INDIRA GANDHI INSTITUTE OF TECHNOLOGY (IGIT), SARANG

Sarang, Dhenkanal-759146

Implementation of Local Area Network

Request for Proposal (RFP)

Implementation of Local Area Network (LAN)

At

IGIT, SARANG

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DISCLAIMER

Indira Gandhi Institute of Technology (IGIT), Sarang is inviting eligible interested Vendors to submit Request for Proposal (RFP) for the Implementation of Local Area Network (LAN).

No contractual obligation whatsoever shall arise from the RFP process unless and until a formal contract is signed and executed between Indira Gandhi Institute of Technology (IGIT), Sarang and the Vendor concerned. Indira Gandhi Institute of Technology (IGIT), Sarang reserves the right not to proceed with the implementation of the project.

Indira Gandhi Institute of Technology (IGIT) Sarang
Sarang, Dhenkanal-759146
Odisha

No.   **Dated:**

Request for Proposal (RFP)

Implementation of Local Area Network (LAN)

Indira Gandhi Institute of Technology, Sarang invites applications for Request for Proposal (RFP) from eligible interested and experienced Vendors on Implementation of Local Area Network (LAN).

The sealed cover superscribed 'Request for proposal for Local Area Network (LAN)' shall be opened on **01.06.2021 at 10.00 AM (IST)**. Sealed cover shall contain two sealed covered envelopes–Part-I (Technical bid) and Part-II (Financial bid). The Part-I (Technical bid) shall be opened on the same day in presence of attending Vendor(s). The Part- I (Technical bid) shall contain Bank draft for earnest money and other documents as required in the herein- under. The Part- I (Technical bid) without bank draft for earnest money shall be rejected outright. The Part–I (Technical bid) shall be evaluated in accordance with qualification criteria for short-listing the Vendors as prescribed in the RFP document. The Part- II (Financial bid) shall be opened in due course as noted in 'Schedule for submission of RFP'.

Part -I (superscribing Technical bid)

The Technical bid shall detail the technical specifications of the proposed solution, compliance to the specifications of various modules detailed in the RFP, implementation plan, post implementation warranty and support plan along with the Checklist for Technical Bid, supporting documents such as certificate of incorporation, memorandum of Association, copy of PAN, GST certificate, work order copy/ experience

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certificates, IT returns of last 3 years audited account statements, Vendors profile and other requisite documents. Bank Draft for earnest money shall be kept in separate envelope marked as 'EMD' and be placed within this envelope. Any other relevant papers, which a Vendor feels necessary along with the Terms and Conditions duly signed and accepted by the Vendor shall form part of this Technical bid.

Part -II (superscribing Financial Bid)

1. The Financial bid shall give detailed breakup of price in INR of various modules, taxes and other work as per the pro-forma in **Section-II** enclosed and the financial bid shall also contain the year wise maintenance charges in INR for next three years **after free maintenance period of one year.**

2. IGIT, Sarang shall not be liable for any expenses incurred by the Vendor in preparing the bid documents for this RFP or for any correspondence or for any negotiations associated with the award of a contract.

Late Applications: Any application, received after the last date and time i.e., **31.05.2021 (4 PM)** for submission, shall not be accepted. Applications received after the last date shall be summarily rejected and returned unopened.

The completed application (response document), (printed, signed and bound copy) shall be submitted in a sealed cover superscribed with the title "Request for Proposal for Local Area Network (LAN)" at the address given below (by registered/speed post only):

**To
The Director
Indira Gandhi Institute of Technology, Sarang
Sarang, Dhenkanal-759146, Odisha, India.**

The RFP document, instruction to Vendor, other detailed terms and conditions can be downloaded from the website: **http://www.igitsarang.ac.in.**

Last date and time of submission of tender	**31.05.2021 till 4.00 PM**
Cost of the tender for LAN	**Rs 1,000/- (Rupees one thousand only)**
EMD Cost of the tender for wired/wireless LAN (Ethernet)	8,80,000/-
EMD Cost of the tender for wired/wireless LAN (GPON)	1,50,000/-

Important Details

The document is prepared by IGIT, Sarang. It should not be reused or used in any form either fully or partially. The information provided by the Vendors in response to this tender document shall become property of IGIT, Sarang and shall not be returned.

SCHEDULE FOR SUBMISSION OF RFP

The following are the schedule of events for this project. The schedule is subject to change depending on the outcome of the events / responses of the events and a final schedule shall be established prior to contracting with the successful Vendor(s).

Event	Date and Time
Availability of RFP Document at IGIT Sarang Website	26.04.2021
Last Date and time for submission of completed RFP Document	31.05.2021 till 4.00 PM
Opening of RFP (Technical Bid)	01.06.2021 at 10.00 AM
Opening of RFP (Financial Bid)	08.06.2021 at 10.00 AM

1. INTRODUCTION & OBJECTIVE

Indira Gandhi Institute of Technology (IGIT), Sarang was established in the year of 1982 and was managed directly by the Govt. of Orissa in the name of Orissa College of Engineering (OCE). Prior to this, since 1981, the institute in the name of Modern Polytechnic (MPT) was offering Diploma Courses in Civil, Electrical, Mechanical, Mining Survey Engineering. In the year 1987, both OCE & MPT were merged and renamed as IGIT, Sarang and the management was transferred to an Autonomous Society. Presently, the Institute is offering nine Under Graduate Engineering courses in Chemical, Civil, Electrical, Mechanical, Metallurgical and Material Sciences, Electronics & Telecommunication, Computer Science Engg., Production Engg., Architecture; & two part-time Post Graduate Engg courses in Industrial Power Control & Drives, Environmental Sc. &Engg.; Ten full time Post Graduate Engg courses / Master course in Computer Sc. Engg., Electronics and Telecom. Engg, Wireless Communication Technology, Geotech Engg., Mechanical System Design, Mett. & Materials Engg., Power Electronics & Drives, Power System Engg., Production Engg., Structural Engg., Master's in computer application; besides five Diploma Courses in Civil, Electrical, Electronics & Telecommunication, Mechanical & Metallurgical Engineering.

IGIT Sarang requests proposals for installation and Implementation of local area network (LAN) described in the attached specifications from interested parties (herein after known as "the Vendor"). Prices quoted shall be all-inclusive and represent complete implementation at the site given in the attached specifications. The Vendor shall be responsible for all parts, labor, and all other associated apparatus necessary to completely develop, test, install and turnover for acceptance to IGIT, Sarang.

2. SCOPE OF WORK

This section deals with the requisite specifications for wired/wireless LAN both for Ethernet and GPON.

Supply, Installation and Commissioning of Fiber Optic Cables

Supply, Installation and Commissioning of Fibre Optic Cables throughout the campus including Academic campus and Hostels.
Optical Fibre Cable laying and Execution of Networking (LAN Connection, switch, routers, OLT, ONU, Splitter with proper shielded wiring)
The Vendor will do the survey of the (LAN Connection, switch, routers, OLT, ONU, Splitter with proper shielded wiring etc.) and supply specified items with the following specifications as mentioned below.

Items are to be quoted per unit price.

Technical Specifications for Active Items for wired/wireless Ethernet LAN

Technical Specifications for Active Items

A. Next generation firewall (NGFW)

Sl No	Features	Compliance (Yes/No)	Deviations / Remarks with Cross Reference
	General Requirements		
1	Proposed NGFW OEM must be Leader in Gartner Magic Quadrant for Enterprise Network NGFW's in last 3 years and must have achieved at least 95% of security effectiveness in NSS Labs Breach Prevention Systems report 2019.		
2	The proposed solution shouldn't use any proprietary ASIC hardware for any kind of performance Improvement. The solution should be completely based on multi-core CPU for effective use of compute.		
3	The solution must have Firewall, Application visibility and control, IPS, Anti-virus, Anti-malware, Anti-bot and URL filtering capabilities from day one. The operating system of the solution proposed must not have any backdoor		

	vulnerability identified in last 3 years.		
4	Licensing should be a per device and not user/IP based (should support unlimited users)		
5	Firewall should support creating access-rules with IPv4 & IPv6 objects simultaneously		
6	The Proposed solution must be in HA mode from Day one.		
Hardware and Interface Requirements			
7	The proposed solution must be supplied with minimum 8 X 1G RJ 45 ports and 4 X 10G SFP+. The proposed solution should be highly scalable and should be able to scale up if needed without replacing the existing appliances. The 10G ports must either be populated with 10GBaseSR SFP+ optics or 10GBase SFP+ DAC cables having 3 meters length.		
8	The appliance must be supplied with minimum 240 GB internal SSD based storage		
9	Proposed appliances must be supplied with minimum 16 GB RAM from day one and should be scalable to double in future.		
Performance Requirements			
10	NGFW (IPS with Bi-Directional Scan + Application Control+ Firewall features enabled) Throughput must be minimum 5 Gbps tested under an enterprise traffic condition with protocol mix of multiple packet sizes and not just one particular packet size. The bidder shall submit the performance test report from Global Product Engineering department / Global Testing Department/ Global POC team of OEM to certify the mentioned performance		
11	The proposed solution should be provided at least 2.5 Gbps of throughput after enabling anti-virus, URL filtering and Malware Inspection under a enterprise traffic condition with protocol mix of multiple packet sizes and not just one particular packet size. The proposed solution must have the capability of linearly increasing the throughput to at least 5 times in future in case additional compute is procured in future to enhance the performance. In case of scalability with multiple appliances, the solution framework should be configurable with N + 1 Redundancy.		

12	The proposed appliance must provide at least 2 Gbps of VPN throughput		
13	The proposed appliance must support at least 4 Million concurrent connection from day one and should be scalable to double. The solution must support at least 80,000 new connections per second.		
Architecture Features			
14	Proposed appliance must support configuration minimum 2 nos. virtual firewall/contexts from day one and should be scalable to support at least 20 virtual instances in future.		
15	NGFW system should support virtual tunnel interfaces to provision Route-Based IPsec VPN		
16	It should support the system authentication with RADIUS and local authentication. Both should work simultaneously.		
Solution Filtering Requirements			
17	It should support the filtering of TCP/IP based applications with standard TCP/UDP ports or deployed with customs ports		
18	the solution must have an Internal CA and External third-party CA must be supported		
19	Solution must support 3DES and AES-256 cryptographic for IKE Phase I and II IKEv2 plus "" and "Suite-B-GCM-256" for phase II		
20	Solution must support at least the following Diffie-Hellman Groups: Group 1 (768 bit), Group 2 (1024 bit), Group 5 (1536 bit), Group 14 (2048 bit), Group 19 and Group 20		
21	Solution must support data integrity with md5, sha1 SHA-256, SHA-384 and AES-XCBC		
22	The NGFW should have no limit for firewall policies		
23	The IPS should scan all parts of the session in both directions and should be able to scan the complete file during the transit.		
24	The NGFW should support authentication protocols like LDAP, RADIUS and have support for NGFW passwords, smart cards, & token-based products like SecurID, LDAP-stored passwords, RADIUS or TACACS+ authentication servers, and X.509 digital certificates.		
25	IPS should have the functionality of Geo Protection to Block the traffic country wise in incoming direction, outgoing direction or both. IPS also should alert through Mail if any IPS		

	traffic/event detected from Specific Country.		
26	NGFW Should support Identity Access for Granular user, group and machine-based visibility and policy enforcement		
27	IPS should be able to detect and prevent imbedded threats with in SSL traffic.		
28	The solutions should support automated machine learning based detection engines		
29	The solution should allow for third party signature import such as Snort		
30	Anti-Bot application must use a multi-tiered detection engine, which includes the reputation of IPs, URLs and DNS addresses and detect patterns of bot communications		
31	IPS must have a software-based fail-open mechanism, configurable based on thresholds of security gateways CPU and memory usage		
32	Anti-Bot and Anti-Virus application must have a centralized event correlation and reporting mechanism		
33	Solution must protect from DNS Cache Poisoning, and prevents users from accessing blocked domain addresses		
34	Solution must provide VOIP protocols protections		
35	IPS and/or Application Control must detect and block remote controls applications, including those that are capable tunnelling over HTTP traffic.		
36	Solution must be able to create a filtering rule with multiple categories.7		
37	Solution must be able to create a filtering for single site being supported by multiple categories.		
38	Solution must have users and groups granularity with security rules		
39	The solution must have an easy to use, searchable interface for applications and URLs		
40	The solution must categorize applications and URLs. In addition, the solution should also support applications by Risk Factor		
41	The application control and URLF security policy must be able to be defined by user identities		
42	The application control and URLF database must be updated by a cloud-based service		
43	The solution must have unified application control and URLF security rules		

44	The solution must provide a mechanism to limit application usage based on bandwidth consumption		
45	The solution must allow network exceptions based on defined network objects		
46	The solution must provide the option to modify the Blocking Notification and to redirect the user to a remediation page		
47	Solution must include a Black and White lists mechanism to allow the administrator to deny or permit specific URLs regardless of the category		
48	Solution must have a configurable bypass mechanism		
49	Solution must provide an override mechanism on the categorization for the URL database		
50	The application control and URLF security policy must report on the rule hit count		
51	**DNS based attacks:** The solution should have detection and prevention capabilities for C&C DNS hide outs: -Look for C&C traffic patterns, not just at their DNS destination -Reverse engineer malware in order to uncover their DGA (Domain Name Generation) -DNS trap feature as part of our threat prevention, assisting in discovering infected hosts generating C&C communication		
52	The solution should have detection and prevention capabilities for DNS tunnelling attacks		
53	Anti-Bot and Anti-Virus policy must be administered from a central console		
54	Anti-Bot and Anti-Virus application must have a centralized event correlation and reporting mechanism		
55	Anti-virus application must be able to prevent access to malicious websites		
56	Anti-virus application must be able to inspect SSL encrypted traffic		
57	Anti-Bot and Anti-Virus must be having real time updates from a cloud-based reputation service		
58	Anti-Virus must be able to stop incoming malicious files		
59	Anti-Virus must be able to scan archive files		
60	Anti-Virus and Anti-Bot policies must be centrally managed with granular policy configuration and enforcement		

61	The Solution offers support for SSL Inspection/Decryption with leading performance across all threat mitigation technologies		
62	The solution should support Perfect Forward Secrecy (PFS , ECDHE cipher suites)		
63	The solution should support AES-NI, AES-GCM for improved throughput		
64	Internal CA and External third-party CA must be supported		
65	Solution must support 3DES and AES-256 cryptographic for IKE Phase I and II IKEv2 plus "" and "Suite-B-GCM-256" for phase II		
66	Solution must support at least the following Diffie-Hellman Groups: Group 1 (768 bit), Group 2 (1024 bit), Group 5 (1536 bit), Group 14 (2048 bit), Group 19 and Group 20		
67	Solution must support data integrity with md5, sha1 SHA-256, SHA-384 and AES-XCBC		
	Solution must include support for site-to-site VPN in the following topologies:		
68	Full Mesh (all to all),		
69	Star (remote offices to central site)		
70	Hub and Spoke (remote site through central site to another remote site)		
71	Solution must support the VPN configuration with a GUI using drag and drop object to VPN communities		
72	Solution must support clientless SSL VPNs for remote access.		
73	Solution must support L2TP VPNs, including support for iPhone L2TP client		
74	Solution must allow the administrator to apply security rules to control the traffic inside the VPN		
75	Solution must include the ability to establish VPNs with gateways with dynamic public IPs		
76	The solution should support future integration with on-premise or cloud-based sandbox for prevention of APT attacks		
77	The solution should detect the attack at the exploitation stage		
78	The solution must provide the ability to Protect against zero-day & unknown malware attacks before static signature protections have been created		
79	The solution must provide Real-Time Prevention-unknown malware in web and mail traffic		

