"Technical Compliance   Annexure I"

Technical Compliance of Switches (Active)

Line Number	Item Name	Description	Quantity
1.0	**WS-C2960X-24PS-L**	Catalyst 2960-X 24 GigE PoE 370W 4 x 1G SFP LAN Base	17
1.1	CAB-IND-10A	10A Power cable for India	17
2.0	WS-C2960X-24TS-L	Catalyst 2960-X 24 4 x 1G SFP LAN Base	10
2.1	CAB-IND-10A	10A Power cable for India	10
3.0	**WS-C3850-24T-S**	Cisco Catalyst 3850 24 Port Data IP Base with 2 no's of 1 G port with module ready to connect a 1 G Fiber.	2
3.0.1	CON-SNTP-WSC384TS	SMARTNET 24X7X4 Cisco Catalyst 3850 24 Port Data IP Base	2
3.1	CAB-TA-IN	India AC Type A Power Cable	2
3.2	S3850UK9-33SE	CAT3850 Universal k9 image	2
3.3	STACK-T1-50CM	50CM Type 1 Stacking Cable	2
3.4	CAB-SPWR-30CM	Catalyst 3750X Stack Power Cable 30 CM	2
3.5	PWR-C1-350WAC	350W AC Config 1 Power Supply	2

For Cisco Catalyst WS-C2960X-24PD-L	
General Features	The switch should have a minimum of 24 nos. 10/100/1000 Ethernet Ports
	The switch should have a minimum of 2 SFP+ Uplinks
	The switch should support 2x10G SFP+ modules
	The switch have support 2x1G SFP modules
	The switch have support a total of 26 Ports
	The switch should support MTBF of 325780 hours
Performance and Scalability	The switch should have Forwarding bandwidth of 108 Gbps
	The switch should support Full-duplex Switching bandwidth of 216 Gbps
	The switch should support 64-Byte Packet Forwarding Rate of 95.2 Mpps
	The switch should support a Dual Core CPU
	The switch should support 128 MB of Flash memory

	The switch should support 512 MB of DRAM
	The switch should support 1023 VLANs
	The switch should support 4096 VLAN IDs
	The switch should support Jumbo frames of 9216 bytes
	The switch should support Maximum transmission unit (MTU) of 9198 bytes
	The switch should support 16000 Unicast MAC addresses
Dimension	The Switch should be 1RU
	The switch should support Operating temperature up to 5000 ft (1500 m) -5º to 45ºC
	The switch should support Operating relative humidity 10% to 95% noncondensing
Stacking	The switch should support Stacking
	Stacking should enable all switches to function as a single unit
	The switch should support an optional Stacking Port
	Stacking module should be Hot-swappable
	Stacking should support a minimum of 2 or more Switches
	Stacking should support a maximum of 8 Switches
	Stacking should support 80 Gbps of throughput
	Stacking should support single IP address management for the group of switches
	Stacking should support single configuration
	Stacking should support simplified switch upgrade
	Stacking should support automatic upgrade when the master switch receives a new software version
	Stacking should support stacking cable length of 3m
	Stacking should support QoS to be configured across the entire stack
Power Supply	The switch should support an auto-ranging power supply with input voltages between 100 and 240V AC
	The switch should support an External Redundant Power Supply
Standards	The switch should support IEEE 802.1D Spanning Tree Protocol
	The switch should support IEEE 802.1p
	The switch should support IEEE 802.1Q Trunking
	The switch should support IEEE 802.1s Multiple Spanning Tree (MSTP)
	The switch should support IEEE 802.1w Rapid Spanning Tree (RSTP)
	The switch should support IEEE 802.1x

	The switch should support IEEE 802.1ab (LLDP)
	The switch should support IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	The switch should support IEEE 802.3af Power over Ethernet
	The switch should support IEEE 802.3af Power Classification
	The switch should support IEEE 802.3at Power over Ethernet +
	The switch should support IEEE 802.3ah (100BASE-X single/multimode fiber only)
	The switch should support IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports
	The switch should support IEEE 802.3 10BASE-T specification
	The switch should support IEEE 802.3u 100BASE-TX specification
	The switch should support IEEE 802.3ab 1000BASE-T specification
	The switch should support IEEE 802.3z 1000BASE-X specification
	The switch should support RMON I and II standards
	The switch should support SNMP v1, v2c, and v3
RFC compliance	The switch should support RFC 768 - UDP
	The switch should support RFC 783 - TFTP
	The switch should support RFC 791 - IP
	The switch should support RFC 792 - ICMP
	The switch should support RFC 793 - TCP
	The switch should support RFC 826 - ARP
	The switch should support RFC 854 - Telnet
	The switch should support RFC 951 - Bootstrap Protocol (BOOTP)
	The switch should support RFC 959 - FTP
	The switch should support RFC 1112 - IP Multicast and IGMP
	The switch should support RFC 1157 - SNMP v1
	The switch should support RFC 1166 - IP Addresses
	The switch should support RFC 1256 - Internet Control Message Protocol (ICMP) Router Discovery
	The switch should support RFC 1305 - NTP for accurate and consistent timestamp
	The switch should support RFC 1492 - TACACS+
	The switch should support RFC 1493 - Bridge MIB
	The switch should support RFC 1542 - BOOTP extensions
	The switch should support RFC 1643 - Ethernet Interface MIB
	The switch should support RFC 1757 - RMON (history, statistics, alarms, and events)
	The switch should support RFC 1901 - SNMP v2C
	The switch should support RFC 1902-1907 - SNMP v2

