

(राष्ट्रीय पशु जैव प्रोद्योगिकी संस्थान)
National Institute of Animal Biotechnology

Corrigendum -- Change of Specification

Please refer NIAB Tender Details as follows.

Tender ID : 2018_DBTEC_318433_1

Tender Reference Number : NIAB/SP/2017-18/77

Tender Title : To Establish the Network Facility/ICT at NIAB New Campus

The following changes may please be noted before submission of bids.

CHAPTER - 6

SPECIFICATION AND OTHER TERMS OF REQUIREMENTS

Technical specification (page 31 to page 42)

For existing

Read as following revised specification. Rest of the tender conditions remains same.

Manager (S&P)

NIAB-Hyderabad

Date:- 05/04/2018

CHAPTER - 6

SPECIFICATION AND OTHER TERMS OF REQUIREMENTS

Revised Technical specification

<u>Technical Specifications</u>			
Item No-1	CORE SWITCH	Quantity- 1	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Product details- Please specify		
1	Please mention Make, Model No. and Part Code of L3 Core Switch		
B	Architecture & Port Density		
1	Switch should offer Wire-Speed Non-Blocking Switching & Routing Performance at Layer 2 & Layer 3 from Day-1 on All Ports.		
2	Switch should support 1G , 10G , 40G from Day-1		
3	The core Switch should have Twenty four (24) 1GbE SFP / 10GbE SFP+ ports and at least 2 nos 40G QSFP+ ports supported from day 1.		
4	Switch should support Stacking up to 8 Switches with more than 80 Gbps stacking bandwidth per Switch.		
C	Performance		
1	Switching Bandwidth: Should provide Non-Blocking switch fabric capacity of 1Tbps or more.		
2	Forwarding Capacity: Should provide wire-speed packet forwarding of 756 Mpps or more.		
D	Layer 2 features		
1	Should support 4000 active VLANs		
2	Should support 80,000 MAC addresses or more.		
3	Shall support IP multicast snooping IGMP v1, v2, v3		
4	Should support Jumbo Frames (up to 9000 bytes)		
E	Layer 3 features		
1	Should support minimum 55K or more IPv4 routes & 6000 or more IPv6 routes		
2	Should support Basic IPv4 and IPv6 Static Routing, ECMP, Host Routes, Virtual Interfaces, Routed Interfaces, Route Only and Routing between directly connected subnets from day 1.		
3	Should support the following Dynamic IPv4 & IPv6 Routing protocols and Multicast Routing Protocols from day 1.		
4	Dynamic IPv4 and IPv6 Routing protocols like RIP v1&v2, RIPng, OSPFv2, OSPFv3, BGP4, BGP4+, Multi-VRF or equivalent , VRRPv2 & VRRPv3 from Day 1.		
5	PIM-SSM, PIM Sparse, PIM Dense, PIM Anycast RP, and PIM passive IPv4 multicast routing from Day 1		
6	IPv4 Multicast Non-stop routing (NSR) support for PIM-SM, SSM, and Anycast RP from Day 1		
7	PIM-SSM, PIM Sparse, PIM Anycast RP, MSDP and PIM6-SM Snooping IPv6 multicast routing from Day 1		
F	Security		
1	Switch should support RADIUS, TACACS/TACACS+ and username/password for Authentication, Authorization and Accounting (AAA) with Local User Accounts and Local User Passwords.		

