PERFORMANCE AUDIT REPORT
ON
EXPANSION OF BROADBAND SERVICES THROUGH MSAN TECHNOLOGY AND UPGRADATION OF IP CORE & ACCESS NETWORK IN AJ&K AND GB

SPECIAL COMMUNICATIONS ORGANIZATION

AUDIT YEAR 2021-22
APRIL, 2025

AUDITOR-GENERAL OF PAKISTAN

SERVING THE NATION BY PROMOTING ACCOUNTABILITY, TRANSPARENCY AND GOOD GOVERNANCE IN THE MANAGEMENT AND USE OF PUBLIC RESOURCES

FOR THE CITIZENS OF PAKISTAN

Preface

Articles 169 and 170 of the Constitution of the Islamic Republic of Pakistan, 1973, read with Sections 8 and 12 of the Auditor-General's (Functions, Powers and Terms and Conditions of Service) Ordinance, 2001, require the Auditor-General of Pakistan to conduct audit of accounts of receipts and expenditure from Consolidated Fund and Public Accounts of the Federation and each Province; and the accounts of any authority or body established by the Federation or a Province. Performance Audit of the project "Expansion of Broadband Services through MSAN Technology and Upgradation of IP Core & Access Network in AJ&K and GB" executed by the Special Communications Organization under MoITT was conducted in the light of Performance Audit Manual and ISSAI standards accordingly.

Directorate General Audit, Postal and Telecommunication Services, Lahore conducted Performance Audit of the aforementioned project with a view to report significant findings to stakeholders. Audit examined the economy, efficiency, effectiveness, environmental and equity aspects of the project. The Audit Report indicates specific actions that, if taken, will help the management realize the objectives of the project. The audit findings included in this report have been finalized in the light of management response and discussions in the DAC meeting held on 20th May, 2022.

The Audit Report is submitted to the President of Pakistan in pursuance of Article 171 of the Constitution of the Islamic Republic of Pakistan, 1973, for causing it to be laid before the Parliament.

Islamabad: (**Muhammad Ajmal Gondal)**
Dated: April, 2025 **Auditor-General of Pakistan**

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Abbreviations and Acronyms

AGP	Auditor-General of Pakistan
AJ&K	Azad Jammu and Kashmir
BISP	Benazir Income Support Programme
BoD	Board of Directors
BoQ	Bill of Quantities
CDWP	Central Development Working Party
CIR	Committed Information Rate
CPE	Customer Premises Equipment
CV	Coefficient of Variation
DDP	Delivered Duty Paid
DDWP	Departmental Development Working Party
DAC	Departmental Accounts Committee
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
FAC	Final Acceptance Certificate
FAT	Final Acceptance Test Fiber Access Terminal
FBA&A	Financial Budgeting Accounting & Auditing
FCF	Federal Consolidated Fund
FEC	Foreign Exchange Component
FDH	Fiber Distribution Hub
FTTH	Fiber-to-the-Home
GB	Gilgit Baltistan
Gbps	Gigabit Per Second
GSM	Global System for Mobiles
3G/4G	Third Generation / Fourth Generation
ICT	Information Communication Technology
IP	Internet Protocol
IRR	Internal Rate of Return
ISP	Internet Service Provider
KIU	Karakoram International University
KKH	Karakoram Highway
KM	Kilo Meter
KPIs	Key Performance Indicators
LI	Lawful Interception
Mbps	Megabits Per Second
MoITT	Ministry of Information Technology and Telecommunication
MoPD&SI	Ministry of Planning, Development and Special Initiatives

MSAN	Multi Services Access Node
MSDN	Multi Services Data Network
MTDF	Mid Term Development Framework
NICL	National Insurance Company Limited
NPV	Net Present Value
OFC	Optical Fiber Cable/Optic Fiber Cable
OLT	Optic Line Terminal
ONT	Optic Network Terminal
OSP	Outside Plant
OTC	One Time Cost
PAC	Provisional Acceptance Certificate Public Accounts Committee
PAT	Provisional Acceptance Test
PAO	Principal Accounting Officer
PSDP	Public Sector Development Programme
PSTN	Public Switch Telephone Network
PTA	Pakistan Telecommunication Authority
PTCL	Pakistan Telecommunication Company Limited
P&TS	Postal & Telecommunication Services
PPRA	Public Procurement Regulatory Authority
PPRs	Public Procurement Rules
RFP	Request for Proposal
QoS	Quality of Service
SCO	Special Communications Organization
SLA	Service Level Agreement
SMP	Significant Market Power
STP	Software Technology Park
ZTBL	Zarai Tarqiati Bank Limited

Executive Summary

Directorate General Audit, Postal and Telecommunication Services conducted the Performance Audit of the project "Expansion of Broadband Services through MSAN Technology and Upgradation of IP Core & Access Network in AJ&K and GB" on the request of Ministry of Planning, Development & Special Initiatives. The main objectives of the performance audit were to examine economy, efficiency, effectiveness, environmental and equity aspects of the project. Audit was carried out as per guidelines provided in Performance Audit Manual, ISSAI Standards and instructions issued by the Auditor-General of Pakistan. The Audit team evaluated performance of the project on the basis of project record for the financial years 2019-20 to 2023-2024.

The objective of the project was to replace existing Public Switch Telephone Network (PSTN) technology with IP based Multi Services Access Node (MSAN) technology for (triple play i.e., voice, data and video) in eleven locations including nine major cities and towns of Azad Jammu and Kashmir (AJ&K) and Gilgit-Baltistan (GB). The modern optical fiber-based technology supports a wide range of services, applications and mechanisms complying with all regulatory requirements. Prior to this project, existing landline and broadband services of SCO were provided through PSTN technology and copper network which had become obsolete.

Original PC-I of the project was approved by CDWP at Rs 1,540 million on 6th August, 2019 with the completion date of 30th June, 2022. The cost of the project was revised in April, 2020 to Rs 1,771 million through re-appropriation with a useful project life of ten (10) years.

Audit observed that SCO successfully expanded broadband connectivity through MSAN project and significantly contributed in socio-economic benefits such as digital education, e-governance and e-commerce. However, Audit noticed inefficiencies in project planning and execution which resulted in significant variances. Audit also identified key areas of concern, including inadequate planning, uneconomical procurement of goods, pricing disparities and service quality issues. Additionally, the monopolistic position of SCO caused high tariffs and limited competition, impacting affordability of the public at large.

a) Key Audit Findings

SCO management implemented the project with the following significant technological improvements and socio-economic contributions:

1. Replaced outdated PSTN technology with IP-based, Fiber-to-the-Home (FTTH) technology, enabling triple-play services (voice, data, and video) in AJ&K and GB.
2. Enhanced broadband network capacity from 44 Gbps to 200 Gbps (100 Gbps active + 100 Gbps backup) and increased internet speed from 4 Mbps copper media upto 100 Mbps optic fiber media.
3. Significantly extended the network coverage from 3 KM to 20 KM with improved packet transfer rate from 16 Mbps/port to 2.25 Gbps/port.
4. Increased the broadband users' penetration from 22,899 to 36,912 (including 24625 new users and 12287 users shifted from DSL to fiber.)[1]
5. Facilitated the general public through e-governance by issuance of 75111 state subject and domiciles, 327850 driving licenses, online services to 1.4 million land owners etc.
6. Connected over 48000 students of different universities, colleges, and schools in online learning and facilitated loanees and beneficiaries of HBL Microfinance, BISP, ZTBL and NRSP through online services.
7. Promoted tourism through improved digital infrastructure installed at hotels and resorts and served more than 100,000 tourists during the season; and
8. Promoted entrepreneurship in ICT by establishing Software Technology Parks (STPs) in AJ&K and GB and supporting over 500 IT professionals in e-commerce.[2]

Besides above significant contributions, audit also identified following gaps in execution and post-implementation phase of the project which affected the achievement of the project objectives:

i. Ineffective project planning resulting in significant physical and financial scope deviations from approved PC-I.[3]

[1] Findings No. 1 to 4 (Para 2.1.1)
[2] Findings No. 5 to 8 (Para 2.1.2)
[3] Para 2.2.1

ii. Non-adherence to PPRs resulting in purchase of equipment at non-competitive rates[4].

iii. SCO's tariffs in AJ&K and GB were substantially higher as compared to the rates of PTCL and Nayatel in other areas of Pakistan, which was against the sectoral objective of the Federal Government as well as project objective relating to provision of higher bandwidths at low rates[5].

iv. SCO was operating as a sole provider of Fiber-to-the-Home (FTTH) services in GB, which gave it monopolistic market position, thus limiting competitive pricing.

v. SCO service quality did not meet the average download throughput KPI ≥80% of offered bandwidth in all three selected cities viz; Muzaffarabad, Skardu and Gilgit. In Skardu, the maximum average download throughput was 74.9%; however, average upload throughput KPI≥50% was achieved in Skardu and Gilgit except Muzaffarabad[6].

vi. Users including institutions such as the University of AJ&K, Karakoram International University (KIU) and Gilgit Cardiac Hospital reported SCO's services as expensive and requested for more competitive pricing parity. 48.5% institutional customers rated customer support of SCO as 'Average' or 'Poor'[7].

b) Recommendations

Following are the recommendations which, if implemented, will improve the economy, efficiency, effectiveness of the project and help realizing the project objectives:

i. SCO needs to adopt adequate planning procedures, preparation of feasibility studies, implement the project plan as per approved PC-I and avoid subsequent scope revisions and re-appropriations.

ii. SCO management must comply with PPRA Rules to ensure transparency and economy in procurement of goods and services.

iii. SCO should revise the pricing structure of services to align with sectoral and project objectives of lower rates for higher bandwidths.

