राष्ट्रीय प्रौद्योगिकी संस्थान सिलचर
National Institute of Technology Silchar
(राष्ट्रीय महत्व का संस्थान)
(An Institute of National Importance)
असम / Assam - 788010

फोन/Phone	: (03842) 224879	वैब/Wed	: http://www.nits.ac.in
फैक्स/Fax	: (03842) 224797	ई पी ए बी एक्स/EPABX	: 233841 - 5100/5101

E-mail : director@nits.ac.in

No. NITS/PS-623/LAN & Wi-Fi/18/CORRIGENDUM/   Date: 15-10-2018

CORRIGENDUM

Sub. : Amendment in Technical Specification of required item.

**Ref. : Tender No. NITS/PS-623/LAN & Wi-Fi/18, dtd.13.10.2018,
Pre Bid Meet. 31.10.2018, LOS-16.11.2018**

Some modification has been made in the Technical Specification of required items of the above referred tender. Modified Technical Specification with details of the above tender are as follows. Consider only these technical specifications.

N.B.: All the Terms & Conditions of the tender has been remain **UNCHANGED.**

Registrar
Registrar
कुलसचिव
National Institute of Technology Silchar
राष्ट्रीय प्रौद्योगिकी संस्थान सिलचर
Assam, India
असम, भारत

TECHNICAL SPECIFICATION

A.   6 Fiber SM Outdoor armored Cable/(4 or 6) core SM indoor Fibre, G652.D

Sr No.	Specifications	Requirement
1	Cable Type	06F MULTITUBE OUTDOOR ARMOURED OPTICAL FIBER CABLE - DRY
2	Fiber Type	Single Mode, 9/125/250 micron primary coated buffers, OS2 (ITU T G652.d)
3	Armour (for outdoor only)	Electrolytically Chrome-Coated Steel (ECCS) Armor of min. 0.15 mm thickness
4	Cable Construction Type	BELLCORE GR 20 / IEC 794-1
5	Attenuation	@ 1310nm <=0.34 db/Km MAX
		@1550nm <=0.22 db/Km MAX
		@ 1380-1386nm <= 0.31db/Km
6	Cut Off Wave length (nm)	<1260
7	Point Discontinuity (db)	<= 0.1
8	Chromatic Dispersion @ 1310nm (ps/nm x Km)	<=3.5
9	Chromatic Dispersion @ 1550nm (ps/nm x Km)	<=18
10	Core/Mode-Field (um)	9
11	Clad Diameter (um)	125
12	Coat Diameter	250
13	Loose tube material	PBTP Loose tubes dry. 1 nos containing fiber cores and 5 nos filler tubes arranged around a central FRP rod (for outdoor).
14	Loose Tube Color	Blue
15	Loose tube diameter (Nominal)	2.4 mm
16	Loose tube filling	Water swellable threads
17	Fiber Identification	BLUE, ORANGE, GREEN, BROWN, GRAY & WHITE
17	Jacket material	FR HDPE outer jacket
18	Jacket thickness	2 mm Min.
19	Strength members	Water Swellable tape at the periphery of the multiple loose tube arrangement. Water swellable yarns arranged between tubes.
		Central FRP rod strength member around which the loose tubes should be arranged symmetrically
20	Tensile Force	2500 N
21	Cable Weight	150 Kg/Km
22	Cable Outer Diameter	<= 13.2 mm

