

NATIONAL BROADBAND POLICY - 2021

Consultation Draft v1.0

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MINISTRY OF INFORMATION TECHNOLOGY & TELECOMMUNICATION
GOVERNMENT OF PAKISTAN

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To cater for the next Digital wave, the policy creates a 3D matrix ecosystem i.e., “**Boundless, High Speed & Secure Connectivity**” at par excellence to add value proposition in National Digital Sovereignty in the region.

Foreword

For accelerated digital inclusion and growth of its citizens, the Government of Pakistan is rigorously pursuing the agenda of “**Digital Pakistan**” as envisioned by the Honorable Prime Minister to present an equal opportunity at every door step.

The Government of Pakistan is cognizant of the fact that Telecom Sector is a major contributor and a key enabler of country’s GDP growth and a definitive path towards a knowledge based economy. For achieving our National Developmental Objectives sustainably and transparently, connectedness, digitalization and indigenous innovation are the three main drivers under the guidelines of Sustainable Developmental Goals of the United Nations.

In light of the recent technological developments associated with the 4th Industrial Revolution and the directives laid in Telecom Policy – 2015 has necessitated a ‘call for action’ for reviewing the progression of the telecom sector and accordingly streamline the future course with a renewed resolve.

The increasing interdependence of people on internet for socio-economic well-being, has laid the foundation for declaring “broadband as a utility” and this aspect will serve as the underlying artifact for the succeeding reformative agenda of **National Broadband Policy – 2021** a guide towards a digital revolution in Pakistan.

Introduction

Since the enactment of Re-organization of the Telecommunication System Act in 1996, the Telecom Sector has undergone two major transitions in a span spread over less than two decades by witnessing the sector deregulation in 2003-04 and release of Next Generation Mobile Services (NGMS) licenses in 2014-15 followed by Telecom Policy – 2015.

The two phases have yielded tangible benefits for the country right from providing basic telecommunication services through fixed and wireless mediums all the way to high-speed broadband connectivity which was made possible through enabling policies and market centric regulations, opening doors for local and foreign investments in the country.

Owing to the escalating demands for higher bandwidth, converged platforms, overarching services, evolving user behaviors, unique commercial models, disruptive technologies and compulsory user privacy and protection in the digital space has once again induced the policy makers to embrace transformation and tug the entire ecosystem into an era of open and intelligent networks.

While understanding the predominant nature of the evolving digital ecosystem, the Government of Pakistan recognizes that there is no single solution for enabling and governing the digital space and that every stakeholder in the value chain has to play its role for reaping desired social and economic results with the help of technology.

Out of the lessons learned from market behavior analysis and the findings of implementation status of the previous policy the following major impediments comes out clearly;

- a. Decelerated Policy Implementation for market enablement.
- b. Obsolete regulatory regime due to complex and evolving digital ecosystem.
- c. Inefficient resource distribution and utilization.

Going forward, the National Broadband Policy – 2021 aims to fairly distribute the digital dividend through defining attributes, as follows;

- a. User centric and technology neutral
- b. Evidence based and forward looking
- c. Objective and target oriented

For achieving the above, the policy is organized in a journey based approach while keeping the user first and foremost. For keeping the directives generic and agile, the user journey is distributed over four main pillars such as; inclusivity & accessibility, usability & market enablement, digital trust and

transformation & evolution. For having a simple and achievable action course, each guideline is mapped with clear objective(s) and target(s) for timely implementation of the policy.

With the help of National Broadband Policy - 2021, the Government of Pakistan reassures its continued support for timely progression of the industry, seamless adoption of novel frameworks and technologies, attract new investments in the sector and to present the people with new opportunities through an all-inclusive approach for a **Prosperous Digital Pakistan**.

Market Overview

Socio-Economic Indicators

The telecommunication sector of Pakistan contributes as much as 5.4% (2019-20) of the total GDP and supplies with more than 450,000 direct and indirect jobs for livelihood by attaining a teledensity of nearly 80% to gain access to transformative technologies, including fixed and mobile broadband. According to the World Bank findings, in developing economies such as Pakistan, every 10% increase in broadband penetration accelerates economic growth by 1.38%. In another research done by GSMA, suggests that for every new job created in the Pakistani telecom sector, 11 are generated in the wider economy unfolding the positive impact of interconnectedness and digital inclusion on economy and the society. The following table offers a bird eye-view of the socio- economic contribution of the telecom sector in Pakistan.

i. Population	222,250,000
ii. Median Age	22.8 Years
iii. Overall GDP (FY 2019-20)	US\$278.2 Billion
iv. Telecommunication Sector Contribution (FY 2019-20)	US\$ 16.7 Billion
v. Job Creation (Direct/Indirect)	450,000

Penetration

The table below explains the overall performance and achievements of the telecom sector since 2015 which paves the way for identifying gaps and setting future targets.

Market Attribute	Initial State (Feb - 2015)	Current State (Nov - 2020)
Teledensity	76.65 Million (38.325%)	169 Million (79.65%)
Broadband Penetration	12.23 Million (6.115%)	87 Million (40.95%)
Avg. Connection(s)/Subscriber	1.94	1.87
Unique Mobile Subscribers	51.34% of TD	53.47% of TD
Unique Internet Subscribers	19.58% of TD	34.5% of TD
Smartphone Penetration	7.66%	52%
Annual Internet Subscriber Growth	24.89%	9.12%
Average Internet Speeds (F/M) – DL/UL	1.9/1.1 Mbps	14.87/10.8
Average Internet Consumption/ Subscriber/Month (in GBs)	0.9GB	1.91GB

Table- 1

The first five years of post NGMS auction phase suggests that, the telecom sector has shown promising results in terms of digital inclusion for improving the access to information through internet and technology adoption. However, there is further room for improvement in terms of



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optimizing the accessibility and utilization and by offering an enabling environment for new technological advancements via policy support.

Revenues & Investments

The revenues of telecom sector climbed from PKR 459.2 billion in 2015-16 to PKR 551.9 billion in 2018-19 registering a healthy 16.8% of CAGR. The Investments in the sector surged as an initial reaction to NGMS auction in the first 2 years, however the graph levelled off in the later half which accounted for US\$ 3.18 billion in the past 4 years. The tables below illustrated the market performance with respect to revenues earned and investments made in the past 4 years.

Revenue – PKR (in Billions)				
Telecom Sector Regime	2015-16	2016-17	2017-18	2018-19
Cellular Mobile Operators (CMOs)	345,537	367,530	382,410	445,652
Fixed/Wireless Local Loop/Class-VAS	81,400	78,439	75,382	73,837
Long Distance & International (LDI)	32,309	29,969	31,016	32,428
Total	459,246	475,938	488,808	551,916

Table-2

Investments – US\$ (in Millions)				
Telecom Sector Regime	2015-16	2016-17	2017-18	2018-19
Cellular Mobile Operators (CMOs)	656.1	801.9	568.1	406.1
Fixed/Wireless Local Loop/Class-VAS	8.9	16.6	24.6	18.2
Long Distance & International (LDI)	54	153.2	199.9	210.9
Total	719	971.7	792.6	635.3

Table-3

Market Share

The market share in terms of different access services was largely dominated by NGMS providers followed by optic fiber services proliferation due to higher demand of backhaul services which further enabled local loop service providers to expand FTTH access in limited capacity to home subscribers due to abundance of fiber resources in major metropolises of Pakistan. The government realizes that deeper penetration of fixed broadband and fiberization in tier-2/3 cities needs an enabling environment through policy intervention.

Furthermore, investments in cloud infrastructure and services has shown an emerging trend and requires further facilitation for improving the quality of internet. Here is a brief overview of fixed and mobile services based market share of different access network providers.

Type of Broadband Access	Broadband (Subscribers)	Market Penetration	Avg. Internet Speed (DL/UL) in Mbps
NGMS	84.81 Million (97.65%)		18.8/12.9 Mbps



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1.13 Million (1.3%)

10.93/9.51 Mbps

Table-4

Coverage

As a result of the obligations set forth in the NGMS spectrum licenses auctioned in 2014, the service providers were required to extend mobile broadband coverage to 50% of tehsil headquarters (including 20% tehsils headquarters in each province) nationwide in the next six years. As a result of this compulsion, the service adoption gap between urban and rural population has reduced to less than 5%, however it is further learnt that less than 20% of the total handsets owned in the rural areas are smartphones which probably is one of the major concerns hindering digital inclusion. Also the quality of broadband services provisioned in the rural areas needs to be uplifted for enhancing usability and improving customer experience.

For curbing the digital divide in the unserved and underserved areas of the country, Broadband for Sustainable Development (BSD) Program was organized by USF. Approximately 1587 MBB sites and 9773 kilometers of OFC network are currently servicing more than 146 Towns/THQs nationwide, for equitable sharing of digital resources.

The table below presents an overview of the telecom infrastructure availability, resources optimization, service utilization and consumer readiness situation spanning over the last 5 years.

Connectivity Attributes	Index Scores				
	2014-15	2015-16	2016-17	2017-18	2018-19
Network Coverage	31.6	41.1	54.8	65.4	67
Network Performance	17.81	25.7	36.36	43.44	51.27
Spectrum Availability	14.02	20.38	21.48	20.14	20.14
Infrastructure Availability	28.59	37.56	46.98	46.55	49.12
Online Security	26.63	35.67	44.7	40.7	40.7
Content & Services	29.53	33.11	36.94	37.55	39.41
Consumer Readiness	27.05	27.4	27.96	28.41	28.82
Connectivity Index	30.76	34.66	38.29	39.15	39.63

Tab-e-5

In consideration to the progression and limitations with respect to connectivity, new provisions are proposed later in this policy to mitigate challenges pertaining to; infrastructure support, service utilization enhancements and consumer readiness leading to sustainable telecom services operations.

Tariff & ARPU

As the demand weighs in favor of broadband internet, so does the concentration of Service Providers by developing data centric products and service plans. According to global market trends 60% to 65% of the total ARPU consumed by a subscriber is of the internet services as legacy services dependency on legacy services continues to deplete.

Even though sizable investments have been made by operators for service expansion and enhancements (developing access/long-haul network infrastructure and acquiring spectrum resources), the market response and open competition has led to contained service provisioning either at same or even better tariff offerings. Pakistan has ranked 17th in terms of internet service affordability for 1GB volume of internet per month and ARPU has shown a CAGR of 66% since 2015. The table below explains the tariff and ARPU situation between 2015 and 2020.

Tariff/ARPU Attributes	2015	2020
Average Price of 1GB Internet Volume	PKR 300	PKR 110
ARPU/Subscriber/Connection (Fixed/Mobile)	PKR 133.35 (US\$ 1.27)	PKR 211 (US\$ 1.32)
ARPU Distribution (Legacy/Broadband) in %	75%/25%	65%/35%

Table-6

The government realizes that lower internet costs have not accounted for desired average revenues compared to peer markets and economies and requires further provisions in the policy with respect to consumer awareness, quality of service, infrastructure support and smartphone penetration. These could be the driving factors for affordable and sustainable services.

Policy Challenges

In recognition to the challenges which could not be addressed through earlier interventions or the ones which are in the process of being addressed and finally the ones ahead with respect to national digital development requires a renewed commitment through this effort. It would help in setting up a user journey based driving approach, involving policy directives in a structured and agile manner. Some of the specific challenges which the National Broadband Policy – 2021 aims to address are;

- i. The need for affordable access to broadband for all.
- ii. To address the challenges concerning digital divide especially in unserved and underserved areas nationwide.
- iii. Overcoming the challenges in rolling out the required digital infrastructure and related financing models including extensive fiberization and efficient spectrum management.
- iv. Harmonization of existing tax regime on telecommunication services.
- v. Stimulating the development of local and relevant content and services.
- vi. The need for improved and consistent broadband quality of service.
- vii. Urging the importance digital trust over telecommunication networks to promote wider use of digital technologies in all spheres of life.
- viii. Developing the awareness and capacities of people, including their media and information literacy.
- ix. Understanding the impact of Internet in terms of sociocultural developments economic growth and environmental sustainability.
- x. Lowering barriers for investments applied on existing licensees and for new investors in telecom sector and promoting public-private partnerships.
- xi. Necessitating an agile policy and regulatory environment for an evolving digital ecosystem.
- xii. Challenges vis-à-vis accelerated evolution towards adoption of Xth Generation technologies and fiberization, necessary for improving the state of broadband infrastructure.

Policy Vision & Objectives

Policy Vision

For furthering the initiative of Digital Pakistan, it is pivotal to craft a policy vision which is user centric, market oriented, simple to govern and all-inclusive in nature, laying a strong foundation to address outstanding issues expediently and explore new opportunities in the most agile manner. The National Broadband Policy – 2021 aims to;

“Revitalize the state of telecommunication by accelerating the efforts for digital inclusion of every citizen in any corner of the country to gain universal access to high speed affordable internet, enhance the use of digital space by providing equal opportunity for socio-economic wellbeing in a safe, responsible and healthy environment through evolving policy and regulatory measures required for timely and sustainable adoption of cutting edge technologies and digital infrastructure”

Policy Objectives

The policy objectives furnished below would essentially help in explicating the areas of priority and further draw an alignment with the market issues and opportunities concerning inclusivity, usability, resource optimization, safety, transformation and evolution of an entity (person, organization and/or government).

- i. To address the challenges of internet access by fast tracking the penetration of digital access, optimizing the use of existing infrastructure and equitable distribution of digital dividends through need based policy interventions.
- ii. For the early inclusion of digitally divided people, promote service based and open competition, rationalize taxes and offer essential incentives for reducing the cost of inclusivity.
- iii. For the socio-economic wellbeing, enhance the awareness of using the internet/digital services for learning and earning.
- iv. Xth Generation internet service and technology readiness and enablement.
- v. Bring improvements in quality of broadband services via timely and appropriate interventions.
- vi. To improve the availability of internet by localizing content and inducing a culture of indigenous research and innovation at the grassroots for addressing societal challenges and exploring opportunities through effective and efficient use of digital/internet space.

- vii. To plan and optimize infrastructure/resources available with National & Provincial Governments/State Organizations for improving the delivery of internet/digital services in synergies and partnerships.
- viii. To increase resilience, improve safety and build trust of users for using internet services as an enabling medium for performing their routine businesses transparently, at minimal cost and hassle.
- ix. For a purposeful adoption and humanization of Fourth Industrial Revolution (4IR), develop a roadmap for harnessing evolving communication technologies and to create an enabling environment through necessary facilitation and appropriate regulation.
- x. Review and transform the roles of regulator and other facilitative bodies of the government for achieving the national broadband targets timely and conveniently.
- xi. Encourage investments by removing barriers hindering inclusivity and usability.

Policy Drivers

The user centric policy drivers on which the foundation of the National Broadband Policy – 2021 is laid consists of the following four major pillars;

1st Pillar: Inclusivity & Accessibility

The 1st pillar will focus on the digitally divided people who are yet to be digitally included and will provide guidelines regarding use of existing fiber resources, facilitating infrastructure sharing, introducing national broadband networks and its role in the development of sustainable broadband infrastructure in public-private partnerships, reviewing the role of USF for sustainable penetration of broadband services in unserved and underserved areas of the country further enhancing the capability for use of already laid infrastructure, further assessing the rolling spectrum strategy and offering interventions for resource optimization as well as roadmap for inclusion of new mobile spectrum bands, facilitating the provisioning of rights of ways, plan for commercial use of data satellite and proposal for smartphone adoption and increased local manufacturing of internet devices/terminals in Pakistan.

2nd Pillar: Usability & Market Enablement

The 2nd pillar will help in organizing matters related to enhancing the use of internet and for market enablement such as; roadmap for service based competition, review of licensing framework, outlining the future course of OTT platforms and content management, broadening the role of Ignite as research and innovation enabler, facilitating the cloud infrastructure and internet exchange points, reviewing the quality of service rules for improving user experience, developing and implementing new services and technologies in public-private partnerships, supporting with necessary infrastructure and services for enabling social services in the digital space.

3rd Pillar: Digital Trust

The 3rd pillar will emphasize on the privacy and protection of user consuming internet and will help in creating awareness and propose a framework for securing identity and data online, ease of access for reporting criminal activity online, guidelines for constituting CERTs, standardizing and implementing user privacy, propose common operating environment and standards for internet security, environment protection support, framework for standardizing new technologies and services.

4th Pillar: Transformation & Evolution

The 4th and final pillar of the policy would help user by providing a transformational roadmap for legacy services and technologies, review the role of different public sector organizations responsible for facilitating different telecommunication services, plan for adopting open source technologies and platforms, broadly identify future technologies and make provisions for early

adoption, propose broad strategy for the adoption of Internet of everything and last but not the least provide guideline for international cooperation in ICTs.

National Broadband Targets

For enhancing the implementation capacity of broadband plans and strategies through special funding instruments for aiding the economic structure based on thorough market analysis and benchmarking, the ITU Broadband Commission advocates to align National Broadband Targets with international action plan until 2025.

For spurring digital development, it is critical to define broadband targets which would help in assessing and strengthening the national broadband agenda and would also harmonize the progress with the seven advocacy targets of the Broadband Commission. It would allow international observers to gauge Pakistan's performance owing to its commitment to the international community. The targets furnished below are staggered in to two phases starting from 2021, with 1st phase completing in 2025 and the extended 2nd phase concluding in 2030.

Socioeconomic Targets

Macro indicators reflecting the contribution of digital/broadband development on economy and its impact on the wellbeing of people. With increasing reliance on digital platforms and services it is anticipated that by 2030, the technology and associated digital ecosystem in the country would account for resolving 70% ~ 80% issues of daily life.

Socioeconomic Indicators	2015 to 2019	Target 2025	By 2030
Contribution towards GDP	5.4%	7% ~ 8%	≥ 10%
Job Creation	450K	+250K	+300K
Internet Access to Public Schools & Hospitals	<15%	≥70%	100%
Revenues (in Billion) – US\$ (4 Years)	16.1	19~20 (@25% CAGR)	24~25 (22% CAGR)
Investments (in Billion) – US\$ (4 Years)	3.12	4.5~5 (@50% CAGR)	7~7.5 (@50% CAGR)

Table-7

For achieving the socioeconomic targets set forth, the following demand side and supply side targets will help in realizing the overall growth.

Inclusivity & Accessibility Targets

With a focus on the early digital financial inclusion of millennial population, it is anticipated that Pakistan can achieve the targets given below well before time due to propelling digital culture in the country.

Inclusivity & Accessibility Indicators	Targets		
	Current (2020)	Before 2025	By 2030
Teledensity/Broadband Penetration – in %	80%/41%	100%/≥80%	100%+
Fixed Broadband Penetration	1.13%	≥15%	≥35%
Unique Internet Subscribers of TD – in %	34.5%	≥50%	≥75%
Smartphone Adoption – in %	52.11%	≥ 75%	100%
Annual Subscriber Growth Rate (UMS/UIS) – in %	3.75%/9.12%	4.5%/≥10%	≤5%
Avg. Broadband Internet Access Speed – in Mbps	≥14	≥30	≥70
Connectivity Index	39.63	≥65	≥75

Table-8

- i. To ensure that 100% population living in tier-2/3 cities should have access to high-speed internet by 2025.
- ii. More than 75% of metropolis, district, town, tehsil and union council should be connected with Optical Fiber Cable based fixed/wireless access network with an average per user internet speeds of 50Mbps in major cities of Pakistan by 2025.
- iii. Every social and welfare service facility such as; schools, hospitals, courts, police/fire stations, district/union council offices should have access to broadband internet services with atleast 50Mbps connectivity by 2025.
- iv. More than 75% of businesses and commercial facilities should have access to high-speed fixed and mobile broadband internet by 2025.
- v. Every internet user to have ownership of atleast one latest smartphone(s) and/or device(s).
- vi. To introduce next wave of fixed and mobile services and ensure coverage in 25% of the cities in Pakistan by 2025 and another 75% cities/towns by 2030 while accommodating technological evolution and resource optimization on the go.
- vii. To facilitate 75% of internet users with digital bank accounts by 2025.
- viii. Develop and operationalize atleast five (5) carrier-neutral Internet Exchange Points and cloud data centers in public-private partnerships by 2030.

Usability & Market Enablement Targets

One of the major challenge towards digitalization of communities is the efficient use of internet. For embracing internet as a utility, it is important to make a user understand the time and cost savings they can achieve by relying onto transparent, secure and easy to use digital platforms and services. This would not only help in increasing the broadband demand but will also improve the cost and ease of doing business leading to a sustainable digital ecosystem.

It is broadly realized that the broadband infrastructure already in place is underutilized and requires immediate support in terms of affordability, content availability, improved user experience, digital skills and services.

For creating an enabling environment, the following targets are articulated to organize the demand side in coherence with the supply side.

Usability & Market Enablement Indicators	Targets		
	Current (2020)	Before 2025	By 2030
Internet Affordability (in US\$)	0.69	≥50%↓	≥30%↓
Average Internet Usage (in GBs)	1.91	≥20	≥50
User Experience (in msec)	35	≤25	≤10
Content Availability (in %)	<30%	≥60%	≥90%
Gross Expenditure on R&D (GERD) of GDP (in %)	0.24%	1%	2%
Digitally Skilled Users (in Million)	1	5	10
Community Broadband Centers/million population	≤3	≥10	≥25

Table-9

- Every user should be able to choose between a minimum of two (2) broadband service providers irrespective of their location by 2025.
- To increase the use of internet by 200% amongst youth aging between 13 and 25 years by 2025, by offering atleast 30% extra volume of internet in same price range as that of a normal user.
- Increase the use of internet by atleast 300% amongst Women and Persons with Disabilities before 2025, by increasing volume of internet by atleast 50% within same price range as that of a normal user.
- To make atleast 50% of public services available over digital platforms/infrastructure by 2025 and 100% services to be digitally enabled by 2030.
- To have more than 75% of academic content available online for embracing blended education by 2025.

- vi. More than 70% Small and Medium Enterprise to have an internet connection of atleast 50 Mbps by 2025.
- vii. Atleast 70% Hotels and Tourists Resorts to have an internet connection of atleast 50 Mbps by 2025.
- viii. For increasing the use of internet in the impoverished and underserved section for their participation in the socioeconomic development of the country, develop and enable atleast 10 Community Broadband Centers per every Million population by using existing facilities by 2025.
- ix. Facilitate schools, hospitals and other public facilities with necessary access devices, tools and platforms for optimally utilizing the internet services.
- x. For promoting indigenous research and innovation, enhance the network of National Incubation Centers in every district headquarters by 2030.
- xi. To develop atleast (5) smart communities each in Karachi, Lahore and Islamabad by 2025.

Digital Trust Targets

For coping with the threats of next digital wave, an important element is to harmonize the online protection and privacy of users in view of their increasing dependencies over the internet. For ensuring a safe, secure and transparent digital ecosystem. The following targets are set to be realized by 2025.

- i. To develop and embrace National Framework for Internet Security.
- ii. To ensure that every smartphone/internet device is provisioned with necessary data protection and privacy measures as per national guidelines.
- iii. To organize atleast one Telecom Sector CIRT/CERT, One National Telecom Security Operations Centre (SOC) and facilitate establishment of Provincial Digital CERTs as per the guidelines of the ITU.
- iv. To have atleast 100 patents registered through local Intellectual Property Organization on annual basis.
- v. To organize and implement Numbering, Naming and Addressing Rules for evolving a resilient internet ecosystem by 2025.

- vi. For the protection of environment, ensure that by 2030, the carbon footprint of Telecom Sector is in compliance with 1.5°C trajectory of pre-industrialization level (42% reduction in Greenhouse Gases Emission) as defined under ITU recommendation “ITU-T L.1470 ‘GHG emissions trajectories for the ICT sector compatible with the UNFCCC Paris Agreement’1” and aligned to the IPCC Special Report on 1.5°C.

Transformation & Evolution Targets

The 4th Industrial Revolution continues to explore and open new avenues of technological evolution which has resulted in overarching services of disruptive nature. This particular aspect has made it difficult for policy makers to keep up with the transformational process in order to reap long term and sustainable benefits for society and the economy.

