

Annual Report

2016




Pakistan Telecommunication Authority

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 **PTA** *Annual Report 2016*

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VISION

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

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ACRONYMS

| | |
|--------|---|
| AJ&K | Azad Jammu and Kashmir |
| ALF | Annual License Fee |
| ASR | Approved Settlement Rate |
| APNIC | Asia-Pacific Network Information Centre |
| BTS | Base Transceiver Station |
| BVS | Biometric Verification System |
| CMO | Cellular Mobile Operator |
| CM Pak | China Mobile Pakistan Ltd. |
| CNIC | Computerized National Identity Card |
| CPE | Customer Premesis Equipment |
| CSC | Customer Service Center |
| CVAS | Class Value Added Services |
| DSL | Digital Subscriber Line |
| EVDO | Evolution Data Optimized |
| FAB | Frequency Allocation Board |
| FBR | Federal Board of Revenue |
| FIA | Federal Investigation Agency |
| FDI | Foreign Direct Investment |
| FED | Federal Excise Duty |
| FLL | Fixed Local Loop |
| FTTH | Fiber-to-the-Home |
| FY | Fiscal Year |
| GB | Gilgit Baltistan |
| GDP | Gross Domestic Product |
| GST | General Sales Tax |
| GVA | Gross Value Added |
| ICH | International Clearing House |
| ICANN | Internet Corporation for Assigned Names and Numbers |
| ICT | Information & Communication Technologies |
| ISOC | Internet Society |
| IDP | Internally Displaced Person |
| IM | Information Memorandum |
| IMEI | International Mobile Equipment Identity |
| IN | Intelligent Network |
| ISP | Internet Service Provider |
| ITU | International Telecommunication Union |
| KPIs | Key Performance Indicators |
| KPK | Khyber Pakhtunkhwa |
| LDI | Long Distance & International |

| | |
|--------|--|
| LEA | Law Enforcement Agency |
| LIBOR | London Interbank Offered Rate |
| LL | Local Loop |
| LTE | Long-Term Evolution |
| MBB | Mobile Broadband |
| M&RITT | Monitoring and Reconciliation of International Telephone Traffic |
| MCS | Military College of Signals |
| MHz | Mega Hertz |
| MNP | Mobile Number Portability |
| MoU | Memorandum of Understanding |
| NADRA | National Database and Registration Authority |
| NGMS | Next Generation Mobile Services |
| NSRC | NADRA Swift Registration Centre |
| PCO | Public Call Office |
| PKR | Pakistan Rupee |
| PMCL | Pakistan Mobile Communication Limited (Mobilink) |
| PTCL | Pakistan Telecommunication Company Limited |
| PPRA | Public Procurement Regulatory Authority |
| PTML | Pakistan Telecommunication Mobile Limited (Ufone) |
| QoS | Quality of Service |
| SBP | State Bank of Pakistan |
| SCO | Special Communications Organization |
| SIM | Subscriber Identity Module |
| SMRA | Simultaneous Multiple Round Ascending |
| SMS | Short Messaging Service |
| SOP | Standard Operating Procedure |
| TB | Terabytes |
| USF | Universal Service Fund |
| VAS | Value Added Services |
| WiMAX | Worldwide Interoperability for Microwave Access |
| WHT | Withholding Tax |
| WLL | Wireless Local Loop |

The Authority

*Dr. Syed Ismail Shah
Chairman*



*Mr. Tariq Sultan
Member (Finance)*



*Mr. Abdul Samad
Member (Compliance
& Enforcement)*



It gives me immense pleasure to present the Annual Report of PTA for the year 2015-16, covering the key regulatory initiatives and outlook of the telecom sector at the end of fiscal year 2015-16.

PTA's vision is to create a 'Smart Pakistan' where technologies drive Policies, services meet consumer expectations and regulations facilitate innovations. Since the availability of MBB in Pakistan that vision is becoming a reality. Data-centric services spurred new consumer experience and alternate revenue streams for operators in a short span of time. The demand for mobile broadband has increased tremendously and there arose a need to allocate more spectrum for such services. PTA carried out the spectrum auction in a fair and transparent manner which resulted in award of license to Telenor Pakistan on 14th July 2016 and resultantly Telenor Pakistan has joined the list of 4G operators in Pakistan by winning spectrum in the 850 MHz band. Currently 3 out of 5 cellular mobile operators in Pakistan are offering 4G services whereas more than 46% of the population already has access to the 3G services being offered by four cellular mobile operators. For the proliferation of telecom services in Azad Jammu and Kashmir (AJK) and Gilgit Baltistan (GB), PTA also held WLL spectrum auction on 29th December, 2015 where Linkdotnet and PTCL won different lots offered in various regions of the AJK & GB.

Introduction of advanced technologies alone cannot generate significant outcome unless conducive, business-friendly and forward looking regulatory platform is made available to the operators. In this context, PTA issued the 'Regulations for Technical Implementation of Mobile Banking, 2016' to launch the much needed interoperability mechanism between multiple banks and multiple operators to revolutionize the mobile banking sector. The benefits of broadband and ICTs can be availed properly only if we have a talented pool of ICT experts, entrepreneurs and skilled developers who are well equipped with ICT knowledge. PTA held numerous training and awareness sessions to encourage the culture of mobile app development, cloud computing, IPv6 routing, Internet Exchange Points, Internet of Things, Big Data Analytics and Android based App development.

The availability of technology, supportive regulatory framework and skilled human resource is transforming Pakistan's telecom sector into fast changing, high on demand and customer centric market. PTA understands that fair competition is the key to harness the true potential of mobile broadband buzz. Therefore, PTA kept a watchful eye on the level of competition in the market by devising Retail Tariff Regulations, providing input to Ministry of IT on Competition Rules, ensuring spectrum availability and publishing cellular mobile QoS Survey results. However, PTA also remained realistic about the market saturation phenomenon in the cellular sector and accepted consolidation in the market by approving the merger request of Pakistan Mobile communications Ltd. (Mobilink) and Warid Telecom (Pvt.) Ltd.

I am pleased to note that the necessary constituents of a 'Smart Pakistan' are fitting together. ICT solutions, being offered on mobile broadband, are making a big difference in every walk of life. Hundreds of billions of rupees are being sent and received over the mobile money channels by the people of Pakistan. In 2015-16 the amount transacted through mobile banking was Rs. 1,492 billion. In the e-commerce arena, online business ventures are becoming a multi-million dollar industry offering latest consumer products, often at discounted prices to the buyers. In the education sector, ICT tools are being used to monitor school governance in Punjab and to deliver online education across the country via virtual classrooms. Pakistan Education Research Network (PERN) has brought

Chairman's Message

colleges/universities together over a connected network platform while free lance writers from Pakistan are earning handsome wages online. In the health sector, different apps and sensing systems are helping in early discovery of epidemics and treatment of patients, especially in the rural areas of Pakistan. The Government of Punjab is monitoring the quality of drugs and health facilities remotely using ICT tools. The travel habits and traditional cab culture is being revolutionized with the introduction of world famous commute services such as Uber and Careem, in addition to the already available local ICT services such as Travly. Government use of ICTs is also gaining momentum at the federal and provincial level. Our national border management is being assisted by NADRA's automated Border Control system. KPK Government has introduced the e-KP initiative which offers various citizen-centric services using ICT channels. Similarly, Government of Punjab has launched a centralized centre for citizen facilitation where services of 17 Government departments have been aggregated at one place.

With so much happening in the ICT sector of Pakistan, it is essential that these achievements are highlighted in the international arena to project true level of ICT development in Pakistan. Therefore, PTA carried the soft image of Pakistan in various international conferences and also hosted many important global events in Pakistan. It is due to the combined efforts of PTA and MoIT that the international ICT community recognizes Pakistan as one of the potential ICT leaders in the near future. A prime example of this fact is the four-day visit of H.E. Mr. Houlin Zhao, Secretary General ITU to Pakistan where his Excellency called on the honorable President of Pakistan, Mr. Mamnoon Hussain and Special Assistant to the Prime Minister, Syed Tariq Fatemi. The Secretary General ITU inaugurated the 'ITU-PTA Regulators Roundtable' conference where 55 senior regulatory officers of 23 Asia-pacific countries participated. The Regulators Roundtable Conference was followed by a 3 day International Training Program attended by 117 delegates from 24 countries. It is indeed a matter of honor for Pakistan that our senior officers provide training on emerging regulatory challenges to telecom experts from 15 regional countries. The Secretary General ITU also inaugurated National ICT Information Centre on 19th July 2016 along with Ms. Anusha Rehman Khan, Minister of State for Information Technology. Moreover, PTA also held 'INET Islamabad' international conference on the importance of digital economy for sustainable development in Pakistan. Similarly, various events were held for discussion on mobile money, disaster management using ICTs, and national coordination for ICT indicators collection. PTA also provided training to the participants from ICTI Afghanistan on mobile application development. On the other hand, PTA also recognized the need for capacity building of its officers by collaborating with the United States Department of Commerce for its Commercial Law Development Program. Twenty seven officers attended the USTTI Training Programs during 2015-16.

In the midst of all the national and international commitments, PTA also kept its focus on consumer protection. PTA consumer complaint management system managed to redress 99% of the received complaints. PTA also made crucial amendments in the regulatory framework to address consumer concerns more effectively. Extensive awareness campaigns about fictitious and fraudulent activities in the telecom sector were also run to alert the consumers. PTA also remained in consultation with the operators to resolve the consumer issues of operator assistance charges, removal of disowning of SIMs charges, standardization of charges on printing of postpaid bills, SMS alerts for usage history etc. PTA also expects that all Law Enforcement Agencies will carry out their respective roles in the enforcement of Prevention of Electronic Crimes Act, 2016.

In the end, I would like to assure the people of Pakistan that PTA will continue to make its best efforts for introduction of innovative and cost effective influx of latest telecom technologies. We strive to provide an enabling regulatory environment to the operators so that they can extend affordable, modern and high quality telecom services to the people of Pakistan while earning legitimate profits on their investments.

I hope you find the report useful and informative.

Dr. Syed Ismail Shah
Chairman



Significant Developments 2015-16

Pakistan Telecommunication Authority

Secretary General ITU Visits Pakistan

ITU - PTA Asia Pacific

and Regulatory Roundtable
International Training Program

15-22 July, 2016

**Chairman PTA, Dr. Syed Ismail Shah
Secretary General ITU Mr. Houlin Zahu,
State Minister IT&Telecom Ms Anusha Rehman and
Secretary IT & Telecom Mr. Rizwan Bashir Khan**
during opening session ITU - PTA Regulatory Roundtable and
International training program 18th July, 2016



Secretary General ITU
during opening session
ITU - PTA Regulatory Roundtable and
International training program
18th July, 2016



Group Photo Participants of
ITU - PTA Regulatory Roundtable and
International training program

Secretary General ITU Visits Islamabad



"ITU-PTA International Training Program



Secretary General ITU Visits PTA



INET, Islamabad

16 - 18 November, 2015



Group Photo INET Participants



Chairman Board of Investment & Special Assistant to the Prime Minister of Pakistan Dr. Millat Ismail during closing ceremony of INET, Islamabad



ICT Indicators Symposium
25th July, 2016



Launch of PTA-SBP Regulatory Framework for M-Banking Interoperability and Signing MOU
16th May, 2016



PTA organized IXP workshop
18-22 April 2016



ITU-PTA Regulators Training for ATRA
on Licensing & Services Regulation
20-21 July 2016



ITU-PTA-ICTI Training on
Mobile Application Development
16-26 February 2016



CLDP Fall Training Seminar
27-28 Oct 2015



Workshop on Quality of Service/ Quality of Experience

1st December 2015



WLL Spectrum Auction in AJK & GB

29th December 2015



Session on Cloud Computing

20th October 2015



Workshop on Openstack

12th December, 2015



Awareness Session on Big Data Analysis

9th August 2015



Seminar on Infrastructure Sharing

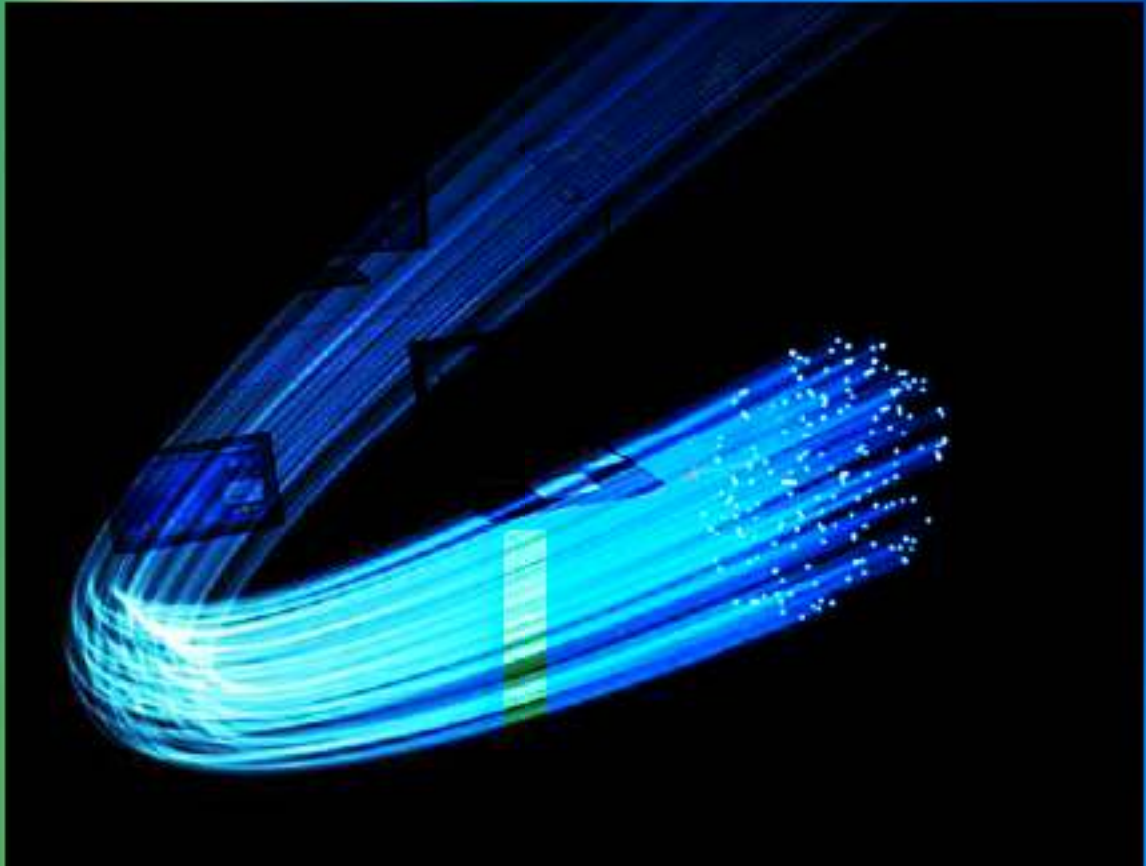
2nd September, 2015



Meeting on Telecom Policy Review

25th December 2015





**Telecom
Infographics**

2015-16



TELECOM INFOGRAPHICS

TELEDENSITY

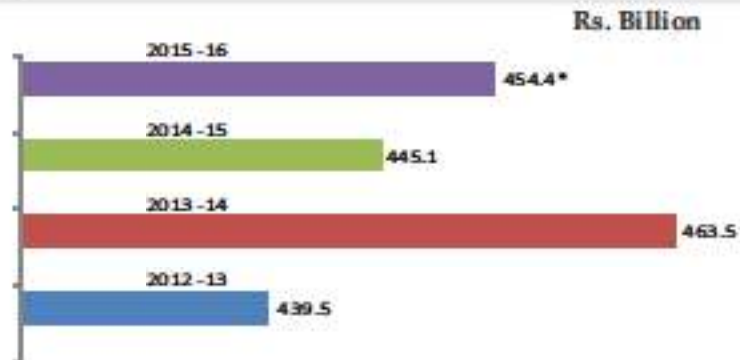
Total Teledensity of Pakistan reached at the end of June 2016 **70.9%**