	The switch should support RFC 1981 - Maximum Transmission Unit (MTU) Path Discovery IPv6
	The switch should support FRC 2068 - HTTP
	The switch should support RFC 2131 - DHCP
	The switch should support RFC 2138 - RADIUS
	The switch should support RFC 2233 - IF MIB v3
	The switch should support RFC 2373 - IPv6 Aggregatable Addrs
	The switch should support RFC 2460 - IPv6
	The switch should support RFC 2461 - IPv6 Neighbor Discovery
	The switch should support RFC 2462 - IPv6 Autoconfiguration
	The switch should support RFC 2463 - ICMP IPv6
	The switch should support RFC 2474 - Differentiated Services (DiffServ) Precedence
	The switch should support RFC 2597 - Assured Forwarding
	The switch should support RFC 2598 - Expedited Forwarding
	The switch should support RFC 2571 - SNMP Management
	The switch should support RFC 3046 - DHCP Relay Agent Information Option
	The switch should support RFC 3376 - IGMP v3
	The switch should support RFC 3580 - 802.1X RADIUS
Layer-2 Features	The switch should support Automatic Negotiation of Trunking Protocol, to help minimize the configuration & errors
	The switch should support IEEE 802.1Q VLAN encapsulation
	The switch should support Centralized VLAN Management. VLANs created on the Core Switches should be propagated automatically
	The switch should support Spanning-tree PortFast and PortFast guard for fast convergence
	The switch should support UplinkFast & BackboneFast technologies to help ensure quick failover recovery, enhancing overall network stability and reliability
	The switch should support Spanning-tree root guard to prevent other edge swicthes becoming the root bridge.
	The switch should support IGMP filtering
	The switch should support discovery of the neighboring device of the same vendor giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.
	The switch should support Per-port broadcaststorm control to prevent faulty end stations from degrading overall systems performance
	The switch should support Per-port multicast storm control to prevent faulty end stations from degrading overall systems performance

	The switch should support Per-port unicast storm control to prevent faulty end stations from degrading overall systems performance
	The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN
	The switch should support Auto-negotiation on all ports to automatically selects half- or full-duplex transmission mode to optimize bandwidth
	The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.
	The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.
	The switch should support Local Proxy Address Resolution Protocol (ARP) working in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth.
	The switch should support IGMP v1, v2 Snooping
	The switch should support IGMP v3 Snooping
	The switch should support IGMP v1, v2 Filtering
	The switch should support IGMP Snooping Timer
	The switch should support IGMP Throttling
	The switch should support IGMP Querier
	The switch should support Configurable IGMP Leave Timer
	The switch should support MVR (Multicast VLAN Registration)
L3 Features	The switch should support Inter-VLAN routing
	The switch should support IPv4 unicast Static Routing
	The switch should support 16 IPv4 Static routes
Cisco Catalyst Smart Operations	The switch should support configuration of the Software image and switch configuration without user intervention
	The switch should support automatic configuration as devices connect to the switch port
	The switch should support diagnostic commands to debug issues
	The switch should support system health checks within the switch
	The switch should support Online Diagnostics
Quality of Service (QoS) & Control	The switch should support 4 egress queues per port to enable differentiated management
	The switch should support scheduling techniques for Qos

	The switch should support Weighted tail drop (WTD) to provide congestion avoidance
	The switch should support Standard 802.1p CoS field classification
	The switch should support Differentiated services code point (DSCP) field classification
	The switch should support Control- and Data-plane QoS ACLs
	The switch should support Strict priority queuing mechanisms
	The switch should support Rate Limitting function to guarantee bandwidth
	The switch should support rate limiting based on source and destination IP address
	The switch should support rate limiting based on source and destination MAC address
	The switch should support rate limiting based on Layer 4 TCP and UDP information
	The switch should support availability of up to 256 aggregate or individual polices per port.
Management	The switch should support Command Line Interface (CLI) support for configuration & troubleshooting purposes.
	The switch should support four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis
	The switch should support Layer 2 trace route to ease troubleshooting by identifying the physical path that a packet takes from source to destination.
	The switch should support Trivial File Transfer Protocol (TFTP) to reduce the cost of administering software upgrades by downloading from a centralized location.
	The switch should support SNMP v1, v2c, and v3 of-band management.
	The switch should support Telnet interface support for comprehensive in-band managementof-band management.
	The switch should support CLI-based management console to provide detailed out-of-band management.
	The switch should support Serial Console Port
	The switch should support USB Console Port
	The switch should support SNMPv1, SNMPv2c, and SNMPv3
Miscellaneous	The switch should support greener practices
	The switch should support solutions that monitors and conserves energy with customized policies
	The switch should support reduction of greenhouse gas (GhG) emissions
	The switch should support an increase in energy cost savings
	The switch should support sustainable business behavior

