



ISLAMIC EMIRATE OF AFGHANISTAN  
MINISTRY OF COMMUNICATION AND IT  
AFGHAN TELECOM CORPORATION

**TOR**

For

**Afghan Telecom IT/ISP backbone Project**

Afghan Telecom Corporation, IT Department, PTT  
Building, Nader Pashtoon avenue.

Kabul – Afghanistan



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## Executive Summary

### About us:

Afghan Telecom (AFTEL) is the largest & only Operator in Afghanistan with highest numbers of subscribers of Internet distributing several Gigabytes of bandwidth in the Country DSL Internet services, DSL Internet service is the cheapest internet which is provided through Afghan Telecom fixed line digital phone in Kabul, Jalal Abad, Kandahar, Kunduz, Herat, and Mazar e Sharif with shared internet bandwidth. Afghan Telecom Internet and other communication Services are offered on globally standard Fiber optic backbone with having Fiberring all around Afghanistan and a Fiber ring in Kabul. Afghan Telecom is committed to world- class customer service and support demonstrated by its outstanding customer service record, 24 x7 coverage and local service and support. Our Network Operations Centers and technical support staff offer customers support for their business-critical Internet applications and provide proactive network monitoring 24 hours, 365 days. Afghan Telecom constantly monitors all links to its uplink providers for outages, reliability, local lead errors, alerts and etc. using. The Link outages will not be noticed by our end user customer since we have multiple routes to our uplink providers this give our customer high level of Internet and services availability. Afghan Telecom provides access to its monitoring and reporting system to customers via a monitoring server, so that customers can directly check the real time bandwidth utilization and prepare reports to their management accordingly.

**Our Vision:** We hope to maintain our high level of quality services so that we can be the best and preferred Internet service provider in Afghanistan, we have a quality policy which is about achieving sustained services that consistently satisfy the needs and expectations of our customers.

**Our Mission:** We want to surpass the needs and expectations of all our customers by providing reliable services with readily available customer support. This also means that we want to provide complete, high- quality Internet solutions to all of our customers by incorporating sensible and cost-effective technologies.



## **BACKGROUND**

This project is designed for upgradation of ISP/Backbone Devices in the Center zone (Kabul) and relevant zones (Herat, Kandahar and Mazar) as it is clear to everyone that Afghan Telecom Company has been providing internet and telecommunication services in all over the Country since its establishment until now, and it has been a pioneer in the public and private sectors.

According to the needs for more services and the increasing number of customers for internet services, Afghan Telecom tries to provide continuous and uninterrupted services to all customers, so this company needs to upgrade ISP network equipment's to achieve the above goals, Considering the problems that the existing equipment has, it cannot meet the needs of the customers, because the equipment that is currently available in the company is all end of life and end of support, the problems which are increasing day by day and this has a negative impact on the internet and telecommunication services of the company and will also affect the customers, so before we face any kind of availability impacts or any kind of other problems, it is highly recommended to upgrade the relevant equipment as soon as possible.

## **Purpose of project**

The purpose of this project is to select a well-known vendor to provide ISP/Backbone equipment's (Routers, Layer 3 core switches) for Afghan Telecom infrastructure by adding and installing these equipment's AFTEL will be able to provide the high available network services to all customers without any interrupting 24/7, and support all needs in any level of customers in telecom section and internet services.

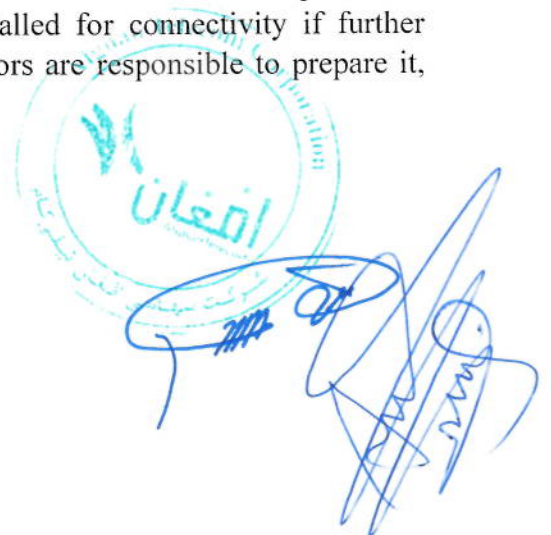
## **Expected response Details**

Proposals from Suppliers must contain enough technical information with detail to enable Afghan Telecom to evaluate the offer which should include technical description of each product, system design, capacity and product roadmap.