■ Wireless Local Loop ■ Cellular Mobile ■ Fixed Local Loop



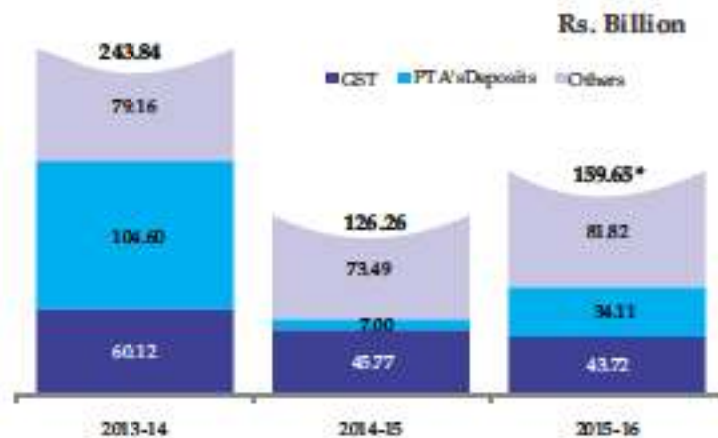
TELECOM REVENUES

At the end of FY 2015-16, telecom Revenues reached **Rs. 454.4 Billion**



TELECOM CONTRIBUTION

At the end of FY 2015-16, total telecom Contribution to the National Exchequer was **Rs. 157.8 Billion**



TELECOM INVESTMENT

Total Telecom Investment during FY 2015-16 **US\$719.7 Million**

| Sector | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|-------------------------------|--------------|----------------|----------------|---------------|
| Cellular Mobile | 570.4 | 1,789.7 | 977.6 | 630.4 |
| Long Distance & International | 1.9 | 1.8 | 12.2 | 6.3 |
| Local Loop | 16.1 | 14.2 | 3.9 | 54.0 |
| Wireless Local Loop | 11.9 | 30.0 | 7.2 | 0.0 |
| Total | 600.3 | 1,835.6 | 1,020.9 | 719.7* |

*Last Quarter for the FY 2015-16 Figures are estimates.

FY2015-16

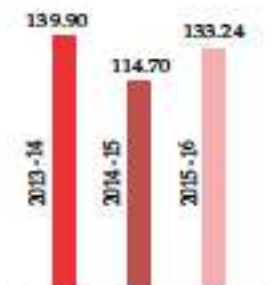
(US\$ Million)

| FDI Inflow | Telecom | Net FDI |
|------------|-----------------------|---------|
| 377.9 | | 246.8 |
| 2,761.1 | Pakistan | 1,901.2 |
| 13.68% | %age Share of Telecom | 12.98% |

FDI INFLOW IN TELECOM

FDI Inflow in Telecom during FY 2015-16 US\$ Million **377.9**

CELLULAR MOBILE SUBSCRIBERS
Million



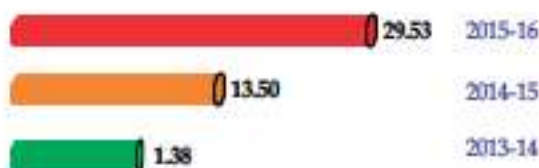
CELLULAR MOBILE PENETRATION
Percentage



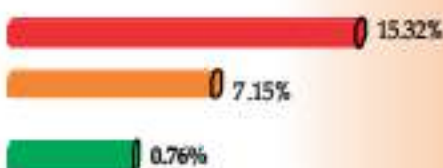
CELLULAR MOBILE SUBSCRIBERS SHARE
Percentage



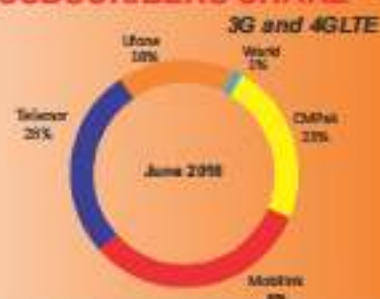
MOBILE BROADBAND SUBSCRIBERS
Million



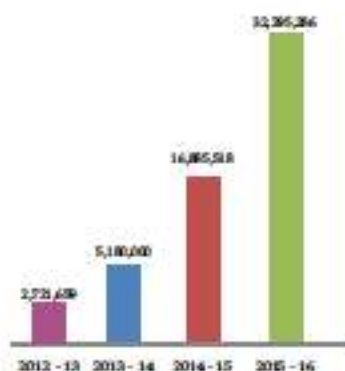
MOBILE BROADBAND PENETRATION
Percentage



MOBILE BROADBAND SUBSCRIBERS SHARE

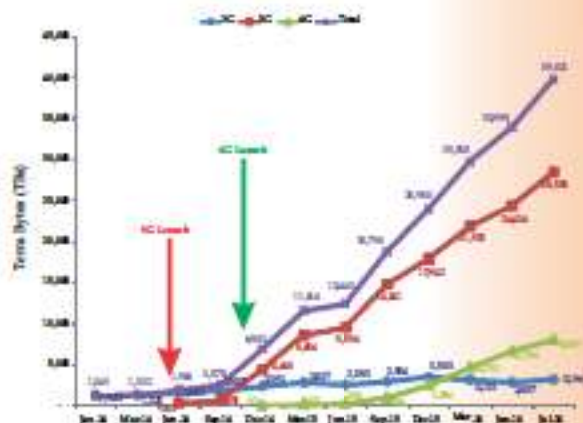


BROADBAND SUBSCRIBERS



DATA USAGE

2G, 3G and 4G LTE Networks

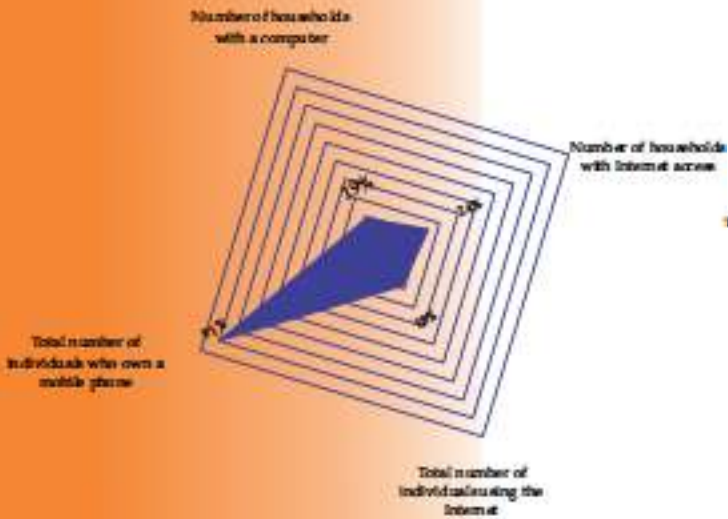


DATA REVENUE OF CELLULAR MOBILE

Rs. Million



ICT OUTLOOK (Percentage)

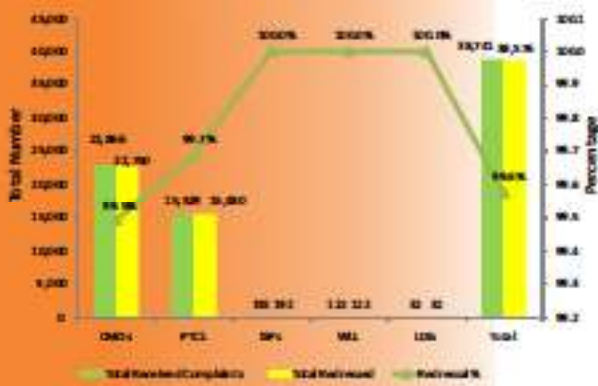


Source: Public Data Bureau of Statistics

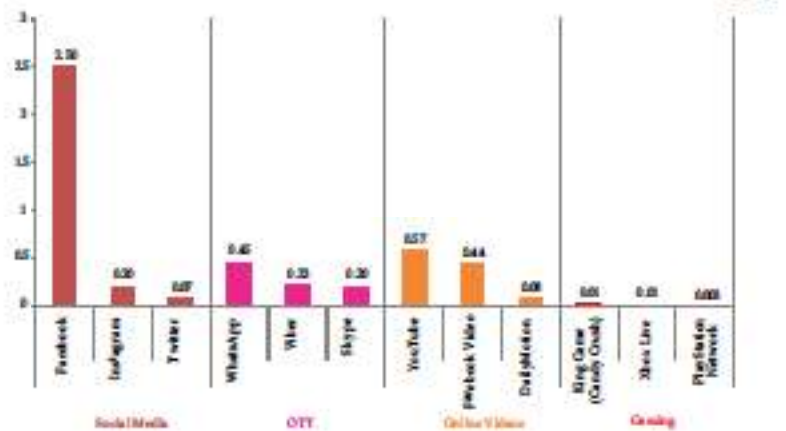
IT SKILLS (Percentage)



COMPLAINTS RECEIVED & RESOLVED FY2015-16

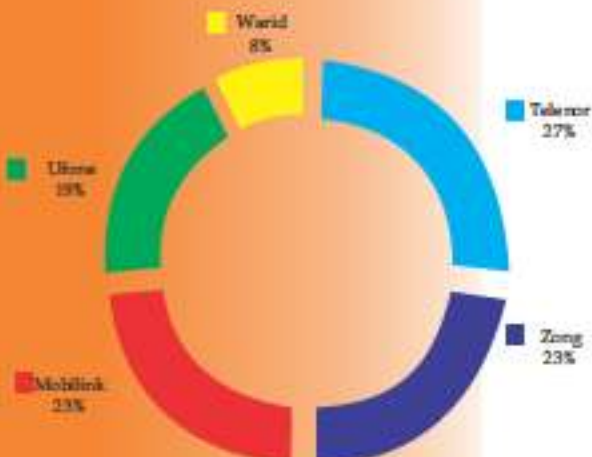


INTERNET USAGE TRENDS Estimated users per day (in Millions) 2016



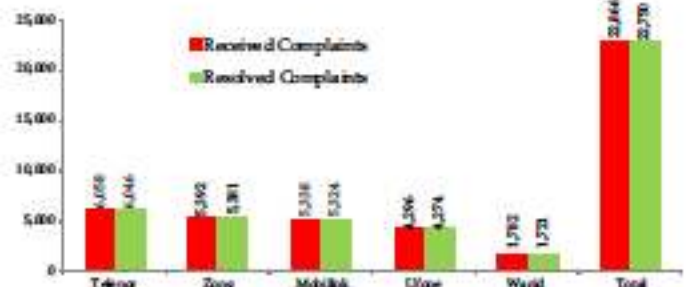
BREAKUP OF CMOs COMPLAINTS Received Complaints

FY2015-16



CMOs COMPLAINTS RECEIVED & RESOLVED FY2015-16

FY2015-16



1 REFARMING SPECTRUM

Spectrum is a critical resource for the development of telecommunication and innovation in the economy. Availability of spectrum as per market and technological requirement ensures continuity of innovation in mobile communications and related applications. With the increased influx of bandwidth hungry advanced next generation mobile services (NGMS), the demand for spectrum is increasing rapidly. Therefore, it is important for the regulator to understand key technology and service delivery trends, and review the spectrum availability and allocations to optimize the spectrum use where it can add the most to the economy.

PTA and FAB review and plan the spectrum management regularly and ensure that use of spectrum is efficient and prudent in the best national interests. The proper regulatory procedures have been put in place for the efficient and interference free operation of radio communication services. In order to meet the competing and conflicting demands of all radio communication services and spectrum users in Pakistan, spectrum is managed in accordance with ITU regulations. PTA and FAB are prudently working on the allocation of new spectrum for the next generation radio communication services aimed to regularly conduct market assessments and auctions additional spectrum to encourage innovative services.

Spectrum Management Strategy

The Telecommunication Policy 2015 sets the goal of spectrum management as "Allocation and assignment of spectrum to maximize social and economic benefits that can be derived from the use of this scarce resource." To achieve this goal, this policy provides a comprehensive spectrum management structure establishing a balance between the competing needs of different users and the finite availability of spectrum. The principal measures concern spectrum harmonization and planning, re-allocation of spectrum in accordance with international norms and spectrum pricing particularly in bands where spectrum is likely to become, or is already in, short supply.

Under Telecom Policy 2015, MoIT on the recommendations of PTA and FAB will prepare and publish a rolling spectrum strategy to be published every year that provides a programme for the succeeding three years from the date of publication. The Spectrum Strategy will identify for the succeeding years: Plan for existing spectrum allocation audit; Terms of Re-allocation of existing spectrum to legacy licensees; New spectrum bands to be made available; Consequential requirements for spectrum re-farming; Spectrum to be auctioned, with an indication of approximate timescales; Spectrum to be subject to Administrative

Incentive Pricing (AIP); and Spectrum to be subject to spectrum trading and/or other market mechanisms. The spectrum strategy will anticipate longer term developments such as longer term changes in spectrum allocation and availability for use.

For the implementation of spectrum strategy envisioned in the Policy, PTA and FAB are actively working on the required tasks and have prepared drafts of required frameworks and regulations, and consultations with the stakeholders is underway.

Spectrum Refarming

Spectrum refarming is an important tool in spectrum management and ITU has also defined standards for redeployment of spectrum. It is a combination of administrative, financial and technical measures aimed at removing users equipment of the existing frequency assignments either completely or partially from a particular frequency band. The frequency band may then be allocated to the same or different services. These measures may be implemented in short, medium or long time scales. Most of the re-farming processes take place as a natural migration. Usually from older obsolete technologies towards the newer more advanced ones. In those cases redeployment is either in the interest of incumbent users of frequency bands or incumbent users leave that band with removal of their old systems (e.g upon cessation of license duration in the absence of further demand). In both of these cases redeployment will not cause problems to spectrum management authorities and therefore the use of compensation or other re-farming measures will not be necessary. It is when redeployment involves some forced removal of existing frequency assignments, not in the interest of the incumbent user, when the re-farming becomes problematic and requires application of a number of specific redeployment measures, such as redeployment funds, pricing incentives, regulatory measures etc. This will make the incumbent users comfortable whenever they are required to vacate the spectrum in the national interest for enhanced services to the end users.

In the past, PTA in coordination and assistance with FAB, also carried out refarming in 900 and 1800 MHz band which has resulted into great advantage to consumers and Government of Pakistan by additional spectrum bandwidth availability. PTA also watched the interest of the licensees and based on the request and latest trends in the WiMAX systems in 2006-07 also refarmed the spectrum in 3500 MHz from FDD to TDD access technology . This step resulted into effective business models and operators started to launch broadband services.