80	Solution must include a Zero-hour protection mechanism for new viruses spread without relying solely in heuristic or content inspection		
81	The solution should have a real-time capability to eliminate unknown threats and remove exploitable content, including active content and embedded objects and deliver safe content to the users.		
82	Solution must include IP compression for client-to-site and site-to-site VPNs		
Management, logging and reporting			
83	The management solution should be appliance based centralized management dashboard along with correlated logging and reporting.		
84	Solution must be able to segment the rule base in a sub-policy structure in which only relevant traffic is being forwarded to relevant segment		
85	Solution must be able to segment the rule base in favour of delegation of duties in which changes in one segment will not affect other segments		
86	Solution must be able to segment the rule base in a layered structure		
87	Security management application must support role-based administrator accounts. For instance, roles for firewall policy management only or role for log viewing only. The log Viewer should support text-based log search for easier operation.		
88	Solution must combine policy configuration and log analysis in a single pane, in order to avoid mistakes and achieve confidence of the change.		
89	The proposed solution should have complete customization of overviews and reports generation for every logged event in every security field		
90	Solution must include an automatic packet capture mechanism for IPS events to provide better forensic analysis		
91	Solution must support adding exceptions to IPS enforcement from the log record		
92	Solution must include a graphical monitoring interface that provides an easy way to monitor gateways status		
93	Solution must provide the following system information for each gateway: OS, CPU usage, memory usage, all disk partitions and % of free hard disk space		
94	Solution must include a tool to correlate events from all the gateway features		

95	Solution must allow the creation of filters based on any characteristic of the event such as security application, source and destination IP, service, event type, event severity attack name, country of origin and destination, etc.		
96	Upon malicious files detection, a detailed report should be generated for each one of the malicious files. The details report should include but not limited to Screen Shots, timelines, registry key creation/modifications, file and process creation, network activity detected		
97	The application must support a mechanism to assign these filters to different graph lines that are updated in regular intervals showing all events that matches that filter. Allowing the operator to focus on the most important events		
98	The event correlation application must support a graphical view events based on time		
99	Solution must show the distribution of events per country on a map		
100	Solution must allow the administrator to group events based on any of its characteristics, including many nesting levels and export to PDF		
101	Solution must include the option to search inside the list of events, drill down into details for research and forensics.		
102	It the event list view Solution must include the option to automatically generate small graphs or tables with the event, source and destination distribution		
103	Solution must detect Denial of Service attacks correlating events from all sources		
104	Solution must detect an administrator login at irregular hour		
105	Solution must detect credential guessing attacks		
106	Solution must report on all security policy installations		
107	Solution must include predefined hourly, daily, weekly and monthly reports. Including at least Top events, Top sources, Top destinations, Top services, Top sources and their top events, Top destinations and their top events and Top services and their top events		
108	Solution must support automatic reports scheduling for information that need to extract on regular basis (daily, weekly, and monthly). Solution must also allow the administrator to		

	define the date and time that reporting system begins to generate the scheduled report		
109	Solution must support the following reports formats: PDF & Excel		
110	Solution must support automatic report distribution by email, upload to FTP/Web server and an external custom report distribution script		
111	Upon malicious files detection, a detailed report should be generated for each one of the malicious files. The details report should include but not limited to Screen Shots, timelines, registry key creation/modifications, file and process creation, network activity detected		
Services and Support			
112	The complete solution should be provided with comprehensive warranty, subscription and support for 3 years.		

B. <u>Core Switch</u>

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	Port Density from day 1: 48 x 1G/10G/25G un-populated SFP28 ports and 4 x 40G/100G QSFP28 un-populated uplink ports.		
2.	The switch should support AC as well DC power supplies and from day one should have redundant hot-pluggable RPS. It should also have field replaceable fans/fan-tray that support hot-replacement/online insertion & removal.		
3.	Switch should have switching capacity of 3 Tbps or better.		
4.	Switch should support at least 1 Bpps forwarding rate.		
5.	Should have at least 8 GB DRAM and 8 GB Flash		
6.	The switch should support clustering of two or more physical switches into a single logical switch with enablement of MC-LAG/TRILL/VPC/Multi-Link Trunking/Virtual chassis or equivalent for High-Availability. The OEM/bidder must ensure that in case any license is required for this functionality, the same must be included in the offer.		
7.	Switch should support non-stop routing/forwarding/stateful switch-over/fail-over or similar & comparable functionality.		
8.	Switch should support at least 64K Mac address		
9.	The switch hardware shall support 256-bit encryption.		
10.	Switch should support 1000 VLANs		
11.	Switch should support 200k IPv4 & IPv6 routes or routing entries		
12.	Switch should support up to 32k IPv4 & IPv6		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	multicast routes		
13.	Shall support multi-chassis link/port aggregation.		
14.	Switch should support advance L3 protocols like BGP, IS-IS, PIM-SM, PIM-SSM, MSDP, etc.		
15.	Switch should have following L3 routing protocols configurable from day 1: VRRP, RIP, OSPF, Policy based Routing.		
16.	Switch should support VXLAN, VRF/MPLS		
17.	Switch shall allow QoS configuration with 8 queues per port and support IPv4 and IPv6 QoS classification and policing		
18.	Switch should support control plane policing to protect switch CPU from DoS attack		
19.	Shall support QoS ACLs as well as security ACLs where each type of ACLs should be expandable to 16k or better.		
20.	Switch should support 802.1x for user authentication and authorization and support tight integration with AAA/RADIUS as well as Network Access Control (NAC).		
21.	The offered product should support for future implementation of SDN for Campus/DC networks using on-premises SDN controller for automation of network operations and network segmentation using VXLAN, VRF, MPLS or equivalent technologies.		
22.	Support for sFlow/NetFlow/jFlow or equivalent for visibility of traffic flow and optimization of network performance and security incident detection. Shall support 64k or more flow entries per switch.		
23.	a) Switch should have dedicated OOB Management port, RJ45/USB		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	Management/console ports. b) Shall support SNMP v2c/v3, HTTP/HTTPS or similar GUI based device management, Telnet/SSH, USB, RMON, IP SLAs, Port Mirroring.		
24.	The offered switch must support Netconf/RestConf/Yang/Python/Ansible/Puppet or equivalent open standards-based API for 3rd party integration, provisioning & configuration, collection of real-time statistics for telemetry, health monitoring, etc.		
25.	The switch shall be compliant to: a) Operating Temp: 0°C to 45°C or better b) Operating Humidity: 5% ~ 90% RH (non-condensing)		
26.	**The switch should be provided with 8x5xNBD advance Hardware replacement support along with 24x7 OEM Remote or OEM TAC support for the entire duration of Warranty/Maintenance contract as mentioned in this RFP/Tender.**		

C. <u>**Distribution Switch**</u>

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	Switch shall have 16 X 1G/10G SFP+ un-populated Ports from day one, along with 4 X 1G/10G/25G SFP28 un-populated uplink ports		
2.	The Switch should have dual redundant hot swappable power supplies and field replaceable fans/fan-tray.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
3.	a) The Switch should support stacking/Virtual chassis/IRF/equivalent to configure two or more switches as a single logical switch. b) Switch should support NSF/SSO or equivalent when connected in virtual chassis/stack/VSS/IRF/equivalent		
4.	Shall support multi-chassis or cross-stack link/port aggregation.		
5.	The Switch should have at least 8 GB SSD memory and 8GB DRAM		
6.	The Switch should have at least 520 Gbps non-blocking switching capacity and 386 Mpps of forwarding rate.		
7.	Support at least 32,000 MAC addresses.		
8.	The Switch should support at least 16,000 IPv4 & IPv6 routes and 8,000 IPv4 & IPv6 multicast routes		
9.	The Switch should support at least 1000 VLANs/SVI's and 4000 VLAN ID's		
10	The Switch should support at least 4k ACLs		
11	The Switch should have IP Static Routing RIP, OSPF, Policy Based Routing, VRRP, from day one.		
12	a) The switch should support IPv4 & IPv6 Layer-3 protocols including OSPF, BGP, IS-IS, PIM-SM, PIM-SSM, etc. b) The switch shall also support MACSec in hardware, VRF/MPLS, VXLAN.		
13	The switch shall support Control Plane Policing, IPv6 First Hop Security, RA Guard, DHCP snooping, SSH		
14	Support for sFlow/NetFlow/jFlow or equivalent for visibility of traffic flow and optimization of		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	network performance and security incident detection. Shall support 64k or more flow entries per switch.		
15	The offered switch shall have support for Netconf/Restconf/Yang/Python/Ansible/Puppet or equivalent open standards-based API for 3rd party integration, provisioning & configuration, collection of real-time statistics for telemetry, health monitoring, etc.		
16	Switch should support 802.1x for user authentication and authorization and support tight integration with AAA/RADIUS as well as Network Access Control (NAC).		
17	Shall support eight egress queues. Shall support 802.1p CoS, DiffServ		
18	The offered product should support for future implementation of SDN for Campus/DC networks using on-premises SDN controller for automation of network operations and network segmentation using VXLAN, VRF, MPLS or equivalent technologies.		
19	The switch shall be compliant to: a) Operating Temp: 0°C to 45°C or better b) Operating Humidity: 5% - 90% RH (non-condensing)		
20	**The switch should be provided with 8x5xNBD advance Hardware replacement support along with 24x7 OEM Remote or OEM TAC support for the entire duration of Warranty/Maintenance contract as mentioned in this RFP/Tender.**		

D. 24 Port PoE+ Access Switches

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	19" Rack mountable Layer-3 stackable switch with dedicated stacking ports that should be distinct from uplink ports defined below (uplink ports mentioned here should not be used for stacking).		
2.	Port Density: a) The switch shall have 24 x 1G 802.3af PoE / 802.3at PoE+ Copper (RJ45) ports with PoE+ power budget of 370 Watts. b) Additional 4 x 10G SFP+ uplink ports from day 1.		
3.	a) Shall support internal redundant power supply and fans. b) The Switch shall support minimum 370W PoE power from day one, scalable to 740W PoE power when an internal redundant power supply is added. c) Switch shall be supplied with single internal power supply from day one.		
4.	Performance Requirements: a) DRAM: 2 GB or better, Flash: 4 GB or better b) Switching Capacity (excluding stacking/virtual chassis): 128 Gbps c) Forwarding Rate (excluding stacking/virtual chassis): 95 Mpps d) MAC address: 16k e) IPv4 & IPv6 routes: 1,500 f) Multicast routes: 1000 g) QoS & ACL entries: 1,000 h) VLANs/SVI: 500 with 4000 VLAN IDs i) sFlow/NetFlow/jFlow or equivalent Flow entries: 10k		
5.	a) Switch should support Stacking/Virtual Chassis or equivalent with eight (08) or more switches per stack/virtual chassis. b) Each switch shall support minimum 80 Gbps stacking bandwidth using dedicated		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	stacking/virtual chassis ports (Stacking/Virtual chassis configuration using uplink ports mentioned above in port density shall not be acceptable).		
6.	Shall support: a) Link Aggregation (LACP/LAG/EtherChannel/equivalent) with cross-stack link/port aggregation b) STP, MSTP, RSTP, VTP or Equivalent		
7.	The offered product should support for future implementation of SDN for Campus/DC networks using on-premises SDN controller for automation of network operations and network segmentation using VXLAN, VRF or equivalent technologies.		
8.	Shall support RIP, OSPF stub/routed access/edge, Policy based routing, etc from day1, with scalability to support IS-IS, OSPF, MSDP or equivalent, PIM-SM, PIM-SSM, VXLAN, VRF/VRF-Lite		
9.	Support for Neflow/sFlow/jFlow or equivalent along with embedded event management		
10.	Shall support MACSec on uplink ports		
11.	Shall support 802.1x based authentication		
12.	QoS: The switch shall have eight queues per port and support 802.1p CoS, DSCP, WRR/SRR scheduling.		
13.	a) Switch should have dedicated OOB Management port, RJ45/USB console/management ports. b) Shall support SNMP v2c/v3, HTTP/HTTPS or similar GUI based device management, Telnet/SSH, USB, RMON, IP SLAs, Port and/or VLAN mirroring.		
14.	Shall support integration with Software defined networks for DC/Campus with open management & standards programmability using Netconf/Restconf/Yang or equivalent.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
15.	The switch shall be compliant to: a) Operating Temp: 0° to 45°C or better b) Operating Humidity: 5% ~ 90% RH (non-condensing)		
16.	**The switch should be provided with 8x5xNBD advance Hardware replacement support along with 24x7 OEM Remote or OEM TAC support for the entire duration of Warranty/Maintenance contract as mentioned in this RFP/Tender.**		

E. **8 Port PoE+ Access Switches**

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	Compact 8-port Managed L2 PoE+ switch. The bidder shall include 19" Rack mount kit with each switch.		
2.	Port Density from day 1: a) 6 x 1G 802.3af PoE / 802.3at PoE+ Copper (RJ45) ports b) 2 x Multi-Gigabit ports supporting 100 Mbps/1/2.5/5/10 Gbps speeds. c) Additional 2 x 10G SFP+ un-populated uplink ports		
3.	The Switch shall support minimum 240W PoE power from day one.		
4.	Performance Requirements: a) Switching Capacity: 92 Gbps b) Forwarding Rate: 68 Mpps		
5.	Shall support: a) Link Aggregation (LACP/LAG/EtherChannel/equivalent) with cross-stack link/port aggregation b) STP, MSTP, RSTP, VTP or Equivalent		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
6.	Support for Neflow/sFlow/jFlow or equivalent for network application visibility.		
7.	Shall support 802.1x based authentication, VLAN or Port based Access Control Lists, IPv6 First hop security, DHCP snooping, Dynamic ARP inspection, IP source Guard, RA Guard or equivalent.		
8.	QoS: The switch shall have eight queues per port and support marking, classification, scheduling.		
9.	Shall support SNMP v2c/v3, HTTP/HTTPS or similar GUI based device management, Telnet/SSH, RMON, Port and/or VLAN mirroring.		
10.	Shall support integration with Software defined networks for DC/Campus for automation, segmentation, and access policies.		
11.	The switch shall be compliant to: c) Operating Temp: 0° to 45°C or better d) Operating Humidity: 5% ~ 90% RH (non-condensing)		
12.	**The switch should be provided with 8x5xNBD advance Hardware replacement support along with 24x7 OEM Remote or OEM TAC support for the entire duration of Warranty/Maintenance contract as mentioned in this RFP/Tender.**		

F. Wireless Controller

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	The network solution shall include Wireless LAN (WLAN) based on a centralized WLAN architecture, in which a central controller (deployed in redundancy), makes all the decisions for on the wireless network and is in control of all the Access Points.		
2.	The WLAN shall deliver high capacity, with ubiquitous coverage that is free of co-channel interference.		
3.	a) WLAN Controller should be based on IEEE802.11ac (Wave 1 & Wave 2), 802.11ax with MIMO and MU-MIMO b) The controller should be backward compatible with IEEE802.11 a/b/g/n clients and devices.		
4.	The Wireless network should support, Data over Internet, Data on local LAN, VoWLAN, BYOD, Location based Services.		
5.	The WLC shall be manageable through SNMP.		
6.	The WLC shall support 802.11i security standard for authentication and encryption.		
7.	The WLC shall be able to support public clients (Guest users) for wireless internet access.		
8.	The WLC shall be scalable with respect to addition of users, AP's, Bandwidth.		
9.	The WLC shall be able to support any 802.11 a/b/g/n/ac/ax wireless client.		
10.	Must be compliant with IEEE CAPWAP or equivalent for controller-based WLANs.		
11.	Should have at least 2 x 1/10G Copper or Fibre interface. In case of fibre ports, appropriate 10G transceivers or 10G Direct attached cables of minimum 3 meters must be provided for		

	connectivity with Core switch.		
12.	Should support both centralized as well as distributed traffic forwarding architecture with L3 roaming support & IPv6 ready from day one.		
13.	a) The WLAN Controllers should be deployed in High Availability from day one and should be provisioned with required licenses for all the Wireless Access Points mentioned in the Bill of Quantity BOQ from day one. b) Each WLAN controller should be scalable to support 500 or more Access Points and 10,000 clients using incremental licenses without changing or adding any hardware in future.		
14.	Should support minimum 2000 VLAN and 1000 WLAN support		
15.	Should support seamless roaming of client across all Access Points.		
16.	Shall support complete integration with WIPS and location-based services in future by adding software/license/hardware		
17.	WLC should support AP License Migration from one WLC to another		
18.	WLC should support 1+1 / N+1 redundancy from day and should support active–standby/active–active topology.		
19.	WLC should support L2 and L3 roaming.		
20.	WLC should support guest-access functionality.		
21.	Should support client load balancing to balance the number of clients across multiple APs to optimize AP and client throughput.		

