189 million biometrically verified SIMs and subscribers. The scheme is expected to play a pivotal role in women's economic empowerment and improvement of their socio-economic status.

Pursuant to the National Financial Inclusion Strategy (NFIS), AMA has been designed to provide an easy, swift, secure, and

Governor SBP, Chairman NADRA, and Member Finance PTA, among others, at the launching ceremony of the AMA scheme.

cost-effective channel to access financial services with complete interoperability among operators and financial institutions. Powered by a unified Unstructured Supplementary Service Data (USSD) platform, the scheme allows opening of a mobile banking account by dialing *2262# from any mobile phone (smart or feature phone) using the SIM of any mobile operator, and making transactions without Internet connectivity. The broader objective of the scheme is to promote financial inclusion, which is at the heart of all efforts for a thriving, stable, and documented economy.

Seeking Consumer Consent for Activation of VAS

A detailed consumer complaint analysis conducted during the period between July 2021 to June 2022 revealed auto-activation of VAS without consumer consent as being a major issue. Taking cognizance of the problem, PTA convened marathon sessions with CMOs to seek their comments and feedback, which were analyzed and effectively responded to by the regulator. Consequently, on August 12, 2021, PTA directed all CMOs not to activate any kind of VAS through single click, and to activate VAS only after seeking prior consent of consumers through One-Time Password, USSD, SMS, App, etc. Compliance reports were also sought from CMOs. Of late, PTA has observed rising complaints against two operators, who have again been directed to halt VAS.

Inclusion of VAS in Mobile Apps of CMOs

Rising complaints about charging of VAS by CMOs without consumer consent prompted PTA to conduct an in-depth evaluation of different VAS services being offered by CMOs. According to the analysis, the mobile

applications of CMOs were not depicting updated VAS information to consumers, resulting in confusion and complaints. On August 2, 2021, PTA issued a directive instructing CMOs to update their mobile applications to include information about VAS activated by each individual consumer in his/her account, along with the procedure for its de-activation through mobile application so that instant and comprehensive information about subscribed VAS is available to consumers. A series of meetings with CMOs were convened and the feedback thus received was duly analyzed. PTA rigorously followed-up the issue with all CMOs, who have resultantly initiated the process of updating their mobile applications; a major chunk of VAS data has been updated on their Apps. As per CMOs, the task is cumbersome and time-consuming but complete VAS data will be shifted in due course of time.

Billing Verification Exercise of CMOs

PTA routinely carries out billing verification to ascertain the accuracy of the charging mechanism of CMOs for voice and SMS services. The purpose of the exercise, which is conducted through the 'NEMO' tool, is to assess the actual charges deducted from consumers, as against advertised tariffs or otherwise. During the period under review, PTA carried out three billing verification surveys in which no overcharging by CMOs was observed. The overall results were found to be satisfactory.

Mechanism to Curb Pornographic Content

In a bid to clampdown on pornographic and indecent content as defined in Section 37 of the Prevention of Electronic Crimes Act 2016, PTA implemented the CDNS policy enforcement mechanism to ensure automated, effective, and seamless blocking of unlawful content in real-time. The development of the mechanism, which was inaugurated at the PTA Headquarters in Islamabad on April 12, 2022, was a result of months of joint efforts and close coordination with the telecom industry and other stakeholders.

Curbs on Social Media Advertisements by Illegal Housing Societies

During the period under review, PTA instructed all housing societies operating without NOCs from the concerned quarters, to refrain from advertising their illegal businesses on SM platforms. They were warned of legal action in case of non-compliance. The instruction was issued after the Lahore Development Authority invited PTA's attention to the need to control advertisements of illegal housing societies on digital and social media pursuant to a directive issued by the Lahore High Court in a writ petition vide its order of March 30, 2022.

Free Calling Facility by CMOs due to Adverse Weather Conditions in Murree

PTA, in aid of the Murree administration, ensured instant provision of free on-net calling facility to mobile phone users who had run out of balance after remaining stuck on the roads of Murree and Galiyat areas for 24 hours due to adverse weather conditions. The response was necessitated by an unprecedented emergency wherein numerous precious lives were lost. Acting on PTA's directions, CMOs extended free calling facility on their networks to users with zero balance. Users were also able to contact their respective operators for any queries. PTA also directed all telecom operators to ensure uninterrupted services to users and to make adequate backup arrangements in case of power outages.

Regulatory Excellence

ITU Gen-5 Regulatory Benchmark

Recently, ITU initiated tracking and benchmarking of the regulatory environment of member countries for global and regional comparisons. The Union appreciated the regulatory practices of PTA and ranked the Authority as a 4th Generation Regulator (G4), placing Pakistan among the top five regulators in the Asia-Pacific region, and the 'Leading' G4 regulator in South Asia (2020 GSR).

ITU has lately revised its assessment framework to include several other cross-sector indicators for evaluation of the regulatory and policy environment of a country set to embrace digital transformation. The 5th Generation (G5) benchmark helps to fast-track collaborative, cross-sector regulation as the best and quickest means to leverage digital transformation for the regulator, the industry, and the economy. Pakistan has made significant progress towards this end, leaping to an 'Advanced' level of G5 regulator. ITU's recognition of PTA is testimony to the rapid evolution of ICT regulations in Pakistan and a prospective transition towards collaborative regulations.

PTA is continuously striving to achieve new international benchmarks under its commitment to protect consumer interests and enhance public-private collaborations for the digital transformation and socio-economic betterment of Pakistan.

Cross-Sector Collaboration

On May 19, 2022, PTA and NH&MP signed an MoU for collaborative initiatives. This synergy in areas of mutual interest will have a resounding national impact vis-à-vis

On May 19, 2022, PTA and NH&MP signed an MoU for collaborative initiatives. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), IG NH&MP Mr. Khalid Mahmood, and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, attended the ceremony.

high-speed and improved connectivity and availability of quality digital services throughout the national highways and motorways of Pakistan. The areas of collaboration include establishing a coordination mechanism for smooth working relations; enhancing voice and data connectivity and coverage on motorways; and knowledge-sharing regarding optimum use of future technologies and latest developments in the telecom sector. Human resource capacity-building in both organizations and holding of training sessions and discussion forums on relevant challenges and technological advancements also constitute a key area of collaboration.

Similarly, driven by the need to build on mutual strengths, PTA and NEPRA signed an accord on September 12, 2022, for initiation of collaborative, cross-sectoral projects. The areas of collaboration include establishment of a coordination mechanism for smooth working relations vis-à-vis digitalization of networks, specifically in the areas of cyber security, transition towards smart grids and advance metering Infrastructure programmes, provision of power-to-community through telecom infrastructure in rural sites, alternate energy solutions, power tariff for telecom sector, and knowledge-sharing regarding optimum use of future technologies and other latest developments. Both organizations will conduct capacity-building programmes and training sessions on relevant issues and technological advancements. NEPRA's 'Power with Security' initiative on the first-ever cyber security drive focusing on Information Technology and Operation Technology is one such example of building strengths in a cross-sectoral environment.

Similar strategic partnerships with other authorities and ministries including NHA, OGRA, NADRA, NTISB, Ministry of Commerce, Ministry of Climate Change, and Pakistan Post are also in the offing.

Regulatory Frameworks and Regulations

https://pta.gov.pk/en/laws-&-policies/regulatory-framework-170222

CMO's QoS and Roll-Out Regulations

Performance measurement against a common QoS standard is an absolute must to foster a competitive environment characterized by subscriber satisfaction. QoS parameters can be measured both through network monitoring terminals and field surveys via drive tests. The opinion of customers also needs to be factored in when gauging the performance of telecom operators.

Following the adoption of 3G and 4G technologies, PTA strictly followed international best practices and QoS standards, and established benchmarks for compliance by CMOs to obtain consumer satisfaction. However, growing subscriber base created segments of dissatisfied customers with mounting complaints against the cellular mobile network. To address this issue, PTA amended the existing regulations and issued the Cellular Mobile Network QoS Regulations, 2021. These regulations, which are now applicable to all cellular mobile communication service and NGMS licensees, lay down the minimum QoS standards and associated measurements for reporting and recordkeeping of mobile network coverage, as well as voice, SMS, and mobile broadband services. These regulations will allay concerns on various QoS parameters, especially call drop, call quality, and data throughput, among others.

Fixed Broadband QoS Regulations, 2022

Following the advancement of broadband technologies and introduction of Gigabit-fast-Internet, the theoretical broadband speed has now been enhanced to 1000 Mbps, along with the promulgation of WiFi-6/802.11ax protocol/standard, where data rates of 10Gbps (dense IoT deployment) have been attained. In Pakistan, the quality of broadband services has become a matter of concern due to growing number of broadband subscribers in the wake of migration from legacy networks to modern Fiber-To-The-Home (FTTH) networks. Addressing this issue required a harmonized and common approach for regulation of QoS to enable greater quality prospects for consumers, irrespective of their location. The PTA-issued Broadband Quality of Service Regulations 2014, hence needed to be reviewed. In particular, the definition of broadband as 'Always On' with a minimum data rate of 256kbps, required updating according to international standards. During the year under review, PTA approved

the revised Broadband Quality of Service Regulations, which shall apply to all Broadband Service Providers with revised KPIs for broadband services. According to the new KPIs, fixed broadband Internet speeds for download data throughput should be at least 4Mbps (up from 256 kbps) and 2Mbps upload; fixed broadband consumers should get a minimum of 80% of the advertised speed at all times, compared to the previous value of 60%; and web page loading time should be less than 3 seconds. These KPIs shall act as quantifiable benchmarks for determining QoS for fixed broadband services. The regulations have been gazette-notified.

Critical Telecom Data and Infrastructure Regulations

In 2020, PTA introduced CTDISR to preserve the security of telecom networks and services. It also worked with MoITT on the Cyber Security Policy, which was issued by the latter in 2021 after multi-stakeholder consultations.

Short Range Devices and IoT Services Framework

IoT is one of the major technologies of the 4th industrial revolution (Industry 4.0). It is used to run smart city systems and digital services such as smart homes, smart meters, and transportation. To facilitate IoT service operations in Pakistan, PTA issued a regulatory framework for SRDs and terrestrial IoT services. This framework provides a regulatory mechanism for the industry to develop the IoT ecosystem in Pakistan. The framework aims to accelerate the growth of IoT services to facilitate digital transformation, create IoT-enabled systems in different sectors to automate operations, and render electronic services to the masses. The introduction of the IoT framework is yet another step towards realization of the government's 'Digital Pakistan' vision.

Spectrum Charging Mechanism for New Services in VHF/UHF Bands

During the period under review, PTA received several applications for assignment of exclusive frequency spots in VHF/UHF bands for implementation of LPWAN services. This required extension of the existing charging regime for Radio-Based Services (RBS) to cover the charging mechanism of new IoT services. To this effect, PTA conducted a comprehensive analysis of the charging mechanism for new services in the VHF/UHF bands for LPWAN. The analysis included a detailed comparison of the existing RBS/Land Mobile Wireless Services, which are operational in exclusively allocated spectrum band in the

VHF/UHF range with IoT/new services utilizing LPWAN (LoRa, Sigfox, etc.). PTA also conducted an analysis of the existing rates for RBS services to determine the charging mechanism applicable to IoT service in the VHF/UHF range. Relevant international trends for utilizing the VHF/UHF band for IoT services, and corresponding charging procedures, were also closely examined. Resultantly, the existing charging framework of RBS has been upgraded and a new charging slab for low-powered devices has been introduced. The framework is now being implemented.

Telecom Infrastructure Sharing Framework

Effective infrastructure sharing has become an absolute necessity in the wake of rising inflation, low ARPU, skyrocketing fuel prices, revenue challenges, tumultuous rupee-dollar disparity, requirement of massive capital expenditure (CapEx) for new technologies like 5G, connectivity challenges in remote areas, and extended nationwide coverage, among other factors. Passive sharing, active sharing, and spectrum sharing are some of the potential solutions to tackle these issues through network infrastructure sharing.

Guided by Section 7.5 of the Telecom Policy 2015, PTA initiated working on the infrastructure sharing framework predicated upon the principles of neutrality, non-discrimination, and equal access. Under this framework, which is based on international best practices, a mechanism for licensees and other stakeholders is being developed to enable sharing of their telecom and other infrastructure facilities including passive elements space, electrical power, air-conditioning, security, cable ducts, and space on antenna and towers, and active elements (BTS, Node-B, e-Node B, BSC, RNG etc). During the period under review, PTA carried out stakeholder consultations on the draft framework and received cross-industry feedback. The framework will be launched after formal approval from MoITT.

Spectrum Sharing and Trading Framework

Growing demand for radio frequency spectrum has obligated regulators to focus on latest trends in spectrum management. The objective of spectrum management, which is a process for efficient regulation of the use of radio frequencies, is to capitalize on the social, economic, and technological benefits of this natural resource. Spectrum sharing and trading are some of the technical and regulatory tools that are currently being used for spectrum management.

During the year under review, PTA did substantial work in formulation of spectrum sharing frameworks; the process involved thorough analysis and assessment of

international developments and telecom market dynamics. Draft frameworks have been shared for consultations with industry and relevant internal and external stakeholders. PTA has analyzed and updated the frameworks in the light of feedback, and will submit the documents for MoITT's approval in due course.

Monitoring QoS

Cellular Mobile Operators' QoS Surveys

Independent Quarterly QoS Surveys

PTA periodically conducts nationwide mobile QoS surveys to assess the network performance of CMOs in relation to licensed KPIs laid down for voice, data, and SMS services. Quarterly surveys are carried out with 'SMARTBENCHMARK,'

a state-of-the-art automated QoS monitoring and benchmarking tool. The drive test teams select survey routes with a view to include main roads, service roads, and most of the sectors and colonies falling in the surveyed areas. Based upon the compliance level of each KPI against the threshold defined in the respective licenses and QoS regulations, CMOs are ranked between 1st to 4th position in each category—mobile network coverage, voice, and SMS services—in surveyed cities, motorways, and highways. Similarly, in the mobile broadband speed segment, ranking is determined, based on highest data download and upload speeds. Field teams of PTA are carrying out the service quality monitoring activity with

🗒 Quarterly Surveys		
Quarter	**Territory/Location**	**No. of Surveys**
3rd Quarter, 2021	Cities and Roads	18 Cities and 8 Roads
4th Quarter, 2021	Cities and Roads	22 Cities and 10 Roads
1st Quarter, 2022	Cities and Roads	24 Cities and 12 Roads
2nd Quarter, 2022	Cities	12 Cities
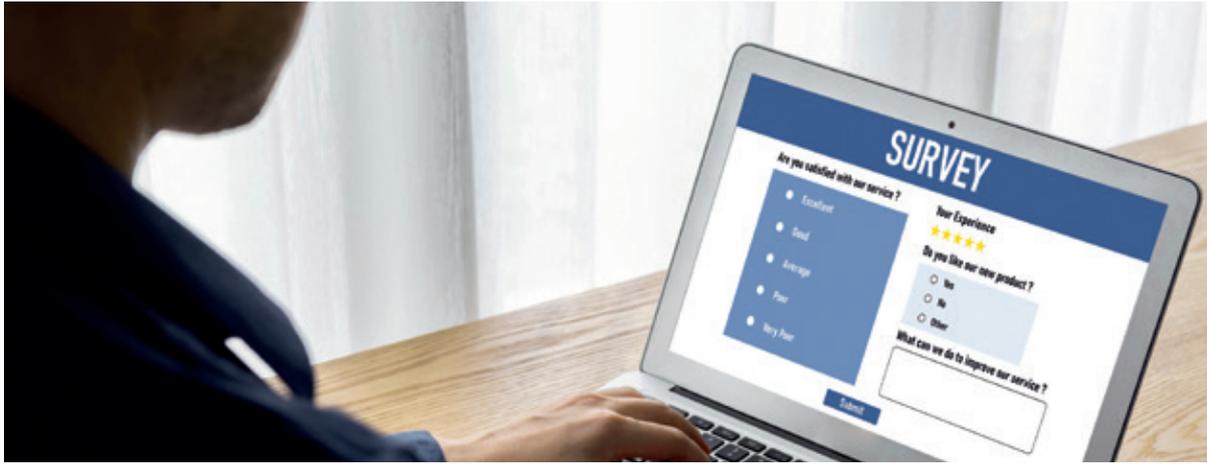
the objective of pursuing operators for provision of better mobile services and promoting healthy competition among them. Survey results are subsequently published on the PTA website for awareness of the public and subscribers. They are also taken up with the concerned operators for necessary remedial action for improvement of services, as and when required. During the period under review, 76 cities and 30 motorways, national highways, and inter-city roads were surveyed. Details of quarterly QoS surveys conducted during FY 2021-22 are shared below.

First Quarter, FY 2021-22

Independent QoS surveys were carried out in 18 cities of Punjab, Khyber Pakhtunkhwa (KPK), Sindh, and GB in the first quarter of FY 2021-22. Zong turned out to be the leading operator in terms of coverage, mobile broadband (4G) services, and voice category, whereas Ufone turned out to be the best in mobile broadband (3G) services category. (See Table for ranking of CMOs against each assessed category).

Overall Standing in QoS Surveys					
Service		1st	2nd	3rd	4th
Mobile Network Coverage		Zong	Telenor	Jazz	Ufone
Mobile Broadband	3G	Ufone	Jazz	Telenor	Zong
	4G	Zong	Jazz	Telenor	Ufone
Voice			Zong	Ufone & Telenor	Jazz	-
SMS			Jazz & Zong	Ufone	Telenor	-

Second Quarter, FY 2021-22

Independent QoS surveys were carried out in 18 cities of Punjab, KPK, Sindh, and Balochistan during the second quarter of FY 2021-22. To expand the outreach of the QoS survey and to gauge the performance of CMOs, the roads of Punjab, KPK, and Balochistan were also surveyed.

Zong and Ufone maintained their positions in the overall survey results. (See Table for categorization and ranking of CMOs in relation to compliance of Voice QoS KPIs).

Voice QoS KPIs			
Operator	Compliant	Non-Compliant	Standing
ZONG	98	10	1st
ufone	113	12	2nd
Jazz	131	18	3rd
telenor	104	16	4th

Third Quarter, FY 2021-22

Independent QoS surveys were carried out in 11 cities of Punjab, KPK, Sindh, and Balochistan during the third quarter of FY 2021-22. The surveys measured the performance of CMOs and the quality of mobile services on different roads, highways, and motorways. Zong and Ufone maintained their positions while Jazz noticeably improved its network coverage, compared to the preceding quarters, and turned out to be the best vis-à-vis network coverage QoS KPIs i.e., signal strength of 4G/LTE and 3G networks. (See Table for categorization and ranking of CMOs in relation to compliance of QoS KPIs governing network coverage).

Network Coverage, Compliance Level, Number of Cities					
Operator	Compliant		Non-Compliant		Standing
	4G	3G	4G	3G	
Jazz	11	11	-	-	1st
ZONG	11	11	-	-	1st
telenor	7	11	4	11	2nd
ufone	5	11	6	11	3rd

Fourth Quarter, FY 2021-22

The monitoring exercise continued in the fourth quarter of FY 2021-22 to meet the target of cities identified in the agreement with the Prime Minister's Office. The survey results were quite encouraging; CMOs were largely compliant vis-à-vis broadband services. However, SMS and voice KPIs in some areas were below the licensed threshold. Eventually, necessary instructions for corrective measures were issued to CMOs for improvement in service quality per licensed standards. (See Table for standing of CMOs for latency of operators in 3G and 4G broadband services).

Standards Institute (ETSI). It categorizes the overall network performance, based on automated tests with commercial smartphones simulating the typical end-user behaviour (voice call, data transfer, browsing, streaming video and SM, etc.) in a public network. By conducting NPS benchmarking, PTA spurred competition among CMOs, inspiring them to improve their existing infrastructure with the goal of enhancing mobile network quality across the country. Pakistan is the first country in the region to conduct the NPS campaign as per latest ETSI TR103 559 robust mobile benchmarking methodology developed in August 2019. The NPS report is accessible on the PTA website at

Latency - Number of Cities									
Operator	**Compliant**				**Non-Compliant**				**Standing**
	Auto	4G	3G	Total	Auto	4G	3G	Total	
ufone	01	08	-	09	13	05	14	**32**	1st
ZONG	-	03	06	09	14	11	08	**33**	2nd
Jazz	-	01	01	02	14	12	10	**36**	3rd
telenor	01	01	-	02	13	13	14	**40**	4th

All survey results are accessible on the PTA website (*https://pta.gov.pk/en/consumer-support/qos-survey/qos-survey*) for the information of subscribers; they have also been communicated to CMOs for remedial action.

Complaint-Based QoS Surveys

PTA, in collaboration with CMOs, carried out surveys and network optimization exercises in different cities of Pakistan in response to complaints lodged by consumers. During the period under review, 72 surveys were carried out throughout Pakistan to resolve user complaints, resulting in significant improvement in QoS.

CMOs' QoS Benchmarking Campaign

In tandem with the above-mentioned quarterly QoS surveys, PTA conducted a nationwide CMOs' QoS benchmarking campaign during January-February 2022. Using the Network Performance Score (NPS) methodology, testing was carried out on approximately 4,522 kilometers covering five cities, four towns, and four motorways and highways. During the campaign, 15,427 voice calls, 17,608 fixed size downloads, 16,670 fixed size uploads, 5,651 capacity downloads, 5,668 capacity uploads, 15,300 SM Apps, 10,230 video streaming, 499,638 latencies, and 82,192 web browsing tests were simultaneously performed while testing the networks with devices operating in 4G mode.

NPS is a harmonized and integrative scoring methodology standardized by the European Telecommunications

https://pta.gov.pk/assets/media/second_network_performance_score_28022022.pdf

Administrative Sanctions

Show Cause Notices and Enforcement Orders

PTA issued 190 Enforcement Orders/Determinations/Disposals and 129 Show Cause Notices (SCNs) to its licensees during the period between January 2021 to June 2022. These orders and notices are primarily served on non-commencement of licensed services; non-submission of outstanding dues or Annual Audited Accounts (AAAs); non-payment of Annual Regulator Dues (ARDs), non-provision of Smart QoS Monitoring and Benchmarking Tool; and incorrect data provision. Inability to conduct third-party audits, provision of services in the absence of a commencement certificate, communication breakdowns, overcharging, data leakage, unauthorized spectrum usage, and matters related to SIMs and QoS are additional reasons that may warrant administrative sanctions.

In line with the Telecom Re-organization Act 2006, PTA imposed penalties of over PKR 139 million for different violations during the stated period. Almost 80% of the

penalties pertained to issues of QoS, breakdown of services, non-provision of data, and undue transfer of SIMs. (See Table for details of penalties imposed on different violations made by licensees).

	Enforcement Orders	Licensees	SCNs	Issue	Fine Imposed (PKR Million)
Enforcement Orders, Show Cause Notices Issued and Fines Imposed (Jan. 2021-June 2022)					
1	Jan. 27, 2021	Telenor	Sept. 10, 2020	Non-Dissemination of Kashmir Day Messages	1.0
2	May 31, 2021	Ufone	Oct. 22, 2020	Security Breach of Consumer Data	5.0
3	June 29, 2021	Telenor Zong Mobilink	June 29, 2020	Failure to Meet QoS KPIs in 4th Quarter of 2019 (QoS Survey, AJK)	0.4
4	June 29, 2021	Telenor Zong Mobilink Ufone	June 29, 2020	Failure to Meet QoS KPIs in 3rd and 4th Quarters of 2019 (QoS Survey, Pakistan)	8.4
5	June 29, 2021	Telenor Zong Mobilink	July 7, 2020	Failure to Meet QoS KPIs in 1st Quarter of 2020 (QoS Report)	0.8
6	Oct. 18, 2021	EDOTCO Pakistan	Aug. 21, 2020	Non-Provision of Telecom Tower Facilities	1.0
7	Nov. 8, 2021	PTCL	Aug. 6, 2021	Provision of Incorrect Data	1.0
8	Dec. 6, 2021	Telenor	March 19, 2021	Breakdown of Major Communication Services in AJ&K	50.0
9	Jan. 14, 2022	Mobilink	March 31, 2021	Failure to Meet QoS KPIs in 4th Quarter of 2020 (QoS Survey, Pakistan)	30.0
10	Feb. 1, 2022	Telenor	Dec. 31, 2021	Non-Maintenance and Non-Provision of Data on Sale of SIMs	1.0
11	May 13, 2022	Ufone	July 2, 2021	Undue Transfer of SIM	20.0
12	May 20, 2022	Telenor	Sept. 27, 2021	Invalid Transfer of SIM	20.0
13	June 13, 2022	Zong Telenor	Jan. 17, 2022	QoS Issues at Warsak and Charsadda Road, Peshawar	0.4
	Total Fine Imposed				**138.9**

Internet and Social Media Management

Continuity of support to SM users and creation of an enabling environment for tech companies by PTA and GoP has significantly increased the SM user base in Pakistan, where over 70 million SM users are currently active. PTA's support and facilitation of the SM segment in line with the government's 'Digital Pakistan' vision is creating an impact on improving meaningful connectivity and reducing usage gaps. (See Table for profiling of Pakistan's SM users).