Recently PTA, along with FAB, carried out spectrum refarming to meet the future demand for valuable spectrum through regulatory measures. Refarming of 1900 MHz band wherein the WLL operators have agreed to free their assigned frequencies and shift to the new one. The frequency spectrum initially assigned to various WLL licensees was from 1880-1900 MHz and 1960-1980 MHz. The downlink band i.e. 1960-1980 MHz forms a part of 2100 MHz 3G band which ranges from 1920-1980 MHz and 2110-2170 MHz. Though the present spectrum assignment in 2100 MHz band is 1920-1950 MHz and 2110-2140 MHz, WLL operators are causing Receiver blocking effect due to adjacent placement of uplink and downlink frequencies. Moreover, the frequency spectrum 1960-1980 MHz once vacated by WLL

operators could be auctioned for much valuable 3G services in future. It will also help resolve cross border interference issues being faced for quite some time now. The other portion of the WLL spectrum in 1900 MHz was affected from CMOs in 1800 MHz and due to rearrangement, this affect will also minimized.

As a result of PTA's constant efforts of PTCL, DVCom Data (Pvt) Ltd. and WorldCall Limited shifted from current assignments in 1900 MHz to Evolved PCS band s i.e. from 1960-1980 to 1980-1995 MHz . This case was presented to Frequency Allocation Board meeting based on the enormous advantages to all wherein frequencies were approved for these licensees in their respective licensed regions:

It is pertinent to note that these WLL operators have agreed to refarm through regulatory measures by PTA only thus saving huge amount cost PTCL and DVCom Data (Pvt) Ltd. have already started the process while WorldCall Telecom Limited is exploring options from vendors for the switch over.

Keeping in view the increasing requirement for frequency refarming/redeployment in the light of evolving technological trends and international practises, Telecom Policy 2015 requires a framework to be developed which will be a combination of administrative, technical and financial measures. PTA and FAB are currently working on development of such framework which will be sent to MoIT for approval.

Assignment of Spectrum for Next Generation Mobile Services (NGMS)

Realizing the urgent need of 3G and advanced generation mobile communication services in Pakistan, the current democratic Government of Pakistan has been pro-active to make available the required spectrum in a timely manner. The first process was carried out in April 2014, wherein 30 MHz of spectrum in 2100 MHz band and 10 MHz spectrum in 1800 MHz band were auctioned. After the success of 2014 auction, extraordinary broadband growth and additional requirement of NGMS spectrum, the Government decided to offer more spectrum for NGMS in the country. Accordingly, 10 MHz of spectrum in 850 MHz band was made available in 2016.

NGMS licenses were awarded to CMPak (Zong), PTML (Ufone), PMCL (Mobilink) and Telenor in a ceremony held on 22nd May 2014 in Islamabad.

KPIs were included in NGMS licenses for meeting the QoS obligations and provision of the latest telecommunication facilities to subscribers. The licensees have fulfilled the two years rollout obligations as per their license and the QoS surveys carried out by PTA have shown that QoS is largely as per KPIs spelled out in their licenses.

The unsold spectrum of 10 MHz in 1800 priced at \$210 Million and 7.38 MHz spectrum in 850 priced at 291 Million USD accounts for at least a total of 501 Million USD. As per Government's Policy Directive dated 17th March 2014, no addition spectrum was to be auctioned for 18 months from the date of the 2014 auction. However, for any spectrum and the license for a new Operator which remain unsold in NGMS license auction, PTA retained the right to hold or dispose of the same as deemed appropriate.

Additional Bandwidth Requirements

The NGMS auction 2014 was very successful where operators aggressively rolled out their broadband services across Pakistan. The broadband users also responded overwhelmingly to the availability of NGMS services in the country. Resultantly, broadband subscriptions have shown a growth of over 1900% during June - 2014 to July- 2016.

Increase in the number of broadband subscribers has also pushed the total data used on the mobile networks: jumping from a mere 1,964 TBs in the month of June 2014 to a massive level of 39,821 TBs in July 2016. Mobile data usage is expected to increase further in future due to increased usage of data hungry next generation services and applications over mobile networks. In order to meet the growing data needs in the market, mobile operators are to have strategies for more spectrum acquisition and optimization of their network.

Award of Spectrum in 850 MHz

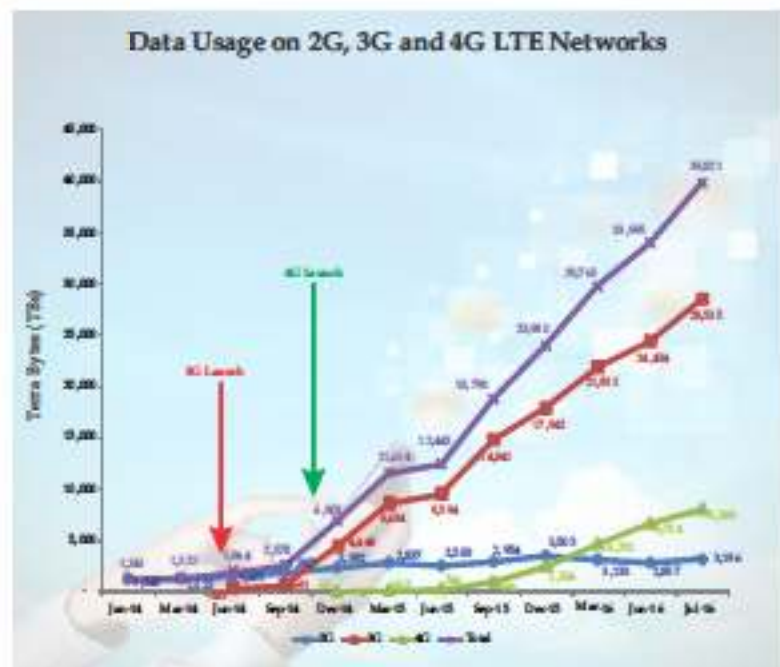
Keeping in view the success of NGMS auction in 2014 and overwhelming response of broadband users in Pakistan, the Government of Pakistan decided to assess the market for additional spectrum requirements for NGMS in the market, and if deemed appropriate, MoIT and PTA may start the process of allocation of available spectrum in 850 MHz and 1800 MHz.

To assess the market for next generation mobile services for the unsold spectrum i.e. 10MHz each in 1800MHz and 850MHz, PTA hired international consultancy services. The consultant took into account market demand, adoption of NGMS, ecosystem for new technologies, available spectrum, current holdings of spectrum and comprehensive technical, commercial and strategic analysis of the operators. The Consultant undertook comprehensive market evaluation/assessment to clearly determine the market demand of spectrum, its base price and market value, and the best timeline to carry out further auction of spectrum. It was suggested that two auctions separated in time would have benefits: 850 MHz auction was recommended to be carried out in 2016 with a market value of \$383 - \$457 Million and the auction for 1800MHz was recommended in 2017 or beyond.

The market assessment of 850 MHz spectrum has shown that the ecosystem behind 850MHz is light, however, it is fast developing. Similar to any other evolving band, the device ecosystem is currently mature at the medium to high end of the market. The demand for 850MHz was expected from the operators that have addressed their basic data capacity needs from 2100MHz or 1800MHz, and will most likely be using the 850MHz to deploy sub-urban and rural broadband as well as relieving network congestion in areas where needed. The interest in 850MHz in the next 2 years was expected to increase with more clarity around 700MHz and 800MHz roadmap in Pakistan, and maturity of LTE/3G 850MHz around the globe. The demand for 1800MHz was expected to be primarily driven by operators that do not have sufficient 1800 MHz spectrum for LTE services. The assessment of 1800 MHz spectrum

using different approaches including technical evaluation, estimation of market values, and understanding of data/LTE demand and required ecosystem for 1800MHz, revealed that auction of 1800 MHz spectrum should be carried out in 2017 or beyond.

Keeping in view the Consultant's recommendations, GoP set the base price for the spectrum in 850 MHz band at US\$ 395 million. PTA published the Information on 26th April, 2016 with all information on the base price, bidding process and auction time line. In accordance with the timelines of the auction process, an information session with the prospective bidders including Mobilink, Telenor, World Call & Multinet, was held on 23rd May, 2016. PTA completed this procedure in an



open and transparent manner, in line with the policy directive of the Ministry of IT & Telecom and rules of the Public Procurement Regulatory Authority (PPRA). In response to invitation for applications, PTA received a bid only from Telenor for 10 MHz in 850 MHz by the deadline of 1st June, 2016. After processing the application of Telenor according to the procedure, requirements and criteria laid down in the IM, Telenor was awarded 10 MHz of spectrum in 850 MHz band. After the successful trial, Telenor has formally launched its 4G services in 6 major cities. With the prudent approach of current Government on the availability of spectrum for advanced services, Pakistan's three out of five mobile operators are now offering LTE / 4G services, ensuring sufficient competition in the LTE market.

WLL Auction in AJK and GB, 2016

In order to open new opportunities for advanced data services in AJK and GB regions, Government decided to auction available WLL spectrum in the region. Subsequent to the Policy Directives of Azad Jammu & Kashmir and Gilgit Baltistan Councils, PTA published advertisement and Information Memorandum (IM) for "Auction of Spectrum in 1900 MHz and 3.5 GHz for WLL Services at AJ&K and GB" on 16th October 2015. AJ&K and GB Councils, MoIT, PTA and FAB worked jointly to make the auction successful. PTA carried out all the steps for this auction in a transparent manner in accordance with the timeline and process stipulated in the IM.

In accordance with the timelines of the auction process, an information session with the prospective bidders was held on 10th November 2015. Applications along with pre-bid deposits were received till

PTA conducted Auction of Spectrum for WLL Services for AJ&K and GB at PTA Headquarters. Pakistan Telecommunication Company Limited (PTCL) and LinkDotNet Telecom Limited (LDN) participated in the auction of one lot of 3.5 GHz in TR-I (Mirpur Region). The auction was witnessed by representatives from AJ&K and GB Councils, MoIT, FAB and the telecom industry.

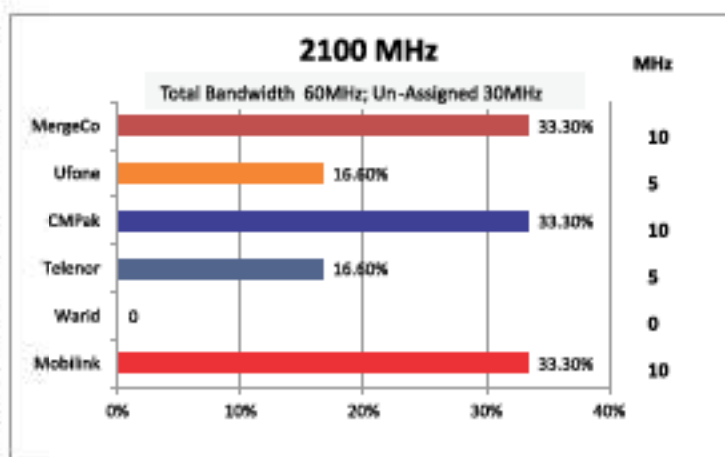
The auction was conducted in an open and transparent manner through open outcry method. Linkdotnet offered the highest bid of Rs. 10 million during the process and therefore, was declared the successful bidder for one lot. PTCL took the second lot by matching the price of Rs.10 million. The total bid price for all spectrum lots comes to Rs. 108.4 million.

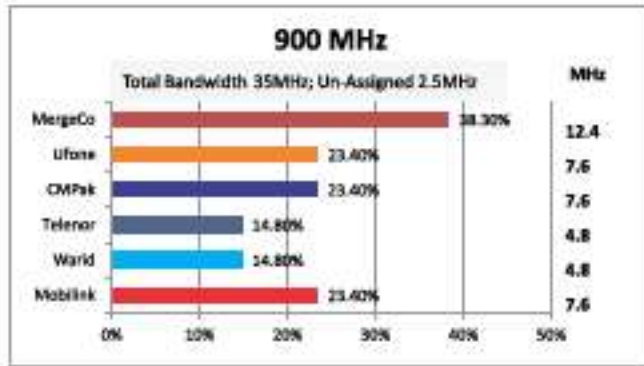
PTCL applied for all of the nine lots offered (Mirpur, Muzaffarabad, and GB Regions) i.e. 1X1900 MHz and 2X3.5 GHz in all three regions of AJ&K and GB while LinkDotNet applied for one lot of 3.5 GHz in TR-I (Mirpur). PTCL was offered all the lots applied in TR-II (Muzaffarabad) and TR-III (Gilgit Baltistan) at base price in accordance with the IM while in TR I each 3.5 GHz slot was offered to bid winners at the highest bid price of Rs.10 million each. The 1900 MHz slot in TR I (Mirpur) will go to PTCL at the price of Rs.55.8 million.

The auction has provided opportunities for enhanced telecom services for the people of AJ&K and GB. The successful operators will be able to offer new wireless services. It is a win win situation for all stakeholders including government, operators and the consumers as it will ensure revenues for government, business for operators and better services for consumers of the far-off regions. This will have positive cumulative effect on the economies of these regions. PTA has suggested government to set up handset assembly plants and data centers in AJ&K and GB as natural climate in these areas is very favourable for such businesses.

Current Spectrum Assignments

Band specific percentage and division of the spectrum in graphical form is shown below for the understanding of the individual spectrum assignments. Currently there is no cap for maximum spectrum holding. In spite of this, PTA has managed to maintain a reasonably proportionate spectrum holding with the mobile operators. PTA, however, will consider working with the Telecom Licensees, FAB and MoIT for readjustment of the spectrum in order to obtain spectrum efficiencies and to arrange contiguous spectrum.





MoIT through Telecom Policy 2015 has also extended the opportunity to the existing licensees regarding spectrum sharing and trading along with active sharing of the systems. This aspect, after the frameworks are finalized, will definitely help the licensees with lesser spectrum. In this regard, PTA is developing a spectrum sharing framework, after which in a case where a new operator wants to operate in Pakistan and there is no additional spectrum available it will be allowed to negotiate the terms with existing operators to share the spectrum with it.



2

TOWARDS SMART PAKISTAN

Information and Communications Technologies (ICTs) are the key enablers of sustainable economic development and technological revolution in a country. Implementation of comprehensive, collaborative and consolidated ICT policies and programs can be the differentiating factor in achieving sustainable fiscal and social targets of the national development agenda. Pakistan Vision 2025 outlines the importance of ICT for creating a knowledge based economy and encourages the adoption of ICT technologies at all Government levels. Following the same vision, PTA has been focusing on the creation of sound regulatory regime that enables the use of modern technologies and building erudite ICT workforce. PTA's ICT development strategy has been focused on the following two key paradigms:

"Pakistan cannot rely on ICT infrastructure development alone. A holistic strategy will be followed to create conditions for skills, innovation and entrepreneurship to flourish alongside modern infrastructure."

Pakistan Vision 2025
Government of Pakistan

- ***Enabling Regulatory Framework for Technological Innovation***
To provide a conducive, business-friendly and forward looking regulatory platform for the operators to allow best possible implementation of latest ICT technologies in Pakistan.
- ***Enabling ICT Capacity Building***
To create a pool of ICT experts, entrepreneurs and skilled developers by equipping them with ICT knowledge, hands-on training and incubation platforms.