**B.	Fiber Management Shelf, LC type Rackmount, 1U**

Sr No.	Specifications	Requirement
1	Fiber Management shelf	1U 19" rack mountable
		The fiber management shelf series should be ideal for high density front patching applications.
		Should have Compact design and high density capacity to deliver carrier class fiber management to central offices, Pops, FTTx, mobile systems and LANs.
		High Density:
		1U: 6 / 12 / 24 Fiber terminations
		Shall be factory fitted with LC SM adapters, LC-PC SM pigtails, splice trays, protector sleeves and fiber management rings, with zero assembling required during installation
		Shelves shall be available and compatible with all connector types
		Mounting brackets can be placed in different positions
2	Material	Min 16 gauge steel
3	Drawer shelf features	Easy access to splicing tray
		Easy access to back side of connector
4	Accessories	Fiber management guides, radius controls & secure tie downs to be integrated in the shelf for better cable management
		Should be preloaded with grounding kits and earthing lugs. Labeling strip for adhesive labels.
5	Cable Inlets	Cable inlets should be secured from dust and dirt penetration
6	Material	Min 16 gauge steel
7	Pigtails loaded in Shelf:	
i	Type	LC-PC Type, SM 1.5 Mtr.
ii	Attenuation	<=0.3 dB
iii	Return Loss	>= 45 dB
iv	Cable Info	9/125 um
v	Outer Dia	0.9 mm
vi	Buffer material	LSZH
vii	Buffer Color	White
viii	Strippability	Semi tight
9	Warranty	25 years on component and performance
10	Compliance	ROHS / ELV Compliant

**C.	6/12/24 Fiber LIU (with pigtail), SCAPC type Loaded, Rack-mount**

a.	It should be loaded with 6/12/24 nos. of SCAPC Pigtails and SCAPC adapters, 2 nos of splice trays of 6/12/24 fiber capacities. The splice trays should be hinged on a tower so that lower trays can be easily accessible. The splice tray should have the following dimensions in mm – 225(L) x98(W).

b.	A tray wedge should be supplied along with the kit for ease of working on the lower trays.

c.	The adapter plates should be suitably identified with adapter numbering.

d.	The kit supplied should contain at least 30 fusion splice protectors, 20 nos of cable ties, suitable quantity of foam tape and hose clamps.

e.	There should be a provision to store the loop of loose tube.

f.	The fiber cable should be fixed to the body with hose clamps and there should a provision for strength member attachment.

g.	The rails used should be self-locking type so that there is no possibility of the drawer moving forward accidently.

h.	The top cover should be removable type, no tools should be required to open the top cover.

i. Optical Performance: Insertion Loss: ≤ 0.3dB
Return Loss: ≥ 60dB

D. LC-LC Fiber Patch Cord, SM

Sr No.	Specifications	Requirement
1	Make and Type	LC/PC to LC/PC Duplex tuned Fiber Optic Patch Cord 9/125 Micron
2	Cable Sheath	LSZH
3	Cable Diameter	1.8 mm twin zip
4	Ferrule	Ceramic
5	Buffer	Tight buffered
6	Insertion Loss	MAX .3 db
7	Return Loss	> 45 db
8	Temperature Range	-10 Degree C to +60 Degree C
9	ROHS	ROHS/ELV Compliant
10	Warranty	25 Years
11	Length	1 Mtr, 3 Mtr, 5 Mtr, 10 Mtr, 15 Mtr

E. CAT6 UTP Jacks with Face Plate and Back Box

Sr No.	Specifications	Requirement
1	Type	PCB based, Unshielded Twisted Pair, Category 6, TIA /EIA 568-C.2 and ISO/IEC 11801
2	Modular Jack	750 mating cycles
3	Wire terminal	200 termination cycles
4	Accessories	Integrated bend-limiting strain-relief unit for cable entry
		Support cable pair termination process on the jacks at 90 degree angle.
		Bidder should have a mechanism to maintain the quality of the termination in respect of the skill level of the termination staff.
5	Housing	Polyphenylene oxide, 94V-0 rated.
6	Blocks	Polycarbonate, 94V-0 rated
7	Jack contacts	Beryllium copper, plated with 1.27 mm [.000050] thick gold in localized area and 3.81 mm [.000150] minimum thick tin-lead in solder area over 1.27 mm [.000050] minimum thick nickel under plate
8	Wiring blocks	Polycarbonate, 94V-0 rated
9	Approvals	(a) UL Listed / CSA Approved
		(b) ETL verified to TIA / EIA Cat 6
10	Performance characteristics @ 250 MHz	Insertion Loss : 0.10dB NEXT : 47.9dB FEXT : 40.1dB Return Loss : 46dB
11	ROHS Compliant	ROHS/ELV Compliant
12	Warranty	25 years on component and performance
13	Faceplate	Single port British Style 86 x 86 mm shuttered, White. Should be supplied with labeling strips and label covers.