PTA has consistently been encouraging SM companies to register with the Authority as per Removal and Blocking of Unlawful Online Content (Procedure, Oversight and Safeguards) Rules, 2021. To this end, PTA initiated the registration of SM companies for compliance of the said

	Social Media		
S. No.	**Platform**		**Users (Million)**
1	YouTube		71.7
2	Facebook		57.5
3	Snack Video		20.0
4	Snapchat		18.8
5	TikTok		18.3
6	Instagram		15.6
7	LinkedIn		7.6
8	Bigo and Likee		4.2
9	Twitter		3.4

Source: Statistics from Sources [1]~[4]

rules. (See Table for list of SM companies that applied for registration and were issued registration certificates after due diligence).

S. No.	**Company**	**Platform**
1	Joyo Technology Pakistan (Pvt.) Ltd.	SnackVideo
2	Bigo Service Pakistan (Pvt.) Ltd.	BIGO Live Likee
3	Mico World Ltd.	YoHo MICO

Registration of SM Companies

Furthermore, PTA also maintains constant liaison with international SM companies for the development of an effective monitoring mechanism with respect to blocking and removal of unlawful content. Dedicated channels have been established with major SM platforms including Facebook, YouTube, TikTok, and Twitter, etc. Also, wherever required, SM companies have nominated dedicated focal persons besides providing separate escalation channels for quick removal of sensitive reported content.

Engagement with TikTok

PTA and TikTok convened a detailed meeting focusing on content moderation on the TikTok platform in line with local laws and societal norms. The exercise was a step in the direction of meaningful engagement. TikTok highlighted its various ongoing initiatives, along with its future investment strategy in the local market for dissemination of safe, productive, informative, and legitimate content to Pakistani users. Acknowledging the efforts, PTA assured continuous engagement with TikTok to arrive at a mutually acceptable mechanism for provision of safe, lawful, and productive Internet experience to users in Pakistan. PTA restored the services of TikTok but will continue to monitor the platform to prevent dissemination of content that is contrary to Pakistan's law and societal values.

Public Awareness Campaigns for Safe Social Media

PTA has consistently been utilizing various channels to raise public education with respect to productive, responsible, safe, and legitimate usage of SM platforms. In addition to regularly disseminating advisories through print media and SMSs, it also collaborates with entities such as UNICEF and the Wafaqi Mohtasib (Federal Ombudsman) Secretariat Task Force regarding online child protection, and SM platforms to create awareness regarding online harm and safe SM usage. Recently, a web series titled 'Chai Chats' has been launched in collaboration with Meta to educate SM users (aged between 18 to 25 years) on social cohesion and responsible online behaviour. This series is being disseminated through the Meta Chai Chats Page, PTA's official SM accounts, and through SM influencers. An added aim is to complement this effort by educating and holding training sessions for teachers belonging to at-risk communities.

Unlawful Content Management

PTA houses a dedicated Cell that monitors unlawful online content, where applicable, and resolves complaints received from the public as well as government organizations. It also regularly disseminates advisories through SMSs, as well as social and print media, alerting the public to report unlawful online content to PTA for appropriate action. As many as 1.1 million URLs, including 187 mobile applications used for various unlawful activities, have so far been processed for blocking. (See Table for categorization of complaints related to unlawful content).

Category	**Processed**
Contempt of Court	8,709
Defence of Pakistan	36,900
Glory of Islam	78,119
Defamation/Impersonation	7,713
Miscellaneous	6,464
Decency and Morality	905,009
Proxy	10,219
Sectarian/Hate Speech	40,536
Total	**1,191,050**

Complaints Related to Unlawful Content/URLs

Impact of DIRBS

Bringing benefits such as cleansing of the local market of fake and substandard handsets, smuggled mobiles, and non-GSMA approved mobiles on network, DIRBS has achieved seamless functioning. Its wider impact on the economy has manifested in the shape of a newly established mobile ecosystem, emergence of local handset manufacturing industry, job creation, investments by global mobile manufacturers, increased government revenues, and 100% registration of handsets across all cellular networks

of Pakistan. Today, commercial imports of 1.24 million have been taken over by local manufacturing, which stands at 16.70 million. (See Table for impact of DIRBS on the status of blocked, banned, and barred devices in Pakistan).

- PTA issued the MDM Regulations 2021, which enable companies to obtain MDM authorization for a period of 10 years. As many as 30 authorizations have been issued so far. The list includes international brands like Samsung, Xiaomi, Nokia, Oppo, Vivo, Techno,

Commercial vs. Local Manufacturing vs. FBR Revenue and Job Creation Impact						
Year	Commercial Import (Million)	Local Manufacturing (Million)	Impact of DIRBS	Job Creation (Approx.)	No. of Manufacturing Plants and Companies	Revenue Collected by FBR (PKR Billion)
2016	21.60	0.29	-	200	3	-
2017	19.80	1.72	-	600	3	-
2018	17.20	5.20	-	3,000	9	22.0
2019	16.28	11.74	Increase by 125% from 2018	8,000	11	46.3
2020	25.01	13.13	2.16 Million 4G Smart Phones Assembled in Pakistan	600	3	54.0
2021	10.27	24.65	10.06 Million Smart Phones Manufactured in Pakistan	20,000	30	19.3 (July 2021-Jan. 2022)
2022 (Jan.-Sept.)	1.24	16.70	7.24 Million 4G Smart Phones Manufactured in Pakistan	26,000	30	-

and Infinix, and local brands like VGO Tel and E-Tachi, among others.

- Today, 30 local plants in Pakistan are manufacturing feature and smart phones, not just for local market consumption but export purposes also. In just nine months (January-September 2022), Pakistan manufactured a whopping 7.24 million smartphones, resulting in the creation of skilled jobs for over 26,000 people.

- For the first time in Pakistan's history, the import volume of CBU phones in 2021 registered a decline as

most of the local demand was catered through locally manufactured products. According to data spread over five months, CBU imports dropped further amid a major shift towards locally manufactured mobile phones.

- PTA blocked 175,000 devices against IMEI numbers reported stolen through DIRBS.

- DIRBS identified and blocked 29.56 million IMEIs identified as duplicate. It also blocked 0.88 million cloned IMEIs identified as being used against 5.28 million MSISDN numbers.

Imported Quantity Commercial and Locally Manufactured

Year	Quantity
2019	28,025,307
2020	37,552,042
2021	34,923,203
2022 (Jan.-Sept.)	17,936,490
Total	**28,025,307**

Uptake of 4G, 3G, 2G IMEI on Local Mobile Networks

Year	4G (%)	3G (%)	2G (%)
2019	32%	13%	56%
2020	39%	9%	52%
2021	47%	5%	48%
2022 (Jan.-Sept.)	49%	5%	46%

Commercial vs. Locally Manufactured Imports (Million)

Commercial Locally Manufactured

Year	Commercial	Locally Manufactured
2016	21.36	0.29
2017	18.11	1.72
2018	12.07	5.20
2019	16.28	11.74
2020	24.51	13.01
2021	10.26	24.66
2022 (Jan.-Sept.)	1.24	16.70

Locally Manufactured Devices (Million)

2G Smart Phones Total

Year	2G	Smart Phones	Total
2019	11.62	0.12	11.74
2020	10.98	2.06	13.05
2021	14.60	10.06	24.66
2022 (Jan.-Sept.)	9.46	7.24	16.70

Financial Inflows and Outflows

Pursuant to the Telecommunication Re-organization Act 1996, PTA regularly carries out spectrum auctions, announces license awards and renewals, and collects regulatory dues from telecom licensees.

During the period under review, PTA collected and deposited PKR 102.5 billion in FCF, which was PKR 53 billion more than the amount budgeted in Federal Budget 2021-22. Moreover, NGMS auction proceeds of Rs. 3.9 billion for AJ&K and GB were also collected. (See Table for major

receipts including proceeds from NGMS auction and license renewals in Pakistan and AJ&K and GB).

Amount Received (FY 2022)

Description	Pakistan		AJ&K and GB	
	US$ Million	PKR Million	US$ Million	PKR Million
NGMS Auction Proceeds	180	29,981	22.9	3,908
License Renewal Fees, 2019	153	27,842	-	-
License Renewal Fees, 2021 (Jazz)	243	44,536	-	-

Engagement with National Assembly and Senate

During the period under review, PTA extensively engaged with the National Assembly and Senate of Pakistan and various Standing Committees constituted by the two floors of the house, as reflected in the Table. These committees are mandated to address a wide range of IT and telecom-

related issues of national importance and public interest. Concerns raised by public representatives in the Senate and National Assembly Committees were also appropriately dealt with and responded to by PTA. Major issues related to the following areas were flagged and addressed:

- ◗ DIRBS.
- ◗ QoS in different areas of the country.
- ◗ Mobile service coverage in different areas of the country.
- ◗ Blocking of unlawful and blasphemous content from the Internet.
- ◗ Blocking of fake SM accounts, and addressing the cybercrime menace.

S.No.	Detail	National Assembly	Senate
Engagement with National Assembly and Senate			
1	Starred Questions	7	9
2	Un-Starred Questions	2	-
3	Resolutions/Motions	3	4
4	Calling Attention Notices	1	-
Standing Committee Meetings			
5	Standing Committee on IT and Telecom	10	9
6	Standing Committee on Cabinet	5	5
7	Standing Committee on Interior	1	-
8	Standing Committee on Defence	1	-
9	Functional Committee on Government Assurance	-	2
10	Standing Committee on States and Frontier Regions	-	1
	Total	**30**	**30**

Employee Service Regulations

During the year under review, PTA carried out remarkable improvisation in work processes and policies for smooth functioning of the organization. A significant headway in this regard was revision of the Employee Service Regulations 2008, to improve service-related matters and other relevant SOPs. The review process entailed a thorough analysis of existing regulations and amendments in terms of various employee-related policies. In this regard, the following newly-developed and revised employee-related policies were approved:

- ◗ Medical Board-Out Policy.
- ◗ Medical facility for consultants and daily wagers.
- ◗ Grant of proficiency and Eid allowance for consultants and daily wagers.
- ◗ Professional certification of PTA employees.
- ◗ Revision in HBA policy.

2

Telecom and ICT Development

Telecom and ICT Development

Seen from a holistic perspective, digital connectivity is reshaping the very fabric of societies and economies worldwide. Individuals, businesses, and industries alike are exploiting the immense opportunities emerging from enhanced use of ICTs. Being the telecom sector regulator, PTA continues to play a pivotal role in creating an enabling environment for expansion of advanced networks, and improving the availability of and access to cutting-edge ICT technologies in association with the telecom industry and allied stakeholders. This synergy is aimed towards growth of the telecom industry amid tough economic conditions and inflationary pressures.

It is because of the supportive regulatory environment in Pakistan that 90% of the country's population enjoys mobile coverage and over 194 million SIMs/subscribers are biometrically verified. Broadband penetration is 56%, thereby creating a pool of 124 million broadband subscribers. Furthermore, 3G and 4G mobile signal coverage is available to more than 78% of the populace. The volume of broadband data usage spiraled to 8,970 petabytes in FY 2021-22, while the usage of SM and e-commerce platforms also witnessed a new high. This expansion in networks and increased broadband usage enabled the telecom industry to reach the revenue mark of PKR 694 billion during FY 2021-22.

Telecom and Broadband Growth

Economies around the world are embracing digital transformation at an astonishing pace. Disruptive technologies and rising customer expectations are pushing the telecom industry to search for advanced solutions geared towards high-speed connectivity and access. The expansion of broadband access across the country constitutes a key aspect of Pakistan's digital policy and PTA's regulatory approach.

Pakistan's journey towards high-speed mobile broadband services dates back to 2014, when PTA carried out

spectrum auction for NGMS and initiated the deployment of 3G and 4G infrastructure in the country. PTA further strengthened the uptake of 4G services with additional spectrum auctions of 1800 MHz, 850 MHz, and 2100 MHz bands in the years 2016, 2017, and 2021 in Pakistan, and AJ&K and GB. The simultaneous launch of 3G and 4G mobile technologies, coupled with the creation of a competitive environment and continuous supply of the required spectrum for advanced technologies, paved the way for achieving the 124 million broadband mark in just eight years, compared to a relatively insignificant 7.7 million subscriptions in September 2014. Of the 56% broadband penetration achieved in eight years, 54.6%

Broadband Penetration–Mobile and Fixed (Percentage)
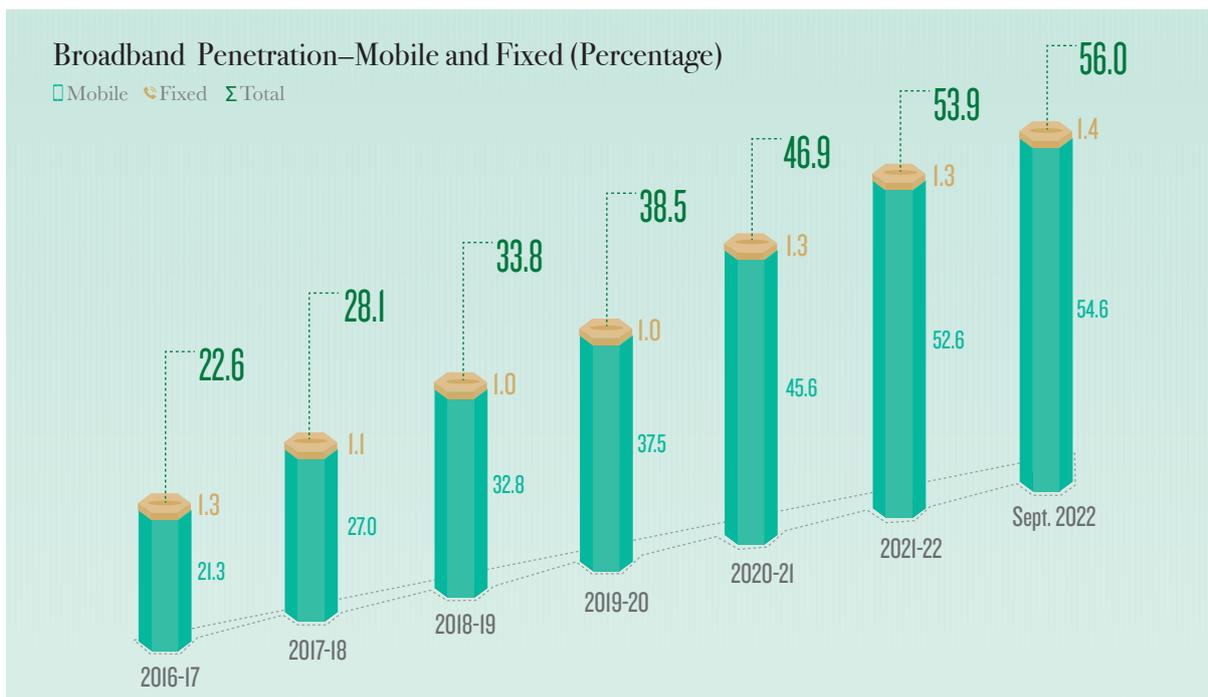
constitutes mobile broadband and 1.4% fixed broadband penetration. As such, 97.5% of the broadband penetration in Pakistan has resulted from mobile services. PTA is still making concerted efforts to boost fixed broadband networks and subscriptions.

In terms of mobile broadband subscriptions, Jazz is leading with a share of 38%, followed by Zong (27.8%), Telenor (21.4%), Ufone (11.6%) and SCO (1.2%). (See Key Metrics on Page 28). Pursuant to its policy of adequate availability of spectrum for NGMS growth, PTA organized a spectrum auction in September 2021, wherein Ufone won 9 MHz in 1800 MHz at the cost of US$ 279 million. Additional spectrum acquisition clearly provided the impetus for Ufone to boost its broadband drive, enabling it to achieve highest growth in its market share amongst all operators during FY 2021-22. While Ufone was able to increase its market share by 0.7%, Zong's share rose by 0.1% only. On the other hand, the market shares of Jazz and Telenor declined by -0.5% and -0.4%, respectively.

Mobile and Fixed Subscribers (Million)

 Mobile Fixed Σ Total

	184.2	2.6	186.8	2020-21
	194.6	2.6	197.2	2021-22
	194.1	2.6	196.7	Sept. 2022
	162.3	2.7	165.0	2018-19
	168.6	2.5	171.1	2019-20
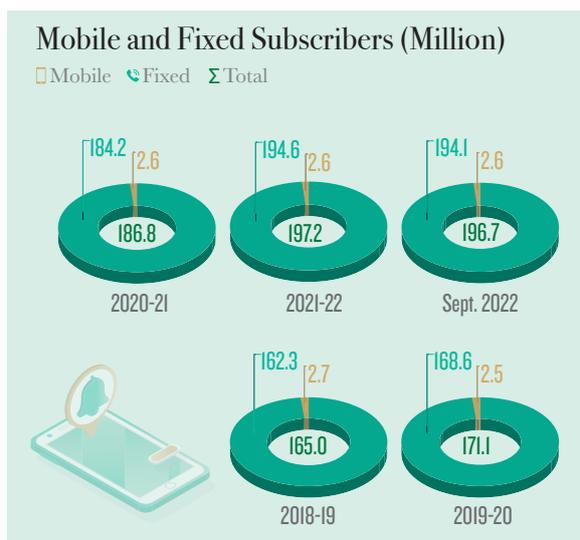
further declined to 0.58% of the Gross National Income per capita—well below the UN Broadband Commission's recommendation of less than 2%. (Source: ITU/A4AI).

Mobile and Fixed Broadband Subscribers (Million)

 Mobile Fixed Σ Total

Year	Mobile	Fixed	Total
2018-19	69.4	2.1	71.5
2017-18	56.5	2.3	58.8
2016-17	42.1	2.6	44.7
Sept. 2022	120.6	3.0	123.6
2021-22	115.8	3.0	118.8
2020-21	99.9	2.8	102.7
2019-20	81.7	2.1	83.8

During the year under review, mobile subscriptions registered a healthy annual growth of 6%. In the domain of subscriber growth, Zong took the lead with 9% growth, followed by Jazz (8%), Telenor (1.4%), and Ufone (0.7%). In terms of mobile subscriptions, Jazz led with a share of 38.6%, followed by Telenor (25.3%), Zong (23.1%), Ufone (12.1%) and SCO (0.9%). Over the last four years, Jazz and Zong have successfully increased their market shares while Telenor and Ufone saw a decline owing to lower investments and late entry in 4G market. (See Key Metrics on Page 26).

Currently, 78% of Pakistan's population is covered by 3G and 75% by 4G mobile signals, meaning that the needs of a vast majority are being catered. Pakistanis have access to Internet and broadband services at the most affordable rates in the region. Notably, mobile 1GB data cost has

The broadband and data cost targets listed in the National Broadband Policy 2021 (draft available on the MoITT website) envisage 80% broadband penetration by 2025 and 90% by 2030, with a greater than 30 Mbps average broadband speed by 2025, and 50% reduction in average price per Gigabyte by 2025. PTA, in its performance agreement with the Prime Minister's Office, set a target of 51% broadband penetration by June 2022 and 55% by June 2023. The Authority successfully achieved the 55% mark in July 2022. According to the Speedtest Global Index (July 2022), Pakistan's average mobile broadband download speed of 20.84 Mbps is above the speed levels in other regional countries such as India (19.57 Mbps) and Bangladesh (16.33 Mbps). Furthermore, broadband targets have also been supported by coverage and QoS obligations in 4G cellular mobile licenses to ensure provision of quality 4G services to subscribers.

Increased penetration of broadband services has propelled active use of data services by Pakistanis. As such, during the period under review, 8,970 petabytes of mobile data usage was reported, indicating a 31% increase from the previous year. During FY 2021-22, average data usage per NGMS subscriber per year was 81 GBs (i.e., 6.8 GBs per month), compared to 73 GBs in FY 2020-21, indicating a growth of 11%.