Enabling Regulatory Framework for Technological Innovation

Technological evolution has become the driving force behind the economic and social rise of any country in the world. Businesses and research institutions spend billions of dollars in research and development every year to foster new technologies, fast and secure communications and sustainable economic models. At the same time, Governments provide supportive policy and regulatory space to the private players in the best interest of the country. On the same footing, PTA has also adopted a reconciliatory approach over the years to enable technological innovation in Pakistan which has shown

positive results. A big step in this regard was the introduction of 3G and 4G LTE services in the country in 2014 which is serving as bedrock for modernization of ICTs in Pakistan.

PTA-SBP Regulatory Framework for Mobile Banking Interoperability

Mobile money services provide a convenient and viable channel for extending formal financial services to the huge unbanked population in Pakistan. According to State Bank of Pakistan (SBP), 85% of the people in Pakistan are unbanked, especially in the rural areas where the business viability of establishing a brick and mortar bank branch network is impractical. On the other hand, cellular mobile services are available to more than 86% of the population. Therefore, the simplest and fastest way to provide banking access to the general population is to use the cellular mobile platform. The necessary technological bandwidth is also available for the mobile banking operators and consumers after the launch of 3G and 4G LTE services in Pakistan. Currently, cellular mobile operators (CMOs) and Financial Institutions (FIs) are providing mobile banking services through their individual products. However, interoperability has been the missing factor in the proliferation of mobile banking services so far. PTA and SBP wanted to fill up the void of interoperability in Pakistan that would be catalyst for financial services proliferation in Pakistan. PTA considers Third Party as a common platform where CMOs and FIs can join hands thereby creating a many-to-many mobile banking platform. PTA and SBP formed a joint working group to formulate the mechanism of introducing this mobile banking model. After a lot of coordination and efforts, both the regulators promulgated their respective regulatory frameworks to introduce the concept of interoperability in mobile banking sector of Pakistan. PTA issued 'Regulations for Technical Implementation of Mobile Banking, 2016' whereas SBP launched the "Regulations for Mobile Banking Interoperability 2016". Moreover, PTA and SBP jointly signed a Memorandum of Understanding (MoU) on Regulatory Framework for Mobile Banking Interoperability on 16th May, 2016 in Islamabad to formalize cooperation between the two institutions. Minister of State for IT and Telecom Ms. Anusha



Rahman was the chief guest on this occasion. Mr. Ashraf Mahmood Wathra, Governor, SBP, Chairman, PTA, Dr. Syed Ismail Shah and Jeffrey Hedberg, CEO & President, Mobilink were also present at the ceremony. Senior management of the commercial banks, CMOs and senior officers from PTA and SBP also attended the ceremony.

It is expected that the exemplary coordination and joint strategy by two prominent regulators in Pakistan will help in achieving the target of National Financial Inclusion Strategy set by the Government of Pakistan i.e 50% of the adult population of Pakistan should have a bank account, by 2020. PTA will also issue quality of service benchmarks and security standards required for protecting consumer sensitive data and their financial data. PTA and SBP will jointly supervise and monitor the operations of mobile banking services while CMOs and AFI's will put in place an effective complaint handling mechanism. Currently, PTA is in the process of issuing Licenses under these regulations.

Measuring ICT Development in Pakistan

ICTs have truly revolutionized the communication landscape of the world. Pakistan has also made giant strides in the telecom and ICT arena over the past decade, especially after the introduction of Next Generation Mobile Services in 2014. However, a true picture of ICT development in Pakistan has not been depicted on the international level so far. PTA took cognizance of the situation and analyzed the methodology of international ICT rankings, gaps in ICT data provision to international organizations and identified key stakeholders of ICT data collection in Pakistan. The conclusion of analysis revealed that there is an imminent need to conduct a comprehensive survey for measuring ICT development at the household level in Pakistan. Therefore, PTA started a consultative process with the Pakistan Bureau of Statistics (PBS) on the indicator analysis, scope, size, sample, questionnaire design, timelines and reporting mechanisms. PBS agreed to cover the most important ICT questions in the existing national survey in the first phase. Hence, a separate module was included in the PBS's Social & Living Standards Measurement Survey (PSLM) for the year 2015-16. The results of the sample survey were shared with PTA in March, 2016 by PBS. PTA analyzed the results and forwarded the required indicators data to the International Telecommunication Union (ITU) for computation of next year's IDI. PBS has also concluded the full PSLM survey on 30th June, 2016 and the results will be shared with PTA shortly. PTA and MoIT are also working with the PBS to conduct a separate national survey for measuring ICT development in Pakistan next year.

Pakistan Emergency Telecommunication Regulatory Framework

Pakistan has been prone to natural disasters like floods, earthquake and other calamities that result into loss of life and property. In such emergency scenarios, the communication of fast, reliable and uninterrupted information is the key to success of relief efforts. Telecommunication has a pivotal role in prevention, preparedness, response and recovery phases of the disaster management. Therefore, Ministry of IT has

"A national Disaster Telecommunications Plan for the provision and use of telecommunications services before, during and after a national disaster will be formulated"

Telecommunication Policy 2015

undertaken an initiative to develop “Regulatory Framework for Disaster Management using ICTs” as part of a comprehensive National Disaster Telecommunications Plan. In this regard, MoIT requested ITU's assistance to design a comprehensive Emergency Communications Strategy for Pakistan. Under the draft Regulatory Framework, PTA has been mandated to develop the Regulations, test and audit the licensee networks for compliance and conduct exercises. It is expected that the regulatory framework for emergency communications will be finalized in the near future.



Enabling ICT Capacity Building

Technological advancement is the basic ingredient for proliferation of ICT services and creation of smart societies. However, true potential of technology cannot be realized unless we have skilled and knowledgeable human resource to implement it. Therefore, PTA regularly conducts workshops, trainings and awareness sessions on emerging technologies for capacity building of experts. In this regard, PTA has arranged several training programs on IXP operations, Big Data, IPv6, DNSSEC and Internet Resource Management (IRM), through international organizations like ICANN, APNIC, ISOC and NSRC in various cities of Pakistan.

Mobile App Awards

The vision of Smart Pakistan cannot be achieved if fruits of ICTs are not delivered to every person in the country including the Persons with Disabilities (PWDs). The independent international sources quote that about ten to fifteen percent of Pakistan's population consists of people with disabilities (PWDs). Therefore, it is imperative for the ICT stakeholders to direct the ICT benefits towards empowerment of PWDs. Following its commitment to promote innovation and accessibility, PTA and Internet Society (ISOC) Asia-Pacific Bureau launched “Pakistan Mobile App Awards 2016” in collaboration with Ministry of IT, Telenor & Special Talent Exchange Program (STEP). The competition's theme “Embracing Mobile Accessibility” focuses upon the development of mobile applications on the needs of PWDs in Pakistan. The Competition will judge ready-to-use mobile applications under the following disability groups: persons with visual impairment, persons who are deaf or hard of hearing, persons with physical disabilities, and persons with cognitive impairments. A panel of judges will evaluate and decide on the top five mobile apps based on a pre-defined criteria. Apart from lucrative cash prizes, the winner team of developers will also be given an opportunity to turn their solution into a functioning startup through formal incubation at PTA's M-Lab.

In order to spread awareness about the Awards, awareness workshops have also been held at Islamabad, Lahore, Karachi, Peshawar and Quetta to connect the developers and PWDs. These workshops help in information dissemination to the developers about the mobile accessibility, and also provide opportunity to interact with PWDs and get firsthand account of their needs so that they can develop useful, relevant and easy-to-use applications to participate in the Mobile App Awards.



KP Apps - The Khyber-Pakhtunkhwa (KPK) Apps Challenge

Development of local content and relatable applications/tools by the young tech force of Pakistan is the nucleus of realizing PTA's dream of a Smart Pakistan. Therefore, PTA joined a high level collaboration between the World Bank, KPK IT Board, Code for Pakistan, Tech Valley Abbottabad and doChers, to launch an application development challenge called "KP Apps" in 2016. KPApps was aimed at strengthening the broader tech ecosystem in the province of KPK by encouraging team building, promoting entrepreneurship, increasing governmental adoption of technology, and strengthening networks of youth interested in using technology as a force for positive social change. A total prize money of Rs. 0.6 million was announced to attract maximum participation by the youth. The participants were required to submit their mobile and web applications, websites or any other tech tool, in following categories: Civic Engagements, Governance, Health and Mobile-only Apps for Agriculture, Finance or Education. A total of 42 teams from all over Pakistan submitted their applications for civic, governance, health and mobile categories. A panel of experts evaluated the applications and selected winners and runner ups in each of the announced categories.

Workshop on IPv6 and Routing

PTA and Pakistan Network Operators Group (PKNOG) in collaboration with APNIC (Asia Pacific Network Information Centre) arranged trainings sessions on IPv6 to enhance awareness of modern Internet technologies, capacity building and to provide platform for technical discussion and support within the Pakistani networkers community. First training program on IPv6 was held at LUMS, Lahore on 10-12 August 2016, whereas second training program on Routing including IPv6 was conducted at Habib University, Karachi. Networking professionals from IT & Telecom sector, academia and students with relevant background attended the training sessions through prior registration at APNIC website.

Workshop on Internet Exchange Points (IXP)

IXP is a physical infrastructure through which Internet Service Providers (ISPs) and Content Delivery Networks (CDNs) exchange internet traffic between their networks (autonomous systems). The primary purpose of an IXP is to allow networks to interconnect directly, via the exchange, rather than through one or more third-party networks. PTA organized the Workshop from 18-22 April, 2016, at PTA Headquarters, Islamabad to discuss and deliberate on the idea of setting an IXP in Pakistan. All the relevant stakeholders including IT & telecom industry experts, representatives of telecom companies, ISPs and Higher Education Commission (HEC) attended the workshop. On this occasion, international experts of IXP from USA and Australia, Ms. Jane Coffin, Director (Business Strategies), ISOC and Mr. Philip Smith, Consultant, Network Startup Resource Center (NSRC),



educated the audience about different aspects of IXP set up i.e. technical perspectives, global landscape, best practices & regional perspective, legal aspects, dispute resolution and cost Issues.

Awareness session on Internet of Things (IOT)

Internet of Things (IOT) is the next big thing in the technology world that can connect billions of devices capable of sensing, communicating and decision making to make human life easier and more efficient. Therefore, PTA arranged an awareness session on IOT on 4th December, 2015 at PTA Headquarters, Islamabad. Dr. Syed Ismail Shah, Chairman PTA, Mr. Tariq Sultan, Member (Finance), Mr. Abdul Samad, Member (Compliance & Enforcement), senior officers of PTA, officials from telecom sector and members of academia attended the session. Mr. Shoaib Akmal, a telecom industry veteran, introduced the participants to the IOT components, devices and sensors, networks and IOT Applications.

Awareness Session on Big Data Analysis

Business Analytics and big data are transforming the way businesses and governments operate. Competing on analytics is the new norm where the competitive advantage is defined by turning proprietary and other data sets into insights using advanced algorithms. Big Data Analytics also presents a great opportunity for the youth of Pakistan to become experts in this field and fill the huge employment gap that will emerge on the global level in the next few years. To highlight the benefits and importance of Big Data Analytics, PTA arranged an awareness session on 21st October, 2015 at PTA Headquarters, Islamabad. Dr. Syed Ismail Shah, Chairman PTA, Mr. Tariq Sultan, Member (Finance), Mr. Abdul Samad, Member (Compliance & Enforcement), senior officers of PTA, representatives of telecom operators and academic professionals attended the session. On this occasion, Professor Dr.

Murtaza Haider, Associate Professor at the Ted Rogers School of Management, Ryerson University, Toronto, introduced the participants to the bigdatauniversity.com, an IBM-led university that is offering free training in big data analytics. Dr. Haider also highlighted the current and future scope of big data analytics in the business, human resource and Governance.



Training for Women on Android Development

Mobile application development is an excellent opportunity for the women entrepreneurs and female technology enthusiasts. The success of 3G and 4G LTE services has opened up new arrays of innovation which will help in further amplification of the female entrepreneurship culture in Pakistan. PTA and MoIT arranged a five day professional training program for women on “Android Development & Augmented Reality” at PTA Headquarters, Islamabad. The training program is a part of “m-entrepreneurship for women” initiative of PTA. The



training program included sessions on how to develop a mobile app on Android platform, hand-on experience of mobile application development and marketing tactics to sell the app. After the training, 20 women developers were equipped with necessary application development skills to create their own apps who will also act as ‘master trainers’ to conduct training sessions for more women in their respective areas.

Awareness Session on Cloud Computing

Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. In the simplest terms, cloud computing means storing and accessing data and programs over the Internet instead of a computer's hard drive. This computing approach can reduce costs of purchasing expensive systems and equipment for business requirements by using the resources of cloud computing service provider. Therefore, PTA in collaboration with National ICT R&D Fund Co and PLUMgrid arranged an awareness session on

Cloud Computing/Openstack on 21st October, 2015 at PTA Headquarters, Islamabad. On this occasion, Dr. Affan A. Syed, Director Engineering PLUMgrid briefed the audience about the various aspects of cloud computing in an interactive session with the participants. It is expected that the business organizations and individuals will look into cloud computing service as a viable investment opportunity or may use the services as a client to save operational costs.





3

INTERNATIONAL COLLABORATIONS

In the fast changing technological landscape, new kinds of regulatory challenges also emerge for every country in the world rapidly. The telecom and ICT regulators often collaborate under the umbrella of international forums on regular basis in order to share regulatory experiences to cope with such regulatory challenges and capacity building of their workforce. During the year 2015-16, PTA continued to participate in international events and managed many events in Pakistan in collaboration with International organizations like ITU (International Telecom Union), APT (Asia Pacific Telecommunity) and others. PTA also conducted training and workshops for the regional countries to pass on its knowledge and experience of regulating a competitive and advanced telecommunication sector.

ITU-PTA Asia-Pacific Regulators Round Table and International Training Program

Pakistan has been one of the key members of the ITU, the world's largest telecommunication forum. Besides playing its role effectively at key positions in several ITU Regulatory Groups, PTA has a long history of collaborations with ITU for development of telecommunication systems and standards in the Asia-Pacific region. Continuing the tradition, PTA and ITU arranged the "ITU-PTA Asia-Pacific Regulators' Roundtable (RR)" from 18-19 July 2016 and the



"ITU-PTA International Training Program (ITP) 2016" from 20-22 July, 2016 for the first time in Islamabad where 117 participants from 24 countries participated.

It is indeed a matter of great honor for Pakistan that Mr. Houlin Zhao, Secretary General, ITU visited Pakistan and presided over the inaugural session of the Regulators Roundtable. Executives of Asia Pacific regulators discussed in detail the emerging regulatory challenges faced by the region and the way forward. Particularly, interactive sessions on collaborative regulations for smart digital societies, impact of over the top (OTT) services, emerging technologies and way forward were held where participants shared their regulatory experience with each other.