	The switch should support Efficient switch operation
	The switch should support Intelligent power management
	The switch should support measuring of energy between itself and endpoints
	The switch should support control of energy between itself and endpoints
	The switch should support discovery of manageable devices for Energy measurement
	The switch should support support monitoring of power consumption of endpoints
	The switch should support taking of action based on business rules to reduce power consumption
Network security features	The switch should support IEEE 802.1x to allow dynamic, port-based security, providing user authentication.
	The switch should support Port-based ACLs for Layer 2 interfaces to allow application of security policies on individual switch ports.
	The switch should support SSHv2 and SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
	The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration.
	The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.
	The switch should support Port security to secure the access to an access or trunk port based on MAC address.
	The switch should support Multilevel security on console access to prevent unauthorized users from altering the switch configuration.
	The switch should support Private VLAN
DHCP Features	The switch should support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addressesDHCP binding database, and to rate-limit the amount of DHCP traffic that enters a switch port.
	The switch should support DHCP Interface Tracker (Option 82) feature to augment a host IP address request with the switch port ID.
	The switch should support DHCP Option 82 data Insertion
	The switch should support DHCP Option 82 Pass Through
	The switch should support DHCP Option 82 - Configurable Remote ID and Circuit ID
	The switch should support DHCP Snooping Statistics and SYSLOG

IPv6 Features	The switch should be on the approved list of IPv6 Ready Logo phase II - Host
	The switch should support IPv6 unicast Static Routing
	The switch should support 16 IPv6 Static routes
	The switch should support IPv6 MLDv1 & v2 Snooping
	The switch should support IPv6 Host support for IPv6 Addressing
	The switch should support IPv6 Host support for IPv6 Option processing
	The switch should support IPv6 Host support for IPv6 Fragmentation
	The switch should support IPv6 Host support for IPv6 ICMPv6
	The switch should support IPv6 Host support for IPv6 TCP/UDP over IPv6
	The switch should support IPv6 Host support for IPv6 Ping
	The switch should support IPv6 Host support for IPv6 Traceroute
	The switch should support IPv6 Host support for IPv6 VTY
	The switch should support IPv6 Host support for IPv6 SSH
	The switch should support IPv6 Host support for IPv6 TFTP,
	The switch should support IPv6 Host support for IPv6 SNMP for IPv6 objects
	The switch should support IPv6 Port Access Control Lists
	The switch should support IPv6 Router Access Control Lists
	The switch should support HTTP, HTTP(s) over IPv6
	The switch should support SNMP over IPv6
	The switch should support SysLog over IPv6
	The switch should support IPv6 Stateless Auto Config
	The switch should support DHCP based Auto Config (Auto Install) and Image download
	The switch should support IPv6 QoS
	The switch should support RFC4292/RFC4293 MIBs for IPv6 traffic
	The switch should support SCP/SSH over IPv6
	The switch should support Radius over IPv6
	The switch should support TACACS+ over IPv6
	The switch should support NTPv4 over IPv6
	The switch should support IPv6 First-Hop Security
	The switch should support IPv6 First Hop Security: RA Guard
	The switch should support IPv6 First Hop Security: DHCPv6 Guard
	The switch should support IPv6 First Hop Security: IPv6 Binding Integrity Guard

	For Cisco Catalyst Catalyst 2960-X 24 GigE PoE 370W 4 x 1G SFP LAN Base
General Features	The switch should have a minimum of 24 nos. 10/100/1000 Ethernet Ports
	The switch should have a minimum of 2 SFP+ Uplinks
	The switch should support 2x10G SFP+ modules
	The switch have 2x1G SFP modules
	The switch have support a total of 26 Ports
	The switch should support MTBF of 325780 hours
Performance and Scalability	The switch should have Forwarding bandwidth of 108 Gbps
	The switch should support Full-duplex Switching bandwidth of 216 Gbps
	The switch should support 64-Byte Packet Forwarding Rate of 95.2 Mpps
	The switch should support a Dual Core CPU
	The switch should support 128 MB of Flash memory
	The switch should support 512 MB of DRAM
	The switch should support 1023 VLANs
	The switch should support 4096 VLAN IDs
	The switch should support Jumbo frames of 9216 bytes
	The switch should support Maximum transmission unit (MTU) of 9198 bytes
	The switch should support 16000 Unicast MAC addresses
Dimension	The Switch should be 1RU
	The switch should support Operating temperature up to 5000 ft (1500 m) - 5º to 45ºC
	The switch should support Operating relative humidity 10% to 95% noncondensing
Stacking	The switch should support Stacking
	Stacking should enable all switches to function as a single unit
	The switch should support an optional Stacking Port
	Stacking module should be Hot-swappable
	Stacking should support a minimum of 2 or more Switches
	Stacking should support a maximum of 8 Switches
	Stacking should support 80 Gbps of throughput
	Stacking should support single IP address management for the group of switches
	Stacking should support single configuration
	Stacking should support simplified switch upgrade