It is therefore, necessary to pronounce targets which are able to accommodate evolution and offer the policy a ubiquitous outlook.

- i. Transform PTA as a full-fledged 5th generation regulator for ensuring timely regulation and introduction of new technologies and platforms of overarching nature by 2025.
- ii. To have a more inclusive and integrated role of public sector organizations for allowing contribution of government in the development and viability of digital ecosystem by 2025.
- iii. To establish atleast three (3) government funded research and development centers for harnessing technologies under the umbrella of 4th Industrial Revolution and beyond by 2030.
- iv. To organize atleast five unique initiatives/programs with international R&D, Standardization Organizations regarding to provide access to latest tools and systems by 2025.
- v. To establish long term cooperation with atleast five (5) international policy making, standardization, research & innovation and funding bodies for technological advancement and content localization by 2025.
- vi. Formulate and implement atleast five (5) branching policies and/or implementation strategies with a focus on disruptive technologies such as Artificial Intelligence, Blockchain, Internet Security and Spectrum Strategy with respect to future networks including Satellite Communications etc. by 2025.

Dynamic Tax System

Unlike before, where the purpose of telecommunication was to provide with basic communication services and internet for having access to information, therefore the tax system was also organized in a similar capacity to seek pragmatic contributions from the industry.

Tax is the most important aspect towards smooth functioning of the state and therefore it requires a careful treatment, however at the same time Information and Communication Technologies (ICTs) due to its cross cutting nature does not only help in early inclusion of citizens in the tax net but also acts as an assurance towards a knowledge based and transparent economy.

The Government of Pakistan while realizing the significance of tax application and interconnectedness simultaneously, is of the view that timely achievement of National Broadband Targets would not only help in creation of new opportunities for economic development but will also allow Authorities to increase their tax base and achieve new and fresh revenue targets. It is therefore expressed that;

Policy Action#1

1.1 Tax

- i. Pakistan Telecommunication Authority (PTA) shall conduct an impact analysis survey on different types of taxes, duties and other charges applicable on internet user and the industry. Identify direct/indirect impediments in service adoption and/o utilization and develop a correlation among current tax regime, early digital inclusion of the people and in achieving the strategic objectives for socioeconomic development. Based on the outcomes of the survey, PTA shall propose its recommendations to the Ministry of IT & Telecom for further consideration.
- ii. The Ministry of IT & Telecom after reviewing the recommendations of the survey report, shall organize a “Tax Reforms Committee for Digital Financial Inclusivity” comprising of members from the Ministry of Finance, Ministry of IT & Telecom, Federal/Provincial Tax Authorities, PTA, FAB, USF, the Industry and any other stakeholders it may deem appropriate with clear objectives and timelines for articulating a “Smart Tax Plan”, a phase wise and time barred strategy intended to digitally enhance economy all across the country.
- iii. The tax review process shall be prioritized into two parts with a narrow focus on inclusivity and affordability, each part shall be strategized and linked with National Broadband Targets and the Broadband for Sustainable Development Program of USF, so as to extend benefits to the most deserving faction of the society.

- iv. The plan may be built on a hybrid approach i.e. short term subsidies and continuing relief program for sustainable digital financial inclusion and shall be harmonized through all Federal/Provincial Tax Authorities.
- v. PTA shall conduct the survey and submit its recommendations to the Ministry of IT & Telecom before June 2021 for further consultation and development of Smart Tax Plan which shall be submitted to the Ministry of Finance for further approvals. The plan may be ratified and implementation shall initiate in Q4, 2021.
- vi. Gradual normalization of Advance Income Tax on telecom services (voice and internet for both fixed and mobile) considering telecom services as an essential utility service.
- vii. Harmonization of Sales tax in provinces and FED in Federal territory on telecom services i.e. single and market aligned GST rate across the country.
- viii. Resolution of SIM Issuance Tax, PKR 250 against the issuance of every new SIM.
- ix. Introduction of simplified advance tax mechanism u/s 147 of ITO, 2001 for telecom and exemption from all withholding/collection provision under ITO, 2001 is recommended. Similar exemptions have already been afforded in the banking and oil industries. Inclusion of Telecom sector (all PTA licensees) in DIVISION III of PART III of the Income Tax Ordinance to grant relief of 3% minimum tax instead of 8% tax.
- x. Abolishment of Additional Customs Duty (4%) and Regulatory Duty (9%) on the network equipment imported by telecom companies excluding smartphones which is subject to Mobile Device Manufacturing Policy.
- xi. Additional Customs Duty and Regulatory Duty on Raw Material for manufacturing of Optical Fiber Cable may be brought down to 5% and 3% respectively.
- xii. Inclusion of Telecom operators (licensees of PTA) in the definition of Industrial Undertaking by FBR under section 2 (29C) of Income Ordinance 2001.

1st Pillar – Inclusivity & Accessibility

1st Pillar - Inclusivity & Accessibility

The first pillar of the policy which entails the development and efficient use of digital infrastructure and resources, it is empirical that digital access, the backbone, core infrastructure and other strategic resources such as spectrum and satellite networks shall be dealt discretely with a target based approach by serving the most deserving communities at first. Another matter of concern requiring guidelines for early implementation is the Right of Ways issue helping in optimal use in underutilized infrastructure for sustainable operations and preserving the environment, new instruments could be introduced for propelling local/foreign investments in infrastructure development for fast-tracking internet adoption through sustainable programs and instruments.

Digital Infrastructure

Emerging markets such as Pakistan are supposed to witness highest growth in digital economy, due in part to the young population with longest time using the internet. Despite the rising importance of digital economy, Digital Infrastructure financing gap in Asia alone is estimated to reach \$241 billion (i.e. 50% of global digital infrastructure investment gap) by 2030. These gaps are largely prevalent in middle and low-income countries causing a barrier for inclusivity.

Majority of funding for the development of infrastructure is driven through private sector with 72% of infrastructure related investments, 18% in public-private partnerships and public funding accounting for upto 9% in Asia. Public funding and PPP are increasing, but at slow pace and small scale and therefore, measures are required to address these challenges for providing an enabling environment for infrastructure development.

Policy Action#2

2.1 Data for Development

- i. PTA shall organize a program via multi-stakeholder engagement, “Data for Development” and initiate the process for nationwide data collection of digital infrastructure and inclusivity.
- ii. The data collection attributes shall be aligned with the ICT Development Index (IDI), so as to harmonize the progress and performance broadband development based on international best practices.
- iii. The data to be collected with respect to ICT readiness (which is only one part of IDI) may be divided into four parts, the Cloud and Internet Backbone Infrastructure, The National Backbone & Metro Infrastructure, the Access (Fixed and Mobile) Infrastructure and last but not the least, adoption of smart devices and internet connections.

- iv. Based on the data collected, demand forecast and the National Broadband targets set forth, PTA shall extrapolate data for future needs.
- v. PTA shall ensure that data is collected through verifiable resources, make all efforts to automate the process on real-time basis and is reported on biannual basis.
- vi. The Ministry of IT & Telecom shall organize a steering committee for gauging the progress for which shall meet on quarterly basis.
- vii. The program shall be of continuing nature and help the Government in reviewing and realigning National Broadband Targets on periodic basis.

2.2 Fiberization

- i. The preferred medium for wireline access will be fiber to facilitate delivery of broadband services. The PTA will consult with licensees to determine suitable standards and/or incentives to spur commercial fiber deployment.
- ii. PTA will put in place the regulatory framework for the provision of wholesale fiber services on a fair and non-discriminatory basis as required in a license or on designation of SMP in a relevant market under the Competition Rules.
- iii. PTA will devise and enforce framework for transformation of legacy infrastructure with timelines that are measurable and realistic. Also a monitoring mechanism for transformation of the above to be established by PTA and enforced. It is one of the major environmental concern in the country that needs to be addressed on immediate basis once the policy comes into effect.
- iv. Owing to timely accomplishment of National Broadband Targets, all such legacy infrastructure shall be transformed within ten (10) years' timeframe from date of enactment of this policy.

2.3 Outside Plant Code

- i. An advisory code for local authorities will be developed to ensure that ducts and associated access points provided in new roads, footpaths and railway tracks, and those that are being rebuilt. A duct sharing scalable model to be formulated and enforced by PTA for all new installations.
- ii. PTA will develop a framework with the appropriate authorities for roads to develop a code for the construction of telecommunications ducts to be included in the specification for any road or railway construction or rebuilding program. The code will provide a specification for ducts to carry telecommunications cabling including any necessary related power cabling and voids

or spaces to be provided at critical points for the provision of buried or surface mounted equipment chambers.

- iii. This code will be required also, to determine the terms on which ducts and voids/spaces are provided to telecommunications license holders, taking account of the need to stimulate and facilitate the provision of telecommunications infrastructure. The tariff for the use of such infrastructure will be determined in manner equivalent to that for rights of way. The building costs for ducts, spaces and voids will be included in the budget for the road, footpath or railway track and will be borne by the budget holder.

2.4 In-building Cabling

- i. PTA will review and identify standards for in-building telecommunications cabling for new, existing and re-furbished buildings. PTA will work with the stakeholders in the telecommunications sector, the building industry, architects and cable installers to disseminate such standards.

2.5 Wi-Fi Hotspots

- i. Provision of Wi-Fi hotspots based on international standards will be allowed for commercial use. The PTA will put in place necessary regulations encompassing appropriate adjustments in transmit power and hop length, to ensure that the benefit available from Wi-Fi is maximized within constraints of the ITU-R Radio Regulations and possible interference effects. In this context, a Wi-Fi hot spot is a Wi-Fi node that is attached to a fixed network and provides limited mobility access or fixed access.
- ii. Therefore, backhaul for public Wi-Fi hot spots will be provided by a fixed network operator where such services are available. Mobile operators wishing to provide public fixed or limited mobility Wi-Fi services to their own customers may do so under a commercial arrangement with a fixed network operator.
- iii. Wi-Fi offloading of mobile traffic to a Wi-Fi node linked to a mobile network or to a Wi-Fi hot spot linked to a fixed network may be undertaken by mobile licensees. In the spirit of the license granted to a mobile operator, the Wi-Fi node linked to a mobile network may be used to provide offloading of mobile traffic only from its own subscribers and from those that are roaming on its network. The Wi-Fi node linked to a mobile network must not be used as a Wi-Fi hot spot that provides fixed or limited mobility services.
- iv. PTA will ensure that consumer protection and other regulatory arrangements that apply to ISPs more generally apply to Wi-Fi hot spots.

2.6 Infrastructure Sharing

- i. To implement cost savings in the telecoms industry and to mitigate the delays incurred in procuring rights of way for new infrastructure, reducing environmental impact, sharing of

passive and active infrastructure must be considered before granting a new right of way or space to build towers or for other infrastructure.

- ii. All licensees are obligated to share infrastructure on mutually agreed commercial terms. All licensees with significant market power in a relevant market are obliged to share infrastructure on fair and non-discriminatory terms.
- iii. PTA to develop necessary regulations and/or amendments to license conditions, codes of conduct and model contracts, subject to consultation with stakeholders, and arbitrate between licensees in disputes over infrastructure sharing. Infrastructure sharing obligations encompass a requirement to lease facilities on a fair and non-discriminatory basis to other licensed service providers. The facilities provided include space, electrical power, air conditioning, security, cable ducts, space on antenna and towers etc.
- iv. Infrastructure sharing (passive and active) shall be provided based on the regulations and guidelines established by PTA, in consultation with MoITT, on the principles of neutrality, non-discrimination and equal access. The guidelines will take account of established international best practices.

2.7 National Broadband Network 2.0 (wholesale only)

- i. National Broadband Network 2.0 (NBN 2.0) is a special vehicle for developing common services corridors (wholesale only) in identified areas/vicinities via public funding instrument. The aim of NBN 2.0 is to precisely address the demand and supply gaps by;
 - a. PTA shall organize/introduce public funding instrument via collaborative regulation for existing licensees to jointly or severally raise capital via pooling of available infrastructure in an infrastructure investment trust based model for allowing local investors to participate in demand driven infrastructure development and for reducing overall investment risks.
 - b. Making provision for developing new infrastructure in public-private partnerships (while keeping licensees' rights, obligations and competition related matters intact) for addressing growing demand in targeted areas.
 - c. Using the options above jointly or severally or in combinations for sustainable digital infrastructure advancements.
- ii. Based on the data collected through "Data for Development" program, especially for wholesale networks and the guidelines issued under Right of Ways policy directive, the Ministry of IT &

Telecom may organize sustainable infrastructure development program(s) for timely accomplishment of National Broadband Targets.

2.8 National Roaming

- i. In the interest of quick rollout of services and to achieve the objectives related to provision of universal service, national roaming will be encouraged in accordance with mobile license terms. Mobile licensees will be encouraged to offer nationwide service as expeditiously as possible at mutually acceptable terms.
- ii. Licensees that are designated as SMP in a relevant market under the Competition Rules.

2.9 Peering and Exchange Points

- i. Internet and other traffic will be exchanged within Pakistan using local peering or exchange points as far as it is possible to do so, recognizing that the use of international peering points in other countries imposes an unnecessary cost burden and a potential security risk. PTA will take appropriate measures in consultation with stakeholders to encourage establishment of local peering and exchange points of IP traffic on legally established gateways in Pakistan.

2.10 Data Centers Infrastructure Development

- i. In order to revitalize the infrastructure as a service for digital trade, digital sourcing and to establish digital corridors internationally & hosting of international and domestic software applications and to improve the efficiency of downloaded applications, the policy encourages the domestic deployment of Data Centers in Pakistan either through foreign direct investment or through Joint ventures or collaborations in public and private sector.
- ii. Considering the Information security concerns, data center has to offer a secure environment that minimizes the chances of a security breach. A data center must, therefore, keep high standards of information and cyber security for assuring the integrity and functionality of its hosted computer environment.
- iii. Cooling environment which is the biggest challenge of Data Centre Operations, Pakistan Northern areas provides an optimum cooling and connectivity attraction for foreign investors where the temperature remains near to zero all around the year.
- iv. In this regard a framework shall be developed by PTA in-consultation with respective stakeholders and MoITT to effectively utilize the technology zones / Industrial zones allocated and available areas already established in Pakistan in addition to other investment model facilitations with redundant commercial power and redundant optic connectivity eco systems.

2.11 Corporate Networks

- i. Corporate entities that wish to establish intra-corporate networks will continue to be facilitated using services provided by licensees. Corporate networks will be permitted to connect to a licensee's public network in one or more places for the purpose of origination and termination of intra corporate traffic. However, a corporate entity may not engage in any commercial activity that enables transit of commercial voice or data across a corporate network between such points of interconnection.

Spectrum Management

The Ministry of IT & Telecom in consultation with PTA, FAB and other stakeholders needs to ensure timely and adequate access to spectrum under transparent, reasonable, and flexible use terms and conditions in order to enable the expansion of high-speed broadband access and facilitate the deployment of new and innovative applications.

In conformance to the ITU Radio Regulations and in the national interest, spectrum management must ensure that adequate spectrum is provided over both the short and long term for public service organizations to fulfil their missions for voice and broadband connectivity, for private sector business communications, for broadcasting information to the public and for research/amateur activities.

The policy actions below offers an orderly method for allocating frequency bands, authorizing and recording frequency use, establishing regulations and standards to govern spectrum use, resolving spectrum conflicts, and representing national interests in international fora.

Policy Action#3

- 3.1. Recognizing that spectrum is a scarce resource belonging to the State and must be used in public interest, the overriding spectrum policy goals are to;
 - i. Use spectrum in an efficient and flexible manner.
 - ii. Maximize social and economic benefits.
 - iii. Promote stability and transparency.
 - iv. Support the emergence of Xth Generation Telecommunications Services.

3.2. Spectrum Harmonization

- i. Whilst spectrum allocation will continue to be, in principle, technology neutral, it will also continue to be harmonized with ITU radio regulations, guidelines, resolutions and recommendations except where national interest warrants a different determination.

“The farming & re-farming of scare spectrum resources for maximum and efficient utilization on any standard technology within the regulatory framework & considering quality parameters” is defined as Technology Neutral.

Pakistan is within the ITU Region 3. The process of allocating frequencies to services and the regulatory framework is largely determined by external factors such as public policy, legislation and international regulations or agreements. Pakistan will play an active role in

international fora, through engagement with relevant government departments, to ensure that as far as possible, the international allocation and regulatory framework accommodates Pakistan's specific requirements. A structured and output based process led by Federal Government will be introduced to this effect.

3.3. Spectrum Strategy

- i. MoITT, on recommendations of FAB and PTA, will prepare and publish a Rolling Spectrum Strategy to be published every year that provides a program for the succeeding three years from the date of publication. The Spectrum Strategy will identify;
- ii. For the succeeding period;
 - a. Plan for existing spectrum allocation audit.
 - b. Terms of Re-allocation of existing spectrum to legacy licensees.
 - c. New spectrum bands to be made available.
 - d. Consequential requirements for spectrum re-farming.
 - e. Spectrum to be auctioned, with an indication of approximate timescales.
 - f. Spectrum to be subject to Administrative Incentive Pricing (AIP); and
- iii. Spectrum to be subject to spectrum trading and/or other market mechanisms.
- iv. Anticipated longer term developments such as longer term changes in spectrum allocation and availability for use.
- v. While stability is important, the strategy must adapt to the changing needs of the telecommunications sector. Therefore, PTA and FAB will continuously review the environment and spectrum needs and in consultation with stakeholders make recommendations to the Federal Government to update the spectrum strategy to ensure that it remains consistent with evolving demands.

3.4. Release of Spectrum

- ii. Spectrum will be released in a timely manner to meet the requirements of new and existing services. This is essential to avoid any constraint on usage or degradation of quality of service arising from lack of spectrum. Regulators, PTA, will take account of the linkage between economic growth and penetration of services when recommending the spectrum

to be released and the timing of release. Regulators will take into account the value of spectrum to the economy as well as to the exchequer in determining the details of the mechanism used for valuing and selling spectrum.

3.5. Spectrum Refarming

- i. Spectrum will be re-farmed where its current use is not in the best social and economic interests of Pakistan, it is underutilized, used inefficiently or its use is inconsistent with international allocations. The refarming will ensure the reassignment of frequencies to uses with greater social and commercial benefits than are attainable from the prevailing assignment of those frequencies. Spectrum to be refarmed will be identified in the rolling spectrum strategy. The requirement of spectrum in the context of national security will be given due consideration as per operational requirements of defense sector.
- ii. PTA in consultation with FAB will propose a refarming framework to be approved by the Federal Government.
- iii. The Spectrum Refarming Framework will be based on international best practices and market demand scenario. The framework will be a combination of administrative, financial and technical measures aimed at moving incumbent users and hence their equipment out from their spectrum assignments in a particular band either partially or completely so that the band may be allocated to other uses. It will also provide a process for estimating the compensation required, where applicable, through a well-structured criteria.
- iv. Federal Government, in consultation with PTA and FAB will decide to refarm any spectrum and such decision will be effected through a policy directive.
- v. Upon decision by the Federal Government for refarming of a particular band, a Spectrum Refarming Committee comprising of MoITT, FAB, PTA and incumbent users will;
 - a. Estimate the value of the refarmed spectrum using the valuation method to be adopted.
 - b. Estimate the compensation cost of refarming (for government users only); and
 - c. Determine timeline for Refarming.
- vi. The government users who are required to vacate spectrum identified for refarming, may receive compensation for relocating to new spectrum. FAB will assist these spectrum users

throughout their transition to a new spectrum band. Funds for compensation may be raised from fees collected from the issuance of licenses that incorporate spectrum assignments in the refarmed band.

- vii. On refarming, compensation costs will be recovered from the license fees paid through the regulatory authority that collects the fees. PTA will create Spectrum Refarming Fund (SRF) and allocate an amount, to be determined by the Refarming Committee, from the fees it collects for this fund. Payment of compensation to the government users from whom the spectrum is refarmed, if required, will be made as approved by the Committee on the basis of predefined criteria for the purpose.
- viii. Re-farming includes but is not limited to the bands associated with the uses in the following section.

3.6. Analogue UHF TV and MMDS Spectrum

- i. The use of digital technologies has dramatically changed the way in which telecommunication and broadcast services are delivered to and accessed by users. During the Policy period, FAB will determine the spectrum allocated to analogue UHF TV services that may be reallocated either wholly or in part to telecommunication services, in order to achieve a digital dividend. MMDS spectrum will also be reallocated to telecommunication/converged services to achieve international best practice and to maximize the benefit of the spectrum.
- ii. Digital Switch over Policy, Plan and Cut over timelines to be determined through close collaboration of the Ministry of Information and Broadcasting (MoIB) and MoITT in consultation with other stakeholders.

3.7. Spectrum Assignment

- i. Spectrum will be assigned in a manner that recognizes the value of the spectrum to the prospective licensee and to the economy as a whole, and in a manner that is consistent with the Spectrum Strategy. Where spectrum is licensed, a fee will be charged based on the most appropriate of the following methods;
- ii. Through Telecom Policy – 2015, three unique modes of spectrum assignments shall continue to prevail for future assignments;
 - a. **Auctions** will be the preferred method of assigning access rights to blocks of spectrum for dedicated use. To the extent possible, these will be technology neutral and include coverage in minimum time frame and quality of service obligations in the license to

maximize public benefit. Where a band is to be shared between users and/or applications, blocks of spectrum will be created that reflect these joint uses.

- b. **Administrative Incentive Pricing (AIP)** reflects the opportunity cost of spectrum to encourage efficient use of spectrum and will be introduced for congested spectrum that has not been subject to an auction, for example microwave spectrum. AIP improves the efficient use of spectrum by setting the price for spectrum at a level that encourages the user to consider alternatives and encourages spectrum use to move to the highest value application.
 - c. **Administrative Cost Recovery (ACR)** will be adopted where auctions and AIP are inappropriate, for example in aeronautical, maritime and amateur radio bands. The fee will be set to reflect the costs incurred in administering spectrum in the band from which frequency is to be assigned. This approach will be applied to spectrum that is not congested and where the risk of interference is low.
- iii. There may be instances where following an auction, one or more licensee may require further spectrum to meet demand for its services. Such demand may, in principle, be fulfilled by further planned spectrum auctions of additional spectrum. In this regard, PTA will propose policy recommendations to the Federal Government for the release of further spectrum where available to licensees that have already been assigned spectrum through a legitimate mechanism previously. In doing so, PTA in consultation with FAB, will take account of the availability of relevant spectrum, plans for further planned release of spectrum, the terms and benchmarks of the original auction where applicable and the licenses to which the spectrum will be assigned. The further assignment of spectrum will be fair and will ensure that it does not discriminate against other licensees.
- iv. The ASAF will continue as defined in Section 4.4 and Appendix B of the 2004 Mobile Cellular Policy till AIP is introduced consequent to this policy. The fee structure will be redefined by the PTA to include additional spectrum assigned to mobile services. The ASAF will not be charged on spectrum assignments subject to ACR. The ASAF will be taken into account in determining any AIP price. The ASAF will be replaced by AIP, when AIP payments cover at least FAB budget requirements that are currently funded through the ASAF. The determination of the budgetary elements covered by the ASAF till the time it exists, will be fair to all spectrum users and will not discriminate between them. Therefore, a cost allocation study will be conducted by PTA for the purpose of allocating the costs of the FAB Budget to various types of spectrum assignees.

- a. Any methods of assigning and pricing spectrum used will be consistent with the following principles;
- b. Be in accordance with Pakistan Table of Frequency Allocations;
- c. Be fair, transparent and non-discriminatory;
- d. Encourage fair competition where appropriate;
- e. Establish a fee which is economically justified when balanced with the investment;
- f. Take account of any roll-out obligations specified;
- g. Be simple to execute;
- h. Discourage collusion and predatory behavior.
- v. The PTA will propose to Federal Government the methods of assigning and pricing frequency spectrum after consultation with stakeholders.
- vi. These methods will apply to all assignments, including those for telecommunications, broadcast and for any other use of spectrum to avoid discrimination between prospective spectrum users.