Regulators' Roundtable was followed by an international training program by PTA in collaboration with ITU from 20 - 22 July, 2016 at Islamabad. Representatives from several countries from Asia Pacific Region including Bhutan, Bangladesh, China, Cambodia, India, Indonesia, Nepal, Maldives, Philippines, Papua New Guinea, Sri Lanka, Samoa, Solomon Island, Timor-Leste, and Vietnam participated in the event. The program was aimed at disseminating knowledge and case studies to the participants for finding new ways and means to address emerging regulatory issues and challenges in their respective countries. During the three-day event, PTA officers conducted training sessions on different topics such as biometric verification of SIM users' data, spectrum management and



auction, competition issues, child online protection, broadband for networked society, digital financial inclusion, cyber security, consumer protection & quality of Service, OTT players and ICTs for persons with disabilities & women empowerment. The training covered principles, practices and recommendations which are expected to assist regulators in the Asia-Pacific region in addressing the telecommunication/ICT regulatory challenges.

Secretary General, ITU Visits PTA Headquarters

Mr. Houlin Zhao, Secretary General, ITU visited the PTA headquarters on 19th July, 2016. Chairman PTA, Members of the Authority and senior officers of PTA welcomed the Honorable Secretary General and Mr. Ioane Koroivuki, Regional Director ITU Asia-Pacific. Chairman PTA briefed the Honorable Secretary General about PTA's functions, regulatory approach, licensing framework and the resulting impact on performance of the telecom sector. The Chairman highlighted the remarkable growth in mobile broadband after launch of 3G and 4G LTE services in Pakistan. The Secretary General was apprised of the fact that the investor friendly policies of the Government of Pakistan and fair regulatory



regime have been the major catalysts for telecom growth and innovation. Executive Director, Frequency Allocation Board (FAB) also informed the Secretary General about the activities and major initiatives of FAB. Mr. Zhao acknowledged the role of PTA as an important member of the ITU and also expressed satisfaction on telecom development in Pakistan. The Secretary General also mentioned his desire to include PTA in the consultative process to address the emerging issues of ICT's, especially the regulatory approach on OTT services. The Secretary General also assured of ITU's continued cooperation with PTA for capacity building and technological assistance on ICT matters.

Conference on Digital Economy - INET Islamabad

PTA and Internet Society (ISOC) Asia-Pacific Bureau organized 'INET Islamabad' conference from 16-18 November, 2015 at Islamabad. Barrister Zafarullah Khan, Special Assistant to the Prime Minister for Law presided over the inaugural session as the chief guest. Mr. Miftah Ismail, Chairman Board of Investment (BoI) and Special Assistant to the Prime Minister also graced the occasion as the Chief Guest of the closing session of the conference.

Renowned speakers from ITU, Asia Pacific Telecommunity (APT), ISOC and national experts deliberated on the theme of "Towards Digital Economy in Pakistan: Building ICT Agenda for Sustainable Development". The speakers emphasized that countries in the Asia-Pacific region are building ICT Policies and Plans to take full advantage of new digital opportunities and Pakistan should follow suit.



Commercial Law Development Program (CLDP) by US Department of Commerce

ICT and broadband have become the nucleus of future economic growth, trade, health, governance and societal developments. Pakistan is also at the cusp of ICT revolution after the introduction of 3G and 4G LTE services. So there is an imminent need to learn from the experiences of the developed nations when formulating ICT policies and plans. In this regard, USAID funded a program for senior management of PTA, FAB, MoIT and Cabinet Division to visit the facilities across the USA and attend briefings by experts of various fields in the US telecom sector at



Washington University, Seattle and American University, Washington DC. The Program was designed to cover major aspects of the ICT and telecom Policy, regulatory and market environment in the USA and the roles of respective stakeholders. In addition to the meetings and briefings, the Pakistan Delegation also got an opportunity to visit the various Government and private offices of the leading stakeholders in ICT sector of USA including the Federal Communications Commission (FCC). The officers of Pakistan learnt new information and developed regulatory skills that will be helpful in driving forward the ICT sector of Pakistan. Member Finance, PTA also made presentations at Washington University and CLDP office to apprise the US participants about the State of telecom Sector development in Pakistan.

ICT Indicators Symposium

Pakistan has made giant strides in the telecom and ICT arena over the past decade, especially after the introduction of Next Generation Mobile Services in 2014. PTA, MoIT and other stakeholders of ICT data collection & dissemination exert their best possible efforts to keep a tab on the ICT developments in their relevant fields. However, a true picture of ICTs cannot be depicted unless all stakeholders collaborate on a unified platform for data sharing. Therefore, PTA, MoIT and ITU arranged the 'ICT Indicators Symposium' on 25th July, 2016 in PTA Auditorium, Islamabad to ensure coordination for data collection and reporting of ICT indicators by all stakeholders including Planning Commission, PBS, provincial statistical offices etc. The Chief Guest of the event was Ms. Anusha Rehman Khan, Minister of State for Information Technology & Telecommunications while Mr. Rizwan Bashir



Khan, Secretary, MoIT, was the guest of honor. Senior Advisor, ITU, Mr. Sameer Sharma was the key Association alongwith PTA for conducting this Symposium. Representatives from MoIT, Pakistan Bureau of Statistics (PBS), telecom operators, international research organizations and senior officers of the Authority were among the key participants. The symposium speakers educated the audience about the importance of ICT data collection, the methodology of international ICT rankings, identification gaps in ICT data collection and way forward to remove impediments on ICT data collection and dissemination in Pakistan.

ITU-PTA-ICTI Training on Mobile Application Development

PTA has always played an active role in the regional ICT cooperation for capacity building of the neighboring countries. It is due to the amicable relations of PTA with the international and regional

organizations that the telecom sector of Pakistan is already considered an exemplary model of regulatory success. Therefore, foreign delegates regularly engage PTA for assistance and cooperation to meet the regulatory challenges in their respective countries.



On ITU's request, PTA organized a training course for the trainers of Information and Communication Technology Institute (ICTI), Afghanistan from 16-26 February 2016 at PTA Auditorium, Islamabad. The training course was meticulously designed to build human and institutional capacity in mobile application development, to train executives of ICTI and to analyze case studies on different countries of Asia Pacific region so that international best practices can be adopted.

PTA-GSMA Mobile Money Workshop

Mobile Money (branchless banking) is a convenient, secure and affordable way to transfer money via mobile phones. Pakistan's mature, advanced, competitive and dynamic cellular sector provides an excellent foundation for the financial inclusion of the unbanked population in the country. Realizing the potential of this huge pool of prospective mobile accounts, PTA has been actively engaged in highlighting the importance of mobile money towards sustainable economic development in Pakistan. Continuing the tradition, PTA and GSMA joined hands to arrange the Mobile Money Workshop on 8th March, 2016 at PTA Auditorium, Islamabad. The Workshop provided an interactive platform for the mobile money stakeholders in Pakistan to discuss the evolution of an enabling regulatory environment that can contribute to National Policy objectives. Experts from GSMA, State Bank of Pakistan (SBP) and PTA shared the global and local insights from the mobile money industry. Different case studies from Pakistan, Tanzania, Kenya, Philippines and India on mobile money, digital commerce initiatives and regulatory principles were discussed. The workshop was attended by senior representatives from the Ministry of IT, Ministry of Finance, USAID, World Bank, SBP, cellular mobile operators, financial institutions and PTA officers.



TRANSFORMING PARADIGMS OF TRADITIONAL COMMUNICATION

4

Information and Communication Technologies (ICTs) are reshaping the communication norms in every facet of the human society. The traditional ways of information flow are increasingly being replaced by digital networks that has huge impact on the personal and business relationships. The heart of all ICT revolution is the fast, reliable and secure data

connection that enables the provision of high quality ICT services in any form or shape. In Pakistan, the major hurdle in ICT proliferation was the unavailability of sufficient bandwidth for ICT services. Ministry of IT and PTA addressed that issue with the spectrum auction of 3G and 4G LTE services in 2014. Moreover, Ministry of IT also issued Telecom Policy 2015 which has also been a landmark achievement. Hence, in the last two years there has been a significant change in the ICT profile of Pakistan. The provision of mobile broadband has revolutionized the entire communication landscape in every aspect of human life. The Government and private sector are utilizing the ICT opportunities for better governance and even better financial returns respectively. A brief account of ICT impact on the various sectors of economy and society is given below:

Economy

The relationship between ICT growth especially broadband and socioeconomic development in a country has been extensively studied by leading researchers and institutes in the world. It has been empirically established that growth in broadband or internet penetration has significant positive impact on country's economic outlook. Pakistan has also made giant strides in the development of digital financial inclusion and knowledge economy. Financial Institutions (FIs) are the front runners being early technology adopters of modern ICT opportunities for transition from traditional book keeping to computer-based solutions. Online banking, ATMs, virtual banking and mobile payment systems are some of the key

"Vision 2025 envisages investment in the determinants of national competitiveness, especially skill development, information and communication technologies, and engagement in international markets."

Pakistan Vision 2025
Government of Pakistan

"10 percentage point increase in broadband penetration boosts per capita growth rates by 0.9 to 1.5 percentage points."

Broadband Infrastructure and Economic Growth' by Czernich, Falck, Kretschmer, and Woessmann (2011)

"a one percent increase in the size of a country's Internet-using population increases GDP per employed person by 8 to 15 dollars."

Does the Internet increase labor productivity? Evidence from a cross-country dynamic panel by Najarzadeh, Rahimzadeh, and Reed (2014)

banking services making full use of ICTs. Banks are reduced to a palm sized phone as Telcos are providing banking services on mobile handsets through their mobile banking solutions. According to State Bank of Pakistan, total volume of branchless banking was over Rs. 486 billion during October to December, 2015 while the number of branchless banking transactions surpassed Rs. 101.6 billion during the same period. The numbers are testimony of the fact that the mobile money has the potential to expand the reach of banking services to the 85% unbanked population of Pakistan. The amalgamation of ICTs and banking services can help in moving towards a fully documented economy which is necessary to improve the tax collection circle and achievement of 18% tax to GDP ratio by 2025 as stated under the goals of the Pakistan Vision 2025.

The economic impact of ICTs can also be observed with the tremendous rise of e-commerce through websites such as daraz.pk, olx.com, zameen.com, pakwheels.com etc which is still at the embryonic stage. The potential for e-commerce growth is astronomical. According to GSMA's recent report, Pakistan's e-commerce industry is expected to grow to several hundred million dollars by 2020 from the current figure of US \$30 million. The 'Black Friday' sale by daraz.pk on 27th November, 2015 became an instant hit as more than 1.5 million people visited the website to avail discounts of up to Rs 132 million offered by the website. The business owners attribute the rapid expansion in e-commerce trends to the introduction of mobile broadband services in Pakistan. The explosive growth in e-commerce can safely be said to be on of the biggest benefits of NGMS

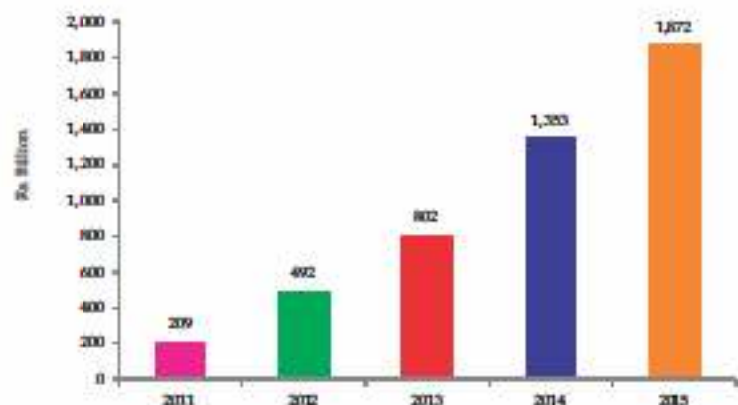
Education

ICTs can be an efficient tool to disseminate education and improve the learning and literacy rate in a country. ICTs can be helpful in delivering course material to the students via video lectures, digital notes, online exams etc as well as help a formal classroom by using interactive audio-video equipment, course management systems and class information portals etc. The concept of Massive Open Online

Trend in Number and Value of Transactions



Amount Transacted through Mobile Banking Accounts



Course (MOOC) is also gaining momentum where learning content is delivered online to any person who wants to take a course, with no limit on attendance. Pakistan also established Virtual University (VU) in year 2002, a distant and online learning institute offering degree courses in information technology and management sciences that enables the students in far flung areas to get formal education and graduate degrees. For students with limited financial resources, the Prime Minister's and Chief Minister's Laptop Scheme is a wonderful step to provide ICT opportunities to the young students in Pakistan. Moreover, the schools in Punjab are being smartly monitored by the on-field 950 monitoring officers who are responsible to visit the schools in their respective areas and provide digital feedback to the Government on the facilities, education standards and staff through a customized Tablet. The monitoring reports are also available online for general public. Similarly, Pakistan Education & Research Network (PERN) provides communication infrastructure to universities, institutions of higher learning and research organizations to meet their networking and internet requirements. Moreover, HEC National Digital Library (DL) is a program to provide researchers within public and private universities in Pakistan and non-profit research and development organizations with access to international scholarly literature based on online delivery, providing access to high quality, peer-reviewed journals, databases, articles and e-Books across a wide range of disciplines. Pakistan has also seen a tremendous rise in the freelance writing by graduates, especially females, who work from home and earn through online writing and research. According to Elance-oDesk Annual Impact Report 2014, Pakistan is 5th in terms of freelancers with highest earnings index.

Governance

One of the most important areas of ICT adoption is the use of technology at the Government level for citizen-centric facilities. The life of a commoner can be highly facilitated if the ICTs are used for general public services such as automation of land and revenue records, police complaints, judiciary, driving licenses, identity cards, birth certificates, visas, etc. The introduction and successful implementation of biometric verification has already facilitated and enabled several invitations by various government departments and institutions. Government of Pakistan has undertaken several key initiatives to capitalize on the potential of ICTs for good governance. Most of the Government departments have their own websites that provide information and downloadable material for public use. National Database and Registration Authority (NADRA) has developed an Automated Border Control (ABC) system which serves as a tool for law-enforcement agencies in eradicating illegal immigration and human trafficking. Moreover, e-driver license facility has also been developed which stores personal information and history of traffic violations of drivers. Submission of passport fee online through Mobilink's Mobicash outlets is another positive step as customers can avoid long queues at banks. The Khyber Pakhtunkhwa Government has introduced e-KP initiative under which a dedicated grievances redressal mechanism, Right to Information to citizens, online Government recruitment portal and e-hubs for promotion of ICT products have been developed for the benefit of KPK residents. In order to provide a centralized centre for citizen facilitation, the Government of Punjab has launched e-khidmat

Markaz at Lahore, Rawalpindi and Sargodha where service of seventeen Government departments have been integrated under one roof. These services include issuance of Birth Certificate, Marriage Certificate, Death Certificate, Divorce Certificate, Character Certificate, Motor Vehicle Registration, Token Tax Collection, Vehicle Transfer of Ownership, FARD¹, Learner's Driving License, Traffic Fine Collection, Domicile Certificate, Issuance of CNIC, NADRA E-Sahulat, and Route Permit. In a revolutionary move in the history of judicial system in Pakistan, first ever e-Court was inaugurated in Rawalpindi where statements could be recorded online removing delays as compared to traditional case processing. Similarly, issuance of e-stamp papers online is another innovation in public services whereby any person can purchase high value non-judicial / judicial stamp papers online by following a simple laid down procedure.