[4] Para 2.2.3
[5] Para 2.3.1
[6] Para 2.1.3
[7] Para 2.1.4

iv. Policy level initiatives are required for fostering competition and encouraging entry of new service providers in AJ&K and GB to enhance competition and service quality.

v. Upgradation of infrastructure is needed to address coverage gaps and improve throughput consistency. Regular monitoring of service quality should be carried out to ensure compliance with QoS regulations.

vi. SCO must strengthen customers' support operations to address user complaints promptly and introduce training programmes for support staff to improve service delivery.

1. Introduction and Methodology

1.1 Background

SCO has been providing telecommunication services to the areas of Gilgit-Baltistan and Azad Jammu & Kashmir since 1976. Catering to the claim of the SCO's management that, due to sparse population of these areas the services are not commercially viable, the Government of Pakistan assists the Organization in its efforts to align itself with modern technology and keep pace with the private telecom operators. The project "Expansion of Broadband Services through MSAN Technology and Upgradation of IP Core & Access Network" was planned to replace the obsolete Public Switch Telephone Network (PSTN) technology with Multi Services Access Node (MSAN) network technology. PSTN provided double play services which could be used for voice and data transmission, whereas MSAN provides triple play services for transmission of voice, data and video. The project was planned to replace the decades old telecommunication system at eleven locations in nine major cities and towns of AJ&K and GB.

Original PC-I of the project was approved by the CDWP at a cost of Rs 1,540 million on 6th August, 2019 with the completion date of 30th June, 2022. However, the cost of the project increased to Rs 1,771 million due to change in the physical scope of the project. The useful life of the project was planned to be ten (10) years.

1.2 Project Objectives

The project objectives were to:

i. Provide multi-services (triple play i.e., voice, data and video) to the people of AJ&K and GB by using one connection.

ii. Contribute in socio-economic development, education, knowledge-based economy and e-commerce sectors.

iii. Improve efficiency of the public and private sectors and business organizations by providing IP connectivity.

iv. Upgrade existing IP Core network for provision of high-speed, high-quality state of the art broadband internet services in AJ&K and GB.

v. Install necessary equipment to facilitate the law enforcement agencies for mandatory Lawful Interception (LI) requirements i.e.,

check/monitor the traffic.

In addition, the project was expected to achieve the following sectoral objectives of five-years' plan:

a) Promote infrastructure development for increasing tele-density and the spread of telecom services in all market segments (voice, data & cellular).

b) Accelerate the expansion of quality/uninterrupted telecom infrastructure to extend modern services to un-served and under-served areas.

c) Ensure consistency in Pakistan's ICT policy for higher bandwidth and low prices.

1.3 Audit Objectives

The main objectives of the Performance Audit were to:

i. Evaluate the necessity of the project;

ii. Assess whether the project was managed with due regard to economy, efficiency, effectiveness, environmental and equity aspects.

iii. Highlight service delivery issues identified during the Quality of Service (QoS) survey;

iv. Evaluate the overall management of the project and achievement of its objectives; and

v. Determine whether the project was properly planned, approved and executed. (Checking the requirements of PC-II & PC-I)

1.4 Audit Scope and Limitations

Scope of the audit covers the project period starting from 11th September, 2019 to 30th June, 2024 and the field audit activities carried out at SCO's Headquarter during July, 2022, re-audit activity in October, 2023 and field survey carried out in September, 2024 for obtaining user's feedback on quality and effectiveness of broadband services in Muzaffarabad, Skardu and Gilgit.

Non-setting of standard KPIs in PC-I for measuring the socio-economic impact of the project was the major limitation in performance audit. Audit visited various offices viz Planning Department, Bureau of Statistics and Commissioner offices in AJ&K and GB but the relevant data for comparison

and measuring the impact of the project before and after implementation of the project was not adequately available. Due to social limitations, the data relating to feedback of female users of broadband services could not be sufficiently incorporated. Further, audit was constrained to measure the project outcomes relating to payback, NPV and IRR as the project was in the initial phase of its operation.

1.5 Audit Methodology

To evaluate the project's performance, a result-oriented approach was adopted utilizing both qualitative and quantitative methods. Audit examined the RFP, tender documents, procurement record, minutes of BoD and previous audit reports. Given the limitations highlighted in Section 1.4 where, project objectives lacked quantified KPIs in the PC-I, the performance measurement was carried out on the basis of available evidences gathered through field survey, technical quality of service (QoS) survey of PTA and use of statistical techniques for variability and consistency of services. Audit obtained users' response through feedback questionnaire and interviews of the representatives of government departments, educational institutions and general public in different areas like technology, education, e-commerce, e-governance, tourism and environment.

2. Review of Performance

2.1 Effectiveness

Audit assessed the overall effectiveness of the project to establish the network infrastructure for triple play broadband services (vice, data & video), its socio-economic contributions and achievement of sectoral objectives. Audit also evaluated the quality of services against the specified KPIs, customer feedback on quality of services including support services and complaint resolution.

2.1.1 Outputs

As a result of implementation of the project, a network infrastructure of 32000 broadband Fiber-to-the-Home (FTTH) subscribers' capacity was established in nine (09) major cities of AJ&K and GB for provision of triple play broadband services. A comparison of outputs of both the legacy PSTN network and upgraded network is given as under:

Sl. No	Description	Before MSAN Project	After MSAN Project
1.	Telephone Subscribers	50,943	55,020
2.	Teledensity of Telephone Subscribers *(Number of telephone connections/100 people)*	0.92	1.00
3.	Broadband Subscribers	22,899	36,912 (12287 DSL Users)
4.	Teledensity of Broadband Subscribers *(Number of Broadband connections/100 people)*	0.41	0.67
5.	Network Broadband Capacity	44 Gbps	200 Gbps (100 Active +100 Backup)
6.	Video Facility	Nil	Digital TV Channels
7.	Bandwidth/User	Upto 4 Mbps	Upto 100 Mbps
8.	Network Coverage	Upto 3 KM	Upto 20 KM
9.	Data Packet Transfer Rate	16 Mbps/port	2.25Gbps/Port

Above table depicts that after execution of the project the telecom infrastructure for triple play services was established with upgraded technical parameters and addition of Digital TV.

Numbers of telecommunication subscribers increased from 50943 to 55020 users, resulting in 8% growth in telephony subscribers as well as increase in teledensity of telephony services from 0.92 to 1.00. The number of broadband subscribers also grew up from 22899 to 36912 (24625 OFC subscribers and 12287 DSL subscribers), showing a significant increase of 61.2% subscribers as well as increase in teledensity of broadband users from 0.41 to 0.67.

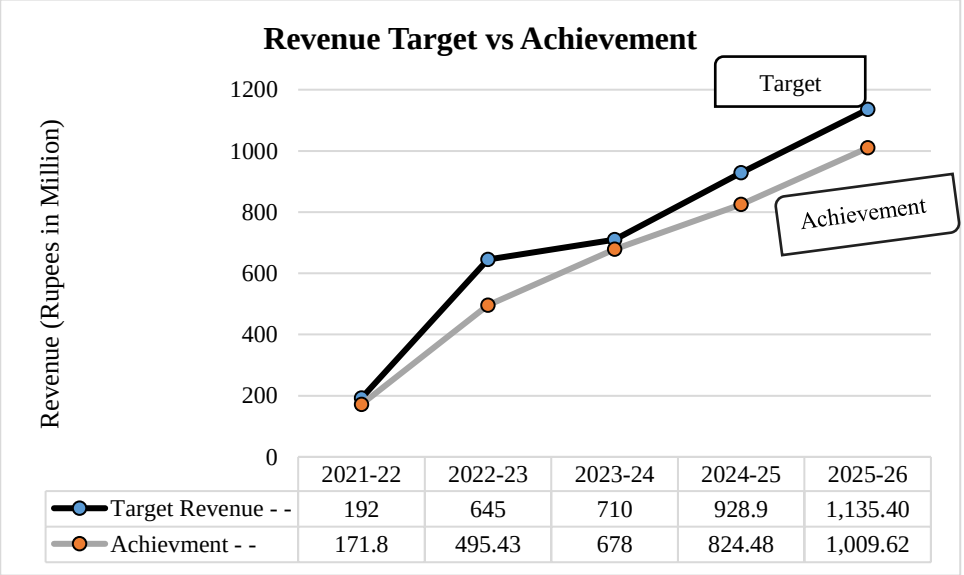
The broadband capacity of the network also enhanced from the capacity of 44 Gbps to 200 Gbps (100 Gbps active and 100 Gbps backup capacity) with greater data packet transfer rate upto 2.25 Gbps/port. The most significant parameter was the increase in bandwidth/user from 4 Mbps to 100 Mbps. Further, the network coverage was also reasonably improved from 3 KMs to 20 KMs, enhancing the network coverage upto 7 times of the old network.

In addition to above, the overall revenue generation of the project against the target was 87% from its completion in June 2022 till FY ending on

30th June, 2024 on actual basis and forecasted upto FY 2025-26 as detailed below:

FYs	Revenue Target	Revenue Achievement	Remarks
2021-22	192.00	171.80	Actual
2022-23	645.00	495.43	
2023-24	710.00	678.00	
2024-25	928.90	824.48	Forecast
2025-26	1,135.40	1,009.62	
Total	**1547**	**3,508.23**	

The same has also been depicted in the following chart which shows that the revenue target has been achieved by 95.4% in FY 2023-24; however, the gap in revenue target and achievement is increasing in subsequent years as shown by forecast data.