22.	Should support dynamic bandwidth selection among 20MHz, 40MHz, 80Mhz & 160MHz channels, ensuring one access point on 20Hz and another on 160 MHz channel connected on the same controller at same WLAN group.		
23.	Should be able to do dynamic channel bonding based on interference detected on any particular channel(s).		
24.	Must support RF Management with 40 MHz and 160 MHz channels with 802.11n & 802.11ac wave 2.		
25.	Must support Airtime Fairness.		
26.	WLC Should have Rogue AP detection, classification and standard WIPS.		
27.	WLC should be able to exclude clients based on excessive/multiple authentication failure.		
28.	Shall support AES or TKIP encryption to secure the data integrity of wireless traffic		
29.	Should support AP location-based user access to control the locations where a wireless user can access the network		
30.	Should support Public Key Infrastructure (PKI) to control access		
31.	Must be able to set a maximum per-user bandwidth limit on a per-SSID basis.		
32.	The WLAN shall support multiple applications and user groups.		
33.	The WLAN shall support multiple SSID's with the ability to tag an SSID to a specific VLAN		
34.	The Wireless controller shall be able to provision a Wireless network which should support, Data over Internet, Data on local LAN, VoWLAN, BYOD, Location based Services & Streaming video.		

		Complied (Yes/No)	Deviations / Remarks with Cross Reference
35.	The WLAN Controller shall support open API's like Restconf/Netconf/Yang/Puppet/Ansible or similar tools for provisioning automation, telemetry, health monitoring, etc.		
36.	The WLAN controller shall support integration in future with SDN controller for DC/Campus and support automation, management etc.		
37.	Support standard 802.1x, WPA (PSK), WPA-2 (AES) & Dynamic PSK security, plus automatic wireless setting and encryption key security		
38.	Should support SNMPv3, SSHv2 / SSL for secure management.		
39.	Should support encrypted mechanism to securely upload/download software image to and from Wireless controller.		
40.	Should support AP Plug and Play (PnP) deployment with zero-configuration capability		
41.	Should support AP grouping to enable administrator to easily apply AP-based or radio-based configurations to all the APs in the same group		
42.	Operating Temperature: 0°C – 45°C Humidity: 10 ~ 95% RH non-condensing		
43.	**The switch should be provided with 8x5xNBD advance Hardware replacement support along with 24x7 OEM Remote or OEM TAC support for the entire duration of Warranty/Maintenance contract as mentioned in this RFP/Tender.**		

G. Wireless Access Point

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	The proposed Indoor Access Points must be/have: a) Wi-Fi 6 compliant with support for IEEE 802.11ax as well as backward compatibility		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	to legacy standards (802.11n/a/b/g) b) Should have dual radios for 2.4 GHz and 5 GHz with internal or external omni-directional antenna. c) capable of automatically or manually switching the radio band from 2.4 GHz to 5 GHz such that both radios operate simultaneously in 5 GHz band. d) 4x4 MU-MIMO with four spatial streams for both 802.11ax as well as 802.11ac Wave & Wave-2 and 4x4 MIMO with 4 spatial streams for 802.11n clients.		
2.	The AP must include standard OEM provided Mounting brackets for mounting on Celling or walls.		
3.	Access Point shall support Console port that uses Standard Port (RJ-45) or USB type connection		
4.	Should have 1x Multi-Gigabit (100Mbps/1Gbps/2.5Gbps) RJ45 interface.		
5.	Access Point should have USB port for future requirement.		
6.	Must have at least 4 dBi antenna gain on 2.4GHz radio and 5 dBi gain on 5 GHz radio		
7.	Must Support minimum aggregate PHY data rate of 4.5 Gbps per AP using both radios simultaneously.		
8.	Must support minimum of 23dbm of transmit power in both 2.4Ghz and 5Ghz radios and should follow the local Indian regulatory norms.		
9.	Must support AP enforced load-balance between 2.4Ghz and 5Ghz band.		
10.	Must incorporate radio resource management for power, channel, and performance optimization		
11.	Must have -93 dBm or better Rx Sensitivity.		
12.	Must support Proactive Key Caching and/or other methods for fast roaming across Access Points.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
13.	Access Points must support encrypted user data and management traffic between controller and Access point for better security.		
14.	Must support the ability to serve clients and monitor the RF environment concurrently.		
15.	Same model AP that serves clients must be able to be dedicated to monitoring the RF environment.		
16.	Must be plenum-rated (UL2043).		
17.	Must support 16 WLANs per AP for SSID deployment flexibility.		
18.	Must support Power over Ethernet, local power (DC Power) or power injectors.		
19.	Shall conform to WMM, 802.1x, WPA3, EAP-TTLS, MSCHAP v2, AES and other standards & protocols for robust security.		
20.	Access Point should 802.11 DFS certified		
21.	a) Operating Temperature: 0° to 50°C b) Humidity: 10% ~ 90% non-condensing.		
22.	The switch should be provided with 8x5xNBD advance Hardware replacement support along with 24x7 OEM Remote or OEM TAC support for the entire duration of Warranty/Maintenance contract as mentioned in this RFP/Tender.		

H. Network Management System (NMS)

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1.	NMS shall be able to monitor and configure 250 (two hundred fifty) devices from day 1 and should have scalability to manage up to 1000 devices in future. NMS shall be able to manage both switches, routers, and Wireless network (WLAN controller & AP) in single pane of glass management.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
2.	The NMS should be able to monitor Wireless Controller, Access Points, Radio resource management, Rogue AP's, and interferers, roaming as well as able to perform configuration management for the Wireless AP & controllers.		
3.	NMS should be scalable to provide Deep application visibility using NetFlow/sFlow or equivalent, NBAR or equivalent or packet inspection to recognize a wide variety of applications and SNMP.NMS should be able to provide Network topology.		
4.	Should provide a customizable at-a-glance summary of all discovered devices and existing network switches & routers to proactively identify problem areas and help prevent network downtime.		
5.	Should be able to discover, configure, monitor, manage, and deploy configurations to dynamically update groups of devices.		
6.	Should allow flexible definitions of administrator roles and responsibilities with RBAC (Role based Access Control) for different teams.		
7.	Should enable performance management by providing customizable dashboards and historical data visibility		
8.	Should be able to generate reports designed to summarize utilization of and traffic patterns on network interfaces.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
9.	a) Should allow administrators to track device configuration changes, enabling viewing, retrieval, and restoration of configuration files, and monitoring of configuration drift for troubleshooting purposes. b) The system design should provide access to only authorized users, RBAC and by using Secure Digital Certificates to completely trace back an individual user.		
10	The NMS should be from same OEM as switches as well as Wireless LAN solution		

I. **AAA & Guest Authentication**

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1	The Solution should provide a highly powerful and flexible attribute-based access control solution that combines authentication, authorization, and accounting (AAA); profiling; posture/health check; BYOD, and guest management services on a single platform.		
2	Solution should include all required licenses to perform above mentioned capabilities for 5000 concurrent session from day one.		
3	It should allow IGIT to authenticate and authorize users and endpoints via wired, wireless, and VPN with consistent policy throughout the enterprise.		
4	Solution should support centralized configuration and management of profiler, posture, guest, authentication, and authorization services in a single web-based GUI console, greatly simplifying administration by providing consistency in		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	managing all these services.		
5	Provides complete guest lifecycle management by empowering sponsors to on-board guests		
6	Should help organization to identify the number of endpoints that have a specified application installed and these applications should be classified into various categories		
7	Solution should be dedicated hardware appliance or virtual appliance. In case virtual appliance is supplied, the successful bidder should either install the virtual appliance on the rack servers being procured through this RFP or they (the SI/successful bidder) may supply additional dedicated Rack mountable hardware server having redundant hot-swap disk drives in hardware RAID configuraton, redundant PSU and required OS/Hypervisor from day one.		
8	Proposed solution should support two appliances to be configured in Active/Standby. However, initially only a single appliance/virtual appliance should be supplied.		
9	Should support consistent policy in centralized and distributed deployments that allows services to be delivered wherever required		
10	Solution should deliver customizable self-service portals as well as the ability to host custom web pages to ease device and guest on-boarding, automate endpoint secure access and service provisioning, and enhance the overall end-user experience inside business-defined workflows		
11	Should support enforcement of security policies by blocking, isolating, and repairing non-compliant machines in a quarantine area without requiring administrator attention		
12	Should support Identity source sequences which defines the order in which the solution will look for		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	user credentials in the different databases. Solution should support the following databases: Internal Users, Internal Endpoints, Active Directory, LDAP, RSA, RADIUS Token Servers, Certificate Authentication Profiles		
13	Password settings for internal users and admin users, option should be available to choose if the password can contain any dictionary word or its characters in reverse order		
14	Allows Organization to configure the AD and LDAP server with IPv4 or IPv6 address		
15	Should utilize standard RADIUS protocol for authentication, authorization, and accounting (AAA).		
16	It shall support a wide range of authentication protocols, including PAP, MS-CHAP, Extensible Authentication Protocol (EAP)-MD5, Protected EAP (PEAP), EAP-Flexible Authentication via Secure Tunneling (FAST), and EAP-Transport Layer Security (TLS).		
17	solution should support TACACS+ to simplify device administration and enhance security through flexible, granular control of access to network devices		
18	TACACS+ device administration should support: 1. Role-based access control 2. Flow-based user experience 3. Per Command level authorization with detailed logs for auditing		
19	solution should support capability to customize TACACS+ Services by specifying customer TACACS+ port number		
20	solution should support capability to create different network device groups so that administrator can create: 1. Different policy sets for IOS/OS or wireless		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	controller OS 2. Different for firewall 3. Differentiate base on location of device		
21	solution should be able to create TACACS+ profile like Monitor, Privileged level, default, etc. to control the initial login session of device administrator.		
22	solution should be able to create TACACS+ authorization policy for device administrator containing specific lists of commands a device admin can execute. Command sets should support; exact match, case sensitive,? (any character), * (matches any), etc. and support stacking as well		
23	solution must support TACACS+ in IPv6 network		
24	Offers a rules-based, attribute-driven policy model for creating flexible and business-relevant access control policies. Provides the ability to create fine-grained policies by pulling attributes from predefined dictionaries that include information about user and endpoint identity, posture validation, authentication protocols, profiling identity, or other external attribute sources. Attributes can also be created dynamically and saved for later use		
25	Provides a wide range of access control mechanisms, including downloadable access control lists (dACLs), VLAN assignments, URL redirect		
26	Solution should allow end users to interact with a self-service portal for device on-boarding, providing a registration vehicle for all types of devices as well as automatic supplicant provisioning and certificate enrolment for standard PC and mobile computing platforms.		
27	Solution should be able to integrate with MDM vendors like: Airwatch, Good, Mobileiron, Zenprise etc.		
28	Should support full guest lifecycle management, whereby guest users can access the network for a		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	limited time, either through administrator sponsorship or by self-signing via a guest portal. Should include guest portal customize from day one		
29	Solution should support establishing user identity, location, and access history, which can be used for compliance and reporting.		
30	Solution should have capability to collect endpoint attribute data via passive network telemetry, querying the actual endpoints, or alternatively from the infrastructure via device sensors on switches.		
31	It shall support capability that provides the organization to get finer granularity while identifying devices on network with Active Endpoint Scanning. Solution must have single unified agent for VPN, Posture assessment & 802.1x authentication		
32	Solution should be scalable to support profiling capabilities integrated into the solution in order to detect headless host. The profiling features leverage the existing infrastructure for device discovery. Should support the use of attributes from the following sources or sensors: * Profiling using MAC OUIs * Profiling using DHCP information * Profiling using RADIUS information * Profiling using HTTP information * Profiling using DNS information / Nessus * Profiling using Net Flow information / On guard Agent * Profiling using SPAN/Mirrored traffic		
33	Should have predefined device templates for a wide range of endpoints, such as IP phones, printers, IP cameras, smartphones, and tablets.		
34	Solution should support receiving updated endpoint profiling policies and the updated OUI database as a feed from the OEM database.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
35	Solution should support the following endpoint checks for compliance for windows endpoints: • Check process, registry, file & application • Check operating system/service packs/hotfixes • Check firewall product is running • check for Antivirus installation/Version/ Antivirus Definition Date • check for Antispyware installation/Version/ Antispyware Definition Date • Check for windows update running & configuration		
36	Should be a persistent client-based agent or clientless to validate that an endpoint is conforming to a company's posture policies.		
37	Client based agent should support deploying in stealth mode to monitor and enforce posture policies		
38	Allows administrators to quickly take corrective action (Quarantine, Un-Quarantine, or Shutdown) on risk-compromised endpoints within the network.		
39	Should support integration with 3rd party vulnerability assessment tools like Rapid7, Tenable/Nessus, etc.		
40	Should allow to create read-only administrative users who can view the configurations on GUI, but cannot create, update, or delete data		
41	Should allow viewing the summary of the reports that are exported by the users in the last 48 hours along with the status.		
42	Should support troubleshooting & Monitoring Tools		
43	Includes a built-in web console for monitoring, reporting, and troubleshooting to assist help-desk		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	and network operators in quickly identifying and resolving issues. Offers comprehensive historical and real-time reporting for all services, logging of all activities, and real-time dashboard metrics of all users and endpoints connecting to the network.		
44	Solution should have capability which allows users to add a device on a portal, where the device goes through a registration process for network access. Should allow users to mark as lost any device that you have registered in the network, and blacklist the device on the network, which prevents others from unauthorized network access when using the blacklisted device. Should have capability to reinstate a blacklisted device to its previous status in Device Portal, and regain network access without having to register the device again in the Devices Portal. Should also support removing any device in the enterprise network temporarily, then register the device for network access again later.		
45	The NAC solution should support blocking of unauthenticated/rogue machine without giving any access to the network.		
46	Solution must allow administrator to add exception for certain device properties in the device templates/ device profiles available in the solution to filter unintentionally picked parameters of endpoints.		
47	The solution must have internal CA server functionality with flexibility to create certificate template to be used by other network services		
48	Solution should support 3rd party integration for sharing Contextual awareness and other endpoint related data such that it can Publish, subscribe and work as broker as well.		
49	Open seating environments where the MAC address is not peristance, solution should be to authorize managed endpoint		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
50	The solution must integrate with other security solutions like Security information and event management (SIEM), Vulnerability Assessment tool, Next-generation Firewalls, APT, Network behaviour Anamoly detection and Threat Detection solutions etc to enforce policy based on the endpoint/device Attributes receive from NAC.. All the necessary licenses for integration with other security devices must be supplied from day one.		
51	The Solution should act as a Network Identity provider for all the security solution like Next Generation Firewall, SIEM, APT, Network Behaviour Anamoly detection and Threat Detection solution		
52	Solution must be able to integrate with CAMPUS SDN FABRIC		