	Stacking should support automatic upgrade when the master switch receives a new software version
	Stacking should support stacking cable length of 3m
	Stacking should support QoS to be configured across the entire stack
PoE & PoE+	The switch should have PoE (IEEE 802.3af)
	The switch should have PoE+ (IEEE 802.3at)
	The switch should have flexible power allocation across all ports
	The switch should have 370W of Available PoE Power
	The switch should have 24 ports up to 15.4W
	The switch should have 12 ports up to 30W
	The switch should support Per port power consumption to specify maximum power setting on an individual port
	The switch should have Per port PoE power sensing to measure actual power being drawn
	The switch should support protocol to allow switch to negotiate a more granular power setting of IEEE classiffied devices
	The switch should support a PoE MIB to get visibility into power usage
	The switch should support a PoE MIB to set different power-level thresholds
Power Supply	The switch should support an auto-ranging power supply with input voltages between 100 and 240V AC
	The switch should support an External Redundant Power Supply
Standards	The switch should support IEEE 802.1D Spanning Tree Protocol
	The switch should support IEEE 802.1p
	The switch should support IEEE 802.1Q Trunking
	The switch should support IEEE 802.1s Multiple Spanning Tree (MSTP)
	The switch should support IEEE 802.1w Rapid Spanning Tree (RSTP)
	The switch should support IEEE 802.1x
	The switch should support IEEE 802.1ab (LLDP)
	The switch should support IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	The switch should support IEEE 802.3af Power over Ethernet
	The switch should support IEEE 802.3af Power Classification
	The switch should support IEEE 802.3at Power over Ethernet +
	The switch should support IEEE 802.3ah (100BASE-X single/multimode fiber only)
	The switch should support IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports
	The switch should support IEEE 802.3 10BASE-T specification
	The switch should support IEEE 802.3u 100BASE-TX specification
	The switch should support IEEE 802.3ab 1000BASE-T specification
	The switch should support IEEE 802.3z 1000BASE-X specification
	The switch should support RMON I and II standards

	The switch should support SNMP v1, v2c, and v3
RFC compliance	The switch should support RFC 768 - UDP
	The switch should support RFC 783 - TFTP
	The switch should support RFC 791 - IP
	The switch should support RFC 792 - ICMP
	The switch should support RFC 793 - TCP
	The switch should support RFC 826 - ARP
	The switch should support RFC 854 - Telnet
	The switch should support RFC 951 - Bootstrap Protocol (BOOTP)
	The switch should support RFC 959 - FTP
	The switch should support RFC 1112 - IP Multicast and IGMP
	The switch should support RFC 1157 - SNMP v1
	The switch should support RFC 1166 - IP Addresses
	The switch should support RFC 1256 - Internet Control Message Protocol (ICMP) Router Discovery
	The switch should support RFC 1305 - NTP for accurate and consistent timestamp
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	The switch should support RFC 1493 - Bridge MIB
	The switch should support RFC 1542 - BOOTP extensions
	The switch should support RFC 1643 - Ethernet Interface MIB
	The switch should support RFC 1757 - RMON (history, statistics, alarms, and events)
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	The switch should support RFC 1981 - Maximum Transmission Unit (MTU) Path Discovery IPv6
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	The switch should support RFC 2597 - Assured Forwarding
	The switch should support RFC 2598 - Expedited Forwarding
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	The switch should support RFC 3046 - DHCP Relay Agent Information Option

	The switch should support RFC 3376 - IGMP v3
	The switch should support RFC 3580 - 802.1X RADIUS
Layer-2 Features	The switch should support Automatic Negotiation of Trunking Protocol, to help minimize the configuration & errors
	The switch should support IEEE 802.1Q VLAN encapsulation
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	The switch should support discovery of the neighboring device of the same vendor giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.
	The switch should support Per-port broadcaststorm control to prevent faulty end stations from degrading overall systems performance
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	The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN
	The switch should support Auto-negotiation on all ports to automatically selects half- or full-duplex transmission mode to optimize bandwidth
	The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.
	The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.
	The switch should support Local Proxy Address Resolution Protocol (ARP) working in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth.
	The switch should support IGMP v1, v2 Snooping
	The switch should support IGMP v3 Snooping
	The switch should support IGMP v1, v2 Filtering
	The switch should support IGMP Snooping Timer
	The switch should support IGMP Throttling

	The switch should support IGMP Querier
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L3 Features	The switch should support Inter-VLAN routing
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Cisco Catalyst Smart Operations	The switch should support configuration of the Software image and switch configuration without user intervention
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	The switch should support rate limiting based on source and destination IP address
	The switch should support rate limiting based on source and destination MAC address
	The switch should support rate limiting based on Layer 4 TCP and UDP information
	The switch should support availability of up to 256 aggregate or individual polices per port.
Management	The switch should support Command Line Interface (CLI) support for configuration & troubleshooting purposes.
	The switch should support four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis

	The switch should support Layer 2 trace route to ease troubleshooting by identifying the physical path that a packet takes from source to destination.
	The switch should support Trivial File Transfer Protocol (TFTP) to reduce the cost of administering software upgrades by downloading from a centralized location.
	The switch should support SNMP v1, v2c, and v3 of-band management.
	The switch should support Telnet interface support for comprehensive in-band managementof-band management.
	The switch should support CLI-based management console to provide detailed out-of-band management.
	The switch should support Serial Console Port
	The switch should support USB Console Port
	The switch should support SNMPv1, SNMPv2c, and SNMPv3
Miscellaneous	The switch should support greener practices
	The switch should support solutions that monitors and conserves energy with customized policies
	The switch should support reduction of greenhouse gas (GhG) emissions
	The switch should support an increase in energy cost savings
	The switch should support sustainable business behavior
	The switch should support Efficient switch operation
	The switch should support Intelligent power management
	The switch should support measuring of energy between itself and endpoints
	The switch should support control of energy between itself and endpoints
	The switch should support discovery of manageable devices for Energy measurement
	The switch should support support monitoring of power consumption of endpoints
	The switch should support taking of action based on business rules to reduce power consumption
Network security features	The switch should support IEEE 802.1x to allow dynamic, port-based security, providing user authentication.
	The switch should support Port-based ACLs for Layer 2 interfaces to allow application of security policies on individual switch ports.
	The switch should support SSHv2 and SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
	The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration.
	The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.