3.8. Spectrum for Digital Microwave Communication

- i. Spectrum will be allocated for digital microwave communication to provide backhaul for fixed and mobile services. The roll out of future technologies, in the absence of fiber, is likely to create a bottleneck in backhaul. With this in view, and before the bottleneck arises, the microwave spectrum will henceforth be allocated, assigned and charged for to licensees and other users through Administrative Incentive Pricing mechanism to ensure rational use of spectrum for the purpose.
- ii. Digital microwave spectrum may be used by the licensees for any point-point application including access to customers as long as they are licensed for the service. For example, it can be used by a LL/ LDI licensee to connect to a customer site.

3.9. Continuing Spectrum Rights & Obligations

- i. LDI licensees will continue to be entitled to radio spectrum (where available) for point-to-point and/or backbone links, within the parameters of their licenses, on payment of spectrum charges to PTA.

- ii. LL licensees will continue to be entitled to radio spectrum for WLL systems, and also spectrum for point-to-point links, within the parameters of their licenses, on payment of spectrum charges as specified in this policy.
- iii. LL and LDI licensees that receive spectrum will continue to be required to meet defined usage milestones, failing which they will be required to relinquish their rights to use the assigned spectrum.

3.10. Relinquished Spectrum Rights

- i. Licensees will relinquish rights to spectrum that is no longer needed for their operations. Un-used assigned spectrum will be withdrawn if a licensee fails to begin operations within eighteen months of award.

3.11. License Renewal Where the License Includes Spectrum Assignments

- i. Renewal of license and associated spectrum at the end of a license period will be as per the policy of the Government. PTA will in a timely manner initiate the process in accordance with terms and conditions of the license.
- ii. In case of renewal of licenses, PTA will make recommendations to Federal Government within the timelines stipulated in the respective licenses.
- iii. Other spectrum not subject to license renewal terms will be priced in accordance with the applicable spectrum pricing method specified in Section 3.7.
- iv. Where separate payments for microwave and mobile spectrum have been introduced subsequent to the initial assignment of mobile spectrum, the spectrum fees associated with the mobile spectrum will be determined under the terms of the applicable license. Any microwave spectrum will then be charged using the AIP method in place.

3.12. Introduction of AIP for Microwave Spectrum Assignments

- i. AIP will be introduced for microwave spectrum assignments. In the past microwave spectrum for backhauling purposes was assigned to operators in line with Federal Government policies based on the market conditions prevailing at that time. It has been observed that operators are requesting additional spectrum for backhaul transmission instead of utilizing alternate means or utilizing their existing assignments more efficiently. There is a need to introduce an appropriate charging mechanism for the microwave spectrum assignments in order to ensure efficient and economical use of the scarce resource as per international best practices. The existing licenses will be modified accordingly.

- ii. Therefore, PTA will establish a regulatory framework for the introduction of AIP for microwave spectrum for new and existing assignments. Practice hitherto has been to bundle microwave spectrum used for backhaul from base stations with spectrum for fixed and mobile access in a single license fee payment. The introduction of AIP will require payments for microwave spectrum to be made separately. This unbundling of the fee structure will improve the efficiency with which licensees use microwave spectrum. It is not intended to increase the fees paid overall by licensees for spectrum already acquired. Hence, the framework for the introduction of AIP for microwave spectrum will;
 - a. Estimate the value of microwave spectrum on an AIP basis taking account of other means, including fiber, of providing backhaul.
 - b. Allow for a phased introduction of AIP that recognizes that licensees will need time to review and revise their use of microwave spectrum, implement alternative methods of providing backhaul and recognizes also the investment that has been made in microwave equipment.
 - c. Encourage the implementation of alternative methods of providing backhaul and increased efficiency in the use of microwave spectrum.
 - d. Enable operators that keep up with the phased introduction of AIP not to increase the overall cost of backhaul.
- iii. PTA will consult stakeholders on the framework for AIP prior to its approval by the Federal Government.

3.13. Unlicensed Access

- i. License-exempt spectrum may continue to be used for fixed access and backhaul by LL and CVAS licensees, subject to any restrictions imposed by PTA in line with international best practices and standards.
- ii. License-exempt spectrum will be made available in a manner consistent with ITU -R Radio Regulations. Devices will be type approved, conform to international standards or those published by PTA and access will be on a non-interference and non-protection basis.

3.14. Test and Development Licenses

- i. Temporary Test and Development Licenses will be issued by PTA, as appropriate. The industry and other eligible organizations will be able to test and develop new services by the assignment of spectrum with specific conditions of use for research, development,

testing and demonstration activities and that such licenses will be made available within three months of application.

- ii. PTA will prepare a framework for test and development licenses including criteria for the provision of licenses, license conditions, the duration of the licenses, the terms and conditions of reissuing the licenses on expiry. PTA will consult stakeholders on the framework and then finalize the test and development framework to enable eligible organizations to acquire such licenses. PTA will forward the applications to FAB for allocation of suitable frequency band for any such request as per procedure in vogue. In defining the requirements for an organization to be eligible, PTA will consider the following types of organizations; telecommunications licensees, equipment manufacturers and research & development organizations, in order to encourage the highest level of technology and application innovation in Pakistan as possible.

3.15. Spectrum Trading

- i. The purpose of spectrum trading is to allow markets to determine the best use of spectrum.
- ii. Spectrum trading will be permitted under specific conditions. Spectrum trading occurs through the outright sale of the rights and obligations or term lease, subject to license conditions and approval by PTA under intimation to FAB.
- iii. A spectrum trading framework will be developed by the PTA and FAB, and will be subject to policy level approval by Federal Government. Factors like spectrum capping shall be considered while developing such framework.
- iv. In relation to trading, the seller will be expected to pay a Trading Fee. A Processing Fee and any other applicable fee will be levied to cover re-issuing of licenses.
- v. The decision to trade is a commercial decision for the license holder. The terms of the trade will be a commercial agreement between licensees.
- vi. Spectrum will be traded only if the relevant license that contains the spectrum assignment to be traded, permits trading. Spectrum assigned to a licensee without such a permit will not be traded unless Federal Government specifically authorizes the trade as being in the public interest.

- vii. Nevertheless, spectrum trading will be permitted only for spectrum that has been acquired through a pricing arrangement that represents its market value (i.e. auction or AIP). Spectrum subject to Administrative Cost Recovery or other forms of nominal pricing will not be traded.
- viii. Spectrum may be traded between holders of the same license type only. For example, spectrum trading may take place between LL licensees or mobile licensees but not between an LL licensee and a mobile licensee to maintain the basic value of the different categories of spectrum. Spectrum will not be traded by any licensee with the necessary license conditions until the licensee has fulfilled its payment and roll out obligations unless it also transfers its roll out obligations with the trade and same is verified and authorized by PTA. The eligibility for receiving spectrum through a trade will be the same as the eligibility for assignment of spectrum by FAB. The acquirer of spectrum will be required to obtain (or already hold) the appropriate telecommunications license and to meet the terms of that license.
- ix. The framework for spectrum trading will take into account the effects of such trading on competition, national security, public health and safety, compliance with the national laws and policies and compliance with international obligations and international relations.
- x. Swapping of spectrum will be considered as a two-way spectrum trade subject to approval by PTA and FAB.

3.16. Spectrum Sharing

- i. Spectrum may be shared between any licensees with the necessary license conditions to enable the sharing.
- ii. A spectrum sharing framework will be developed by PTA in consultation with FAB and stakeholders and will be subject to policy level approval by Federal Government.
- iii. The applicant licensees will be required to jointly inform PTA and FAB regarding intended sharing. PTA in consultation with FAB will determine whether the sharing is to be permitted taking into account its effect on competition, national security, compliance with national laws and policies and compliance with international obligations and international relations.
- iv. Spectrum will not be traded by any licensee with the necessary license conditions until the licensee has fulfilled its payment obligations to Government of Pakistan. Permission to

share spectrum will not absolve the assigned licensee from any roll out and payment obligations that are conditions of its license or imposed by regulations.

3.17. Future Xth-Generation Spectrum

- i. Following the ITU-T and 3GPP recommendations and in order to enable the next generation wireless broadband technologies, PTA in co-ordination with FAB to make available the frequency bands for timely adoption of emerging next generation cellular technologies to be commercially launched within six months of the approval of the policy. In this regard a comprehensive framework for X-Generation frequencies to be finalized by Q3 – 2021 to enable the commercial launch of next generations services in 2022.

3.18. Small and Mid-sized Enterprises (SMEs) Scale Up

- i. Small and mid-size enterprises (SMEs) are considered to be the heartbeat of emerging & developing economies such as Pakistan.
- ii. The importance of small and mid-size enterprises (SMEs) is not limited to emerging nations only. Between 2002 and 2012, small and mid-size enterprises (SMEs) created 77% of new jobs in Canada, nearly the same percentage as in most emerging economies. These companies are vastly important to the country's economic growth, both in terms of creating jobs and generating tax revenues. The same is true in the Pakistan, where small businesses accounted to a greater extent for new jobs creation.
- iii. Governments recognize the importance of small and mid-size enterprises (SMEs) contribution in the economy and regularly offer incentives, including favorable tax treatment and better access to loans, to help keep them in business.
- iv. In Telecom sector, for Small and mid-size enterprises business at least two free band spectrums shall be allocated for prompt readiness of business connectivity that enables high-speed broadband deployment promptly.
- v. In this regard PTA and FAB in co-ordination with MOITT will develop a complete framework within Q4 2021 to be available for SME's.
- vi. In addition to SME's, these free bands shall be usable for Internet of Things (IoT), smart cities, smart education, smart health and safe city projects all over Pakistan under first pillar of Policy initiative, apart from incoming X-generation Cellular sites back end connectivity where no high throughput and capacity alternate is available for front & back haul.

3.19. Mergers & Acquisitions

- i. On merger or acquisition of a company with spectrum assigned under its telecommunications license, spectrum and license rights and obligations of licenses will be transferable to the merged or acquiring organization. Where Mergers and Acquisitions are concerned, access to spectrum, and the associated license, is a critical asset of companies that rely on wireless communications.
- ii. Whether a merger or acquisition should be allowed to proceed is a competition matter which is outside the jurisdiction of spectrum management, and legitimate mergers should not be impeded by inability to transfer spectrum licenses. Therefore, except where there are overriding technical reasons, or reasons arising out of the national interest, the spectrum rights and obligations of licenses will be transferable to the merged or acquiring organization. PTA are to intimate FAB of any merger/ acquisition.
- iii. Mergers and acquisitions will be allowed subject to paragraph 3.17.1 and subject to having met all license obligations including payment and roll out obligations.

3.20. Interference Protection

- i. Complaints and enforcement: License holders expect the swift resolution of interference issues, which is essential for well managed spectrum. FAB is responsible for investigating interference complaints and the PTA is responsible for undertaking enforcement actions. PTA will attempt to resolve interference issues notified to them within 30 days of notification.

Right of Ways

The deployment of telecommunications infrastructure has a wide range of potential negative impacts on the environment and public safety, e.g., noise, public amenity, radiation. In addition, the construction process may also involve considerable disruption to day to day activities, for example road closures. It is therefore understandable that infrastructure deployment projects are subject to a range of necessary approvals to ensure that the environment and public safety is protected and disruption keep to a minimum.

Right of Ways is an essential factor in gauging a country's ability for providing an enabling environment for "Ease of Doing Business" and therefore it shall be given due importance through policy provisions and effective implementations.

Policy Action#4

- 4.1. As mandated under section 27-A of the Pakistan Telecommunication (Reorganization) Act 1996, a coordinated and effective mechanism will be developed for expeditious implementation of Right of Ways in accordance with the "Public & Private Right of Way Policy Directives" issued in January, 2021.
- 4.2. For the ease of doing business the said policy directive shall govern swift deployment of digital infrastructure nationwide.
- 4.3. All civil infrastructure development organizations under the control of appropriate Governments and private sector developers, shall ensure the availability or provision of telecom service corridors for installation of telecom infrastructure or cables in all new lands (towns or societies) development, railways, roads or highways, buildings, and electric distribution poles.
- 4.4. Private housing societies shall be bound through their bye-laws, at the time of their establishment, for the provision of Common Service Corridor while awarding them NOC by the appropriate Government.
- 4.5. All new housing societies shall be encouraged to build telecom ducting infrastructure at the time of development as is outlined in the RoW policy directive 2021 to be utilized by any telecommunication licensee.
- 4.6. PTA shall take necessary measures for timely implementation of the directives including but not limited to;

- a. The public authority shall not impose any conditions on a licensee that are discriminatory, anti-competitive, and will not give any preferential treatment to any licensee.
- b. The public authority can charge the licensee for expenses as prescribed in its schedule rates, for rehabilitation or reinstatement of any damages to roads and other infrastructure by the licensee. In case licensee, at its own costs, undertakes the rehabilitation or reinstatement work to the satisfaction of public authority within the prescribed time frame, no such charges will be payable by the licensee to public authority.
- c. The licensees can use the poles of government and privately owned electricity distribution and supply companies (*DISCOs*) for aerial installation of optical fiber cables at the prescribed rent fixed by the Government of Pakistan in pursuance of the decision of Inter-Provincial Coordination Committee (IPCC) and approved by WAPDA vide Notification No. 1507-34 GMCSrrariffT-62/voc-IV dated 3 November 2004.
- d. Licensees using electricity Distribution Company's poles and paying approved tariff to DISCOs shall not be required to pay any additional NOC and/or permission fee to the society or owner of the area in which the poles are located.
- e. The licensees installing BTS towers shall pay such reasonable amount by civic bodies to the owner of the high rise buildings and charges to housing societies for the installation of BTS towers including telecommunication network and no other charges shall be payable by the licensee to the public authority or the housing society for BTS towers installed on rooftops of commercial buildings or ground, whether public or private property.
- f. The private housing societies, public or private industrial estates, public or private multi-dwelling units, high rise buildings, apartment complexes shall be required to follow the above policy directives and public authorities shall be required to incorporate these clauses in the NOCs of their building and town plans. The public authorities issuing NOCs or approval plans shall be responsible for compliance of this policy directive from the private entities operating in their respective jurisdictions. However, the right of denial, only to the owner of house or property, may be allowed in such circumstances, where alternate is available. Public or private multi-dwelling

units, high rise buildings, flats, and apartment complexes shall not charge any fee for the installation of optical fiber cables within buildings except fair and non-discriminatory rental of actual space occupied by the fiber cables and cabinets in cable risers, service corridors and basement utility rooms.

- g. Once right of way granted and fee and other terms agreed, the owner of Private Right of Way or the public authority shall not unilaterally change or alter the terms and conditions of right of way permission for the licensees.
 - h. Any intentional obstruction to the course of business of the licensee for telecommunication network installation, operations and maintenance, coercive shut down of BTS towers, cutting of cables, etc. by the Public Authority or owner of Private right of way, after the grant of right of way and up to date payment of all fees by the licensee, shall be treated as an offence under Section 31 of Act.
- 4.7. For any disputes arising for the issues concerning right of way shall be dealt in accordance with the directives issued vide “Public & Private Right of Way Policy Directive” guidelines. Any change/amendment enacted by the Ministry from time to time regarding the said policy directive shall be implemented by the Authority.
- 4.8. All civic bodies shall lay down a fast track or one window operation for receiving applications for granting permission of right of way to the respective telecommunication license holders in light of the mechanism, documentation framed, formed and finalized under this directive. A revised application procedure needs to be devised within one month from the date of issuance of this policy directive. Timelines given in section 27 A of the Act shall be strictly complied with.
- 4.9. For the efficient implementation of the directive above, PTA in consultation with stakeholders shall plan, procure, install, integrate and commission an integrated “Right of Ways Information Management System (RoW-IMS)” consisting of the following attributes;
- i. Online application mechanism.
 - ii. Automated identification of route/building and any other facility via Geographic Information System (GIS).

- iii. Identification of available Optic Fiber Cable resources on the requested (to be organized via Data for Development Program).
 - iv. Identification of Authority responsible for processing the ROW request.
 - v. Automated application submission (along with necessary supporting documents) to the concerned authority.
 - vi. Online payment system for submitting fees to respective Authority.
 - vii. Application Tracking System.
 - viii. Application Escalation System.
 - ix. Application Approval and Permit/NOC Issuance System.
 - x. Standards and Specifications, Rules and Guidelines compliance system for handling of RoWs.
 - xi. Project Tracking and Complain Management System.
 - xii. Dispute Resolution System.
- 4.10. With the help of Data for Development Program, PTA shall retain an updated and real-time register/record of all the infrastructure already laid along with their locations and system configurations which may help in efficient processing of Right of Ways and sharing of resources in line with National Broadband Network 2.0 explained earlier.
- 4.11. PTA shall oblige all licensees through necessary amendments in the license requisites for documenting, reporting and updating data for the infrastructure laid in RoW-IMS for maximizing investments by improving the cost of doing business.
- 4.12. PTA shall identify and facilitate relevant Agencies and Authorities responsible for issuing of RoW NOC/permit through awareness programs and subsequent onboarding on RoW-IMS in a staggered manner.

Pakistan Telecommunication Company Limited (PTCL) as Incumbent Operator

The incumbent operator had a significant role in successful deregulation of the sector. Although the state of market development and the status of basic infrastructure and competition in the market differs immensely from the last decade, there still remain some avenues where certain elements of previously applied obligations on the incumbent have to be carried forward until the formulation and implementation of Competition Rules.

Policy Directive#5

- 5.1. PTCL will continue to offer non-discriminatory shared access to its last mile infrastructure with related co-location space for service providers to install their own exchange side broadband equipment in PTCL's exchanges. Access to copper and related co-location space will be at cost oriented wholesale rates. PTA will monitor the shared access for fair competition.
- 5.2. PTCL will continue to provide backhaul services to licensed telecommunications service providers from its local exchange to the service provider's Point of Presence at wholesale rates.
- 5.3. PTCL's backhaul services and service provisioning will be subject to service level agreements between the parties.
- 5.4. PTCL will have sufficient dedicated staff for the facilitation of access to its exchanges to ensure speedy provisioning of services as per the timelines agreed with PTA.
- 5.5. PTA will monitor the services and tariffs provided under Paras 5.1 to 5.2 to ensure fair and non-discriminatory behavior on behalf of the incumbent.

Role of Universal Services & Community Based Broadband Networks

Universal Service Fund (USF) continues to play a pivotal role in connecting remote communities in an expedient manner and has furthered their bid for bridging the digital divide through Broadband for Sustainable Development Program.

Since its inception, USF has deployed more than 1,587 NGMS sites and has laid more than 9,773 km of Optic Fiber Cable for providing equal access to broadband internet services covering more than 146 town/tehsils to marginalized section of the society. USF continues to improve the accessibility of underserved areas with an aim to curb the digital divide even in the most challenged areas of the country.

Policy Action#6

6.1. USF focus

- i. The established USF policy will continue, funded at its present level, and will focus on;
 - a. Making available affordable voice telephony and broadband access in unserved and under-served areas so as to meet an overall goal of providing services to such segments of the population.
 - b. Community Broadband Services that provide telephony and broadband access to the Internet in general and government services in particular.
 - c. Broadband access to education, health, and other institutions in USF Contract Areas sufficient to meet the need of the user community within the institution.
- ii. The USF will not cover areas that are or will be covered by roll out obligations on particular licensees.
- iii. Mechanism shall be developed by USF within six (6) months from the ratification of this policy for effective utilization of the deployed fiber in unserved and underserved areas.
- iv. In accordance with the Amendment in clause 33B of the Telecommunication Re-organization Act 1996 (XVII of 1996) via Presidential Ordinance No. XIV of 2020, USF shall continue to offer its services for;
 - a. providing access to people in the unserved, underserved, rural and remote areas of the country

6.2. USF funding

- i. Contributions for the USF will be collected from a percentage of licensed operators' revenues (the USF Contribution), and may be collected from other sources, as specified in the Telecommunications Act and USF Rules made there under.
- ii. The USF Contribution will be limited to a maximum of 1.5% of a licensee's gross revenue minus inter-operator payments and PTA/FAB mandated payments. In addition to this the Access Promotion Contribution (APC), as applicable from time to time, and any other source of funding.

6.3. Use of the USF

- i. Funds will be provided for capital expenditure and for operating expenditure associated with the provision of services in a Contract Area for a specified, limited start-up period during which

the USF Contractor implements its infrastructure and grows its customer base and provides the USF Services. Funding beyond that period will not be available, since the contractor is assumed to have factored in the risk of failure when constructing its offer.

- ii. The USF will also be used to fund the development and delivery of services, infrastructure or other related items, through the Special Projects mechanism.
- iii. There should be a presumption in favor of the use of fiber over microwave in backhaul and fiber over copper in wireline access to meet growing fixed and mobile broadband requirements.

6.4. Eligibility for Applying for USF Contracts

- i. All licensed operators that contribute to USF will be eligible to apply for all Universal Service Fund contracts, subject to having met all license obligations including payment and roll out obligations.
- ii. No restrictions will be placed on eligibility arising from success in earlier auctions. Competition issues that may arise will be resolved using the Competition Rules introduced in this Policy by the Federal Government. Consortia are allowed to bid for USF contracts, provided the specific requirements are met.

6.5. USF Services

- i. The Services falling under scope of USF will include the following retail services;
 - a. Telephone services to local, national, mobile, toll free, premium rate and international numbers, including facilities for incoming calls from all sources, accessed from public access points as well as private lines.
 - b. Access to emergency services (as under voice licenses).
 - c. Broadband Internet access.
 - d. E-mail, fax and other related services.
 - e. Telecentres, including the equipment, buildings and other capex and OPEX associated with the Telecentre itself.
 - f. Broadband Internet access to support multiple terminals at telecentres at speeds consistent with the size of the concurrent user base.

- g. In case of special projects, narrowband and broadband wireline access to specified institutions such as educational and health care institutions with suitable capacity for the size and characteristics of the user base. These institutions may be provided with fiber access.
- ii. The USF Services will include the following wholesale services to be offered after the start of the supply of the Supported Services according to a timetable specified and approved by the USF Board.
 - a. Multi-Megabit and multi-Gigabit fiber based transit and backhaul services within the USF Contract Area.
 - b. Wholesale narrowband and broadband wireline access (e.g. Local loop unbundling, wholesale line rental, bit stream over copper or fiber) and shared narrowband and broadband wireless access.
 - c. Wholesale narrowband and broadband wireline access services for organizations provided over fiber to the premises.
- iii. The purpose of requiring the provision of wholesale services is to ensure that all licensees that contribute to the USF may also benefit from the extension of coverage that it provides.
- iv. These wholesale services will be provided in a fair and non-discriminatory manner consistent with the Competition Rules.
- v. PTA will set the wholesale tariffs that will be applied to the Wholesale Services in the USF Contract Area in order to ensure that operators that provide retail services may make a reasonable profit. These wholesale tariffs would be set at levels prevalent in the remaining areas of Pakistan.
- vi. Any operator that provides services in a USF Contract Area will be required to do so under the tariff plan that it applies anywhere in Pakistan.
- vii. Any operator that provides services in a USF Contract Area will be required to provide services to the same overall quality as is available elsewhere in Pakistan. This quality obligation includes telecommunications services, customer services and billing services.
- viii. The Competition Rules will apply to Contract Areas. Under these Rules, a separate geographic market may be defined for a Contract Area if conditions in the Contract Area are sufficiently different from conditions elsewhere in Pakistan.

6.6. Rolling Program

- i. The USF Company will maintain a rolling program of USF projects. The program will provide a prioritized list of projects in areas that require USF intervention (Contract Areas) and the anticipated dates when the Contract Areas will be tendered. The program will be published annually and will cover the three subsequent years starting on or shortly after the date of publication. In this way, the sector will be able to anticipate tendering opportunities and will be given at least two years visibility of the USF program. Each annual update will extend the rolling program by a year, and specify any updates to the program for the overlapping period.
- ii. The USF Company will implement the rolling program following a consultation with stakeholders.

6.7. USF Contract Area

- i. A USF Contract Area will have the following characteristics.
 - a. It is currently an unserved or underserved populated area.
 - b. It is suffering Market Failure associated with the supply of telecommunications services and this Market Failure is likely to endure.
 - c. It is not within the roll out obligation of any licensee.
- ii. The USF Company will maintain a list of such areas and, accordingly, prioritize them in the rolling program for subsequent tendering in a transparent and reasonable manner.