2	Should support secure communications to the management interface and system through SSL, Secure Shell (SSHv2), Secure Copy and SNMPv3		
3	Should support IP Source Guard, DHCP snooping, DHCPv4, DHCPv6 and Dynamic ARP Inspection.		
4	Should support IPv4 and IPv6 ACLs with up to 2000 rules per ACL and a minimum of 6000 rules per system (Stand alone Switch or Stack).		
5	Should support byte and packet based broadcast, multicast and unknown-unicast limit with suppression port dampening or equivalent.		
6	Should support IPv6 Router Advertisement (RA) Guard.		
7	Should support Flexible Authentication with 802.1x Authentication and MAC Authentication.		
G	Manageability		
1	Should support manageability using Network Management Software with Web based Graphical User Interface (GUI).		
2	Switch's Operating System should have industry standard Command Line Interface (CLI).		
3	It should have Telnet, TFTP, HTTP access to switch management/monitoring		
4	Should support NetFlow or sFlow or IPFIX or equivalent		
H	Physical Attributes, Power Supply and Fans		
1	Mounting Option : 19" Universal rack mount ears		
2	Should be loaded with dual hot swappable, redundant load sharing AC power supplies to provide 1:1 power supply.		
3	Should be loaded with redundant hot swappable fans.		
4	Operating Temperature should be 0° C to +45° C		
I	Mandatory Compliance :		
1	All categories of Switches, Transceivers & Switch OS should be from same OEM		
2	Quoted Switch should Be NDPP Certified (Proof should be submitted)		
J	Warranty		
1	Switch should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		
K	Product brochure		
1	Vendor should provide printed technical catalogs/brochures for the quoted model containing technical specifications, features.		

Item No -2	Access Switch - 24 port switch	Quantity- 16	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Product details- Please specify		
1	Please mention Make, Model No. and Part Code		
B	Architecture & Port Density		
1	Switch should offer Wire-Speed Non-Blocking Switching & Routing Performance at Layer 2 & Layer 3.		
2	The Access Switch should have Twenty Four (24) 1GbE RJ45 ports and should have Four 1GbE/10GbE SFP+ Port from Day-1 .		
3	Access Switch should support Stacking of 8 Switches or more with more than 40 Gbps stacking bandwidth per Switch.		
C	Performance		
1	Switching Bandwidth: Should provide Non-Blocking switch fabric capacity of 128 Gbps or more.		

2	Forwarding Capacity: Should provide wire-speed packet forwarding of 95 Mpps or more.		
D	Layer 2 features		
1	Should support 4000 or more VLANs		
2	Should support 16,000 MAC addresses or more.		
3	Shall support IP multicast snooping with support for IGMP v1, v2, v3 and MLD v1 & v2		
4	Should support Jumbo Frames (up to 9000 bytes)		
E	Layer 3 features		
1	Should support minimum 1000 IPv4 & IPv6 routes		
2	Should support Layer 3 dynamic routing protocols like RIPng / OSPFv3 etc.. for future purpose		
F	Security		
1	Switch should support RADIUS, TACACS/TACACS+ and username/password for Authentication, Authorization and Accounting (AAA) with Local User Accounts and Local User Passwords.		
2	Should support secure communications to the management interface and system through SSL, Secure Shell (SSHv2), Secure Copy and SNMPv3		
3	Should support IP Source Guard, DHCP snooping, DHCPv4, DHCPv6 and Dynamic ARP Inspection.		
4	Should support IPv4 and IPv6 ACLs with up to 500 rules per ACL and a minimum of 6K rules per system (Standalone Switch or Stack).		
5	Should support multicast protocol.		
6	Should support IPv6 Router Advertisement (RA) Guard.		
7	Should support Flexible Authentication with 802.1x Authentication and MAC Authentication.		
G	Manageability		
1	Should support manageability using Network Management Software with Web based Graphical User Interface (GUI).		
2	Switch's Operating System should have industry standard Command Line Interface (CLI).		
3	It should have Telnet, TFTP, HTTP access to switch management/monitoring		
4	Should support NetFlow or sFlow or IPFIX or equivalent		
H	Physical Attributes		
1	Mounting Option : 19" Universal rack mount ears		
2	Operating Temperature should be 0° C to +45° C		
I	Mandatory Compliance :		
1	All categories of Switches, Transceivers & Switch OS should be from same OEM		
2	Quoted Switch should Be NDPP Certified (Proof should be submitted)		
3	Switch should comply to Vibration IEC 68-2-36, IEC 68-2-6, Shock and drop IEC 68-2-27, IEC 68-2-32	-	-
J	Warranty		
1	Switch should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		
K	Product brochure		
1	Vendor should provide printed technical catalogs/brochures for the quoted model containing technical specifications, features.		