2.1.2 Impact Assessment/Outcomes

Information technology has assumed an enabling role in the emerging dynamics of a knowledge society and knowledge economy. The Federal Government in its "Digital Pakistan Policy, 2018" has declared the ICT as the "Key Lever" for economic development through e-governance, e-education, e-commerce, e-health and e-justice etc. Therefore, to assess the impact of the project, data was gathered through public survey, interviews with heads of various government departments and feedback of private sector organizations. Audit assessed the impact of the project in the following areas:

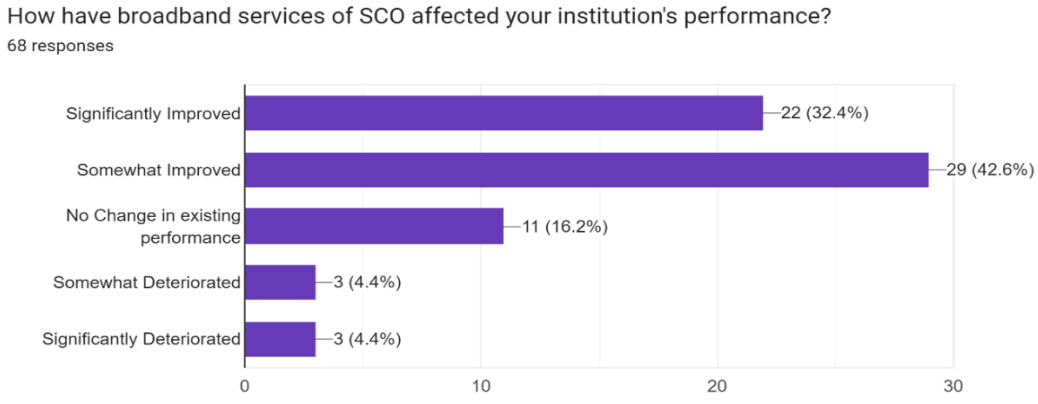
(a) Technological Impact

Before expansion of broadband services through MSAN project, SCO was providing the voice and broadband service through PSTN, DSLAM and Copper Cable Network with bandwidth upto 4 Mbps which did not support the triple play vice, data and video. After implementation of the project, SCO established the network infrastructure with enhanced bandwidth capacity from 4 Mbps to 100 Mbps through optic fiber cable supporting triple play services, increased network coverage from 3KMs to 20 KMs radius and improved packet transfer rate from 16 Mbps/port to 2.25 Gbps/port.

Audit observed that though the services in these areas were upgraded, yet these areas were under-served in term of network coverage which was reinforced by the response of the respondents during the feedback surveys. Audit also observed that a number of applications for new connections were pending due to non-availability of Fiber Access Terminal (FAT).

(b) Impact on the field of education

In order to assess the impact of the project, at least 24 universities, colleges, government training institutes and schools were visited in Muzaffarabad, Skardu and Gilgit. From the feedback of these institutions it transpired that the project was of great relevance as 48040 students were directly using the internet facility through upgraded optical fiber media. The major surge in broadband demand was observed due to increased tendency of online-education after covid-19. Although, these institutions had concerns about pricing, speed, quality, customer support and limited alternate switching options, yet 75% of the institutions were of the view that their performance had 'significantly improved' or 'improved to some extent'.



(c) Impact on social safety and e-commerce

i. The HBL Microfinance was using the FTTH broadband services of higher than 20 Mbps in each of 16 branches of GB and facilitating more than 75000 beneficiaries/loanees through its online facility.

ii. BISP had Central Office in Gilgit with its Zonal office in Skardu and other offices at Tehsil Level using FTTH broadband services of SCO to facilitate almost 40000 female beneficiaries in GB Region through its database beneficiaries' services.

iii. ZTBL Gilgit was facilitating about 5000 customers/loanees in GB Region through the broadband connectivity.

iv. National Rural Support Programme (NRSP) Gilgit was facilitating 7000 (5000 male+2000 female) beneficiaries through online banking services.

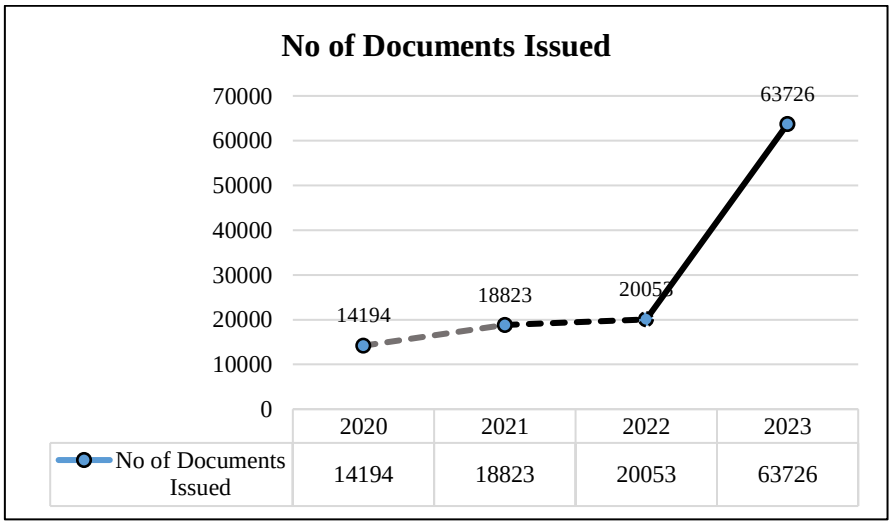
(d) Impact on e-governance

AJ&K Information Technology Board, Muzaffarabad was providing following services in coordination with concerned local departments through 48 FTTH broadband connections of SCO in different locations of AJ&K.

i. Facilitated 75111 citizens of AJ&K region in obtaining the State Subject and Domiciles through digitization of services over the three years period from 2021-2023. A dashboard was developed showing the progress of cases of total applications of State Subject and Domiciles received, under process and ready to deliver to the public.

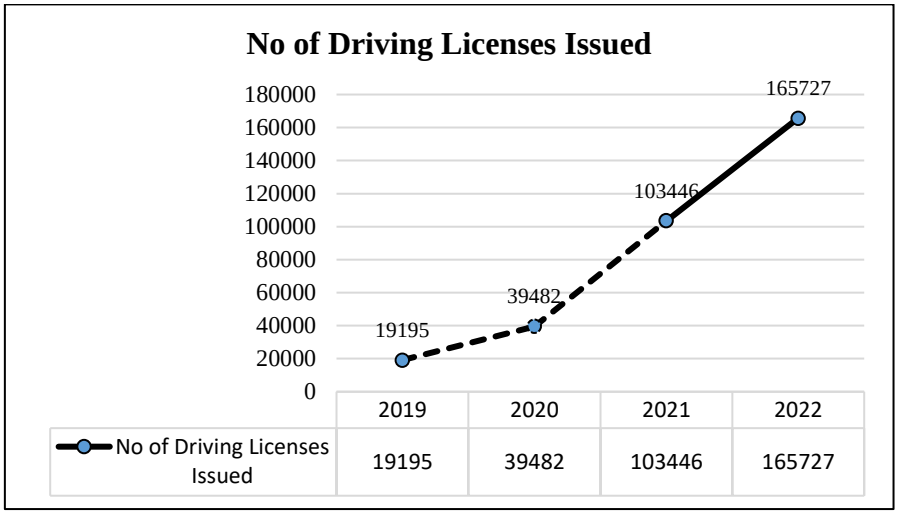
ii. Developed an online system of computerized fard, mutations, Shajra-e-Nasab and online availability of record through establishment of 13 digital service centers in AJ&K, delivering 116796 documents to the citizens. Further, the land record of 1.4 million owners was digitized in 1016 villages and a revenue of Rs 26 million was generated and deposited into the exchequer of AJ&K Government as depicted in the following graph which represents a trajectory showing moderate growth in number of documents issued before 2022. Before the execution of the project during 2020 to 2022, as shown by the dashed line, the number of documents issued increased steadily, starting from 14194 in 2020 and reaching 20053 in 2022. However, in 2023, there is a steep surge in the number of documents issued jumping to 63726

due to expansion of broadband services and better public awareness in the post 2022 period.



AJ&K Statistical Year Books 2021-2023

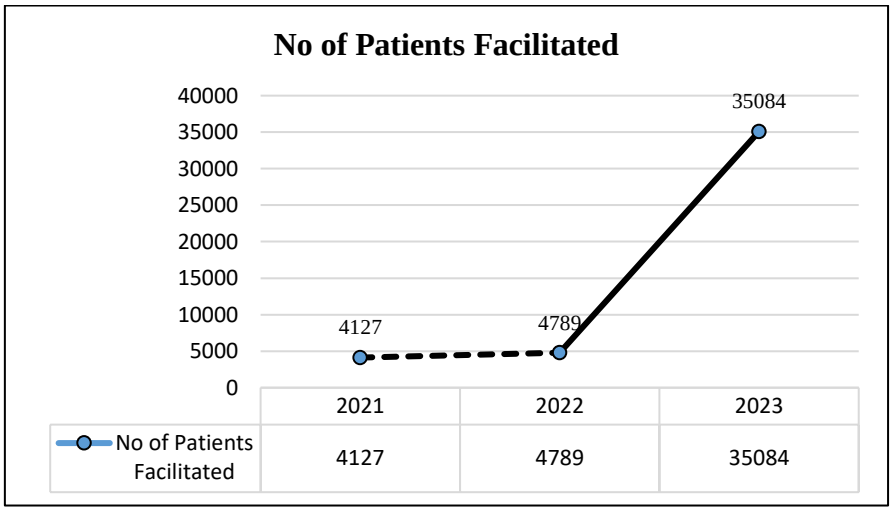
iii. Digitized the services of driving licenses to facilitate the general public of AJ&K and issued 327850 driving licenses (new, upgrade, duplicate and renewed) through digital services and contributed Rs 35 million in the exchequer. Following graph shows an increasing trend in the number of licenses issued from 2019 onwards; however, there is a sharp increase in numbers in post 2021 period due to expansion of broadband services in major cities of AJ&K.