6.8. Market Failure

- i. An area of the country that is experiencing Market Failure is one where a hypothetical telecommunications operator which is extending its footprint in order to provide the USF services are unable to make a normal profit over a typical planning period, assuming reasonable projections of demand, incremental costs of extending the business, no common costs, and typical sector values for cost of capital and discount rate.
- ii. The estimate of the loss made by the hypothetical operator can be used in the determination of any maximum subsidy to be offered.

6.9. Services Facilitation by USF

- i. USF contractors will also facilitate and provide access to services and applications particularly to enable expanded use of next generation telecom access by the people of underserved and unserved areas. These may include services relating to;
 - a. e/m Government

- b. e/m Commerce
 - c. e/m Banking
 - d. e/m Payments
 - e. e/m Health
 - f. e/m Agriculture
 - g. e/m Education/Learning
 - h. Other ICT services (based on Federal Government IT Policy)
- ii. USF projects where so desired will include provisioning of these services in the scope of work for the relevant projects announced by the USF company.

6.10. Community Broadband Services

- i. USF contractors will provide community broadband services in areas with low income to enable access to telecommunications and over the top services, including e-Government services and applications that serve developmental needs, without the need to purchase handsets or other devices. This will ensure access to applications and services developed under this policy as well as similar applications that may be available from other sources.

Satellite Communication Networks

With the changing role of satellite in the provision of broadband service, and in anticipation of new broadband satellite systems, there are important policy challenges to be considered. As satellite based broadband services continues to evolve and economize, it presents a new array of opportunities for policy makers and regulators to provide an enabling environment for improving accessibility and inclusion especially in rural and remote areas nationwide.

For achieving desirable results in relation with the National Broadband Targets considering that more than 60% of the population resides in rural areas, it is empirical to find the right combination of complementary technologies to bridge the digital divide. Satellite technology, fiber optic cables, and terrestrial microwave systems are not mutually exclusive, competing technologies, but together form the inventory to be used for the design, implementation and operation of broadband systems needs to be optimized from spectrum standpoint in light of international commitments.

Policy Action#7

7.1. Definitions

- i. The Satellite Services covered by this Policy are as defined in the Radio Regulations published by the International Telecommunications Union (ITU);
 - a. Fixed-Satellite Service (FSS): A radio-communication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radio-communication services.
 - b. Mobile-Satellite Service (MSS): A radio-communication service between mobile earth stations and one or more space stations, or between space stations used by this service; or between mobile earth stations by means of one or more space stations. This service may also include feeder links necessary for its operation.
 - c. Broadcasting-Satellite Service (BSS): A radio-communication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public.
- ii. An “earth station” is defined by the ITU as a station located either on the Earth’s surface or within the major portion of the earth’s atmosphere and intended for communication with one or more space stations; or with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.
- iii. In this Policy, the term “Earth Station” is to be distinguished from the term “Gateway Earth Station”. The term “Gateway Earth Station” is used for an earth station that acts as a gateway to a public network. Any earth station used for access is termed as a Terminal Earth Station.

7.2. Satellite Service Provision

- i. Satellite based telecommunication services can be provided by any foreign or domestic satellite operator through a satellite service provider duly licensed by PTA.
- ii. A satellite service provider is an entity that provides satellite based telecommunication services.
- iii. The satellite service provider will satisfy the licensing requirements specified by PTA for the provision of such services before providing the same to its customers.

- iv. The satellite service provider will not be required to establish a local gateway to provide telecommunication access service within the geographic bounds of Pakistan by satellite unless adequate lawful interception cannot otherwise be established subject to any specific requirements.
- v. Satellite based telecommunication services will not include DTH distribution service.

7.3. Access to Electromagnetic Spectrum

- i. Access to spectrum and associated orbital resources for satellite services will be managed by FAB in accordance with the applicable ITU-R Radio Regulations, Recommendations and Pakistan Table of Frequency Allocations while keeping in view the protection of existing services/ users to the extent possible with minimum chances of harmful interference.

7.4. Access to Space Segment Capacity

- i. Radio transmissions from earth stations have the potential to cause harmful interference to communication satellite systems. The Government of Pakistan has obligations under international ITU Radio Regulations to avoid causing such harmful interference.
- ii. Satellite terminal equipment must conform to the relevant ITU guidelines and recommendations.
- iii. Satellite service providers will be required to register their Earth Stations with PTA prior to installation.
- iv. All relevant technical details of earth stations will be shared with PTA. The same information will be used by FAB for interference mitigation, if reported by foreign or the national satellite operators.

7.5. Satellite based Telecommunication Service Licensing and General Provisions

- i. The present rights and obligations specified in the LDI, LL and infrastructure licenses associated with the installation and use of satellite networks will continue to apply.
- ii. Local entities that currently operate without any of the above mentioned licenses or in future intend to market bandwidth or services of satellite to corporate or other customers may do so after acquiring a satellite services class license. This category of CVAS will be duly introduced by PTA in pursuance to this policy. USF contribution provisions will also be applied to such licensees in line with other licensees eligible to provide such services. Licensees will be required to register the VSAT network with PTA.
- iii. VSAT or other Terminal Earth Station may be used to provide fixed access to public telecommunication networks as per following framework;

- a. Any LL licensee may use VSAT, etc. services in such a manner under its license having first registered the service with PTA in accordance with their license.
 - b. A class licensee may use VSAT, etc. services in such a manner through satellite service provider to provide narrowband and broadband access. The holder of a license that allows the provision of a public telephony service may use VSAT, etc. services in such a manner as to provide such public telephony services.
 - c. Licensees that use VSAT, etc. services to provide fixed access to public telecommunication networks will be required to use an LDI licensee for the provision of national and international transit services.
- iv. VSAT services are used to provide point to point transmission nationally or internationally.
- a. Any LDI, Infrastructure or CVAS licensee may use VSAT services in such a manner under its license having first registered this use with PTA.
 - b. An LL licensee may use VSAT, etc. services in this manner with in its geographic area having first registered this use with PTA.
- v. **Mobile Satellite Services**
- a. Except where noted below, the operation of a terminal in a Mobile Satellite Service will require authorization from the PTA. Satellite terminals that operate in Mobile Satellite service must conform to relevant technical standards which will be specified and made available on the PTA website.
 - b. For remote unserved and underserved areas which fall under the mandate of USF shall be encouraged for provisioning of Broadband Services using local satellite infrastructure. In this regard, USF is required to devise/include instruments in tendering process and contractual obligations while allocating contracts under its mandate.
- vi. **General Licensing Provisions for GMPCS**
- a. The use of mobile terminals for Global Mobile Personal Communications by Satellite (GMPCS) will not require a specific end user license where the service is provided either by a local service provider or on a roaming basis by 'recognized' providers of GMPCS Services. For the purposes of this policy a 'recognized' provider will be one that is registered with PTA.
 - b. The local service provider will need to obtain a class license in the category to be set up by PTA for the provision of GMPCS services, unless it holds a mobile license. A mobile operator

will inform PTA on the introduction of a GMPCS service. Whether the local service provider is providing services using a domestic satellite network or one owned by a foreign entity, it will be a provision of the class license that information concerning traffic originating in, or routed to, Pakistan are made available to PTA and that provision of lawful interception of such traffic will be mandatory.

vii. **Roaming GMPCS Terminals**

- a. Use of GMPCS terminals on a roaming basis is subject to provisions being in place with the respective GMPCS operators to provide data concerning traffic originating in, or routed to, Pakistan. A list of such 'recognized' operators will be made available on the PTA website. The PTA website will provide guidance for GMPCS operators to ensure they are included on this list.
- b. Prior to entering Pakistan it will be the responsibility of the individual user of the GMPCS terminal to register their intent to bring a GMPCS terminal into the country. A web based registration process will be established by the PTA to facilitate this. Where a GMPCS operator is not included on the list of 'recognized' operators the use of a GMPCS terminal will not be permitted.
- c. Unregistered GMPCS operators shall not be authorized to bring GMPCS terminals in the country.

viii. **Aeronautical Terminals**

- a. Aeronautical terminals will require a license/NOC from the PTA for operation while in Pakistan's Airspace. The license/NOC will set out the conditions of use for the Aeronautical Terminal.

ix. **Earth Stations on Vessels (ESV)**

- a. Earth Stations on Pakistan registered vessels operate under the regulations set out by the ITU or other recognized international standards body. NOC with appropriate conditions, issued by the PTA, will be required for the use of terminals on foreign registered vessels within the territorial waters of Pakistan.
- b. Where an ESV operator is required to coordinate the use of the terminal with Pakistan, as determined under the relevant sections of the ITU-R Radio Regulations or other recognized international standards body, FAB will be the point of contact.
- c. PTA will develop and publish processes and requirements relating to registration and granting permission for the use of equipment and services, and licensing of satellite based telecommunication services.

7.6. Satellite Service and Satellite System Spectrum Fees

- i. Satellite related spectrum fee will be calculated on an Administrative Cost Recovery Basis. The schedule of licensing fees will be published on the PTA website.
- ii. PTA will review and update Satellite related spectrum fees periodically to ensure they are consistent with international best practice as well as the efficient and effective use of spectrum resources as required by this policy. PTA will consult with stakeholders before significant changes to the license fee arrangements are made.

7.7. Satellite Terminal Equipment Standards

- i. To protect adjacent satellites and terrestrial services, satellite terminal equipment used in earth stations will be regulated by technical standards published by PTA. A technical standard will prescribe the minimum technical requirements to be fulfilled by the satellite terminal equipment intended for sale and use in Pakistan. These requirements will conform to the relevant requirements published by the ITU or other recognized international standards body for satellite earth stations and to the extent possible will be based on existing international equipment standards.

7.8. Installation Standards

- i. The operator of an Earth Station or Terminal will be responsible for ensuring that the installation adheres to international best practices to avoid interference with other services and appropriate health and safety standards.

7.9. Publicly Available Information

- i. Information relating to the operation of satellite systems, licensing processes, charging mechanisms, standards, complaints procedures and public consultations will be made available publicly through the PTA website.

7.10. PTA in consultation with FAB and other stakeholders and in line with the decisions of ITU-WRC19 shall conduct a study for the most optimum use of C-Band and other identified bands on the following grounds;

- i. The social and economic impact of using C-Band for satellite and/or IMT-2020 - a comparison.
- ii. The opportunity cost associated with the migration of C-Band and other identified bands from satellite services to IMT-2020 services.
- iii. The technological roadmap of C-Band and other identified bands for satellite and IMT-2020 based services.

- iv. Identification of potential new bands for tenancy of legacy services in line with the agenda of WRC-2023.
 - v. Types of services being offered and the number of licensed/registered operators using C-Band and other identified bands for service delivery.
 - vi. Possible avenues for co-existence of legacy services in C-band and other identified bands.
- 7.11. The outcomes of the study shall be furnished for the review of Spectrum Allocation and Refarming Working Group {refer 3.1(iii)} and the working group shall furnish its recommendations for further consideration of MoITT.
- 7.12. The Ministry may endorse the recommendations and it shall be made part of Spectrum Allocation and Refarming Plan (or Rolling Spectrum Strategy) for further implementation.
- 7.13. PTA in consultation with FAB shall issue a list of available spectrum blocks, their potential use and fee schedule for the bands available for different types of satellite services.
- 7.14. USF shall formulate a plan for using satellite based broadband for backhaul and direct access in challenged terrains for the inclusion of remote communities where installation of NGMS and/or other fixed services are not possible for embracing National Broadband Targets.
- 7.15. For harnessing rapid development in broadband satellite technologies and services, the Ministry may organize a multi-stakeholder based “Satellite Management Working Group” which shall liaise with ITU, ITSO, APT, other inter-governmental organizations and international players and shall furnish its recommendations on atleast annual basis for the adoption of evolving policies, standards, facilitative frameworks, strategies, plans and other best practices associated with satellite ecosystem.
- 7.16. All other guidelines as laid out in Telecom Policy – 2015 and the rules and terms issued by PTA and FAB from time to time under the Telecommunication Re-organization Act 1996 shall continue to prevail.

Adoption of Smartphones & Other Internet Devices

Adoption of Smartphones/Smart Devices is an integral part of digital connectivity value chain. The realization of inclusivity is literally reflected through the adoption of smartphones and all other factors are supplementary. The journey of a user towards digitalization begins only with a smartphone ownership and that in itself is the biggest challenge for embracing digital inclusion for e-health/e-education.

In Pakistan, the smartphone adoption has picked up in the past two years due to reducing costs which is improving the rate of smartphone adoption in rural communities. However there is still a sizable gap to cover if Pakistan is to achieve the National Broadband Targets timely.

Policy Action#8

- 8.1. As per the guidelines given in National Broadband Targets under this policy, The Ministry of IT via stakeholder consultation may organize a sustainable “Smartphone for All Program” for the digital inclusion and awareness of youth, women and rural community through early smartphone adoption.
- 8.2. The objective of Smartphone for All Program shall be to improve the buying ability of target audience via installment based financing instruments.
- 8.3. For orchestrating preferential financing instruments, the Ministry may develop an alliance with continuing National Programs (such as; Kamyab Jawan and/or Ehsaas Program) aimed at socioeconomic development of the country for early realization.
- 8.4. Considering the importance of digital inclusion targets for long term social and economic gains that the country can achieve, the Ministry may even consider to rollout the program independently through other financing arrangements.
- 8.5. To formalize this action, PTA may issue rules and guidelines ensuring seamless functioning of the proposed system.

2nd Pillar – Usability & Optimization

2nd Pillar - Usability & Optimization

Until the purpose of using internet remains focused on entertainment and socializing, it is difficult to term internet as a utility. The necessity emerges only when the dependency of a user escalates and internet becomes a tool for resolving daily life issues. To achieve this and beyond the 2nd Pillar of the policy focuses on providing an enabling environment through open competition, service optimizations, indigenous research and innovation pertaining local issues, awareness and subsequent facilitative platforms.

Continuous evolution in digital platforms is increasing the demand for bandwidth and internet volumes, which is pushing policy makers to keep abreast with changing needs and to optimize online experiences. From simple social networking sites to integrated communities and from diverting streaming portals to life learning platforms are crafting knowledgeable societies through overarching services.

For achieving National objectives in a multifaceted and multilayered digital ecosystem, assistive policy measures can help in grasping new investments and collaborative models for public-private engagements creating a new wave of demand for affordable high-speed internet.

Licensing Framework

Converging platforms, sharing infrastructure, overarching technologies and service led competition has necessitated the need for reviewing and accordingly simplifying the licensing regime for allowing co-existence of conventional as well as unique services in a complimenting manner.

The modernization of licensing framework has a key role in uplifting the demand for internet use and to allow regulations consistent with international best practices and for promoting services based competition benefitting the user via industry facilitation at all times.

Policy Action#9

The current licensing regime shall continue to apply, however the interventions offered below shall be timely incorporated and embraced for improving the adoption and use of internet in a transparent manner.

- 9.1. The current licensing regime will continue to apply. Separate category in class licenses regime associated with satellite services will be introduced. However, PTA will conduct bi-annual assessment of market absorption capacity and any new licensing in LL, LDI and WLL sectors will be subject to such assessment.
- 9.2. The present licensing regime already distinguishes between those operators that provide infrastructure as well as services and those that provide services alone. Nevertheless, there is a need to further enhance and optimize the licensing regime to cater for emerging technological and market trends.

9.3. MoITT in consultation with PTA, will therefore review the licensing policy framework, keeping in view the market state at that time, the move to regulation through Competition Rules, changes in the technology used to provide services and consequential changes in the types of organizations that are telecommunications service providers. It is expected that this review will take place by 31st December 2021. Any proposed changes to the licensing regime will be made in consultation with the sector stakeholders and will be subject to approval by Federal Government.

9.4. Any new licensing regime will be based on international best practices. It will enable new services to be readily provided while meeting service specific requirements (including but not limited to quality of service, customer protection, content acceptability and national security) as they are defined. The licensing regime will continue rights and obligations associated with scarce resources and any obligations on network roll out.

9.5. In developing the new licensing regime inter alia the following should be taken into account;

- i. Section 20 of the Telecom Act, and in particular, which over-the-top services should be licensed under a “general authorization” in which a service provider is deemed to hold a license by virtue of the services that it provides and is then subject to the terms of that general authorization, which may include national security requirements.
- ii. Whether there should be a separation of spectrum and operations licensing.
- iii. The requirements for licensing of satellite services specified elsewhere in this Policy.
- iv. The requirements for licensing public Wi-Fi metropolitan area networks.
- v. The requirement for spectrum related licensing for non-public telecommunications use such as amateur radio, maritime and aviation uses.
- vi. In addition to the specific cases listed above, the extent to which telecommunications and content services require licensing.
- vii. Whether distinctions should be maintained between different license types, and if not, the implications of removing such distinctions including the rights and obligations of existing licensees that would need to be transitioned.

- viii. The method of licensing of those organizations that hold a broadcasting license to offer telecommunications services to ensure equivalent treatment of alternative infrastructure providers.
 - ix. The licensing of telecommunications licensees for the provision of broadcast media and/or distribution service, including the necessity of doing so given the evolving nature of TV.
- 9.6. A process for orderly transition in terms of rights and obligations of new and legacy licenses will form a part of the new licensing regime.
- 9.7. PTA will continue to prepare requisite license templates, information packages and other necessary measures with the approval of Federal Government, to facilitate the licensing process. Issuance of revised licenses would commence as soon as possible after the approval of the revised licensing regime by Federal Government.
- 9.8. This policy will be without prejudice to the purpose specific licenses given to Government/Semi-Government and Autonomous organizations, as these specific licenses do not allow holders to become commercial operators.

Competition Rules (Service/Infrastructure)

The telecommunications sector is known for being very capital-intensive. Investment decisions by telecommunications operators are related not only to infrastructure investments, but also to investments in the development of new services to capture and/or retain customers whose subscriptions allow their investments to be recovered in as short a time as possible.

Pakistan's telecommunication market continues to perform in the absence of a Competition Policy. Although it is observed that major urban centers continue to embrace perfect competition via sufficient number of suppliers available to choose from, however suburbs, smaller cities and rural areas continue to face imperfect competition largely due to infrastructure limitations.

Policy Action#10

Owing to international best practices, it has been broadly agreed and understood that access operators and retail services irrespective of their media shall embrace service based competition for achieving National Broadband Targets. Therefore, adhering to section 4 rule (m) and 6 rule (e) of Telecommunication Re-organization Act 1996, the following guidelines are furnished to promote fair and transparent competition for protecting consumer rights.

- 10.1. The current competitive and open telecommunications market structure will be maintained.
- 10.2. To consolidate the robustness of the market structure, the sector will increasingly be managed through the application of Competition Rules for the telecommunications sector. These Competition Rules will be developed by MoITT as mandated under Section 57 of the Telecom Act and in conformance with the Competition Act 2010. The Competition Rules will govern all competition related matters of the telecommunications sector. These Rules will provide processes for market review, including but not limited to: identifying product markets, determining the respective market power of service providers within each market, determining whether anti-competitive behavior is prevalent and what remedies should be applied as ex ante or ex post measures. The rules will be based on best international practice for markets with similar levels of competition to those evident in Pakistan. Competition rules to be introduced within 06 months from the issuance of this Policy.
- 10.3. A set of initial product markets will be defined on the basis of current international practices and conditions in Pakistan. These will then be used to evaluate specific issues including assessment of Significant Market Power (SMP) in each of these markets and examination of allegations of unfair competition by any licensee. Remedies specified in the Competition Rules may then be applied as appropriate in the case of SMP. Also, if allegations of unfair competition are substantiated as a result of regulatory process, remedies will be clearly defined in the Competition Rules.

- 10.4. Product markets may themselves comprise a number of geographic markets representing different market conditions. Separate wholesale and retail product markets may be defined.
- 10.5. The test for SMP will be based on international best practices taking account of many ways in which a licensee may achieve and maintain such a power. The test for significant market power will consider individual, joint or collective market power.
- 10.6. The criteria that may be used to test for SMP for an individual licensee will include, but will not be limited to any combination of: market share, overall size of the licensee, control of infrastructure not easily duplicated, technological advances and superiority, developments, absence of or low countervailing buying power, easy or privileged access to capital market and financial resources, product / service diversification, economies of scale and scope, vertical integration, a highly developed distribution and sales network, absence of potential competition, barriers to expansion, ease of market entry, excess profitability, lack of active competition on non-price factors, barriers to switching and customers' ability to access and use information on prices and other service aspects.
- 10.7. The assessment of joint or collective dominance is an evaluation of characteristics of the market that make it conducive to tacit coordination/collusion and whether such coordination is sustainable. Criteria includes but is not limited to any combination thereof; market concentration, transparency, maturity of the market, growth (particularly stagnant or moderate demand growth), low elasticity of demand, homogeneous product, similar cost structures, similar market shares, lack of technical innovation (mature technology), absence of excess capacity, high barriers to entry, lack of countervailing buying power, lack of potential competition, various kinds of informal or other links between the undertakings in the market, retaliatory mechanisms, lack of or reduced scope for price competition, excess profitability, lack of active competition on non-price factors, barriers to switching and customers' ability to access and use information on prices and other service aspects.
- 10.8. Once a specific market within the telecommunications sector is managed using the Competition Rules, controls in that market on wholesale and retail pricing will be removed except as required under the Rules or in order to protect the customer from unfair practices as defined in rules, regulation or guidelines.
- 10.9. Remedies that may be imposed on operators with Significant Market Power in specific instances may include the following;
 - i. The obligation of transparency including the requirement to produce a reference offer this could apply to both interconnection and access services.

- ii. Obligation of non-discrimination.
 - iii. Obligation to produce regulatory accounts with appropriate accounting separation.
 - iv. Obligations to provide wholesale telecommunications services.
 - v. Obligations to allow access to, and use of, specific network facilities.
 - vi. Price control and cost accounting obligations – including the requirement to apply cost orientation - for example this could include Long Run Incremental Cost (LRIC) based interconnection charging.
- 10.10. Remedies will be applied, in the first instance, for upstream wholesale markets, if possible, to minimize regulation of downstream retail markets.
- 10.11. To make a service available in a fair and non-discriminatory manner, the provider of the service must offer and then deliver it to another service provider at the same price and under the same conditions as it offers the service to its own business in all relevant components of the service delivery process from planning, through ordering, implementation, activation, configuration, operation, maintenance and termination of the service.
- 10.12. Pricing remedies, including interconnection charges, will follow international best practices for cost plus orientation and will be reviewed on a regular basis but not less than once every two years.
- 10.13. The designations of SMP and consequential obligations on licensees at the time of publication of this policy will remain subject to product market review under the Competition Rules.
- 10.14. On implementation of the Competition Rules and identification of markets relevant to the services, PTA will review the markets, determine market power of all operators in the market and impose remedies accordingly. In doing so, an orderly transition of remedies will be determined.
- 10.15. All other identified markets will be reviewed in accordance with the Competition Rules.
- 10.16. Stakeholders will be consulted during the development of the Competition Rules and during application of the Rules through PTA's regulatory framework, where substantial remedies are involved as defined in the framework. The framework will be prepared by PTA and reviewed by the Competition Commission of Pakistan.

Customer Services & QoS

The technological evolution and consumerization are drastically impacting the use of internet. Efficient connectivity leads to increased use and further excites a user to consume more content for achieving desired access to information.

These requirements can vary from high level transparency guidelines on how the information on traffic management techniques is disclosed to end-users, to requiring actual indicators for data network performance for fixed and mobile broadband providers.

Quality of Service has an impeding effect on user experience over digital platforms. Evolving productivity software, streaming platforms, integrated social networks and other such mobile applications are escalating the demand for bandwidth on daily basis and therefore, it is pivotal to align the Quality of Service measures for broadband internet access in line with the National Broadband Targets while keeping the quality of service regulations for traditional services intact.