Item No -3	Access Switch - 24 port PoE+ switch	Quantity- 2	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Product details- Please specify		
1	Please mention Make, Model No. and Part Code		
B	Architecture & Port Density		
1	Switch should offer Wire-Speed Non-Blocking Switching & Routing Performance at Layer 2 & Layer 3.		
2	The Access Switch should have Twenty Four (24) 1GbE PoE+ RJ45 ports and should have Four 1GbE/10GbE SFP+ Port from Day-1 .		
3	Access Switch should support Stacking of 8 Switches or more with more than 40 Gbps stacking bandwidth per Switch.		
C	Performance		
1	Switching Bandwidth: Should provide Non-Blocking switch fabric capacity of 128 Gbps or more.		
2	Forwarding Capacity: Should provide wire-speed packet forwarding of 96 Mpps or more.		
D	Layer 2 features		
1	Should support 4000 or more VLANs		
2	Should support 16,000 MAC addresses or more.		
3	Shall support IP multicast snooping with support for IGMP v1, v2, v3 and MLD v1 & v2		
4	Should support Jumbo Frames (up to 9000 bytes)		
E	Layer 3 features		
1	Should support minimum 1000 IPv4 & IPv6 routes		
2	Should support Layer 3 dynamic routing protocols like RIPng / OSPFv3 etc.. for future purpose		
F	Security		
1	Switch should support RADIUS, TACACS/TACACS+ and username/password for Authentication, Authorization and Accounting (AAA) with Local User Accounts and Local User Passwords.		
2	Should support secure communications to the management interface and system through SSL, Secure Shell (SSHv2), Secure Copy and SNMPv3		
3	Should support IP Source Guard, DHCP snooping, DHCPv4, DHCPv6 and Dynamic ARP Inspection.		
4	Should support IPv4 and IPv6 ACLs with up to 500 rules per ACL and a minimum of 6K rules per system (Standalone Switch or Stack).		
5	Should support multicast protocol.		
6	Should support IPv6 Router Advertisement (RA) Guard.		
7	Should support Flexible Authentication with 802.1x Authentication and MAC Authentication.		
G	Manageability		
1	Should support manageability using Network Management Software with Web based Graphical User Interface (GUI).		
2	Switch's Operating System should have industry standard Command Line Interface (CLI).		
3	It should have Telnet, TFTP, HTTP access to switch management/monitoring		
4	Should support NetFlow or sFlow or IPFIX or equivalent		
H	Physical Attributes & PoE Power Budget		
1	Mounting Option : 19" Universal rack mount ears		
2	PoE Power Budget : The Switch should provide 360 watts of PoE+ power.		

3	Operating Temperature should be 0° C to +45° C		
I	Mandatory Compliance :		
1	All categories of Switches, Transceivers & Switch OS should be from same OEM		
2	Quoted Switch should Be NDPP Certified (Proof should be submitted)		
3	Switch should comply to Vibration IEC 68-2-36, IEC 68-2-6, Shock and drop IEC 68-2-27, IEC 68-2-32	-	-
J	Warranty		
1	Switch should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		
K	Product brochure		
1	Vendor should provide printed technical catalogs/brochures for the quoted model containing technical specifications, features.		

Item No- 4	Access Switch - 8 port PoE+ switch - 8 nos	Quantity- 8	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Product details- Please specify		
1	Please mention Make, Model No. and Part Code		
B	Architecture & Port Density		
1	Switch should offer Wire-Speed Non-Blocking Switching & Routing Performance at Layer 2		
2	The Access Switch should have Twelve (8) 1GbE PoE+ RJ45 ports and should have Two 1GbE/10GbE SFP+ Port from Day-1 .		
3	Access Switch should support Stacking up to 4 Switches with more than 40 Gbps stacking bandwidth per Switch.		
C	Performance		
1	Switching Bandwidth: Should provide Non-Blocking switch fabric capacity of 56 Gbps or more.		
2	Forwarding Capacity: Should provide wire-speed packet forwarding of 41 Mpps or more.		
D	Layer 2 features		
1	Should support 4000 or more VLANs		
2	Should support 16,000 MAC addresses or more.		
3	Shall support IP multicast snooping with support for IGMP v1, v2, v3 and MLD v1 & v2		
4	Should support Jumbo Frames (up to 9000 bytes)		
E	Layer 3 features		
1	Should support minimum 1000 IPv4 & IPv6 routes		
2	Should support Layer 3 dynamic routing protocols like RIPng / OSPFv3 etc.. for future purpose		
F	Security		
1	Switch should support RADIUS, TACACS/TACACS+ and username/password for Authentication, Authorization and Accounting (AAA) with Local User Accounts and Local User Passwords.		
2	Should support secure communications to the management interface and system through SSL, Secure Shell (SSHv2), Secure Copy and SNMPv3		
3	Should support IP Source Guard, DHCP snooping, DHCPv4, DHCPv6 and Dynamic ARP Inspection.		
4	Should support IPv4 and IPv6 ACLs with up to 500 rules per ACL and a minimum of 6K rules per system (Standalone Switch or Stack).		