J. Server Hardware for NMS, AAA with Guest Authentication, DHCP & DNS

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1	a) The proposed branded server (assembled servers will not be acceptable) shall be used to host NMS, AAA as well as Windows/Linux based basic network service applications like DNS, AD/LDAP, DHCP and other applications as required. Hence, the bidders/OEMs are required to consider the specifications given herein as minimum requirement and propose any additional resources (compute, memory, storage, network, virtualization licenses, etc) as they deem necessary to run their offered NMS and other applications/services mentioned above. b) For sizing of applications for DNS, AD/LDAP, DHCP and other basic network		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	services, they may consider standard hardware resource requirements for MS-Windows server/CentOS Linux server environments. c) Supply of Operating System like MS-Windows server with licenses or Linux server (CentOS/Ubuntu/RedHat) is not in scope of the successful bidder. However, the successful bidder shall install, configure, and integrate the above-mentioned applications/services along with the NMS within the same server hardware using virtualization technology.		

2	a) 19" Rack mountable 1U server with dual CPU sockets, Redundant Power supply, hot-pluggable hard disk drives and hardware-based RAID adapter supporting RAID levels 0,1,5 or better.
	
	b) Bidders can provide two options for KVM:
	
	  i. KVM accessories including I/O cables for video, keyboard, mouse along with minimum 8-port 19-inch rack- mountable KVM console (ATEN/D-Link/Netrack/Raritan) including 14" or higher LCD console + keyboard + trackpad.
	
	OR
	
	  ii. 14" or better Full HD (1080p) LCD monitor (LG/Samsung/BenQ), with USB Keyboard and Optical Mouse.		

3	Latest Generation Intel Xeon Gold CPU - Dual or Single CPU from day one with at least 20 Cores in total, and each CPU supporting not less than 2.3 GHz.		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
4	Memory: a) 24 memory slots – supporting DDR4 b) 128 GB from day 1, expandable to minimum 512 GB c) Minimum 2666 MHz d) Server shall support Intel Optane DC Persistent Memory		
5	Storage: a) Minimum number of internal hot-pluggable Drive bays: 8 b) Support for Drives: SAS/NL-SAS, SATA, NVMe SSD Available Storage Capacity from day 1: 1 TB using SAS/SATA/SSD drives configured in RAID-5 c) RAID Adapter: 12 Gbps with 2 Gbps BBWC from day 1		
6	Expansion slots: • 3 x PCI 3.0 slots or 2 x PCI 3.0 slots and one mLOM slots which can support NIC/HBA/CNA		
7	Network Interfaces: • 2 x 1G/10GBaseT RJ 45 Ethernet Interface for LAN connectivity from day one.		
8	OS & Hypervisor: a) Bidder shall supply VMWare vSphere 6.5 standard or latest with license to support all CPU's populated from day 1. Technical support including standard online/telephonic support for at least 1 or 3 years should be bundled with the offer. b) The server should be compatible with the following Operating systems:		

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
	o MS-Windows Server (2012/2016 and/or latest) o CentOS/RedHat o Ubuntu		
9	Shall have embedded/integrated management controller for centralized management that support - IPMI v2.0, SNMP v2 and v3, Syslog, XML API, vKVM etc.		
10	Rackmount kit with rails should be supplied from day one.		

K. Optical/Copper Transceivers (25G/10G/1G/DAC)

Sl No	Minimum Technical Specifications	Complied (Yes/No)	Deviations / Remarks with Cross Reference
1	All the following transceivers required for this project should be from the same OEM as switches, Wireless Controller & AP: • 1000BaseT SFP, 1000BaseLX SFP, 1000Base SX SFP, 1000BaseLX SFP • 10GBaseLR SFP+, 10GBaseSR SFP+, 10/25GBASE-SR SFP28, 10/25GBASE-LR SFP28, 10/25GBASE SFP28 DAC cables, 10G DAC SFP+ (passive/copper cable with minimum 3m length and SFP+ transceivers at both end) • **3rd party or local/Chinese made transceivers shall not be acceptable.** **Bidder shall submit certified declaration specific to this tender that all Copper as well as optical transceivers offered for this project will be from the switching + WLAN + NMS OEM**		

L. 2 KVA Online UPS with 120mins Back up

Sl No	Parameter	Minimum Specifications	Compliance (Yes / No)
1	Capacity	2 KVA, 2 KW (1Øinput/ 1Ø output)	
2	Topology	True Online Double Conversion UPS Standalone UPS with single battery bank	
3	Technology	Microprocessor based, PWM with IGBT based, Phase neutral reversal protection	
	INPUT		
4	Input Facility	1Ø, 2-wire & Ground, (Phase & Neutral + Ground)	
5	Input Voltage Range	160 ~ 280 VAC (On 100% Load), 120~290 VAC (On 50% Load),	
6	Input Frequency Range	45 ~ 55Hz, Autosensing	
7	Input Power Factor	≥0.99	
	OUTPUT		
8	Power Factor	0.9	
9	Nominal Output Voltage	220/230VAC	
10	Voltage regulation	± 1% static, ± 5% for Dynamic Load	
11	Nominal Frequency	50Hz	
12	Waveform	Sine wave	
13	Crest factor	3:1	
14	Total harmonic distortion (THDv)	< 3% (linear load); <5% (nonlinear load)	
15	Output Short Circuit Protection	Electronic, trip	
16	Transfer time	Mains mode to battery mode: 0 ms; Inverter mode to bypass mode: <5 ms	
17	Maintenance/Manual Bypass	Automatic & Manual	
18	Efficiency	Overall (Ac to AC) : > 93%, Inverter > 93%	
19	Inverter overload capability	upto 100% infinite	
		>100% ~ 110%: for 10 mins;	
		>110% ~ 130%: for 1 minute;	
		> 130%: upto 3 seconds	
20	Indications through Display Panel (LCD/LED)	Input Voltage/frequency, Output Voltage, Output frequency, Battery Voltage & Load Percentage. Input Mains on, System Overload, Mains Fail, Inverer Trip, Load on Battery, Load on Bypass.	

21	Alarms	Battery Low, UPS Trip, Inverter Overload	
	Special Protection Device		
23	Isolation Transformer	Inbuilt/external Isolation transformer shall be provided for full Isolation from Mains	
24	Surge Protection device	Type 2, Single Phase Two pole, AC - SPD	
		Suitable for TNS System (1Ph+N) ,	
		Un - 230 VAC	
		Uc - 320V	
		Imax - 40kA	
		In - 20kA	
		Up - <= 1.5kV	
		1. Should have Reversible installation facility: reversable chassis to allow cable entry from above or below	
		2. Should have clear display of protection end of life of cartridge.	
		3. Two types of terminal: for rigid or flexible cable and for fork type comb busbar.	
		4. Should have thermal disconnection system.	
		5. Should have Cartridge security System: vibration proof insertion 'click' effect.	
		6. Should have individual Mechanical cartridge Coding for safety system to avoid possible cartridge replacement error.	
	BATTERY & BATTERY BANK CHARGER		
25	DC BUS voltage	> 72/84/96 VDC	
26	Batteries Type	Sealed Maintenance Free, 12 V	
27	Battery Make	Exide/Quanta	
28	VAH Required For 120 Min Battery Backup	5400	
29	Number of Battery Banks	One (No parallel in Battery Bank will be allowed)	
30	Minimum Charger Rating	The Charger should be able to deliver charging current (minimum) equivalent to 10% of Battery AH rating offered.	
31	Battery re-charge time (After complete discharge) to 90% capacity	8-10 Hours	

32	Battery Housing	Should be compact and space saving MS Steel Open Racks complete with interconnectors	
33	Interfaces	Should support DOS/UNIX/WINDOWS OS, RS 232 Connector should be available	
34	Cold Start	should be provided	
35	Self-Diagnosis	UPS should be capable to carry out self-test of Rectifier/Charger & Inverter Module during start up	
	PHYSICAL		
36	Operating Temperature	0-40 degree C	
37	Operating Altitude	1000 m.a.s.l	
38	Type of Cooling	Forced Air	
39	Noise Level	<60 dBA at 1 meter distance	
	CERTIFICATIONS		
40	ISO Certification	ISO 9001: 2008, ISO 14001:2004, ISO 18001/ISO 45001, ROHS, ISO 20001:2018, ISO27001:2018, ISO 50000:2007, ROHS	
41	CE Certification (Safety)	IEC/EN 62040-1-1, IEC/EN 50091-1, IEC/EN 60950 (Safety), IEC/EN 50091-2, IEC/EN 62040-2 (EMC Emissions), IEC/EN 62040-3(Performance & Design), IEC/EN 61000-4 (EMC Immunity), & IEC/EN 60146 (Design & Manufacture) & BIS Certificate	
42	Test Certificates	Test Certificates should be Provided from SAMEER/ERTL of the quoted model should be enclosed.	
	SUPPORT		
43	Web/Window base Support	It is mandatory to provide online centralized call tracking system Like OVSD (Open view Service Desk) for monitoring of logged calls viewing through web / windows-based access for at least 2 officials.	
44	Service Support	Manufacturer must have minimum 10 No service engineer in all the States in direct pay roll (Documentary Proof like PF/ESI to be submitted)	
45	Turn Over	Manufacturer must have minimum Turn Over of 170Cr in last 3 Years with Net profit. Audited Balance should be enclosed.	

Sl No	Parameter	Minimum Specifications	Compliance (Yes / No)
46	Performance Certificate	OEM should have supplied and installed minimum 2000 No's of UPS in Single LOI followed by various PO from 1 KVA or higher capacity Online UPS onwards capacity in Govt/PSU/Govt. Undertaking Banks and Financial Institution during last 3 years. Documentary evidence like LOI, PO and Satisfactory completion Certificate to be enclosed	

M. 1 KVA Offline UPS with 15mins Back up

Sl No	Parameter	Minimum Specifications	Compliance (Yes / No)
1	Capacity	1000VA, 600W (1Øinput/ 1Ø output)	
2	Topology	Line Interactive UPS system	
3	Technology	Microprocessor based high reliable.	
	INPUT		
4	Input Facility	1Ø, 2-wire & Ground, (Phase & Neutral + Ground)	
5	Input Voltage Range	160 ~ 280 VAC (On 100% Load)	
6	Input Frequency Range	47 ~ 53Hz, Autosensing	
	OUTPUT		
7	Power Factor	0.6	
8	Nominal Output Voltage	220/230VAC	
9	Voltage regulation	± 10% static	
10	Nominal Frequency	50Hz	
11	Waveform	Simulated Sine wave	
12	Output Short Circuit Protection	Electronic, trip	
13	Efficiency	Overall: > 80%	
14	Indications through Display Panel (LED)	Input Mains on, Mains Fail, Load on Battery,	
15	Alarms	Battery Low, UPS Trip, Inverter Overload	
	Special Protection Device		
16	Surge Protection device	Type 2, Single Phase Two pole, AC - SPD	
		Suitable for TNS System (1Ph+N),	
		Un - 230 VAC	
		Uc - 320V	
		Imax - 40kA	
		In - 20kA	
		Up - <= 1.5kV	

		1. Should have Reversible installation facility: reversable chassis to allow cable entry from above or below	
		2. Should have clear display of protection end of life of cartridge.	
		3. Two types of terminal: for rigid or flexible cable and for fork type comb busbar.	
		4. Should have thermal disconnection system.	
		5. Should have Cartridge security System: vibration proof insertion 'click' effect.	
		6. Should have individual Mechanical cartridge Coding for safety system to avoid possible cartridge replacement error.	
	BATTERY & BATTERY BANK CHARGER		
17	DC BUS voltage	24VDC	
18	Batteries Type	Sealed Maintenance Free, 12 V	
19	Battery Make	Exide/Quanta	
20	VAH Required	168	
21	Battery re-charge time (After complete discharge) to 90% capacity	8-10 Hours	
22	Battery Housing	Should be compact and space saving MS Steel Open Racks complete with interconnectors	
	PHYSICAL		
23	Operating Temperature	0-40 degree C	
24	Operating Altitude	1000 m.a.s.l	
25	Type of Cooling	Forced Air	
26	Noise Level	<60 dBA at 1 meter distance	
	CERTIFICATIONS		
27	ISO Certification	ISO 9001: 2008, ISO 14001:2004, ISO 18001/ISO 45001, ROHS, ISO 20001:2018, ISO27001:2018, ISO 50000:2007, ROHS	

		IEC/EN 62040-1-1, IEC/EN 50091-1, IEC/EN 60950 (Safety), IEC/EN 50091-2, IEC/EN 62040-2 (EMC Emissions), IEC/EN 62040-3(Performance & Design), IEC/EN 61000-4 (EMC Immunity), & IEC/EN 60146 (Design & Manufacture) & BIS	
28	CE Certification (Safety)		
	SUPPORT		
29	Web/Window base Support	It is mandatory to provide online centralized call tracking system Like OVSD (Open view Service Desk) for monitoring of logged calls viewing through web / windows-based access for at least 2 officials.	
30	Service Support	Manufacturer must have minimum 10 No service engineer in all the States in direct pay roll (Documentary Proof like PF/ESI to be submitted)	
31	Turn Over	Manufacturer must have minimum Turn Over of 170 Cr in last 3 Years with Net profit. Audited Balance should be enclosed.	
32	Performance Certificate	OEM should have supplied and installed minimum 2000 No's of UPS in Single LOI followed by various PO from 1 KVA or higher capacity Online UPS onwards capacity in Govt/PSU undertaking Banks and Financial Institution during last 3 years. Documentary evidence like LOI, PO and Satisfactory completion Certificate to be enclosed	

Technical Specifications for Passive Items (wired/wireless LAN)

Passive OEM PQ Criteria

1. All Passive materials (Fiber & Cat6 UTP) should be of same make.

A. Cat6 UTP Cable 23 AWG CM Rated FR PVC 305 Mtrs

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	Compliant to TIA / EIA 568-C.2 Category 6 cable Specifications. Supports ultrahigh speed data networks such as Gigabit Ethernet (1000	

		Complied (Yes / No)
	Base-T and 1000 Base-TX) and beyond.	
2	Category 6 Unshielded Twisted Pair 100Ohm (305 Mtrs in Reel). Characterized up to 600Mhz. Should be highlighted in the product data sheet.	
3	Should be 4 pair, 23 AWG, Conductor Dia Norm: 0.574, CM Rated and should have central X-shaped polymer spine maintaining 4 pairs separation.	
4	Sheath Type: Fire Retardant PVC, Nominal O.D: >= 6.2mm, NPV :65%, D.C. Resistance: 9.38 ohm/100m, Temperature: Max 75°C Propagation Delay: 537.6@100MHz	
5	Should be UL Listed, ETL verified & 4 Connector Chanel tested. (Documents to be submitted for both)	
6	The product must be ISO 9001:2015& ISO 14001: 2015 Certified. Certificate copy should be attached.	