	The switch should support Port security to secure the access to an access or trunk port based on MAC address.
	The switch should support Multilevel security on console access to prevent unauthorized users from altering the switch configuration.
	The switch should support Private VLAN
DHCP Features	The switch should support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addressesDHCP binding database, and to rate-limit the amount of DHCP traffic that enters a switch port.
	The switch should support DHCP Interface Tracker (Option 82) feature to augment a host IP address request with the switch port ID.
	The switch should support DHCP Option 82 data Insertion
	The switch should support DHCP Option 82 Pass Through
	The switch should support DHCP Option 82 - Configurable Remote ID and Circuit ID
	The switch should support DHCP Snooping Statistics and SYSLOG
IPv6 Features	The switch should be on the approved list of IPv6 Ready Logo phase II - Host
	The switch should support IPv6 unicast Static Routing
	The switch should support 16 IPv6 Static routes
	The switch should support IPv6 MLDv1 & v2 Snooping
	The switch should support IPv6 Host support for IPv6 Addressing
	The switch should support IPv6 Host support for IPv6 Option processing
	The switch should support IPv6 Host support for IPv6 Fragmentation
	The switch should support IPv6 Host support for IPv6 ICMPv6
	The switch should support IPv6 Host support for IPv6 TCP/UDP over IPv6
	The switch should support IPv6 Host support for IPv6 Ping
	The switch should support IPv6 Host support for IPv6 Traceroute
	The switch should support IPv6 Host support for IPv6 VTY
	The switch should support IPv6 Host support for IPv6 SSH
	The switch should support IPv6 Host support for IPv6 TFTP,
	The switch should support IPv6 Host support for IPv6 SNMP for IPv6 objects
	The switch should support IPv6 Port Access Control Lists
	The switch should support IPv6 Router Access Control Lists
	The switch should support HTTP, HTTP(s) over IPv6
	The switch should support SNMP over IPv6
	The switch should support SysLog over IPv6
	The switch should support IPv6 Stateless Auto Config
	The switch should support DHCP based Auto Config (Auto Install) and Image download
	The switch should support IPv6 QoS

	The switch should support RFC4292/RFC4293 MIBs for IPv6 traffic
	The switch should support SCP/SSH over IPv6
	The switch should support Radius over IPv6
	The switch should support TACACS+ over IPv6
	The switch should support NTPv4 over IPv6
	The switch should support IPv6 First-Hop Security
	The switch should support IPv6 First Hop Security: RA Guard
	The switch should support IPv6 First Hop Security: DHCPv6 Guard
	The switch should support IPv6 First Hop Security: IPv6 Binding Integrity Guard

	Cisco Catalyst 3850 24 Port Data IP Base with 2 no's of 1 G ports with module ready to connect 1 G Fiber.
1.1	The Switch should have atleast 24 10/100/1000 Line Rate for 64byte Packets with 2 x 1 G uplinks Ports.
1.2	The Switch should support 4 x 1G or 2 x 10G or 1 x 10G and 2 x 1G Uplink Modules.
1.3	The Switch should support Redundant Power Supplies
1.4	The Switch should also support 440W DC power supply.
1.5	The Switch should be capable of terminating wireless control plane from locally connected AP's.
1.6	The Switch should be Stackable from Day 1 with Stack Power capabilities.
1.7	The Switch Architecture should be able to Stack atleast 8 Switches together.
1.8	The Switch stack should be based on Distributed forwarding Architecture, where in each stack member forwards its own information on network.
1.9	The Switch Stack Architecture should have centralized control and Management plane with Active Switch and all the information should be Synchronized with Standby Switch.
1.10	The Switch should support Stateful Switchover (SSO) when switching over from Active to Standby switch in a Stack.
1.11	The Switch Stack Architecture should be Plug & Play for attaching or removing any switch from the stack without any downtime.
1.12	The Switch Stack Architecture should allow the end user to stack 24 Port Switch with 48 Port of the same model.
1.13	The Swich should be based on a Modular OS Architecture capable of hosting applications.
1.14	The Switch should have RJ45 & Mini USB Console Ports for Management
1.15	The Switch should have USB 2.0 for OS Management (uploading, downloading & booting of OS and Configuration)
1.16	The Switch should have Front to Back Airflow system.
1.17	The Switch should have Multicore CPU Architecture.
1.18	The Switch should have atleast 2GB of Flash for storing OS and other Logs.
1.19	The Switch should have atleast 4GB of DRAM.
1.20	The Switch should have atleast 1 10/100/1000 dedicated Ethernet Management