AJ&K Statistical Year Books 2021-2023

iv. The project was launched in 2021 and provided online facilitation to 44000 patients in 13 locations of AJ&K through Online Health

Facilitation Center/Portal. The time series data in the following graph shows that the number of patients facilitated over the three years since the launch of project in 2021 was 4127 which slightly increased to 4789 in 2022; however, it significantly surged to 35084 during 2023. This overwhelming increase suggests a substantial improvement in patient facilitation possibly due to expanded broadband services and better public awareness.

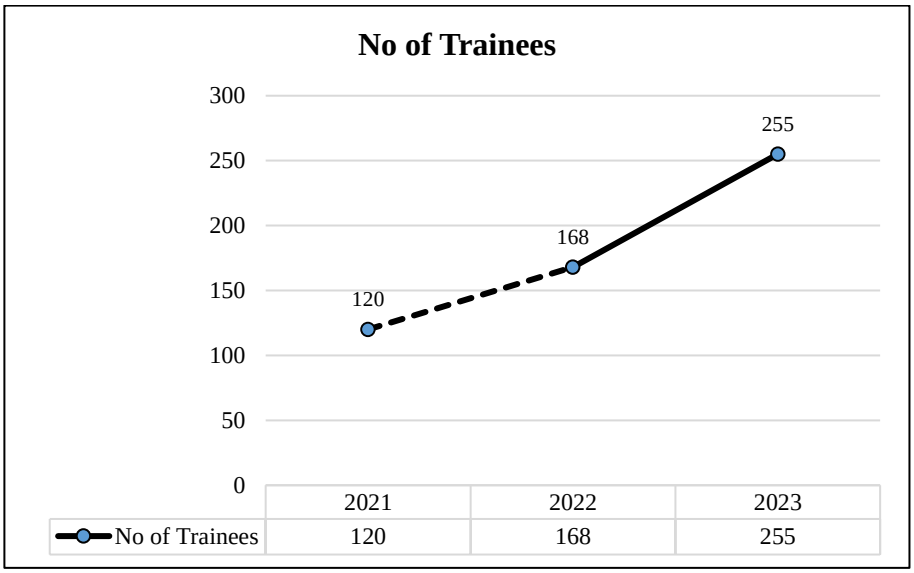


AJ&K Statistical Year Books 2021-2023

v. Facilitated more than 100000 general public through its online portal of High Court by providing online view/status of cause lists of various court cases since the launch of project in 2022-23.

vi. Facilitated 5000 members since 2022-23 through the social community portal being managed through the connectivity of SCO.

vii. Established IT Excellence Center Poonch and Muzaffarabad in 2021 and trained more than 543 students in different areas of IT through online as well as on campus trainings as shown by a steady increasing trend in the following graph.



AJ&K Statistical Year Books 2021-2023

(e) Impact on tourism

Shangrilla Resort Skardu and Serena Hotel Gilgit & Karimabad were the major customers of the broadband services connected with SCO through 46 broadband internet connections of different bandwidths ranging from 20 Mbps to 50 Mbps since upgradation of broadband services in 2022 which indicates the data usage due to improvement in broadband services. A significant number of tourists visited Gilgit Baltistan during the season. Both the institutions were hosting almost 100000 annually local and foreign tourists visiting the GB during the season.

(f) Promotion of entrepreneurship and R&D in ICT

SCO established Software Technology Parks (STPs) each in Muzaffarabad, Skardu and Gilgit to promote entrepreneurship and freelancing in AJ&K and GB. STP in Skardu and Gilgit were established in October, 2020 and April, 2021 respectively. STP Muzaffarabad was established recently in August, 2024. Before completion of MSAN project, SCO was providing broadband services to these STPs through old copper-based DSL with limited maximum bandwidth upto 4 Mbps; however, after upgradation of broadband services in June 2022, to promote ICT, SCO is providing free broadband services with bandwidth upto 100 Mbps to all the startups working in these STPs. Nine (09) startups with more than 500 IT professionals are working in these STPs and promoting entrepreneurship in the field of ICT. Besides, these STPs SCO also established a mini freelancing hub in Skardu with digital lab

comprising 12 systems and free internet services recently in FY 2023-24 for especially-abled people to empower and bringing them into mainstream.

(g) Environmental Impact

The project involved the deployment of optical fiber network through Fiber Distribution Hubs (FDHs) which is a passive optical network and require less power consumption for data transmission as compared to the copper-based DSL media. As an outcome, the project resulted into reduced consumption of energy from 870 Ampere by DSL nodes to 100 Ampere used by passive optic fiber network resulting into annual saving of Rs 17.380 million on account of expenditure on electricity.

2.1.3 Quality of Services

Pakistan Telecommunication Authority (PTA), being the regulator, carries out the quality of services survey of fixed broadband service providers. To evaluate the QoS, audit requested PTA to conduct the survey in Muzaffarabad, Gilgit and Skardu against the Technical KPIs specified in QoS Service Regulations, 2022. Audit evaluated the quality of services offered by SCO against the questions (i) Whether the KPI of Network performance parameters of core nodes and access nodes was met? (ii) Whether the KPI of average download throughput was met and in which city the average download throughput was better? (iii) Whether KPI of upload throughput was met and in which city the average upload throughput was better? (iv) In which city the broadband services were more consistent?

(i) Network availability

Regulation 5(2)(a&b) of QoS Regulations, 2022 required the network availability of Access Nodes and Cored Nodes to be ≥99%.

Audit observed that according to the QoS survey of PTA, the services of SCO met 100% required KPI for network availability of access nodes and core nodes against selected IP addresses in all the three cities.

(ii) Data Download Throughput

Regulation 5(2)(c) of QoS Regulations, 2022 required the technical KPI for Data Download Throughput ≥ 80% of the advertised bandwidth for broadband services.

Audit observed that the required KPI for Download Throughput ≥ 80% of the advertised bandwidth was not met in all the three cities. However, the average download throughput of 74.9% in Skardu was better than Muzaffarabad and Gilgit. The average download throughput is calculated below however, the detailed calculation is given in **Annexure-I**

Average ($\bar{X}_M$) (Download Speed) **Muzaffarabad** $= \frac{\sum \mathbf{X_M}}{N} = \frac{\mathbf{335.3}}{5} =$ **67.06%≤ 80%**

Average ($\bar{X}_S$) **(**Download Speed**)** **Skardu** $= \frac{\sum \mathbf{X_S}}{N} = \frac{\mathbf{374.4}}{5} =$ **74.9% ≤ 80%**

Average ($\bar{X}_G$) **(**Download Speed**)** **Gilgit** $= \frac{\sum \mathbf{X_G}}{N} = \frac{\mathbf{358.9}}{5} =$ **71.8% ≤ 80%**

(iii) Data Upload Throughput

Regulation 5(2)(d) of QoS Regulations, 2022 required the technical KPI for Data Upload Throughput ≥ 50% of the advertised bandwidth for broadband services.

Audit observed that the required KPI for Upload Throughput ≥ 50% of the advertised bandwidth was met in Skardu and Gilgit except in Muzaffarabad. However, the average upload throughput of 71.8 % in Gilgit was better than Muzaffarabad and Skardu. The average upload throughput is calculated below however, detailed calculation is given in **Annexure-II.**

Average ($\bar{X}_M$) (Upload Speed) **Muzaffarabad** $= \frac{\sum \mathbf{X_M}}{N} = \frac{\mathbf{226.6}}{\mathbf{5}} =$ **45.32%≤ 50%**

Average ($\bar{X}_S$) **(**Upload Speed**)** **Skardu** $= \frac{\sum \mathbf{X_S}}{N} = \frac{\mathbf{334.7}}{5} =$ **66.9% ≥ 50%**

Average ($\bar{X}_G$) **(**Upload Speed**)** **Gilgit** $= \frac{\sum \mathbf{X_G}}{N} = \frac{\mathbf{359.3}}{\mathbf{5}} =$ **71.8% ≥ 50%**

(iv) Consistency of services

To measure the consistency of the services (upload and download throughputs) in all the three cities, Coefficient of Variation (CV) a relative measure of dispersion, was used.

Audit observed that the download throughput was more consistent in Skardu with relatively lower variation/fluctuations of 19.73% and more volatile in Muzaffarabad with significantly higher variation rate of 61.62% as shown below:

$$\boldsymbol{CV_M = \frac{S}{\bar{X}_M} \times 100} \qquad = \frac{41.32}{67.06} X\ 100 = 61.62\% \qquad \textbf{C.V}_{\textbf{M}}\textbf{=61.62\% (Muzaffarabad)}$$

$$\boldsymbol{CV_S = \frac{S}{\bar{X}_S} \times 100} \qquad = \frac{14.77}{74.9} \times 100 = 19.73\% \qquad \textbf{C.V}_{\textbf{S}}\textbf{=19.73\% (Skardu)}$$

$$\boldsymbol{CV_G = \frac{S}{\bar{X}_G} \times 100} \qquad = \frac{14.67}{71.8} \times 100 = 20.4\% \qquad \textbf{C.V}_{\textbf{G}}\textbf{=20.4\% (Gilgit)}$$

Audit further noticed that the upload throughput was more consistent in Gilgit with relatively lower variation/fluctuations of 9.78% and more volatile in Muzaffarabad with significantly higher variation rate of 68.9% as shown below:

$$\boldsymbol{CV_M = \frac{S}{\bar{X}_M} \times 100} \qquad = \frac{31.23}{45.32} \times 100 = 68.9\% \qquad \textbf{C.V}_{\textbf{M}}\textbf{=68.9\%}$$

$$\boldsymbol{CV_S = \frac{S}{\bar{X}_S} \times 100} \qquad = \frac{10.65}{66.9} \times 100 = 19.73\% \qquad \textbf{C.V}_{\textbf{S}}\textbf{=15.9\%}$$

$$\boldsymbol{CV_G = \frac{S}{\bar{X}_G} \times 100} \qquad = \frac{7.02}{71.8} \times 100 = 9.78\% \qquad \textbf{C.V}_{\textbf{G}}\textbf{=9.78\%}$$

2.1.4 Feedback of Survey

In order to assess the effectiveness of the services, a field survey was planned and conducted. Two separate feedback questionnaires were designed for both institutions and general public. The institutions included various government departments, banks, universities, colleges, schools and hotels. The general public represented students, businessmen, government employees and private users. The feedback of 140 participants (70 from each segment) was obtained in Muzaffarabad, Gilgit and Skardu through circulation of Google Forms and direct feedback collection from the respondents. Besides, meetings with the administrative heads of departments were held which included offices of Additional Chief Secretary AJ&K, Additional Secretary Home Department AJ&K, Deputy Director IT Board AJ&K, the Secretary I.T GB, the Secretary Higher Education Department, GB and heads of various Universities in AJ&K and GB. Focal persons for coordination in obtaining the feedback were nominated and Whatsapp groups were created for coordination with the line departments in obtaining the feedback.