F.   CAT6 UTP Patch Panel, 24/48 port

Sr No.	Specifications	Requirement
1	Type	24/48-port, Modular, 1U, PCB based, Unshielded Twisted Pair, Category 6, TIA / EIA 568-C.2 and ISO/IEC 11801
2	Port arrangement	Configured as 6 Port Module with individually replaceable CAT-6 Jacks
3	Circuit Identification	Front of each module shall be capable of accepting 9 mm to 12 mm labels
4	Port Identification	9mm or 12mm Labels on each of 24-ports (to be included in supply
5	Modular Jack	750 mating cycles
6	Wire terminal	200 termination cycles
7	Accessories	Integrated bend-limiting strain-relief unit for cable entry on each port
8	Materials	
	Housing	Polyphenylene oxide, 94V-0 rated
	Wiring blocks	Polycarbonate, 94V-0 rated
	Jack contacts	Beryllium copper, plated with 1.27 mm [.000050] thick gold in localized area and 3.81 mm [.000150] minimum thick tin-lead in solder area over 1.27 mm [.000050] minimum thick nickel under plate
	Panel	Powder coated steel
9	Approvals	UL listed / ETL Verified
10	Termination Pattern	TIA / EIA 568 A and B
11	ROHS Compliant	ROHS/ELV Compliant
12	Warranty	25 years on components and performance

G.   CAT6 UTP Patch Cord

Sr No.	Specifications	Requirement
1	Type	Unshielded Twisted Pair, Category 6, TIA / EIA 568-C.2 & ISO/IEC 11801
2	Conductor	24 AWG 7 / 32, stranded copper conductors 100 Ohm
3	Length	4 feet, 7 feet, 10 feet
4	Plug Protection	Transparent Slim boot
5	Jacket	Flame Retardant PVC
6	Warranty	25-year component
7	UL Listing	CMR Rated
8	ROHS Compliant	ROHS/ELV Compliant

H.   CAT6 UTP Cable

Sr No.	Specifications	Requirement
1	Type	Unshielded Twisted Pair, Category 6, TIA / EIA 568-C.2 & ISO/IEC 11801. Cabling system to be Certificate by Intertek (ETL) for the 4-Connectors channel testing to the Cat 6 Cabling system as per the ANSI/TIA 568 C.2 & as well as the ISO 11801 standards up to 600 MHz.
2	Conductors	23 AWG solid bare copper
3	Insulation	Polyethylene

4	Jacket	Flame Retardant PVC
	Pair Separator	Cross-member (+) fluted Spline.
5	Approvals	(a) UL Listed / UL Verified. UL Mark should be visible on the Packaging.
		(b) ETL verified to TIA / EIA Cat 6
6	Operating temperature	-20 Deg. C to +60 Deg. C
7	Frequency tested up to	Minimum 600 MHz; ETL report to be provided for 600 MHz performance.
8	Packing	Box of 305 meters
9	Cable Outer Diameter	.23 inches
10	Delay Skew	45ns MAX.
12	Impedance	100 Ohms + / - 15 ohms, 1 to 600 MHz.
13	UL/NEC Ratings	CMR Rated
14	Mutual Capacitance	5.6 nF MAX /100 Mtr.
15	Conductor Resistance	66.58 Ohms Max / KM
16	Propagation Delay	536 ns/100 Mtrs. MAX @ 250 Mhz
17	Performance characteristics @ 250 MHz	Attenuation: 32.8dB/100m NEXT : 44dB PS NEXT : 41dB ELFEXT : 23dB PSELFEXT : 19dB Return Loss: 25.3dB ACR : 11.3dB
		Should have a PSNEXT margin of 7.5 dB over CAT6
		CAT6 cabling system should be tested and verified by the Independent third party laboratories for Zero BER (Bit Error Rate) testing at the data transmission speed of 1 Gbit/s.
18	ROHS Compliant	ROHS/ELV Compliant