	Port
1.21	The Switch should have atleast 3 fans and incase of failure of any one of those the other fans should automatically speed up. Fans should be field replaceable.
1.22	The Switch should have power savings mechanism wherein it should reduce the power consumption on ports not being used.
1.23	The switch should be Rack Mountable and should not take space more than 1RU.
2	**Switch Performance**
2.1	The Switch should have atleast 88G nonblocking switching bandwidth.
2.2	The switch should have atleast 65.47Mpps of forwarding rate.
2.3	The Switch should have atleast 240Gbps Unidirectional or 480Gbps Spatial Reuse Stack Bandwidth.
2.4	The Switch should have upto 20Gbps throughput for Wireless Control Plane.
2.5	The Switch should support atleast 32000 MAC Addresses
2.6	The Switch should support atleast 24000 IPv4 routes
2.7	The Switch should support atleast 4000 VLAN ID's & 1000 SVI's.
2.8	The Switch should support atleast 64 WLAN's per switch
2.9	The Switch support support 9198 bytes of Jumbo Frames
3	**Layer 3 Features**
3.1	The switch should support routing protocols such OSPF, BGPv4, IS-ISv4.
3.2	The Switch should support IPv6 Routing capable protocols such as OSPFv3 in hardware.
3.3	The Switch should support Policy Based Routing (PBR)
3.4	The Switch should support IP Multicast and PIM, PIM Sparse Mode, PIM Dense Mode, PIM Sparse-dense Mode & Source-Specific Multicast for Wired and Wireless Clients.
3.5	The switch should support basic IP Unicast routing protocols (static, RIPv1 & RIPv2) should be supported.
3.6	The switch should support IPv6 & IPv4 Policy Based Routing (PBR)
4	**Layer 2 Features**
4.1	The Switch should be able to discover (on both IPv4 & IPv6 Network) the neighboring device giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems..
4.2	The switch should support Detection of Unidirectional Links (in case of fiber cut) and to disable them to avoid problems such as spanning-tree loops.
4.3	The switch should support centralized VLAN Management, VLANs created on the core switch should be propogated automatically.
4.4	The switch should support 802.1d, 802.1s, 802.1w Spanning-Tree & itsEnhancement for fast convergence.
4.5	The switch should support 802.1q VLAN encapsulation.
4.6	The switch should support 802.3ad (LACP) to combine multiple network links for increasing throughput and providing redundancy.
5	**Network Security Features**

5.1	The switch should have Port security to secure the access to an access or trunk port based on MAC address to limit the number of learned MAC addresses to deny MAC address flooding.
5.2	The switch should support DHCP snooping to prevent malicious users from spoofing a DHCP server and sending out roughe addresses.
5.3	The switch should support Dynamic ARP inspection (DAI) to ensure user integrity by preventing malicious users from exploiting the insecure nature of ARP.
5.4	The switch should support IP source guard to prevent a malicious user from spoofing or taking over another user's IP address by creating a binding table between the client's IP and MAC address, port, and VLAN.
5.5	The switch should support Unicast Reverse Path Forwarding (RPF) feature to mitigate problems caused by the introduction of malformed or forged (spoofed) IP source addresses into a network by discarding IP packets that lack a verifiable IP source address.
5.6	The switch should support Bidirectional data support on the SPAN port to allow the intrusion detection system (IDS) to take action when an intruder is detected.
5.7	The switch should support flexible & multiple authentication mechanism, including 802.1X, MAC authentication bypass, and web authentication using a single, consistent configuration.
5.8	The switch shoud support RADIUS change of authorization and downloadable Access List for comprehensive policy management capabilities.
5.9	The switch should support Private VLANs to restrict traffic between hosts in a common segment by segregating traffic at Layer 2, turning a broadcast segment into a nonbroadcast multiaccess like segment to provide security & isolation between switch ports, which helps ensure that users cannot snoop on other users' traffic.
5.10	The switch should support Multidomain authentication to allow an IP phone and a PC to authenticate on the same switch port while placing them on appropriate voice and data VLAN.
5.11	The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.
5.12	The switch should support IGMP filtering to provide multicast authentication by filtering out nonsubscribers and limits the number of concurrent multicast streams available per port.
5.13	The switch should support VLAN ACLs on all VLANs prevent unauthorized data flows from being bridged within VLANs.
5.14	The switch should support IPv6 ACLs that can be applied to filter IPv6 traffic.
5.15	The switch should support Port-based ACLs for Layer 2 interfaces to allow security policies to be applied on individual switch ports.
5.16	The switch should support Secure Shell (SSH) Protocol, Kerberos, and Simple Network Management Protocol Version 3 (SNMPv3) to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
5.17	The switch should support TACACS and RADIUS authentication to facilitate centralized control of the switch and restricts unauthorized users from altering

	the configuration.
5.18	The switch should support Multilevel security on console access to prevent unauthorized users from altering the switch configuration.
5.19	The switch should support Bridge protocol data unit (BPDU) Guard to shut down Spanning Tree PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops.
5.20	The switch should support Spanning Tree Root Guard (STRG) to prevent edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes.
5.21	The switch should support Wireless end-to-end CAPWAP-compliant DTLS encryption to make sure of encryption between access points and controllers across remote WAN/LAN links.
5.22	The Switch should support IPv6 RA Guard, DHCPv6 guard, IPv6 Snooping to prevent any Man-in-middle attack.
5.23	The Switch should support IPv6 RA Throttler for Wireless Implementation
5.24	The Switch should support Dynamic VLAN, Downloadable ACLs, Multi-Auth VLAN Assignment, MAC Based Filtering & Web Authentication security mechanism.
6	**Wireless Features**
6.1	The Switch should be capable of terminating atleast 50 AP locally per switch or in a Stack.
6.2	The Switch should be capable of handling atleast 2000 clients on Wireless control plane.
6.3	The Switch should be capable to run in either in Wireless Controller Mode or Wirless data plane terminating mode or both.
6.4	The Switch should be capable of configuring atleast 64 WLAN per switch.
6.5	The Switch should be compatible to run in Wireless data plan terminating mode with external wireless controller of the same OEM.
6.6	The Switch should have capability to maintain database of locally served clients which should be shared with other Wireless Appliances within a network for fast roaming.
6.7	The Multiple switch when running in Controller mode should be capable of creating a virtual Mobility groups to enabling fast roaming of clients across different controller with in a network
6.8	The Multiple Switch when running as Wireless data plan terminating points should be capable of creating logical fully mesh groups to enable fast roaming within or across the multiple groups.
6.9	The Switch should support both L3 & L2 roams with in a network.
6.10	The Switch should support all Wireless Authentication Mechanism, IEEE 802.11i - EAP-TLS, EAP-SIM, EAP-TTLS, WPA, WPA2, 802.1x, WEP, WPA2-Enterprise, etc and other standards.
6.11	The switch should support 2.4 GHz and 5GHz frequency APs
6.12	The Switch should be capable of supporting IEEE 802.11ac