All the technical documentation (Hardware and software configuration and installation guide) should be provided in either Word or PDF format. The pricing details should be provided in excel format.

## **Technical Specifications and Requirement**

Optical fiber cables are already laid and connectivity is established. Between all provinces and zones No need for any equipment or devices to be installed for connectivity if further equipment's required to implements this project selected vendors are responsible to prepare it, below are our required ISP/Backbone appliances specification.



**Routers & Switches Requirement**

**Routers slots and Interface requirements**

ID	Regions	Required Router Quantity	Per Router Slot Capability	Per Router Interfaces capacity and required ports
1	Kabul	1+1	14 Slots or more	12x100G, 2x40G, 24x10G
2	Herat	1+1	8 Slots or more	12x100G, 2x40G,24x10G
3	Mazar	1+1	8 slots or more	12x100G, 2x40G,24x10G
4	Kandahar	1+1	8 slots or more	12x100G, 2x40G,24x10G

**Switches slots and Interface requirements**

ID	Regions	Required Switch Quantity	Per Switch Slot Capability	Per Switch Interfaces capacity and required ports
1	Kabul	1+1	8 Slots or more	2x100G, 4x40G, 24x10G or more
2	Herat	1+1	8 Slots or more	2x100G, 2x40G, 24x10G or more
3	Mazar	1+1	8 Slots or more	2x100G, 2x40G, 24x10G or more
4	Kandahar	1+1	8 slots or more	2x100G, 2x40G, 24x10G or more

**Note:** The 14 Slots Routers must have **30Tbps** Switching Capacity and the 8 Slots router must have **16Tbps or more** switching capacity and switches must have **30Tbps** switching capacity with multiple module support.

**Devices Features:** Devices (routers and switches) should support the following requirements, by default without any extra modules or license requirements implementations.

**Layer 2 Services:**

- IEEE802.1q
- IEEE 802.3ad
- IEEE802.1p
- IEEE 802.1ab
- Ethernet WAN
- PPPoE
- SPAN/RSPAN/ERSPAN
- Layer2 & Layer3 Etherchannel
- STP
- RSTP
- MSTP
- RRPP
- VTPv2
- VTPv3
- All types of VLAN

**Layer 3 Services:**

- IPv4
- IPv6
- OSPFv2/V3
- RIPv2



- RIPng
- IS-IS
- IS-ISv6
- BGPv4
- BGPv4+
- Summarization & Aggregation
- Redistribution Features between different routing protocols/static/default routing
- Authentication, Authorization and Accounting Features
- IPv6 over IPv4 Tunnel
- IPv4 over IPv6 Tunnel
- IPv6CP
- IPv6 ACL
- Telnet
- 6VPE
- Static Router protocol

#### **IP Multicast Services:**

- IGMPv1,v2,v3
- IP Multicast Routing
- RPF Check
- PIM Sparse-mode
- Auto-RP
- Bi-directional PIM
- Layer 2 Multicast
- IGMP Snooping

#### **Security Services**

- Standard ACL
- Extended ACL
- Named ACL
- Routing Protocol & ACL
- Time-Based ACL
- Device Access Security
- Layer 2 Security
- IPv6 First Hop Security

#### **VPN Services:**

- Site-to-Site
- Remote-Access
- IPsec-VPN
- DMVPN
- GRE
- MGRE
- Routing Protocol Over DMVPN



### **MPLS Services:**

- LDP
- RSVP-TE
- Seamless MPLS
- L2 VPN (VPLS/H-VPLS/VLL)
- MPLS/BGP L3 VPN
- MPLS Layer 2 VPN
- MPLS Layer 3 VPN
- SRV6
- SRV6 BE
- SRV6 Policy
- EVPN E-line
- EVPN E-LAN
- EVPN E-Tree
- EVPN L3 VPN