I.   15U Rack

Sr No.	Technical Features
1	Wall mount 2 post rack supporting 19" rackmount equipment

2	Equipment Space: Height: 15 RMU
	                 Width: 19" EIA
	                 Depth: 20" D

3	Material: Black Powder Coated Aluminium alloy
4	Cable Management: Shall support vertical and horizontal cable managements for front, back and patch cable managements.
5	Load Capacity: 1000 lb of equipment
6	Construction: Bolted assembly
7	Universal hole pattern, 5/8"- 5/8" – 1/2 " vertical hole spacing
8	Cable Ladder tray to be included in supply for providing support to the rack as well as routing cables.
9	The rack shall be supplied with both side vertical cable managers with hinged doors. Vertical cable duct width should be min 4 inches with finger style cable managers in front and rear.

J.   24-port switch:

Architecture	Stackable managed switch with 24 x 10/100/1000 BaseT (all 24) ports and minimum of 4 100/1000 SFP ports, having non-blocking architecture
	Should have one out of band ethernet Management ports and one serial Console port
	The switch should be supplied with necessary modules / transceivers of the same OEM as the switch. **(Bidder to quote cost of transceiver as separate item. Further, technical bid should explicitly mention if they are quoting SX, LX, ZX or other variants of transceiver. Bidder can make a physical inspection of the site, before submission of bid, at their own cost after obtaining permission from the Institute Authority in this regard.)**
	Should have at least 55 Gbps switching fabric
	Should have switching throughput of minimum 40 mpps
	Should have minimum 1 GB RAM and min. 2 GB flash
L2 and L3 features	Should support minimum 4K concurrent, port-based VLAN
	Should have minimum 16K MAC table with 6,00,000 Hrs or better MTBF
	Should support Static IP routing, RIP and RIPng from day-1
	Should be IPv6 enabled on day-1 without any additional hardware/software
Security and Management	L2/L3/L4 IP based, Source port, destination port, MAC based, Time based
	Should have IEEE 802.1X user authentication, Web-based authentication and MAC-based authentication
	Switch should have Dynamic ARP protection to block ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
	DHCP protection to block DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks should be supported
	DHCP enforcement to prevent users with Static IP should be supported
	The switch shall support multiple administrator accounts. Each administrator account shall be configurable with the desired level of management privileges
	Should have local and remote port mirroring with N:N mirroring
	Should have RADIUS authentication for secure switch CLI logon
	The switch should support SNMP V2c and V3, XML api, SDN with Open flow and RMON
	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.
	Secure Web based management (https) and SSH v2 based management should be supported
	Time synchronization using Network time protocol must be available
	The switch should have feature of backing up the configuration & restoring a backed-up configuration. Multiple Configuration files must be supported. Config/image upload and download by SFTP should be supported.
QoS	Should have IP multicast Snooping, supporting min. 1K groups
	Should have IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
	Should have IEEE 802.1p Traffic prioritization allowing real-time traffic classification into 8 priority levels mapped to 8 queues