Some of the evident challenges faced in improving the quality of service for broadband internet are;

Policy Action#11

11.1. Customer Services

- i. All licensees will be required to publish a customer charter and provide standard terms and conditions for their customers. In addition, licensees should put in place mechanisms to prevent abuse of their systems that results in customers receiving unsolicited or fraudulent communications.
- ii. All licensees will provide coverage and pricing information to customers in an easily accessible and understandable form.

11.2. Quality of Service

- i. It is recognized that licensees are subject to quality of service parameters specified in their licenses.
- ii. PTA will ensure that common services are subject to international quality of service standards based on the existing or emerging KPIs. PTA will monitor customer service performance. Service monitoring will include, but not be limited to;
- iii. Call center performance: call waiting time including variance in call waiting time, problem resolution success rate, the mean time required to resolve problems including variance, and customer perception of customer service performance.

- iv. Other problem resolution performance.
- v. Billing accuracy and billing problems, including billing problem resolution performance.
- vi. Service activation performance including time taken to activate common services including variance.
- vii. Service termination performance including time taken to terminate common services including variance.
- viii. Steps will be taken to improve Broadband quality of service for customers. The PTA will monitor broadband quality of service provided by all service providers against its KPIs including committed bandwidth and outage commitments with the customers, will publish the results and take action against service provider for violation of the license condition and consumer contracts.
- ix. PTA in consultation with stakeholders and in line with identified National Broadband Targets shall review the Broadband Quality of Service (BB-QoS) Regulations-2014.
- x. The parameters and mechanism defined in the Broadband Quality of Service Regulations-2014 shall be completely revitalized through standardization and harmonization of guidelines in accordance with standards provided by ITU based on international best practices.
- xi. PTA shall propose an escalating Key Performance Indicator and Key Quality Indicator Matrices for rollout as well as service obligations for broadband service providers for achieving National Broadband Targets. The KPI matrix shall be separately defined for different licensing regime and for the next five (5) years or beyond for gauging the performance of service providers on year- on-year basis.
- xii. For improving the monitoring mechanism, PTA shall improve/enhance its technical and resource capacity to automate and integrate Network Termination Points for real-time monitoring of all licensees at all times. In this regard PTA shall organize a QoS system for carrying out necessary functions in line with identified indicators.
- xiii. For improving service/customer experience and to lessen billing, service activation/termination and other service related disputes, PTA as part of Data for Development Program shall organize a study for assessing the performance of Customer Service Centers and Call Centers in terms of traffic versus capacity in peak and off-peak hours, ability to resolve different types of complains

in shortest possible time, complaint handling system situation and other factors associated with the quality of service.

- xiv. Based on the outcome of the study, PTA shall draft “Customer Services Regulations” in consultation with stakeholders which shall include escalating service key performance indicators in line with National Broadband Targets.
- xv. Updated draft of Broadband Quality of Service Regulations and Customer Services Regulations shall be presented for the review and processing of MoITT.
- xvi. The recommendations of PTA shall be reviewed and after necessary consultations may be ratified by MoITT for further implementation by PTA.
- xvii. As a result of Broadband Regulations and Customer Services Regulations, if necessary, amendments in licensing obligations shall be made by PTA.

Service Affordability

The prevailing tariff for broadband access in Pakistan is pleasantly conducive and well within the 2% range of the total income of an individual as prescribed by ITU. The price of telecommunication and Internet services is cited as one of major barriers to Internet access and usage. Monitoring prices is very difficult, as prices depend on; type of service (fixed versus mobile), bundling of different services, different operators (within the same market), data, voice and text allowances and whether national or international comparisons are made.

There is evidence to suggest that affordability or the ability of individuals or households to pay for telecom services relative to their disposable income is one of the main barriers that affect consumer consumption of Internet services. Affordability depends not only on both price and income, but also on other, competing spending choices available.

The prices for voice and data services have been falling over the last decade, in line with growing competition and strong increases in subscriber rates and usage.

Policy Action#12

- 12.1. PTA will ensure that all licensees provide affordable services. PTA will review the appropriateness and adequacy of telecom services' prices available from licensees on a regular basis. The prices will be on the basis of cost plus a reasonable rate of return.
- 12.2. For improving the utilization of internet in the country, MoITT in consultation with stakeholders shall organize a "Service Affordability Plan" for targeted section of the society while focusing on persons with disabilities (PWDs), women and youth (under the age of 18 years) to play an effective role in the socioeconomic development of the country.
- 12.3. The plan shall divided into two main parts i.e.; improving usability and productivity.
 - i. For improving the usability of internet services of the target audience, may engage fixed/mobile access network operators to explore the possibility of increasing a percentage of volume in different offerings/packages, while keeping the Competition Rules and other obligations intact.
 - ii. Simultaneously, the Ministry in Public Private Partnership develop productivity programs for increasing use of internet for learning and earning. The programs associated with social wellbeing and digital financial inclusion of a user shall be prioritized.

- iii. For facilitating knowledge based economy through documentation and financial inclusion, the MoITT may consider to organize special internet support programs in PPP for freelancers earning through different local/international digital platforms and online marketplaces.
- 12.4. Similarly, Digital Platforms and ICT service providers, operating under Open Entry and other relevant licensing regimes, may also be consulted for the facilitation and uplifting of target audience via market driven subsidies while keeping Competition Rules and other licensing obligations intact, for achieving the National Broadband Targets.
- 12.5. For early achievement of Service Affordability Plan, MoITT may devise a “Service Affordability Committee” for stakeholder engagement and preparation of potential programs for improving service affordability of target audience.
- 12.6. The Service Affordability Plan shall be definitive and time barred action until identified targets are achieved and no compulsion/obligation shall be drawn on any participant to offer any support/service, unless contractually obligated in a PPP based program. However, a general understanding may be drawn for embarking interested participants in this national cause.
- 12.7. Based on necessary consultation and after seeking necessary approvals, MoITT shall ratify and implement “Service Affordability Plan” and subsequent programs, which shall be steered by Service Affordability Committee.
- 12.8. PTA shall continue to ensure that all licensees provide affordable services. PTA shall review the appropriateness and adequacy of telecom services’ prices available from licensees on a regular basis. The prices will be on the basis of cost plus a reasonable rate of return.

Fair Usage Policy & Acceptable Usage Policy

Fair usage policy and terms of service are matters which are largely unknown to end-users due to awareness issues. Fair usage policy governs the extent of use of the services offered by a service provider, broadly in terms of volume and time.

Similarly acceptable usage policy is aimed at seeking compliance for using a service for best purposes and not engaging in activities which are harmful for a user or a society or the service provider.

Both factors are important in governing the usage of internet services, however, it shall not be used as a tool to exploit users or to draw discrimination in service utilization.

Policy Action#13

- 13.1. For protecting the rights of user in the digital space, PTA shall conduct a study on Fair Usage Policy (FUP) and Acceptable Usage Policy (AUP) applied by different licensees and digital platforms on different types of services offered to a user in line with international best practices.
- 13.2. Based on the outcome of the study, PTA in consultation with stakeholders and in accordance with National Broadband Targets shall draft harmonized “Fair Usage” and “Acceptable Usage” Rules for ensuring fair competition and for embracing non-discriminatory practices.
- 13.3. PTA shall present the draft rules to MoITT for further review and processing. MoITT after necessary consultations may ratify the rules for implementation by PTA.
- 13.4. For effective implementation of FUP and AUP, PTA shall ensure that all licensees shall rollout user awareness campaigns and if required make necessary amendments in licensing obligations accordingly.

Open Internet

For a country to embrace internet as a utility, it needs to live by the rules of neutral networks and equal opportunity to all in the digital space. The term 'equal opportunity' in itself is a relative term and requires further understanding with regards to accessibility and usability. For a responsible and civilized society, it is important to organize a management mechanism in order to ensure a prevailing environment for the openness of internet by harmonizing and standardizing the ecosystem for its most efficient use.

Open internet paves the way for early adoption of cutting-edge technologies, attract new investments and promote indigenous research and innovation, however, scarce resources, cultural and religious norms and consistency of democratic practices from within also requires due consideration with increasing dependency on internet and therefore, rules and guidelines can help in improving usability and strategizing openness of internet for enhancing usability and accelerate adoption.

Policy Action#14

- 14.1. For embracing an evidence-based approach, PTA shall undertake a market assessment study directly or via consultant of repute for analyzing the current situation of openness of internet in the country under Data for Development Program.
- 14.2. The survey shall focus on the practices adopted by service providers for ensuring open internet for all policy and to identify such practices, where a certain type of service, platform, IP address and/or protocol is being promoted/discriminated limiting fair access to internet and content.
- 14.3. The study shall also take into consideration the compliance by service providers and digital platforms for adopting different guidelines/regulations issued by PTA from time to time for protecting a user from possible online harm and actions detrimental to social norms.
- 14.4. Based on the outcomes of the study/survey and in line with international best practices formulate draft "Open Internet Rules" and engage stakeholders for consultation and processing.
- 14.5. The draft rules shall then be offered to MoITT for further review. After reviewing the same, MoITT may ratify the "Open Internet Rules" for further implementation by PTA.

Ease of Doing Business

A diverse and competitive digital space in conjunction with open and conducive regulatory environment guarantees new and extended investments. A population in excess of 220 million is more than sufficient for achieving economies of scale for enabling indigenous research and innovation, residing content and harnessing local production.

Elements influencing the ease of doing business in this age of information are; making the appropriate information available to the right audience at the right time and improving the cost and time factors for realizing necessary compliances, rest the business can handle by itself.

Policy Action#15

For improving the situation of doing business in telecom sector adhering to international best practices the following actions needs to be undertaken;

15.1. Simplified Access to Information

- i. Data collected during various surveys and studies under Data for Development Program shall be organized by PTA in the form of indicators, reflecting the performance of the market and made available online over unified platform for public.
- ii. Information regarding available and used resources (such as spectrum, numbering), right of ways, tariff, tax information etc. shall also be made available over unified platform.
- iii. Efforts shall be made to integrate and automate data collection (after initial studies/surveys) in prescribed formats for optimizing efforts in data collection and improving overall transparency and periodic updates shall be ensured for keeping the data up-to-date.
- iv. PTA shall align all data in the context of international indicators reflecting the performance of the market which will allow new investments in the country.

15.2. Effective Implementation of Policy

- i. MoITT and PTA shall make all efforts for early adoption of this policy by implementing rules, regulations, guidelines and frameworks.
- ii. The efforts made shall be time barred in line with the targets furnished via National Broadband Targets and subsequent timelines advocated against each policy action.
- iii. PTA shall continuously gauge the impact of implementation of policy measures on the market and reflect the outcome as part of its annual report as well as separately.

- iv. MoITT in consultation with PTA and other stakeholders shall organize awareness campaigns and programs for informing/educating international policy makers and observers on the improvements of market, transparency through which data is collected attained by ensuring effective policy implementation.

15.3. Doing Business Portal (Unified Portal for facilitating Investors in digital space)

- i. MoITT in consultation with Board of Investment (BOI), PTA and other stakeholders may develop an integrated information and facilitation “Doing Business Portal” which shall provide the licensees, new investors and the general public with the following access;
 - a. Transparent access to information on market situation and performance, implementation of acts, policies, rules and regulations and applicable levies and taxes on the sector.
 - b. Access to information regarding availability of resources and provision for using such resources.
 - c. Access to facilitative portals such as Right of Way Information Management System, Spectrum Management System, Licensing Application, DIRBS, Type Approval Application, dispute registration and resolution system, etc.
 - d. Provide an integrated access to other portals for enabling and supporting business operations in digital space such as; company registration and compliance management portal of SECP, tax number application and filing portal of FBR, Single window portal for custom clearance (including WEBOC) etc.
 - e. The Doing Business Portal shall also showcase all the efforts made by government such as collaborations and partnerships with international governments, local and multinational conglomerates/investors as a confidence building measure for investors.
 - f. Apart from making market data available, the Portal shall also provide with market success stories and information about businesses looking for investments in telecom/digital sector.

15.4. Termination & Transfer of Business

- i. Consolidation is a natural free market phenomenon and it is important that customers and other stakeholders are protected in case of consolidation among licensees or sale of existing licenses to new players for consumer confidence in the sector to be maintained.

- ii. Therefore, the regulatory framework applicable on the exit of a licensee from the market or transfer to another company or a business holding, a telecommunications license shall be optimized to ensure an organized termination or transfer of the business, while keeping the following into consideration;
 - a. To protect customers and other stakeholders in the business.
 - b. To require the return of any deposits and payment of outstanding dues to PTA and/or other Government Authorities.
 - c. On transfer, to enable the transfer of licenses and obligations to the acquiring business subject to the approval of PTA.
- iii. The PTA will approve a transfer if the purchasing entity fulfils the criteria for the granting of a license under Section 21 of the Telecom Act or is an existing licensee.
- iv. These requirements are in addition to the normal responsibilities of a business when winding up or transferring its affairs.

Content Management

Telecommunications services provide alternate or exclusive channels for the supply of various forms of content. Examples include: broadcast TV, video on demand, still images, radio, music and other sound files, books and reports, games, financial services, ecommerce services, including the sale of restricted products such as pharmaceuticals, health services and education services. Nevertheless, such content may be, and generally is, supplied through other channels also.

Policy Action#16

- 16.1. With respect to the delivery of content, the proper role of telecommunications policy and regulation is to support the development and maintenance of telecommunications services with appropriate characteristics to facilitate the delivery of content by a telecommunications network. PTA is required to manage content over the internet through integrated licenses or ISPs as per their licensing conditions under the Act. Federal Government recommended to the Government to authorize PTA to determine the characteristic of content irrespective of the channel used for its supply. PTA will have to consider the characteristics of each channel in determining how to manage its content which it will do under a well-defined framework.
- 16.2. This framework will enable PTA to monitor and manage content including any blasphemous and pornographic material in conflict with the principles of Islamic way of life as reflected in the Objectives Resolution and Article 31 of the Constitution, material viewed as leading to the exploitation or abuse of children or other vulnerable groups, and material that is considered to be a direct incitement to commit a crime of a serious nature and detrimental to national security, or any other category stipulated in any other law. The framework would nevertheless protect the right to freedom of speech and expression under Article 19 of the Constitution subject to any reasonable restrictions imposed by the Constitution and the law and cover public networks.
- 16.3. PTA under its inherent mandate on regulation of “access to content” through the licensees will perform the assigned role with requisite consultation of stakeholders’ vis-à-vis categorization of content whose access is regulated. PTA will also build its capacity to handle this function and Regulations and/or SOP will be put in place to manage this activity.
- 16.4. Although mechanism mentioned above will take into account all freedom of information safeguards provided under the Constitution and law with requisite application of limits and constraints, Telecommunications operators and service providers will nevertheless need to be mindful of any content filtering and blocking that may be obligated by PTA either by itself or on recommendation of a concerned agency and/or a duly mandated forum as the case may be.

- 16.5. Government recognizes that telecommunications operators and service providers: LL, WLL, mobile licensees, class licensees, cable landing stations, etc. carry content which is outside their control as such content is under the control of third parties. As such, they are acting as intermediaries when they do not originate the content. Government will not require intermediaries to identify content to be filtered or blocked.

VoIP & OTT Services

The model for delivery of Internet based VoIP and other OTT is fundamentally different from the earlier model in which services were embedded in the network. Therefore, most regulatory regimes designed in accordance with the earlier model are not satisfactory when applied in this context. The proposed revision to the licensing framework will address this issue in the long term. However, there is an immediate requirement to regulate services such as VoIP and other voice services that are partial or full substitutes for the traditional Public Switched Telephone Network, particularly when the services are provided by unlicensed service providers either in Pakistan or in other countries.

Policy Action#17

- 17.1. PTA, in consultation with Federal Government and stakeholders, will develop appropriate regulatory framework to treat VoIP and other Over-The-Top (OTT) services. The framework will take account of the possibility that service providers offering such services may preferably install equipment in Pakistan where possible, the rapidity of development of such services, the extensive range of such services, the potential requirements for scarce resources (e.g. numbers), requirements for access to emergency services, requirements for lawful interception, cooperation with law enforcement agencies, data retention obligations on operators, impact on operator networks, and where appropriate, the requirement for interconnection with the equivalent embedded or OTT.
- 17.2. Taking into account the globally emerging revenue sharing arrangements between local licensees and OTT players, for offering better than normal best-effort or differentiated version of the services, licensed access providers will be free to enter into mutual agreements with those service providers enabling them to monetize OTT service delivery on mutually agreed terms.

Interconnection & International Telecommunication

As technology has changed and competition has intensified, many forms of interconnection have evolved. All involve the linking of networks to enable customers of one network to communicate with customers of another network or to have access to services offered by another network operator.

Policy Action#18

18.1. Interconnection

- i. The obligation on licensees to interconnect for the origination and termination of telephony traffic remains, so that calls may be established between any two numbers in Pakistan and/or between international calls originated and terminated within/outside Pakistan.
- ii. Once the Competition Rules are applied to relevant markets, operator specific fixed and mobile termination rates will be determined for those operators with SMP in a relevant fixed or mobile market. A clear and open schedule of charges should be first encouraged and subsequently will be overseen by the PTA to ensure fair and competitive market.
- iii. For licensees designated as SMP in the relevant market, the schedule of charges and the standard termination charge will be determined using a cost orientation approach appropriate to pricing in a wholesale market. PTA will therefore propose appropriate cost regime for interconnection and apply it to licensees that have SMP in the relevant market. This regime will have due provisions for IP based interconnection in line with international best practices applied to such interconnection in Next Generation Networks (NGN). Any other upcoming technology may also be considered.
- iv. Termination rates and schedules of charges will be reviewed every three years or earlier if the market conditions so require. Costs will take account of documented plans for infrastructure and service roll out that have been formally approved by the licensee concerned. If such plans change materially over the period during which the termination rate and other charges apply, the termination rate and other charges will be re-determined. The use of such termination rates is intended to promote the roll out of networks.
- v. Operators that are not subject to SMP in the relevant market may use commercially agreed termination rates. All licensees will inform PTA of applicable termination rates and any changes to those rates. PTA will arbitrate between the parties if required.
- vi. Interconnection obligations on individual operators specified in preceding paragraphs will be subject to any action taken as a consequence of the application of the Competition Rules.

18.2. International Telecommunications

i. International traffic termination

- a. Each LDI licensee will enter into commercial agreements with international carriers and other national carriers for originating and terminating switched voice traffic, subject to approval by PTA as per regulations. PTA's approval shall be limited to the enforcement of license conditions, any remedies imposed arising from the regulation of the market under the Competition Rules and regulation arising from national security considerations.
- b. PTA will continue to determine Approved Settlement Rate (ASR) as appropriate.
- c. The cable landing stations established by eligible licensees will provide access to any LDI licensee on fair and non-discriminatory terms at its cable landing stations for accessing the bandwidth on submarine cables. Such arrangements will be made on commercial terms.
- d. PTA will carry a study and formulate recommendations for the Federal Government to facilitate establishment of cable landing stations, under appropriate licenses, to increase diversity and promoting competition in this segment. The study will investigate international best practices especially effects of the practice of capacity swaps in respective countries between licensed operators of a country having capacity on a submarine cable with non-licensed party on the submarine consortium or a party of some other submarine cable system of another country.

ii. Cross Border - Point to Point (Bilateral) Links

- a. LDI licensees will be eligible for establishing cross border communications links with other countries. Such links may be established using fixed wireline, terrestrial wireless, submarine cables or satellite technologies subject to approval by PTA and if necessary, by relevant authorities in the neighboring country, based on the following criteria;
 1. Any bilateral links will be terminated at a legally established peering point or landing station in Pakistan.
 2. Prior approval will be obtained for any spectrum used from FAB in Pakistan and the relevant regulatory authority of the neighboring state where the cross border link terminates.
 3. The ITU prescribed regime will be used for cross border interference protection in relation to any wireless communication to prevent interference on both sides of the border by FAB.

4. Prior approval will be obtained for any proposed use of satellite communication by respective operators from relevant authorities.
 5. If on the onward route, the communications link is to be part of any international cable system, the details and legal arrangements of such participation will be made available to the PTA by the applicant. In such a case, a clear roadmap for establishing connectivity with a credible International Partner Consortium at a well-established Point of Presence at the far end will be provided.
 6. All security related requirements (e.g. LI compliance) as specified by the PTA in consultation with the security agencies will be complied with.
- iii. The PTA will facilitate the process for approving/issuance of NOC for establishment of cross border links. The requests will be evaluated by already established committee comprising the Chairman of the PTA, and a representative from each of the following: Ministry of the Interior, the Cabinet Division, Ministry of IT & Telecom and Security Agencies. The approval/NOC or denial of a request for a cross border link will be granted in a timely manner ensuring that in any case it may not exceed six weeks.
 - iv. In case of change of ownership of a licensee that operates bilateral links, prior clearance from PTA will be required, and where ownership includes foreign nationals, clearance should be provided in consultation with the Security Agencies.
 - v. Long distance carriers will be allowed to enter into international transit agreements with operators from other countries subject to approval by PTA on a case by case basis and subject to Para 5.9.2. If traffic through the bilateral link is to be transited out of Pakistan both on forward and reverse link, clear declaration of the entry and exit points and the size/capacity of the interfaces at such entry and exit points, is required to be made available by the Pakistani LDI licensee involved.

Role of Ignite and Indigenous Research & Innovation

In accordance with Rule 33(C) & (D) of the Telecommunication Re-organization Act 1996, Research & Development Fund (Ignite – Technology Fund) continues to promote indigenous research and innovation in the field of Information and Communication Technologies for optimizing and enhancing the use of internet.

The fund is backed via contributions of telecommunication licensees as part of their licensing obligations which accounts for 0.5% of licensee's gross revenue minus inter-operator and related PTA/FAB mandated payments.

As a nation with relatively limited resources, Pakistan has to ensure that every investment it makes in developing its information and communication technology achieves the desired results and earns a high rate of return. The allocation of resources is therefore closely aligned to its national priorities of transforming the country into a knowledge-driven economy, so as to maximize economic and social returns. R&I is a key activity in enhancing the generation of new products, processes, services or solutions. Ignite therefore, needs to work closely with industry, observers, opinion makers and foreign investors to guide them to invest in R&I and other technological development activities.

Policy Action#19

Adhering to National Broadband Targets and to promote the culture of indigenous research and innovation at the grassroots, the following measures shall be undertaken by Ignite on priority basis;

19.1. Funding

- i. The R&D Fund contribution will be limited to a maximum of 0.5% of a licensee's gross revenue minus inter-operator and related PTA/FAB mandated payments to the National ICT R&D Fund established with the Ministry of Information Technology.
- ii. The National ICT R&D Fund will be used for;
 - a. The development and deployment of applications and relevant content associated with Government developmental goals and WSIS Action Lines to be delivered over telecommunications networks including via smart phones, tablets and through Telecentres;
 - b. The development of Intellectual Property in ICT, particularly in telecommunications working in conjunction with the international research and development community. However, the ownership of Intellectual Property will lie with the National ICT R&D Fund Company.
- iii. The Fund will be utilized for demand and output driven research and development.

- iv. The Fund will at all times take into consideration that the eco-system, applications and content being developed will also be equally relevant for many other developing countries. Therefore, the Fund will coordinate with relevant organizations to fully promote and export applications, contents and Intellectual Property created through R&D funding.
- v. Application development, content development and the development of intellectual property will normally utilize Pakistani private sector resources in order to grow and develop the local ICT sector.
- vi. The Fund will facilitate promotion of ICT start-ups, incubators, technology acceleration programs as well as Human Resource Development.
- vii. The Fund will also facilitate promotion of ICT events and conferences.

19.2. Government Developmental Goals and WSIS Capacity Building Action Lines

- i. Applications associated with Government goals in sync with WSIS Action Lines will include but not be limited to;
 - a. e/m Government
 - b. e/m Commerce
 - c. e/m Banking
 - d. e/m Payments
 - e. e/m Health
 - f. e/m Agriculture
 - g. e/m Education/Learning

19.3. Content Development

- i. Structured formal cloud sourcing of useful content and application development to young creative content/app creators will also be considered by the relevant agencies and the National ICT R&D Fund Company to enable self-employment among the youth.