B. CAT6 INFORMATION OUTLET WITH FACE PLATE AND BACK BOX (IO Box)

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	Category 6, EIA/TIA 568-C.2, FCC Subpart F 68.5 Compliant, IEC-603-7 Compliant	
2	All information outlets should accept, 22-24 AWG copper	
3	Jack should have integrated Spring loaded shutter for protection against dust when not used and prevents incomplete mating	
4	Should be UL Listed and ETL verified	
5	Jack Connector Plastic Housing: Polycarbonate, UL94V-0 rated, Operating Life: Minimum 750 insertion cycles Operating Life: Minimum 200 determinations Contact Material: Copper Alloy IDC Contact Plating: Tin/Lead Plate Contact Force: 100g minimum	
6	Face Plate Material VE10 ABS and 86 x 86mm. Back Box should be supplied as per the requirement.	

C. CAT6 24 PORT JACK PANEL Loaded

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	Should Be made of cold rolled steel and conform to TIA / EIA 568-C.2 Component Compliant	
2	Each Port should be with individual spring loaded shuttered for dust protection. Each port (jack) and individual replaceable.	
3	Wire Accommodation: 22-24 AWG solid. Should be ETL Verified for Category 6 Component Compliance, UL Listed & RoHS Compliance.	

4	Should have integral rear cable management shelf.	
5	Takes the following plugs: RJ 11 (4 contacts), RJ 12 (6 contacts), RJ 45 (9 contacts).	
6	Voltage Proof : 1000 V D.C. or A.C Peak and Also 1500V D.C or A.C Peak	
7	Commercial Standards: TIA/EIA-568-B.2-1 Component Compliant FCC Subpart F 68.5 Compliant IEC-603-7 Compliant ISO 11801 Class E Compliant ETL Verified for Category 6 Component Compliance	

D. CAT6 UTP PATCH CORDS (1Mtr)

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	Cable 4 Pairs 24 AWG copper with RJ45 Clear Polycarbonate Plug	
2	The Jacket most Low Smoke Zero Halogen (LS0H)	
3	Minimum comply with proposed ANSI/TIA/EIA-568-C.2	
4	MIN operating life: 750 insertion cycles RJ45 plug and boot material: Clear polycarbonate Contact material: 0.35mm thick copper alloy Contact plating: Selective gold RJ45 plug dimensions compliant: ISO/IEC 60603-7-4 & FCC 47 Part 68	
5	Pre-terminated with WE8W plugs. Slim clear anti-snag slip on boots. Suitable for EIA 568A or 568B wiring, ETL Verified & RoHS Compliant	
6	Commercial Standards ISO/IEC 11801:2002/Amd 2:2010 Cat 6-, TIA-568-C.2 Cat 6	
7	Fire Propagation Tests: LS0H Sheath: CSA FT1, IEC 60332-1, IEC 61034	

E. CAT6 UTP PATCH CORDS (2Mtrs)

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	Cable 4 Pairs 24 AWG copper with RJ45 Clear Polycarbonate Plug	
2	The Jacket most Low Smoke Zero Halogen (LS0H)	
3	Minimum comply with proposed ANSI/TIA/EIA-568-C.2	
4	MIN operating life: 750 insertion cycles RJ45 plug and boot material: Clear polycarbonate Contact material: 0.35mm thick copper alloy Contact plating: Selective gold RJ45 plug dimensions compliant : ISO/IEC 60603-7-4 & FCC 47 Part 68	

Sl No		Requirement	
5		Pre-terminated with WE8W plugs. Slim clear anti-snag slip on boots. Suitable for EIA 568A or 568B wiring, ETL Verified & RoHS Compliant	
6		Commercial Standards ISO/IEC 11801:2002/Amd 2:2010 Cat 6-, TIA-568-C.2 Cat 6	
7		Fire Propagation Tests: LS0H Sheath: CSA FT1, IEC 60332-1, IEC 61034	

F. Outdoor OFC 24 Core Single Mode Multi Tube

Sl No	Specifications	Requirement	Complied (Yes / No)
1	Cable Type	24 Core fiber Cable, Single Mode, Armoured, Gel filled cable complying to ISO.IEC 11801 - 2nd Edition, type OS2; AS/ACIF S008; AS/NZS 3080, EIA/TIA 568-C.3. RoHS Compliant ITU-T REC G 652D spec for Low Water Peak fibre; supports 10G + data applications. Qualifies as per ICEA-640 standard Complies with Telcordia GR20, IEC-60793-2-50 and TIA/EIA 492-CAAB standards	
	Construction Details:		
2	Outer Sheath	Anti-Rodent, Anti Termite and UV HD Polyethylene - Black	
3	Armouring	ECCS Tape	
4	Central Strength Member	Fibre Reinforced Plastic(FRP	
5	Loose tube diameter	1.7mm (Nominal	
6	Water Blocking	Thixotropic Gel (tube)	
7	No. of tubes and dummies	4Nos tubes and 2 Nos dummie	
8	Colour of Fibres in Tube	Blue, Orange, Green, Borwn, Grey & White	

9	Dimensions and Mass Overall Cable (Nominal)	10.8 mm	
10	Mass (Nominal)	135 kg/km	
	Physical Characteristics:		
11	Core Diameter	9.2±0.4 μm	
12	Cladding Diameter	125± 1.0 μm	
13	Coating Diameter	245± 10 μm	
	Characteristics - Optical Performance :		
14	Attenuation	,@ 1310nm <=0.38 db/Km MAX	
		,@1550nm <=0.22 db/Km MAX	
15	Chromatic Dispersion	1285-1330nm : ≤3.5 ps/nm.km	
		1550nm : ≤18.0 ps/nm.km	
16	Zero Dispersion Wavelength	1302 to 1322nm	
17	Cable cut-off wavelength	≤1260 nm	
	Technical Information :		
18	Max. Bending Radius (during full load	20D	
19	Max. Tensile Strength-Short Term	3500N	
20	Max. Tensile Strength-Long Term	2500N	
21	Min. Crush Resistance-	4400N/10 cm	
22	Operating Temperature range	-40°C ±75°C	

G. Outdoor OFC 6 Core Single Mode Uni Tube

Sl No	Specifications	Requirement	Compliance (Yes / No)
1	Cable Type	> 6Core Optical Fibre Cable, Single Mode, Unitube, Armoured, Gel filled cable. > Complying to : ISO.IEC 11801 - 2nd Edition, type OS2; EIA/TIA 568-C.3.;ITU-T REC G 652D, IEC 60793/60794, TIA 568, EIA 455 spec. > Suitable for use in direct burial, outdoor ducts and backbone cabling.	
2	Armour	Corrugated Steel Tape Armour -Thickness > 0.15mm	
3	Water Blocking	Thixotropic Gel (Tube), Petroleum Jelly (Interstices)	
4	Attenuation	@ 1310nm <=0.35 db/Km MAX	
		@1550nm <=0.22 db/Km MAX	
5	Attenuation Discontinuity	Both Windows <0.10dB	
6	Fibre protection(Tube)	Polybutylene Terephthalate (PBT)	
7	Loose tube material	Single PBTP Loose tube filled with water blocking Thixotropic gel	
8	Jacket material	UV Stabilised Polyethylene (HDPE)	
9	Peripheral Strength Member	Two Steel wires	
10	Tensile Strength	1500N	
11	Crush Resistance	2000N/10 cm	
12	Cable Diameter	9 mm ± 10%	
13	Max. Bending Radius (during installation)	20D	
14	Fibre Identification	Colour coded	
15	Cable weight Kg/Km	85 kg/km ± 10%	
16	Operating Temperature	-20 Degree C to +70 Degree C	
17	Cable Length Per Drum	2.0 Km ± 10%. No Fibre in the Cable shall have any joint.	
18	Test Reports	OEM factory test reports must be provided against each drum / roll of Fibre cable	
19	OEM Certification	OEM should have certification of ISO 9000:2008 or above and ISO 14001	

H. 12-Port Rack Mount Sliding LIU

Sl No	Specifications	Requirement	Complied (Yes / No)
1	Rack Mount	19" rack mounted with 1U height, Sliding Drawer	

		Type with 4 Cable entry/exit points (covered with rubber grommets)	
2	Accommodation and Supports	Accommodation of single mode cable multimode fibers Capable of supporting SC and LC interface - For 24 Port with SC Adapter & 48 Port with LC Adapter Configurable. Fits up to four 6/12 pack plates/Angled 6 pack plates Management rings within system to accommodate excess fiber bend radius.	
3	Fiber Adapter	For 12 Port LIU – 2 x 6 Fiber SC Adapter Plates Rest part covered with Blank Adapter Kit	
4		Fiber Adapters Compliant with: ISO/IC 11801, ANSI/TIA/EIA 568.B.3-2000, ANSI/TIA/EIA-492, TELECORDIA GR-409, ICEA-596	
5	Fiber Splice Tray	Each LIU should have splice tray	
	Pigtail SC SM OS2 1.5M LSZH		
6	Materials	SC type connector with LSOH Jacket - Reduces toxic / corrosive	
7	Length	1.5 Mtrs length	
8	Testing	100% Factory polished, tested and Guaranteed Performance	
9	Technical Information	Cable: 900um Buffered Outside Diameter: 900um Buffer Diameter: 900um tight buffer Minimum bend radius: install: 30 mm Operating Temperature: -20ºC to 75ºC Retention Strength: 100N RoHS Compliance	

Sl No	Specifications	Requirement	Complied (Yes / No)
10	Commercial Standards	ISO/IEC 1108:2008. ANSI/TIA/EIA-568-C.3, EIA 492, Telecordia GR-409, ICEA-596, OS2-STD ITU-T-G652 D	

I. **24-Port Rack Mount Sliding LIU**

Sl No	Specifications	Requirement	Complied (Yes / No)
1	Rack Mount	19" rack mounted with 1U height, Sliding Drawer Type with 4 Cable entry/exit points (covered with rubber grommets)	
2	Accommodation and Supports	Accommodation of single mode cable multimode fibers Capable of supporting SC and LC interface - For 24 Port with SC Adapter & 48 Port with LC Adapter Configurable. Fits up to four 6/12 pack plates/Angled 6 pack plates Management rings within system to accommodate excess fiber bend radius.	
3	Fiber Adapter	4x 6 Fiber SC Adapter Plates Rest part covered with Blank Adapter Kit	
4		Fiber Adapters Compliant with: ISO/IC 11801, ANSI/TIA/EIA 568.B.3-2000, ANSI/TIA/EIA-492, TELECORDIA GR-409, ICEA-596	
5	Fiber Splice Tray	Each LIU should have splice tray	
	Pigtail SC SM OS2 1.5M LSZH		
6	Materials	SC type connector with LSOH Jacket - Reduces toxic / corrosive	
7	Length	1.5 Mtrs length	
8	Testing	100% Factory polished, tested and Guaranteed Performance	
9	Technical Information	Cable: 900um Buffered Outside Diameter: 900um	

		Buffer Diameter: 900um tight buffer	
		Minimum bend radius: install: 30 mm	
		Operating Temperature: -20ºC to 75ºC	
		Retention Strength: 100N	
		RoHS Compliance	
10	Commercial Standards	ISO/IEC 1108:2008. ANSI/TIA/EIA-568-C.3, EIA 492, Telecordia GR-409, ICEA-596, OS2-STD ITU-T-G652 D	

J. SC-LC SM OFC Patch Cord-3 mtr

Sl No	Minimum Specifications	Requirement	Complied (Yes / No)
1	Type of connectors	SC - LC LSOH Jacket - Reduces toxic / corrosive	
2	Length	Minimum 3 meters	
3	Polishing	100% Factory polished and tested	
4	Insertion Loss	Less than 0.35dB per connector	
5	Attenuation	0.4dB/km over 1310nm to 1625nm	
6	Standards	ROHS Compliant	
7	Jacket Material:	LS0H IEC 61034-1 & 2, IEC-60332-1, IEC-60754-1 & 2	

K. 15U Floor Mount rack

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	The OEM should be ISO 9001-2015, ISO 14001 Certified	
2	19" Wall Mount Rack: 15U x 600mmwidth x 600mm depth, Steel frame structure design, Top & Bottom Cover with Vent and Cable entry/exit provision, Powder coated finish 80uM with Seven Tank pre-treatment process. The product must confirm to DIN41494 Standard.	

3	Front toughened glass door with lock & key	
4	Front panel mounting hardware. – 1 No.	
5	230V A/C 90 CFM fan mounted on top cover - 2 Nos.	
6	PDU 6 sockets 6/16A – 1 No.	
7	Horizontal Cable Manager 1U with loops – 3 Nos.	

L. 42U Network Rack

Sl No	Minimum Specifications Required	Complied (Yes / No)
1	The OEM should be ISO 9001-2015, ISO 14001 Certified	
2	19" Floor standing Rack: 42Ux 800mmwidth x 1000mm depth, Aluminium Extrusion Vertical Profile, Top & Bottom Cover with Vent and Cable entry/exit cut outs, Powder coated finish 80uM with Seven Tank pre-treatment process. The product must confirm to DIN41494 Standard.	
3	Removable Side Panels partially vented -2 Nos.	
4	Front Honeycomb Door with lock & key	
5	Rear Honeycomb Door with lock & key	
6	Heavy Duty Castors with break– 1 Set	
7	Front panel mounting hardware. – 1 No.	
8	230V A/C 90 CFM fan - 4 Nos.	
8	Fan Housing Unit 4 Fans - 1 No.	
9	Earthing Kit-1 No.	
10	Horizontal Cable Manager- 2 Nos	
11	Vertical Power Distribution Unit with 12 x 5/15 sockets Round Pin, 230 Volts AC, 32 Amp with MCB – 2 Nos.	