	Should be able to set the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), TCP/UDP port number, source port, and DiffServ
	Should have per-port Rate Limiting setting at ingress
	Should support IEEE 802.1ba (AVB) from day-1 without any additional hardware/software
Manageability	Should have sFlow / netflow for traffic monitoring
	Should have L2 Traceroute and L2 Ping
	Should support IEEE 802.1d, 802.1s, 802.1w. Should provide less than 50 msec convergence based on RFC 3619
	Should have EnergyWise or equivalent that monitors the power consumption, and also can take action based on business rules to reduce power consumption.
	Should have Auto Smartports or equivalent that discovers and configures the ports as other devices are plugged into the switch
Resiliency	Should support IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	Should have Link recovery to maintain voice convergence (less than 150 ms recovery)
	Should support Redundant Power Supply
Safety & Env. certification	FCC Part 15 Class A
	The switch shall conform to IEC-60950/CSA-60950/EN-60950/UL-60950 standard for safety requirements of information technology equipment.
Others	Should be operating in temperature: 0°C to 50°C and relative humidity: 10% to 95% Non-condensing
	Must have EAL3 /NDcPP or above common criteria certification
	OEM End-of-sale declaration shall not have been released for the quoted model at the time of the bid submission. Bider must submit this declaration, certfied by the OEM, alongwith the bid.
	The switch shall be supplied with the latest OS version
	All the specified features/parameters/certifications must be available on the Technical Bid opening date. Features/parameters/certifications proposed to be available in near future/on roadmap shall not be considered
	Bidder should submit the RFC 2544, RFC 2889 report based on Tolly, Lippis or equivalent established 3rd party test report
	Authorization letter from OEM (Active) (in original) as proof of being authorized system Integrator and authorization certificate for sale and maintenance of quoted products.
	Proposed switch should be offered with min. 3 year warranty with NBD. Successful bidder, upon award of the work order/purchae order, will have to submit a letter from the OEM (in original) stating that, they have entered into back-to-back contract, mentioning explicitly the terms and period of the contract, with the OEM.
	The OEM should have presence in India for min 10 years and the incorporation letter for the same has to be submitted along with bid.
	The OEM should have TAC center with India toll free number. OEM having R&D center in India will be a bonous for the bidder in the technical bid evaluation.
	All the proposed switches IOS should be on the same platform for seamless and ease of manageability.

K.   48-port switch:

Architecture	Stackable managed switch with 48 x 10/100/1000 BaseT (all 48) ports and minimum of 4 100/1000 SFP ports, having non-blocking architecture
	Should have one out of band ethernet Management ports and one serial Console port
	The switch should be supplied with necessary modules / transceivers of the same OEM as the switch. **(Bidder to quote cost of transceiver as separate item. Further, technical bid should explicitly mention if they are quoting SX, LX, ZX or other variants of transceiver. Bidder can make a physical inspection of the site, before submission of bid, at their own cost after obtaining permission from the Institute Authority in this regard.)**
	Should have at least 100 Gbps switching fabric
	Should have switching throughput of minimum 75 mpps
	Should have minimum 1 GB RAM and min. 2 GB flash
L2 and L3 features	Should support minimum 4K concurrent, port-based VLAN
	Should have minimum 16K MAC table with 6,00,000 Hrs or better MTBF
	Should support Static IP routing, RIP and RIPng from day-1
	Should be IPv6 enabled on day-1 without any additional hardware/software
Security and Management	L2/L3/L4 IP based, Source port, destination port, MAC based, Time based
	Should have IEEE 802.1X user authentication, Web-based authentication and MAC-based authentication
	Switch should have Dynamic ARP protection to block ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
	DHCP protection to block DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks should be supported
	DHCP enforcement to prevent users with Static IP should be supported
	The switch shall support multiple administrator accounts. Each administrator account shall be configurable with the desired level of management privileges
	Should have local and remote port mirroring with N:N mirroring
	Should have RADIUS authentication for secure switch CLI logon
	The switch should support SNMP V2c and V3, XML api, SDN with Open flow and RMON
	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.
	Secure Web based management (https) and SSH v2 based management should be supported
	Time synchronization using Network time protocol must be available
	The switch should have feature of backing up the configuration & restoring a backed-up configuration. Multiple Configuration files must be supported. Config/image upload and download by SFTP should be supported.
QoS	Should have IP multicast Snooping, supporting min. 1K groups
	Should have IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
	Should have IEEE 802.1p Traffic prioritization allowing real-time traffic classification into 8 priority levels mapped to 8 queues