19.4. Development of Intellectual Property in ICT

- i. The National ICT R&D Fund will coordinate market research, solicit applications and also consider unsolicited application for services in the ICT areas including those listed in para 19.2(i). The Fund will develop, maintain and implement a rolling three year plan specifying the projects to be let and the outcomes expected.
- ii. Projects covering applied research in ICT, market research, product specification, product development may also be funded from the National ICT R&D Fund.
- iii. The Fund will establish links with international centers of expertise in the application areas listed in para 19.2(i) and those concerned with telecommunications infrastructure and services. The Fund will explore methods and coordinate joint working with development organizations in Pakistan and such international centers of expertise on particular projects.
- iv. The Fund will establish links with multilateral development partners to keep in sync with trends in international research arena and to establish joint funding of particular development/innovation projects.
- v. The consequences of such activity will be the development of intellectual property in ICT. In return for funding of the development of this intellectual property, the Fund will take an agreed share of the intellectual property produced.

19.5. Rolling R&D Funding Program

- i. The National ICT R&D Fund Company will maintain a rolling program of projects. The program will include projects to be funded, projects under execution and projects to be completed during the plan period.
- ii. The program will be published annually and will cover the three subsequent years starting on or shortly after the date of publication. In this way, interested parties will be able to anticipate tendering opportunities and will be given at least two years' visibility of the program. Each annual update will extend the rolling program by a year, and specify any updates to the program for the overlapping period.
- iii. The National ICT R&D Fund Company will implement the rolling program.
- iv. The National ICT R&D Fund Company, will as part of its rolling program, report on the outcome/impact of each project on completion when publishing the program.
- v. The National ICT R&D Fund will also facilitate skill development in the telecommunications sector.

- vi. The funding mechanism to be based on transparent, effective, efficient business model, considering resilience of the projects and Return of Investments.
- vii. To scale up Ignite as an international organization, develop maximum value-, short-, mid- and long-term strategic plan to be developed for effective and efficient output of programs under Ignite.

19.6. Ecosystem Enablement

- i. In consultation with stakeholders, Ignite shall formulate the first “Startup & HRD Strategy” of Pakistan in line with National Broadband Targets for promoting the use of internet via indigenous research and innovation.
- ii. The strategy shall clearly identify the roadblocks in fostering a culture of innovation and accordingly propose specific programs with guidelines on its target audience, development process, timeline and expected outcomes.
- iii. The programs identified in the Startup/HRD strategy shall largely focus on the future technologies and its social impact, while enhancing the use of internet for learning and earning.
- iv. The strategy shall also help in aligning collaboration and partnerships with industry and global internet players via appropriate instruments for timely achieving the identified targets.
- v. Based on the outcome of the consultation process, Ignite shall share the draft strategy to MoITT for further review and processing, which the MoITT may ratify after seeking necessary clarifications.

19.7. Review and Optimization of New & Existing Programs

- i. Ignite in accordance with the directives of its Board and in consultation with MoITT shall organize “Program Review Committees” for reviewing and optimizing the programs which are under implementation. To do so, the Committee shall formulate pragmatic indicators in line with international best practices to evaluate the socioeconomic impact of all programs in progress with respect to investments made and targets achieved.
- ii. Based on the outcomes of the review process the Program Review Committee shall furnish its recommendations to the Board of Directors of Ignite continuing, optimizing, evolving and/or retiring of programs.

- iii. The review process shall take into consideration all third party monitoring and evaluation reports for each of the programs, furnished from time to time and also carry out random/anonymized visits to analyze the exact on ground situation.
- iv. The Program Review Committee shall be a permanent and an independent establishment comprising of members from the Board of Directors of Ignite, MoITT and the industry for each program under execution or to be initiated and it shall be notified upon commencement or at any given point in time during the execution process for enhancing program performance.
- v. Apart from reviewing the program progress, the committee shall also analyze the process and procedures associated with a program for simplifying the engagement process by adopting best practices.
- vi. The committee shall only review programs in totality and shall furnish its recommendations to the Board and MoITT for further consideration and necessary action (if required) without making any direct interventions.
- vii. The review process shall be periodic (atleast on quarterly basis) and the continuity of such a committee shall be decided by the Board of Directors and MoITT collectively.

19.8. Incubation & Startups

- i. For supporting an entrepreneurial culture in the country, Ignite may extend the outreach of its National Incubation Center Program to other cities/districts nationwide in a staggered manner as part of its Startup & HRD Strategy and in accordance with National Broadband Targets.
- ii. It is learnt that National Incubation Centers have witnessed limited footfall from informal startups and public educational institutions due to lack of awareness and therefore, Ignite shall collaborate with public/private academic institutions such as but not limited to; NAVTTC, Virtual University, etc. having nationwide outreach for establishing “Multipurpose Centers” comprising of Micro Incubation Centers, Training & Development Facilities and Co-Working Spaces preferably via Public-Private Partnerships for embracing National Broadband Targets.
- iii. Ignite shall also propose a roadmap for the existing National Incubation Centers as to what shall be the course of action upon completion of their term as per contract. Irrespective of its decision for supporting the Incubation Center operations, Ignite may continue to facilitate incubated startup for another such term as deemed appropriate by the Board of Directors in consultation with MoITT.

- iv. For budding entrepreneurship at the very grassroots, Ignite shall organize an understanding with Higher Education Commission, Federal and Provincial Education Boards and other technical institutions for assisting them in the articulation of purpose built and hands-on courses/toolkit on entrepreneurship and startups in an escalating manner preferably in public-private partnership and in line with international best practices.
- v. Ignite may develop and implement an integrated/collaborative platform for fairly and transparently organizing startups to get funding and guidance, investors to find promising startups to fund and independent mentors and consultants to assist and enable startups/entrepreneurs via appropriate facilitation.

19.9. Skill Development of Freelancers/Professionals

- i. Ignite shall review its DigiSkills Program via Program Review Committee and propose its recommendations for continuing, optimizing and retiring the program based on the results achieved in line with program objectives.
- ii. Skilled Professionals having applied experience on cutting edge technologies such as; Artificial Intelligence & Machine Learning, Blockchain, Cloud Computing, AR/VR technologies, Cybersecurity, Internet of Things etc. are in high demand and therefore, Ignite in consultation with MoITT shall organize a “High Impact Skill Development Program” for producing expert level resources for addressing local and international demand.
- iii. The program shall provide end-to-end integration, from enrollment of individual in a cohort/course to completion of certification and enlistment on local/international employability portals. Special consideration shall be given to organizing the course outline based on international best practices and the certification shall be internationally recognizable for providing equal opportunity to the trained individuals. The program shall be embraced in public-private partnership in adherence to Board of Directors of Ignite and in consultation with MoITT.
- iv. For improving outreach and promoting local professionals Ignite shall collaborate with local and international employability platforms and freelancing portals by aligning with their needs and demand for improving the placement and remuneration situation.
- v. Ignite may also collaborate with Pakistan Software Export Board for assisting local industry and associated professionals with high impact skill development and placement of trained resources.

- vi. The High Impact Skill Development Program shall be elaborated as part of Startup & HRD Strategy using evidence-based approach.

19.10. R&D Initiatives

- i. Ignite shall review the current status of SEED Fund Program via Program Review Committee for analyzing the impediments of the program and issues pertaining to its outreach, complexities in funding mechanism and reasons for delays in processing of applications. Based on the outcomes of the review, the Committee shall offer its recommendations to enhance, optimize or retire the program.
- ii. For improving localization of internet ignite shall organize a “National Centre of Excellence Program on OpenSource” with a focus on OpenRAN, OpenAI, OpenStack Cloud, Open System Architecture, Open Source Software, RISC-V and Cyber/Information Security in Public Private Partnerships.
- iii. The Centre of Excellence shall act as hub for research and development on open systems and standards by providing access to local and international research-based resources, tools and technologies of latest standards for enabling R&D and fund institutions and projects based on Open Source for timely commercialization.
- iv. The Centre of Excellence shall be established in cities with higher demand and opportunities and necessary linkages and partnerships shall be established with international/multilateral organizations embracing OpenSource.

19.11. Commercialization & Internationalization

- i. It is broadly observed that local startups incubated at NICs and elsewhere has a very high failure rate which needs to be rectified. For improving the success of local startups, Ignite shall articulate a “Startup Commercialization & Internationalization Program” with a focus on developing synergies and partnerships with different industries (local/MNCs) and internet companies for excelling the course of commercialization of incubated/funded startups via special matchmaking and market enablement services.
- ii. Under the said Program, Ignite shall collaborate with Pakistan Software Export Board (PSEB) to facilitate local startups for promoting their services and platforms internationally, providing orientation on the situation of doing business in target market and explore possible avenues for business matchmaking.

- iii. For further enhancing the outreach globally, Ignite shall organize and participate in local and international promotional events on annual basis for showcasing incubated/funded startups allowing them maximum market exposure.
- iv. Ignite shall assist startups in developing product portfolios, pricing structure and marketing plans through industry experts engagement associated with target markets.
- v. Ignite shall support startups in developing local/international sales and distribution (S&D) networks based on workable partnership models and channel programs. The program shall be organized as part of Startup & HRD Strategy.

19.12. Intellectual Property & Copy Rights

- i. Intellectual Property is an integral element in flourishing research and innovation culture and a critical indicator in recognizing the performance of a society towards efficiently resolving issues by introducing unique products and services. Ignite shall immediately engage with local Intellectual Property Organization (IPO) for addressing challenges concerning intellectual property for safeguarding it locally and internationally.
- ii. To formalize the efforts of equipping local IPO with necessary resources, Ignite in consultation with MoITT shall proceed to inking an understanding with local IPO for enhancing their capability to facilitate IP processing indigenously.
- iii. Similarly, for harmonizing digital copyrights, Ignite with the help of local/international consultant shall facilitate in formulating product/service centric copyrights for digital platforms and services for copyright protection in accordance with international best practices.
- iv. For continued facilitation, Ignite shall develop and operate IPR & CR Portal for processing such requests expeditiously.

19.13. Cloud Platform Facilitation

- i. Majority of digital platforms and services embrace cloud based offerings to their users which has a cost of rendering such services, the fee does not only associates with hosting of integrated platforms/portals, but the engagement commences right from conceptualization where cloud based services and tools are adopted for designing of products, owing to which Ignite shall identify potential Cloud Solution Providers for different types of platform development, hosting and collaboration services and organize partnership/synergy with them for offering market driven preferential/discounted access to local startups on local and international platforms.

19.14. Rolling R&D Fund Program

- i. As part of Data for Development Program, Ignite in consultation with MoITT through a local/international consultant of repute, shall organize a study on the situation of local entrepreneurial/startup ecosystem in the country. The focus of the study shall be to analyze the current state based on relevant indicators reflecting the performance of society/market, situation of R&I w.r.t comparable economies, challenges faced by local startups concerning funding, commercialization and underlying reasons for high failure rate.
- ii. Based on the outcome of the study, Ignite shall harmonize its data in line with international best practices which shall be reflected through indicators and accordingly organize its Startup & HR Strategy.
- iii. Ignite shall further data available on its portal and other platforms for promoting the culture of innovation and coincide it with National Broadband Targets. The data and indicators shall be organized in an integrated and automated manner after the initial survey and be periodically reviewed and updated.

Accelerating E-Inclusion

Growing digital reliance of the new generations has ousted the need for developing more physical infrastructure. The COVID-19 pandemic has further catalyzed the dependency on digital platforms and services like never before. Government of Pakistan, with the help of big data did not only implemented smart lockdowns but it has largely help in providing medical aid to the most deserving people in time allowing the government to use its medical resources efficiently.

Similarly, the educational institutions are also pivoting to more of blended education technique special in the metropolises, however, small cities and towns requires catching up. Although the Universal Services Fund has already been mandated to spread the use of e-health and e-education in remote areas, however the need for having socio-economic services is far greater and to address this challenge the government needs to put in a more enhanced effort for optimizing the access of government, health, education, emergency and justice services by accelerating the integration of socioeconomic verticals through a comprehensive strategy.

Policy Action#20

- 20.1. With the help of Data for Development Program, MoITT may organize a nationwide survey and study directly or via local/international consultant of repute for assessing the situation of connectivity of schools, hospitals, police stations, courts and other facilitative public

institutions. The survey shall focus on those areas/facilities which are beyond the mandate of USF.

- i. The survey shall outline, the availability, health, use, demand, challenges regarding high-speed internet connectivity and adoption of online platforms at all such public facilities.
- ii. The study shall also provide MoITT with necessary recommendations on the type of connection and/or service required, solution to the onground challenges, prioritization based on demand and awareness and adoption level in a given area/facility.
- iii. The study shall further propose a strategy for expanding nationwide outreach of socioeconomic services with clear objectives and timelines.
- iv. MoITT may review the data, recommendations and proposed strategy in the study and carry out necessary stakeholder consultation on it.

20.2. Based on detailed review and consultation, MoITT may develop an “E-Inclusion Program” aimed at sustainably connecting all government led social and economic functional facilities in a phase wise manner having the following scope;

- i. The program shall be extended to all such facilities in cities, towns and districts nationwide, which does not fall under the scope of USF and are yet underserved.
- ii. The program shall be implemented in a phase wise approach with facilities having highest demand shall be catered on priority, irrespective of its location.
- iii. The program shall include high-speed internet connectivity as advocated in National Broadband Targets, digital platform for facility enablement including necessary utilization tools, gadgets and training/awareness module for the on-site staff as well as users.
- iv. The program shall be widely promoted via electronic (including digital) and print media for timely awareness and adoption ensuring increased usability.
- v. The systems and services deployed on identified locations shall be precisely monitored for its usability and if the desired results are not achieved in terms of usability, the matter shall be escalated to Authorities.

- vi. The program shall preferably be implemented in public-private partnership (as per Program Scope).
 - vii. The program may also include facilities in GB, AJK and parts of KPK recently merged from FATA.
 - viii. The program may contain any other provisions in the scope as deemed appropriate by MoITT.
 - ix. Upon completion of the execution part, the program shall be handed over to designated service provider/licensee (public or private) for carrying out seamless operations.
- 20.3. As part of effective planning and delivery of “E-Inclusion Program”, the Ministry may constitute a “Program Office” under its supervision for which the scope and organization constitution shall be managed in accordance with program requirement and international best practices.
- 20.4. For ensuring smooth and timely implementation of the program, MoITT shall organize a “Program Review Committee” comprising of officials from MoITT, TF/NTC, USF and industry for analyzing the progress of program on periodic basis until its realization.
- 20.5. The Program Committee shall offer its recommendations on the progress and possible improvement of the program to MoITT, without any direct intervention.
- 20.6. For organizing such a comprehensive program, MoITT may explore different long-term financing options for timely achievement National Broadband Targets.

3rd Pillar – Digital Trust

3rd Pillar – Digital Trust

There has never been a greater need for governments to develop policies that foster trust in the digital environment. Economies are increasingly relying on financial technology and digital financial services to stay afloat, and demand for services such as mobile and digital payments, telework platforms, food delivery and e-commerce have grown exponentially. In addition, trust is essential for overcoming fake news and conspiracy theories, which spread particularly fast in times of crisis through connected platforms. Data privacy frameworks that protect citizens' data, together with a national digital identity system, can provide a foundation of trust.

Increasing connectivity and data-intensive economic activities, in particular those that rely on large streams of data “big data”, the widespread use of fixed/mobile connectivity, and the emerging use of the high-speed Internet to connect computers and sensor-enabled devices (the Internet of Things [IoT]) have the potential to foster innovation in products, processes, services and markets and to help address widespread economic and social challenges.

These developments have been accompanied by a change in the scale and scope of a number of risks, relating in particular to digital security and privacy, with potential significant impacts on social and economic activities. Furthermore, as new business models emerge to take advantage of new opportunities, it may be more difficult for consumers to navigate through the resulting complexity of the evolving digital ecosystem. This combination underscores the need for an evolution in policies and practices to build and maintain trust.

User Privacy & Consumer Protection

User privacy over internet are among the most challenging issues raised by digital services. In a multilayered internet structure, concerns thus relate to the wealth of personal data that online activities generate, which, while enabling organizations to sketch rich profiles about individuals, also bring risks to both the individuals and the organizations. Therefore, careful analysis and rectification is required at each layer of communication for ensuring the privacy of a user leading to enhanced trust in internet adoption and its dependable use.

The article-14 of the Constitution of Islamic Republic of Pakistan guarantees privacy of home alongside dignity of every man and woman as their fundamental right. Therefore, privacy of a common person in the internet ecosystem shall be harmonized based on international best practices.

Policy Action#21

21.1. By the virtue of Data for Development Program, PTA via local/international consultant of repute shall perform a study for identifying the type of practices adopted by telecommunication licensees, highly used digital platforms/websites and other business

verticals (especially payment gateways and ecommerce platforms) for handling user data and the disclosures offered to the users regarding exact use of their data.

- 21.2. The outcomes of the study shall further lead to stakeholders' consultation for the harmonization of various user privacy policies in practice by PTA.
- 21.3. For ensuring consistency in privacy policy of different service providers and platforms, PTA shall draft "Guidelines for User Privacy" and if required make necessary amendments in "Telecom Consumers Protection Regulations 2009" for explicating the purpose and use of data being collected online owing to outcomes of study, the consultation process and evolving platforms/services in accordance with international best practices.
- 21.4. PTA after necessary consultations, shall present the draft "Guidelines for User privacy" and proposed amendments in the "Telecom Consumer Protection Act 2009" (if required) for review and processing with MoITT.
- 21.5. Subsequent to thorough review of the recommendations of PTA in light of applicable laws and other measures, MoITT may endorse the said guidelines and amendments (if any) for further implementation.
- 21.6. For effective implementation of enacted regulations and guidelines, PTA may consider to embrace an Internet "sweep", which is a systematic screening of websites to identify breaches of consumer law. Sweeps can be domestic in focus or undertaken as part of a coordinated action between cooperating Consumer Protection Enforcement Authorities at intra/inter government levels. Sweeps are undertaken with a view to requiring contravening websites to take corrective actions. A sweep will typically focus on detecting breaches of consumer protection regulation and user privacy guidelines in a particular sector.
- 21.7. PTA shall further engage with State Bank of Pakistan (SBP) to scrutinize the free flowing exchange of user data amongst staff of different banks and based on the consultation process may facilitate in the enforcement of user privacy over telecommunication networks.
- 21.8. PTA shall develop online content (readable/video) for users, organizations and service providers for increasing awareness regarding rights and obligations of user privacy.
- 21.9. For effective implementation of guidelines, PTA shall orchestrate indicators reflecting



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overall market situation with respect to user privacy adoption, harmonization and awareness via market assessment study with respect to user privacy and based on its outcomes shall make/improve regulations and/or guidelines.

Cybersecurity

The dependence of our societies on the digital infrastructure is growing and the internet remains inherently vulnerable due to its disruptive nature. The confidentiality, integrity and availability of ICT infrastructure are challenged by rapidly evolving cyber-threats, including electronic fraud, theft of intellectual property and personal identifiable information, interruption of service, and damage or destruction of property. The transformational ability of ICTs and the Internet as catalysts for economic growth and social development are at a critical point where citizens, the national trust and confidence in the use of ICTs are at constantly at risk, needing a holistic measure in a top-down approach.

Both offensive and defensive capabilities are required to defend against illicit and illegal activities in the internet space and to preempt incidents before they can cause harm the user, the industry and subsequently the country.

As per the current situation, “Critical Telecom Data and Infrastructure Security Regulations – 2020”, outlays the guidelines for licensees for protecting the user data and critical infrastructure assets form potential cyber threats. Similarly, for addressing issues pertaining to protection of data in general the “Data Protection Act – 2021 (DPA)” is enunciated for defining the rights and obligations of different actors in the internet ecosystem. Finally, the “Pakistan Electronic Crime Act – 2016 (PECA)”, provides necessary protection against online harm, fraudulent and malicious activities required for enhancing digital trust of internet users.

Policy Action#22

- 22.1. As part of Data for Development Program, PTA shall conduct a market study directly or via local/international consultant of repute for analyzing the cybersecurity situation of users, telecom service providers and digital platforms and measures in place for tackling cyber risks and threats. The study shall also scrutinize the coordination mechanism, the previous incidents and other measures implemented in line with international best practices.
- 22.2. As a result of the study and consultation with stakeholders, PTA shall orchestrate a cybersecurity framework for defining a coordination and information sharing mechanism amongst licensees and with PTA for effective cyber threat/risk management.
- 22.3. In adherence to Section-46 of the Pakistan Electronic Crime Act – 2016, PTA shall organize a National Telecom Sector Computer Emergency Response Team (CERT) and a National Security Operations Center (NSOC) for addressing challenges pertaining to user and telecom infrastructure in-security.

- 22.4. PTA shall further enhance its institutional capacity relating to incident management and facilitation with respect to OTT and other digital platforms.
- 22.5. PTA shall develop a coordination mechanism with other sectoral CERTs and the National CERT as per the guidelines laid out in National Cybersecurity Policy for improving digital trust of internet users.
- 22.6. PTA shall organize cybersecurity awareness programs and advisory content for users and licensees from time to time with respect to combating cybersecurity challenges.
- 22.7. PTA shall also scrutinize on continued basis different Intrusion Detection and Preventions Systems, Firewall Platforms, Antivirus Updates etc. provided by different solution providers and organize coordination mechanism and common operating environment guidelines via CERTs in this regard.
- 22.8. PTA shall also organize cybersecurity targets for the Telecom Sector with clear objectives and timelines and reflect the sectoral performance via globally accepted indicators.
- 22.9. MoITT in consultation with PTA and other stakeholders may devise an International Cooperation Strategy for cybersecurity management at inter-governmental (international and regional), bilateral and transnational digital platforms.

Numbering, Naming & Addressing Resources

Numbering, Naming and Addressing resources are recognized as critical drivers of telecommunications developments and has become a key competitive factor for enabling users in the internet space. Internet organization via effective numbering is an indispensable means to route calls and transport data through the networks in order to identify and reach customers and services while helping service providers in the billing process.

The availability and mode of number allocation could influence the way operators engineer their networks, possibly with consequential costs to both operators and users. These and other reasons make fair and equitable access to numbering resources of vital importance to competition and to ensure the development of a competitive telecommunications market is not disadvantaged on numbering grounds and simultaneously establishing digital trust.

Numbering Allocation & Administration Regulations – 2018 is in effect and allows licensees and users with necessary guidelines for application, allotments, number portability, information on

assignment and schematics etc. For Naming part there is no particular regime, however Country Code Top Level Domain is organized via PK-NIC and “.gov.pk” is managed by NTC. Finally, the IP Addressing is demand driven and directly managed by APNIC. Operators continue to make direct applications and manage their IP schemes.

Policy Action#23

23.1. Numbering

- i. Licensed service providers that offer new voice services whose subscribers may be reached via the PSTN will be provided with suitable number ranges.
- ii. The policy supports transition to IPv6 within a reasonable timeline, preferably by 2021. The transition would take into account national security requirements.
- iii. PTA directly or via onboarding local/international consultant of repute shall formulate “National Numbering, Naming and Addressing Management Plan”, identifying the challenges, future demand for numbering, optimization of resources, plan for adoption of new systems (such as ENUM) and roadmap for numbering convention.
- iv. The plan shall further be deliberated with stakeholders and the final draft be presented along with recommendations to MoITT for review and approval. MoITT based on recommendation and after thorough review may endorse the plan for further implementation.
- v. PTA shall review the current application process with respect to application of UAN/UIN and further optimize it for ensuring expeditious processing via process automation and integration.
- vi. PTA shall develop and/or procure a tracking system for Numbering, Naming and Addressing resources for effective management of scarce resources on dynamic basis.

23.2. Naming Resources

- i. In consultation with stakeholders, PTA shall develop a “Naming Service Rules” for standardizing, harmonizing, optimizing and evolving naming resolution process in accordance with Data Protection Act- 2021 and based on international best practices.
- ii. After necessary consultations and with appropriate recommendations, PTA shall share the said Rules with MoITT for review and finalization. Based on the review process, MoITT may ratify the Rules for further implementation.
- iii. MoITT may enhance its engagement with ICANN, UN-IGF, IANA, APNIC and other such international multi-stakeholder platforms for addressing matters pertaining to ccTLD, timely

allocation of resources and improving the state of participation and contributions towards these organization.