Mobile Internet Download Speed (Mbps)		
Country	July 2022*	
	Median	Mean
PAKISTAN	14.33	20.84
INDIA	13.41	19.57
BANGLADESH	9.65	16.33
NEPAL	14.23	20.60
SRI LANKA	11.39	20.94

*Median are preferred to reflect the speeds a user is likely to achieve.
Source: Speedtest Global Index

The widespread expansion of mobile broadband services owes it to continuous upgrading and expansion of advanced networks. In this context, while PTA maintained reasonable rollout obligations in cellular licenses in tandem with creating a competitive environment for broadband services, mobile operators also stepped up with modified business plans to expand and upgrade their networks. Resultantly, during FY 2021-22, CMOs added 3,607 cell sites, compared to 1,707 in the previous year. Similarly, 8,075 cell sites were upgraded for 4G services, compared to 3,333 in the previous year. Spectrum auction, license renewals, and effective rollout obligations by PTA positively impacted the expansion and upgrading of operators' network. The total mobile cell sites stand at 52,565.
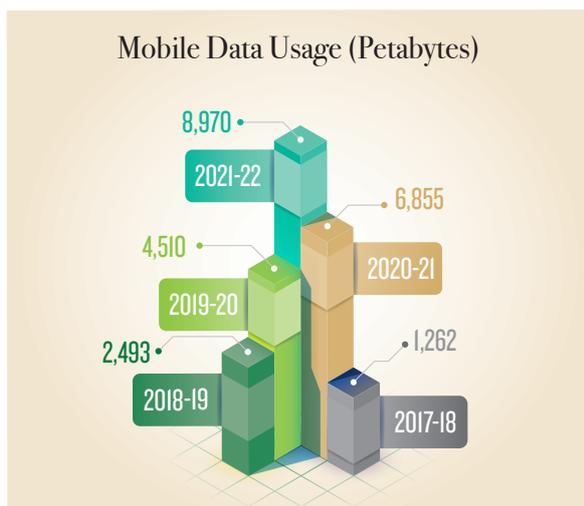
Generally, FY 2021-22 was a prosperous year for the telecom sector in Pakistan despite challenges such as increasing operational costs triggered by inflationary pressures and increase in fuel prices in the year's last quarter (April-June). PTA's pro-growth measures including spectrum auction and license renewals, along with operators' expansion of network and increased broadband usage, translated into an investment of US$ 2.1 billion in the telecom sector during FY 2021-22, thereby registering a significant increase of 55% from the corresponding period last year. The increased activity also enabled telecom operators to register a healthy Year over Year revenue growth of 9% during the first three quarters of FY 2021-22. However, economic slow-down and increased operational costs

Mobile Data Usage (Petabytes)

8,970 — 2021-22
6,855 — 2020-21
4,510 — 2019-20
2,493 — 2018-19
1,262 — 2017-18

Cellular Mobile Cell Sites

■ 2G ■ 3G ■ 4G

	2017-18	2018-19	2019-20	2020-21	2021-22
2G	42,119	45,171	47,251	48,958	52,565
3G	32,983	38,228	42,306	43,161	45,303
4G	20,056	30,618	36,764	40,097	48,172

Telecom Revenue (PKR Billion)

540 ▶ 2017-18
606 ▶ 2018-19
597 ▶ 2019-20
651 ▶ 2020-21 (R)
694 ▶ 2021-22 (P)

P: Provisional   R: Revised

Mobile ARPU Per Month (PKR)

219.1 — 2017-18
238.3 — 2018-19
213.9 — 2019-20
215.2 — 2020-21
220.2 — 2021-22

Telecom Investment (US$ Million)

1,132 — 2017-18
840 — 2018-19
1,394 — 2019-20 (R)
1,336 — 2020-21 (R)
2,073 — 2021-22 (P)

P: Provisional   R: Revised

Effective Price (Revenue) Per GB/Month (PKR)

48.96
37.86
34.23

2019-20   2020-21   2021-22

resulted in rather sluggish growth in the last quarter. As such, overall telecom revenues during FY 2021-22 stood at an estimated PKR 694 billion, indicating an annual growth rate of 6.6% over the previous year. (See Key Metrics on Page 30).
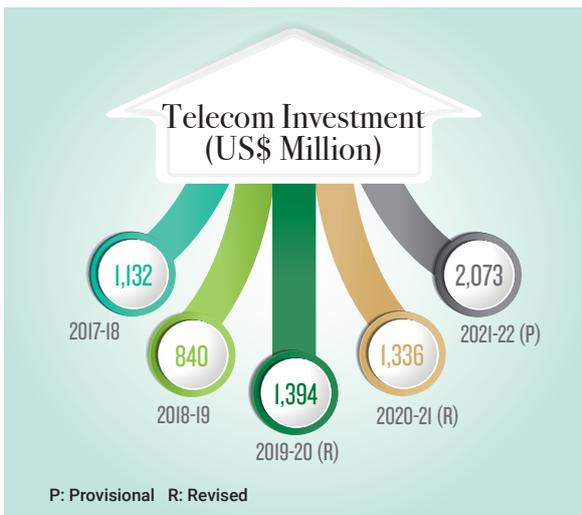
In terms of ARPU, the mobile sector registered modest improvement as indicated by an increase from PKR 215 in FY 2020-21 to PKR 220 per month in FY 2021-22. This increase can be attributed to expansion of mobile services, addition of new subscribers, increased usage of data services, and increase in tariffs. Given the rising number of Internet subscribers, a major chunk of mobile operators' revenue comes from provision of data services. The share of data revenue in the gross revenue generated by mobile operators increased from 38% in FY 2017-18 to 61% in FY 2021-22. The data ARPU of the mobile industry stood at PKR 237 per month during FY 2021-22 as against PKR 234.7 in the previous year, reflecting a minor increase of 0.37%, compared to a 11% increase in data usage per subscriber; this shows that the average
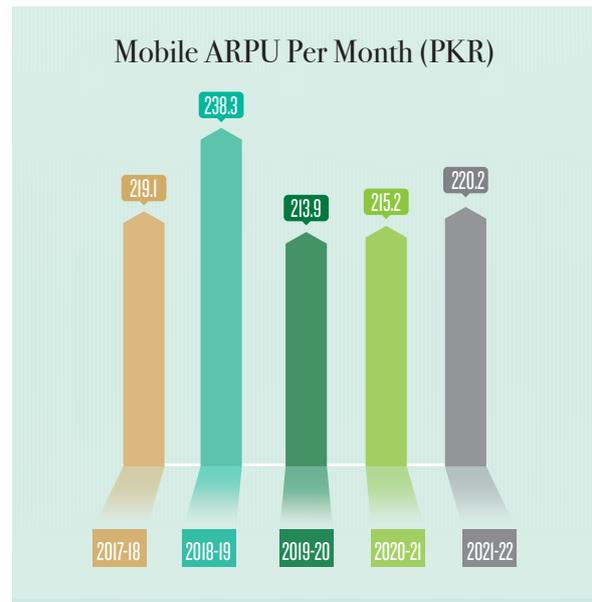
price for data has further declined in Pakistan. This is also evident from the effective price per GB calculation, which shows that price (in terms of Revenue/GB) further declined to PKR 34.23 in FY 2021-22, compared to PKR 37.86 in the previous year.
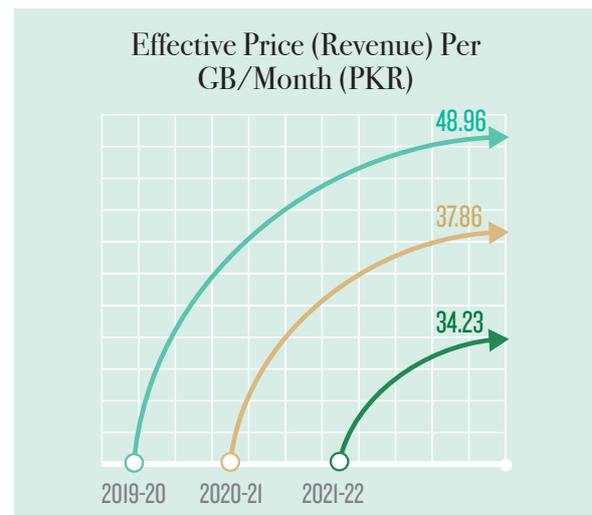
PTA is strategizing enhancement of the current infrastructure to promote digital inclusion. During the year under review, it extensively interacted with the industry for the uplift of 4G/LTE services in Pakistan, including AJ&K and GB. The Authority ensured availability of additional spectrum (1800 MHz and 2100 MHz bands); renewed and reframed spectrum assignments; facilitated OFC deployment, mitigated Right of Way (RoW) issues, and enhanced QoS and coverage obligations for provision of high-quality 4G services to the people of Pakistan, AJ&K, and GB. PTA is also supporting rationalization of future spectrum prices as the unprecedented depreciation of Pak Rupee has called for review of dollar denominated spectrum prices, which have exposed telecom operators to an additional burden in terms of higher spectrum payments in rupees.

These measures will enable operators to judiciously manage their network planning and investments, and will also increase accessibility and availability of telecom services to meet the ever-growing demand for broadband. Alongside GoP's policy on availability of 5G services, MoITT and PTA are also planning spectrum auction for enhanced proliferation of LTE, Voice over LTE (VoLTE), and 5G services soon. Successful 5G tests have already been carried out in the country. PTA will also pursue the availability of large contiguous bandwidth and prioritize and facilitate the roll-out of 5G.

E-Commerce and Financial Inclusion

The expansion and increased use of broadband services in Pakistan has led to proliferation of the e-commerce market, which has registered impressive growth in the last few years. Businesses are quickly adapting to digital platforms to increase their outreach and augment their sales. EcommerceDB—a subsidiary company of Statista—labeled Pakistan as the 37th largest market for e-commerce in 2021, with a revenue of US$ 5.9 billion, placing it ahead of Iran. The company reported Pakistan's e-commerce market as having had an astounding growth of 45% during 2021, compared to worldwide growth rate of 15% percent.

According to EcommerceDB, designer clothing shops topped the online store ranking for Pakistan in 2021. The fashion industry accounts for 70% of the total e-commerce revenue generated in Pakistan, followed by electronics

E-Commerce Merchants Registered with Banks

2,523 — March 2021
3,003 — June 2021
2,993 — Sept. 2021
3,968 — Dec. 2021
4,445 — March 2022

Source: State Bank of Pakistan

and media (12%), food and personal care (11%), toys, hobbies, and DIY (4%), and furniture and appliances (4%).

In May 2021, Amazon added Pakistan in the list of countries that are allowed to sell on its marketplace. Thousands of sellers from Pakistan have since joined the Amazon marketplace. The Trade Development Authority of Pakistan has reported Pakistan as being among the top three new sellers that joined Amazon's marketplace in the US in 2022. The development, which owes it to concerted efforts made by GoP, is a great opening for e-commerce. Small and medium enterprises and women entrepreneurs will particularly get a chance to reach out to customers around the globe.

Experts believe that widespread Internet availability and usage in Pakistan promises huge growth potential for e-commerce in the years to come. This is also evident

from the fact that as of March 2022, the number of e-commerce merchants registered with banks has increased to 4,445, registering a staggering 76% annual growth. The compound annual growth rate of Pakistan's e-commerce market for the next four years (CAGR 21-25) is predicted by EcommerceDB to be 7%.

Pakistan's widespread telecom infrastructure (with over 52,565 telecom towers/sites and a nationwide distribution network with over 220,000 retailers and franchises) is not only catering to the needs of telecom services, but also helping the spread of various other digital services. For instance, the distribution network of proactively participating mobile operators has enabled opening of 88.5 million mobile banking (m-Wallets) accounts and creation of 637,231 m-wallet agents.

The use of broadband services also heralded a remarkable increase in e-banking; quarterly mobile banking transactions (App-based/Internet only) registered an eight-fold increase from 11.9 million in the first quarter of 2019 to 101.5 million in the first quarter of 2022. Quarterly Internet banking transactions almost quadrupled from 8.6 million in the first quarter of 2019 to 38.3 million in the first quarter of 2022. Similarly, the uptake of myriad digital solutions and services in the country was only made possible through broadband.

According to Pakistan's Bureau of Statistics, 93% of Pakistani households have mobile phone ownership

(96% in urban and 91% in rural areas), which shows a great potential for mobile-based digital payments and other financial services to the unbanked. Collaborative efforts of mobile operators and banks have increased mobile banking accounts by 148% from 35.7 million in June 2019 to 88.5 million in June 2022. As depicted in the graphs, mobile banking continued its growth as manifested in value of transactions above PKR 10.6 trillion in FY 2021-22 (a growth of 32% from the previous year). In addition, the AMA scheme, which was commercially launched in August 2022, has over 5 million accounts; the scheme is expected to further facilitate ongoing financial inclusion efforts in Pakistan.

Despite encouraging growth in banking accounts and increasing transactional activities, Pakistan's financial inclusion rate is lagging in regional and global terms. According to the Global Findex 2021, only 21% adults (aged 15+ years) in Pakistan have bank account ownership, compared to an average of 71% in developing countries. Financial services are adopted in Pakistan mostly for making digital payments; as such, access to savings or credit solutions is limited. Despite the introduction of cash transfer programmes like Ehsaas Kafalat, which covers over 8 million women, account ownership of women stands at 13% only—less than half of men's account ownership of 28%. As such, there is a strong need for efforts to take this journey further by including the unbanked population in the financial system and helping them adopt digital payments.

M-Banking Transactions (Billion)
- Value of Transaction (PKR)
- Transactions

Year	Value of Transaction (PKR)	Transactions
2017-18	3,184	0.75
2018-19	4,129	1.12
2019-20	5,151	1.49
2020-21	8,086	2.23
2021-22	10,637	2.73

Mobile Wallet Accounts (Million)
- 2021-22: 89
- 2018-19: 36
- 2019-20: 53
- 2020-21: 75

AMA Transaction Value (PKR Million)
- July-Sept. 2021: 1,693
- Oct.-Dec. 2021: 7,761
- Jan.-March 2022: 12,714
- April-June 2022: 14,107

Source: State Bank of Pakistan

Internet Traffic Trends

Pakistanis are increasingly benefitting from digital services as evident in the massive increase in Internet traffic. This section presents an analysis of the salient features and trends of web services in Pakistan, based on analytics carried out by PTA. The SM industry massively flourished during the year under review. The creation and marketing of new applications and evolution of older ones truly rejuvenated the industry. Internet traffic trends across Pakistan reflected Facebook as the most used SM protocol in Pakistan, followed by WhatsApp, with YouTube and TikTok being the most popular video protocols.

The Covid-driven shift in organizational work processes prompted an increase in the use of applications that enhance the efficiency of organizations and individuals while preventing substantial costs vis-à-vis traveling and logistics. Among various work-from-home platforms, Zoom was the most popular and widely used platform in Pakistan during the year under review.

Top Digital Brands Building Complex Ecosystems				
amazon	**Apple**	**Microsoft**	**f Facebook**	**G Google**
Amazon Prime	AppleTV	Xbox Live	Facebook (Meta)	Google (Alphabet)
Twitch	iTunes	Windows Update	Instagram	YouTube
Amazon.com	iCloud	Skype	Facebook Video	Waze
Alexa	Apple Software Update	Outlook 365	WhatsApp	Google Cloud
Amazon Glacier	FaceTime	Office 365	Facebook Messenger	Google Play
Amazon Music	Apple Music	SharePoint	Oculus	Google Search
Chime	Apple Watch (40m)	OneDrive		Google Docs
	Apple.com	Windows Store		Google Drive
	iCloud Photo Stream	LinkedIn		DoubleClick
	Mac App Store	Microsoft TEAMS		Gmail
	Siri	Netflix		Google Home
				Crashlytics
				Nest
				Looker
				Fitbit

Source: Sandvine Phenomena Report

Top Ten Protocols–By International Bandwidth (Percentage)	September 2022
SSLv3*	15.2%
YouTube	8.5%
Facebook	8.2%
QUIC IETF**	6.0%
WhatsApp	4.8%
Google	3.7%
Snack Video	3.5%
TikTok	3.3%
Android Market	2.8%
Others	43.9%

*SSLv3: SSLv3 is a protocol used by HTTPS websites which now constitute over 80% of the total websites over the Internet. SSLv3 traffic includes web browsing as well as other web services e.g., email, etc.

**QUIC IETF: QUIC IETF is a protocol which is used by Google Chrome browser by default. The majority of QUIC IETF shows traffic for Google protocols.

Top Ten Social Media Protocols–By International Bandwidth (Percentage)

September 2022

Protocol	Percentage
Facebook	56.6%
WhatsApp	19.4%
Snapchat	11.3%
Instagram	6.3%
Twitter	1.8%
Likee	0.7%
GitHub	0.7%
imo	0.6%
Azar	0.5%
Others	2.2%

Top Ten OTT VoIP Protocols–By International Bandwidth (Percentage)

September 2022

Protocol	Percentage
WhatsApp	63.0%
BIGO	11.5%
imo	4.1%
Zoom	3.7%
Facebook	3.6%
Agora.io	2.7%
RTP	2.6%
Microsoft Teams	1.5%
Skype	1.4%
Others	5.8%

Top Ten Video Protocols–By International Bandwidth (Percentage)

September 2022

Protocol	Percentage
YouTube	39.9%
Snack Video	16.5%
TikTok	15.6%
Snapchat	7.8%
HTTP Media Stream***	6.7%
Generic VOD Streaming****	3.2%
Netflix	2.6%
Twitter	1.0%
Amazon Prime	0.8%
Others	5.8%

***HTTP Media Stream: Video streaming from Internet websites
****Generic VOD Streaming: Video streaming from video on demand applications

Conclusion

The telecom infrastructure in Pakistan has witnessed significant growth in terms of network expansion, additional cell sites, OFC deployment, use of data and digital platforms, e-commerce, and digital banking, among other parameters. Despite challenges such as low FTTT ratio, RoW issues for deployment of OFC across cities and towns, and industry profitability, the country is fast heading towards digitalization. PTA will pursue active engagement with the industry and other stakeholders to overcome the above challenges. It will also continue to provide an enabling regulatory environment, facilitate the proliferation of LTE advanced, and ensure availability of 5G services in the near future.

Telecom Developments in AJ&K and GB

The enhancement and strengthening of telecom infrastructure and services in AJ&K and GB remained a key priority area on the agenda of PTA and GoP. The telecom market has embraced competition in every domain including mobile broadband, fixed broadband, FTTH, and fixed line services. Although the Special Communication Organization (SCO) enjoyed the distinction of being the only operator in the region for a long time, the post-2006 emergence of the private sector in the local telecom market altered the entire scenario.

One of PTA's core objectives is to promote fair competition in the telecom market by promoting investment, encouraging maximum participation of private sector organizations, and facilitating infrastructure sharing. With reference to AJ&K and GB, the Authority prioritized digitalization by increasing mobile and fixed line broadband penetration, and enhancing coverage and footprint of telecom services through improved QoS and better user experience.

As a follow-up to the foregoing, PTA renewed the licenses of Jazz, Telenor, and Ufone in June 2021 against a fee of US$ 13.5 million each, with enhanced QoS and rollout obligations. Also, to provide equal opportunities to all operators, additional spectrum of 46 MHz was made available to CMOs through spectrum auction worth US$ 30 million. An additional 20 MHz was awarded to SCO to meet the growing demand for data services in AJ&K and GB. The revenue thus generated will be utilized for further improvement of telecom services in the region through the Public Sector Development Programme.

The renewed licenses obligate CMOs to enhance their network and improve coverage. Each CMO will annually install a minimum of 10 new cell sites—five each in the urban and rural areas. Both active and passive infrastructure sharing is now allowed. Moreover, all existing sites of CMOs will be upgraded for provision of mobile broadband (3G, 4G) over the next three years; these services will have to conform to the new QoS standards i.e., minimum speeds of 1 Mbps and 4 Mbps for 3G and 4G services, respectively.

During the period under review, PTA also issued 10 fixed broadband licenses and introduced new obligations related to LDI licenses for enhancement of optical fiber footprint in AJ&K and GB. Consumers in general, and tourism, digital financial services, and education in particular are expected to flourish in the region as a result of the above initiatives.

Teledensity and Telecom Subscribers

Five mobile operators are presently providing 2G, 3G, and 4G services in AJ&K and GB. With over 5.9 million subscribers, teledensity in the region stands at 105%, as against 89% in Pakistan. Over 99% of the total teledensity comes from mobile penetration.

Telenor is the leading operator in the region, with a maximum number of cellular subscribers, followed by SCO. SCO provides maximum network coverage in the rural and urban terrain, covering almost 450 major cities,

Mobile Licenses in AJ&K and GB

2G/3G/4G	2G/3G/4G	2G/3G/4G	2G/3G/4G	2G/3G/4G

Licenses in AJ&K and GB

SCO	Integrated License
FLL	06
LDI	14
WLL	06
TTP	06
CVAS	14

Teledensity

■ Mobile ■ Fixed ■ Total

	2017-18	2018-19	2019-20	2020-21	2021-22
Total	76.8	80.2	91.2	100.5	105.1
Fixed	1.3	1.2	1.1	1.1	1.0
Mobile	75.5	79.0	90.1	99.4	104.1

Cellular Subscribers

Legend: Ufone, Jazz, Zong, SCO, Telenor, Total

Year	Ufone	Jazz	Zong	SCO	Telenor	Total
2017-18	0.2	0.4	0.7	1.3	1.8	4.3
2018-19	0.2	0.4	0.9	1.3	1.7	4.5
2019-20	0.2	0.4	1.0	1.3	2.2	5.1
2020-21	0.2	0.5	1.0	1.6	2.3	5.6
2021-22	0.2	0.5	1.1	1.7	2.4	5.9
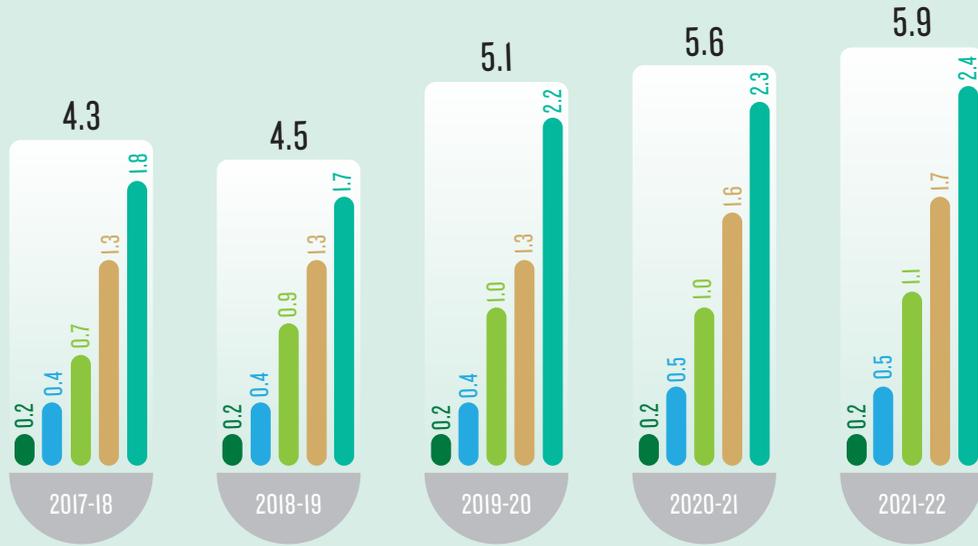
towns, and villages. The cellular subscriber base has registered a steady increase, with a 10% average growth over the last five years. The region currently has 6 million mobile subscribers.

The region has three key fixed line service providers—SCO, PTCL, and Wateen—which are offering services to 54,807 subscribers. However, owing to the non-availability, inaccessibility of fixed network, and non-affordability of alternative mobile services, the subscriber base remained stagnant over the last two years. Although PTA has issued 12 local loop licenses (FLL and WLL) for AJ&K and GB, these licensees are primarily providing data services.

FLL and WLL Subscribers

Year	FLL	WLL	Total
2018-19	56,854	8,744	65,598
2019-20	55,238	6,010	61,248
2020-21	49,733	4,026	53,759
2021-22	52,034	2,773	54,807

Mobile Broadband Subscribers

Legend: Ufone, Zong, Telenor, SCO, Total

Year	Ufone	Zong	Telenor	SCO	Total
2017-18			0.02	0.38	0.40
2018-19		0.33	0.02	0.50	0.86
2019-20		0.43	0.60	0.56	1.58
2020-21		0.51	0.80	1.08	2.39
2021-22	0.07	0.65	1.05	1.36	3.13
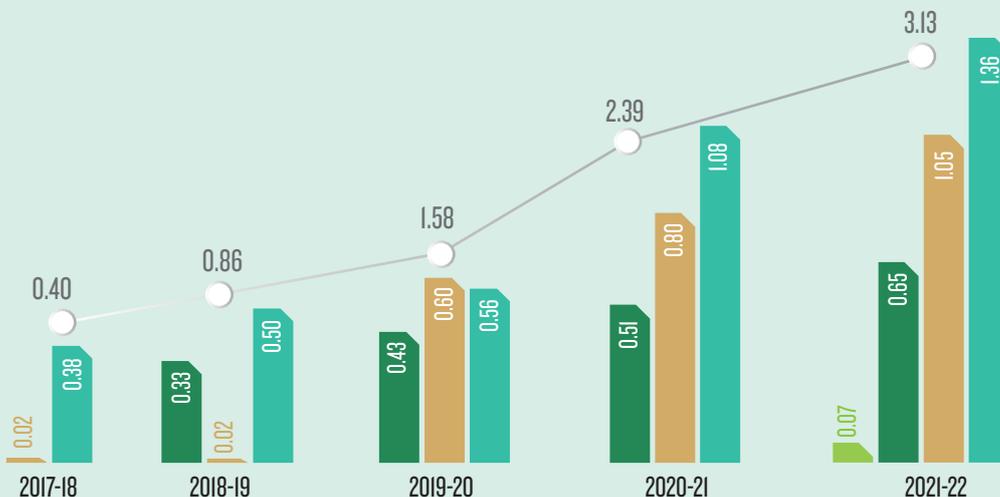
Both fixed and mobile broadband services are available in the region. All CMOs are currently providing mobile broadband services only; fixed broadband services are being offered mainly by PTCL and SCO. Remarkable growth in broadband penetration and the number of subscribers has been observed in recent years. Today, broadband penetration stands at 55.5%, with over 3 million subscribers across the region benefiting from broadband services. Notably, out of 5.9 million mobile subscribers, over 50% are utilizing broadband services, which is an encouraging trend. These facts notwithstanding, the insignificant number of fixed broadband subscribers requires immediate attention, especially in terms of optic fiber rollout in the region.