	Should be able to set the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), TCP/UDP port number, source port, and DiffServ
	Should have per-port Rate Limiting setting at ingress
	Should support IEEE 802.1ba (AVB) from day-1 without any additional hardware/software
Manageability	Should have sFlow / netflow for traffic monitoring
	Should have L2 Traceroute and L2 Ping
	Should support IEEE 802.1d, 802.1s, 802.1w. Should provide less than 50 msec convergence based on RFC 3619
	Should have EnergyWise or equivalent that monitors the power consumption, and also can take action based on business rules to reduce power consumption.
	Should have Auto Smartports or equivalent that discovers and configures the ports as other devices are plugged into the switch
Resiliency	Should support IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	Should have Link recovery to maintain voice convergence (less than 150 ms recovery)
	Should support Redundant Power Supply
Safety & Env. certification	FCC Part 15 Class A
	The switch shall conform to IEC-60950/CSA-60950/EN-60950/UL-60950 standard for safety requirements of information technology equipment.
Others	Should be operating in temperature: 0°C to 50°C and relative humidity: 10% to 95% Non-condensing
	Must have EAL3 /NDcPP or above common criteria certification
	OEM End-of-sale declaration shall not have been released for the quoted model at the time of the bid submission. Bider must submit this declaration, certfied by the OEM, alongwith the bid.
	The switch shall be supplied with the latest OS version
	All the specified features/parameters/certifications must be available on the Technical Bid opening date. Features/parameters/certifications proposed to be available in near future / on roadmap shall not be considered
	Bidder should submit the RFC 2544, RFC 2889 report based on Tolly, Lippis or equivalent established 3rd party test report
	Authorization letter from OEM (Active) (in original) as proof of being authorized system Integrator and authorization certificate for sale and maintenance of quoted products.
	Proposed switch should be offered with min. 3 year warranty with NBD. Successful bidder, upon award of the work order/purchae order, will have to submit a letter from the OEM (in original) stating that, they have entered into back-to-back contract, mentioning explicitly the terms and period of the contract, with the OEM.
	The OEM should have presence in India for min 10 years and the incorporation letter for the same has to be submitted along with bid.
	The OEM should have TAC center with India toll free number. OEM having R&D center in India will be a bonous for the bidder in the technical bid evaluation.
	All the proposed switches IOS should be on the same platform for seamless and ease of manageability.

L. 12-port switch: (if OEM do not have 12-port switch same should be replaced by 24-port switch as per specification above)

Architecture	Stackable managed switch with 12 x 10/100/1000 BaseT (all 12) ports and minimum of 4 100/1000 SFP ports, having non-blocking architecture
	Should have one out of band ethernet Management ports and one serial Console port
	The switch should be supplied with necessary modules / transceivers of the same OEM as the switch. **(Bidder to quote cost of transceiver as separate item. Further, technical bid should explicitly mention if they are quoting SX, LX, ZX or other variants of transceiver. Bidder can make a physical inspection of the site, before submission of bid, at their own cost after obtaining permission from the Institute Authority in this regard.)**
	Should have at least 30 Gbps switching fabric
	Should have switching throughput of minimum 20 mpps
	Should have minimum 1 GB RAM and min. 2 GB flash
L2 and L3 features	Should support minimum 4K concurrent, port-based VLAN
	Should have minimum 16K MAC table with 6,00,000 Hrs or better MTBF
	Should support Static IP routing, RIP and RIPng from day-1
	Should be IPv6 enabled on day-1 without any additional hardware/software
Security and Management	L2/L3/L4 IP based, Source port, destination port, MAC based, Time based
	Should have IEEE 802.1X user authentication, Web-based authentication and MAC-based authentication
	Switch should have Dynamic ARP protection to block ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
	DHCP protection to block DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks should be supported
	DHCP enforcement to prevent users with Static IP should be supported
	The switch shall support multiple administrator accounts. Each administrator account shall be configurable with the desired level of management privileges
	Should have local and remote port mirroring with N:N mirroring
	Should have RADIUS authentication for secure switch CLI logon
	The switch should support SNMP V2c and V3, XML api, SDN with Open flow and RMON
	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.
	Secure Web based management (https) and SSH v2 based management should be supported
	Time synchronization using Network time protocol must be available
	The switch should have feature of backing up the configuration & restoring a backed-up configuration. Multiple Configuration files must be supported. Config/image upload and download by SFTP should be supported.
QoS	Should have IP multicast Snooping, supporting min. 1K groups
	Should have IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