- iv. PTA shall maintain a database of all the domains hosted in Pakistan by different local hosting services providers.
- v. All such service providers shall be scrutinize by PTA from time to time for evaluating the course of internet security and the service providers shall be obliged to offer their facilities for such audits under Naming Service Rules.

23.3. Addressing Resources

- i. PTA shall conduct a brief study on the availability of IP Address resources in the country with respect to current and evolving demand patterns, IP blocks availability situation with different licensees, IP management plan, Autonomous System Numbers (ASN) and the requirement in the National Broadband Targets for inclusion and adoption of internet and availability of IPv4 resources with IANA and APNIC for allocation of IP resources.
- ii. Based on the outcome of the study, PTA shall engage with stakeholders to discuss their plan for migration to IPv6 and articulate a plan for demand driven and phase-wise adoption.
- iii. While anticipating an exponential increase in internet demand and diversified services, PTA shall further evaluate the possibility of organizing service and/or technology centric networks (such as smart city, autonomous vehicles, drones etc.) via AS number pre-assignments.

Environmental Protection

Environmental concerns, including climate change, represent some of the most serious global challenges of the 21st century. Advanced information and communications technologies can contribute significantly both to the problems and to the solutions. As a growing, energy-intensive, ubiquitous industry, ICTs have a strong impact on the environment in virtually every country. At the same time, as a field driven by innovation and competition, these technologies present a variety of opportunities to engineer Green alternatives to traditional modes of operation. And ICTs can play a vital role in helping to facilitate research, analysis, awareness raising, and cooperation to address critical environmental issues.

While taking stock from the Paris Accord (United Nations Framework Convention on Climate Change [b-UNFCCC PA]) on limiting the Green House Gas Emissions to no more than 1.5° of the pre-industrial temperatures the ITU under its recommendation ITU-T L.1470 advocates the de-carbonization of ICT sector and via ICTs of other Sectors, emphasizes on the resource sharing of

Fixed/Mobile wholesale as well as retail networks, using of alternate power sources, limiting electricity budgets etc.

According to EDGAR database created by European Commission and Netherlands Environmental Assessment Agency released in 2018, Pakistan's CO₂ emissions have increased by approx. 200% in the past 25 years only, averaging at per land 224 (total CO₂/km²/year) and per capita 1.0 (total CO₂/capita/year).

Policy Action#24

24.1. *Study of Carbon Footprint and Science Based Target Setting*

- i. Under the Data for Development Program, PTA shall directly or via local/international consultant of repute, organize a study for "Measuring the Carbon Footprint of Telecommunication Licensees and Associated Services" in the country with an aim to recognize year 2021 as baseline year for setting Science Based Targets for the Telecom Sector.
- ii. The study shall analyze the direct emissions of operators, the emissions caused due to service operations in terms of active network equipment, datacenters, power backup systems, impact of the fixed network laying and overall value chain emissions (including manufacturing of equipment and terminal devices).
- iii. Similarly, PTA shall organize another study under the purview of Data for Development Program directly or via local/international consultant of repute for "Assessing the Carbon Footprint of Internet Terminal Devices" including smartphones, laptops, computers and any other in use, general life of devices in the market with respect to internationally defined standards, quality of devices being imported (new/refurbished/e-waste etc.) and processes as well as infrastructure in place for e-waste management.
- iv. Based on the outcomes of both the studies, recommendations shall be furnished in terms of target setting, standardization of goods and developmental/operational practices being adopted and roadmap for de-carbonization of industry in accordance with the recommendations of ITU-T L.1470 GHG emissions trajectories for the ICT sector compatible with the UNFCCC Paris Agreement and aligned to the IPCC Special Report on 1.5°C.

24.2. *Environment Protection Rules*

- i. Based on the outcomes of the first study and the subsequent recommendations, PTA shall consult with stakeholders and based on available data and guidelines proposed vide Science Based Targets initiative (SBTi) compatible with the UNFCCC Paris Agreement, identify year-on-year de-carbonization budgets and targets.

- ii. Based on the identified targets, PTA shall formulate “Environment Protection Rules” for Telecom Industry and present the same for review and further processing to MoITT.
- iii. For effective implementation of Rules and achievement of identified targets, PTA shall develop/procure an “Emission Management System” for the monitoring and evaluation of all the licensees and their performance with respect to identified targets.
- iv. PTA shall also expedite the enactment of Outside Plant Code and In-building Cabling Standards for development and operations to ensure efficient environment protection as explained in Policy Action# 21 below.

24.3. E-Waste & Digital Trash Policy/Rules

- i. While referring to the outcomes of the second study and subsequent recommendations, MoITT in consultation with PTA and other stakeholders may articulate E-Waste & Digital Trash Management Framework/Guidelines for manufacturers, traders, retailers, waste management companies and users.
- ii. After necessary consultation and review process, MoITT shall ratify the framework/guidelines for further implementation by PTA.
- iii. As part of the E-Waste & Digital Trash Management Framework, MoITT may include a public-private partnership program for establishing E-Waste Processing/Management facilities, owing to meager situation of standardized processing facilities in the country and for achieving identified de-carbonization targets timely.

24.4. PTA will monitor the environmental impact of licensees and the authority to define standards for the sector and issue orders to licensees and take other action on contravention of such standards.

Technology & Service Standardization

Standardization and standards ensure a degree of uniformity, fairness, and quality across a wide array of disciplines and processes. Standards are a key means of diffusing innovation through the economy as a whole, ensuring that the majority of firms do not lag too far behind early adopters of new ideas.

Standards can play a vital role in growing the market both nationally and globally. In essence, a standard describes the technical consensus on performance of a product or service. Standards

impact on all areas of economic life, e.g., supporting safety regulations, assuring quality and enabling compatibility of products. New standards may emerge through a competitive market process or by accepted use.

Policy Action#25

25.1. Establishing National Organization for Standardization, Research and Implementation (NOSRI)

- i. For creating a link between standardization, the industry and the market, PTA in consultation with MoITT and other stakeholders, shall establish a “National Organization for Standardization, Research and Implementation (NOSRI)” which shall develop technical specifications, common operating environment, implementation and operational manual/guidelines and shall offer any other assistance required for efficient functioning of systems as per international best practices.
- ii. The mandate of NOSRI within the ambit of Information and Communication Technologies (ICTs) shall be to standardize new technologies for early adoption, embrace existing standards developed by other international standard developing organization via effective coordination and research, analyze locally developed products and facilitate them in patenting process for standardization, establish guidelines for end-of-life and end-of-support to ensure systematic sunset of technologies consistent with local market use, conduct studies from time to time to assess the overall market situation regarding technologies and systems in use, technologies in the pipeline and their impact on the market/industry and organize processes for transfer of technology necessary for evolution of the society.
- iii. The licensees, distributors, retailers, telecom infrastructure developers and other affiliated stakeholders shall ensure that all the equipment procured, installed, managed and operated, all the infrastructure laid and managed and all the devices manufactured and traded are in accordance with the rules, guidelines and any other advisory issued by NOSRI/PTA from time to time.
- iv. In case of ambiguity or omissions regarding standardization, the concerned may approach NOSRI and/or PTA for seeking necessary clarification through proper communication channel as provided on NOSRI/PTA website.

25.2. Telecommunication Standards for Network Equipment

- i. In accordance with section 28 of Telecommunication Re-organization Act 1996, NOSRI/PTA in consultation with stakeholders and as per the guidelines provided by international standardization organizations for telecommunication network equipment shall draft the “National Standards for Telecommunication Equipment”.

- ii. The standards may include, general specifications, industry and code requirements, performance requirements, interoperability requirements, HSE requirements, specific materials requirements (if any), warranty/guarantee coverage requirements, electrical/electronic efficiency requirements, installations and operations requirements and any other requirements as deemed appropriate from time to time.
- iii. The purpose of standardization shall be at all times to facilitate adoption and harmonization of new technologies and standards without drawing any prejudices whatsoever.
- iv. After necessary consultations with the stakeholder, PTA shall present the final draft of National Standards for Telecommunication Equipment to MoITT for assessment and further consultations. Based on which the MoITT may endorse the proposed standards for further implementation.

25.3. Simplification and Automation of Type Approval Process for Terminal Equipment

- i. For improving accessibility and transparency, NOSRI/PTA shall develop or procure Automation of Type Approval in accordance with guidelines furnished in Type Approval Technical Standards Regulations-2019.
- ii. NOSRI/PTA shall further organize at all major sea/dry ports in Pakistan “Facilitation Help Desk for On-Spot Type Approval of Terminal Equipment”, so that systematic impediments concerning demurrages to traders, distributors and users could be reduced.
- iii. NOSRI/PTA shall further harmonize guidelines for users directly ordering smartphones and other communication terminal devices from international e-commerce platforms making necessary provisions in the DIRBS platform for approval of ordered devices or any other regime applicable in this regard.
- iv. NOSRI/PTA shall establish helpdesks on international airports nationwide for facilitating On-spot DIRBS registration of unregistered devices.
- v. NOSRI/PTA may continue to review and update the Type Approval Technical Standards Regulations and the register for approved devices in accordance with given timelines.

25.4. Passive Infrastructure Standardization

- i. NOSRI/PTA shall articulate guidelines for “Structured Passive Infrastructure Standards”, pertaining to outside plant, in-building cabling, tower erection, outdoor fixed/mobile sites, equipment spaces & pathways, power plants & backup sites, material & development quality

and any other standards required for the protection of environment, safety, uniformity and efficiency of passive telecommunication infrastructure.

- ii. NOSRI/PTA may issue standards in a consolidated form or respectively, however, it shall be issued as part of principle document of Structured Infrastructure Standards.
- iii. NOSRI/PTA shall organize a resilient monitoring, evaluation and enforcement system for consistent adoption of the said standards and shall review/update all issued standards from time to time.

25.5. Humanizing the 4IR Technologies & Systems

- i. For making human values and ethics central to technological development and policy, MoITT in consultation with stakeholders, may develop a “Technology Humanization Program”, for studying the potential impact of technologies identified under the umbrella of 4th Industrial Revolution (such as AI, Blockchain, IoT, Cloud Technologies, Big Data, 3D Printing, Drones, etc.) and accordingly devising an action plan for harnessing new technologies for social good.
- ii. The aim of the Program shall be to analyze different products and services embracing 4IR technologies in context of its impact on the society in terms of wellness, fairness, openness, privacy and opportunities it serves to the society.
- iii. Based on the outcomes of the study, licensees, service/solution providers may be engaged for harmonizing the services for improving service delivery, while keeping the integrity of a user foremost and if at all required necessary Rules may also be enunciated for smooth and transparent adoption of new technologies and services.

25.6. Telecommunications Terminal equipment will be subject to type approval based on international norms and testing by one of the approved set of laboratories. Approved laboratories may be in countries other than Pakistan.

25.7. The use of phones with duplicate identifiers and stolen phones will be blocked. In this regard, PTA will develop a regulatory framework to ensure that;

- i. Stolen phones, blocked phones, and phones with no duplicate or non-standard identifiers are blocked from use in Pakistan, and;

- ii. Mobile licensees actively identify such phones on their networks and will maintain and update industry wide database with information about such phones for the benefit of the mobile services sector worldwide.

25.8. This framework will be developed in consultation with all relevant stakeholders. The framework will specify that;

- i. Mobile terminal equipment must have a valid and unique IMEI or equivalent identifier.
- ii. Mobile licensees will become members of the International Mobile Equipment Identity Database (IMEI DB, formerly the CEIR) operated by the GSMA, or others as applicable.
- iii. Mobile licensees will include countries that are the source of a large number of stolen devices to Pakistan in their IMEI DB notification profile.
- iv. Mobile licensees will report stolen terminal equipment and terminal equipment with invalid identifiers to the IMEI DB on identification as such.
- v. Mobile licensees will block stolen terminal equipment once reported.
- vi. Mobile licensees will not allow the registration of new terminal equipment with invalid identifiers on their networks.
- vii. Blocked identifiers will not be activated.

Cyber Vigilance

Cyber vigilance has an important role for improving user trust over internet by serving the purpose of a watchdog for protecting the assets and wellbeing of a user online and keeping them from online harm. It further assists the Government by monitoring illicit activities online and tackle them before it injures a user or a society on internet without intervening in day to day online affairs or breaching any data integrity pact with a user.

Cyber Vigilance Division consist of two departments WAD (Web Analysis Directorate) and Vigilance Directorate. Web Analysis Directorate is responsible for improving user experience over internet and protecting the society from potential harm by performing necessary activities to identify and

channelize content reported as harmful by the public. Whereas, Vigilance Directorate is responsible for detection and apprehension of grey traffic.

Both the directorates continue to function efficiently, however with enhancing internet ecosystem and complex technologies in effect makes the job of the organization more challenging.

Policy Action#26

- 26.1. Owing to evolving situation of internet and emerging new technologies, PTA shall review the capacity and ability of Cyber Vigilance Directorate and if required enhance its efficiency, for improving the course of Digital Trust in the internet ecosystem.
- 26.2. For the purpose of transparency of the activities carried out by Cyber Vigilance Division, PTA shall publish a bi-annual “Internet for Good Report” on the performance of the division and their contribution for improving the internet ecosystem in the country.
- 26.3. PTA shall organize an “Integrity Audit” vial local/international Auditor of repute and atleast on annual basis in order to scrutinize the activities of the Directorate in compliance with identified mandate and based on international best practices. Based on the outcomes of the Audit activity, PTA shall ensure compliance via process automation and shall enhance performance as per the recommendation of Auditor.
- 26.4. For protecting the interest of the user and industry, PTA shall further improve the monitoring and enforcement efforts against grey traffic.
- 26.5. The division shall continue to perform within its identified mandate and establish a seamless coordination mechanism with law enforcement agencies for timely reporting of illegal and malicious activities over internet in compliance with PECA, for timely action.
- 26.6. A new concept of national borders has emerged with the advancement of telecommunications globally; the Digital Borders. It requires policy initiatives for protection of telecommunication networks and information flowing on these networks.
- 26.7. In order to be able to carry out communications analysis functions related to telecommunication sector and networks including incoming VoIP, Grey traffic analysis & mitigation, network threat detection, malware analysis, web analysis and legally



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mandated content filtering, IP consumer trends and OTT applications visibility, critical

infrastructure information protection, PTA will deploy a solution under a framework ensuring long term sustainability through constant updates and upgrades in order to keep pace with ever changing technological trends and capacity requirements. Due to immense value addition in terms of network and communications security for the telecommunications industry, a sustainable model based on industry inclusion and contribution through membership may also be considered.

4th Pillar – Transformation & Evolution

4th Pillar – Transformation & Evolution

After embracing the first three steps of the journey i.e. digital inclusivity & accessibility, enhanced usability, ensuring online trust, the transformation and evolution of the user is of utmost importance, which also serves as the 4th pillar of the journey in this policy. The digitization of societies and economies are continuously generating record amounts of data which is driven by increased and faster connectivity of people and things.

Fiber to the home (FTTx) and fast mobile networks provide the opportunity to engage in digital activities such as; social media, interactive OTT platforms, omni-channel e-commerce marketplaces, integrated productivity tools, etc., allowing user-generated content and subsequent motivation for it. At the same time, more objects become “smart”, i.e. connected to the Internet to receive and send data. As a result of the explosion of data, new technologies have evolved that help to examine through data and derive value from combining and analyzing large data sets. These technologies are often described in umbrella terms such as artificial intelligence (AI) and big data.

The new technologies requires policy makers to reconsider the tools they deploy to facilitate fair competition in the ICT sector and protect consumers. New technologies also pose legal, ethical, and macroeconomic challenges. Central banks, consumer protection agencies, competition commissions, and ICT regulators scramble to assess the implications for their fields of responsibility.

The implication is that roles of sector-specific regulators such as for the ICT sector, water, electricity, and banking, and subject-specific regulators such as a consumer protection agency or the competition commission may need to be redrawn and, in some cases, more specialized regulators may need to be established.

Through this pillar, the aim is to streamline the transformational journey of a user by redefining the role of the Authority, enhancing public sector organizations’ agility and market driven technology adoption, in response to cloud computing, AI, Blockchain, big data, and the Internet of Things (IoT). Whereas, the desired outcomes for fair competition, consumer protection and economic development would remain the same.

The transition to an all-IP network means that laws, policies, and regulations need to evolve to maintain fair competition. This has consequences for national regulatory institutions including ICT and broadcasting regulators, competition commissions, and consumer protection agencies. Big data, AI, and the IoT are driving the need for a redesign of the regulatory landscape because these technologies are able to combine, analyze, and utilize disparate sources of data, providing insights

that do not only apply to any one sector but across sectors and not only to one jurisdiction but to many.

Transforming Legacy Services

Legacy PSTN based services and associated infrastructure impounds a heavy recurring costs on the service providers and poses a hurdle for users to embrace high-speed broadband internet. The adoption of next generation infrastructure has significantly increased especially in mobile access networks, however, fixed access networks continues to struggle due to higher network transformation costs. IP Transformation is moving the industry from a capital-intensive, technology-focused model to a user-centric service-delivery model.

Software Defined Networks (SDN) enabled via General Purpose Machines (GPMs) has allowed for flexible and optimized infrastructure use and sharing on demand basis, allowing service providers to re-purpose their infrastructure by drastically reduce operational costs, add new revenue streams and most importantly improving the competition situation and transparency for the user.

While understanding the impact of early transformation on market sustainability and that the source of income of service providers would heavily rely on internet centric digital services and subsequent data monetization in the next 20 years or so, therefore, traditional services are seen as threat to the society and requires a multi-stakeholder consensus for timely evolution.

Policy Action#27

- 27.1. MoITT may organize a study directly or via local/international consultant of repute for analyzing the current situation of demand/use of traditional telecom services using a bottom-up approach, identifying the challenges at user level, network/service levels, ecological impact and the technology roadmap under the Data for Development Program.
- 27.2. The findings of the study shall be applied for articulating the “Legacy Service/Network Transformation Strategy” and further be deliberated via multi-stakeholder consultation in light of the findings of study and international best practices.
- 27.3. The Strategy shall identify a cut-off date for switching-off legacy infrastructure, directives to PTA for optimizing appropriate licensing regime(s) for wholesale and retail legacy services by defining clear rights and obligations after service migration to all-IP based infrastructure to avoid service overlap and protecting the interest of each of the respective licensees, necessary review/provisions in the Competition Rules, Quality of Service Regulations, use of Assigned/Auctioned Spectrum Bands, Strategy linkage with Environment Protection Rules and any other measure required for achieving established targets in the Service/Network Transformation Strategy.

- 27.4. The Legacy Service/Network Transformation Strategy may be ratified by MoITT after necessary consultation, review and approval process, with PTA to be designated as implementation/enforcement organization for the Strategy.
- 27.5. Within six (6) month from the approval of this policy, PTA shall devise and implement Rules/Regulations with a target to revamp the over the ground legacy infrastructure (such as; copper network and over the ground poles etc.) via services corridors as defined in the Right of Way Policy Directive by 2030 for improving the state of internet, consumer protection and for embracing environmental obligations.

Evolution towards 5th Generation Policy & Regulatory Regime

The overarching nature of cross cutting technologies has necessitated for a broader role of regulators from being a simple sector specific regulatory authority to a more user journey centric integrated role by embracing enhanced coordination mechanism, forming new bodies or even in many cases convergence of different regulators for ensuring a simple yet effective regulatory regime for facilitating, enabling and protecting users, promoting investments and allowing government to organize its resources in the best possible manner.

For adopting enabling regulatory frameworks in the digital space, it is crucial that regulators shall avoid the mere extrapolation or expansion of existing, potentially outdated laws and regulations to new players or new topics. As advocated by ITU, the regulators shall adopt measures which may include deregulation or self-regulation or a coregulatory approach, that will lead to greater innovation, easier deployment of new and emerging technologies, incentivize investment, and focus on inclusivity and collaboration.

For flexible regulatory approach towards new services and business models while remaining user centric and target oriented, it is important that every rule, regulation, strategy or even a simple guideline shall draw a relation with market/user situation via continuing market surveys, review of current and emerging risks, impact assessment studies allowing data backed decision making for promoting investments and innovation.

Policy Action#28

- 28.1. The PTA will undertake its roles as defined in the Telecommunications Re-organization Act 1996 (amended 2006) in a proactive manner and to act accordingly to implement this Policy in areas where Policy has been specified and to adhere to the generally stated principles within this Policy where specific Policy measures have not been specified.

28.2. MoITT in collaboration with PTA & FAB will devise a framework for sector contribution to Standards Development Organizations (SDOs).

Open Source

The Networks and associated Technologies are continuously evolving and Software Defined Networks (SDNs) are the future of telecommunication services, where service/technology centric hardware platforms will no more be required. General purpose computing in a cloud based environment installed in different synchronous and asynchronous configurations will serve the purpose of automated service provisioning using programmable multimode systems. Owing to these elements, investments in Open Source technologies and platforms are inevitable and therefore, research and development of such technologies and services and shall promote local startups to facilitate service providers locally and abroad.

Policy Action#29

29.1. In realization to the increasing technological convergence and dependency on Software Defined Networks (SDN), Open Source has a critical role in network evolution interalia network economics.

29.2. In view of these developments, Ignite in consultation with MoITT shall establish an “Open Source - Resource Center” for carrying out research on available technologies and resources which may be optimized to support network evolution through optimum resource utilization.

29.3. The Open Source – Resource Center, shall take into considerations the following requirements;

- i. Research and Development on Multiband/Multimode Radio Technologies.
- ii. Study and roadmap development for the adoption and implementation of Open RAN and Open Core Networks.
- iii. Standardization of using Open Source based platforms and services.
- iv. Research and Development on RISC-V computing for enabling local manufacturing of microprocessors and allied integrated circuits.

- v. Study and develop standards on Nano Computing in light of available Open Source based technologies.
 - vi. For the accommodation of new technologies and services the Resource Center shall organize standardization sandbox framework in relation with cutting edge technologies identified through 4th Industrial Revolution.
- 29.4. For early enablement, Ignite shall devise such a facility supported by an all-inclusive program (with a focus on commercial research and academia, both) and after necessary consultations with stakeholders, shall offer its recommendations to MoITT for endorsements.
- 29.5. MoITT after review of such recommendations shall inculcate the resource center for supporting an Open Source development culture in the country.

Autonomous Networks

The technology evolution has reached to a point where networks are orchestrated by introducing new level of automation and intelligence in the management and provisioning of services by the networks themselves. This revolution is termed as Autonomous Networks.

The future potential economic and social benefits increasingly depend on more recent technologies that, in turn, rely on these existing and more mature fundamental building blocks, including the IoT, cloud computing, big data analytics, artificial intelligence (AI) and Blockchain. This set of technologies forms an ecosystem in which each technology both exploits and fosters the development of the others.

Cloud computing is based on always-on everywhere-available and high-speed Internet connectivity and is essential to big data analytics, which relies on cheap and massive processing power and storage capacity. Big data also critically depends on sophisticated algorithms that, in turn, form the basis of AI. To comprehend their virtual or physical environment and take appropriate decisions, machines such as robots and drones rely on AI that often uses big data to identify desired patterns.

It is important for policy makers to cope with challenges and opportunities associated with Autonomous Networks for ensuring fair and transparent competition, transformation of licensing regimes, consumer protection and digital trust provisioning for efficient and human friendly adoption of technologies and networks.

Policy Action#30

- 30.1. In accordance with international best practices, PTA shall organize a study directly or via local/international consultant of repute for understanding the current state of network



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automation in the country, type of services being rendered and to what extent and the impact of adoption of Autonomous Networks.

- 30.2. Based on the outcomes and recommendations proposed in the study, PTA shall carry out a stakeholder consultation for educating on the best practices adopted and seeking inputs for harnessing automated networks in the country.
- 30.3. Based on the consultation process and the outcomes of the study PTA shall draft “Autonomous Networks/Services Adoption Strategy”, providing adoption, usage, regulatory, competition, privacy and security guidelines and implementation timelines while keeping the user first and foremost.
- 30.4. The draft strategy shall be presented to MoITT for further review, consultation and endorsement. MoITT may after taking necessary measures may ratify the strategy for implementation.