### **QoS Services:**

- Based on traffic classification Diff-Serv model
- Based on VLAN, 802.1p, VLAN+802.1p traffic classification
- WRED
- Based on port traffic Shaping
- Supports priority queues per SQ8
- PQ
- WFQ

### **Network Reliability Services:**

- GR
- LSP1:1
- PW Redundancy
- IP/LDP FRR
- TE FRR
- VPN FRR
- BFD for LSP
- PW
- IGP
- IPV4
- IEEE 802.1ag
- IEEE 802.3ah
- ITU-T Y.1731,
- G.8032

## **SERVICES REQUIRED**

The ISP backbone network providing mutual access of internal networks of an enterprise is a core area and has the following characteristics:



- A large number of routes
- IPv4/IPv6 dual stack
- Flexible routing policies
- A large number of users and heavy traffic



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The following lists the main service requirements of the ISP backbone network that provides mutual access of internal networks of an enterprise:

**Route control requirements:**

- Provide flexible route forwarding, and control route advertisement and import based on routing policies.

**Reliability requirements:**

- Ensure bandwidth using multiple egress links.
- Ensure high reliability and service continuity for important services such as enterprise private line services.
- Provide backup functions for key network nodes to ensure reliable transmission of data services.
- Shorten the service interruption time as much as possible to ensure user experience upon an intermittent link disconnection or a device fault.
- The routers should not stacked during the operational process, should handle the proper capacity.

**Tasks required from this effort will include but are not limited to:**

- Equipment Procurement.
- Testing, Configuring, Monitoring, Inspection and installation of these devices.
- Completing the testing of upgraded equipment.
- All installation materials, tools, cables, optical jumpers and all accessories are required.
- All required licenses shall be without expire date (permanent).

**Power Supply Unit:**

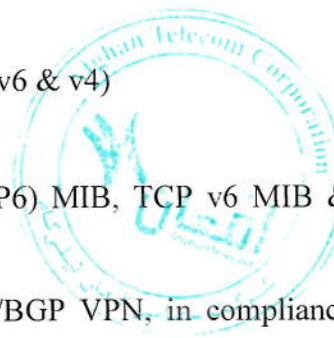
- The equipment should support dual power source (1+1 redundancy) and compatible with existence rectifier DC power support.
- The required equipment in this project power source should be DC.

**Other Services that are required.**

- ✓ Support Manual tunnel
- ✓ Support Automatic tunnel
- ✓ Support 6 to 4 tunnel
- ✓ Support GRE tunnel & MGRE tunnel



- ✓ Support ISATAP tunnel
- ✓ Support IPv4 over IPv6 tunnel
- ✓ Support IPv6 over IPv4 tunnel
- ✓ Support IPv6 Provider Edge (6PE)
- ✓ Support IPv6 static routes & Dynamic Routes
- ✓ Support IPv4 static routes & Dynamic Routes
- ✓ Support all types of Exterior Gateway Protocols & Interior Gateway Protocols
- ✓ Support Dynamic routing protocol such as  
(BGP4+RIP,RIPng,OSPF,OSPFv3,EIGRP,EIGRP name Mode, and IS-ISv6 & v4,  
IPv6 neighbor discovery, PMTU discovery, TCP6, ping IPv6, tracet IPV6, socket  
IPv6.
- ✓ Support Static IPv6 DNS, IPv6 DNS server, TFTP IPv6 client, and IPv6 policy  
based routing.
- ✓ Support IP/MPLS services, low latency and write-rate forwarding at scale, while  
providing the reliability needed to meet strict service-level agreement
- ✓ Support IPv6 full support-Addressing IPv4 routes over BGP IPv6 sessions-  
Accounting of system statistics for IPv4 and IPv6 traffic, Authentication for MBGP-  
BFD for IPv6 BGP sessions-BGP extensions for IPv6.
- ✓ Support IPv4 Unicast, Multicast, Static & Dynamic Routing, Policy routing, routing  
policy and routing load sharing, multicast static multicast and PIM-  
DM/SM/SSM/PIM-SSM mapping, MSDP, MBGP, dynamic multicast, VPN  
multicast, multicast load sharing, controllable multicast.
- ✓ Support LDP, MPLS traffic load sharing, MPLS label allocation policy, MPLS TE  
BW automatic adjustment.
- ✓ Support Internet Control Message Protocol (ICMPv6 & v4)
- ✓ Support Management Information Base (MIB)
- ✓ Support User Datagram Protocol version 6 (UDP6) MIB, TCP v6 MIB & IPv6  
MIB+110
- ✓ Support MPLS TE, P2MP TE/Mldp and MPLS/BGP VPN, in compliance with