📞 Fixed Broadband Subscribers

Year	Subscribers
2021-22	54,807
2020-21	53,759
2019-20	61,248
2018-19	65,598
2017-18	72,409

Telecom Infrastructure

Owing to the difficult terrain and geographical disadvantage, the rollout of telecom infrastructure in AJ&K and GB requires heavy investment with longer payback period. PTA is a strong proponent of infrastructure sharing, especially in these areas, with the understanding that cost savings will be beneficial, not just for operators but subscribers too. There are currently 1,785 cell sites across the region, showing a growth of 6% during the period under review. Of these, 449 are 3G and 1,053 are 4G-enabled sites. Telenor has maximum cell sites in the region—476. Ufone and SCO added maximum cell sites to their networks during the period under review, registering a growth of 14% and 12%, respectively. Meanwhile, Jazz and Zong have been consistently expanding their networks over the years.

Cell Sites in AJ&K and GB

■ Ufone ■ SCO ■ Jazz ■ Zong ■ Telenor ■ Total

Year	Ufone	SCO	Jazz	Zong	Telenor	Total
2016-17	157	190	289	338	445	1,419
2017-18	158	220	267	338	443	1,426
2018-19	157	252	262	389	468	1,528
2019-20	157	264	301	367	472	1,561
2020-21	156	265	368	422	476	1,687
2021-22	178	278	385	472	476	1,785

Note: SCO Figures as of March 2022

Seven companies have been awarded Telecom Infrastructure Provider and Telecom Tower Provider licenses in AJ&K and GB; of these, only four have been issued certificates for commencement of service. These companies will be laying OFC and erecting towers for LDI and CMOs for connectivity. Rolled out by SCO and PTCL, the total run of OFC deployed in the region so far is 5,375 kilometers, which reflects an increase of 1,510 kms from last year. With the commissioning of FTTH by SCO, triple play services (the

👥 OFC by FLL Operators

Year	PTCL	SCO	Total
2019-20	20	3,845	3,865
2020-21	20	3,845	3,865
2021-22	20	5,355	5,375

ability to supply voice, data, and video applications all at once) have been launched in nine major cities of AJ&K and GB while laying of access network of 30 more cities in the region is currently underway.

Pak-China OFC Connectivity

OFC connectivity between Pakistan and China dates back to 2018. Over 820 kilometers of OFC has been deployed between Khunjerab and Rawalpindi against a cost of US$ 40 million. Thirty percent of the project cost has been recovered and deposited into the national exchequer within the first year of its commissioning. The Phase 1 of another project for upgradation and protection of Pak-China OFC for redundancy is in progress. The completion of the protection network is anticipated to enable exchange of higher volumes of international traffic. Moreover, such cross-border connectivity will enable alternative international connectivity for Pakistan, thereby reducing the country's reliance on submarine cables. Meanwhile, SCO has established an IP-based satellite network in eight remote and far-flung areas of GB for provision of efficient ICT services.

Digital Connectivity for Socio-Economic Uplift

Today, as many as 715 educational institutions and 340 hospitals and healthcare facilities across AJ&K and GB are digitaly connected, providing education and healthcare services for the region's population. Over 180 financial institutions are offering online banking and ATM services in AJ&K and GB under SCO's assistance. Moreover, digital connectivity and 4G services are available in 130 tourist locations, making it possible for tourists to enjoy high-speed broadband and stay connected. SCO is also ensuring cross-border OFC connectivity in AJ&K and Sust, which will pave the way for connectivity with neighbouring countries including China, Afghanistan, Iran, and India. Even along the Karakoram Highway (KKH), SCO has installed over 52 BTS for uninterrupted communication.

4G BTS at Fairy Meadows (Source: SCO).
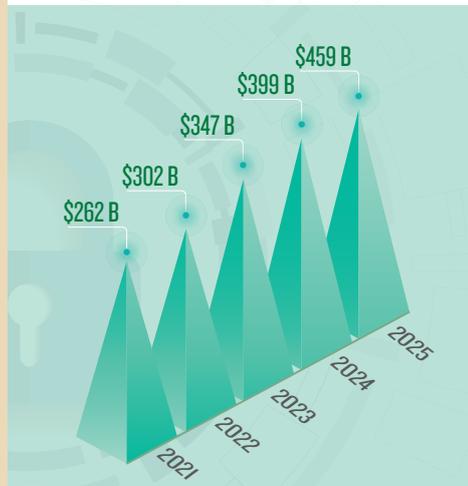
3

Cyber Security

Cyber Security

Rapid technological evolution is transforming societies in general and the world at large. However, while the benefits of these advancements remain undisputed, their flipside is evident in the shape of just as rapid development of novel cyber and information security threats at the hands of cyber criminals.
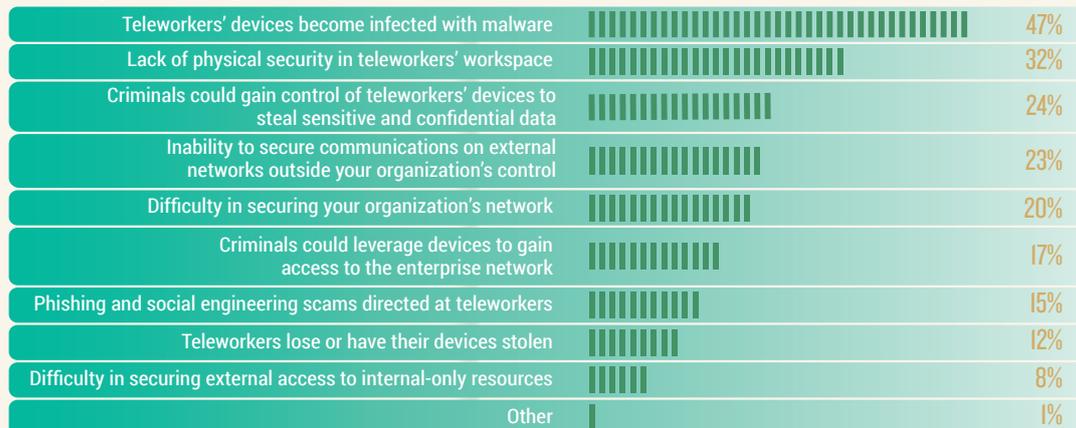
Courtesy Covid-19, the past two-and-a-half years have witnessed drastic changes in work ethics and practices, the most remarkable being remote working. The pandemic has undoubtedly nudged even the most reluctant of employers to resign to this new normal. The distant working environment has also opened gateways for cybercriminals to enjoy a global fields-day! Cyber-attacks have since been on the up and up, globally. (See graphic representation for a list of key security risks facing organizations, as described in the Global Risk Report independently produced by the Ponemon Institute LLC[1]).

Global Cyber Security Spending
$1.75 Trillion Cumulatively (2021-2025)

$262 B
$302 B
$347 B
$399 B
$459 B

2021 2022 2023 2024 2025

Source: https://www.bgp4.com
/2022/06/08/recent-investments-in-cyber-security-firms/

Cyber Security in Remote Work Era
Security Risks Organizations are Most Concerned About

Risk	%
Teleworkers' devices become infected with malware	47%
Lack of physical security in teleworkers' workspace	32%
Criminals could gain control of teleworkers' devices to steal sensitive and confidential data	24%
Inability to secure communications on external networks outside your organization's control	23%
Difficulty in securing your organization's network	20%
Criminals could leverage devices to gain access to the enterprise network	17%
Phishing and social engineering scams directed at teleworkers	15%
Teleworkers lose or have their devices stolen	12%
Difficulty in securing external access to internal-only resources	8%
Other	1%

https://www.keeper.io/hubfs/PDF/Cybersecurity%20in%20the%20Remote%20Work%20Era%20-%20A%20Global%20Risk%20Report.pdf

Legal Framework and Aligning Processes

The rapid increase in cyber threats at a time when the cyber security scenario in Pakistan was still being discussed and awaited approval, led to the introduction of CTDISR in November 2020. A joint initiative spearheaded by PTA, in consultation with MoITT and telecom operators, CTDISR was introduced to ensure security of telecom infrastructure and end-users by improving procedures and infrastructure, and ensuring regular audits. PTA allowed almost a year for its licensees to allocate budget, deploy relevant tools, and have third-party audits conducted by shortlisted companies. The Authority also issued the Cyber Security Framework in this context.

Critical Telecom Data and Infrastructure Security Regulations

Having introduced CTDISR in 2020, PTA simultaneously worked on the development of the Cyber Security Policy, with MoITT as one of the key stakeholders. Following exhaustive consultations with relevant stakeholders, the policy was issued by MoITT in 2021.

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[1] https://www.keeper.io/hubfs/PDF/Cybersecurity%20in%20the%20Remote%20Work%20Era%20-%20A%20Global%20Risk%20Report.pdf
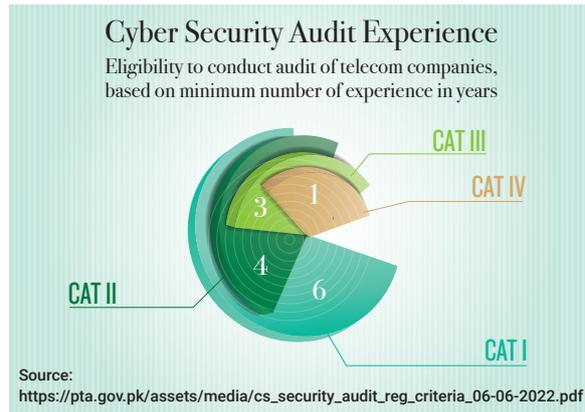
Cyber Security Framework

The Cyber Security Framework was developed in the wake of extensive PTA-led consultations involving leading cyber security experts and representatives of the telecom industry. Based on CTDISR, the framework defines obligations for auditors and PTA licensees. It guides auditors about performing gap assessment in light of PTA's Cyber Security Regulations; the assessment includes interpretation and expectations against each security control, where necessary. As part of the framework, a maturity model has also been devised, whereby controls have been classified based on their criticality. ITU places a lot of significance on the Cyber Security Framework of member states when calculating the Global Cyber Security Index. The framework is a milestone towards improving the security landscape of the telecom industry in Pakistan, and enabling organizations to better manage and control cyber security risks.

Audit, Assurance, and Compliance of Critical Telecom Data and Infrastructure

After the introduction of CTDISR, PTA allowed appropriate time for its licensees to implement the recommended cyber security controls and tools, as a first step. The licensees were then asked to not only conduct regular internal audits for enhanced security compliance, but also seek third-party impartial audits from shortlisted cyber security audit firms.

For the sake of clarity, PTA categorized telecom operators and audit companies by size, so that large audit firms could conduct audits of large firms. Meanwhile, some telecom operators flagged concerns vis-à-vis standardization of the security audit firms and asked PTA to arrange for their security clearance. Consequently, PTA reached out to relevant audit companies, guiding them to apply for security clearance through PTA so that their cases could be processed by designated security agencies. To cope with increasing market demand created by implementation of CTDISR, PTA invited applications—both through print media advertisements and its own website—for registration of security audit firms. Over 20 companies have thus far registered, and the number is constantly growing.

Cyber Security Audit Experience
Eligibility to conduct audit of telecom companies, based on minimum number of experience in years

CAT III
CAT IV
CAT II
CAT I

3 1 4 6

The growing number of audit firms necessitated the standardization of audit processes in line with international best practices. Rising to the requirement, PTA developed the criteria for cyber security audit firms, as well as licensee categorization (*https://pta.gov.pk/en//security-audit-firms-090222*). These rules were made in consultation with telecom operators and security audit firms, and were approved by PTA. The objective was to shortlist companies qualified to conduct audit of the telecom sector in a free and transparent manner, with all aspiring firms getting a fair and equal opportunity.

During the first quarter of 2022, PTA performed compliance audits of large tier-1 telecom operators like Telenor, Jazz, Zong, and Ufone/PTCL; the audits of National Telecommunication Organization and SCO have already been planned. These measures, which reflect direct implementation of CTDISR 2020, will provide a compliance framework that will eventually encompass the entire industry. PTA is also working on the National Cyber Security Framework for Telecom, in which compensating controls will further be elaborated.

While numerous licensees have submitted their CTDISR compliance reports to PTA, necessary regulatory action will be taken against those who have not done so.

Registration of Cyber Security Audit Firms

PTA has published the criteria for registration of audit firms on the PTA website so that telecom operators can engage standard impartial third-party audit firms. This will ensure that audits are performed independently and are considered credible by all parties. The latest development in this context is the issuance of the first National Cyber Security Policy, 2021. Currently, only a few Cyber Security Incident Response Teams are functioning in the public, private, and defense sectors. PTA is actively pursuing the formation of CERT for the telecom industry and aims to make it fully functional by the end of 2022.

Cyber Security

Central DNS Management

In view of policy directives originating from the PM's Office for implementation of stringent measures to eliminate illegal and pornographic content, PTA issued instructions for speedy enforcement of the CDNS policy. Thereafter, PTA arranged several meetings with the industry, conducted briefings on the CDNS working mechanism, and provided operators with Application Programming Interface reference documentation for implementation.

After extensive coordination and technical testing, 12 CDNS operators have successfully integrated their DNS infrastructure with PTA's CDNS portal. Nationwide

implementation of CDNS is in the pipeline. PTA is currently in the impact assessment phase, which is marked by extensive consultations and coordination with various Internet Service Providers (ISPs).

Centralized DNS
FOR FASTER, SAFER, AND EASIER HOSTING

Central DNS (CDNS) Working Model

Internet

ptcl

Jazz

ZONG 4G
A NEW DREAM

telenor

Transworld

CSD

Sync

NAYAtel

CYBERNET

multinet
INFRASTRUCTURE FOR THE NATION

NEXLINK

WATEEN

KKN
KonneKting Networks

PTA CDNS Portal

🔒 **List of Blacklisted Domains**
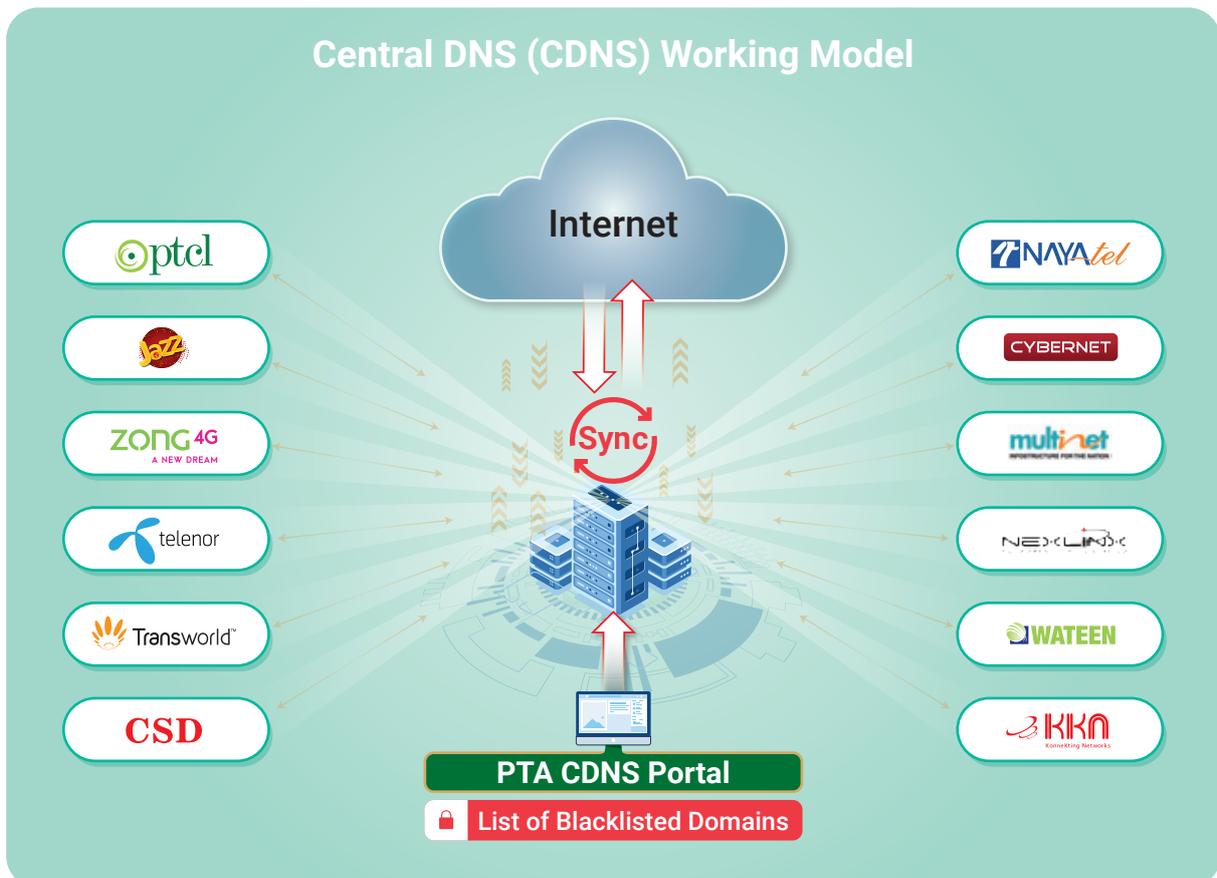
Cyber Security Revamp

PTA is constantly working to improve the cyber security posture; strengthen cyber resilience; and identify, mitigate, and respond to potential cyber threats against internal systems. The following activities are actively being pursued in this context:

- ➲ Penetration testing of PTA's internal and public web application.
- ➲ Infrastructure security audit and configuration reviews of PTA.
- ➲ Third-party security audit and penetration testing of PTA's IT systems.
- ➲ Vulnerability assessment of critical systems for emerging cyber threats.
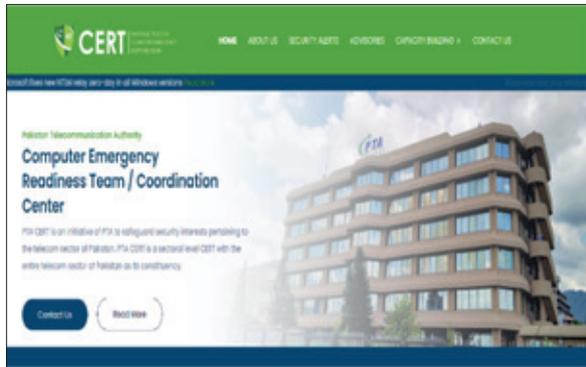

SECURE

National Telecom Computer Emergency Response Team

With access restricted to its licensees only, PTA inaugurated the Telecom CERT portal in March 2021 for bilateral information sharing on emerging threats. However, due to rising public demand, the Authority decided to launch the national Telecom CERT (nTCERT) website for awareness of telecom operators and the general public alike.

The nTCERT website, which enables PTA to safeguard the security interests of Pakistan's telecom sector, offers updated cyber security alerts, advisories, and awareness infographics. The website features:

➲ Latest security advisories and alerts for public.

➲ Awareness messages on safe usage of Internet services.

➲ Information on capacity-building initiatives and workshops.

➲ Latest information regarding CTDISR.

➲ Public feedback on emerging threats and suggestions for improvement.

(See Tables for a summary of the number of security alerts and advisories issued on the portal).

⚠ Security Alerts (2020-2022)					
Year	Q1	Q2	Q3	Q4	Total
2020-21	0	29	35	47	111
2021- 22	69	47	52	19	187
Total					298

⊘ Security Advisories (2018-2022)					
Year	Q1	Q2	Q3	Q4	Total
2018-19	09	11	09	10	39
2019-20	11	9	10	10	40
2020-21	11	14	12	11	48
2021-22	11	15	13	12	51
Total					178

It is through the nTCERT portal that PTA gets a high-level view of the security posture of different telecom organizations which, in turn, can anonymously share incident details and indicators of compromise with the Authority.

Capacity-Building

With reference to capacity-building, PTA collaborated with the Internet Society (ISOC) to arrange a two-week self-paced online training on 'Encryption' for the telecom industry. The training was conducted by Associate Professor of Computer Networks at the School of Technology, Moulay Ismail University of Meknes, Morocco, Dr. Nabil Benmar.

Online Training

Public Awareness

PTA utilizes various IT applications to raise public awareness and to apprise end-users of the security measures that they can take to recognize and respond to threats and scams, thereby operating in a secure SM environment.
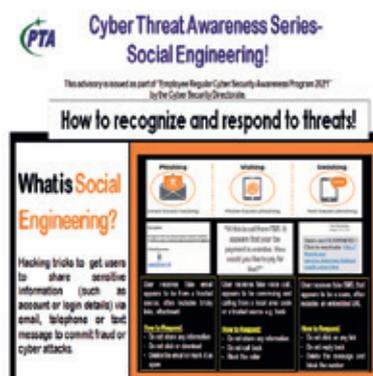
Internet Exchange Points

In compliance with the Telecom Policy 2015, PTA has established three IXPs in Islamabad, Karachi, and Lahore with the cooperation of the Higher Education Commission (HEC), the Punjab Information Technology Board (PITB), ISOC, the Asia Pacific Network Information Center (APNIC), and other telecom industry stakeholders. Initially, PTA deployed IXPs in the premises of HEC in Islamabad and Karachi in the years 2016 and 2019, respectively.

PTA established the Lahore IXP with the cooperation of APNIC, PITB, Nexlinx, and Cybernet. The Authority also arranged CDN through KK Networks; all ISPs with 5G bandwidth will immensely benefit from CDN in terms of cache fill. Additionally, PTA is in the process of deploying instance of M-Root server at the Lahore IXP through APNIC and Japan IX. The hard work and dedication of the IXP team paid off when the traffic of the Lahore IXP jumped to almost 5 Gbps within just a few months of its launch. (See graph for traffic chart of the Lahore IXP).

Traffic Trends of Lahore
PKIX-LAHORE :: PKIX-LAHORE

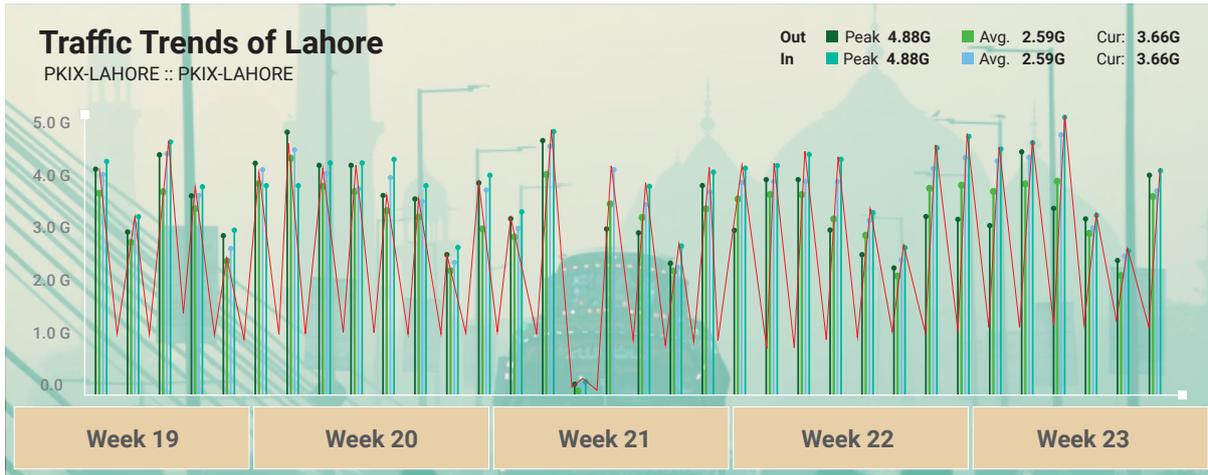|					
Out	Peak	4.88G	Avg. 2.59G	Cur: 3.66G
In	Peak	4.88G	Avg. 2.59G	Cur: 3.66G

| Week 19 | Week 20 | Week 21 | Week 22 | Week 23 |

Transition from IPv4 to IPv6

PTA and APNIC jointly organized two five-day workshops on Internet Protocol version 6 (IPv6) for CMOs and ISPs. The workshops were conducted by APNIC and supported by local trainers, who shared best practices for smooth transition of the telecom infrastructure from IPv4 to IPv6.

PTA continuously engages with its licensees for capacity-building through international organizations like APNIC, ISOC, the Internet Corporation for Assigned Names and Numbers (ICANN) and the South Asian Network Operators Group (SANOG). Most of its operators have already configured their core networks to support dual stack to simultaneously support both IPv4 and IPv6. Furthermore, the transition to IPv6 will enable the adoption of 5G and IoT technologies in Pakistan. PTA has instructed all telecom operators to complete their transition for end-user network by December 31, 2022.