6.13	The switch should be capable of terminating the wireless control plane of the 802.11 a/b/g/n AP
6.14	The Switch should provides visibility and comprehensive threat prevention for the mobility network through monitoring, alerts, classifying, and remediation of wireless and wired network vulnerabilities.
6.15	The switch should facilitate efficient Power and Channel Management to the respective regulatory domains.
6.16	The Switch should support Mitigation of non WiFi inteference's.
6.17	The Switch should support IEEE802.11r for Management Frame Protection
6.18	The Switch should support IEEE802.11v for Network Power Save Client
6.19	The switch should support Wireless multicast streaming clients
7	**Quality of Service (QoS) & Control**
7.1	The Switch should support Advanced Modular Wired and Wireless QoS Policies
7.2	The Switch should have a inbuilt mechanism to distribute bandwidth amongst wireless clients to ensure all users have a fair share on bandwidth.
7.3	The Switch should be capable of deploying QoS policies at multiple levels based on AP, Radio, SSID & clients who are directly connected to the switch.
7.4	The Switch should be capable of Downloading Downloadable Access List from network security engine based on user identity.
7.5	The Switch should be capable of Queuing, Policing, Shaping and marking Wired and Wireless Traffic based on Class of Service (CoS) or DSCP.
7.6	The switch should support IP SLA feature set to verify services guarantee based on business critical IP Applications
7.7	The switch should support Auto QoS for certain device types and enable egress queue configurations.
7.8	The switch should support 802.1p CoS and DSCP Field classification using marking and reclassification on a per-packet basis by source and destination IP address, MAC address, or Layer 4 Transmission Control Protocol/User Datagram Protocol (TCP/UDP) port number.
7.9	The switch should support Shaped round robin (SRR) scheduling to ensure differential prioritization of packet flows by intelligently servicing the ingress queues and egress queues. Weighted tail drop (WTD) to provide congestion avoidance at the ingress and egress queues before a disruption occurs. Strict priority queuing to ensure that the highest priority packets are serviced ahead of all other traffic.
7.10	The Switch should support Rate limiting based on source and destination IP address, source and destination MAC address, Layer 4 TCP/UDP information, or any combination of these fields, using QoS ACLs (IP ACLs or MAC ACLs), class maps, and policy maps.
7.11	The Switch should support Eight egress queues per port for wired traffic and four egress queues for wireless to enable differentiated management of different traffic types across the stack for wired traffic.
8	**Application Visibility**
8.1	The Switch should support Flexible Neflow v9 from day 1.

8.2	The Switch should be capable of enabling FnF on all ports of the switch for Ingress and Egress Traffic.
8.3	The Switch should support atleast 24000 Flows per switch
8.4	The Switches when stacked together should be capable to exporting the flow independently / directly to the FnF Collector.
8.5	The Switch should be capable of showing customized reports on OS CLI, based on Top Talkers, Top Destination, Top Protocols etc.
8.6	The Switch should be capable of monitoring Wireless Flows from directly connected AP's
8.7	The Switch should be capable of Microflow Policing for Wireless Clients.
8.8	The Switch should be capable of monitoring network traffic on Physical, VLAN & WLAN.
9	**Standards & Compliance (Switch Should support all the mentioned Standards)**
9.1	IEEE 802.1s
9.2	IEEE 802.1w
9.3	IEEE 802.1x
9.4	IEEE 802.11
9.5	IEEE 802.1x-Rev
9.6	IEEE 802.3ad
9.7	IEEE 802.3af
9.9	IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports
9.10	IEEE 802.1D Spanning Tree Protocol
9.11	IEEE 802.1p CoS Prioritization
9.12	IEEE 802.1Q VLAN
9.13	IEEE 802.3 10BASE-T specification
9.14	IEEE 802.3u 100BASE-TX specification
9.15	IEEE 802.3ab 1000BASE-T specification
9.16	IEEE 802.3z 1000BASE-X specification
9.17	RMON I and II standards
9.18	SNMPv1, SNMPv2c, and SNMPv3
10	**Safety & EMI & EMC Compliance & Certification (Switch should support all of the mentioned standards)**
10.1	FCC Part 15 (CFR 47) Class A
10.2	ICES-003 Class A
10.3	EN 55022 Class A
10.4	CISPR 22 Class A
10.5	AS/NZS 3548 Class A
10.6	BSMI Class A (AC input models only)
10.7	VCCI Class A
10.8	EN 55024, EN300386, EN 50082-1, EN 61000-3-2, EN 61000-3-3

Technical Compliance of Switches (Passive):