Moreover, Land Record Management Information System has transformed the manual paper-based land records of Punjab into a computerized database. Computerization of land records has given access to the right holders to a fast, secure, reliable and robust land records management system with defined set of SOPs for error-free service delivery to the citizens. This will help reduce property frauds in a tremendous way.

Health

ICTs have a great potential in fast and reliable flow of information for medical services and providing tele-health facilities in the rural areas. Pakistan has a low doctor to patient ratio (1:1000 approx) and the number is even worse for the rural areas. In this scenario, ICT solutions are the key to providing diagnostic and medical advice to the patients in the remote areas of Pakistan. There is also a huge buzz regarding healthcare apps and solutions in the Government and private sector. Punjab Information Technology Board (PITB) has launched several important health care initiatives in the recent past such as Dengue Activity Tracking System (to log all field activities related to prevention & eradication of the dengue), Disease Surveillance System (for early detection of any future outbreaks), Medicine Inventory Management System (to maintain comprehensive stock information for medicines across all District & Tehsil Headquarter Hospitals) and Drug Inspection and Monitoring (to monitor registered and unregistered pharmacies, the availability of standard drugs and compliance with drug laws). In the private sector, wearable personal healthcare products are also becoming a massive hit globally. Another award-winning medical initiative with ICTs at its core, is doctHERs that enables the female doctors to inspect and prescribe treatment to the patients remotely through web connection. doctHERs have established physical clinics at various locations where qualified nursing staff assists the female doctor (available via remote link) in providing medical treatment to the patients.

¹A document showing details of ownership about a piece of land in the revenue record

Transport

The unprecedented uptake of mobile broadband has opened doors to new and innovative business ventures in Pakistan. Uber, world's largest cab service, has recently entered into Pakistan by launching its services in Lahore and proving to be an instant hit among the commuters of the city. Similarly Careem, another car hiring service, is a huge success in the cities of Karachi, Lahore and Islamabad which provides onboard Wi-Fi facility in partnership with Telenor. Travly is also another innovative service that allows a user to book a rickshaw, car, bus etc online or through app. Even the long distance travel services such as Daewoo Pakistan, Q-Connect are providing internet and multimedia solution to the passengers in addition to developing online booking through website and apps. Similarly, numerous apps and online services have been developed for hotel booking and event planning for the travelers and tourists. Applications have also been developed to buy movie tickets only.

Pakistan is at the crossroads of ICT revolution where ample regulatory space is provided to the innovators and entrepreneurs on the bedrock of advanced telecommunication technologies. The demand side of ICTs is ever expanding and the operators, developers and service providers are rapidly catching up. Mobile broadband has become the propeller of modernization in ICT services. The demand for mobile broadband is so high that the CMOs have covered 237 cities against their roll out obligation of 15 cities (in the first 18 months) as laid down in the Next Generation Mobile Services (NGMS) license. This is ample justification of the fact that the ICT services have huge unmet demand and humungous potential for investment and growth in Pakistan. PTA is exerting all possible efforts, permissible within its regulatory ambit, to highlight the importance of ICTs in every sector of the economy and vows to provide maximum facilitation to the private sector for bringing ingenious ICT services to the people of Pakistan.

5

CONSUMER PROTECTION

One of the core responsibilities of PTA under the Pakistan Telecommunication (Re-Organization) Act, 1996, is to ensure that the rights and interests of telecom consumers are safeguarded. PTA has undertaken several key initiatives over the years on the regulatory and operational front to discharge this duty. PTA issued Telecom Consumer Protection Regulations, 2009 and Protection from SPAM, Unsolicited Fraudulent and Obnoxious Communication Regulations, 2009 that are updated from time to time according to the changing nature of consumer complaints. PTA believes that the consumer feedback is the best method of devising future regulatory strategies and to take proactive measures for customer facilitation. Therefore, PTA has also dedicated a special Department to receive and redress the consumer complaints against any telecom service/operator in the country. During the period under review, following are the major activities of consumer protection undertaken or contributed to by the Authority.

Prevention of Electronics Crimes Act, 2016

Internet is a true amalgamation of technology, applications and services that has penetrated into every facet of the human life. The applicability and implications of the internet in the modern world are practically unquantifiable. The unlimited advantages of technology modernization are well justified but at the same time, technology can also cause nuisance when used in an unethical, uninvited, criminal, harmful and derogatory manner. Every country deals with these challenges through relevant Laws but as the Laws get stringent, the ways of committing crimes evolve as well. Internet has also given birth to completely new types of cyber-crime and criminals which cannot be effectively dealt with existing traditional legislation. In Pakistan, there was no law to comprehensively deal with the growing threat of cyber-crimes. Prevention of Electronic Crimes (PEC) Ordinance, 2007 and 2008 were ineffectual to tackle the modern day needs of strong relevant legislation. Different Government bodies and operators were handling the consumer complaints as per their own set of consumer protection measures, but there was an imminent need to provide a National level Law that can address the cyber issues effectively. Therefore, Government of Pakistan formulated the 'Prevention of Electronics Crimes Bill 2016' after two years of dedicated efforts and coordination with all the stakeholders. The Bill was passed unanimously by the Senate of Pakistan and the National Assembly of Pakistan after due deliberations and extensive debate.

The PEC Act, 2016 will effectively prevent cyber crimes and help in protecting the privacy of internet users, especially on the social media. The Act envisages imprisonments and heavy fines for cyber terrorism, campaigning against innocent people on the internet, spreading hate material on the basis of ethnicity, religion and sect or taking part in child pornography. Special Courts will be established in consultation with High Court for hearing the cyber-crime related cases. Cyber terrorism, electronic fraud, exaggeration of forgery, crimes, hate speeches, pornographic materials about children, illegal access of data (hacking) as well as interference with data and information systems, specialized cyber related electronic forgery and electronic fraud etc will be punishable acts under the PEC Act, 2016. The PEC Act, 2016 will also apply on the people who engage in anti-state activities online from other countries. With the permission of the Court, the Government will be able to seek help of other countries for investigation into cyber crimes. Child pornography will be non-bailable offence besides seven years in jail and Rs 5 million fine. Children under the age of 10 years have been given immunity and the proposed legislation will not be applicable to them. The PEC Act, 2016 will not be applicable on the print and electronic media.

Amendment in Consumer Protection Regulations, 2009

PTA has always strived to take proactive measures for protection of telecom consumers from the fraudulent and misleading entrapments by fictitious elements. It had been observed by the Authority that the commercial practices and promotional schemes by the operators are often misunderstood by the general public which causes financial and mental distress to the consumers. Therefore, PTA amended the provisions of "Telecommunication Consumer Protection Regulations, 2009" to include a comprehensive mechanism regarding launch of commercial practices and telecommunication promotional schemes by the operators. According to the amended regulations, the operators are required to give prior information to PTA at least ten working days before the launch of any commercial practice including promotional schemes. Operators can offer permissible incentives including free or additional telecom services, and/or services offered on concessional rates excluding lottery. PTA may alter, restrict, suspend or impose of any commercial activity or telecommunication service promotional schemes if deemed necessary. Moreover, operators will be responsible to provide an undertaking that the commercial practice and telecom promotional schemes are in compliance with the Act, Rules, Regulations and all other laws of Pakistan. Operators will be responsible to provide a complete list of the number, type of the incentives allocated to be distributed to the qualifying consumers, parameters/benchmarks for determining winners and details of mechanism, place and date for selection of qualifying consumers. It is expected that Amendment in Consumer Protection Regulations, 2009 will mitigate the consumer concerns over unwanted and misleading commercial campaigns and offers by the operators.

Consumer Awareness Campaigns

The unprecedented growth of telecom sector has also been misused by some criminals and fraudsters who connive to rob and befool innocent consumers by luring them into misleading and fake promotions and offers. PTA regularly runs awareness campaigns and conducts consumer forums to apprise the general public of the scams and deceptions in the telecom sector. In this regard, PTA published advertisement in the leading newspaper, warning general public of the fake prize schemes and unsolicited marketing/spamming, obnoxious/unknown calls and SMSs. Telecom consumers can register a complaint with their respective cellular mobile operator or inform PTA at toll free number 0800-55055, or landline 051-9225325, or email at complaint@pta.gov.pk or through PTA's website www.pta.gov.pk. PTA analyzes the received complaint and takes up the matter with concerned CMO to track down the culprits. The SIMs and handsets involved in such activities are blocked while some cases are also forwarded to Federal Investigation Agency as per Pakistan Telecommunication (Re-organization) Act, 1996 for action.

Operators Assistance Charges

PTA gives top priority to consumer protection but also keeps into account the legitimate business interests of the operators. CMOs have been given sufficient regulatory space to follow their business strategies and price plans for better earnings and profits. However, it had been noticed by the Authority that operators are starting to levy unjustified fees on the consumers for balance inquiry, account reload, helpline services, admin/operational/maintenance, collectively called as 'Operator Assistance Charges'. After due deliberations, the Authority issued a Directive to CMOs on 22nd November, 2011 with clear instructions not to increase any of such charges without prior approval of the Authority. The Directive was challenged by the operators in the Islamabad High Court. The case was actively pursued by PTA and in December, 2015, the Islamabad High Court remanded the case back to PTA with directions to give hearing opportunity to CMOs before issuing final decision on the matter. The Authority complied with the Orders of the Islamabad High Court and is in consultation process with the operators.

Removal of Charges on Disowning of SIMs

Cellular mobile segment of the telecom sector of Pakistan is increasing maturity level with strong competition. Consequently, a race has ensued among operators to get maximum subscriber market share that compels the CMOs to offer packages at very low margins. For each cellular mobile SIM, CMOs have to bear procurement cost, warehousing cost, packaging cost, delivery charges and supply of SIM tax. CMOs often absorb the partial or full cost of SIMs (including taxes) to give incentive to the potential customers. Biometric re-verification of SIMs has further added the cost of acquisition of customer because NADRA also charges verification cost which is borne by the operators. Moreover, the Mobile Number portability gives flexibility to customers to change the networks without substantial

cost while retaining their numbers. Resultantly, consumers frequently change the networks and disown the SIMs of an operator after enjoying the upfront incentives by operators who absorbed a reasonable cost to get them on their networks. Resultantly, operators started to levy charges on SIM disowning to recover their cost which resulted in a large number of complaints by consumers to PTA. The Authority heard the CMOs on the matter and is currently evaluating various settlement options including the recovery of SIM cost at the time of issuance of SIM and also to display the related information on their respective websites.

Monitoring of Credit Usage by SMS Alerts

Cellular mobile subscribers often face difficulty in tracking the usage of their credit/balance since a number of voice and data services, taxes and recurring fees are deducted by the operators. PTA took cognizance of the matter and consulted with the CMOs on developing uniform reporting mechanism in the form of daily SMS to the subscribers. Every CMO is offering this service in one form or the other. However, the SMS will be sent on a standard format by operators to every subscriber on their respective network so that transparency in the balance deduction and usage history is maintained.

Standardization of Charges on Printing of Postpaid Bills

Cellular mobile segment of the telecom sector has a very low percentage (2% approx) of postpaid subscribers. Each postpaid subscriber is issued with a monthly bill that contains usage and charges detail. It was brought to the notice of the Authority that CMOs are charging highly for the printing and delivery of such bills from their postpaid customers. PTA consulted with the CMOs on the matter and instructed them to levy fair and uniform charges for the printing of postpaid bills from their customers.

Consumer Complaints Analysis

Consumer Complaints Analysis Share in Total Complaints (Service-Wise) The unprecedented success of telecom services in Pakistan has resulted into millions of subscribers using various services based on advanced technologies offered by a number of operators. More than 86% of the population has access to telecom services now which is ample justification of the fact that telecom services are a major part of daily life of a common man in Pakistan. Consequently, the number of service related



complaints by telecom users also increased over time. In order to make sure that telecom consumers get the best possible customer experience, PTA established a special Department called Consumer Protection Directorate which looks after the consumer complaints, submits summarized complaints information to the Authority and also liaises with the operators for better handling of consumer complaints. Dedicated Online Complaint Management System has also been installed at PTA which collects complaints from the telecom consumers through PTA's website, landline, fax, email and letters. Complainant is kept informed through auto generated email notification to the email address of the complainant taken at the time of lodging of complaint through PTA's website. PTA has a prescribed time limit of fifteen days for redressal of received complaints. The trend of complaints is also taken into account.

The structure of telecom sector of Pakistan is dominated by the cellular mobile services and Fixed Line Services. In the same way, more than 99% of the complaints are related to cellular mobile and fixed line segment i.e. PTCL. In the cellular mobile segment, the misuse of service and illegal practice are common types of complaints that are received by the Authority whereas faulty telephone lines and billing issues are the major areas of concern for PTCL. PTA managed to redress 99% of the received complaints after extensive follow up with the operators.

COMPETITION



Pakistan Telecommunication (Re-organization) Act, 1996 (the Act) Azad Jammu & Kashmir Council Adaptation of Pakistan Telecommunication (Re-organization) Act, 2005 and the Northern Areas Telecommunication (Re-organization) (Adaptation and Enforcement) Order, 2006 entrusted upon PTA to maintain competition in the telecom sector. Fair competition is the key to providing efficient and affordable services to the people of Pakistan, and AJ&K & GB. PTA maintains the competition in the sector through the tools and powers given under the Act and Regulations. For the purpose, PTA undertakes QoS surveys at different places, declares Significant Market Power (SMP) players in the particular telecommunications markets, and mediates in competition disputes among operators. Government of Pakistan has issued Telecom Policy 2015 under which Ministry of IT & T has been entrusted to formulate Competition Rules for the sector under section 57 of the Act and in conformance with Competition Act 2010. The Competition Rules will govern all competition related matters of the telecommunications sector.

Competition in the Telecom Sector

With the prudent regulatory environment, PTA has maintained reasonable competition in all segments of the telecom sector through effective licensing regime, spectrum availability, interoperability, mandatory interconnection and dispute resolution mechanism. The competitive position of telecom licenses in different telecom segments is provided in the table.

Total Number of Licenses Issued

| Sr. No. | License Category | No of Companies | No of Licenses |
|---------|-----------------------------|-----------------|----------------|
| 01 | Cellular Mobile/NGMS | 05 | 10 |
| 02 | Long Distance International | 16 | 16 |
| 03 | Fixed Local Loop | 21 | 84 |
| 04 | Wireless Local Loop | 12 | 103 |
| 05 | Class Value Added Services | 533 | 533 |
| 06 | Land Mobile | - | 554 |

Cellular mobile segment is the most vibrant and competitive part of the telecom sector of Pakistan. Currently, five CMOs are in the market, out of which four are offering 3G services and three are offering 4G / LTE services. Mobilink is the dominant player in terms of share in total cellular mobile revenue (28.7%) and subscriptions (29%). Warid has the smallest share in terms of revenue (11.2%) and subscribers (8.4%) amongst the five mobile operators. Merger of PMCL and Warid will lead to Merged Entity's combined revenue share of 39.9% and subscribers share of 37.4%. Details are in the table:

Due to mobile number portability, customers can easily switch from one operator to the other according to their best suitable tariffs and packages. These developments in the market have resulted into reasonable market shares of individual CMOs except Warid. Since 2006-07, competition in the sector has

consolidated the market where shares of different operators changed significantly. The market consolidation has now moved towards mergers and acquisitions where only competitive operators will be able to survive in future.