Specifications for wired/wireless LAN (GPON)

Table-1: Requirement standards of GPON equipment OLT & ONT

S/N	Item	Description	Complied (Y/N)
1	**ITU-T Standards**	G.984.1: General Characteristics	
2		G.984.2: Physical Media Dependent (PMD) layer	
3		G.984.3: Transmission convergence layer specification	
4		G.984.4: ONT management and control interface specification	
5		GPON System should support high-speed data channel through a single optical fiber with an upstream rate of 1.244 Gbit/s and a downstream rate of 2.488 Gbit/s.	
6	**Wavelength Pattern**	1310 nm wavelength for upstream traffic	
7		1490 nm wavelength for downstream traffic	
8		1550 nm wavelength for video service	
9	**Common Features**	Dynamic Bandwidth Allocation (DBA) for upstream traffic	
10		Advance Encryption Standard 128 Bit (AES) for downstream traffic	
11		Forward Error Correction (FEC) for upstream and downstream traffic	
12	**Services Support**	High Speed Internet access	
13		VPN Services	
14		Point-to-Point and Point-to-Multipoint Layer-2 services	
15		Voice over GPON, Both Analog and IP Telephones	
16		IPTV Service	
17		CATV Services over GPON	
18	**VLAN implementation**	VLAN per subscriber model	
19		VLAN per service model	
20		Or the combination of both	
21	**Split ratios and Distance Support**	Minimum up to 64 ONTs per PON Port	
22		Minimum up to 2560 ONTs per system	
23		Distance up to 20Km with 64 split	
24		Support for Class B+ and Class C+ GPON SFPs	

Table-2: OLT Equipment

S/N	Item	Description	Complied (Y/N)
1	**Link Aggregation**	Load balancing (1:1)	
2		Active and standby (1+1)	
3	**Uplink and Downlink Interfaces (minimum requirement)**	Uplink interface: 2 x 10GbE/GbE (SFP+ slots) and 4 x RJ45 orts and 2 x SFP 1GbE Ports	
4		Downlink Interface: 8 GPON Ports (SFPs)	
5	**OLT Features**	DHCP relay, DHCP Snooping and DHCP option 82	
6		PPPoE Relay Agent	
7		IGMP proxy and IGMP snooping V1/V2/V3	
8		MAC-Forced Forwarding (RFC4562)	
9		IEEE 802.1Q (upto 4094 VLAN IDs)	
10		IEEE 802.3x (Flow Control)	
11		IEEE 802.1ad (Q-in-Q or VLAN Stacking)	
12		IEEE 802.3ad (Link Aggregation)	
13		IEEE 802.1p (Quality of Service)	
14		IEEE 802.1w (RSTP)	
15		IP Anti-Spoofing	
16		Flexible Packet filtering	
17		MAC limit and spoofing prevention	
18		8 priorities queues per port	
19		802.1p, ToS, DSCP marking/remarking	
20		Scheduling: SPQ, WRR, SP+WRR	
21		Network Time Protocol for real time clock service	
22		Rate control of Broadcast, unknown unicast and Multicast packets	
23	**Management**	Dual 10/100Base-T Out-of-Band management	
24		GUI based EMS, CLI, Telnet, RMON, SNMP v1/v2c/v3	
25		Radius, TACACS+ authentication for management access	
26	**Operating Requirements**	Operating Temperature: 0C to 50C	
27		Operating Humidity: 5% - 95% RH	

28	**Physical Requirements**	21" Standard ETSI Rack Mountable, Equipment height not more than 1RU	
29		Full Front access	
30		Forced air cooling with field replaceable air filter	
31		Integrated Fiber management	
32	**Power Supply**	The GPON OLT equipment shall be operated at 94VAC – 250V AC	
33		Dual(A/B) Power Feeds	
34	**Product Certification**	Should be TSEC Certified	
35	**Switching**	Full throughput for all ports (non-blocking)	
36		High capacity packet switching (16K MACs and 4,095 VLANs)	
37		STP (802.1d), RSTP (802.1w)	
38		MAC-forced forwarding (RFC4562) on SNI	
39		Powerful layer 1~ 4 fitering and QoS	
40		Multicasting: IGMP snooping/proxy, 1,024 layer 2 multicast groups	
41		Line-rate unicast packet forwarding and multicast replication	
42		Port based VLAN,802.1Q VLAN, IEEE 802.1ad Q-in-Q VLAN stacking	
43		Independent VLAN learning (IVL)	
44		DHCP relay with Option 82	
45	**Flexible SNI networking**	802.3ad LAG	
46	**Security**	SNI interface types: 2 x 10GbE/GbE (SFP+ slots) and 4 x RJ45 orts and 2 x SFP 1GbE Ports	
47		Layer 1~4 packet fitering via access control lists (ACL)	
48		MAC address limiting per port	
49		DHCP packet fitering	
50		DHCP Option 82	
51		MAC restriction per port	
52		Broadcast/multicast/DLF packet limit	
53		Port flod guard for abnormal traffic	
54		Loop detection and blocking	
55	**QoS**	8 priority queues per port	
56		802.1p, ToS, DSCP marking/remarking	
57		Scheduling: SPQ, WRR, SP+WRR	
58		SrTcm and TrTcm	

59		Head of line blocking prevention	
60	**Congestion Control**	Back pressure (802.3x)	
61		Rate control of broadcast, unknown unicast, multicast packets	
62		Free run SONET/SDH Minimum Clock (SMC) internal clock	
63		Revertive or Non-revertive protection Switching Option	
64	**Synchronization**	Redundant BITS/SSU 1544/2048 KHz and 1544/2048 Kbps inputs	
65		Redundant BITS/SSU 1544/2048 KHz and 1544/2048 Kbps outputs per G.812	
66		Automatic holdover (Stratum 3 or 3E local OCXO) on loss of reference inputs	
67		GPON .984.2Amd.1 Class B+ bi-directional optical transceiver	
68		Single Mode, Single fiber with 1490nm on Downstream (2.488Gbps), 1310nm on the Upstream (1.244Gbps)	
69		Class B+ link budget: 28dB	
70		Hot-swappable	
71	**PON SFP Specification**	SFP (Small Form-factor Pluggable) package with SC/UPC receptacle	
72		Compliant with TEC GR/PON-01/02 April 2008	
72		Transmitter power - Min: +1.5 (dBm)	
74		Transmitter power - Max: +5 (dBm)	
75		Receiver power Min: -28 (dBm)	
76		Receiver power Max: -8 (dBm)	
77		PON SFP should be compatible with the existing GPON OLT system	
78		**Ethernet Standard:** 1000BASE-T	
79	**Ethernet SFP Specifications (1G Ethernet Copper SFP)**	**Media:** Copper	
90		**Connector:** RJ-45	
91		**Distance:** 100m	
92		**Form Factor**: SFP	
93		**Operating Temperature**: 0˚-85˚C	
94		**Ethernet Standard:** 1000BASE-SX	
95	**Ethernet SFP Specifications (1G Ethernet Multimode SFP)**	**Media:** Multimode Fiber (850nm Wavelength)	
96		**Connector:** Dual LC Connector	
97		**Distance:** 550m	
98		**Form Factor**: SFP	
99		**Operating Temperature**: 0˚-85˚C	
100		**Ethernet Standard:** 1000BASE-LX	

101	Specifications (1G Ethernet Singlemode SFP	**Media:** Singlemode Fiber (1310nm Wavelength)	
102		**Connector:** Dual LC Connector	
103		**Distance:** 10Km	
104		**Form Factor**: SFP	
105		**Operating Temperature**: 0˚-85˚C	
106	**Ethernet SFP Specifications (10G Ethernet Multimode SFP)**	**Ethernet Standard:** 10GBASE-SR	
107		**Media:** Multimode Fiber (850nm Wavelength)	
108		**Connector:** Dual LC Connector	
109		**Distance:** 300m	
110		**Form Factor**: XFP/SFP	
111		**Operating Temperature**: 0˚-85˚C	
112	**Ethernet SFP Specifications (10G Ethernet Singlemode SFP)**	**Ethernet Standard:** 10GBASE-LR	
113		**Media:** Singlemode Fiber (1310nm Wavelength)	
114		**Connector:** Dual LC Connector	
115		**Distance:** 10Km	
116		**Form Factor**: XFP/SFP	
117		**Operating Temperature**: 0˚-85˚C	
118		SFP and XFPs should be compatible with the existing GPON OLT and other Network Equipments	

Table-3: Type A - ONT Equipment

S/N	Item	Description	Complied (Y/N)
01	**Type A - GPON ONT Specifications**	Proposed ONT shall provide 4 Gigabit Ethernet ports, with PoE and PoE+ Support	
02	**General features**	IEEE 802.1D	
03		Bridged Mode (Layer2)	
04		Each Ethernet port can be individually configured in bridged mode	
05		IEEE 802.1p (Quality of Service)	
06		8 different T-CONs per ONT	
07		Learning MAC addresses ≥ 256	
08		Dying gasp	
09	**VLAN features**	IEEE 802.1Q (VLAN)	
10		Port-Based VLAN	

11		Q-in-Q or VLAN Stacking	
12		VLAN Translation	
13	**IPv6 Support**	Stateless Address, Auto Configuration (SLAAC); DHCPv6, PPPoEv6,DNSv6	
14	**Firewall**	ACL, DMZ	
15	**QoS**	Traffic Classification and QoS based on Layer 3 and Layer 4 header	
16	**Multicast**	IGMPv2/V3 & Snooping and IGMP snooping with Proxy report	
17	**Connector**	SC/APC, single mode Fiber	
18	**Link Budget**	Class B+. ITU G 984.2 Amd 1	
19	**Wavelength**	Transmit: 1310nm; Receive: 1490 nm	
20	**Tx Output Power**	+0.5 to 5.0 dBm launch Power	
21	**Rx Sensitivity**	-27 dBm	
22	**Rx Overload**	-8 dBm	
23	**TC Layer**	AES (128 bit Key); US and DS FEC	
24	**Subscriber Interfaces**	10/100/1000 Base-T with RJ-45 connector	
25		Temperature 0 to 60 ºC	
26	**Physical**	Humidity 0 to 95% RH	
27		Wall or table mountable	
28	**Power Supply**	Power adapter: Less than 60W, Dying Gasp Support, Should support 30W per Port	

Table-4: UPS for Optical Network Terminal (ONT)

S/N	Item	Description	Complied (Y/N)
01	Features	2-in-1 Device - Combines the functions of Adapter and UPS	
02		Compact plug type design with Zero footprint	
03		Increased reliability by reducing cables/connection	
04		Microprocessor control	
05		Manual power off switch	
06		Auto start when plugged in	
07		Multi-colour LED indicator	
08		Overload, short-circuit, over-charge and over discharge protection	
09		User-replaceable Li-ion battery Over 18 watts of regulated 12V DC to the load	
10	Specifications	Input Voltage Range: 90 VAC ~ 264 VAC	
11		Operational Voltage Range: 90 VAC ~ 264 VAC	
12		Input Frequency: 50 or 60 Hz	
13		Surge protection 1.5KV	
14		DC Output Voltage: 12VDC ± 5%	
15		Max. Power 25W (2.1A)	
16	Battery Specifications	Type Lithium-ion Battery	
17		Voltage 3.7VDC	
18		Capacity 2600mAh	
19		Typical Charging Time 3 hours recover to 90% capacity Protection	
20		Deep Discharge, Over-charge and Short Circuit Protection	
21	Physical Specifications	Input Plug Mounted on the housing (NEMA/UK/Schuko/India)	
22		Output Cable 1m Length (DC Male Jack, OD	

		4mm, ID 1.7mm or OD 5.5mm, ID 2.5mm)	
23		Dimension, D X W X H (mm) 68 x 42 x 74	
24		Net Weight (g) 280	

Table-5: Element Management System (EMS)

S/N	Item	Description	Complied (Y/N)
01	**Management System**	In-band or Out-band management	
02		Command Line Interface (CLI)	
03		Graphical User Interface (GUI)	
04		Simple Network Management Protocol (SNMP) base management	
05		Remote loopback test (GPON interface)	
06	**Features**	The Management features are the features that provide the abilities to the end user for configuring, setting and monitoring the equipment, parameters, states, problems and others of the PON equipment in the network. The proposed PON equipment shall be complied with the following features.	
07		Equipment management	
08		Fault management	
09		Performance management	
10		Topology management	
11		Security management	
12		Database Management	
13		Terminal Management (ONT)	

Table-6: Indoor 802.11ac Wave 2 2x2:2 Wi-Fi Access Point

S/N	Item	Description	Complied (Y/N)
01	**Wi-Fi Standards**	IEEE 802.11a/b/g/n/ac Wave 2	

02	**Supported Rates**	802.11ac: 6.5 to 867Mbps (MCS0 to MCS9, NSS = 1 to 2 for VHT20/40/80)	
03		802.11n: 6.5 Mbps to 300Mbps (MCS0 to MCS15)	
04		802.11a/g: 54, 48, 36, 24, 18, 12, 9 , 6Mbps	
05		802.11b: 11, 5.5, 2 and 1 Mbps	
06	**Supported Channels**	2.4GHz: 1-13	
07		5GHz: 36-64, 100-144, 149-165	
08	**MIMO**	2x2 SU-MIMO	
09		2x2 MU-MIMO	
10	**Spatial Streams**	2 SU-MIMO	
11		2 MU-MIMO	
12	**Radio Chains and Streams**	2x2:2	
13	**Channelization**	20, 40, 80MHz	
14	**Security**	WPA-PSK, WPA-TKIP, WPA2 AES, WPA3, 802.11i, Dynamic PSK	
15		WIPS/WIDS	
16	**Other Wi-Fi Features**	WMM, Power Save, Tx Beamforming, LDPC, STBC, 802.11r/k/v	
17		Hotspot	
18		Hotspot 2.0	
19		Captive Portal	
20		WISPr	
		RF	
21	**Antenna Type**	Beam Flex+ adaptive antennas with polarization diversity	
22		Adaptive antenna that provides up to 64 unique antenna patterns per band	
23	**Antenna Gain (max)**	Up to 3dBi	
24	**Peak Transmit**	2.4GHz: 26dBm	

25	**Power (aggregate Across MIMO chains)**	5GHz: 25dBm	
26	**Minimum Receive Sensitivity**	-103dBm (2.4GHz)	
27		-96dBm (5GHz)	
28	**Frequency Bands**	ISM (2.4-2.484GHz)	
29		U-NII-1 (5.15-5.25GHz)	
30		U-NII-2A (5.25-5.35GHz)	
31		U-NII-2C (5.47-5.725GHz)	
32		U-NII-3 (5.725-5.85GHz)	
PERFORMANCE AND CAPACITY			
33	**Peak PHY Rates**	2.4GHz: 300Mbps	
34		5GHz: 867Mbps	
35	**Client Capacity**	Peak PHY Rates	
36	**SSID**	Up to 31 per AP	
NETWORKING			
37	**Controller Platform Support**	Smart Zone	
38		Zone Director	
39		Unleashed	
40		Cloud	
41		Standalone	

42	**Mesh**	Smart Mesh™ wireless meshing technology. Self-healing Mesh	
43	**IP**	IPv4, IPv6	
44	**VLAN**	802.1Q (1 per BSSID or dynamic per use based on RADIUS)	
45		VLAN Pooling	
46		Port-based	
47	**802.1x**	Authenticator & Supplicant	
48	**Tunnel**	L2TP, GRE, Soft-GRE	
49	**Policy Management Tools**	Application Recognition and Control	
50		Access Control Lists	
51		Device Fingerprinting	
52		Rate Limiting	
53	**IoT Capable**	Yes	