IPV4 → **IPV6**

192.168.1.1

2001: 0db8:85a3:0000:
0000:8a2e:0370:7334

PSEB One-Window Operation for Ease-of-Doing-Business
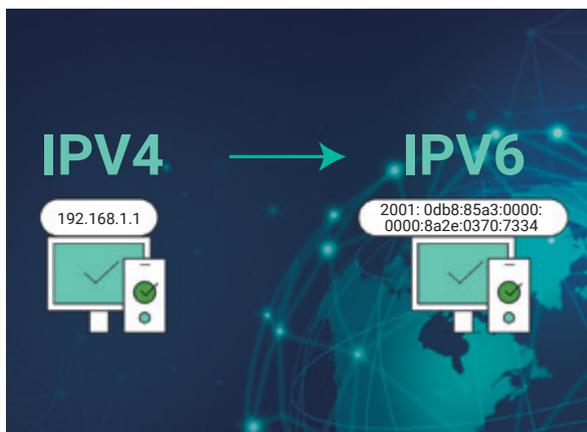
PTA, in collaboration with PSEB, has launched an online portal for one-window operation of IP Whitelisting and VPN registration for software houses, call centers, and freelancers. The portal has been established to promote ease-of-doing-business. Call centers, software development companies, and freelancers having at least one static IP address and verification letter from their respective business concerns can register themselves on this portal. Previously, call centers and IT companies had to route

their applications through relevant ISPs. As depicted in the Table, IP Whitelisting for call centers has increased to 5,214 from 801 in year 2019.

nTCERT will jointly function to provide integrated security awareness, advance threat intelligence, and 24/7 monitoring of the telecom cyber threat landscape to effectively

IP Whitelisting and VPN Registration								
Period	**IP Whitelisting**						**VPN Registration**	
	Call Centers		**Video Conference**		**(LDI/LL)**			
	Comp	IP Add	Comp	IP Add	Comp	IP Add	Comp	IP Add
Up to 2019	389	801	662	1,519	19	523	575	9,810
2019-20	811	1,341	123	248	14	160	279	1,368
2020-21	1,463	1,747	239	357	10	81	1,100	3749
2021-22	1,098	1,325	189	275	5	20	386	748
Total	**3,761**	**5,214**	**1,213**	**2,399**	**48**	**784**	**2,340**	**15,675**

PTA SOC and National Telecom SOC

The bidding process for the PTA Security Operations Center (SOC) and the National Telecomm SOC has been completed, and as per requirements of the Public Procurement Regulatory Authority, the project has been awarded. PTA is in the process of deployment of PTA SOC and nTSOC. Once materialized, both nTSOC and

detect cyber-attacks targeting the telecom sector. This will also facilitate real-time coordination with the industry for proactive and timely countermeasures on important security alerts, remediation for incidents, and continuous improvement of the overall cyber security posture.

SS7 Security

PTA has instructed all CMOs to review the security of the SS7 firewall that they had deployed on its recommendation to counter SS7 attacks, and to include the same in the already planned third-party audits in accordance with CTDISR.
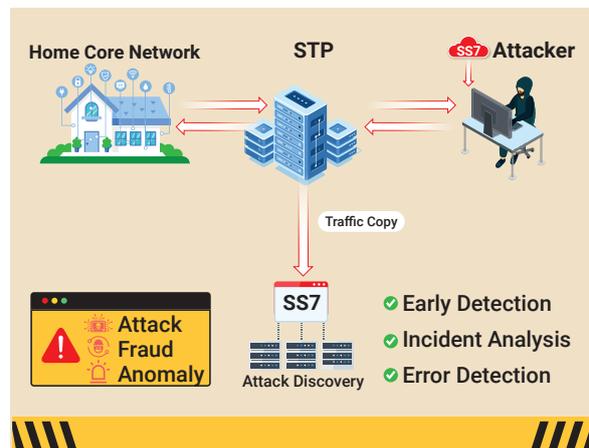
Conclusion

The security measures led by PTA have significantly improved the security of both the telecom sector as well as end-users. However, since security is a continuous process, PTA proactively engages with telecom operators to further strengthen the infrastructure and end-user security. Additionally, the Authority also regularly coordinates with other sectoral and international CERTs to strengthen the security of the country's telecom sector.

4

Consumer Protection

Consumer Protection

O ne of the core undertakings of PTA is to serve consumer interests and deliver consumer value through regulation. To this end, the Authority frequently engages with the print and electronic media to disseminate awareness messages for the consumption of telecom consumers; SMS broadcasts and other SM platforms are also utilized for the purpose. Moreover, PTA carries out regular analysis of consumer complaints for segregation of key problem areas and their prompt rectification by relevant telecom operators. Upholding its mission statement, PTA attaches great importance to its single strategic objective of ensuring fluid, effective, and efficient functioning of the telecom industry in tandem with seamless interconnectivity, and protection of consumer rights. The Authority secures an appropriate degree of protection for consumers and promotes transparent competition in their best interest.

Consumer Awareness Campaigns

Consumer activism cannot thrive in the absence of awareness-raising efforts. PTA strongly believes in making consumers aware of their telecom rights, informing them about its policies on various issues, and educating them about the mechanisms and procedures in place for them to lodge complaints in a bid to seek redress.

As it is, today's fast-paced digital world comes with flipsides; phony text messages and phone calls originating from unknown numbers and enticing gullible subscribers with lucrative deals such as lotteries and plots, or misleading them into believing that they have won huge sums of prize money in lucky draws, are a cause of major concern. Many telecom consumers have thus been hoodwinked and deprived of their hard-earned life savings. Similarly, unsolicited calls and marketing messages from unknown numbers are also a perpetual nuisance for telecom users and tantamount to breach of privacy. To address these issues, PTA initiated several consumer awareness campaigns, using both the print and electronic media, to

inform subscribers about the actions they should take to protect against unsolicited and obnoxious calls and messages. The campaigns were carried out through SMS broadcasts, newspapers, and various SM handles such as Twitter and Facebook, for maximum outreach.

ISO 9001: 2015 Certification

In 2021, PTA received the ISO 9001: 2015 quality management system certification. To keep the certification updated and to remain compliant with ISO requirements, a detailed surveillance audit was conducted by third-party auditors for continuous improvement and user satisfaction.

This certification demonstrates PTA's commitment to deliver highest quality solutions to end-users in Pakistan through the state-of-the-art CMS run by PTA. The Authority is determined to analyze and address issues related to telecom services for continuous improvement, user satisfaction, and engagement.

ISO 9001: 2015 is an internationally recognized standard of consistency and competency using robust quality management systems designed to encourage continuous improvement and enhance customer satisfaction.

Launch of CMS Mobile App

To facilitate telecom consumers even further, PTA launched a user-friendly CMS mobile application—'PTA CMS'— on Android (Google Play) and iOS (Apple App store). Consumers can utilize this App to register complaints related to telecom services, mobile registration, DIRBS, web content, and blocking of stolen handsets, among other issues. The App also allows users to track their complaints and provide feedback on their resolution. It also includes Frequently Asked Questions on different issues for consumer awareness and understanding.

System for Blocking of Lost, Stolen, or Snatched Handsets

In April 2021, PTA launched a new automated Lost/ Stolen Device System (LSDS) for blocking of lost, stolen, or snatched mobile phones. Integrated with DIRBS, this system blocks and unblocks a stolen mobile phone within 24 hours of reporting, after necessary verification. It facilitates users who want to get the IMEIs of their lost, stolen, or snatched mobile handsets blocked to prevent potential misuse.

Complainants can conveniently lodge a blocking request through CMS (available at www.pta.gov.pk) or through the 'PTA CMS' mobile App. (See Table for status of complaints or requests received over LSDS for blocking or unblocking of IMEIs during the period between July 2021, to June 2022).

Complaints Against Lost/Stolen Mobiles	
Complaint Category	No. of Complaints
Stolen/Lost/Theft Mobile Blocking Request	26,508
Stolen/Lost/Theft Mobile Unblocking Request	2,252

Module for Blocking of IMEIs, MSISDNs, and CNICs

PTA developed and launched an automated module in February 2021 for processing of fraudulent complaints in line with the mechanism defined in the 'Protection from Spam, Unsolicited, Fraudulent and Obnoxious Communication (amendment) Regulations, 2020.' The module has the capability to block a mobile handset (i.e., associated IMEI), following which a warning is issued on all other mobile numbers subscribed against the fraudster's CNIC, once his/her involvement in fraudulent communication has been verified by the concerned CMO. In case of repeated violation for the second time, the system highlights the CNIC of the fraudster for blacklisting by the relevant CMO. During the year under review, major complaints were received against fraudulent communication, leading to 11,255 mobile numbers and 11,283 IMEIs being blocked, 677 CNICs being blacklisted or blocked, and warning messages being sent on 34,744 mobile numbers.

Reports for Blocking of IMEIs and CNICs	
IMEIs Reported for Blocking	11,283
CNICs Blocked/Blacklisted	677
Warnings Issued to MSISDNs	34,744

Consumer Support Center

In February 2020, PTA launched its Consumer Support Center (CSC; Toll-Free Number 0800-55055) for efficient registration and management of consumer complaints related to:

- ⮕ Telecom services (CMOs, ISPs, FLL, WLL, etc.).

- ⮕ DIRBS .

- ⮕ Web content (blasphemy, pornography, etc.).

- ⮕ Mobile handset blocking and unblocking.

- ⮕ UAN, Toll-Free, UIN .

- ⮕ Allocation of short code/CVAS registration.

During July 2021 to June 2022, CSC received an average of 32,000 calls per month or 1,100 calls per day. The facility is testimony to PTA's commitment to provide innovative international quality services to address consumer needs. (See graph for month-wise trend of calls received by CSC).

Month-Wise Call Trend at PTA Consumer Support Center (0800-55055) (July 1, 2021 to June 30, 2022)

The toll-free number is active and operational round the year, without a break, from 9 a.m. to 9 p.m. PTA will continue to work on enhancement of CSC in the year ahead for seamless facilitation of telecom consumers.

Pakistan Citizen's Portal

Launched in October 2018, the Pakistan Citizen's Portal (PCP) is a platform where citizens can lodge their complaints against government departments and offices, which are bound to respond to and address those complaints within a specific timeline. Since November 12, 2018, a dedicated section within PTA has been handling and resolving complaints received through PCP. Complaints from concerned telecom operators and licensees are resolved on top priority. (See Table for status of complaints received from November 12, 2018, to June 30, 2022).

No. of Complaints Received through PCP (Nov. 12, 2018, to June 30, 2022)	
Total Complaints Received	62,593
Total Complaints Resolved/Addressed	62,033
Redressal/Disposal (%)	99
Positive Feedback/Satisfaction (%)	62

Complaint Management System

The CMS of PTA received 165,944 complaints against Cellular Mobile Telephony, ISPs, Fixed Local Loop (FLL), and Wireless Local Loop (WLL) from July 2021 to June 2022; 98% of these complaints were addressed. Approximately 49% of the consumer complaints against CMOs were related to restoration of suspended SMS facility blocked due to spam filters. (See Table for details of complaints received during the year under review). Around 95.6% of the total complaints received were against mobile services, given that most of the country's population uses these services. PTA, in cooperation with the respective operators, further categorized the complaints and addressed them according to available legal tools. (See Annex 19 for details of consumer complaints reported to PTA under various categories).

No. of Consumer Complaints Received (2021-22)			
Service Type	Received	Addressed	Redressal/ Disposal (%)
Cellular Mobile Telephony	209,236	207,488	99.16
Internet Services	5,248	5,178	98.67
Fixed Local Loop (FLL)	3,943	3,918	99.37
Wireless Telephony (WLL)	203	196	96.55
Total	**218,630**	**216,780**	**99.15**
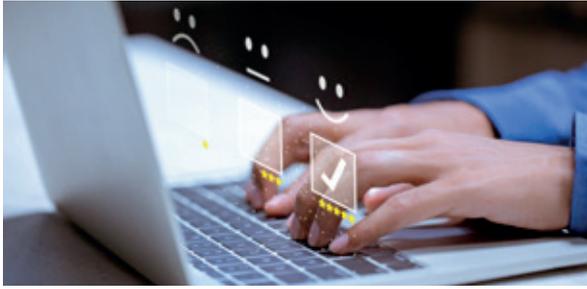
The upgrading of CMS and PTA CMS will be a continuous and ongoing activity. PTA will work to revamp the system in consonance with emerging requirements and technological shifts, with due consideration being given to consumer feedback.

Consumer Conference

Based on the theme 'Consumers First,' PTA organized a grand 'Consumer Conference 2022' in Islamabad on August 25, 2022. The Head of the Prime Minister's Strategic Reforms, Mr. Salman Sufi, joined the conference virtually as chief guest, with representatives of the IT and telecom industry, consumer rights groups, and civil society in attendance.

Addressing the gathering, Mr. Salman Sufi termed the conference "an excellent opportunity" for PTA to obtain first-hand feedback on various issues from consumers themselves. He appreciated the opt-out or unsubscribing mechanism introduced by PTA to seek riddance from unsolicited messages, including those related to telemarketing. He assured enactment of the data privacy law soon for citizens and businesses to enjoy unprecedented data protection. Mr. Salman Sufi also highlighted the efforts that the government is making, alongside relevant stakeholders, to bring the PM's 'Digital Pakistan' vision to fruition.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, Member Telecom MoITT, CEO of USF Pakistan, senior officers of PTA, and representatives of the IT and telecom industry and consumer rights groups attended the conference.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), assured consumers that PTA is alive to their needs and is taking every facilitative step to improve their satisfaction level vis-à-vis resolution of complaints. He termed holding of the Consumer Conference 2022 as manifesting PTA's resolve to obtain consumer feedback directly from the public.

Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, highlighted that PTA, being a progressive regulator with a reconciliatory approach, has improved consumer experience and facilitated industry progress.

The conference also featured presentations. The CEO of USF Pakistan apprised the audience of USF's ongoing projects and its efforts to remove digital disparities in urban and rural areas. The Director General of PTA's Consumer Protection Division, and Director General of Enforcement PTA, presented an overview of consumer complaints received by PTA and initiatives taken regarding QoS, illegal SIMs, etc., respectively. Representatives from Jazz and PTCL offered insights into the telecom industry landscape and recent initiatives for provision of quality services, respectively.

Representatives of consumer rights groups—Mian Irfan Akram from the Consumer Association of Pakistan, and Mr. Kamal Zada from the Consumer Rights Commission of Pakistan—appreciated PTA's focus on consumer issues and hoped that PTA and the telecom industry would jointly resolve core problems, particularly QoS-related issues, facing end-users. The event concluded with a question-answer session with the audience.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, Member Telecom MoITT, CEO of USF Pakistan, senior officers of PTA, and representatives of the IT and telecom industry and consumer rights groups attended the Consumer Conference organized by PTA on August 25, 2022.
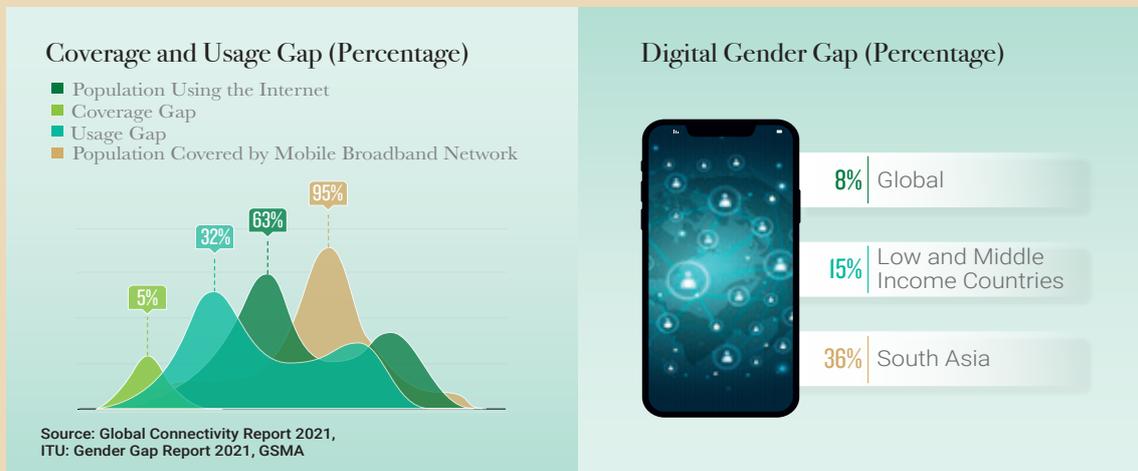
5

Gender Mainstreaming in ICTs

Gender Mainstreaming in ICTs

More than half of the world population is female. Women's participation in economic progress is hence inevitable in the evolving digitalized world. Today, digital gender inclusion is a global priority; leaving women behind in the tech-developmental race will entail huge risks to the national and global economy. The fifth Sustainable Development Goal (SDG5) also exhorts the international community 'to enhance the use of enabling technology, in particular ICTs, to promote women's empowerment.'

Almost 95%[2] of the world population has Internet coverage and only 5% people do not come under mobile broadband network; however, only 63% (5 billion) of the total covered population in the world is using the Internet, showing a huge usage gap which is supported by the fact that almost one in three individuals who have access do not choose to use the Internet. In terms of gender gap, almost 63% of the world's male population is using the Internet as against only 57% women, reflecting a gender gap of 8% in Internet usage. However, in 2020, this gap was as high as 15% in Low- and Middle-Income Countries (LMICs). The gender gap is widest in South Asia and Sub-Saharan Africa and has remained relatively unchanged in all regions since 2017, except South Asia. In South Asia, the mobile Internet usage gender gap narrowed significantly from 67% in 2017 to 36% in 2020, but has now widened to 41%[3], which is an unusual phenomenon. Hundreds of billions of dollars are being lost by governments due to disproportionate Internet usage by females and increasing global gender gaps. According to an estimate, countries have missed out on US$ 1 trillion in GDP because of women's exclusion from the digital world. Closing this gap over the next five years gives policymakers a US$ 524 billion opportunity[4].

Unaffordable devices and data tariffs; inequalities in education and digital skills; social, cultural, and religious values; and privacy risks are some of the key barriers that inhibit women and girls from using the Internet or being online. Addressing the existing and growing digital gaps calls for a multi-stakeholder approach involving active participation on behalf of the government, non-government organizations, private sector, and global gender and technology agencies like UNESCO and UNDESA, among others.

Meaningful and affordable connectivity can serve as a gateway for uptake of digital connectivity by women and marginalized communities. Other measures may include enactment of appropriate laws, creation of awareness, availability of gender disaggregated data, provision of opportunities for mentoring and digital skills training, availability of need-based customized digital products and services in terms of design, safety, and security, promotion of women entrepreneurship, and provision of a conducive environment for STEM-based learning.

Coverage and Usage Gap (Percentage)

- Population Using the Internet
- Coverage Gap
- Usage Gap
- Population Covered by Mobile Broadband Network

5% 32% 63% 95%

Source: Global Connectivity Report 2021,
ITU: Gender Gap Report 2021, GSMA

Digital Gender Gap (Percentage)

8% Global

15% Low and Middle Income Countries

36% South Asia

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[2] Global Connectivity Report 2022–ITU
[3] Mobile Gender Gap Report 2022–GSMA
[4] Cost of Exclusion 2022–A4AI

Overview of ICT Indicators

The importance of digital gender inclusion has inspired GoP to pursue gender inclusion as a top priority. Numerous programmes and projects to this effect have been initiated at the government level. While their results are still awaited, positive improvements are being witnessed in indicators as far as gender is concerned. An overview of the growth of ICT indicators from a gender lens is presented below.

Mobile and Broadband Subscribers

The usage of mobile phones and Internet by females is growing in Pakistan, particularly in metropolitan cities, where mobile phone ownership is marked by good penetration. However, the same is not true for the country's suburban, rural, and far-flung areas, where penetration is not very encouraging due to multiple reasons including online security and safety, and societal and cultural norms. Even though Pakistan is inching closer to attaining 100% mobile penetration, the female uptake of mobile phones and Internet is only showing wider gaps. Today, 52 million biometrically verified SIMs are owned by females; of these, over 26 million are broadband SIMs (3G/4G). A comparison with SIM ownership by the country's male population reflects a huge gap between male and female subscribers.

Subscribers (Male and Female)			
(SIM Ownership)			
		2020-21	2021-22
Cellular Subscribers	Male	133.7	140.8
	Female	48.8	52.1
	Total	182.5	192.9
Mobile Broadband Subscribers	Male	79.0	88.0
	Female	21.0	26.4
	Total	100.0	114.4

Source: Pakistan Telecom Authority
Note: 2020-21 figures have been revised on the basis of percentage of current year.

Mobile Internet Ownership and Usage

There are 4.9 billion Internet users worldwide; of these, 3.2 billion (approximately 85% of the total) are from LMICs. The gender gap in Internet usage in these countries has been narrowing over the years, as reported by GSMA. While the gap declined to 15% in 2020, it surprisingly widened to 16% in 2021. Pakistan is one country where gender gap in mobile Internet usage, although still substantial, has narrowed down, compared to India and Bangladesh, where it has widened. According to the GSMA survey, Pakistan had an Internet usage gender gap of 38% in 2021, which has since narrowed down. However, when it comes to

[5] Mobile Gender Gap Report 2022–GSMA

Gender Gap in Mobile Ownership and Internet Usage in Pakistan (Percentage)			
	Male	Female	Gender Gap
Mobile Ownership	76	51	33
Mobile Internet Usage	36	22	38

Source: GSMA

use cases of Internet per week, usage is as low as three to four times a week[5].

Pakistan has a wider gender gap in terms of mobile ownership (33%), compared to India and Bangladesh, as women are least likely to own a mobile phone than men. The main reasons for not owning a mobile phone in LMICs include low affordability, low digital literacy and skills, and safety and security challenges. However, in case of Pakistan, family disapproval of female mobile ownership is also a major reason for the existing gap.

Moreover, large segments of the population in Pakistan are unaware of mobile Internet, and therefore, do not use it. Seen from the gender lens, women are less likely than men to be aware of mobile Internet, and therefore, cannot enrich their lives with its benefits. On a positive note, Pakistan is one country where public awareness about mobile Internet has shown tremendous increase, and the gender gap in awareness is least in relation to comparable regional countries.

Awareness of Mobile Internet (Percentage)		
Year	Male	Female
2017	47	39
2019	79	70
2021	84	76

Source: GSMA

Social Media

Of the over 4.9 billion Internet users in the world, 4.6 billion are active SM users. An estimate suggests that 18% of the total Internet users and 16% of the total SM users in the world are from South Asian countries, where 25% of the world population resides, and where mobile connectivity averages at 88%.

Today, there are over 70 million SM users in Pakistan (over 31% of the population), with YouTube, Facebook, TikTok, and Instagram being the most commonly used social platforms. However, analyzed from the gender perspective, the gap between male and female usage of SM is very high and fluctuates between 78% to 47%. Instagram usage has the lowest gender gap in Pakistan, while TikTok usage is far less among female users, compared to male users. According to the demographic

Profile of SM Users in Pakistan				
Social Media	Total Users (Million)	Male (%)	Female (%)	Gender Gap (%)
*Facebook	57.1	77.1	22.9	70
YouTube	71.7	72	28	61
TikTok	18 .3	82.2	17.8	78
Instagram	13.8	65.2	34.8	47

Source: GSMA

profile of Meta advertisement audience, females aged between 18-24 years and 25-35 years have maximum reach to advertisements of Meta platforms.

Digital Financial Inclusion

While global expansion of financial services was already taking effect, restricted mobility induced by the Covid-19 pandemic served as a catalyst for financial inclusion, resulting in a huge increases in digital payments. The scenario not only changed the progress of the global financial sector in terms of new economic opportunities and reduced gender gap in account ownership but also built resilience for management of financial shocks. Today, 71% people in the developing countries have a bank account, and around 40% of this population (excluding China) made their first digital payment after the start of the pandemic. Global gender gap in account ownership has also shrunk for the first time, narrowing down from 9 to 6 percentage points in the developing countries.