Herfindahl-Hirschman Index (HHI)

HHI is an index that measures concentration in a market. The higher the HHI, the less competitive the market is. If the value of HHI is 10,000 it shows a monopoly and if HHI is closer to zero, the market is considered highly competitive. HHI of cellular mobile sector over the last three years has been around 2,250, which shows a competitive market. Therefore, necessary safeguards are required to be in place so that healthy competition in the cellular mobile market is maintained and consumer interests are protected after the merger.

Declining Tariffs

Cellular Mobile Operators are offering one of the lowest mobile call charges in the world and the affordability of services has contributed to phenomenal growth in the mobile adoption. All CMOs are involved in aggressive marketing campaigns and promotions. Therefore, the cellular mobile segment of Pakistan needs a thorough review so that financial viability and health of the segment can be assured. In Pakistan, all the CMOs are offering two to five standard prepaid packages with pulse durations of 1 second, 20 second, 30 seconds and 60 seconds. The operators are offering aggressive promotions which

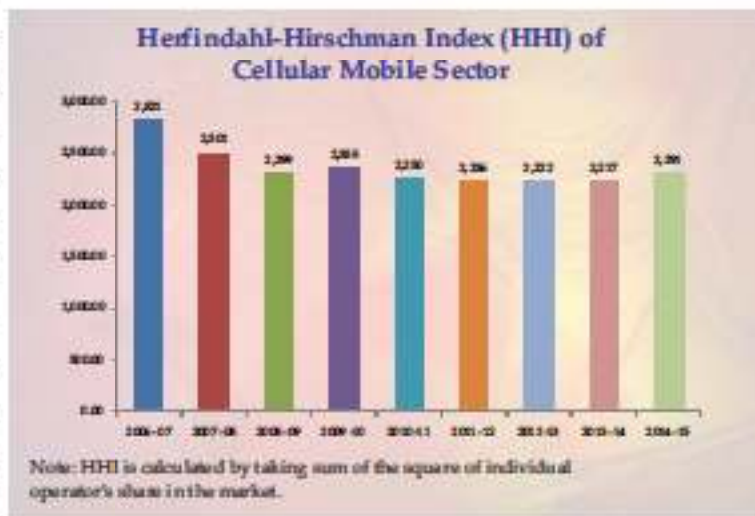
Cellular Mobile Market Shares (%) (June 2016)

| | Subscribers Share (%) | 3G and 4G LTE Subscribers Share (%) |
|------------------------------------|-----------------------|-------------------------------------|
| Mobilink | 29.3 | 30.20 |
| Telenor | 28.5 | 28.35 |
| Ufone | 14.9 | 17.69 |
| CM Pak | 19.0 | 22.58 |
| Warid | 8.3 | 1.18 |
| Total | 100.0 | 100.00 |
| Total of Mobilink and Warid | 37.63 | 31.38 |

Note: Revenue shares are estimated for the quarter Jul-Jun 2016

Cellular Mobile Subscribers Shares (%)

| | PMCL (Mobilink) | PTML (Ufone) | CM Pak (Zong) | Instaphone | Telenor | Warid |
|---------|-----------------|--------------|---------------|------------|---------|-------|
| 2015-16 | 29.4 | 14.9 | 19.0 | - | 28.5 | 8.3 |
| 2006-07 | 41.9 | 22.2 | 1.6 | 0.5 | 16.9 | 16.9 |



include unlimited on-net calls as well as free calls to off-net mobile and fixed-line networks. Telenor is offering lowest tariff for on-net and off-net calls i.e. Rs.1.50 per minute to its prepaid customers. Zong is offering 20 seconds pulse duration and is charging Rs. 1.65 per minute. Ufone and Warid Telecom are charging Rs. 1.70 per minute whereas Mobilink is charging Rs. 1.80 for on-net and off-net calls. Warid is the only operator which is also offering "Friends and Family" tariff for five numbers at Rs. 0.98 per minute (on-net) and Rs. 1.50 per minute (off-net). SMS tariff offered by CMOs are in the range of Rs. 1.20 Mobilink and Rs. 1.48 (Ufone). Some of the operators are charging Rs. 5.00 per day for unlimited on-net calls and Rs. 1.00 per minute for off-net calls. In case of postpaid, CMOs are offering four to seven postpaid packages with pulse duration of 30 seconds and 60 seconds respectively. Monthly subscription charges / line rent offered by CMOs are in the range of Rs. 49 to Rs. 4,000 charged by Ufone and Warid Telecom respectively. On-net tariff is in the range of Rs. 1.00 to Rs. 1.30 per minute whereas off-net tariff is in the range of Rs. 1.25 to Rs. 1.60 per minute.

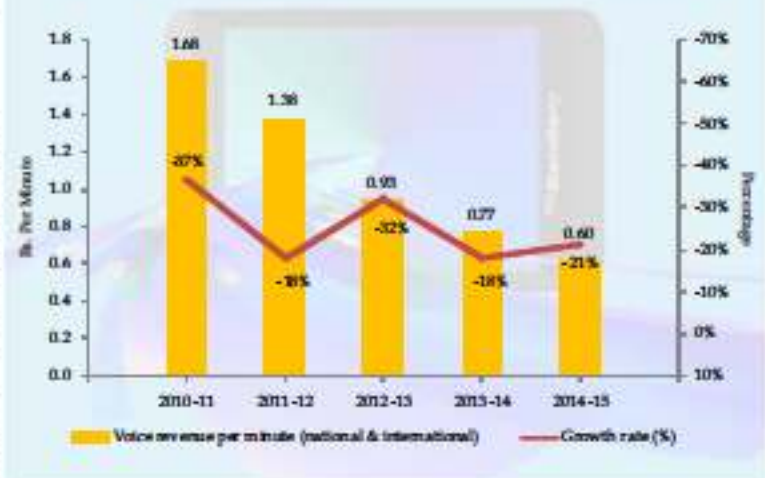
Cellular voice revenues per minute (Price per voice minute) have been calculated from the overall outgoing cellular minutes and cellular voice revenues. This shows the average effective tariffs of voice calls per minute in the cellular mobile market of Pakistan. Trends provided in the figure shows that effective price of cellular mobile calls in FY 2010-11 was about Rs.

1.68 per minute, which has substantially reduced to Rs. 0.60 per minute in FY 2014-15 i.e. price per minute of cellular mobile call is now almost one third of the price in FY 2010-11.

Benefits of Competition: Status of Average Revenue Per Minutes (ARPM) across Asia



Cellular Voice Tariff (Price per Minute (In Rs.))



PTA's Efforts

As mandated under the Act, PTA is playing active role to maintain healthy competition in different segments of the telecom sector in Pakistan while safeguarding interests of the consumers and the

investors. Some of the measures taken by PTA to maintain competition are highlighted in ensuing paragraphs.

Recommendations on the Competition Rules

PTA is actively working on the implementation of the Telecom Policy 2015 and several related tasks are underway. PTA has provided a comprehensive input to MoIT to frame Competition Rules. PTA is of the view that under these Rules, pricing in all defined markets shall be cost based, with minimum/reasonable rate of return and must be assessed regularly for their appropriateness and adequacy keeping in view the affordability of the end-users. Furthermore, operators shall not be allowed to carry out agreements/arrangements that prevent or lessen competition substantially and all kinds/types of anti-competitive behaviors and conduct or practices that may result in the lessening of competition shall not be allowed.

Consultations on Draft Retail Tariff Regulations

Keeping in view the best international practices, the tariffs of non-SMP licensees' are subject to competitive market forces. However, PTA makes regulatory interventions where any form of predatory, anticompetitive, unreasonable, burdensome, unaffordable and unjust pricing is introduced/charged both in wholesale and retail markets.

In order to regulate tariffs of telecom services, PTA, in exercise of the powers under section 5 (2) (o) read with section 26 of the Act, prepared the draft retail tariff regulations and shared with the stakeholders for their comments. After receiving comments, PTA also had consultation sessions with the operators to further discuss the proposed regulations. The regulations provide a degree of pricing flexibility and stability compatible with safeguarding and protecting the interests of consumers. The regulations ensure that tariff is set at a level which takes into consideration the cost of provision of telecommunication services and to ensure that there shall be no cross-subsidization of other telecommunication services by basic telephone service.

Scope of the regulations is to provide pricing flexibility to the extent of achieving stable market prices whereby licensees have level playing field and end-users are not exploited. The subject regulation will ensure that there is no price abuse including cross-subsidization, Price Discrimination, Price Squeeze or predatory pricing. Furthermore, Tariff Regulations will ensure the continuity in tariff review process and publication of Tariffs and operators' Assistance Services charges. There will be no automatic activation and renewal of packages & services unless advertised and informed to end users. PTA, as and when required, may impose Price Floor/Price Ceiling to control any anti-competitive or unfair behavior/situations in the market including, cartelization.

Quality of Service (QoS) Surveys

PTA regularly carries out QoS surveys of telecom services and publishes the survey results for the information of telecom users with the objective that information on the QoS parameters will increase competition among service providers to deliver better service. In the light of growing number of broadband subscribers, PTA has revised KPIs for the broadband service providers, and accordingly a comprehensive broadband QoS survey was carried out during this fiscal year.

Introducing Third Party Service Providers in the Mobile Financial Services

In order to introduce competition in the market for innovative mobile financial services, PTA and SBP have jointly worked on the interoperability of mobile financial services through Third Party Service Providers (TPSPs). In this regard, SBP and PTA have issued "Regulations for Technical Implementation of Mobile Banking, 2016" and "Regulations for Mobile Banking Interoperability, 2016" respectively. These regulations are applicable on mobile operators, TPSPs and financial institutions that offer m-banking services. The regulations provide detailed mechanism for technical implementation of one-to-one and any-to-any model of m-banking. All TPSPs are required to get a license from PTA and authorization from SBP to provide interoperable mobile banking services. All TPSPs and operators are required to enter into Service Level Agreements (SLAs) with FIs authorized by SBP for this purpose. A joint PTA and SBP committee will resolve the disputes between the parties, and protect consumers' interest. Operators and TPSPs shall also put in place an effective and comprehensive consumer protection mechanism against risks of fraud, loss of privacy, delays in service provisioning etc. to the consumers. This regulatory framework provides opportunity for the technical service providers and operators / banks to come forward with their advanced solutions that will make available interoperability on payments and across platforms. TPSPs are expected to introduce competition in the mobile banking sector through interoperable services facilitating new products such as micro insurance, savings, payments, etc.

Spectrum Availability

Availability of appropriate spectrum plays an important role for the promotion of advanced wireless technologies. With the NGMS spectrum auction in 2014, PTA introduced sufficient competition in the 3G mobile data services i.e. 4 out of 5 operators launched their 3G services. Keeping in view the market trends and technological development, GoP issued policy directive for the auction of 10 MHz of spectrum in 850 MHz band, which was awarded to Telenor through a transparent process. Using the newly acquired spectrum, Telenor has successfully launched its 4G services. Now there are three mobile operators which are offering 4G/LTE services, and are expected to bring reasonable competition in the 4G market.

Merger of Mobilink and Warid

PTA received requests on 15th December, 2015 from the PMCL and Warid respectively for the change in substantial ownership interest and merger of PMCL and Warid. In light of the statutory provisions and applicable regulatory regime, PTA while considering the relevant regulatory aspects of cellular market, initiated a consultation process with the concerned stakeholders, including licensees, Government Organizations, Frequency Allocation Board, relevant Ministries, Law Enforcement Agencies and relevant Standing Committees of the National Assembly / Senate.

The merger of two big cellular mobile companies was one of a kind in history of telecom sector in Pakistan which required extensive deliberation, study and analysis of the issue from multiple angles to fully comprehend it. After detailed analysis of the merger, due deliberations, considering stakeholders' comments and regulatory aspects, PTA issued NOC on 23rd May, 2016 for the acquisition / proposed merger / change in substantial ownership of shareholdings of Warid and PMCL based on unconditional acceptance of both the companies to the conditions prescribed in PTA's Order dated 19th May, 2016 related to radio spectrum, BTS sites, quality of service, protection of data, renewal of licenses, interconnection, tariffs, consumer protection and national roaming etc.

After completion of regulatory approvals, the legal merger of the two companies is subject to the fulfillment of the required legal processes in Pakistan i.e. Mobilink and Warid will file a petition to the Islamabad High Court in order to commence the process of legal merger. Upon such legal merger being effected, all the assets and liabilities of Warid (including but not limited to Warid's License, Network, Spectrum, towers, infrastructure, customers etc.) shall stand transferred/assigned to PMCL.

Integrating network assets of the two companies is expected to create better quality mobile network, and new products and services at scale, e.g., mobile financial services, mobile apps, value added services. Combining of customer service assets is also expected to allow superior customer experience, and easier access and availability (even in currently underserved areas) due to wider reaching distribution network. Cost efficiencies to be achieved from merged entity will enable the merged company to put investment for the said expansions.



Annexures

Pakistan Telecommunication Authority

Audited Financial Statements of PTA for the year 2015-16

Pakistan Telecommunication Authority
Balance Sheet
As at June 30, 2016

| | Note | 2016 Rupees | 2015 Rupees | Note | 2016 Rupees | 2015 Rupees |
|---|------|--------------------|----------------------|------|----------------------|-----------------------|
| Due to Federal Consolidated Fund | | 6,961,366,059 | 11,164,364,032 | | | |
| Due from Public Account | 5 | (6,495,068,171) | (5,830,646,397) | | | |
| Due to Government of Pakistan | | 466,297,888 | 5,333,717,635 | | | |
| Non-current liabilities | | | | | | |
| Long term payable to AJK and GB Council | 6 | 189,548,882 | 319,801,474 | 14 | 364,445,936 | 373,916,461 |
| Deferred grant | 7 | 49,275 | 12,014,361 | | | |
| Deferred liabilities | 8 | 882,266,929 | 520,110,719 | 15 | 52,350,000 | 101,700,000 |
| | | 1,071,867,086 | 851,926,554 | 16 | 209,657,486 | 123,529,764 |
| | | | | 17 | 215,325,922 | 230,626,411 |
| | | | | | 841,779,344 | 829,772,636 |
| Current liabilities | | | | | | |
| Unearned revenue | 9 | 3,486,151,250 | 3,486,151,250 | 18 | 137,548,916 | 974,766,464 |
| Payable to AJK and GB Council - net | 10 | 400,240,995 | 343,830,192 | | | |
| Income tax payable | 11 | 1,129,713,087 | 540,302,127 | 19 | 334,461,877 | 274,046,007 |
| Accrued and other liabilities | 12 | 144,726,327 | 216,356,146 | 20 | 5,385,206,196 | 8,695,696,779 |
| | | 5,160,831,359 | 4,588,639,717 | | 5,857,216,989 | 9,944,511,270 |
| | | | | | 6,698,996,333 | 10,774,283,906 |
| Contingencies and commitments | 13 | | | | | |
| | | | | | 6,698,996,333 | 10,774,283,906 |

The annexed notes 1 to 27 form an integral part of these financial statements.