Review of Govt. Sector Organizations’ Role

The role of public sector organization needs to be revitalized for embracing National Broadband Targets within designated mandates as per Telecommunication Re-organization Act 1996 and other appropriate directives of the Federal Government.

For enhancing the adoption, use, affordability of internet in the public sector and with the help of public sector special instruments are required for ensuring sustainable service delivery and operations.

Policy Action#31

31.1. *National Telecommunication Corporation (NTC)*

- i. NTC via local/international consultant of repute, shall conduct a comprehensive study on the availability situation of connectivity, demand and adoption in the government sector, the services in pipeline, the infrastructure availability nationwide, systems in place, technological evolution and the requirements for achieving National Broadband Targets pertaining government availability.
- ii. The outcomes of the study and the recommendations offered by the consultant, NTC may devise a “Going Digital Program” for connecting the unconnected organizations and upgrading existing users with higher data rates based on identified demand.
- iii. The Program shall also make provision for Cloud Services on the concept of “Government as a Service” for provisioning different cloud based services to the target audience.

- iv. The Program shall be evolving and continuously gauge the demand of different Government departments and autonomous organizations, orchestrate new services for digitization in coordination with NITB and subsequently offer/commission services at user premises.
- v. The program shall be organized in a three (3) layered architecture; FTTx based high speed connectivity, provisioning of cloud infrastructure and commissioning of digital services including robust customer support.
- vi. As part of the program, NTC shall also revitalize its customer services and offer SLA based highly organized services to the users.
- vii. The draft program shall then be presented to NTC Board for further consideration and upon approval the same shall be presented to MoITT for further review and processing.
- viii. MoITT after seeking necessary clarifications (if any) may endorse the program for further implementation.
- ix. The efficiency of the NTC will be improved through activation of full range of services mandated under the Act both through indigenous investment by NTC and/or through the establishment of partnerships with the private sector to the benefit of both Government users and the private sector. These partnerships will enable the economies of scale necessary for efficient operation and sustainability of the NTC and may be realized for example by:
 - a. Outsourcing of an enhanced version of the NTC service portfolio.
 - b. Public private partnership whereby the resources of one or more operators would be used in partnership with NTC.
 - c. NTC procuring services to deliver its service portfolio.
 - d. Provision of a full range of services as mandated by the Act to NTC, to all levels of government institutions as well as officials.
- x. Appropriate amendments in the Act may be introduced to ensure information security of NTC designated subscribers, enable sustainability and protection of the Government investments in NTC network specifically through exclusive provision of secure reliable communications to NTC designated subscribers through NTC.

- xi. NTC shall formulate a five (5) year strategic growth plan for improving the state of internet in public sector organizations with clear objectives and targets to be aligned with projected demand within their given mandate.
- xii. While adhering to Telecommunication Re-organization Act 1996, NTC shall review and propose necessary amendments in its rules and management structure for gaining financial autonomy and perpetual business operations.
- xiii. NTC shall actively participate in public tenders for providing broadband/digital services to its customers directly or in joint ventures/consortiums adhering to the rules of Competition Commission.

31.2. Special Communications Organization (SCO)

- i. The Special Communications Organization (SCO) will continue to develop, maintain and operate telecom systems, infrastructure and services within Azad Jammu & Kashmir, Gilgit- Baltistan.
- ii. SCO shall formulate a five (5) year strategic growth plan for improving the state of internet proliferation and adoption in designated area of services with clear objectives and targets to be aligned with projected market demand.
- iii. For expediting the course of strategic digital development in designated areas, SCO shall develop and implement broadband access programs using public-private partnership instrument based on international best practices.
- iv. For allowing self-supporting business operations, SCO shall review and propose appropriate amendments in its rules and subsequent management structure for gaining financial autonomy in accordance with Telecommunication Re-organization Act 1996 for ensuring perpetual and independent service delivery.

31.3. Electronic Certification Accreditation Council (ECAC)

- i. Electronic Certification and Accreditation Council (ECAC) shall formulate a five (5) year strategic growth plan for improving its operational efficacy having clear objectives and targets within its given mandate.
- ii. ECAC in accordance with its mandate shall devise programs and initiatives possibly via public-private partnerships for achieving its strategic objectives.

- iii. While adhering to its mandate, ECAC shall review and propose necessary amendments in its rules and management structure for gaining financial autonomy and perpetual business operations.

31.4. Telecom Foundation (TF)

- i. Telecom Foundation (TF) shall propose a five (5) year strategic growth plan for improving its operational efficacy having clear objectives and targets within its given mandate.
- ii. TF in accordance with its mandate shall devise programs and initiatives possibly via public- private partnership instruments for achieving its strategic objectives.
- iii. While adhering to its mandate, TF shall review and propose necessary amendments in its rules and management structure for gaining financial autonomy and perpetual business operations.

31.5. Pak Datacom Limited (PDL)

- i. Pak Datacom Limited (PDL) shall propose a five (5) year strategic growth plan for improving its operational efficacy having clear objectives and targets within its given mandate.
- ii. PDL in accordance with its mandate shall devise programs and initiatives possibly via public-private partnership instruments for achieving its strategic objectives.
- iii. While adhering to its mandate, PDL shall review and propose necessary amendments in its rules and management structure for gaining financial autonomy and perpetual business operations.

31.6. Telephone Industries of Pakistan (TIP)

- i. Revitalization of the Telephone Industries of Pakistan (TIP) shall be considered by MoITT for the manufacturing of smart devices, 4IR technologies including Electronic Vehicles, Drones, Agri- tech, Robotics and similar platforms.
- ii. TIP shall propose a five (5) year strategic growth plan for improving its operational efficacy having clear objectives and targets within its given mandate.
- iii. TIP in accordance with its mandate shall devise programs and initiatives possibly via public- private partnership instruments for achieving its strategic objectives.

- iv. While adhering to its mandate, TIP shall review and propose necessary amendments in its rules and management structure for gaining financial autonomy and perpetual business operations.

31.7. Broadband Provisioning in Public Buildings

- i. Facilities that enable broadband communications for use by the public sector building occupiers will be installed in new buildings built by the state, municipalities and government enterprises to enable maximum consumption of ICT services in the public sector.

31.8. Local Manufacturing

- i. Federal Government will assess the feasibility of domestic production of telecommunications equipment with specific focus on national assets and other strengths that can be exploited. The assessment will determine the area in the supply chain of equipment manufacturing where Pakistan should operate and whether and how it should cooperate with existing equipment manufacturers. A comprehensive incentive package for attracting joint ventures, Public Private Partnerships and direct investment into this important area will be developed and release after collaborative work of MoITT, Ministry of Finance, Ministry of Industries and other stakeholders.

International Cooperation

The overarching nature of the internet requires focused and delicate approach towards global challenges and opportunities which allows nations and societies to claim their equitable share in the cyberspace. Disruptive and cross functional digital platforms and services needs harmonization with the laws of the land and the laws of the land needs to adopt emerging best practices timely for safeguarding the presence and enhancing the dependency of a user over digital ecosystem. Therefore, the role of international cooperation needs to be orchestrated efficiently for transforming the nation into a knowledge based economy.

Policy Action#32

33.1. Engagement with International/Regional Inter-governmental Organizations

- i. The Ministry may enhance its presence at inter-governmental and multilateral forums for actively participating/contributing in meetings, forums, symposiums, working/study group(s), workshops etc. regarding; articulation of international policy and regulatory recommendations, standardization development and management for adoption of emerging platforms and technologies, efficient resource utilization, infrastructure development, skill development and enhancements and any other activity for embracing international best practices.

- ii. The Ministry may appoint subject matter experts on international cooperation as permanent representative(s)/attaché(s) at inter-governmental forums such as; ITU, APT, ICANN, ITSO, IETF, UN-Broadband Commission and any other organization or forum requiring consistent engagement for staying on top of respective international developments.

33.2. Harnessing International Best Practices

- i. For allowing a futuristic and structured approach towards improving the course of strategy, policy, rules, regulations, frameworks and guidelines issued by the Government, the Ministry and the Authority for the development of digital ecosystem, the Ministry via its International Coordination Wing may furnish “International Digital Development Report” reflecting emerging challenges, opportunities, advancements taking place globally in the cyberspace and accordingly offer its recommendations, strategic frameworks and proposals for harnessing international best practices.
- ii. The offerings made in the report shall be appropriately adopted in forthcoming policies, regulations, frameworks and other such guidelines issued by relevant forums from time to time.

33.3. Bilateral Cooperation

- i. In consultation with stakeholders, the Ministry may devise a “Digital Friendship Strategy” for strategically cooperating with counterparts establishments in other international government(s) for cohesively participating at international/regional inter-governmental foras’ by timely aligning common interests, harnessing best practices, opening avenues for trade in ICTs, participating in the development of digital infrastructure via public and/or private instruments and other matters of bilateral interests to be amicably resolved for efficient strategic partnerships via organizing formal understandings, frameworks, partnership agreements, inclusion of identified and mutually agreed areas of interest in protocols of joint working/economic committees/groups, establishment of subject specific ICT cooperation committees under formal bilateral forums etc.
- ii. In this regard the Ministry may incrementally consult with Ministry of Foreign Affairs (MoFA), Ministry of Commerce (MoC), Economic Affairs Division (EAD) or any other pertinent national forum for inclusion of proposals, recommendations, guidelines and frameworks at different bilateral platforms for preferential treatment of ICTs for embracing Digital Friendship Strategy and in accordance with the appropriate Cabinet Instructions.

33.4. Strategic Alliances & Partnerships

- i. As part of the Digital Friendship Strategy, the Ministry may strategically engage global internet/digital conglomerates and international ICT associations having greater impact on



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society through effective participation in policy making & regulations, opening new avenues for

investments, improving research and innovation for improving the course of internet and content availability in the country.

- ii. In this regard the Ministry or organize understandings and other appropriate instruments as per relevant Cabinet instructions for structured inclusion and win-win partnerships.

33.5. Enabling Funding & Financing

- i. For expediting the outreach, adoption and use of internet/digital platforms, uplifting indigenous research and innovation and to improve the situation of Ease of Doing Business for ICT sector, the Ministry may from time to time engage international/regional financing and funding institutions for timely embracing National Broadband Targets by devising and implementing sustainable ICT Development Programs via appropriate channels.
- ii. Funding/financing generated for such purposes shall only be utilized for identified purposes and possibly through public-private partnerships.

33.6. Enablement of Foreign Direct Investments

- i. For taking the word globally, promoting the situation of ease of doing business in Pakistan, the Ministry may enhance its participation in international/regional foras' and exhibitions with clear objectives and targets.
- ii. The Ministry with the help of appropriate organizations and instruments (such as public-private partnerships) may also organize such events in Pakistan for promoting indigenous research and innovation and for opening new avenues of foreign investments in the digital ecosystem. Such events may be organized on
- iii. For the promotion of its digital development programs, policy and regulatory enhancements aimed at ease of doing business, the Ministry may prepare and distribute such contents and materials for proliferating a positive image building of the country necessary for enticing new foreign investments via appropriate forums and channels.

Other Policy Measures

Other Policy Measures

Policy measures which are required to be inherited from the previous policy and does not fall directly within user journey going forward, but are necessary to be carried forward are accommodated through this framework.

It is reiterated that policy measures from Telecom Policy – 2015 for which directives were issued from time to time and may be required for drawing necessary conclusions shall stay in effect and may be visited on need basis.

Lawful Interception

Policy Action#33

- 37.1. The Federal Government will prescribe rules for Lawful Interception (LI) as mandated under Telecommunication Act. In the light of these rules, framework will be prepared jointly by PTA and authorized agencies/organizations of the GoP. The rules will consider inter alia;
- i. Mechanism for provisioning, maintenance, upgradation and expansion of LI facilities.
 - ii. Possibility of joint provisioning of LI facilities by Licensees.
 - iii. Provision for multi-stakeholder forum in the Federal Government to review and recommend adjustments in LI mechanisms and incidental regulatory adjustments.
- 37.2. Further, the development of new ways of delivering telecommunications services and the new services that are evolving means that lawful interception is a constantly evolving requirement. Lawful Interception requirement of such evolving services will preferably be met before commencement of such services or within an agreed upon timeframe. Failing to comply with the agreed timelines will lead to the application of due regulatory process.
- 37.3. The responsibility of retention of communication session's related information will be the responsibility of the licensee as prescribed.
- 37.4. The lawful interception functional model and systems will be transparent and based on international standards, such as ETSI.
- 37.5. All government entities providing telecom services as licensees or otherwise under a specific authorization shall provide LI facility as per provisions of their licenses or authorization.

Amended Laws & Regulations

Policy Action#34

34.1. In order to realize the objectives of this Policy, directives were issued from time to time and necessary changes to the Acts, Ordinances and Rules may be carried out. The relevant documents include but not limited to;

- i. The Pakistan Telecommunications (Reorganization) Act - 1996 as amended to 2006.
- ii. The Prevention of Electronic Crime Act, 2016.
- iii. The Telecommunications Rules (S.R.O. 847 (I)/2000).
- iv. Policy Directive under Section 8(2) Of the Pakistan Telecommunication Re-organization Act- 1996 for the Renewal of Cellular Mobile Licenses – 2019
- v. Policy Directive for the Auction of Unsold Next Generation Mobile Services (NGMS) Spectrum in Pakistan.

34.2. In addition, the PTA and other regulatory bodies will carry out necessary changes to regulations and other subsidiary instruments necessary to enable the policy.

Continuing Policies & Rules

Policy Action#35

35.1. The following Policy Directives will continue to apply;

- i. Policy Directive under Section 8 of Pakistan Telecommunications Re-organization Act, 1996 regarding closure of telecom services due to national security concerns.
- ii. Guidelines for Mitigating Environmental and Health Related Effects of the Cellular Base Station Antennas.
- iii. Policy on Jammer and Disabler Devices for Blocking Cellular Communications and Related Services.
- iv. Policy Directive for Mobile Subscriber Documentation and Antecedent Verification.
- v. Policy Guidelines on Mobile Network Operators and Mobile Virtual Network Operators.

- vi. Policy to Support Technical Implementation of Mobile Banking including Mobile Money Transfers and Remittances.
- vii. Policy Directive for inter-operator network redundancies.

Service Provision

Policy Action#36

- 36.1. Under this Policy, a licensee may provide any telecommunications service consistent with its license at prices that it determines subject to specific restrictions in this policy and any other legal instrument including Rules under the Act or regulations put in place by the Authority. Licensees may from time to time be required to provide additional services as specified by applicable policy directives, regulations or determinations under the Telecom Act or any other Act, law or regulation applicable to licensees.
- 36.2. Service characteristics and geographic extent of services are limited by license in two important characteristics, i.e. restriction on mobility and restriction on geographic coverage.
- 36.3. A restriction was placed on the use of spectrum assigned to LL licensees for services with limited mobility through terms in their licenses. This limitation meant that the spectrum could not be used to provide the more valuable mobile services and therefore enabled the procurement of spectrum for fixed wireless access at an economic price in comparison with mobile. This restriction on LL to provide only services with limited mobility applies to all telecommunications services provided by an LL licensee.
- 36.4. Therefore, no LL license authorizes the provision of a Mobile Telecommunications Service, other than Limited Mobility Communication Service.
- 36.5. These limitations on service provision apply irrespective of the price plan used and the type of telecommunications service provided.
- 36.6. PTA will develop a framework for applying regulatory remedies and solution within a period of six months.
- 36.7. Obligations on quality of service, reporting of service introductions and changes, and price changes as conditions in licenses and regulations are retained.

Telecommunications and National Disaster Management

Policy Action#37

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

37.2. The National Plan will specify;

- a. The services to be provided during each phase of a disaster: these services will comprise of the services to be provided in the disaster hit areas and the services to be provided in other areas to closed user groups and to the general public. The services to be provided will be a subset of those normally available from a licensee.
- i. A catalogue of critical telecommunications elements to be available at times of emergency. Moreover, the terminal devices connecting to telecommunication networks will need to be traceable within a reasonable distance of actual location to facilitate the provision of emergency services.
- ii. Network redundancy requirements taking account of the possibility that a national disaster may damage the available telecommunications networks themselves.
- iii. The processes to be followed in a national disaster to liaise with licensees about the reconfiguration of their networks and services to provide the specified services and for returning networks and services to their commercial state. Related internal processes are for individual licensees to develop.
- iv. The processes to be followed for the urgent replacement of critical infrastructure including obligations on suppliers of such infrastructure.
- v. Audit and testing processes for the plan.

37.3. With respect to the Plan;

- i. Federal Government in consultation with PTA will assess the National and Provincial requirements for critical telecommunications infrastructure and services. In this respect, relevant Government departments and provincial governments will be consulted.

37.4. The PTA, in conjunction with the NDMA and in consultation with licensees, will develop regulations and licensees will adopt regulations that apply when a regional or national

emergency has been declared by Government or a Provincial Government in the legally required manner to promulgate the Plan.

- 37.5. Having promulgated the necessary regulations and periodically thereafter, PTA will require licensees to audit and test their individual national disaster plans and processes.
- 37.6. PTA in conjunction with NDMA may periodically require licensees to participate in National exercises to test overall disaster management processes and plans.

Policy Implementation & Review Roadmap

As per global best practices for the implementation of policies and strategies, high powered councils and committees are organized to monitor progress, evaluate delivered services and outcomes, intervene for expediting and keeping the process of implementation on course (wherever necessary), validate operations, policy directives and subsequent rules, regulations and other guidelines and evolve for the continuity and sustainability of measures emphasized via policy instruments.

For the transparent and effective implementation of the policy, a comprehensive structure needs to be institutionalized for consistent development and achievement of National Broadband Targets.

Policy Action# 39

39.1. *The Management Committee*

- i. The Ministry may organize a high-powered multi-stakeholder based Management Committee for governing the progress of policy implementation and performance of different public/private organizations, the Funds, the Board and the Authority.
- ii. The Management Committee shall be chaired by the Federal Minister for IT & Telecom and shall comprise of members from the Ministry, the Authority, the Board, the Funds, Executive(s) of Public/Private Sector Organizations/Licensees, Senior Officials of Strategic Organizations, Industry Experts and any other stakeholders as deemed appropriate by the Ministry.
- iii. The Role of the Committee shall be of administrative nature and it shall review the progress, provide necessary guidelines, make decisions on proposed recommendations and where necessary intervene for ensuring compliance with the policy directives for ensuring timely implementation of National Broadband Targets.

- iv. In this regard the Ministry may articulate Terms of Reference and appoint the members of the Management Committee on a fixed term basis for a period four (4) years until the next policy review or as deemed appropriate by the Ministry.
- v. The Committee meetings shall meet for reviewing the progress of policy implementation at least on bi-annual basis or as deemed appropriate by the Ministry.
- vi. For the efficacy and enablement of the Committee, a comprehensive working structure shall be organized comprising of Working/Study Groups identified via user journey pillars presented in this policy followed by a Policy Implementation Cell for managing day to day operations.
- vii. For sustainable working of the Committee and organizational structure orchestrated beneath, shall be managed via monetary instruments for ensuring consistent operationalization.
- viii. The Policy shall be reviewed after every four (4) years in a manner such that, it is organized after every Plenipotentiary and/or ITU-WRC event, so that policy measures could be reviewed and aligned with the proposed recommendations at such foras' while keeping into consideration the rights and obligations of licensees intact and keeping the interest of a user first and foremost.
- ix. The next policy review shall take place in the financial year 2023-2024 and after every 4 years after that accordingly.

39.2. Working/Study Groups

- i. Under the Management Committee, four (4) Working/Study Groups shall be organized for systematic implementation of the policy and providing necessary support and ability to the Committee in taking necessary decisions.
- ii. The Working/Study Groups shall be aligned with the user journey as identified in this Policy for effective implementation of the identified National Broadband Targets. The groups identified here are;
 - a. Inclusivity & Accessibility Working Group
 - b. Usability & Optimization Working Group
 - c. Digital Trust Working Group and
 - d. Transformation & Evolution Working Group

- iii. The Management Committee shall articulate the objectives, targets and timelines to each of the Working Groups and shall assign roles, responsibilities and authorities respectively.
- iv. Based on the National Broadband Targets, the Working Groups shall work closely with the implementation organizations/licensees and shall report to the Management Committee on the progress of policy implementation on quarterly basis.
- v. The Working Groups shall remain an integral part of the policy implementation and shall be formed through apportioning of the Management Committee into four (4) subsets.
- vi. The members of the Working Groups shall be appointed by the Management Committee for a given term with assigned operational budgets and remunerations as per market norms for carrying out designated responsibilities.
- vii. The Working Groups shall meet atleast once in a month and shall be facilitated by the Policy Implementation Cell for implementing the directives of the Working Groups on day-to-day basis.

39.3. Policy Implementation Cell

- i. The Policy Implementation Cell shall be the onground operational support organization to the Working Groups and the Management Committee organized for managing day to day operations for the implementation of policy guidelines furnished in this document.
- ii. The Ministry in accordance with the assigned targets, roles and responsibilities to the Working Groups, shall orchestrate the objectives, deliverables and targets for the Policy Implementation Cell in consultation with the Working Groups.
- iii. The Policy Implementation Cell shall monitor the progress of policy implementation and work in close coordination with the Authority, The Board, the Funds and the public/private organizations and shall present its monthly progress review reports and subsequent recommendations to the Working Groups and the Ministry on the progress of Policy Implementation.
- iv. A collaboration with international policy making organizations & academia is encouraged to constantly improve and to steer the industry in the evolving fast pace direction with right speed and decisions. It shall also help to do research where policy measures are required to uplift the

Telecom industry and to identify the bottle necks and show stoppers areas and where high efficiency can be introduced.

Glossary

3G: Third generation mobile telecommunications technology, following International Mobile Telecommunications- 2000 specifications from ITU. 3G supports Internet access, video calls and mobile TV as well as telephony

4G: Fourth generation mobile telecommunications technology, following International Mobile Telecommunications-2000 specifications from ITU. 4G provides ultrafast broadband access

Xth Generation: Emerging Technologies including 5th Generation Cellular services and technologies beyond.

Access (as an element in a telecommunications network): Transmission from the final distribution point before the CPE to the CPE

Access (regulatory use): Access to a network or service element provided by a network or service provider to another service provider

ACR: Administrative Cost Recovery

AIP: Administrative Incentive Pricing

Allocation (spectrum): The specification of the services to which a particular spectrum band may be put

Assignment (spectrum): The assignment of a specified quantity of spectrum to an individual licensee including technical characteristics of specified spectrum

Backhaul: Transmission from the content source to final distribution point before the CPE

Bit stream service: often used to mean wholesale DSL. A wholesale broadband service that provides broadband transmission over an access element (copper, fibre or in principle, wireless) of a telecommunications network. To provide a connection to a service provider's services, the bit stream service must be used in conjunction with a suitable backhaul service.

Broadband: Electronic information access at high speed

CEIR: Central Equipment Identity Register; a register that lists reported IMEIs and can be used to identify stolen or cloned mobile terminal devices

Content: Information in an electronic format, for example - Websites, TV channels, data, voice etc.

CPE: Customer Premises Equipment. Any piece of equipment that allows the user to convert the sent electronic information into a format that is acceptable by his display unit such as a PC, TV

DTH: Direct To Home. A link that allows the receiving of broadcast TV channels over Satellite

Economic Pricing: pricing established through economic principles Government, eCommerce, eLearning, eHealth: The use of the Internet to provided services to support specific functions

Exchange: Point of Presence of the telephone operator company that allows connectivity and switching between telephone users locally and internationally. In next generation networks, the local exchange is often replaced by concentrators with switching done elsewhere. The local exchange building then provides space for content caching and other functions that are best undertaken near the user, and to provide colocation space for third party service providers

FAB: Frequency Allocation Board. FAB is the statutory body constituted under Section 42 of the Pakistan Telecom Act 1996 to allocate portions of frequency spectrum to different users.

GDP: Gross Domestic Product. A measure of the economic standing of a countr

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