	PHYSICAL INTERFACES		
54	**USB 2.0 port, Type A Connector**	2 x 1GbE ports, RJ-45, PoE in on one port	
55	**USB**	USB 2.0 port, Type A Connector	

	PHYSICAL CHARACTERISTICS		
56	**Physical Size**	16.8(L) x 16.5(W) x 4.1(H) cm	
57		16.8(L) x 16.5(W) x 4.1(H) cm	
58	**Mounting**	Wall, Drop ceiling, Desk	
59		Secure bracket (sold separately)	

S/N	Item	Description	Complied (Y/N)
60	**Physical Security**	Hidden latching mechanism	
61		Kensington lock	
62		T-bar Torx	
63		Bracket (902-0108-0000) Torx screw & padlock (sold separately)	
64	**Operating Temperature**	0°C (32°F) to 50°C (122°F)	
65	**Operating Humidity**	Up to 95%, non-condensing	

Table-7: Indoor 802.11ac Wave 2 3x3:3 Wi-Fi Access Point

S/N	Item	Description	Complied (Y/N)
01	**Wi-Fi Standards**	IEEE 802.11a/b/g/n/ac Wave 2	
02	**Supported Rates**	802.11ac: 6.5 to 1,300Mbps (MCS0 to MCS9, NSS = 1 to 3 for VHT20/40/80 or 1 for VHT160	
03		802.11n: 6.5 Mbps to 450Mbps (MCS0 to MCS23)	
04		802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6Mbps	
05		802.11b: 11, 5.5, 2 and 1 Mbps	
06	**Supported Channels**	2.4GHz: 1-13	
07		5GHz: 36-64, 100-144, 149-165	
08	**MIMO**	3x3 SU-MIMO	
09		3x3 MU-MIMO	
10	**Spatial Streams**	3 SU-MIMO	
11		3 MU-MIMO	
12	**Radio Chains and Streams**	3x3:3	
13	**Channelization**	20, 40, 80, 160/80+80 MHz	
14	**Security**	WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i, Dynamic PSK	

15		WIPS/WIDS	
16	**Other Wi-Fi Features**	WMM, Power Save, Tx Beamforming, LDPC, STBC, 802.11r/k/v	
17		Hotspot	
18		Hotspot 2.0	
19		Captive Portal	
20		WISPr	
RF			
21	**Antenna Type**	Beam Flex+ adaptive antennas with polarization diversity	
22		Adaptive antenna that provides up to 64 unique antenna patterns per band	
23	**Antenna Gain (max)**	Up to 3dBi	
24	**Peak Transmit Power (aggregate across MIMO chains)**	2.4GHz: 27dBm	
25		5GHz: 25dBm	
26	**Minimum Receive Sensitivity**	-100dBm	
27	**Frequency Bands**	ISM (2.4-2.484GHz)	
28		U-NII-1 (5.15-5.25GHz)	
29		U-NII-2A (5.25-5.35GHz)	
30		U-NII-2C (5.47-5.725GHz)	
31		U-NII-3 (5.725-5.85GHz)	
PERFORMANCE AND CAPACITY			
32	**Peak PHY Rates**	2.4GHz: 450Mbps	

33		5GHz: 1300Mbps	
34	**Client Capacity**	Up to 512 clients per AP	
35	**SSID**	Up to 31 per AP	
		NETWORKING	
36		Smart Zone	
37		Zone Director	
38	**Controller Platform Support**	Unleashed	
39		Cloud Wi-Fi	
40		Standalone	
41	**Mesh**	Smart Mesh™ wireless meshing technology. Self-healing Mesh	
42	**IP**	IPv4, IPv6	
43		802.1Q (1 per BSSID or dynamic per use based on RADIUS)	
44	**VLAN**	· VLAN Pooling	
45		Port-based	
46	**802.1x**	Authenticator & Supplicant	
47	**Tunnel**	L2TP, GRE, Soft-GRE	
48	**Gateway and Routing**	NAT/DHCP	
49		Application Recognition and Control	
50	**Policy Management Tools**	Access Control Lists	
51		Device Fingerprinting	

S/N	Item	Description	Complied (Y/N)
52		Rate Limiting	
53	**IoT Capable**	Yes	
	PHYSICAL INTERFACES		
54	**Ethernet**	2 x 1GbE ports, RJ-45	
55	**USB**	1 USB 2.0 port, Type A connector	
	PHYSICAL CHARACTERISTICS		
56	**Physical Size**	20.1(L), 19.5(W), 5.1 (H)cm	
57		7.9 (L), 7.68 (W), 2.00 (H)in	
58	**Mounting**	Wall, Drop ceiling, Desk	
59		Secure bracket (sold separately)	
60	**Physical Security**	Hidden latching mechanism	
61		Kensington lock	
62		T-bar Torx	
63	**Operating Temperature**	0°C (32°F) - 40°C (104°F)	
	Weight	578g (1.3lb)	
65	**Operating Humidity**	Up to 95%, non-condensing	

Table-8: Scalable wired and wireless network controller

S/N	Item	Description	Complied (Y/N)
		Key Functionality	
01	**Device Type Support**	Wi-Fi APs, Switches	

02	**Controller Expansion**	Up to 4 controllers in N+1 active-active mode, supporting non-disruptive capacity expansion	
03	**Controller Redundancy**	3+1 distributed data preserving with N+1 redundancy within a cluster	
04	**Data Offload**	Local offload of traffic directly to the Internet	
05	**AP**	WPA, WPA2-AES, 802.11i, 802.1x/EAP, PSK, WISPr, WEP, WPA3, Enhanced Open, MAC Address*	
06		Fast EAP-SIM re-authentication	
07		EAP-SIM, EAP-AKA, EAP-AKA over WLAN for 802.1x	
08		Wi-Fi Locations with the SZ AAA-Proxy functionality enabled	
09	**User Database**	Internal database up to 25,000 users	
10		External: RADIUS, LDAP, Active Directory	
11	**Access Control**	L2 (MAC address-based) L3/4 (IP and Protocol based)	
12		L2 client isolation	
14		Management interface access control	
15		Time-based WLANs	
16		Device type access policies	
17		Two-factor authentication password, SMS	
18	**Wireless Intrusion Detection (WIDS/ WIPS)**	Rogue AP detection / prevention	
19		Evil-twin/AP spoofing detection	
20		Ad hoc detection	
21	**AAA**	RADIUS (primary and backup)	
22	**Hotspot**	WISPr, Wi-Fi CERTIFIED, Passpoint™, HotSpot 2.0*	
23	**Guest Access**	Should be Supported	
24	**Captive Portal**	Should be Supported	

25	**Mesh**	Self-healing, Self-forming, Zero-touch provisioning	
26	**Media**	802.11e/WMM, U-APSD, Wi-Fi Calling Prioritization*	
27	**mDNS Bonjour Fencing**	Should be Supported	
28	**WISPr**	WISPr authentication, SZ downlink AP Survivability*	
29	**Software Queues**	Per traffic type (4), per client	
30	**SmartCast Traffic Classificatio n**	Automatic, heuristics and TOS based or VLAN-defined	
31	**Rate Limiting**	Should be Supported	
32	**WLAN Prioritizatio n**	Should be Supported	
33	**Client Load Balancing**	Automatic	
34	**Band Load Balancing**	Should be Supported	
35	**AP Provisioning**	L3 or L2 auto-discovery	
36		Auto-software upgrade	
37		Automatic channel optimization	
38			
39	**Power**	(FRU Option) AC hot-swappable power supply	
Physical Characteristi cs		AC power consumption: 135W	
40		Power Rating: 100-127VAC/200-240VAC, 47-63HZ	
41	**Dimensions**	1RU rack mountable: 435 mm (W) x 522 mm (D) x 44 mm (H); 17.13 in (W) x 20.55	

		in (D) x 1.73 in (H)	
42	**Weight**	6.97 kg, 15.37 lb	
43	**Connections**	4 - 1GbE ports	
44		4 - 10GbE ports	
45	**LED**	Front panel LEDs, one rear LED	
46	**Fans**	Three (Field-Swappable fans FRU 902-S120-0000)	
47	**Mean-Time-Between-Failure (MTBF)**	At 25C: 167,007 hours	
48		With 2x fans and 1x AC power supply unit	
49	**Environmental Conditions**	Operating Temperature: 0°C (32°F) – 40°C (104°F)	
50		Operating Humidity: 5% to 95%, non condensing	
51		Humidity storage: 95%, non-condensing	

Table-9: Optical Splitter

Item Description	1)1X8 Optical Splitter with IP 55 rated metal enclosure (Indoor Rack mountable) with SC/APC Connectors & Pigtails for both Input & Output with Splice tray for Splicing 2)1x4 optical splitter with IP 55 rated metal enclosure (Indoor Rack mountable), with SC/APC Connectors & Pigtails for both Input & Output with Splice tray for Splicing 3) 1X16 Optical Splitter with IP 55 rated metal enclosure (Indoor wall mountable) with SC/APC Connectors & Pigtails for both Input & Output with Splice tray for Splicing 4) 1X32 Optical Splitter with IP 55 rated metal enclosure (Indoor wall mountable) with SC/APC Connectors & Pigtails for both Input & Output with Splice tray for Splicing				

S/N	Parameter	Description				Complied (Y/N)
1	Operating Wavelength	1260~ 1650 nm				
2	Splitter Type	**1X8**	**1x4**	**1X16**	**1X32**	
3	Initial Loss	10.5	7.1	13.8	17.1	
4	Uniformity Loss(dB)	0.8	0.5	1.0	1.3	
5	Polarisation Dependent Loss(dB)	0.2	0.2	0.2	0.2	
6	Return Loss (dB)	UPC>=50 APC>=60				

Table- 10: G.657A, 1 Core, Single Mode drop fiber (FRP-LSZH)

S/N	Parameter	Description	Complied (Y/N)
1	Cable Type	1 core for indoor – cable trays, duct, aerial drop for access within building	
2	Type of Fiber	Single Mode Step Index Optical Fiber	
3	Fiber Count	1F	
4	Bending Radius	Not more than 20X overall diameter	
5	Tensile Strength(N)	Installation :130, Operating 50	
6	Operating Temperature	-30ºC to 70ºC	
7	Storage Temperature	-40ºC to 75ºC	

Table- 11: 12 Core, G.652D, Single Mode, Unarmored Central Loose Tube Fiber Cable

S/N	Parameter	Description	Complied (Y/N)
1	Cable Type	12 Core, G.652D, Single Mode, Unarmored Central Loose Tube Fiber Cable	
2	Type of Fiber	Single Mode Step Index Optical Fiber	
3	Fiber Count	12F	
4	Bending Radius	Not more than 20X OD – installation 10 X OD in service	
5	Tensile Strength(N)	>=1200 N	
6	Operating Temperature	-30ºC to 70ºC	
7	Storage Temperature	-40ºC to 75ºC	

Table- 12: 48 Core LIU

S/N	Parameter	Description	Complied (Y/N)
1	Type	Mild Steel/Aluminum with 7 Tank Process powder coating Suitable for 19''Rack mount Applications	
2	Dimensions	44*405*250 mm (H*W*D)	
3	Spool	FR grade PVC	
4	Cable grommet	FR grade Nylon	
5	Splice tray dimension	FR grade ABS	
6	Fiber components standard	Telecordia GR 326	
7	Insertion Loss	less < .3dB (Multimode), < .2dB (Single mode)	
8	Plug/Unplug Durability	1000 time	
9	Accessory	Kit includes mounting ear, cable gland, cable ties and screws	
10	For Fiber Routing	High impact resistance splicing tray & cable spool for fiber & pigtail routing	
11	Adapter capacity	Can manage adaptor panel for maximum 48 SC/48 LC in 1U size	

Table- 13: Face Plate (Optical Termination Box (OTB) with FO Splice Tray in a molded part, 1 no SC/APC Adapter + 1 no Pigtail (0.9mm) with internal shutter)

S/N	Parameter	Description	Complied (Y/N)
1	Adapters with integrated shutters	1	

			Complied (Y/N)
2	Size:	85 x85 x30mm	
3	Material	ABS-PC	
4	Wall mountor Rail DIN 35mm	Yes	
5	Weight:	100g	

Table- 14: 19" Rack (21 U Floor Mount Rack for housing the equipment including cable managers with all other accessories to complete)

S/N	Item	Description	Complied (Y/N)
01	**Basic Frame**	Steel	
02	**Construction**	Welded	
03	**Top & Bottom Cover**	Welded to frame with cable entry exit cut outs in Bottom.	
04	**Front Door**	Lockable Metal Plain Door	
05	**19" Mounting Angle**	Formed Steel	
06	**Standard Finish**	Special Dual Coat Powder coated	
07	**Standard Colour**	Grey & Off White OR Black	
08	**Rack Standard**	Conforms to DIN 41494 or equivalent standard	
09	**Static Load**	30 Kg (Uniformly distributed in U Space) / 2KG Per U	
10	**Dimensions**	600x600	

Table - 15: Desktop PC

S/N	Item	Description	Complied (Y/N)
01	**Processor**	Intel® Core i5	
02	**Operating System**	Windows 10	
03	**Monitor**	21 inch	
04	**Memory**	4GB	
05	**Hard Drive**	500GB	

Table - 16: Layer - 2 Switch with 20 x 10/100/1000 Ethernet Ports and 4 x 1G Combo SFP Uplink ports, Including Installation

S/N	Parameter	Description	Complied (Y/N)
1	**Ports**	● 24 RJ-45 connectors for 10BASE-T/100BASE-TX/1000BASE-T with 4 shared Gigabit SFP slots ● Console port ● Auto medium dependent interface (MDI) and MDI crossover (MDI-X) ● Auto negotiate/manual setting ● RPS port for connecting to redundant power supply unit	
2	**Cabling type**	● Unshielded twisted pair (UTP) Category 5 or better for 10BASE-T/100BASE-TX ● UTP Category 5 Ethernet or better for 1000BASE-T	
3	**Switching**	Capacity : Up to 48 Gbps, non blocking Layer 2 : MAC table size=8000, Number of VLANs=256 active VLANs (4096 range), Head-of-line (HOL) blocking, VLAN Switching Layer 3: IPV6, IPV6 QoS, ACL, MLD snooping, IPV6 applications, RFCs supported RFC2463, RFC3513, RFC 4291, RFC 2460, RFC 2461, RFC 2462, RFC 1981, RFC 4007 and etc…	
4	**Forwarding rate (based on 64-byte packets)**	Up to 35.7 mbps	
5	**Stack operation**	Up to 8 units in a stack (192 ports) ● Hot insertion and removal ● Ring and chain stacking options ● Master and backup master for resilient stack control	

		● Auto-numbering or manual configuration of units in stack	
6	**Security**	**IEEE 802.1X** **Access control**	
7	**Management**	Web user interface : Built-in web user interface for easy browser-based configuration (HTTP/HTTPS) SNMP v1, 2c, and 3 with support for traps SNMP MIBs RFC1213 MIB-2, RFC2863 interface MIB, RFC2665 Ether-like MIB, RFC1493 bridge MIB, RFC2674 extended bridge MIB (P-bridge, Q-bridge), RFC2819 RMON MIB (groups 1, 2, 3, and 9 only), RFC2737 entity MIB, RFC3621 Power Ethernet MIB, RFC 2618 RADIUS client MIB, RFC 1215 traps RMON Embedded RMON software agent supports 4 RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis Port mirroring, Firmware upgrade, Trace route, Single IP management, SSL security for web user interface, SSH, RADIUS, TFTP upgrade, DHCP Client, BOOTP, Syslog, Telnet client (SSH secure support)	
8	**Link aggregation**	● Link aggregation using IEEE 802.3ad Link Aggregation Control Protocol (LACP) ● Up to 8 ports in up to 8 groups	