Pakistan is beset with low levels of financial inclusion and large financial gender gaps due to inherent challenges of low literacy level, insignificant participation of women in economic activity, socio-cultural barriers, and lack of documentation. The country's financial inclusion programme, which kicked off under the National Financial Inclusion Strategy (NFIS) 2015, received a further boost with NFIS 2023. The new strategy stimulated financial inclusion through provision of digital financial services. The ease of branchless banking accounts and mobile wallet accounts has led to improvement of financial access indicators in the last couple of years. However, Pakistan still has only 1% branchless banking agents as women, with only 13% of the bank staff comprising females. (See Table for demographic data of branchless banking accounts with gender gap in digital accounts).

Branchless Banking Accounts by Gender				
Year	Male (Million)	Female (Million)	Total (Million)	Gender Gap (%)
2019	36.1	9.9	46.1	71
2020	47.7	15.1	62.7	65
2021	58.4	20.5	78.8	62
2022	63.7	24.8	88.5	61

Source: State Bank of Pakistan

While growing telecom access in Pakistan is an encouraging trend, widening digital gender gaps, lowest international ranking scores vis-à-vis digital gender inclusion, and insignificant female participation in the country's digital economy collectively highlight the dire need to address the issue of gender divide. Both GoP and the civil society have been working to reduce gender gaps through different platforms, national level policy inclusions, and global programmes.

Digital Gender Inclusion Initiative

One of the core responsibilities of PTA is to digitally connect the country and ensure that affordable access is available to everyone, everywhere, at all times. However, in view of the gender gap in access and availability of digital services and its impact on economic growth, PTA took the initiative of 'Gender Inclusion in ICTs' during the period under review. One of the steps in this connection was the formation of a digital gender inclusion committee. This exclusive all-female officers' committee was mandated to identify challenges related to gender gap in the ICT ecosystem; generate innovative ideas to bridge the digital divide; formulate a concrete plan with specific actionable tasks for gender mainstreaming; and liaise with partner organizations to implement joint projects aimed at bridging the digital gender gulf. The committee conducted a gap analysis and proposed a future roadmap for PTA to address the challenge. A summary of the tasks, projects, and collaborative interventions enshrined in the roadmap are shared below.

Website Updated to Include Gender Inclusion in ICTs

To increase the visibility of initiatives being taken by PTA and its stakeholders, the former added a 'Gender Inclusion in ICTs' section on its official website. This tab (*https://www.pta.gov.pk/en/gender-inclusion-in-icts-210222*) provides all possible information on digital initiatives adopted for gender inclusion in ICTs. PTA also plans to

place data on gender-related telecom indicators in the said section. This is one of the most unique initiatives taken by any telecom regulator in the region.

Launching of Digital Gender Inclusion Initiative

Accelerating Gender Inclusion in ICTs— Shaping Digital Futures

PTA, in collaboration with the telecom industry, launched its 'Gender Inclusion in ICTs' initiative to reduce the digital gender gap in Pakistan with a specific focus on accessibility, affordability, and digital skills. This initiative was launched at a ceremony held in Islamabad on February 22, 2022. The Prime Minister's Special Assistant on Social Protection and Poverty Alleviation, Dr. Sania Nishtar, was the guest of honour. She appreciated PTA's proactive and inclusive approach towards digital connectivity and recommended that growth in digital financial services be leverage to induct women into the formal economy. Federal Secretary for MoITT highlighted the steps that GoP is taking for actualization of the 'Digital Pakistan' vision, and the initiatives being undertaken for female inclusiveness in the tech sector. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), pledged the Authority's commitment to promote access to all and to improve gender inclusion in ICTs in Pakistan. He said that change is possible when all stakeholders synergize their actions toward bridging the digital gender divide.

International organizations including ITU, GSMA, and UNESCO also participated in the event and assured PTA of their complete support to reduce this gap. UNESCO announced its collaboration with PTA on developing a digital inclusion strategy and gender parity in access to ICTs. Similarly, GSMA committed to translate its Mobile Internet Skills Training Toolkit (MISTT) into Urdu; this

toolkit will impart basic skills regarding access to and use of mobile Internet. The initiative was supported by CMOs, fixed line segment, and telecom manufacturers.

Collaborations with International Organizations

In order to reduce digital gender gap in ICTs, PTA has collaborated with leading and effective development and digital organizations. In this regard, MoUs have been signed for effective collaboration in areas of mutual interest including strategy building, advocacy, awareness creation, and skill development. Details of the major collaborations are shared below.

PTA-UNESCO Collaboration on Gender Mainstreaming

UNESCO is actively engaging with relevant stakeholders in Pakistan to promote digital inclusion and use of ICTs for sustainable development. Being the custodian agency for SDG 16.10 (Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements), UNESCO recognizes ICTs and the Internet as possessing immense potential for development.

In view of PTA's strategic positioning to play a leading role in ensuring that Pakistani citizens can reap the dividends of digital transformation equally, UNESCO assisted with and proposed a collaborative partnership for the formulation of a digital inclusion strategy with a focus on gender-based issues. A4AI is playing a vital role in the strategy-building process. UNESCO, in its advisory role, is providing overall support including bringing relevant international experts onboard, focusing on gender inclusion and digital strategies, knowledge-sharing of global debates, and sharing its own ongoing interventions and initiatives

PTA launched its Digital Gender Inclusion initiative at a ceremony held in Islamabad on February 22, 2022. The Prime Minister's Special Assistant on Social Protection and Poverty Alleviation, Dr. Sania Nishtar, was the guest of honour.

Director of Office and UNESCO Representative in Pakistan, Ms. Patricia McPhillips, announced a collaborative partnership with PTA to build a strategy for Gender Inclusion in ICTs in Pakistan at an event held on February 22, 2022.

on digital inclusion and gender mainstreaming. Leading the effort, PTA has identified and mobilized relevant public and private stakeholders and shared available ICT data. For the purpose of analysis, PTA and A4AI are coordinating multi-stakeholder consultations for strategy development. A4AI will also support through provision of latest analytics, research findings, and international best practices to improve gender inclusion in ICTs.

This collaboration will lead to the development of an overarching strategy for PTA and relevant stakeholders for gender inclusion in ICTs in Pakistan; the strategy will delineate the roles and responsibilities' matrix, methodology, and a target-oriented action plan based on stakeholder consultations and international best practices. Importantly, the strategy will be based on a conceptual framework anchored with Pakistan's international human rights obligations and will align with the existing national policies and SDGs. For instance, it will be built on the ITU Gender Commitments under Resolution 70-E, Digital Pakistan Policy 2018, State Bank of Pakistan's 2021 policy on 'Reducing the Gender Gap in Financial Inclusion,' and the National Gender Policy Framework 2022. The strategy will support stakeholders in effectively and efficiently transitioning from policy towards action on existing

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), and Head of APAC, GSMA, Mr. Julian Gorman, displaying a copy of the agreement signed to accelerate gender inclusion in ICTs in Pakistan at the GSMA Mobile World Congress held in Barcelona on March 1, 2022.

priorities such as advancement of digital skills, access, and employability for girls, as well as women's financial inclusion and empowerment. Moreover, the strategy will mirror the principles stipulated in the UNSG's 'Roadmap for Digital Cooperation,' particularly issues such as digital connectivity, digital inclusion, human rights, AI, and trust and security.

PTA-GSMA Collaboration on Gender Inclusion

To reduce the digital gender gap in Pakistan, PTA signed a collaborative agreement with GSMA on March 1, 2022, at the Mobile World Congress held in Barcelona, Spain. Under the accord, GSMA will facilitate the Authority by sharing data, insights, and expertise in identifying target-oriented projects for the purpose. These will include initiatives related to digital financial inclusion, accessibility, affordability, online security, awareness, and acquisition of digital skills by women in rural and urban areas alike. GSMA will support PTA in designing SMS, WhatsApp, and IVR-based consumer surveys through which the latter will retrieve and compile authentic gender-disaggregated data on various gender disparity areas such as SIM and device ownership, Internet, social media usage, and financial access gap, to name a few. GSMA is also sharing with PTA, best practices, guidelines, and internationally recognized data indicators on gender inclusion in ICTs.

Urdu Toolkit on Mobile Internet Skills Training

Through its licensees, PTA will rollout the Urdu version of the Mobile Internet Skills Training Toolkit (MISTT) by the end of 2022. Developed by GSMA, the purpose of the initiative is to specifically enable women to benefit from mobile Internet and mobile money. MISTT addresses usage gaps, drives digital inclusion, and supports the training of first-time and low-use data users by equipping them with the required skills to initiate the use of mobile

Internet and access its life-enhancing services. MISTT-based campaigns also increase mobile Internet and mobile money user base and usage. Campaign materials have been leveraged in 27 markets around the world, thereby building the skills of over 50 million people.

PTA-A4AI Initiative for Meaningful and Affordable Connectivity for Females

An initiative of the World Wide Web Foundation, A4AI and PTA signed a cooperation agreement in February 2022 to share a human-centric vision for 'Digital Pakistan' and work on building the Digital Gender Inclusion Strategy. This cooperation aims to support the building of a digital nation through affordable and meaningful broadband connectivity. Under this agreement, PTA and A4AI will work closely to hold a series of multi-stakeholder gender-responsive policy making workshops in different regions of Pakistan to raise awareness on how to assess and measure the gaps, how to bridge the digital divide, and what solutions to adopt for gender equality. These workshops will ensure that key stakeholders tackle the divide, and accelerate efforts to support women's inclusion in the digital economy and ICTs. The partnership will also work to raise the bar on the quality of Internet access by establishing meaningful connectivity targets for Pakistan.

Digital Gender Sensitization Workshop

A4AI, in collaboration with PTA, organized the first Digital Gender Sensitization Workshop in Islamabad on August 17, 2022. The event focused on gender inclusion and gender responsiveness in ICT and broadband policies, with an emphasis on digital empowerment of women and girls in Pakistan. Additional Secretary MoITT praised PTA's proactive and inclusive approach towards digital gender connectivity. Chairman PTA pledged the Authority's commitment to ensuring access to all and improving digital gender inclusion in ICTs in Pakistan. He informed that PTA

is striving to develop a digital strategy that will unite key stakeholders of Pakistan's gender mainstreaming efforts.

The workshop also featured a session on 'Women Leading the Tech,' chaired by Chairperson of the Competition Commission of Pakistan, Ms. Rahat Kunain Hassan, with eminent Pakistani women leaders as panelists. The panelists emphasized the importance of nurturing an environment that provides women with the support to excel, and consequently, propels the growth of the entire technology ecosystem. A4AI's Regional Head of Asia-Pacific, Anju Mangal, and Regional Head of Africa, Onica Makwakwa, highlighted the significance of meaningful connectivity, affordability, broadband policies, and rural broadband connectivity to address the digital gender gap in Pakistan. UNESCO consultant presented the roadmap on the development of a strong strategy for digital inclusion. The workshop underlined the need for inclusive policy reforms and multisectoral collaborations to close the digital gender divide.

PTA-Huawei MoU for Affordable Devices and Skill Development

PTA and Huawei inked an accord in Islamabad on February 22, 2022, enabling the latter to support PTA in hosting projects, training sessions, and initiatives to promote gender inclusion in ICTs in collaboration with other organizations. The company plans to cooperate in the provision of low-cost tools, phones, and gadgets for females to aid easy learning. Huawei may also explore the possibility of awarding best female learners in 2022, and support PTA in initiating projects to reduce the digital gender gap via awareness programmes and acquisition of digital skills by females. In this regard, Huawei will launch training sessions inviting approximately 500 females in the coming year. The company also plans to collaborate in gender-specific initiatives for women with disabilities.

A4AI, in collaboration with PTA, organized the first 'Digital Gender Sensitization Workshop' in Islamabad on August 17, 2022. The workshop also featured a session on 'Women Leading the Tech,' which was chaired by Chairperson of the Competition Commission of Pakistan, Ms. Rahat Kunain Hassan, with eminent Pakistani women leaders as panelists.

ITU Partner2Connect Digital Coalition–Pledge

The P2C initiative launched by ITU at the ITU World Telecom Development Conference held in Rwanda in June 2022, called for all the member states to pledge their efforts/ projects for improvement of their respective ICT sectors, including initiatives to reduce the digital gender gap. In this regard, in addition to other pledges, Pakistan committed to itself to the development and implementation of a strategy for gender inclusion in ICTs in the country with the assistance of international and national stakeholders. Details of this pledge have already been discussed above.

MoUs with CMOs to Address Gender Gap

PTA made collaborative arrangements with telecom operators including Jazz, Telenor, Zong, Ufone, SCO, and PTCL to reduce the digital gender gap via initiatives related to accessibility, affordability, and digital skills. Formalizing the understanding, MoUs were signed with CMOs at the 'Connected Pakistan: Accelerating Gender Inclusion in ICTs, Shaping Digital Futures' event organized by PTA on February 22, 2022.

By virtue of these accords, CMOs will host projects, training sessions, and other activities to promote digital gender inclusion. They will also announce and facilitate special tariff packages for gender-specific projects. Pakistani vendors and device manufacturers will support CMOs in the provision of low-cost phones with built-in female-specific user-friendly apps in local or regional languages. CMOs, in collaboration with PTA, will also initiate target-oriented projects to reduce the digital gender gap via digital financial inclusion, accessibility, affordability, online security awareness programmes, and acquisition of digital skills by females in rural and urban areas alike. Operators may run specialized IVR, RBTs, SMS, and WhatsApp-based surveys subject to viability, to gauge better visibility of the usage of SIMs by women and to create awareness, especially in the rural areas. They will also focus on gender-specific digital initiatives for women with disabilities. (See Table for details of commitments made by each operator, along with their respective priority areas for implementation of the commitments).

PTA signed MoUs with several telecom operators including Jazz, Telenor, Zong, Ufone, SCO, and PTCL to reduce the digital gender gap. An event in this connection was held in Islamabad on February 22, 2022. Chairman PTA, Maj Gen Amir Azeem Bajwa (R), Member Finance PTA, Mr. Muhammad Naveed, and Member Compliance and Enforcement PTA, Dr. Khawar Siddique Khokhar, attended the ceremony, among others.

CMOs' Commitments for Digital Gender Inclusion

S. No.	Nature of Commitment	Companies
1	Basic Digital Skills	Jazz, Zong
		SCO
2	Entrepreneurship Training	Jazz
		Ufone
		SCO
3	Awareness Campaigns through various Mediums	Jazz, Zong
4	E-Sehat	Jazz, Zong
		Ufone
5	Financial Inclusion	Jazz
		SCO
6	Introduction of Gender Inclusion Policies at Company Level	Jazz
		Ufone
7	E-Education	Jazz, Zong
8	Multistakeholder Collaboration and Public-Private Partnership Projects	Jazz, Zong
9	Development of Local Audio/Visual Content	Jazz, Zong
10	Role Model as Tech Ambassadors for Females	Jazz
11	Online Security and Safety Campaign	Zong, Telenor
12	Digital ICT Labs for Females	Zong
13	ICT Training	Zong
14	Female Volunteers as Tech Ambassadors for Females	Ufone
15	Disability Inclusion (Open Mind Pakistan Programme)	Telenor
16	Software Technology Park	SCO

International Engagements

International Engagements

Guided by the 'Digital Pakistan' vision, PTA leaves no stone unturned to accelerate the process of digital transformation in the country, and to attain global recognition and visibility for its efforts. During the year under review, the Authority capitalized every opportunity to flaunt Pakistan's achievements in the telecom and ICT sector at various regional and global forums, and to foster unique collaborations in areas of mutual interest and technical assistance. With Covid-19 having forced a switchover to the virtual mode, PTA pursued the capacity-building of its workforce through online training sessions, webinars, and workshops.

Increasing Visibility

The Chairman, Members, and officers of PTA participated in various physical and virtual events to highlight the growth and investment potential of Pakistan's ICT sector. The leadership of PTA was also invited to speak at important telecom and ICT events. Highlights of a few important engagements that took place during the year are presented below.

GSMA Mobile World Congress and Ministerial Programme

A PTA delegation led by its Chairman, Maj Gen Amir Azeem Bajwa (R), represented Pakistan at the GSMA Mobile World Congress—one of the biggest and most important telecom and ICT events that takes place in Barcelona, Spain, every year. The delegation attended a series of high-level activities during the conference, which was held from February 28 to March 3, 2022.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), represented Pakistan at the GSMA Mobile World Congress held in Barcelona, Spain, from February 28 to March 3, 2022. The delegation attended a series of high-level activities during the conference.

One of the key highlights of this year's congress was the 'Whole-of-Government Digital Pakistan Roundtable,' that was attended by heads of various government bodies and industry CEOs. Speaking on the occasion, Chairman PTA, Maj Gen Amir Azeem Bajwa (R), apprised the audience of Pakistan's digital profile, with an emphasis on the connectivity landscape. Inviting attention towards the investment

potential in the country's telecom sector, he shared details of some of the major regulatory interventions undertaken to facilitate the industry and consumers; these included cellular license renewal, spectrum auction, rationalization of spectrum, 5G roadmap, fiberization of backhaul, IoT framework, and QoS upgradation, among others.

The PTA leadership also had meetings with the Director of ITU Telecommunication Development Bureau (BDT), Secretary-General of the Asia-Pacific Telecommunity (APT), and Chairman of the Malaysian Communications and Multimedia Commission (MCMC). Moreover, Chairman PTA also visited exhibition booths and interacted with the leadership of Huawei Middle East, GSMA APAC, Ericsson, Starlink, A4AI, and PSEB, among others.

DCO Secretary General's Visit to PTA

The Secretary General of Digital Cooperation Organization (DCO), Ms. Deemah Al-Yahya, visited the PTA Headquarters on November 18, 2022, for a meeting with Chairman PTA, Maj Gen Amir Azeem Bajwa (R). The meeting featured a discussion on matters of mutual interest including enhanced cooperation in the field of ICTs, growth of the digital economy, and efforts to advance the 'Digital Pakistan' vision. Both the dignitaries agreed to collaborate in the direction of inclusive digital transformation and growth of digital industries.

Established in 2020, DCO is a global multilateral body that aims to increase digital prosperity for all by accelerating inclusive growth of the digital economy through enhanced

The Secretary General for Digital Cooperation Organization, Deemah Al-Yahya, visited the PTA Headquarters on November 18, 2021, for an interaction with Chairman PTA, Maj Gen Amir Azeem Bajwa (R). Enhancement of cooperation in the field of ICTs, growth of digital economy, and efforts to advance the 'Digital Pakistan' vision were the key agenda items of the meeting.

cooperation among member states. Pakistan is the founding member of the DCO Council, which has the Kingdom of Saudi Arabia, Bahrain, Jordan, Kuwait, Nigeria, Oman, Rwanda, and Morocco as its other members.

SAMENA Accelerator Roundtable and Huawei Ultra-Broadband Forum

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), delivered the keynote address on 'Right-of-Way Implementation and Socio-Economic Development' at the SAMENA Accelerator Roundtable held in Dubai, UAE, on October 20, 2021. Utilizing the platform, he informed the participants that Pakistan is fully aware of the importance of fiber optic to achieve policy objectives and march towards the socio-economic wellbeing of its people. He added that despite remarkable growth in data usage, the digital infrastructure is resilient because of adequate and redundant international connectivity. The introduction of Telecommunication Infrastructure Provider and Telecommunication Tower Provider licensing regime to establish and maintain infrastructure facilities was another important element of the keynote address.

The SAMENA event was preceded by the 'Huawei Ultra-Broadband Forum (UBBF),' which was held on October 19-20, 2021, under the theme 'Extend Connectivity, Drive Growth.' UBBF is an annual event that attracts the executive leadership of governments, tech companies, mobile operators, service providers, and think tanks to discuss best practices and innovative ways for proliferation of digital connectivity.

APT Policy and Regulatory Forum

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), virtually participated in a panel discussion at the Regulators' Roundtable of the 22nd APT Policy and Regulatory Forum, 2022, organized by APT. Speaking on the occasion, he briefed the audience about PTA's regulatory achievements and cross-sectorial collaborations with other government bodies and private entities. He shared that PTA is striving to achieve 'Leading' status under the G5 benchmark through enhanced cooperation with other stakeholders and regulators. Efforts to achieve the 'Digital Pakistan' vision through prudent policy and regulatory reforms also found a mention in his speech.

World Summit on Information Society

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), virtually participated in the World Summit on Information Society (WSIS) Ministerial Roundtable held on June 1, 2022. He delivered a statement on the WSIS Forum's theme for 2022, 'ICTs for Well-Being, Inclusion, and Resilience: WSIS Cooperation for Accelerating Progress on the SDGs.'

PTA Pledges for ITU Partner2Connect Digital Coalition

PTA made four pledges at the P2C initiative presented as a special track at the ITU World Telecom Development Conference (WTDC) held in Kigali, Rwanda, from June 6-16, 2022. The pledges were to:

- Develop and implement a strategy for digital gender inclusion in Pakistan with the help of national and international stakeholders.

- Use DIRBS to promote smart phone penetration and local manufacturing of mobile phones in Pakistan to boost the 4G ecosystem.

- Facilitate full-scale commercial launch of AMA scheme and to achieve 10 million AMA mobile banking accounts by the end of FY 2023.

- Prioritize collaborative regulation and become ITU's 'Leading' G5 regulator in South Asia by 2022.

The P2C Digital Coalition serves as a leadership level platform for the announcement of new resources, partnerships, and commitments to foster meaningful connectivity and digital transformation globally. An initiative of ITU, P2C provides an opportunity for countries and ICT organizations to showcase their digital development plans under four areas namely, Access, Adoption, Value Creation, and Accelerate.

South Asian Telecommunication Regulators' Council

The South Asian Telecommunication Regulators' Council (SATRC), which is operating under the umbrella of APT, is a sub-regional cooperation organization of telecommunication regulators. SATRC was founded in 1997 for mutual discussion on issues of common interest to telecom regulators in South Asia, ranging from policy and regulation to spectrum and capacity-building. This membership-based platform conducts its activities under the 'SATRC Action Plan' that is devised for two years to address the regulatory issues and challenges emerging out of changing market dynamics, technological developments, and innovations in the field of ICTs. Currently, SATRC has nine members namely, (in alphabetical order), Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka. The SATRC Action Plan VIII includes two Working Groups

(one on Spectrum and the other on Policy, Regulation and Services), capacity-building training sessions and workshops, and a web portal. Following is the gist of major events and activities conducted under SATRC:

SATRC Meeting

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), attended the SATRC-22 meeting, which was held virtually from November 1-3, 2021. The Council took major decisions regarding the SATRC Action Plan VIII, with a focus on the leadership of various Working Groups and financial planning. PTA was re-elected Chair of the Working Group on Policy, Regulation and Services (PRS) by member states. The Council also decided on the work items to be studied by the Working Groups and corresponding meetings and workshops to be held under the SATRC Action Plan VIII. Moreover, during one of the panel discussions at the Council meeting, Member Compliance and Enforcement PTA. Dr. Khawar Siddique Khokhar, participated in the Regulator-Industry Dialogue on 'Advancing Digital Transformation in South Asia.'

Meeting of SATRC Working Group on Policy, Regulation and Services

The first meeting of the SATRC Working Group on PRS was held in Dhaka, Bangladesh, on May 25-26, 2022.

Director General S&D led the PTA delegation as Chair of the Working Group. The meeting was convened to evaluate work items and assign roles and responsibilities to Working Group experts. The SATRC Working Group on PRS has representation of telecom officers and ICT regulators from nine member countries. The Working Group will study the following work items and prepare reports with input and experience of all nine member countries:

The first meeting of the SATRC Working Group on Policy, Regulation and Services was held in Dhaka, Bangladesh, on May 25-26, 2022. Director General S&D, led the PTA delegation as Chairman of the Working Group.