RFC 2547

- ✓ Support Inter-AS VPN Option A, Option B & Option C
- ✓ Support Integration with Internet Services Marini and Kompella
- ✓ Support MPLS L2VPN, MPLS L3 VPN, L2VPN techniques, such as VPLS and VLL, IP internetworking over heterogeneous media Multicast VPN, MPLS-TP EVPN Remote LFA.
- ✓ Support all types of VLAN, VTP version 2 and 3, STP, RSTP,RRPP,SPAN/RSPAN,ERSPAN,MSTP,RSTP
- ✓ Layer2, Routed Access (RIP,EIGRP Stub, OSPF), PBR, PIM Stub Multicast, PVLAN, VRRP, QoS.

#### **Advanced Capabilities and Scales:**

- ✓ BGP, EIGRP, VRRP, GLBP, IS-IS, BSR, MSDP, PIM SM, PIM SSM, BIDIR-PIM, IP SLA, OSPF.

#### **Network Segmentation:**

- ✓ VRF, Software-Defined Access (VXLAN, LISP, SGT), MPLS, MVPN.

#### **Telemetry and Visibility:**

- ✓ Model-driven telemetry, Sampled NetFlow, SPAN, RSPAN.

### **Equipment Capabilities:**

The switching node should be able to handle packet and traffic for new services with the latest international performance and latest specialized specifications issued by ITU-T recommendation, IETF and IEEE standards in order to provide high speed, quality of service guaranteed, high reliability and high security.

The equipment shall support services like:

- Point-to-point service (E-Line)
- Point-to-multipoint service (E-TREE)
- Multipoint-to-multipoint service (E-LAN)
- Equipment should be capable of client-side protection.



- All current ISP services, protocols, software's and equipment should be compatible with this project equipment.
- System should be scalable -be able to upgrade the capacity without fork lift of existing installation.
- The equipment should be delivered in pre-installed racks.
- Automatic amplifier adjustment capability at all sites to allow for non-optimal splicing that may occur in the spans.
- Handle In-service upgrades (with no impact to existing traffic)
- High availability, duplicity/redundancy design should be taken care at Hardware and configuration level.
- Network Devices should support all advanced routing (e.g.: static routing, Dynamic Routing, Policy Based routing and etc.)
- Network Devices should support Network Layer 2 and Layer 3 protocols.
- Network Devices should support all security features which a Router support
- Devices are planned for Backbone Network so it should support large Routing and MAC tables.

## Spare parts

- Extra spare part must function able in the next 10 year.
- 15% Spare Parts support that include (SFPs, Mainboard, Power supply, Module, Fiber and STP Patch card cables and etc. required parts).

## Response information details

Base on the requirements above, supplier should quote for all the equipment and services with information that will include the following.

- Details of the equipment offered and summary of the specification.
- Vendors must provide a detailed price BOQ, in case of discrepancy between unit price and total, the unit price shall prevail.

## Warranty

The seller must deliver equipment which are of the quality and according to the description required by the technical specifications of this Contract and which are contained or packed in the manner required by this Contract.

The Seller shall warrant that the quality and specifications of the equipment delivered pursuant to this Contract shall conform to the contract stipulations.

The warranty period shall remain for one year after of FAC (Final Acceptance Certificate).



In the event that the equipment is found to be in breach of the said warranty and so notified during the term of the warranty and the cause of such breach is attributable to the Seller, the Seller shall promptly repair or replace such equipment.

**Return of Equipment:**

If the equipment is not in accordance with the required technical specification mentioned in this contract, it will be returned back to vendor and vendor is responsible to replace the equipment within 30 working days.