	Should have IEEE 802.1p Traffic prioritization allowing real-time traffic classification into 8 priority levels mapped to 8 queues
	Should be able to set the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), TCP/UDP port number, source port, and DiffServ
	Should have per-port Rate Limiting setting at ingress
	Should support IEEE 802.1ba (AVB) from day-1 without any additional hardware/software
Manageability	Should have sFlow / netflow for traffic monitoring
	Should have L2 Traceroute and L2 Ping
	Should support IEEE 802.1d, 802.1s, 802.1w. Should provide less than 50 msec convergence based on RFC 3619
	Should have EnergyWise or equivalent that monitors the power consumption, and also can take action based on business rules to reduce power consumption.
	Should have Auto Smartports or equivalent that discovers and configures the ports as other devices are plugged into the switch
Resiliency	Should support IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	Should have Link recovery to maintain voice convergence (less than 150 ms recovery)
	Should support Redundant Power Supply
Safety & Env. certification	FCC Part 15 Class A
	The switch shall conform to IEC-60950/CSA-60950/EN-60950/UL-60950 standard for safety requirements of information technology equipment.
Others	Should be operating in temperature: 0°C to 50°C and relative humidity: 10% to 95% Non-condensing
	Must have EAL3 /NDcPP or above common criteria certification
	OEM End-of-sale declaration shall not have been released for the quoted model at the time of the bid submission. Bider must submit this declaration, certfied by the OEM, alongwith the bid.
	The switch shall be supplied with the latest OS version
	All the specified features/parameters/certifications must be available on the Technical Bid opening date. Features/parameters/certifications proposed to be available in near future/on roadmap shall not be considered
	Bidder should submit the RFC 2544, RFC 2889 report based on Tolly, Lippis or equivalent established 3rd party test report
	Authorization letter from OEM (Active) (in original) as proof of being authorized system Integrator and authorization certificate for sale and maintenance of quoted products.
	Proposed switch should be offered with min. 3 year warranty with NBD. Successful bidder, upon award of the work order/purchae order, will have to submit a letter from the OEM (in original) stating that, they have entered into back-to-back contract, mentioning explicitly the terms and period of the contract, with the OEM.
	The OEM should have presence in India for min 10 years and the incorporation letter for the same has to be submitted along with bid.
	The OEM should have TAC center with India toll free number. OEM having R&D center in India will be a bonous for the bidder in the technical bid evaluation.

	All the proposed switches IOS should be on the same platform for seamless and ease of manageability.