- Development of enabling policy and regulatory environments in the context of SATRC to embrace the new ecosystem introduced by 5G.

- Telecom active infrastructure sharing.

- Regulatory issues related to OTT services and applications.

Meeting of SATRC Working Group on Spectrum

The first meeting of the SATRC Working Group on Spectrum was held in New Delhi, India, from June 21-23, 2022. The meeting was convened to discuss work items and plan activities to be carried out over the next two years. Director Enforcement-Wireless, and Director Licensing-Wireless, who represented PTA at the meeting, discussed the work items to be studied by the Working Group. These included:

1. Approaches toward spectrum harmonization for 5G bands.

2. Evaluation of spectrum utilization in SATRC member countries.

3. Regulatory approaches for spectrum sharing, spectrum trading, and spectrum leasing.

4. Cross-border coordination for interference in SATRC countries.

5. SATRC action plans for the development of spectrum management infrastructure, procedure, and tools.

Digital Cooperation and Mutual Assistance Programmes

The changing paradigms of technological development make it imperative for PTA to collaborate with its peers and industry organizations in technical and regulatory areas. PTA also believes in holding multi-stakeholder dialogues and consultations which can potentially blossom into formal cooperation with such entities.

ITU Assistance on 5th Generation of Regulation

ITU has been tracking and benchmarking the telecom regulatory environment of its 193 member countries since the last few years for global and regional comparisons. Generations of regulation (G1 to G4) are the primary benchmark used by ITU for this purpose. In 2020, Pakistan achieved the highest status (G4) with a score of 88/100, making it the only G4 country in South Asia at that time. In 2021, ITU introduced a new approach of collaboration to ICT regulations i.e., the 5th Generation Collaborative Regulation. G5 signifies a shift from ICT to digital economy and collaborative digital regulation among multiple sectors, and cross-sector cooperation of regulators and ministries. In the 2021 benchmarking, Pakistan, among 58 other countries, was ranked as 'Advanced' G5 country in terms of its level of readiness for G5 regulations. Nine countries attained the highest 'Leading' G5 countries' status.

PTA is already on track to being listed among 'Leading' G5 regulators, with continued ITU assistance on the explanation and methodology governing the tracker, and how PTA can improve its ranking. National collaborative governance is one of the main pillars of the G5 benchmark. In this context, PTA has launched a cross-sector initiative by approaching relevant ministries, departments, and government institutions. Formal MoUs have been signed with NH&MP and NEPRA. Moreover, MoUs with the Ministry of Commerce, Pakistan Post, NADRA, NTISB, NHA, and OGRA are in the pipeline.

PTA-A4AI Agreement

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), and the Executive Director of A4AI, Ms. Sonia Jorge, signed a non-binding cooperation agreement for digital cooperation on the sidelines of the GSMA Mobile World Congress 2022 held in Barcelona, Spain. Under this collaboration, PTA will work towards bridging the digital divide in Pakistan by making use of A4AI's policy and regulatory good practices and resources. PTA and A4AI will conduct a

series of gender-responsive workshops in Pakistan to promote awareness around gender mainstreaming in ICTs and enhance key stakeholders' understanding to tackle the digital gender divide in the country. The agreement will further strengthen PTA's commitment to make women an integral part of the digital transformation process in Pakistan.

Addendum with GSMA for Gender Inclusion in ICTs

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), and GSMA Head of Asia-Pacific, Mr. Julian Gorman, signed an addendum for gender mainstreaming in continuation of the non-binding cooperation agreement already signed at the Mobile World Congress, 2022. Under the arrangement, GSMA will conduct a series of activities in collaboration with PTA for enhanced participation of women in the digital transformation process of Pakistan. Some of the key activities include translation and dissemination of GSMA MISTT, Internet usage gap survey, and sharing of best practices for bridging the gender gap, among others.

PTA-MCMC Bilateral Cooperation in ICTs

PTA and Malaysian Communications and Multimedia Commission (MCMC) have principally agreed to collaborate in the field of telecom and ICT development. The cooperation will enable both regulators to exchange knowledge and regulatory skills to address existing and future challenges in their respective domains. This collaboration is one of the outcomes of the high-level meeting held between the Chairmen of PTA and MCMC during the Mobile World Congress 2022, followed by a virtual meeting on April 8, 2022. Under this arrangement, MCMC conducted two virtual sessions for PTA, explaining their 5G model in Malaysia. A non-binding formal cooperation agreement between the two regulators is also in the pipeline.

Chairman PTA, Maj Gen Amir Azeem Bajwa (R) met Chairman MCMC, Dr. Fadhlullah Suhaimi bin Abdul Malek, on the sidelines of the Mobile World Congress held in Barcelona, Spain, on March 2, 2022, to discuss future prospects in areas of mutual interest.

PTA-UNICEF Cooperation on Child Online Protection

PTA and UNICEF have principally agreed to collaborate in the domain of Child Online Protection (COP) in Pakistan. After the finalization of a non-binding cooperation agreement, which is currently under process, the two organizations will implement multiple initiatives to make Internet usage safe for children. These include the introduction of a toll-free helpline for COP, a joint media campaign to promote PTA's online portal for reporting child abuse incidents and inappropriate content on the Internet, and the development of a COP Strategy in collaboration with the Ministry of Human Rights. Meanwhile, PTA has also constituted an internal PTA Committee on COP.

PTA-AFD Team Meeting

Chairman PTA, Maj Gen Amir Azeem Bajwa (R), chaired two meetings with the leadership of Agence Française de Dévelopment (AFD) Group to discuss investment and partnership opportunities in telecom infrastructure, assessment of digital transformation in Pakistan, climate change, OTT regulation, and capacity building and training. AFD is expected to work out a country-level proposal for investment in the ICT ecosystem of Pakistan.

A workshop on 'Mobile Identity' was held at the PTA Headquarters on October 25, 2021. Senior officers of PTA, and representatives of mobile operators and Infobip—a global cloud communications platform—attended the workshop.

PTA-Ericsson Collaboration on WRC-23

PTA has joined hands with Ericsson Pakistan to organize a series of virtual and physical workshops in preparation for next year's ITU World Radiocommunications Conference (WRC-23). In this context, Ericsson organized a virtual session on April 25, 2022, followed by a physical session on 'National Preparations for ITU WRC-23,' which was held at the FAB Headquarters on July 20, 2022. Head of Government and Industry Relations for Middle East and Africa, Ericsson, Mr. Ali Cheema, conducted the session, which highlighted the importance of ITU WRC-23 agenda

items and preparatory process. The participants, including senior officers from MoITT, PTA, and FAB, identified and discussed key agenda items that are priority areas for Pakistan's ICT sector, with a focus on efficient spectrum management and emerging technology propagation. It was agreed that all stakeholders should be part of the national discussions to present and maintain a coherent national approach at the WRC-23.

IPV6 Training Workshops

PTA and the Asia-Pacific Network Information Center (APNIC), Australia, jointly organized two five-day workshops on 'Internet Protocol version 6' (IPv6) for CMOs and ISPs. Mr. Tashi Phuntsho, Mr. Dave Phelan, and Mr. Warren Finch from APNIC conducted the workshops with support from local trainers—Mr. Fahad and Mr. Tahir Hussain. During the workshops, best practices for transition to IPv6 were explained to help Pakistani operators achieve smooth transition. PTA makes special efforts for capacity-building of its licensees through international organizations like APNIC, ISOC, ICANN and SANOG. Most of its operators have already configured their core networks to support dual stack to simultaneously support both IPv4 and IPv6. Furthermore, the transition to IPv6 will enable adoption of 5G and IoT technologies in Pakistan.

PTA-GSMA-Infobip Workshop on Mobile Identity

A workshop on 'Mobile Identity' was held at the PTA Headquarters on October 25, 2021. A joint initiative of PTA and GSMA, the workshop was arranged to explore the benefits of digital identity to consumers and businesses in a bid to advance the digital transformation agenda in Pakistan. Senior officers of PTA, and representatives of mobile operators and Infobip—a global cloud communications platform—benefited from the workshop. Addressing the session, GSMA and Infobip speakers presented the key requirements and functionalities of mobile identity with a focus on use cases and improved security measures to safeguard customer data. PTA has always proactively supported the introduction of consumer-centric innovative solutions like mobile identity to achieve the 'Digital Pakistan' vision. It was agreed that the consultation process will continue in the form of a Working Group that will include representation from more stakeholders in the mobile identity process.

World Bank

PTA is actively engaged with the World Bank to strengthen digital connectivity as a key foundation for digital economy development, and to enhance the government's capacity for digitally enabled delivery of public services. In this context, the Digital Economy Enhancement Project is being funded by the World Bank (IDA Credit) with sponsorship by GoP. The proposed project will consist of Investment Project Financing linked to defined outcomes to enhance the digital infrastructure and close the digital divide. It will also be used for improving digital governance and service delivery capabilities.

7

» Way Forward

Chapter 7

Way Forward

The Covid-19 pandemic—more than any other event in human history—has demonstrated the critical importance of telecom infrastructure and reliable associated services in keeping businesses, governments, and societies connected and running. Due to the economic and social disruption caused by the pandemic, more and more people across the globe now rely on technology for information. Even though life is reverting to normal, human reliance on ICTs continues to grow because the pandemic has highlighted the paramount importance of the telecom ecosystem with the emergence of new services and applications. The unprecedented 'super floods' in Pakistan have made it even more evident how access to the Internet and digital technologies can prove to be a lifesaver. During these testing times, the telecom sector has also proved to be the backbone for other industries to recover and thrive. The surge in data and voice traffic goes on to show that the telecom sector is performing well, compared to other infrastructure sub-sectors.

The increased digitization of consumers and businesses presents important opportunities for the industry to extend revenue streams beyond connectivity—through IoT, digital services, and entirely new models of digital communication. A few of PTA's top priority areas are QoS and coverage, industry profitability, introduction of state-of-the-art technologies, digital inclusion and bridging the digital gender divide, Optical Fiber proliferation, cybersecurity, promotion of local manufacturing, journey towards G5 regulator, management of online content, facilitation of stakeholders through introduction of policies in the areas of infrastructure and spectrum sharing, development of telecom standards, and standardization in provision of telecom infrastructure. PTA's way forward for the coming year is elaborated below.

Quality of Service and Coverage

In Pakistan, existing fixed broadband services are being provided mostly through legacy copper-based networks. PTA has implemented new mandatory conditions in all new and renewed licenses to gradually switchover legacy networks to FTTH connections. This transition will be monitored through active measures. PTA is committed to provide consumers with high-quality services as well as promote rapid technological advancements in the country. Recently, PTA has reviewed the existing Broadband Quality of Service Regulations 2014, and after due consultations with all relevant stakeholders, has issued the revised Fixed Broadband Quality of Service (QoS) Regulations, 2022. These regulations have been updated in keeping with existing and emerging fixed broadband technologies including xDSL (Digital Subscriber Line), Cable Broadband (DOCSIS 3.x), Fixed Wireless, FTTH/GPON, Satellite Broadband, etc. The aim is to better gauge the services agreed upon by the service providers with end-users. Moreover, PTA will conduct QoS surveys to test the quality of services being provided to consumers, and implement and execute the recurring National Broadband Measurement Programme (NBM). For this purpose, pre-configured devices shall be placed with a group of volunteers and line performance shall be measured round the clock.

PTA's initiative to improve QoS standards for 3G and 4G services and to enhance coverage obligations in cellular licenses to reach maximum population, will enrich the overall user experience and outreach of broadband services across the country. Through continuous monitoring and enforcement, the Authority will ensure that the enhanced QoS standards and coverage obligations envisaged in the recent cellular mobile license renewals and NGMS spectrum auctions are available to the people of Pakistan, AJ&K, and GB. To this effect, PTA has chalked out extensive survey plans for 2022-2023, covering the requirements laid down in the agreement signed with the Prime Minister's Office. As per the agreement, PTA must conduct QoS surveys of mobile operators in 48 cities throughout Pakistan, AJ&K, and GB. Additionally, complaint-based QoS surveys will be conducted, as and when required. Currently, PTA has deployed five QoS monitoring tools in Karachi, Lahore, Rawalpindi-Islamabad, Peshawar, and Multan; it plans to enhance its monitoring capability with the addition of five more QoS tools by end-2022. In addition, PTA had promulgated the Mobile Phone Repeaters Technical Standards and Operations Regulations 2020 to enhance mobile coverage inside buildings through installation of signal repeaters, and to avoid harmful interference to CMOs.

Telecom Infrastructure Sharing

There is a desperate need for infrastructure sharing in Pakistan due to increasing inflation, low ARPU, increasing fuel prices, revenue challenges, requirement of massive CAPEX for new technologies like 5G, connecting the unconnected in remote and rural areas, extended nationwide coverage, as well as the need to adopt cost-effective means to address capacity demand growth. There are several emerging approaches e.g., passive sharing, active sharing, spectrum sharing, etc., that aim to tackle these issues by means of network infrastructure sharing.

To this effect, PTA has developed an infrastructure sharing (active and passive) framework based on the principles of neutrality, non-discrimination, and equal access. This framework, which will be issued soon, will provide a mechanism for licensees and other stakeholders to share their telecom and other infrastructure facilities including space, electrical power, air-conditioning, security, cable ducts, space on antenna and towers, etc. The draft framework has been prepared in keeping with international best practices; several rounds of consultations were carried out with the industry as well as internal and external stakeholders.

Spectrum Sharing Regulatory Framework

Rising demand for radio frequency spectrum emphasizes the need for optimum utilization of spectrum. The emergence of new technologies, especially for wireless broadband services, makes the availability of radio frequency spectrum a key imperative for technological developments in the telecom industry. The scenario has forced regulators to introduce measures to liberalize markets, and to focus on latest trends in spectrum management so as to maximize the social, economic, and technological benefits accruing from this natural resource. Spectrum management is the process to regulate the use of radio frequencies in an efficient manner. Various tools are used for spectrum management, spectrum sharing being one of the essential regulatory tools to facilitate efficient use of radio frequency spectrum.

PTA is working towards development of the Spectrum Sharing Framework in view of recent international developments and analysis of market appetite. Before it is issued, the framework will undergo a consultative round with the industry and stakeholders including FAB.

Introduction of 5G

5G is a transformative technology that allows communities to avail the socio-economic benefits of an advanced and data-intensive digital economy. 5G promises improved connectivity, greater network speed and bandwidth, and ultra-low latency. International projections suggest that by the end of 2026, 5G will attract 3.5 billion subscriptions, thereby generating approximately 45% of the world's total mobile traffic data. Pakistan's large population, coupled with its potential for further economic growth, make access to 4G and timely launch of 5G services an absolute imperative. 5G is creating unprecedented opportunities for people and businesses alike, more so because its usage transcends the ICT sector.

PTA and FAB, alongside MoITT, are synergizing for the successful launch of 5G in Pakistan in collaboration with relevant stakeholders. To this end, FAB has already identified available spectrum in various bands with maximum possible spectrum bandwidth. MoITT and PTA have conducted consultative rounds with all stakeholders including cellular and fixed line operators, vendors, academia, and independent consultants to analyze market readiness for 5G launch. Although the introduction of 5G is extremely important for Pakistan to keep pace with regional developments, some of the key challenges associated with its launch include low OFC penetration, fewer potential use cases, tower density, increased inflation, low ARPU, increased OPEX such as high fuel and electricity prices, and high taxation. Despite these challenges, which need to be addressed before a comprehensive 5G policy is issued by the government, PTA and MoITT are making joint efforts to formulate the Infrastructure Sharing Framework, Spectrum Refarming Framework, Spectrum Sharing, National Roaming, and Ease-of-Doing Business to accelerate 5G deployment. Once policy directions are in place for commercial launch of 5G services, PTA will accordingly seek the services of a consultant to devise a suitable auction design with comprehensive recommendations including incentives for investors, rollout models, implementation models, and diverse use cases development involving verticals.

Adoption of State-of-the-Art Wi-Fi Bands

Wi-Fi 6E may soon become widespread across wireless ecosystems around the globe, unlocking a new era of connectivity that will dramatically improve the wireless experience. The adoption of contemporary innovations in tandem with other countries is an absolute must for Pakistan to remain harmonized in spectrum use. The emerging Wi-Fi 6E standard will soon be adopted by smartphone brands, routers, and other network equipment for provision of the latest Wi-Fi version. Moreover, evolving concepts like Metaverse—a highly-interactive 3D virtual world incorporating Augmented Reality (AR), Virtual Reality (VR) and more, and combining aspects of the digital and physical worlds—require the latest Wi-Fi standard for an optimized wireless experience. Home media streaming (server), office intranet (cloud), and rich media applications, among other services, require massive content to load and process, all of which is addressed by Wi-Fi 6E.

Working towards this end, PTA is actively following latest international developments for 6 GHz band. Regulators are considering a variety of approaches including partial, full, and no assignment for unlicensed operation i.e., Wi-Fi 6E. Since Wi-Fi 6E-enabled devices such as User Equipment (UE), routers, laptops, access points, etc., are becoming commercial, now is the right time to decide on the available spectrum band and related parameters in this band. Moving ahead in this direction, PTA carried out a detailed study on 'Considering of Wi-Fi 6E Bands for Adoption in Pakistan,' while factoring in certain essential prerequisites, such as 1) necessity of adoption, 2) adoption by other regulators, 3) existing use of this band in Pakistan, and 4) international best practices on the allowable parameters—frequency range and power.

Development of National Telecom Standards

Telecom standards are important as they provide a mechanism that allows interoperability, compatibility, and conformity. A few more benefits include economies of scale, promotion of local industry, fostering usage of local materials, quality assurance, guarantee/warranty, etc. PTA is working on the development of National Telecom Equipment Standards to provide different standards for different classes of telecommunication equipment. These regulations, which will prescribe the procedure for testing

of telecommunication equipment, will be applicable to all licenses issued under the Pakistan Telecommunication Reorganization Act 1996, including those that are in the business of manufacturing and importing telecommunication equipment. They will categorize the minimum technical standards for telecommunication equipment.

At present, PTA only applies and adopts telecommunication equipment standards issued by ITU Telecommunication Standardization Sector (ITU-T), European Standards (EN), Directive 2014/53/EU for Radio Equipment Directive (RED), FCC, International Organization for Standardization (ISO), Occupational Health and Safety Assessment Specification (OHSAS), European Committee for Electro Technical Standardization (CENELEC), European Telecommunications Standards Institute (ETSI), and International Electro-Technical Commission (IEC) and its International Special Committee on Radio Interference (CISPR).

Optical Fiber Proliferation

The OFC network is an infrastructure that provides higher bandwidth capacity, compared to traditional coaxial cable as well as wireless medium. OFC is a significant building block in the ICT and digital infrastructure. Over the last decade, it has become the preferred medium of transmission to meet the ever-growing demand for bandwidth. The explosion of data traffic from various sources (such as Internet, e-commerce, computer networks, and multimedia) has underlined the need for a transmission medium that is capable of handling higher bandwidth for such vast amounts of information. OFC, with comparatively infinite bandwidth, has proven to be the ultimate solution.

The upcoming 5G services will require massive deployment of OFC, which connects micro base stations and edge nodes in the 5G network infrastructure; this will be an important factor driving the growth of fiber optic demand. OFC penetration is now considered a matter of strategic importance for a country's telecom infrastructure, as well as for broadband and digital connectivity. A transition is hence underway to promote deployment of fiber in the country by introducing new rollout obligations in Long Distance International and Local Loop, and promoting fiber infrastructure deployment through telecom infrastructure licensees. GoP needs to set suitable targets and take appropriate policy measures to accelerate fiberization in Pakistan. Expecting a 5G-ready infrastructure will require strengthening of the 4G network, especially an increase in the percentage of FTTT/Site from the current 11% of the total deployed OFC. The optical network and

transmission system, however, is beset with challenges such as installation difficulty, preliminary installation cost, fiber cable cuts, and difficulty in tracing faults, among others. GoP is working to address the challenges associated with telecom infrastructure deployment; these include eliminating roadblocks in procedures associated with grant of RoW to facilitate both fiber deployment and telecom tower installations.

Review of Telecom Rules and Regulations

PTA is in the process of updating various rules and regulations to keep abreast with advancements in the telecom regime. In this connection, the 'Pakistan Telecom Rules, 2000' and the 'Dispute Resolution Regulations' are currently being updated. To keep pace with change in technology, the proposed rules and regulations are envisaged to make adequate provisions for regulatory certainty and investment promotion.

Standardization in Provision of Telecom Infrastructure

PTA is in the process of preparing outside plant code specifications and guidelines for in-building solution cabling and processes for use of the utility infrastructure for telecommunication services. PTA will devise an advisory code for outside plant for utilization by the local authorities to ensure that telecommunication ducts and associated access points are provided on new roads, railways, and footpaths. Standards for in-building telecommunication cabling including recommendations on neutral host in commercial buildings, will also be developed. Furthermore, guidelines will be framed on standard processes and terms and conditions for use of the infrastructure of electricity, gas, and water networks, and the communication infrastructure owned and operated by utility infrastructure owners, for telecommunication services.

Local SIM Manufacturing

Pakistan is planning to start local manufacturing of SIMs and smart cards to shield the country from the threat of cyber-attacks amid a brewing cyber war. Digital transformation and creation of an enabling ecosystem is one of the key objectives of GoP, and in the era of digital services, SIMs and smart cards assume pivotal importance. The local manufacturing of SIMs will massively benefit the economy as millions of SIMs are currently imported. PTA fully supports the requisite role of performing authorization, compliance, and adoption of SIM cards manufacturing etc., in the telecom sector. The local SIM and smart cards manufacturing industry has already become the principal sector in many national economies and is playing an important role in creating sustainable economic growth. The role of the said industry will not be restricted to the domestic engineering perspective or transfer of technology. Analyzed from a business perspective, it will boost the economy by creating employment opportunities, generating tax income, and saving precious Forex. Moreover, it will add another practical dimension for the academia vis-à-vis research and development.

With the evolution of SIM technology, manufacturers worldwide have come up with new variants of SIMs such as Embedded SIM (eSIM), Soft SIM, and Integrated SIM (iSIM), among others. All these variants are worthy substitutes for a physical SIM card, which has become the new standard for subscriber identity and end-user management. As such, local physical SIM manufacturers may establish eSIM management platforms and offer eSIM products to CMOs via 'Platform as a Service.'

ITU Partner2Connect Digital Coalition

To foster meaningful connectivity and digital transformation in communities across the globe, ITU announced the launch of the P2C Digital Coalition. P2C is an online pledge platform where countries and organizations can showcase their digital development plans at the World Telecom Development Conference (WTDC) under four areas: Access, Adoption, Value Creation, and Accelerate. Pledges may include financial, policy and regulatory, advocacy and programmatic approaches. The pledge is not a binding commitment but a sign of commitment to the world.

P2C is designed to be a game-changer for the ICT sector to take a holistic approach, to pledge, and to mobilize the resources needed to connect those who are still offline. P2C will support implementation of the United Nations Secretary-General's (UNSG) 'Roadmap for Digital Cooperation' and the UNSG's report 'Our Common Agenda,'

in collaboration with the Office of the Secretary-General's Envoy on Technology. Pakistan is a member of ITU's P2C Digital Coalition, as a part of which PTA has pleged to:

(i) Prioritise collaborative regulation and become ITU's 'Leading' G5 regulator in South Asia by 2022.

(ii) Develop and implement a Strategy for Digital Gender Inclusion in Pakistan with the support of national and International stakeholders.

(iii) Facilitate full-scale commercial launch of AMA scheme and achieve 10 million accounts by the end of FY 2023.

(iv) Use DIRBS to promote smart phone penetration and local manufacturing of mobile phones in Pakistan to boost the 4G ecosystem.

Intense efforts are being made to achieve these pledges.