Sl. No.	Basic Requirement	Specification requirement	Documents required
9	Dimensions W x D x H	1 RU Rack mountable	
10	Power	100–240V AC, 50–60Hz, internal, universal; also equipped with redundant power supply connector for external power supply 48V DC Power consumption 12V at 7.5A (90W)	
11	Operating & Storage humidity	10% to 95% relative humidity, noncondensing	
12	Operating temperature	32º to 104ºF (0º to 40ºC)	

3. TECHNICAL BID SHALL CONTAIN THE FOLLOWING PRE-QUALIFICATION CRITERIA

Vendor's profile and other eligibility (All the relevant Certificates must be attached)

Sl. No.	Basic Requirement	Specification requirement	Documents required
1	Legal Entity	The Vendor should be a company registered under the Companies Act, 1956 or a partnership firm registered under Indian Partnership Act 1932 or Limited Liability Partnership Act 2008 with registered office in India and in operation for at least 5 years as on 31.03.2018.	Certificates of incorporation / Registration

2	Turnover	Vendor must have an average annual turnover of Rs.10 Crores per annum during the last three financial years.	Supporting document like Balance sheet/CA Certificate must be submitted
3	Net Worth	The net worth of the Vendor in the last three financial year (as per the last published audited balance sheet) should be Positive	CA Certificate
4	Technical Capability	Vendor should have experience in successfully executing works of similar nature during the last 5 years and executed at least 3 work orders of Supply & Installation of proposed items of value Rs. 50 Lakhs or more in Government/Semi Government/PSU's/ Govt. Educational Institute/ during last 5 financial years.	Documentary proof with satisfactory Installation & acceptance of the same should be attached
5	Tax Registration Certificate	The Vendors must have a valid PAN No., TIN No & Service Tax No	Copies of relevant documents should be submitted.
6	Certification	The bidding company must be ISO 9001:2008 certified company.	Copies of valid certificates.

| 7	Blacklisting	The Vendor should not have been blacklisted by any Government / Government agency / Defense/Financial Institution in India in the past AND there shouldn't be any past / ongoing legal trial in name of any of the Directors / Partners of the bidding company.	A self-declaration letter by the bidder, on the Company's letterhead should be submitted.
8	OEM Authorization	The Vendor should be OEM or Authorized Dealer/System Integrator of the OEM of the offered product.	Authorization Letter from OEMs specific to this tender need to be submitted.
9	Experience	Similar kind of experience in IITs/IISERs/IIMs/NITs/Central University/ State Universities/ State colleges/ State Govt offices/Similar Reputed institutes of same make of value equal or more than 50 Lakhs In the last 3 financial years.	Copies of valid experience certificates.

Financial bids for the wired/wireless LAN shall be opened only for those Vendors who will qualify technically (i.e. those who have submitted valid earnest money, those who have submitted valid documents as per eligibility narrated herein above).

4. CLARIFICATIONS TO RFP

The Vendor may seek clarifications in writing regarding the RFP document within ten days from the date of issue of Notice for RFP. IGIT, Sarang shall respond in writing to any such request for the clarifications and all such clarifications shall be posted on IGIT, Sarang website (www.igitsarang.ac.in). The Vendor shall submit signed copies of all such clarifications furnished and posted by IGIT, Sarang in the Part -1 (Technical Bid) as a token acknowledgement of perusal of such clarifications by the Vendor.
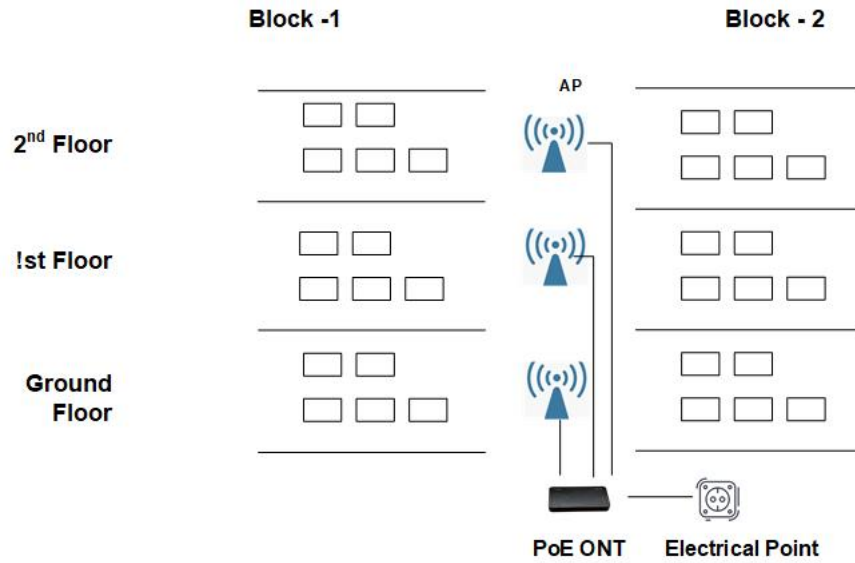
5.

i. LAYOUT DIAGRAM FOR WIRED/WIRELESS LAN (ETHERNET)
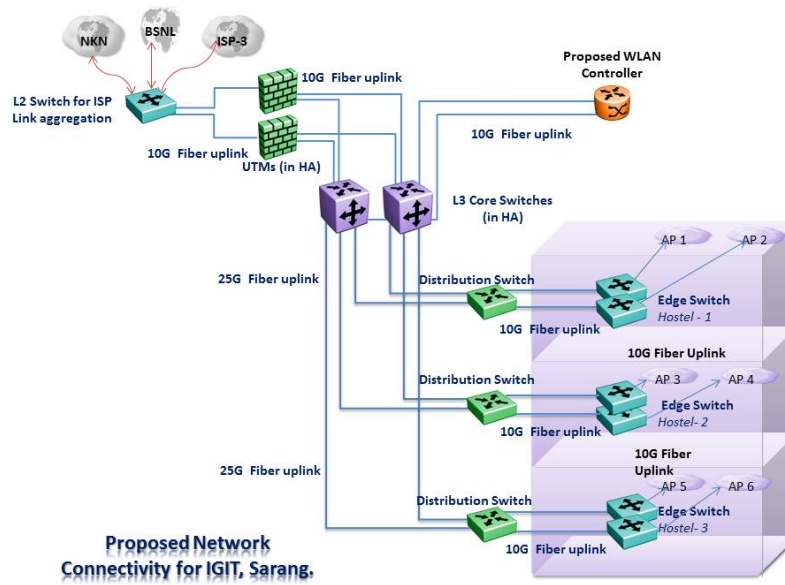
ii. LAYOUT DIAGRAM FOR WIRED/WIRELESS LAN (GPON)
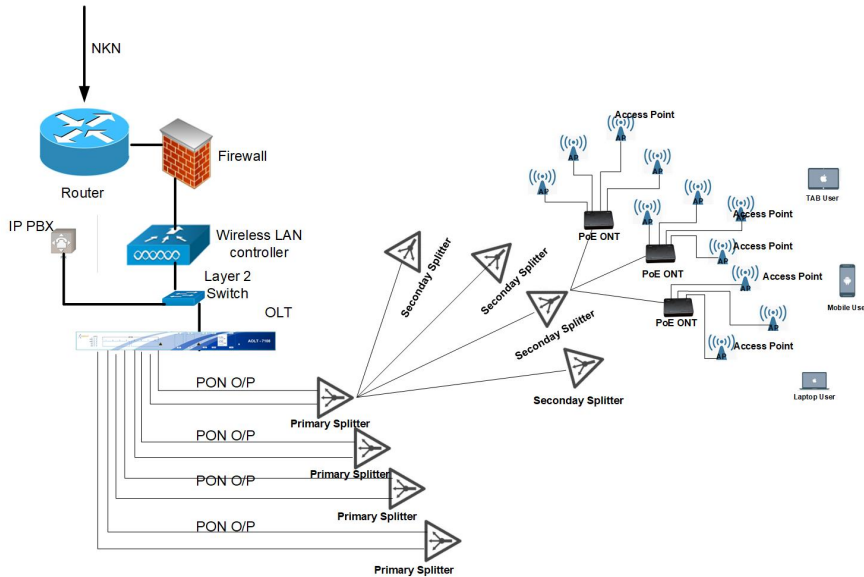
iii. HOSTEL CONNECTIVITY DIAGRAM FOR WIRED/WIRELESS LAN (GPON)

6. VALIDITY OF RFP

The RFP response submitted by the applicants shall remain valid for a period of 120 (ONE-TWENTY) days after the date of RFP response opening prescribed in this document. A RFP response which is valid for shorter period may be rejected as nonresponsive.

7. EARNEST MONEY DEPOSIT (EMD)

(a) EMD of Rs. 8, 80,000 (INR) for wired/wireless Ethernet LAN and RS. 1, 30,000 (INR) for wired/wireless GPON LAN in the form of a Demand Draft drawn in favour of **Principal, IGIT, Sarang** and payable at IGIT, Sarang (SBI IGIT, Sarang Branch Code 10246) must be submitted along with the Part –I Technical Bid in separate envelope. The Bids not accompanied by EMD shall be rejected as non-responsive.

(b) No interest shall be payable by the Institute for the sum deposited as EMD.

(c) The EMD of the unsuccessful Vendors would be returned within one month of signing of the contract.

(d) No bank guarantee shall be accepted in lieu of the EMD.

8. FORFEITURE OF EARNEST MONEY DEPOSIT (EMD)

The EMD shall be forfeited by the **IGIT, Sarang** in the following events:
(a) If the bid is withdrawn during the validity period or any extension agreed by respondent Vendor thereof.

(b) If the bid is varied or modified in a manner not acceptable to the **IGIT, Sarang** after opening of bids during the validity period or any extension thereof.

(c) If the respondent Vendor tries to influence the evaluation process.

(d) If the First ranked Vendor withdraws its bid during negotiations (failure to arrive at a consensus by both the parties shall not be construed as withdrawal of proposal by the consultant).

9. OTHER TERMS & CONDITIONS
9.1 General Terms
(a) The conditional/ incomplete bids or those who received after due date shall be summarily rejected.
(b) The award/ cancellation of work shall be decided at the sole description of **IGIT, Sarang**. Invitation of Tenders/ quotations is not a commitment.
(c) **IGIT, Sarang** reserves the right to accept or reject in part or full or all the offers without assigning any reason thereof. Any decision of **IGIT, Sarang** in this regard shall be final and binding on the Vendor.
(d) The Vendor shall abide by all labour laws such as payment of wages Act 1936 with up-to-date amendments, minimum wages Act 1948 with amendments etc and other laws as applicable during the execution of work.
(e) The institute shall make all payments through account payee cheque drawn on SBI,

IGIT, Sarang in Indian rupees. Necessary bank mandate detailing bank account number etc shall be submitted after execution of agreement.

(f) The successful Vendor should establish a technical control centre at **IGIT, Sarang** for a period of four years or more from the date of completion

(g) Neither party shall bear responsibility for the complete or partial non-performance of any of its obligations (except for failure to pay any sum which has become due on account of receipt of goods under the provisions of the present contract), if the non-performance results from the Force Majeure circumstances such as Flood, Fire, Earth Quake and other acts of God as well as War, Military operation, blockade, Acts or Actions of State Authorities or any other circumstances beyond the parties control that have arisen after signing of the present contract.

(h) In case of any dispute arising out of or in connection with the contract either during the tenure of the contract or thereafter, the Director of the institute is the sole arbitrator to decide the same and his decision is final and binding on both the parties. If differences persist after arbitration and there are compelling reasons to go to court, it shall be decided in the court of Kamakhyanagar/Dhenkanal.

(i) Proposal Binding Period
Prices quoted in the Vendor's response for all labour and materials shall remain in effect for a period of at least three years from last date of the bid submission.

9.2 Price Stability

Contract prices and discounts as offered in the bid and accepted by IGIT, Sarang shall remain fixed during the contract period. In the event of price changes, replacement equipment shall be purchased at the lower of quoted value or then current market price. In no case shall a price higher than contract price be paid for equipment proposed. If **IGIT, Sarang** desires to purchase equipment or services not contained in the contract, future purchases shall be determined using the Vendor -specified discount rate in the proposal from the manufacturer's suggested retail price as of the date of the order. In no case shall the price exceed the favored Vendor prices.

9.3 Right to Reject

IGIT, Sarang reserves the right to reject all bids. Responses should be submitted initially with the most favorable terms that the Vendor can propose.

9.4 Standards

IGIT, Sarang expects that the Vendor would use standards, especially for configuration and user-interface, which shall be used throughout. Checklists for reviewing user interfaces must be developed and used by the Vendor.

9.5 IGIT, Sarang Involvement

Director, IGIT, Sarang shall be the single-point contact for the project. **IGIT Sarang** shall also assign a tester. All major decisions must be made with the involvement and agreement of the **IGIT, Sarang** project team. At no time must the Vendor hold back any information related to the **IGIT, Sarang** project and system, which is requested for by the **IGIT, Sarang** project team. It is the responsibility of the Vendor to ensure that the **IGIT Sarang** project team has complete information on the software and system so that, after the warranty period, the **IGIT, Sarang** project team is fully capable of maintaining and enhancing the software system. The **IGIT, Sarang** Project team shall participate in reviews of all documents and shall have approval authority.

9.6 Requirements Gathering Period

The IGIT, Sarang project team shall fully participate in all activities of the requirements study and configuration period. The IGIT, Sarang team shall be responsible for validating the outcome of the requirements study done by the Vendor. IGIT, Sarang shall fully participate in the configuration of the system and the database creation, and review and approve the outcome of the design.

Section –II (Price Bid)

i. **Instruction for Price Bid**

Price Bid submission- Reverse Auction

1. The price bid submitted by the Vendor shall be inclusive of all elements of costs and shall ensure that the followings are also included therein: -

- The cost of movement of its people from its office to the project sites.
- All the expenses like cost of local travel, boarding and lodging during the stay of the project team of the Vendor etc at IGIT site.
- All expenses incurred during project phases as mentioned above and in System Integration services and solution scope of the RFP.
- All the communication costs associated with the project.
- The costs incurred by the project team of the Vendor for travel to the other offices and project sites of IGIT, or its customers, partners etc. for the purpose of the project.
- Expenses if any to be incurred in any change in functional design document relating to interfaces, modifications, custom developments, enhancements or similar changes including personalizations at any stage after signing off the functional design documents involving up to 5 competent man-days of efforts for each such change.

ii. **a. Format for price bid towards the active and passive components for the LAN**

Component name	Specification/Description	Quantity required	Unit cost	Total cost
Total cost				
GST 18%				
Total cost including GST				

b. **Format for price bid towards installation of LAN**

Item	type	quantity	Unit price	Total cost
Total cost				
GST 18%				
Total cost including GST				