**Inspection and claim:**

After arrival of the equipment at the port of destination (AFTEL warehouse) the Purchaser shall apply to inspection as to the specifications and quantity/weight of the equipment. If damages of the equipment are found, or the specifications and/or quantity are not in conformity with the stipulations in this Contract, the Purchaser shall, within fifteen (15) days after arrival of the equipment and service delivery in all sites in all provinces where the equipment need to be installed, giving a written notice to the seller, claim against the Seller.

In case of damage of the goods incurred due to the design or manufacture defects and/or in case the quality and performance are not in conformity with the Contract, the Purchaser shall, during the guarantee period, request to make a survey and shall make a claim against the Seller (including replacement of the goods) and all the expenses incurred therefore shall be borne by the Seller.

Vendor should provide 24/7 Remote and Physical support during implementation and one year after FAC, without any charges and fee payments.

**Responsibility matrix**

R = responsible

S = support

No.	Item	Contractor	AFTEL
<b>1</b>	<b>Delivery of Equipment</b>		
1.1	Deliver to Kabul (Aftel warehouse)	R	
1.2	Custom process and procedure	R	
1.3	Deliver up to all Zones	S	R
1.4	Based on requirement submitted on sites	S	R
<b>2</b>	<b>Project Implementation</b>		
2.1	Installation of equipment's hardware and software	R	S
2.3	Initial configuration and testing	R	
2.4	Services Migration	R	R
<b>3</b>	<b>Acceptance Responsibilities</b>		
3.1	PAT (Partial Acceptance Test) ATP or Acceptance	R	R



	Test Procedure will be done after equipment installation & integration. AFTEL team will test the quality of installation, expanded capacity, physical and stability condition of hardware part, software part, check the alarms, and all the monitoring parameters. ATP will be done by AFTEL team, Vendor team will be with AFTEL team during ATP.		
3.2	PAC: Preliminary Acceptance Certificate refers to network equipment acceptance certificate signed by the customer. After equipment installation & integration, both AFTEL and supplier team will do the ATP, if there be non-service affecting issues during ATP then AFTEL will sign the PAC.	R	R
3.3	FAC: Final Acceptance Certificate (FAC) is a certificate that documents Provider's equipment or services have satisfied the final acceptance criteria and process as stated in a contract. If there be no issue during ATP, or contractor solved all the issues, FAC will be done after 40 day of PAC certificate issuance date, for the FAC there must no problems or issues related to Provider / contractor.	R	R
3.4	FAC: Final Acceptance Certificate (FAC) refers to network equipment acceptance certificate signed by the customer. After equipment installation & integration, both AFTEL and supplier team will do the FAC , if there be non-service affecting issues during FAC then AFTEL will sign the FAC .	R	R

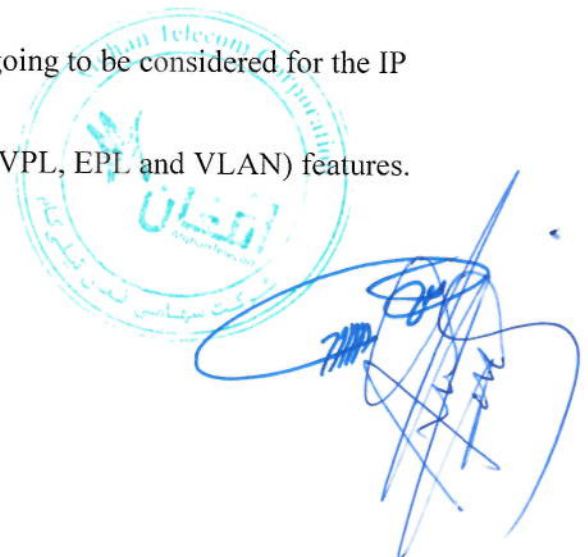
## Acceptance

As the project implementation finished, the acceptance process will start. AFTEL will insure all the equipment used are as per the contract. AFTEL will see if the equipment are properly working and the installation are neatly done. Item by Item the manuals will be checked.