5	Should support multicast protocol.		
6	Should support IPv6 Router Advertisement (RA) Guard.		
7	Should support Flexible Authentication with 802.1x Authentication and MAC Authentication.		
G	Manageability		
1	Should support manageability using Network Management Software with Web based Graphical User Interface (GUI).		
2	Switch's Operating System should have industry standard Command Line Interface (CLI).		
3	It should have Telnet, TFTP, HTTP access to switch management/monitoring		
4	Should support NetFlow or sFlow or IPFIX or equivalent		
H	Physical Attributes & PoE Power Budget		
1	Mounting Option : 19" Universal rack mount ears		
2	PoE Power Budget : The Switch should provide 124 watts of PoE+ power.		
3	Operating Temperature should be 0° C to +45° C		
I	Mandatory Compliance :		
1	All categories of Switches, Transceivers & Switch OS should be from same OEM		
2	Quoted Switch should Be NDPP Certified (Proof should be submitted.		
3	Switch should comply to Vibration IEC 68-2-36, IEC 68-2-6, Shock and drop IEC 68-2-27, IEC 68-2-32	-	-
J	Warranty		
1	Switch should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		
K	Product brochure		
1	Vendor should provide printed technical catalogs/brochures for the quoted model containing technical specifications, features.		

Item No- 5	Wireless LAN (Controller)	Quantity- 1	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Essential Features:		
1	Controller should be 19" Rack mountable 1U/2U height.		
2	WLAN Controller should have minimum 2 nos. of 10/100/1000 Ethernet or SFP Ports and one Console port.		
3	Proposed Controller should be ready for supporting 20 AP's from day one with scalability for 150 AP support in future without adding any new hardware. Controller should be able to support minimum 150 campus connected AP's or more with support of seamless roaming access over L2/L3 network.		
5	Controller should support minimum 250 WLAN's		
6	Controller should have capacity to handle minimum 2000 or more Concurrent devices.		
B	General Feature		
1	Controller should provide air-time fairness between these different speed clients – slower clients should not be starved by the faster clients and faster clients should not adversely affected by slower clients.		
2	Controller should support Spectrum Analysis feature to detect interference from different sources.		
3	System Should provide real-time charts showing interference for access point, on a per-radio, per-channel basis.		
4	Ability to map SSID to VLAN and dynamic VLAN support for same SSID.		