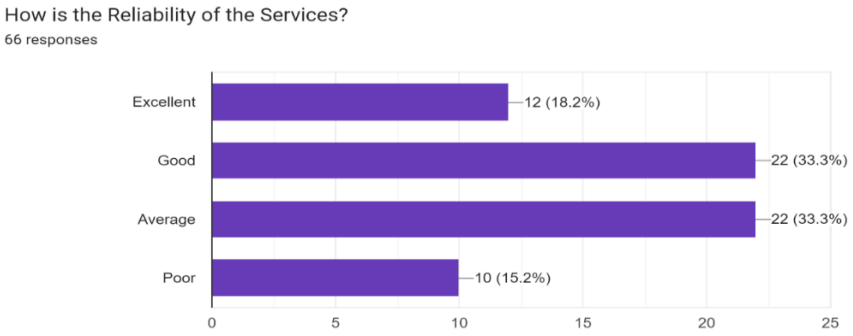
The location wise summary of responses from various institutions and general public is given as under: (Figure-1)



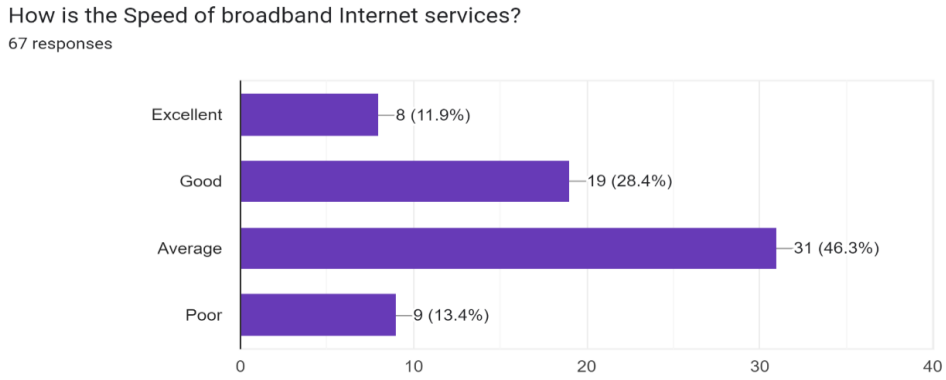
(a) Institutional Feedback

In response to a question relating to reliability of broadband services, out of 66 respondents, 18.2% considered the reliability of services as "Excellent", 33.3% rated the services as "Good" and "Average" each and 15.2% rated the services as "poor" in term of reliability of internet connection.

(Figure-2).



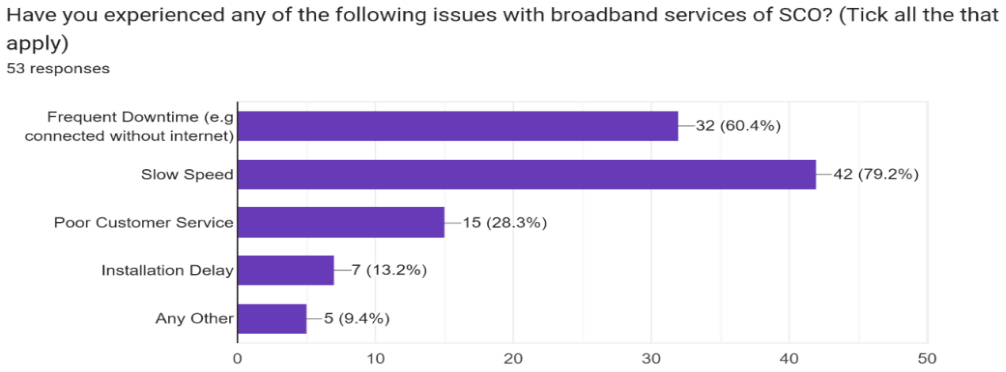
About the quality of speed of broadband connections, 67 respondents replied, out of which 28.4% considered the services as "Good", 46.3% rated the services as "Average" and 13.4% rated the services as "Poor". (Figure-3).



The speed of internet connection was the major concern of most of the institutional customers. Regional Director, Allama Iqbal Open University, Muzaffarabad stated that about 10000 students were engaged in online learning process. However, frequent disconnections and slow speed in broadband services disrupted the online learning process of the students. She opined that dedicated static network be provided to all the educational institutions. Further, the Director I.T University of AJ&K suggested that the link should be stable, disconnections should be minimized and data rate of CIR connection should be maintained.

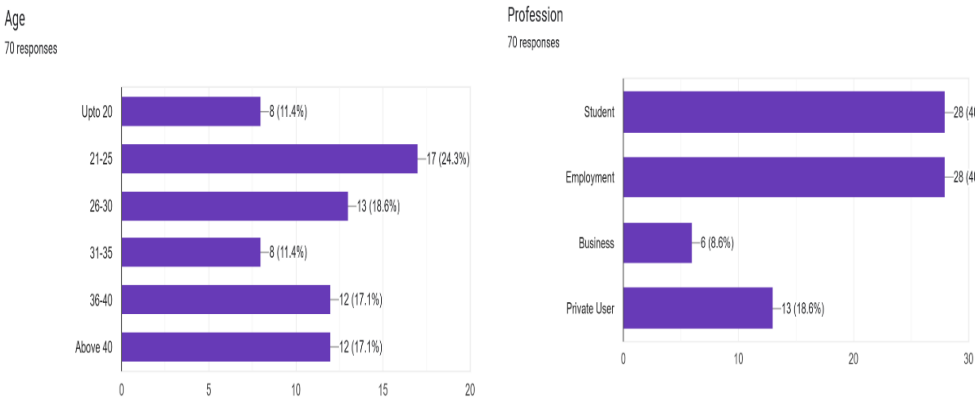
In response to the question of quality of customer support, 48.5% rated the customer support as 'Average/Poor', 38.2% considered the customer

service ‘Good’ and 13.2% rated the service as “Excellent”. Further, about the issues being faced by the customers, out of 53 respondents, 60.4% complained about the frequent downtimes (e.g connected without internet), 79.2% reported the issue of speed, 28.3% complained about poor customer services and 13.2% reported about the installation delay as depicted in (Figure-4).



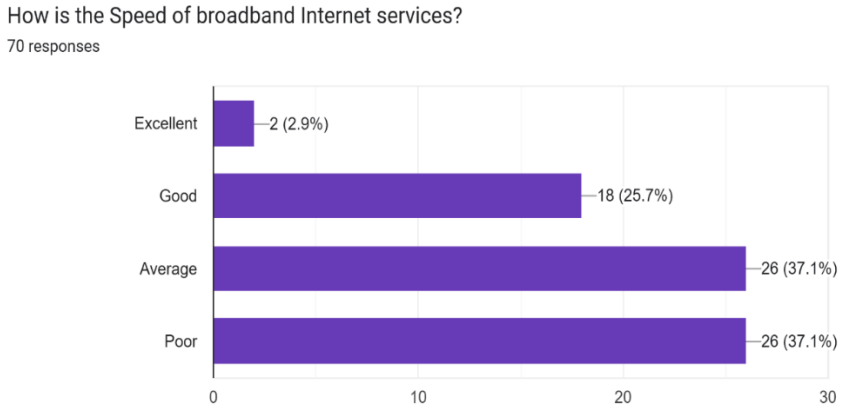
(b) Feedback of general public

The respondents from general public consisted of the people from various demographic age groups belonging to different fields of education, government and private employees, business and private users as depicted in (Figure-5).

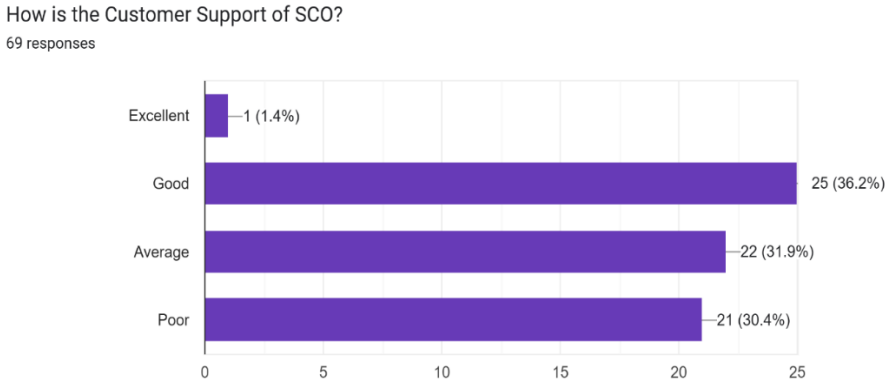


As observed in institutional feedback, reliability, speed, customers services and issues in internet connectivity were the core concerns of the general public. Out of 70 respondents, 22.9% rated the reliability of the broadband services as “Poor”, 47.1% considered the services as “Average” and 28.6% accepted the services “Good” and only 4% rated it “Excellent”.