## ISP Diagram and SFP Modules

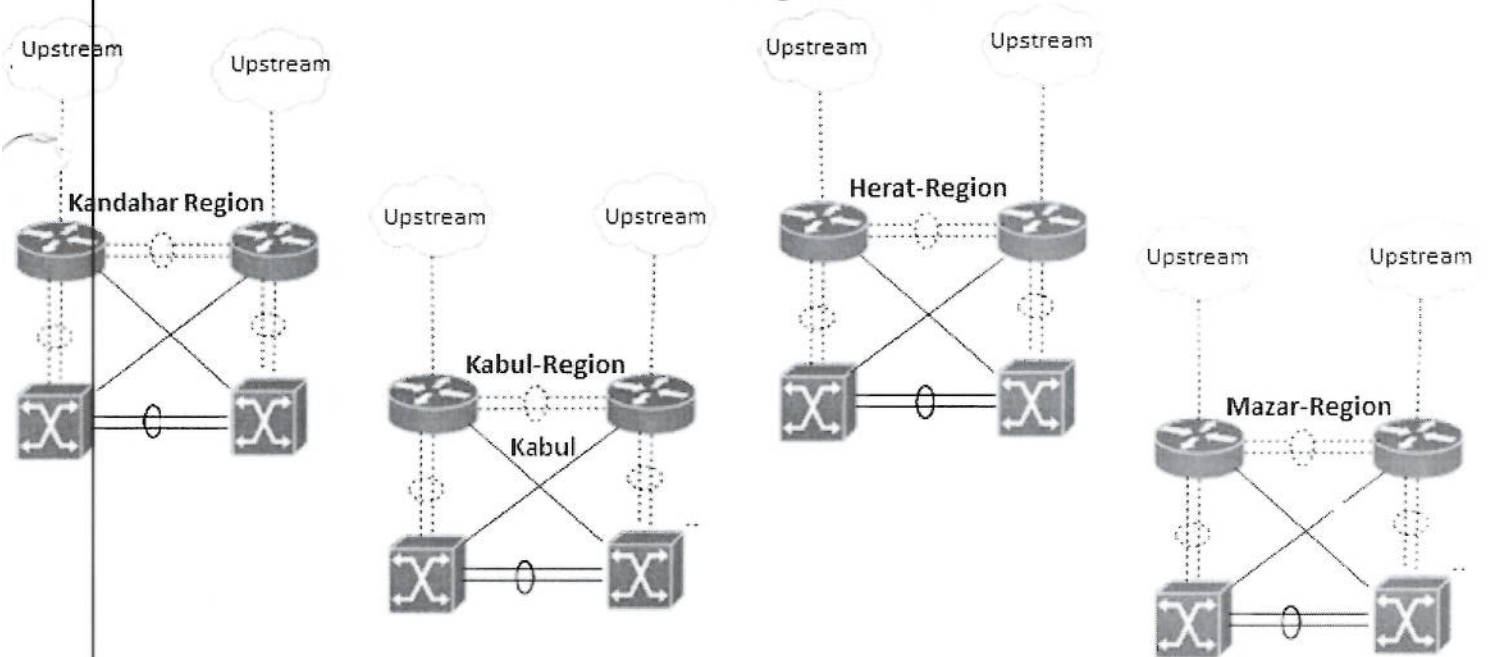
For evaluation of the Zones as shown in the diagram, below are going to be considered for the IP network Design and required Interfaces.

- The 10GE, 40GE, 100GE Interfaces should have (QoS, EVPL, EPL and VLAN) features.



- 10 GE, 40GE, 100GE Interfaces should have the ability to monitor traffic performance in near real time, and should be software configurable to be WAN and LAN.
- The equipment's should have the capability of interconnection with the other vendor equipment.
- All optical interfaces must have separate optical modules i.e., SFP (Small form pluggable factor), SFP.
- All SFPs in current project will be Single Mode.
- 10% from 10G interfaces from current SFPs should be Multimode.
- The SFPs must support 10Km,20Km and 40Km based on device capabilities and technology advanced.