5	support automatic channel selection for interference avoidance		
6	Controller must support 802.11k and 802.11r.		
C	Auto Deployment of AP's at different locations		
1	Access points can discover controllers on the same L2 domain without requiring any configuration on the access point.		
2	Access points can discover controllers across Layer-3 network through DHCP or DNS option		
D	Security & monitoring		
1	Controller should support following for security & Authentication:		
2	WIRELESS SECURITY: WEP, WPA-TKIP, WPA2-AES, 802.11i		
3	AUTHENTICATION : 802.1X, local database External AAA servers : Active Directory, RADIUS, LDAP		
4	System should provide DOS attacks and Intrusion Detection & Prevention and Control for any Rogue Access Points.		
5	The AP should be able to scan for rogue access points and the controller should be able to locate them on a floor map. The controller should be able to send a notification to the administrator when a rogue AP has been detected.		
6	Controller should support CAPWAP/LWAPP/Equivalent protocol.		
7	System must be able to provide L2/L3/L4 Access Control.		
8	Controller Should support L2 Client Isolation so User cannot access each other's devices. Isolation should have option to apply on AP or SSID's.		
9	Controller should be able to create local database of up to 2000 users.		
10	Controller should support Access Control based on Identity/Role/ Device/time or Application.		
11	Support for Walled garden "Walled Garden" functionality to allow restricted access to select destinations by unauthorized wireless users.		
12	IPv4 & IPv6 support from Day 1		
13	Should support on board and external DHCP server		
14	Controller should support integrated or External AAA server including Microsoft AD and Linux based open source AAA servers.		
15	The proposed architecture should be based on controller based Architecture with thick AP deployment. While Encryption / decryption of 802.11 packets should be able to perform at the AP.		
16	The Controller should support OS/Device finger printing and device type based policies i.e allow or deny, Bandwidth rate limit, VLAN mapping.		
17	The controller shall be manageable using CLI, Telnet/SSH, HTTP based GUI and SNMPv2/v3.		
18	The controller should be able to present a customizable dashboard with information on the status of the WLAN network.		
19	The controller should be able to raise critical alarms by sending an email. The email client on the controller should support SMTP outbound authentication and TLS encryption.		
20	The vendor should include the required hardware, Software and License for all the required features from day 1.		
21	Controller should have inbuilt BYOD features and Guest Access management procedure where user may use internet without entering to Enterprise SSID and should be time restricted. The Guest management should be a self-service one from end user perspective without the use of any additional software.		
E	QoS features		
1	per SSID or dynamic Per user bandwidth Rate Limiting		

2	Self-healing (on detection of RF interference or loss of RF coverage) and vendor should provide their Interference mitigation techniques for same Domain interference (interference from AP's connected to same Controller) and from other AP's and 2.4Ghz devices (Microwave's, Radio's etc.)		
3	Dynamic RF management that provides the capability to pause channel scanning / adjust RF scanning intervals based on application and load presence.		
4	Capability to provide preferred access for "fast" clients over "slow" clients (11n vs. 11g) in order to improve overall network performance.		
5	System must support Band Steering where 5 Ghz clients are forced to connect over 5Ghz Radio to provide better load balancing among 2.4Ghz and 5Ghz Radios.		
6	Support advanced multicast features and WMM support to provide best performance on Video applications.		
7	Should have Voice Call Admission control		
F	Client Management		
1	The controller should provide a Guest Login portal in order to authenticate users that are not part of the organization.		
2	The solution should be able to provide a web-based application that allows non-technical staff to create Guest accounts with validity for fixed duration like hours or days.		
3	System should be able to send password direct through Email and SMS to the user.		
4	System should be able to generate one click password for single user, multiple users or single user multiple devices.		
5	System should support internal and External Database for user authentication.		
6	System should support user management features like Rate limiting based on time based WLAN Access & User profile per WLAN etc.		
G	Regulatory		
1	Wi-Fi Alliance certified		
H	Warranty		
1	Should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		

Item No- 6	Wireless LAN (Access Points - Indoor)	Quantity- 14	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Specifications		
1	The APs should support the 802.11a, 802.11b, 802.11g and 11n and ac standards. It should also support 802.11ac Wave 2 standard in the 5 GHz band.		
2	Simultaneous client support on dual band radio is essential.		
3	Shall provide Min 21 dBm Radio output power for both Radios'.		
4	Should support minimum 2x2 or higher MIMO on both radio bands for an aggregate capacity of 1.15Gbps		
5	The access points should be centrally managed.		
6	In some small isolated environments, the AP should be able to function as a full-fledged stand-alone access point without the requirement of a controller.		
7	Security mechanisms should be in place to protect the communication between the Access Point controller and the Access Points.		