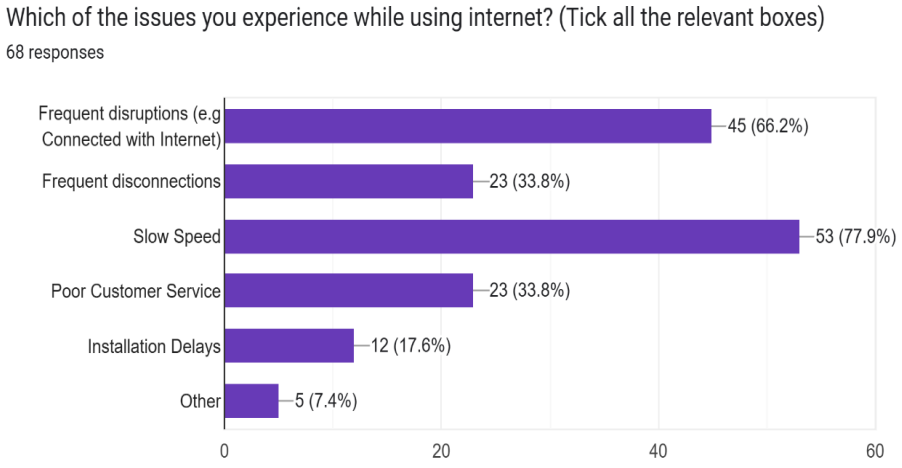
About the speed of internet connections, in aggregate 74.2% considered the speed of broadband connection as “Poor/Average”, 25.7% rated the speed of broadband connection as “Good” and only 2.9% considered the speed as “Excellent” (Figure-6). Some of the respondents were of the consideration to switch over to alternate services, if available in AJ&K and GB.



Further, as regard to customer support, in aggregate 61.5% rated the customer support as “Average/Poor”, 36.2% considered it as “Good” and only 1.4% rated the services as “Excellent” (Figure-7)



Regarding issues in broadband services being faced by the customers, out of 68 customers 77.9% complained about slow speed and 66.2% complained about frequent disruptions (e.g connected without internet). (Figure-8).



2.2 Economy and Efficiency

The emphasis of performance audit was to focus on the economy and efficiency in the management of public resources. Audit of the economy involved the evaluation whether the resources were acquired at the right cost, right time, right place, right quantity and right quality while the audit of efficiency focused on the optimum utilization of resources for maximizing output from the given resources or minimizing input for the given outputs [8]. Audit measured the economy and efficiency in the use of resources against diverse audit criteria ranging from public procurement rules to comparison with the market rates and deviations from terms and conditions of the contract agreements. Following issues of uneconomical and inefficient use of resources were observed during audit.

2.2.1 Ineffective project planning resulting in significant physical and financial scope deviations from approved PC-I

According to Para 2.46 of Chapter-2 of Manual for Development Projects; once approved, the executing agency is required to implement the project in accordance with the PC-I provisions. It has no authority to change or modify any approved parameters of the project. If the project executing agency determines (based on detailed justification) that the project cannot be implemented under the approved parameters and it requires revision of scope, physical components or financial allocation, a revised PC-I must be submitted

[8] Para 2.6 & 2.7 of Chapter 2 of the Performance Audit Manual

to the competent forum for approval. Further, Para 2.09 states that the PC-II approved by the relevant competent forum is required for the conduct of techno economic feasibility study, including technical investigations, market surveys and other studies. The requirement of a PC-II shall be mandatory for infrastructure projects, each costing Rs 500 million or above.

The project management of SCO under the MoITT planned and executed the project for "Expansion of Broadband Services through MSAN Technology and Upgradation of IP Core & Access Network in AJ&K and GB" as detailed below:

(Rupees in Million)

S No.	Components	Approved Cost in PC-I	Re-appropriated cost	BoQ items	Amended BoQ Items
a.	Soft Switch	468.194	188.000	1	1
b.	MSAN		0	171	0
c.	IP Core & Access Network Equipment & system	494.620	531.000	11 & 40	0
d.	Fire Suppression Systems	30.800	0	1	0
e.	OFC, Accessories and lying for Access Network	348.400	1012.000	335 KM	1022 KM
f.	Civil work	34.200	0	171	68
g.	Power Supply	34.200	0	171	0
h.	Project Management Unit (HR)	34.776	20.00	18	15
i.	Consultancy Services	50.000	14.500	-	-
j.	Contingency	44.810	5.500	-	-
Total		**1,540.000**	**1,771.000**		

Audit observed the following major gaps in project planning and execution:

i. SCO management did not carry out the requisite feasibility study of the project and got it approved from the competent forum. Owing to non-preparation of feasibility study, the management did not adequately

evaluate the most feasible technology for laying infrastructure and deviated from approved scope of PC-I by installing the broadband network through GPON technology instead of Multi Services Access Nodes (MSAN) while both the technologies support OFC networks.

ii. Out of ten (10) BoQ items, four (04) items consisting of (171) MSANs, fire suppression system, civil work and power supply costing Rs 379.394 million were eliminated, and their costs were diverted to the other items.

iii. Cost of four (04) items viz soft switch, project management unit, consultancy services and contingencies were reduced by Rs 89.586 million and adjusted against other items.

iv. Costs of two (02) items were escalated due to increase in the quantity of the executed items. The cost of laying OFC was Rs 348.400 million for 335 KMs in the approved PC-1. The project management revised the physical scope of OFC to 1022 KMs at revised cost of Rs 1012 million.

v. The overall cost of the project increased by Rs 231 million in addition to the cost of eliminated BoQ items and their adjustment against other items which indicated that neither the outputs were increased against the planned cost nor the cost was minimized to achieve the planned outputs.

vi. Upon change of the physical and financial scope of the project the revised PC-I was not approved from CDWP.

Audit contends that ineffective planning due to non-preparation of feasibility study and its approval from competent forum resulted in deviation from approved scope and elimination of and change in the BoQ items thus affected of the project economy and efficiency.

The matter was reported to the management and PAO during May, 2022. It was replied that OLT was an advance form of MSAN Technology which had additional advantages in terms of capacity, coverage, and low power consumption. Therefore, OLT was preferred for providing superior services in lower operating expenditure. IP Core and Voice Core of the project were installed in existing telecom infrastructure in which a fire suppression system was already available. The feasibility study was prepared and submitted in May 2019, whereas the project was approved in August 2019.

The reply is not tenable as the PC-I was submitted for approval without feasibility report of the project in March, 2019 instead of May, 2019 and the physical and financial scope was changed without approval of CDWP. Further, the management did not adequately plan the project as the project was

initially planned for MSAN technology which was later on replaced with GPON technology.

The matter was discussed in the DAC meeting held on 20th May, 2022. The DAC directed the management to fix responsibility for non-preparation of feasibility report before submission of PC-I, besides ensuring preparation of feasibility reports in a timely in future.

Audit recommends the compliance of the DAC directives.

(OM No.04 & 11)

2.2.2 Payment to the contractor without insurance coverage

According to Clause 20 of the Contract Agreement, contractor will be responsible for the arrangement and payment of all insurance up-to the date of approval of the Provisional Acceptance Certificate by SCO. The contractor will provide copies of the insurance policies and evidence of premium payments to SCO. Transport and storage insurance will be in the name of SCO in an amount equal to 110% of the delivered duty paid (DDP) value of the equipment in case of off-shore equipment from Karachi/ Lahore/ Islamabad Airport/ Seaport to SCO sites "All risk" basis. In all cases whether under the act of God or other perils the deductible should not be more than 5% of the sum insured. According to Section 166 read with Section 156 of Insurance Ordinance 2000, "Federal and Provincial Governments are required to place all insurance services relating to public property only with National Insurance Company Limited (NICL).

SCO Headquarters, Rawalpindi under the MoITT awarded a contract of Rs 1,012 million to M/s Fiberhome for supply, deployment, installation and commissioning of Access Network. The contractor was liable under the terms and conditions of the contract to insure the equipment, provide insurance policy and evidence of premium payments.

Audit observed that the contractor received premium payment of Rs 50.606 million (Rs 1,012,111,371 x 5%) but he did not insure the equipment with any insurance company.

Audit contends that non-insurance of the equipment not only left the Access Network unsafe and at financial risk in case of any untoward incident or disaster but also resulted in unjustified payment of premium to the contractor which affected the economy of the project.

The matter was reported to the management and PAO during May, 2022. It was replied that the contract was awarded on Duty Delivery Paid basis. Insurance was the responsibility of the contractor who had been asked to provide the insurance documents.

The reply is not tenable as no insurance documents were provided to Audit.

The matter was discussed in the DAC meeting held on 20th May, 2022. The DAC directed the management to obtain the insurance documents from the contractor and get them verified from Audit.

In pursuance of DAC directives, a verification was conducted in October, 2022 but no insurance documents were provided for verification.

Audit recommends compliance of DAC directives.

(OM No.3)

2.2.3 Purchase of equipment without competitive rates

According to Rule 4 of PPRs 2004, Procuring agencies, while engaging in procurements, shall ensure that the procurements are conducted in a fair and transparent manner, the object of procurement brings value for money to the agency and the procurement process is efficient and economical. Further, according to Rule 12 (1) of PPRs 2004, procurements over five hundred thousand rupees and up to the limit of three million rupees shall be advertised on the Authority's website in the manner and format specified by the Authority from time to time. These procurement opportunities may also be advertised in print media, if deemed necessary by the procuring agency.

SCO Headquarters, Rawalpindi under the MoITT awarded a contract of Rs 61.430 million to M/s CARE for Supply and Integration of Lawful Interception (LI) Monitoring System for Voice Network with existing LI System for SCO Mobile Network on 7th April, 2020.