PTA's Journey Towards G5 Regulator

ITU, as we know, is a United Nations' specialized agency for standardization and regulation of the international radio and telecommunication systems. It has been tracking and benchmarking the telecom regulatory environment of its 193 member countries since the last few years for global and regional comparisons, using generations of regulation (i.e., G1 to G4) as the primary benchmark. The G5 benchmark was launched and quickly became the gold standard. This benchmarking introduced a new collaborative approach to ICT regulations—the 5th Generation Collaborative

Regulation. ITU's 5th Generation (G5) of Regulation is a concept of continuous technological development through the adoption of a collaborative regulatory approach. The underlying premise of the said approach is a shift from ICT to digital economy, collaborative digital regulation among multiple sectors, and cross-sector cooperation of regulators and ministries.

The G5 benchmark captures how all countries are addressing the needs of a collaborative approach via an active policy agenda that extends well beyond the ICT scope through collaboration. Since its inception, PTA as a regulator has played its role prudently by ensuring an open, competitive, fair, well-regulated, robust, and thriving telecom sector. ITU has also appreciated PTA's regulatory practices by ranking PTA as 4th Generation Regulator (G4), thus placing Pakistan among the top five regulators in the Asia-Pacific region and the only G4 regulator in South Asia (2020 GSR).

In the 2021 benchmarking, Pakistan was ranked as one of the 58 'Advanced' countries in terms of its level of readiness for G5 regulations. Nine countries were the highest ranked 'Leading' countries, while 82 were in the 'Transitioning' state and 44 had 'Limited' level of G5 readiness. Pakistan has made significant progress and now has leaped to an 'Advanced' of fifth-generation regulation (G5). ITU's recognition of Pakistan/PTA is a testimony to the rapid evolution of ICT regulations in Pakistan and a move towards collaborative regulations. Being at an 'Advanced' stage, Pakistan is very close to achieving the 'Leading' stage of G5 benchmark. PTA is working with different sector regulators and ministries because innovations have a larger spread across different sectors like banking, education, commerce, health, and agriculture, etc. To achieve this level, there are quite a few pointers which require national collaborative action plans, and for this purpose, PTA is closely following up with MoITT, and other stakeholders and public authorities .

Management of Online Content

The enormous volume of content being uploaded on digital media requires a multi-pronged strategy to restrain and prevent both the uploading and dissemination of unlawful content. PTA intends to adopt the following measures to this effect:

- Registration of significant SM platforms compliant with Rule 7(6) of the Removal and Blocking of Unlawful Online Content (Procedure, Oversight, and Safeguards) Rules, 2021.

- Holding of special sessions with moderation teams of SM platforms, especially with respect to sensitive content of a sacrilegious or sectarian nature that may potentially lead to real world harm.

- Collaboration with SM platforms and concerned entities to raise awareness about online harm and safe SM usage.

Telecom Industry Profitability

The telecom sector is one of the fastest growing segments of Pakistan's economy and is a key driver for growth. PTA, as a regulator, is focused on providing an enabling environment to telecom operators, to invest in networks and improve experiences through upgraded and enhanced QoS standards. Pakistan's thriving telecom sector has attracted international telecom players such as China Mobile, Telenor, Etisalat, and VEON owing to expansion of telecom market opportunities and provision of a conducive regulatory environment. The profitability of telecom operators is key to meeting the growing requirement of investments in the telecom infrastructure. Cognizant of this fact, PTA is collaborating with policy makers and CMOs to expand telecom services and to ensure reasonable return on telecom investments. A strong telecommunication infrastructure is considered an important component of economic development. PTA will continue its efforts for sustainable growth and profitability of this sector, and adequate rollout of the telecom infrastructure to meet the growing demand for high-speed data connectivity.

Satellite Broadband Internet

Satellite Internet or High Throughput Satellite (HTS) systems are future technologies aimed at 'Connecting the Unconnected.' Also referred to as a 'Disruptor Technology,' HTS supports diverse user requirements and is by far, one of the most advanced technologies. Aside from high availability, global land and sea coverage, and reliability, what sets HTS technology apart is that it is independent of terrestrial infrastructure (submarine cables, towers, etc.), and frees data-locked countries and connectivity for underserved and unserved areas. Currently, PTA is actively engaging with global satellite broadband providers and evaluating various proposals in this connection. However, a key consideration is its co-existence with the national space programme and IMT/5G in the same frequency spectrum.

8

Annexes

Annex 1: Annual Audited Accounts

PAKISTAN TELECOMMUNICATION AUTHORITY
STATEMENT OF FINANCIAL POSITION
AS AT 30 JUNE 2022

FUNDS AND LIABILITIES	Note	2022 Rupees	2021 Rupees
FUNDS			
Federal consolidated fund	3	3,310,289,831	182,848,176
Pakistan Telecommunication Authority fund	4	4,091,460,383	4,333,669,103
		7,401,750,214	4,516,517,279
LIABILITIES			
NON-CURRENT LIABILITIES			
Staff retirement benefits	5	2,535,134,830	2,001,043,997
Lease liabilities		-	53,271,146
Payable to Competition Commission of Pakistan	6	452,862,063	-
		2,987,996,893	2,054,315,143
CURRENT LIABILITIES			
Unearned income	7	1,183,702,400	1,183,702,400
Payable to AJK and GB Councils	8	6,181,804,368	2,798,089,742
Current portion of non-current liabilities	9	283,349,406	174,750,795
Accrued and other liabilities	10	738,414,265	409,508,818
Income tax payable	19	277,368,848	260,505,851
		8,664,639,287	4,826,557,606
TOTAL LIABILITIES		11,652,636,180	6,880,872,749
CONTINGENCIES AND COMMITMENTS	11		
TOTAL FUNDS AND LIABILITIES		19,054,386,394	11,397,390,028

ASSETS	Note	2022 Rupees	2021 Rupees
NON-CURRENT ASSETS			
Property and equipment	12	616,799,434	603,813,579
Right of use assets		-	77,177,695
Intangibles	13	3,858,572	3,658,210
Long-term loans and advances	14	482,406,821	333,807,341
Deferred income tax asset	15	-	-
		1,103,064,827	1,018,456,825
CURRENT ASSETS			
Fee receivable	16	45,189,029	67,797,305
Receivable from operators on behalf of AJK and GB Councils - net	17	30,041,410	16,050,397
Advances, prepayments and other receivables	18	2,215,265,005	1,299,355,466
Tax refunds due from Government	19	3,385,679,210	3,274,874,325
Bank balances	20	12,275,146,913	5,720,855,710
		17,951,321,567	10,378,933,203
TOTAL ASSETS		19,054,386,394	11,397,390,028

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

CHAIRMAN

MEMBER (FINANCE)

PAKISTAN TELECOMMUNICATION AUTHORITY
INCOME AND EXPENDITURE STATEMENT
FOR THE YEAR ENDED 30 JUNE 2022

	Note	2022 Rupees	2021 Rupees
Income	21	109,254,657,163	40,337,122,664
Expenditure			
General and administrative expenses	22	3,561,522,545	2,203,974,130
Finance cost	23	88,999	4,849,882
		(3,561,611,544)	(2,208,824,012)
		105,693,045,619	38,128,298,652
Other income	24	965,593,001	217,813,299
Surplus before taxation		106,658,638,620	38,346,111,951
Less: Taxation	25	(3,524,053)	245,750,981
Surplus after taxation		106,655,114,567	38,591,862,932

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

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   CHAIRMAN   **MEMBER (FINANCE)**

PAKISTAN TELECOMMUNICATION AUTHORITY

STATEMENT OF CASH FLOWS

FOR THE YEAR ENDED 30 JUNE 2022

	2022 Rupees	2021 Rupees
CASH FLOWS FROM OPERATING ACTIVITIES		
Surplus before taxation	106,658,638,620	38,346,111,951
Adjustments for non-cash charges and other items:		
Depreciation - property and equipment	113,394,766	79,768,149
Depreciation - right-of-use asset	-	15,592,671
Amortization of intangibles	492,042	1,082,385
Property and equipment written off	366,785	-
Finance cost on lease liabilities	-	4,829,293
Provision for:		
- contributory provident fund payable	67,614,423	58,689,210
- accumulating compensated absences	22,102,379	87,637,588
- employee's gratuity scheme obligation	182,208,778	157,557,589
- pension obligation	1,123,338	1,449,744
- post retirement medical benefit	80,962,506	63,516,755
- contribution to Competition Commission of Pakistan	736,211,469	149,466,975
Allowance for expected credit losses	-	140,040,910
Profit on bank deposits	(517,044,699)	(166,492,404)
Mark-up on NGMS license	(750,180,227)	(222,286,963)
Mark-up on license renewal	(2,887,474,906)	(3,179,077,759)
Gain on sale of property and equipment	(169,551)	(22,986,188)
	103,708,245,723	35,514,899,906
Working capital changes:		
(Increase) / decrease in current assets:		
Fees receivable	22,608,276	(134,239,195)
Receivable from operators on behalf of AJK and GB Council - net	(13,991,013)	(197,646)
Advances, prepayments and other receivables	10,459,133	(9,190,880)
	19,076,396	(143,627,721)
Increase / (decrease) in current liabilities		
Unearned income	-	(3,486,151,250)
Accrued and other liabilities	328,905,447	(87,561)
Payable to AJK & GB Council	3,422,657,019	2,388,796,418
	3,751,562,466	(1,097,442,393)
Cash generated from operations	107,478,884,585	34,273,829,792
Increase in loans and advances	(215,476,471)	(21,537,870)
Income tax paid	(136,408,334)	(100,377,291)
Payment made to Competition Commission of Pakistan	(149,466,975)	(125,258,696)
Pension paid	(1,624,912)	(1,449,744)
Staff retirement benefits paid	(175,480,304)	(76,501,117)
	(678,456,996)	(325,124,718)
Net cash generated from operating activities	106,800,427,589	33,948,705,074
CASH FLOWS FROM INVESTING ACTIVITIES		
Capital expenditure on property and equipment	(126,829,419)	(210,503,252)
Capital expenditure on intangibles	(692,404)	(1,316,000)
Profit on bank deposits received	250,314,627	254,717,669
Markup on ISF of NGMS License received	219,808,776	688,635,572
Mark-up on license renewal received	2,825,084,748	3,977,640,806
Proceeds from sale of property and equipment	251,564	22,988,331
Net cash from investing activities	3,167,937,892	4,732,163,126
CASH FLOWS FROM FINANCING ACTIVITIES		
Payment made to Frequency Allocation Board	(876,709,386)	(830,554,594)
Payments to GoP FCF account	(102,542,407,371)	(35,642,514,568)
Adjustment / (repayment) of lease liabilities	5,042,479	(19,597,944)
Net cash used in financing activities	(103,414,074,278)	(36,492,667,106)
Net increase in cash and cash equivalents	6,554,291,203	2,188,201,094
Cash and cash equivalents at beginning of the year	5,720,855,710	3,532,654,616
Cash and cash equivalents at end of the year	12,275,146,913	5,720,855,710

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

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 CHAIRMAN

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 MEMBER (FINANCE)

Annex 2: Telecom Industry's Contribution to National Exchequer (PKR Billion)

Period	GST	PTA Deposits	Others	Total
2017-18	58.1	22.6	82.1	**162.8**
2018-19	26.6	26.0	62.9	**115.5**
2019-20	48.8	141.2	101.8	**291.9**
2020-21 (R)	64.7	44.8	116.3	**225.8**
2021-22 (P)	76.8	102.5	145.9	**325.2**

Annex 3: GST by Telecom Industry (PKR Million)

Period	2017-18	2018-19	2019-20	2020-21 (R)	2021-22 (P)
CMO	42,274	9,707	28,398	44,529	48,102
LL/CVAS	10,353	9,433	13,223	14,468	25,311
LDI	845	1,433	1,928	1,837	1,212
TIP/TTP	4,586	5,995	5,275	3,897	2,197
Total	58,058	26,567	48,825	64,731	76,822

Annex 4: Other Taxes by Telecom Industry (PKR Million)

Year	CMO	LL/CVAS	LDI	TTP/TIP	Total
2017-18	66,968	7,791	3,663	3,720	**82,142**
2018-19	44,344	11,273	2,836	4,471	**62,923**
2019-20	85,497	8,258	3,292	4,797	**101,844**
2020-21	97,666	9,187	3,894	5,547	**116,294**
2021-22 (P)	126,086	9,428	3,254	7,209	**145,976**

Note: Other taxes include withholding tax, income tax, customs duty, etc

Annex 5: FDI in Telecom (US$ Million)

Year	Description	FDI in Telecom	Total FDI	Telecom Share in Total FDI (%)
2017-18	Inflow	288.5	3,494.5	7.6
	Outflow	188.4	714.2	26.8
	Net FDI	100.1	2,780.3	3.2
2018-19	Inflow	235.5	2,785.20	8.45
	Outflow	313.1	1,422.80	22.01
	Net FDI	-77.6	1,362.40	-5.7
2019-20	Inflow	763.3	3,285.80	23.23
	Outflow	140.8	724.6	19.44
	Net FDI	622.5	2,561.20	24.3
2020-21	Inflow	202.34	3,010.50	6.72
	Outflow	167.5	1,163.10	14.4
	Net FDI	34.8	1,847.40	1.88
2021-22	Inflow	168.4	2,622.5	6.42
	Outflow	197.6	754.7	26.18
	Net FDI	- 29.1	1,867.8	-1.56

Source: State Bank of Pakistan
P: Provisional R: Revised

Annex 6: Investment by Telecom Industry (US$ Million)

Year	CMO	FLL & WLL	LDI	CVAS	TIP/TTP	Total
2017-18	727	98	25	37	245	1,132
2018-19	585	63	31	45	116	840
2019-20	829	188	75	53	249	1,394
2020-21 (R)	808	201	31	65	230	1,336
2021-22 (P)	1,175	221	20	100	557	2,073

Annex 7: Telecom Industry Revenues (PKR Million)

Year	CMO	FLL	WLL	LDI	CVAS	TIP/TTP	Total
2017-18	383,646	76,854	4,003	34,424	7,756	32,936	539,619
2018-19	447,311	66,196	5,879	39,567	12,917	33,946	605,816
2019-20	425,961	76,523	5,052	37,130	16,084	36,199	596,950
2020-21 (R)	461,670	80,230	5,320	45,360	18,440	40,070	651,090
2021-22 (P)	499,890	90,150	4,170	39,880	16,900	42,980	693,970

Annex 8: Mobile Operators' Revenues (PKR Million)

Year	Jazz	Ufone	Zong	Telenor	SCO	Total
2017-18	147,031	53,230	72,409	109,744	1,232	383,646
2018-19	180,407	62,280	100,740	102,226	1,657	447,311
2019-20	174,821	53,632	95,414	100,425	1,669	425,961
2020-21	194,961	55,040	105,293	103,737	2,637	461,668
2021-22 (P)	222,329	57,047	112,480	105,798	2,238	499,892

Annex 9: Mobile ARPU/Month (PKR)

Year	Jazz	Ufone	Zong	Telenor	Total
2017-18	227	231	201	218	219
2018-19	263	240	257	194	238
2019-20	240	195	221	184	214
2020-21	241	199	224	180	215
2021-22	253	205	216	178	220

Annex 10: Mobile Subscribers

Year	Jazz	Ufone	Zong	Telenor	SCO	Total
2017-18	55,469,118	20,314,686	30,890,633	43,564,216	1,281,160	151,519,813
2018-19	59,470,721	22,616,449	34,713,311	44,221,147	1,256,780	162,278,408
2019-20	62,808,245	22,323,713	36,712,560	45,424,353	1,290,944	168,559,815
2020-21	69,792,924	23,118,277	40,498,899	49,279,306	1,560,493	184,249,899
2021-22	75,466,451	23,282,996	44,193,661	49,978,275	1,658,986	194,580,369

P: Provisional R: Revised

Annex 11: Fixed Line Subscribers–FLL & WLL (Million)

Year	Total
2017-18	2.90
2018-19	2.65
2019-20	2.49
2020-21	2.57
2021-22	2.61

Annex 12: Mobile Broadband Subscribers

Year	Jazz	Ufone	Zong	Telenor	SCO	Total
2017-18	19,206,445	6,630,766	16,620,516	13,626,893	379,120	56,463,740
2018-19	24,222,714	8,901,792	21,171,595	14,636,038	498,483	69,430,622
2019-20	29,880,315	9,351,854	24,043,012	17,868,772	560,960	81,704,913
2020-21	38,458,078	10,534,021	27,518,921	22,263,536	1,078,351	99,852,907
2021-22	43,986,189	12,929,805	32,104,031	25,373,339	1,357,491	115,750,855

Annex 13: Broadband Subscribers

Year	Mobile Broadband	Fixed Broadband	Total
2016-17	42,084,030	2,556,795	44,640,825
2017-18	56,463,740	2,255,195	58,718,935
2018-19	69,430,622	2,093,949	71,524,571
2019-20	81,704,913	2,094,175	83,799,088
2020-21	99,852,907	2,847,060	102,699,967
2021-22	115,750,855	3,012,019	118,762,874

Annex 14: Digital Financial Indicators

Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
No. of Mobile Wallet (BB) Agents	402,710	405,571	421,053	445,181	534,460	637,231
No. of Active BB Agents	185,297		174,609	182,189	246,280	333,925
No. of Mobile Wallet Accounts	27,312,964	39,246,468	35,730,704	52,522,222	74,620,637	88,549,274
No. of Active Accounts	13,158,310	21,815,840	22,044,942	26,694,588	45,887,496	43,282,879
Deposits as on Quarter End (PKR Million)	15,423	15,345	25,664	36,660	55,259	78,272
No. of Transactions (Thousands)	551,544	748,639	1,116,267	1,489,665	2,233,117	2,725,287
Value of Transactions (PKR Million)	2,427,823	3,183,571	4,128,868	5,151,391	8,086,149	10,637,320
Average Size of Transactions (PKR)	4,417	2,197	1,724	3,462	3,653	3,895
Average Daily Transactions (No.)	1,532,064	2,079,554	3,100,738	4,137,956	6,203,102	7,570,239
Average Deposit In Accounts (PKR)	496	227	547	663	783	829

Source: State Bank of Pakistan

Annex 15: Award of Licenses (FY 2021-22)

Services	New Applications Processed	Licenses Awarded
Wireless HF/VHF /UHF	57	43 Fresh and 60 Re-validated (Total Rs. 103)
Aeronautical Mobile Station License	10	10 Fresh and 20 Re-validated (Total Rs. 30)
Amateur	9	4 Fresh and 8 Re-validated (Total Rs. 12)
Total	**76**	**145**

Annex 16: Contribution to National Exchequer through Spectrum Fee

License Type/Organization Category	Due Amount (PKR) Demand Notes Issued	Due Amount (PKR)
Wireless License	626	58,773,820
Site Registration (Microwave Link)	16	13,839,360
Inmarsat	10	425,000
Aeronautical Mobile Station License	106	629,437
Amateur	36	36,000
Telemetry System	1	50,000
FM Broadcasting	138	2,233,000
Total	**933**	**75,986,617**

Annex 17: Data Related to UAN/Toll-Free Numbers

S. No	Description	Total
1.	Allocation of UAN	**309**
2.	Allocation of Toll-Free	**48**
3.	Re-Allocation of UAN	**137**
4.	Re-Allocation of Toll-Free	**8**
5.	Cancellation of UAN	**205**
6.	Cancellation of Toll-Free	**35**
Total		**742**

Annex 18: Short Code and Number Series

S. No	Description	Total
1.	Allocation of FLL Geographic Numbers	**41,8000**
2.	Allocation of CMO Geographic Numbers	**124,4000**
3.	Allocation of Short Codes	**1,263**
4.	Allocation of NSPC	**2**
5.	Cancellation of FLL Geographic Numbers	**77,000**
6.	Cancellation of CMO Geographic Numbers	**1,180,000**
7.	Cancellation of Short Codes	**1,242**
8.	Cancellation of NSPC	**2**
9.	Change of Backend Numbers (Short Codes)	**126**
10.	Public Service Messages	**21**

Annexes

Annex 19: Consumer Complaints (FY 2021-22)

Nature of Complaint	No. of Complaints	Complaints Addressed
Fraudulent Call or SMS	62,219	62,072
Restoration of Suspended SMS Facility Blocked due to Spam Filters	45,259	45,132
Updating of SIM Record against CNIC (668 DB)	20,417	20,409
Coverage Issues Related to Data Services (3G, 4G, LTE)	19,848	19,573
Illegal Blocking of Number or SIM	19,013	19,001
Billing-Related Issues (Overcharging, Tariff, etc.)	5,692	5,259
Miscellaneous Issues	5,462	5,348
Non-Provision of Service in an Area or Coverage Issues	4,661	4,592
Illegal Use of CNIC for Activation of Mobile SIM	4,505	4,472
QoS-Related Issues (Poor Network, Noise, Call Drop, etc.)	4,303	4,240
Obnoxious Calls or SMS	3,377	3,369
Non-Provision of Service due to Electricity Outage or During Power Load Shedding	2,753	2,674
Fault or Disruption in Broadband	2,706	2,698
Fraudulent Call or SMS (BISP-Related)	2,131	2,123
Change of Package Without User Consent	1,878	1,789
VAS or Package-Related Issues	1,684	1,584
Refund-Related Issues	1,677	1,573
MNP-Related Issues	1,650	1,635
Poor Helpline or Customer Care Service	1,619	1,600
Promotional SMS or SPAM	1,540	1,528
Obnoxious Call or SMS Reporting after First Warning	1,149	1,148
Biometric Verification-Related Issues	763	760
Fraudulent Call or SMS through WhatsApp	696	695
Non-Provision of Service Requested or Subscribed by User	644	621
Illegal Transfer of Connection or Ownership	574	543
Unsolicited SMS	444	431
Fault or Disruption in Telephone	428	417
Withdrawal of Service Request by User	398	393
Misleading Claims by Operator Regarding Promotional or Marketing Messages	382	359
Illegal Issuance of Duplicate SIM	306	301
International Roaming-Related Issues	140	139
Illegal Change of Network without User Consent	128	127
Fault or Disruption in Smart TV or IPTV	110	101
Fraudulent Call or SMS (Bol Game Show-Related)	74	74
Total	**218,630**	**216,780**

ORGANOGRAM

Pakistan
Telecommunication
Authority

PTA

CHAIRMAN

Chairman Secretariat

MEMBER
(FINANCE)

MEMBER
(COMPLIANCE &
ENFORCEMENT)

Chairman branch

- Coord Division
- Admin Directorate
  - Civil Works
    Reporting through
    Director (Admin)
- IL&T Division
- S&D Division
- Web Analysis Division
- Licensing Division
- Cyber Vigilance Division
- L&R Division

- WAD
- S&D DTE
- IL&T DTE
- Medical

- Vigilance
- Cyber Security
- ICT

- Wireless DTE
- RBS DTE
- Wireline DTE

- Litigation
- Regulation
- Law

- G&EA DTE
  through
  DG (Coord)
- HR DTE
  Reporting through
  DG (Coord)
- PR DTE
  Reporting through
  DG (Coord)
- Coordination DTE

MEMBER (FINANCE) branch

- Commercial Affairs Division
- Finance Division
- Audit Division

- CA DTE
- EA DTE
- P&C DTE
- B&A DTE
- Finance DTE
- Audit DTE

- Internal Audit Reporting through Dir Govt. Audit
- Govt. Audit Section

MEMBER (COMPLIANCE & ENFORCEMENT) branch

- Enforcement Division
- Services Division
- Consumer Protection Division

- Enf-Wireless-I
- Enf-Wireline & Coord
- Enf-Wireless-II
- Numb DTE
- TA DTE
- CPD DTE

- Z/O Rawalpindi
- Z/O Lahore
- Z/O Peshawar
- Z/O Karachi
- Z/O Quetta
- Z/O Muzaffarabad
- Z/O GB
  through Dir
  (Enf-Wireline)
- R/O Multan
- R/O Sukkur
- R/O Abbottabad
- R/O Faisalabad
- R/O Gwadar

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Pakistan Telecommunication Authority

Headquarters, F-5/1, Islamabad
www.pta.gov.pk

Point of Contact

Mr. Muhammad Arif Sargana
Director General–Commercial Affairs–PTA
Email: arif@pta.gov.pk