8	Since most radio interference come from the WLAN network itself the vendor should specify what mechanisms such as beam steering/ adaptive antenna technology/ beam forming are available in combination to focus the energy on the destination STA and minimize radio interference with the surrounding of the AP. The vendor should specify if the activation of such feature is still compatible with 802.11n spatial multiplexing.		
9	Since the WLAN network will be using an unlicensed band the solution should have mechanisms that reduce the impact of interference generated by other radio equipment operating in the same band. Describe techniques supported.		
10	The access point should be able to detect clients that have dual band capability and automatically steer those client to use the 5GHz band instead of the 2.4GHz band.		
11	The antennas to be dual polarized and should be integrated inside the access point enclosure to minimize damage and create a low profile unit that does not stand out visually.		
12	The access point should have minimum 1 Gigabit Ethernet port. The AP should get powered on with 802.3 af POE and still function to its full capabilities. The AP should also support an USB port for IoT technologies.		
13	The access point should support 802.1q VLAN tagging		
14	The access point should support WPA2 enterprise authentication and AES/CCMP encryption. AP should support Authentication via 802.1X and Active Directory.		
15	Implement Wi-Fi alliance standards WMM, 802.11d, 802.11h and 802.11e		
16	The Access Point should provide for concurrent support for high definition IP Video, Voice and Data application without needing any configuration. This feature should be demonstrable.		
17	Support RF auto-channel selection by the following three methods: a) measuring energy levels on the channel; b) monitoring for 802.11 signal structures and; (c) detecting radar pulses. Other similar forms of smart selection shall also be accepted.		
18	Channel selection based on measuring throughput capacity in real time and switching to another channel should the capacity fall below the statistical average of all channels without using background scanning as a method.		
19	Should support Transmit power tuning in 1dB increments in order to reduce interference and RF hazards		
20	Device antenna gain (integrated) must be at least 3dBi and should provide automatic interference rejection of about 10dB.		
21	Should support up to 200 clients per AP		
22	Should support DHCP Option 82 in standalone mode (without Controller) as well as in Managed mode (with Controller)		
23	For troubleshooting purposes, the administrator should have the ability to remotely capture 802.11 and / or 802.3 frames from an access point without disrupting client access.		
24	Operating Temperature: 0°C - 45°C		
25	Operating Humidity: 10 % - 95% non-condensing.		
26	Should be plenum rated and comply to RoHS		
27	Should be WiFi certified; WiFi certificate to be enclosed		
28	Should be WPC approved; ETA certificate to be enclosed		
29	Device should be UL 2043 Plenum Rated.		
30	Mechanism for physical device locking using padlock /Kensington lock / equivalent. Mounting Kit should be from the same OEM.		
B	Warranty		
1	Should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		

Item No-7	Wireless LAN (Access Points - Outdoor)	Quantity- 1	
	SPECIFICATION	Compliance Yes/No	Remarks
A	Specifications		
	The APs should support the 802.11a, 802.11b, 802.11g and 11n and ac standards. It should also support 802.11ac standard in the 5 GHz band.		
	The proposed access point should be 802.11ac WAVE2 and Operate in dual band radio.		
	Should support 4 spatial streams on both radio bands for a capacity of 1700 Mbps on 5Ghz and 300 Mbps on 2.4 GHz . AP should be 4x4 MIMO with 4 streams. Should support minimum 3 MU-MIMO concurrent devices.		
	The access points should be centrally managed as well capacity to work as standalone		
	It should have USB interface for IOT compatibility in future.		
	The Outdoor AP should support 40 and 80 MHz channelization and 256-QAM modulation support;		
	The access point should be able to operate in full MIMO mode with 802.3af/at POE. Alternatively the AP should also support AC/POE Injector.		
	Security mechanisms should be in place to protect the communication between the Access Point controller and the Access Points.		
	AP should have options of dual polarised integrated or external antenna for omni directional or directional coverage through pole/wall mount as per the requirement or site survey.		
	The access point should support 802.1q VLAN tagging		
	The access point should support WPA2 enterprise authentication and AES/CCMP encryption. AP should support Authentication via 802.1X and Active Directory.		
	Implement Wi-Fi alliance standards WMM, 802.11d, 802.11h and 802.11e		
	The Access Point should provide for concurrent support for high definition IP Video, Voice and Data application without needing any configuration change. This feature should be demonstrable.		
	Channel selection based on measuring throughput capacity in real time and switching to another channel should the capacity fall below the statistical average of all channels without using background scanning as a method.		
	Upto 16 BSSIDs on 2.4G radio and 5G radio for multiple differentiated user services (e.g. voice).		
	AP should have options of integrated or external antenna for 360 degree omni coverage as well directional antenna to focus on one area through pole/wall mount.		
	Should support minimum 250 or more clients per AP.		
	Should support IPv6 from day one		
	For troubleshooting purposes, the administrator should have the ability to remotely capture 802.11 and / or 802.3 frames from an access point without disrupting client access.		
	Operating Temperature- -40°C to 65°C. Operating Humidity: up to 95% non-condensing.		
	AP should be IP67 rated. An indoor AP with third party IP67 enclosure would not be accepted.		
	Should be WiFi certified and WPC approved; ETA certificate to be enclosed		
	Mounting Kit should be from the same OEM.		
	OEM should be mentioned in Gartner/IDC Leader's Quadrant.		
	OEM should have presence in India for minimum 8 years		