Audit observed that SCO did not invite open tenders to obtain competitive rates and awarded the contract to M/s CARE on quotation basis.

Audit contends that procurement of LI Monitoring System without competitive rates did not bring value for money to SCO.

The matter was reported to the management and PAO during May, 2022. It was replied that the contract for supply and integration of Lawful

Interception (LI) monitoring system was awarded on proprietary basis as per PPRA Rule 42.

The reply is not tenable. SCO did not provide any document of propriety of M/s CARE and rate reasonability for the given equipment. Audit noticed that the same equipment was procured from M/s Sandvine during execution of Pak-China OFC project.

The matter was discussed in the DAC meeting held on 20th May, 2022. The DAC directed the management to show the instruction issued by law enforcement agency to procure the LI system from the vendor besides verification of provisions of PPR 42 by audit.

In pursuance of DAC directives, a verification was conducted in October, 2022, but the instructions issued by law enforcement agencies to procure the LI system from M/s CARE were not provided to audit.

Audit recommends compliance of DAC directives.

(OM No. 10)

2.2.4 Non-receipt of spares from contractor

As per Clause 7.268 of contract agreement with M/s Fiberhome for supply/installation/ commissioning of access network for multi/ triple play services, the contractor will hand over 2% spares (of installed quantities as per BoQ) to SCO at the time of final acceptance.

SCO Headquarters, Rawalpindi under the MoITT awarded a contract of Rs 1,012.111 million to M/s Fiberhome for supply/installation/ commissioning of access network for triple play services on 30th March, 2020.

Audit observed that 2% spares of installed quantity as per BoQ having value of Rs 12.871 million were not received by SCO from the contractor at the time of final acceptance of the project.

Audit contends that non-receipt of spares from contractor was not only an inefficient contract management but also affected the economy as SCO will acquire these spares at an additional cost in the future.

The matter was reported to the management and PAO during October, 2023 but no reply was received. Since, this audit finding pertains to the re-audit

activity as directed by the Auditor-General of Pakistan, no DAC meeting was held to include the DAC directives.

Audit recommends that the matter be inquired to fix responsibility against those held responsible, besides getting receipt of the spares or cost of the spares from the contractor under intimation to audit.

(OM No. 5)

2.2.5 Non-imparting foreign training by contractor despite receipt of payment

According to Clause 7.98 of contract agreement between SCO and M/s Fiberhome International Technologies Pakistan for supply/ deployment/ installation/ commissioning of access network dated 30th March, .2020, SCO will send five (5) hardware and software personnel for foreign training at least for seven calendar days. All permissions, visas, air tickets, boarding & lodging expenses for these arrangements will be borne by the contractor. In addition, standard TA/DA per day per person will be paid by the contractor.

SCO Headquarters, Rawalpindi under the MoITT executed a contract with M/s Fiberhome for supply/ deployment/ installation/ commissioning of access network for multi/triple play services in AJ&K and GB and made payment of Rs 2.600 million to M/s Fiberhome on account of training cost during March, 2020.

Audit observed that M/s Fiberhome did not impart foreign training to the personnel of SCO for capacity building as agreed in the contract agreement.

Audit contends that, due to non-conducting of foreign training, not only the capability to run the technical equipment installed in MSAN was compromised but it also reflected the inefficiency of the management to accomplish the intended objective.

The matter was reported to the management and PAO during May, 2022. It was replied that foreign training couldn't be held due to Covid-19. However, foreign training would be planned in near future for technical staff of the project in coordination with the contractor.

The reply is not tenable as the contractor was liable to provide foreign training to the SCO personnel for capacity building during execution of the project.

The matter was discussed in the DAC meeting held on 20th May, 2022. The DAC directed the management to arrange the foreign training at the earliest under intimation to audit.

In pursuance of DAC directives, a verification was conducted in October, 2022; however, the management did not provide the record relating to the foreign training arranged by the contractor.

Audit recommends compliance of DAC directives.

(OM No. 09)

2.3 Equity

Broadband services in AJ&K and GB were available to public irrespective of gender and caste. Audit also evaluated whether the broadband services were provided on equitable basis in terms of pricing, bandwidth and installation costs as provided to general public in other areas of Pakistan. Audit further assessed that the services were in conformance with the sectoral objective of the Federal Government regarding low rates for higher bandwidths.

2.3.1 Inequitable and costly services to the public of AJ&K and GB

A comparison of prices of different Fiber-to-the-Home (FTTH) packages of different bandwidths being offered by SCO, PTCL and Nayatel was conducted. PTCL was selected being the Significant Market Power (SMP) for providing the services in similar hilly areas of Swat, Chitral, Murree and Mansehra etc. and Nayatel was selected as an operator of major cities with the lowest rates.

SCO was observed to be in monopolistic position in AJ&K and GB in offering FTTH services as there was no other service provider in the territory except it. PTCL and Nayatel were offering the FTTH products to the general public of other areas of country and the rates of both the operators were taken as benchmark for performance measurement being the significant market players.

For the purpose of analysis, only the bandwidth being the basic feature of FTTH broadband services, was taken-into-account. Although, PTCL and Nayatel were offering various add-on offerings like unlimited downloading, One-Television Free, one-month free trial, Double the Speed, Free all net

minutes on PTCL landline and mobile call minutes with their packages; yet only the bandwidth in different packages was mapped for evaluation.

The rates offered by all the three operators were compared on gross packages as well as on base rate in measuring unit of (Rs/Mbps) for conducting comparative analysis. The comparison of packages of SCO, PTCL and Nayatel with different bandwidths is given as under:

Table-1

Bandwidth Package	Rate of Package (Inclusive of Taxes)				Base Rate (Rs/Mbps)			
	SCO-AJK	SCO-GB	PTCL	Nayatel	SCO-AJK	SCO-GB	PTCL	Nayatel
3	1,500	-	-	-	500	-	-	-
5	1,750	-	-	-	350	-	-	-
10	2,500	2000	-	-	250	200	-	-

Table-2

Bandwidth Package	Equivalent Rate of Packages[9] (Inclusive of Taxes)				Equivalent Base Rate (Rs/Mbps)			
	SCO-AJK	SCO-GB	PTCL	Nayatel	SCO-AJK	SCO-GB	PTCL	Nayatel
10	2,500	2,000	-	-	250	200	-	-
20	4,150	3,200	3,560	2,340	208	160	178	117
30	9,850	7,325	3,810	3,420	328	244	127	114
40	14,600	10,850	5,880	4,400	365	271	147	110
50	17,500	13,000	6,900	5,400	350	260	138	108
60	20,000	14,850	8,580	6,351	333	248	143	106
70	22,420	18,590	10,010	7,280	320	266	143	104
100	31,700	23,600	12,300	10,800	317	236	123	108

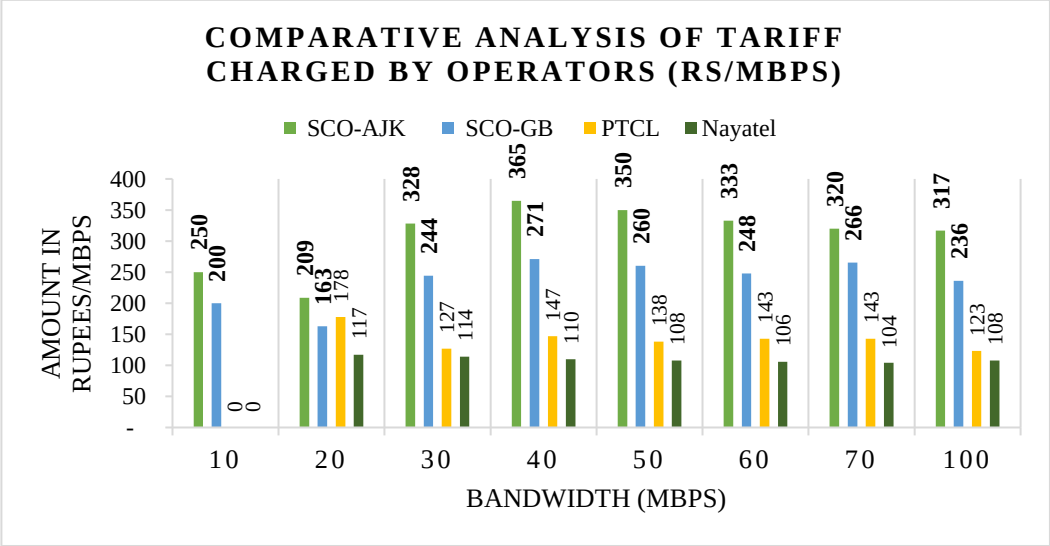
SCO approved tariff and Website data of SCO, PTCL and Nayatel

As depicted in Table-1, SCO was offering FTTH packages in AJ&K starting from 3Mbps to 10 Mbps which had a relatively higher base rate ranging from Rs 250/Mbps to Rs 500/Mbps. PTCL and Nayatel were offering the packages starting from 20 Mbps. *Thus, the general public and institutions in AJ&K had access to a lower bandwidth at relatively higher rates*.

Table-2 indicates that rates offered by SCO for the packages from 10 Mbps to 100 Mbps were almost double than the rates being offered by PTCL and Nayatel in other areas of the country. The analysis further indicates that

[9] Equivalent package rates calculated on the basis of base rate of (Rs/Mbps) rounded upto full rupee

rates of PTCL and Nayatel were decreasing with the increase in bandwidth; however, the rates of SCO were increasing with the increase in bandwidth which was against the sectoral objective of the Federal Government regarding higher bandwidth with lower cost. The same is also depicted in following chart.



The above multiple bar chart shows that the prices of Nayatel were the lowest, whereas the prices of SCO in both AJ&K and GB were significantly higher as compared to PTCL and Nayatel rates offered in other areas of the country.