S.No.	Item	Quantity
1	6 Core Fiber OS2: OS 2, corrugated steel tape 6 core fibre cable 9/125 micron (AMP make)	800
2	Single mode Pigtail: SC single connector type pigtails, 1 meters, 9/125 micron (AMP make)	12
3	Fiber Patch Cord: SC - LC duplex Patch cords 2 mtrs, OS 2, 9/125 micron (AMP make)	2
4	12 Port LIU: 12 ports fibre optic drawer sliding type loaded with 12 SC adapters units for multi mode fibres, OS 2, 9/125 micron. (AMP make)	2
5	24 Port Jack Panel Loaded. (AMP make)	27
6	CAT 6 Patch Cord 1 Mtrs at Switch Side. (AMP make)	650
7	Cable Manager 1 U.	27
8	27 U Rack: 27 U Rack Floor mounted with all accessories,800x800. (Comrack, APW)	3
9	15 U Rack: 15 U Rack Wall Mounted with all accessories,600x600 (comrack, APW)	7
10	42 U Rack: 42 U Rack Floor mounted with all accessories,1000x800 (Comrack/APW)	1
11	Cat 6 UTP Cable Box (AMP make)	2
12	HDPE Pipe: Prelubricated HDPE Pipe 40/33 mm reputed ISI brand	650
13	Router Marker: Fibre Route Markers	10
14	1 inch PVC Flexi : 1-inch PVC Flexible pipe underground and on surface including all accessories (ISI approved brand)	100
15	PVC Channel: Industrial Perforated PVC Channel / Raceway of 3 x 3 / 4 x 3 inches. ISI Approved	200

BILL OF QUANTITY

Financial Bid Format					
Active Components					
S.No	**Item**	**Quantity**	**Unit Rate**	**Sales Tax/Service tax**	**Total Amount in Rs**
1	WS-C2960X-24TS_L	17			
2	WS-C-2960X-24PS-L	10			
3	WS-C3850-24T-S	2			
Total Active Cost - A					
Passive Components					
S.No.	**Item**	**Quantity**	**Unit Rate**	**Sales Tax/Service tax**	**Total Amount in Rs**
1	6 Core Fiber OS2: OS 2, corrugated steel tape 6 core fibre cable 9/125 micron (AMP make)	800			
2	Single mode Pigtail: SC single connector type pigtails, 1 meters, 9/125 micron (AMP make)	12			
3	Fiber Patch Cord: SC - LC duplex Patch cords 2 mtrs, OS 2, 9/125 micron (AMP make)	2			
4	12 Port LIU: 12 ports fibre optic drawer sliding type loaded with 12 SC adapters units for multi mode fibres, OS 2, 9/125 micron. (AMP make)	2			
5	24 Port Jack Panel Loaded. (AMP make)	27			
6	CAT 6 Patch Cord 1 Mtrs at Switch Side. (AMP make)	650			
7	Cable Manager 1 U.	27			
8	27 U Rack: 27 U Rack Floor mounted with all accessories,800x800. (Comrack, APW)	3			
9	15 U Rack: 15 U Rack Wall Mounted with all accessories,600x600 (comrack, APW)	7			

S.No		Qty			
10	42 U Rack: 42 U Rack Floor mounted with all accessories,1000x800 (Comrack/APW)	1			
11	Cat 6 UTP Cable Box (AMP make)	2			
12	HDPE Pipe: Prelubricated HDPE Pipe 40/33 mm reputed ISI brand	650			
13	Router Marker: Fibre Route Markers	10			
14	1 inch PVC Flexi : 1-inch PVC Flexible pipe underground and on surface including all accessories (ISI approved brand)	100			
15	PVC Channel: Industrial Perforated PVC Channel / Raceway of 3 x 3 / 4 x 3 inches. ISI Approved	200			
Total Passive Cost - B					

Installation and Service Components						
S.No	**Service Components**	**Qty**	**UOM**	**Unit Rate**	**Sales Tax/Service Tax (if Applicable)**	**Total Amount in Rs**
1	Termination of 24 ports on Jack panel	27	Nos.			
2	Fixing of cable managers, jack panel, LIU in rack	27	Nos.			
3	Installation of rack with Switche, Servers, jack Panels, Cables, Dressing etc	11	Nos.			
4	Installation and dressing of patch cords on Jack Panel/Cable Mnager/Switch	425	Nos.			
5	Labeling of jack panels with labels	27	Nos.			
6	Installation & Configuration & integration of Cisco Switch	29	Nos.			
7	Labeling of patch cords	425	Nos.			
8	Hard / Soft soil digging and resurfacing (1x3 feet)	650	Mtrs.			
9	Fiber Splicing per core	36	Nos.			
10	Laying and fixing of HDPE Pipe in trench	750	Mtrs.			
11	Pulling of OFC in GI/Flexible GI/HDPE Pipe	800	Mtrs.			

12	Fixing up of Route Markers with concrete base	10	Nos.			
13	Fibre pulling pit with RCC lid (3 x 3 x 3)	4	Nos.			
14	Laying of UTP cables	610	Mtrs.			
15	Fixing up of Industrial Channel	200	Mtrs.			
Total Installation Cost - C						
Total Cost (A+B+C)						
The vendor has to ensure complete installation, integration and commissioning of all equipments supplied in 4 weeks from the release of LOI or PO. In case any component is left out in Service/installation as mentioned above, the same should be considered by the Vendor and Completed for successfully implementation and commissioning fo this Project. The above are indicative in nature and may be taken on actuals.						

REGISTRAR