### ISP Diagram



### Deliverables from this effort will include

- An updated Project Plan to include configuration updates, rack cleanup and a revised schedule for Installation and Testing.
- A Test Plan that will be reviewed and approved by the AFTEL team and implemented by Contractor.
- Updated Visio network diagram to reflect the updated as-built network configuration at the end of the project



## PROJECT ASSUMPTIONS

Contractor should base its proposal on the following assumptions:

- Contractor will be required to perform the installations on weekends, or in approved timeslots with no or limited-service disruptions.
- Appropriate AFTEL staff members will be available for consultation with Contractor's engineers as needed to provide information or answers to specific questions related to the current Environment.
- Any existing network documentation will be made available to Contractor.
- All systems or devices to be assessed reside at AFTEL's main campus location in Kabul zones, and its domestic locations (H).

### Devices Life Cycle

Period of time the Devices are expected to be functioning: **The product useful life should be 10 years**

#### Training:

Vendor should provide (online/on-site) training for Aftel operation team.

### Contract Duration

The Contract duration will be 5 months and 10 days after signing the contract.

SN	Activity	Duration
1	Project Implementation	5 months and 10 days after signing of Contract
1.1	Equipment Delivery based on DDP to AFTEL ware house and Zones	
1.2	Hard & Software Installation and testing	
1.3	Commissioning	
2	Warranty service	12 months affecting after project implementation

## SCOPE OF WORK

### Phase I – Supply (90 days)

**The Contractor will determine the appropriate upgrade path and recommend the solution to AFTEL staff.**





- Contractor will supply the Equipment in 90 Days after contract is signed and assure that all parts, licenses and equipment are delivered and are in working order and able to deliver the expected service.
- The contractor shall not assign, in whole or in part, its obligations to perform under this contract, except with AFTEL prior written consent.
- The Contractor shall be responsible for all obligations arising out of or in relation to this Contract even if some parts of the Contractual obligations are assigned to any third party.
- The contractor shall officially notify AFTEL in writing of all sub contracts awarded under the contract if not already specified in the Contract. Such notification, in his original bid or later shall not relieve the contractor from any liability or obligation under the contract.
- Earlier to handover required hardware and software on site, testing should be completed and result should be acceptable for AFTEL side.
- The contractor shall be responsible for loading and unloading of equipment as required and arrange insurance of the equipment. equipment will be at the risk of contractor till its delivery to the Site and until deliver the required service.
- All equipment and licenses will be registered to AFTEL as the owner.
- All delivery, shipping, and travel expenses should be based on DDP to AFTEL ware house in Kabul.
- Contractor will submit a final project schedule for AFTEL approval.
- Contractor/ bidder must provide Manufactures Authorization.

#### **Phase II – Installation, Configuration and Migration (40 days)**

Contractor is expected to configure the equipment and prepare the sites for installation. Configurations Prior to the installation, Contractor will review the current configurations with the AFTEL staff.

- Contractor is expected to submit a description of all recommended changes to the current configuration.
- Contractor is also expected to submit a detailed configuration solution for replacing the current solution and back out plan.



- Contractor and and Aftel are responsible for services migration from old devices to the new one.

AFTEL staff will coordinate with Contractor on the installation. It is expected that the installation will be performed in the following phase:

1. physical installation on main and regional hub sites

Resources that will be made available to support the installations (All resource should be provide by the contractor if Human resources are required to support Aftel will provide).

- All work will be performed in a professional manner.
- Network downtime will be minimized as work will be performed only during weekend hours, or in approved timeslots with no or limited-service disruptions.

### **Phase III – Testing (30 days)**

- Prior to the installation, a test sheet will be presented for review and approval by AFTEL staff. Contractor will perform all testing with the involvement of AFTEL staff. All test results will be documented and issues will be tracked throughout the project and resolved by the Contractor to the satisfaction of AFTEL.

### **Payment terms**

1. 20% of total contract as advance payment will be paid to contractor against similar bank grantee.
2. 30% of total contract value will be paid to the contractor after delivery and equipment inspection (GRN issuance)
3. 40% of the total contract value will be paid to the contractor after fully project implementation testing.
4. 10% of the total contract will be paid to the contractor after final acceptance certificate issue date.

The End