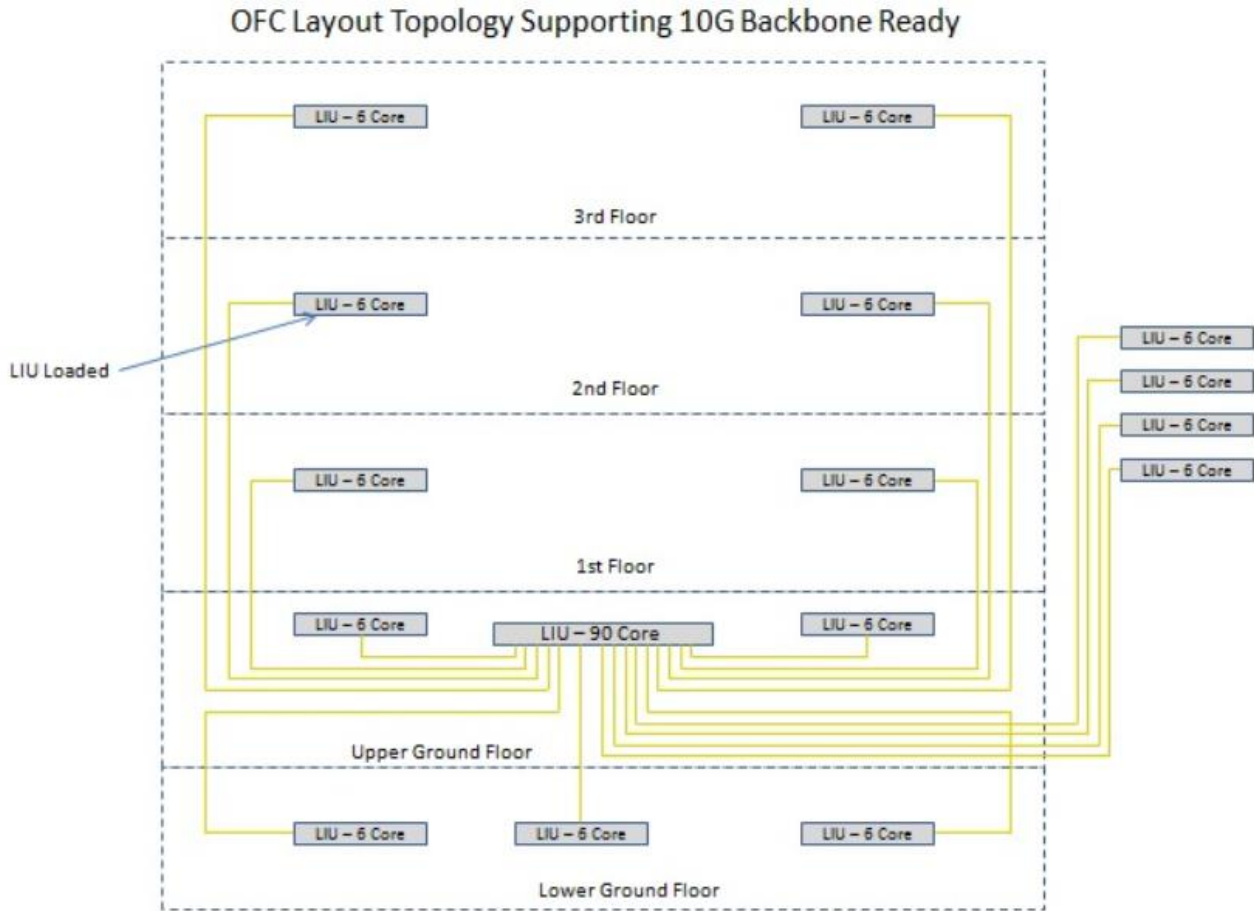
	OEM should have a support Center in India.		
B	Warranty		
	Should be quoted with TAC Support and Warranty for 5 years with NBD Hardware Replacement.		