Member (Finance)

Chairman

Pakistan Telecommunication Authority
Income and Expenditure Account
For the year ended June 30, 2016

| | Note | 2016 Rupees | 2015 Rupees |
|---|------|------------------------|----------------------|
| Revenue | 21 | 42,230,523,988 | 15,493,464,302 |
| Expenditure | | | |
| General and administrative expenses | 22 | 1,155,632,100 | 781,009,898 |
| Provision/(reversal of provision) for doubtful fee receivable | 18.3 | 682,894,699 | (40,850,727) |
| Audit fee | | 700,000 | 700,000 |
| Financial charges | | 12,164 | 5,506 |
| | | (1,839,238,963) | (740,864,677) |
| | | 40,391,285,025 | 14,752,599,625 |
| Amortization of deferred grant | 7.2 | 11,965,086 | 33,620,698 |
| Other income | 23 | 831,162,134 | 1,021,093,627 |
| | | 843,127,220 | 1,054,714,325 |
| Surplus for the year before taxation | | 41,234,412,245 | 15,807,313,950 |
| Less: Provision for taxation | 24 | (4,760,867,619) | (7,071,723,397) |
| Net surplus for the year | | | |
| transferred to due to Federal Consolidated Fund | | 36,473,544,626 | 8,735,590,553 |

The annexed notes 1 to 27 form an integral part of these financial statements.

Member (Finance)

Chairman

**Pakistan Telecommunication Authority
Cash Flow Statement
For the year ended June 30, 2016**

| | Note | 2016 Rupees | 2015 Rupees |
|---|------|-------------------------|------------------------|
| CASH FLOWS FROM OPERATING ACTIVITIES | | | |
| Surplus for the year before taxation | | 41,234,412,245 | 15,807,313,950 |
| Adjustments for: | | | |
| Depreciation | | 28,105,575 | 49,908,708 |
| Provision/(reversal of provision) for | | | |
| - accumulating compensated absences | | 95,514,912 | (26,414,569) |
| - employee's gratuity scheme obligation | | 91,949,456 | 72,167,609 |
| - pension obligation | | 1,012,603 | 1,206,818 |
| - post retirement medical benefit | | 180,093,842 | - |
| - doubtful fee receivable | | 682,894,699 | (40,850,727) |
| Profit on bank deposits | | (407,778,038) | (487,677,937) |
| Amortization of deferred grant | | (11,965,086) | (33,620,698) |
| Gain on sale of property and equipment | | (1,289,940) | (222,436) |
| | | 41,892,950,268 | 15,341,810,718 |
| Changes in assets and liabilities | | | |
| Decrease/(increase) in assets | | | |
| Loans and advances | | 11,583,736 | (14,174,839) |
| Advances, deposits, prepayments and other receivable | | (6,255,703) | (514,774) |
| Fees receivable including initial license fee - net | | 203,672,869 | (260,482,400) |
| (Decrease)/increase in liabilities | | | |
| Unearned revenue | | - | 1,314,000,000 |
| Accrued and other liabilities | | (68,823,078) | 38,455,537 |
| Contributory provident fund payable | | 31,264,163 | 17,521,595 |
| Payable to A.J.K & GB Council | | 40,051,516 | (61,532,837) |
| | | 211,493,503 | 1,033,272,282 |
| Cash generated from operations | | 42,104,443,771 | 16,375,083,000 |
| Income taxes paid | | (4,362,591,138) | (7,307,399,928) |
| Accumulating compensated absences encashed | | (58,868,362) | (70,605,147) |
| Gratuity, pension and post retirement medical benefits paid | | (11,386,547) | (23,324,020) |
| Net cash generated from operating activities | | 37,671,597,724 | 8,973,753,905 |
| CASH FLOWS FROM INVESTING ACTIVITIES | | | |
| Purchases of property and equipment | | (18,663,999) | (25,560,030) |
| Profit on bank deposits received | | 357,334,624 | 678,971,223 |
| Proceeds from sale of property and equipment | | 1,318,889 | 311,540 |
| Net cash generated from investing activities | | 339,989,514 | 653,722,733 |
| CASH FLOWS FROM FINANCING ACTIVITIES | | | |
| Contribution to Federal Consolidated Fund (FCF): | | | |
| - Payment made to Frequency Allocation Board | | (450,019,850) | (371,980,994) |
| - Payments made to FCF | | (34,112,837,014) | (7,017,836,115) |
| - Federal excise duty paid / adjusted during the year | | (6,094,801,183) | (215,043,329) |
| Movement in Public Account | | (664,421,774) | (9,333,285) |
| Net cash used in financing activities | | (41,322,079,821) | (7,614,193,723) |
| Net (decrease)/increase in cash and cash equivalents | | (3,310,492,583) | 2,013,282,915 |
| Cash and cash equivalents at beginning of the year | | 8,695,698,779 | 6,682,415,864 |
| Cash and cash equivalents at end of the year | 20 | 5,385,206,196 | 8,695,698,779 |

The annexed notes 1 to 27 form an integral part of these financial statements.

Member (Finance)

Chairman

Telecom Revenues

| | | (Rs. Million) | | |
|-----------|-----------|-------------------------------|-----------|-----------|
| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
| 311,145 | 322,683 | Cellular Mobile | 317,016 | 345,537 |
| 80,661 | 86,512 | Local Loop | 80,813 | 76,415 |
| 38,572 | 43,901 | Long Distance & International | 40,890 | 26,545 |
| 5,617 | 6,278 | Wireless Local Loop | 3,902 | 5,208 |
| 3,526 | 4,123 | Class Value Added Services | 2,468 | 2,101 |
| 439,521 | 463,497 | Total | 445,088 | 456,371 |

2015-16 Figures are estimated

Telecom Investment

| | | (US \$ million) | | |
|-----------|-----------|-------------------------------|-----------|-----------|
| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
| 570.4 | 1789.7 | Cellular Mobile | 977.6 | 659.4 |
| 1.9 | 1.8 | Long Distance & International | 12.2 | 6.3 |
| 16.1 | 14.2 | Local Loop | 3.9 | 54.0 |
| 11.9 | 10.0 | Wireless Local Loop | 7.2 | 0.0 |
| 600.3 | 1,815.6 | Total | 1,001.0 | 719.7 |

2015-16 Figures are estimated

Foreign Direct Investment

(US \$ million)

| 2014 - 15 | | | 2015 - 16 | | |
|--------------------------|---------|---------|-----------|---------|---------|
| Inflow | Outflow | Net FDI | Inflow | Outflow | Net FDI |
| 948.0 | 882.0 | 65.7 | 377.9 | 131.1 | 246.8 |
| Telecommunication | | | | | |
| 2,732.0 | 1,809.9 | 922.9 | 2,761.1 | 859.9 | 1,901.2 |
| Total | | | | | |

Telecom Sector Contribution to National Exchequer

(Rs. Billion)

| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
|-----------|-----------|-----------------------|-----------|-----------|
| 58.17 | 60.10 | SSJ | 45.80 | 43.72 |
| 6.10 | 00.00 | Activation Fee | 00.00 | 00.00 |
| 5.31 | 104.60 | PJA Deposits | 7.00 | 34.11 |
| 55.15 | 78.60 | Others | 73.50 | 81.82 |
| 124.73 | 243.30 | Total | 126.30 | 159.65 |

Source: Federal Board of Revenue and Pakistan Telecommunication Authority.

Note: Figures for 2015-16 are estimates.

PTA's contributions comprise of all its receipts including Initial and Annual License Fees, Annual Radio Frequency Spectrum Fee, Annual Spectrum Administrative Fee, USF and R&D Fund Contributions, APC for USF, Numbering Charges, License Application Fee, etc. Others include custom duties, WHT and other taxes.

Cellular Subscribers

| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
|-------------|-------------|-----------------|-------------|-------------|
| 37,121,871 | 38,768,346 | <i>Mobilink</i> | 33,424,268 | 39,118,521 |
| 24,547,986 | 24,352,717 | <i>Ufone</i> | 17,809,315 | 19,833,670 |
| 21,177,156 | 27,197,048 | <i>CMQak</i> | 22,102,968 | 25,251,329 |
| 32,183,920 | 36,571,820 | <i>Jelonor</i> | 31,491,263 | 38,020,771 |
| 12,706,353 | 13,084,823 | <i>Warid</i> | 9,830,620 | 11,017,174 |
| 127,737,286 | 139,974,754 | <i>Total</i> | 114,658,434 | 133,241,465 |

3G and 4G LTE Subscribers

| | 2013 - 14 | 2014 - 15 | 2015 - 16 |
|-----------------|-----------|------------|------------|
| <i>Mobilink</i> | 425,992 | 3,656,345 | 8,919,218 |
| <i>Ufone</i> | 539,376 | 2,570,283 | 5,223,096 |
| <i>CMQak</i> | 417,814 | 3,003,222 | 6,668,817 |
| <i>Jelonor</i> | 895 | 4,162,616 | 8,371,991 |
| <i>Warid</i> | — | 106,211 | 347,132 |
| <i>Total</i> | 1,384,077 | 13,498,677 | 29,530,254 |

Fixed Local Loop Subscribers

| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
|-----------|-----------|----------------------|-----------|-----------|
| 2,885,144 | 3,034,361 | PTCL | 3,007,807 | 2,658,538 |
| 107,631 | 106,738 | NTC | 110,957 | 114,535 |
| 14,662 | 14,410 | Brain Telecom | 14,410 | 14,410 |
| 8,977 | 8,887 | WorldCall | 1,977 | 1,977 |
| 4,175 | 4,175 | Union | 2,150 | |
| 3,699 | 3,773 | Naya Tel | 3,699 | 15,000 |
| | | WiseComm | 700 | 795 |
| 3,024,288 | 3,172,344 | Total | 3,141,700 | 2,805,255 |

2015-16 Figures are estimated

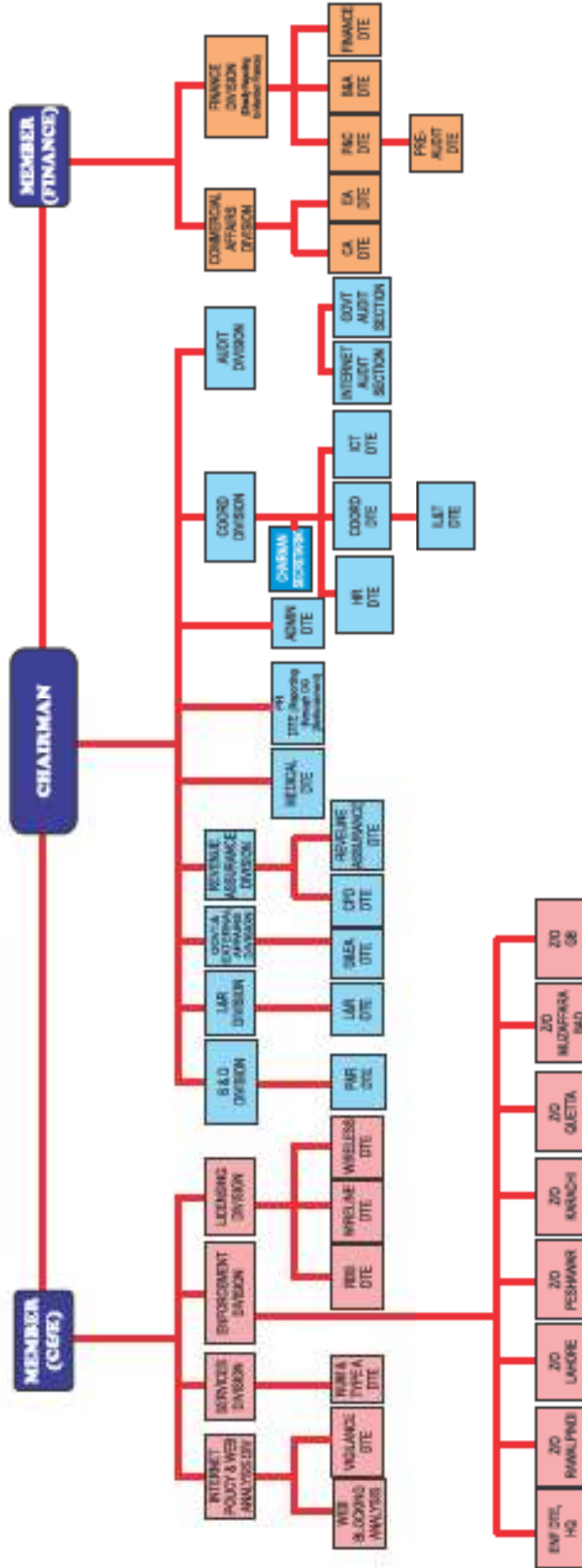
Wireless Local Loop Subscribers

| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
|------------------|------------------|---------------------|----------------|----------------|
| 1,233,793 | 1,152,635 | PTCL | 249,000 | 237,039 |
| 763,330 | 258,001 | TeleCard | 8,321 | 8,321 |
| 32 | 32 | Mytel | 33 | 33 |
| 519,148 | 33,500 | WorldCall | 45 | 45 |
| 12,231 | 11,998 | NTC | 10,717 | 10,137 |
| 281,053 | 308,122 | Wateen | 265,313 | 8,218 |
| 74,148 | 80,597 | Sharp/Qu bee | 80,597 | 59,616 |
| 199,786 | 199,886 | Wi-Tribe | 160,880 | 119,466 |
| 25,074 | 60 | Link Dot Net | 60 | 60 |
| — | 14,630 | NayaTel | 14,630 | 28,392 |
| — | — | Multinet | — | 228 |
| 3,108,595 | 2,059,461 | Total | 789,596 | 442,935 |

2015-16 Figures are estimated

Broadband Subscribers by Technology

| 2012 - 13 | 2013 - 14 | | 2014 - 15 | 2015 - 16 |
|-----------|-----------|------------------|------------|------------|
| 1,064,003 | 1,346,817 | DSL | 1,480,672 | 1,421,746 |
| 33,184 | 37,011 | HFC | 43,362 | 43,167 |
| 575,939 | 530,889 | WiMax | 487,582 | 183,181 |
| 11,152 | 14,848 | FTTH | 19,490 | 25,665 |
| 1,033,513 | 1,861,118 | EvDO | 1,334,725 | 1,084,367 |
| 3,868 | 5,240 | Others | 6,089 | 6,906 |
| — | 1,384,077 | Mobile BB | 13,498,677 | 29,530,254 |
| 2,721,659 | 5,180,000 | Total | 16,885,518 | 32,295,286 |



- Legend**
- S&D : Strategy & Development
 - L&R : Law & Regulations
 - DTE : Directorate
 - RBS : Radio Based Services
 - P&R : Policy & Research
 - GMA : Government & External Affairs
 - CPD : Consumer Protection Department
 - PR : Public Relations
 - HR : Human Resource
 - ICT : Information Communication Technology
 - CA : Commercial Affairs
 - EA : Economic Affairs
 - P&C : Payroll & Cash
 - B&A : Budget & Accounts
 - LL&T : International Liaison
 - Z/O : Zonal Office



**Pakistan
Telecommunication
Authority**

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