Above phenomenon was also observed during the field survey conducted in three main cities - Muzaffarabad, Skardu and Gilgit. Both the institutional users and general public were asked whether the services offered by SCO were cost-effective?

In Muzaffarabad, users responded that the broadband services of SCO were costly. Director I.T of University of Azad Jammu and Kashmir responded that they were user of 100 Mbps CIR connection in 16 computer Labs with 4000 to 5000 students including 50% female students. The internet connection was costly and data rate of CIR connection needed to be maintained. AJ&K I.T Board, one of the major users of broadband services, also responded that the installation of the connection and monthly package was on higher side. Planning & Development Department of AJ&K, another major government department and user of broadband services, also considered the services as 'Average' and 'Costly' in terms of reliability, speed and cost.

In Gilgit, the management of Gilgit Cardiac Hospital stated that the hospital applied for connection (8) months ago but till date SCO did not install the connection except telephone service. SCO demanded Rs 8.6 million as One Time Cost (OTC) of 100 Mbps connection which was very high. Similar was the feedback of System Administrator of Karakoram International University (KIU) about broadband services of SCO. In his feedback in respect of 04 campuses in GB, where almost 14000 students were connected directly or indirectly with the internet services, stated that SCO is the single service provider in this region. More service providers were required as the rates of SCO were too high, equipment were outdated and devices were expensive in remote regions.

Audit observed that the broadband services in AJ&K and GB were not being provided on equitable basis. The public had access to relatively lower bandwidths at higher rates as compared to public in other areas of the country which was against the sectoral objective of the Federal Government. Further, the customer support service was also not upto the mark. The public of AJ&K and GB had access to only one operator whereas the public in other areas of the country had opportunity to avail the same services from multiple service providers (07 to 08 service providers) thus providing them opportunity to switch to better, economical and efficient service providers.

3. Audit Follow-up

Audit observed that the response of SCO management showed reluctance in resolving the issues pointed out by audit as no visible actions were taken by SCO management to resolve the issues. However, audit encourages SCO management to take remedial actions in the light of directives of the DAC meeting held on 20th May, 2022. Audit also recommends the PAO to resolve the issues through pro-active follow-up meetings for implementation of DAC directives.

4. Audit Impact Assessment

The audit has identified critical issues of project planning, procurement inefficiency, service quality, customer support and tariff disparities of SCO with other operators of the country. Implementation of audit recommendations will

contribute to improve in future project planning, cost estimations, procurement efficiency and enhanced public service delivery.

5. Conclusion

The MSAN project successfully upgraded the outdated PSTN network and expanded broadband services across Azad Jammu & Kashmir (AJ&K) and Gilgit-Baltistan (GB), supporting socio-economic development, digital education, e-governance, and e-commerce. The transition to Fiber-to-the-Home (FTTH) technology significantly improved internet speed from 4 Mbps to 100 Mbps and coverage area from 3 KM to 20 KM. However, the project faced several shortcomings that hindered to yield its full potential.

Key issues included inadequate planning, cost overruns, scope changes without approval, procurement violations, pricing disparities and monopolistic position of SCO. The lack of competition and high broadband tariffs negatively impacted the affordability, particularly when compared to service providers in other areas of the country. Additionally, service quality was inconsistent, with download and upload speeds failing to meet benchmarks in multiple cities. Customer support services were rated poorly, with a significant number of institutional and general users expressing dissatisfaction.

Despite these challenges, the project laid a strong foundation for digital transformation in the region. The broadband expansion improved access to education, e-commerce and government services while supporting businesses and tourism. To ensure the long-term success of broadband services in AJ&K and GB, key strategic improvements alongwith following recommendations of audit must be implemented.

6. Recommendations

To resolve the issues, audit recommends as follows:

i. Strengthen project planning and feasibility assessments

SCO management should ensure that projects are carefully planned and feasibility studies (PC-II) conducted before approval of PC-I. Besides, realistic cost estimates should be prepared and projects are executed strictly in conformance to the PC-I, coupled with avoidance of unnecessary changes in

scope. Moreover, KPIs must be included in PC-I for monitoring and evaluation of the project performance.

ii. Ensure economy and transparency in procurements

SCO must adhere to the Public Procurement Rules to ensure economy, transparency and fair competition. Further, SCO needs to enforce the contract clauses to make sure that the procurements bring value to the public money.

iii. Ensure competitive pricing in compliance with the sectoral objective

SCO should revise the broadband pricing to align with sectoral object of the Federal Government regarding lower pricing for higher bandwidths and provision of services to the public of AJ&K and GB on equitable basis as provided in other areas of the country.

iv. Improvement in quality of service and infrastructure

The management should upgrade the broadband infrastructure to eliminate service gaps and capacity limitations by expanding the Fiber Access Terminals (FATs). Regularly monitor the Quality of Service (QoS) to ensure that download and upload throughputs meet the regulatory benchmarks.

v. Enhance customer support and user experience

Although, SCO management has established a complaint resolution system which is centrally managed by SCO Headquarters in Rawalpindi but there is a lack of coordination at unit level offices in complaint resolution. SCO needs to establish an effective 24/7 complaint resolution system with better response times and conduct training programmes for customer service staff to improve user interactions, communication and transparency regarding network outages and service disruptions.

7. Acknowledgment

We wish to express our appreciation to the management and staff of the project for the assistance and cooperation extended to us during this assignment.

8. Annexures

Annexure-I

District	Advertised Bandwidth	Throughput Observed	Achievement Status	(X_M)	(X_M)^2
Muzaffar-Abad	15 Mbps	78.5	Not-Achieved	78.5	6162.25
	10 Mbps	94.7	Achieved	94.7	8968.09
	10 Mbps	9.7	Not-Achieved	9.7	94.09
	10 Mbps	121.9	Achieved	121.9	14859.61
	10 Mbps	30.5	Not-Achieved	30.5	930.25
				$\sum X_M$= 335.3	**$\sum X_M^2$= 31014.29**
Skardu	**Advertised Bandwidth**	**Throughput Observed**	**Achievement Status**	**(Xs)**	**(Xs)^2**
	10 Mbps	50.1	Not-Achieved	50.1	2510.01
	10 Mbps	65.6	Not-Achieved	65.6	4303.36
	10 Mbps	84.9	Achieved	84.9	7208.01
	10 Mbps	87.8	Achieved	87.8	7708.84
	25 Mbps	86	Achieved	86	7396
				$\sum$ Xs= 374.4	**$\sum$ Xs^2= 29126.22**
Gilgit	**Advertised Bandwidth**	**Throughput Observed**	**Achievement Status**	**(X_G)**	**(X_G)^2**
	25 Mbps	46.4	Not-Achieved	46.4	2152.96
	25 Mbps	86.7	Achieved	86.7	7516.89
	15 Mbps	86	Achieved	86	7396
	10 Mbps	70.2	Not-Achieved	70.2	4928.04
	10 Mbps	69.6	Not-Achieved	69.6	4844.16
				$\sum X_M$= 358.9	**$\sum X_M^2$= 26838.05**

Annexure-II

District	Advertised Bandwidth	Throughput Observed	Achievement Status	(X_M)	(X_M)^2
Muzaffar-Abad	15 Mbps	79	Achieved	79	6241.00
	10 Mbps	81.11	Achieved	81.11	6578.83
	10 Mbps	46	Not-Achieved	46	2116.00
	10 Mbps	10.5	Not-Achieved	10.5	110.25
	10 Mbps	10.0	Not-Achieved	10.0	100.00
				$\sum X_M$= 226.6	**$\sum X_M^2$= 15146.08**
Skardu	**Advertised Bandwidth**	**Throughput Observed**	**KPI Achievement Status**	**(Xs)**	**(Xs)^2**
	10 Mbps	66.5	Achieved	66.5	4422.25
	10 Mbps	53.6	Achieved	53.6	2872.96
	10 Mbps	84.7	Achieved	84.7	7174.09
	10 Mbps	59.2	Achieved	59.2	3504.64
	25 Mbps	70.7	Achieved	70.7	4998.49
				$\sum$ Xs= 334.7	**$\sum$ Xs^2= 22972.43**
Gilgit	**Advertised Bandwidth**	**Throughput Observed**	**Achievement Status**	**(X_G)**	**(X_G)^2**
	25 Mbps	71	Achieved	71	5041.00
	25 Mbps	72.7	Achieved	72.7	5285.29
	15 Mbps	73	Achieved	73	5329.00
	10 Mbps	81.3	Achieved	81.3	6609.69
	10 Mbps	61.3	Achieved	61.3	3757.69
				$\sum X_M$= 359.3	**$\sum X_M^2$= 26022.67**

9. List of KPIs and means of verification

Sr	5Es Area	Para No	KPIs	Means of Verification
1.	Effectiveness	2.1.1	Number of Telephone Subscribers	SCO data
2		-do-	Teledensity of Subscribers	-do-
3.		-do-	No of Broadband Subscribers	-do-
4.		-do-	Teledensity of Subscribers	-do-
5.		-do-	Broadband Capacity Enhanced (Gbps)	-do-
6.		-do-	Bandwidth (Mbps)/User	Feedback Survey
7.		-do-	Network Coverage/ KM	SCO Data
8.		-do-	Data Packet Transfer Rate (Mbps/Port)	SCO data & PTA Survey
9.		2.1.3 (i)	Network Service Uptime >99%	PTA Technical QoS Survey
10.		2.1.3(ii)	Avg Download Throughput >80%	-do-
11.		2.1.3(iii)	Avg Upload Throughput>50%	-do-
12.		2.1.4(iv)	Consistency of Services (Coefficient of Variation) $CV = \frac{S}{\bar{X}} \times 100$	-do-
13.	Equity	2.3.1	Base Tariff in (Rs/Mbps)	SCO and website data