		Compliance Yes/No	Remarks
Item No- 8	1G SFP Single Mode fiber transceivers		
Item No- 9	10G SFP+ Multi Mode fiber transceivers		

Passive			
	SPECIFICATION	Compliance Yes/No	Remarks
Preferred brands for UTP Cables, LIU, Patch Panel, Patch Card, OFC Patch Card : Panduit/AMP/Molex/Comscope			
Item No- 10	DAC Cable (Qty - 24nos) Should support 1G &10G, Length - 1Meter Should be from the Same Switching OEM as quoted		
Item No- 11	LIU Loaded for 90 Cores Termination (Qty - 1 lot for 90 Cores) Fiber Optic Termination Box or Splice Panel for (90 Cores), Size - 1U, 19 inch Rack Mountable with Splice Organizer Tray Pigtails - LC, Single Mode, Should Support 1G & 10G. Documentary proof to be submitted for the item.		
Item No- 12	LIU Loaded for 6 Cores Termination (Qty - 15nos for 6 cores each) Fiber Optic Termination Box or Splice Panel for (90 Cores), Size - 1U, 19 inch Rack Mountable with Splice Organizer Tray Pigtails - LC, Single Mode Should Support 1G & 10G. Documentary proof to be submitted for the item.		
Item No- 13	LC-LC SM OFC Patch Cords (Qty - 35nos) OFC Patch Cord Single Mode, Length - 3 Mtrs, Should Support 1G & 10G. Documentary proof to be submitted for the item.		
Item No- 14	LC-LC MM OFC Patch Cords (Qty - 05nos) OFC Patch Cord Multi Mode, Length - 15 Mtrs, Should Support 1G & 10G. Documentary proof to be submitted for the item.		
Item No- 15	CAT6 UTP Patch Cords (Qty - 500nos) Factory Crimped, Length - 7 Fts / 1.5 Mtrs		
Item No- 16	CAT6 UTP Patch Cords (Qty - 400nos) Factory Crimped, Length - 10 Fts / 3 Mtrs		
Item No- 17	12 U Network Rack (Qty - 5no) Wall mountable network rack, 12U / 19 inch with glass door, Lock & Key, PDU 5/16A x 5 port, Cable Manager & Accessories, 800mm depth		
Item No- 18	6 U Network Rack (Qty - 10no) Wall mountable network rack, 6U / 19 inch with glass door, Lock & Key, PDU 5/16A x 5 port, Cable Manager & Accessories, 800mm depth		
Item No- 19	42U Network Rack (Qty - 1no) Floor mountable network rack, 42U / 19 inch with Front & Rear door, Lock & Key, PDU 5/16A x 12 port, Cable Manager & Accessories, 1200mm depth, 800mm width		

Item No- 20	Jack Panel Fully Loaded (Qty – 25 Nos) 24 Port ; 1U/19” Rack Mountable IO’s – CAT6 Type		
Item No- 21	Installation & commissioning (OFC Termination, Field Cat6 cable termination in Jack panel, Rack Mounting etc and all other aspect of Network Deployment)		

A.1. Topology Diagrams for reference:



Switch Layout Topology with 10G OFC Backbone