M.   Indoor Wireless Access Point

Hardware	Access Points proposed must include radios for 2.4 GHz and 5 GHz with 802.11ac
	The access point should be light weight and should support installations above drop ceiling, under ceiling or on wall
	No additional hardware should be required to mount the access point
	LED should be available for activity indication
	Must have 1x IEEE 802.3 Gigabit Ethernet auto-sensing
	The access point must have integrated antenna
	Should allow operation using IEEE 802.3at as well as IEEE 802.af
802.11 ac features	Should support 4 x 4 multiple-input multiple-output (MIMO) and min. three MU-MIMO
	Should support 2.1 Gbps data rates on dual concurrent radio operations
	Should support 20, 40 and 80 MHz Channels
	Should support Maximal Ratio Combining
Radio Features	Should support min. transmit power of 23dbm of transmit power on both 2.4 Ghz & 5 GHz Radio
	The antenna gain should be minimum 3 dBi.
Networking features	The access point or the controller should be capable of running a local DHCP Server
	Access points must support a "controller-less" mode where one AP will provide full RF and network management.
	Access points must provide automatic redundancy in case a site controller fails
	The access point should support captive portal and local data base for authentication
	Must have an dynamic or smart RF management features which allows WLAN to automatically and intelligently adapt to changes in the RF environment
	Should support min. forwarding rate of 70 kpps
	Should support mesh capabilities
Roaming Features	Along with a controller the Access Points should support fast roaming feature
Security features	The WLAN solution should have comprehensive integrated security features.
	The access point should provide wireless IPS sensor support on both radios.
	The WLAN Solution should support IP filtering and NAT
	WLAN solution must support personal and enterprise WPA2 authentication for a staff WLAN concurrent with open access public WLAN
	Security solution must provide Rogue AP detection by comparing the MAC address forwarding tables in common enterprise class Ethernet LAN switches

	Should support secure guest access (hotspot) with captive portal, IPSec and RADIUS Server
Management Features	Should provide features for AP discovery, adoption, provisioning
	Should support management functions including firmware push and statistics
	Access points must support autonomous mode
	Must support telnet and/or SSH login to APs directly for troubleshooting flexibility
QOS Support	Should support WMM,WMM-UAPSD,802.1p,Diffserv and TOS
	Support for Voice-over-wireless LAN (VoWLAN) quality of service (QoS) ensures toll quality, even with many simultaneous calls on a single access point.
	Access point should support 802.11 DFS
Certification	Wi-Fi Alliance (WFA) certified 802.11 a/b/g/n/ac
	Access points must have WiFi Alliance certification for WPA2 Enterprise

N.   Wireless Access Point Controller

Architecture	WLAN controller should be hardware appliance 1U rack mountable. It should be supplied with 200 AP licenses for the campus on Day-1. Should be scalable to min 500 APs in future.
	Proposed Controller & AP should be of the same OEM.
	Should have 4x1000Base-T/F interfaces.
WLAN Features	Should support e dual-band capable clients to the 5 GHz band on dual-band access points.
	Should balance wireless clients across APs on different channels, based upon the client load on the APs.
	Should support internal DHCP server.
	WLAN Solution Layer 3 roaming and mobility that allows a client to roam between APs on the same network but different client subnets, while preserving its IP address and existing data sessions.
Network Policy features	WLAN Controller shall have inbuilt capability to inspect all traffic from each user session and allow or deny any traffic that does not satisfy specified policies.
	WLAN controller shall provide identity-based controls to enforce application-layer security and prioritization.
	WLAN solution shall be capable of controlling bandwidth per user, per VLAN/SSID etc.
RF Planning and Visualization	Network maps with integrated aerial views and automatic floor planning enable easy visualization of topology and status
	Real-time heat-maps show RF propagation within a network

	State-of-the-art Planning Tool with aerial maps, multi-floor auto-placement, coverage maps, and options to clone buildings and floors
	Built-in client and rogue location detection and placement on a floor plan
	Spectrum analysis to detect and identify sources of Wi-Fi interference
WLAN Security	Should prevent students/users connecting to rogue AP and also prevent an outside user trying to connect to campus WLAN.
	Should prevent Ad-hoc connections (i.e. clients forming a network amongst themselves without an AP)
	Should prevent windows bridge (i.e. client that is associated to AP is also connected to wired network and enabled bridging between two interfaces)
Granular Control	Application to monitor and redirect student wireless clients during class time
	Application QoS and firewall with detailed user and device context-based policies
	Configuration of cloud proxy to split Internet and corporate VPN traffic with integration to Web sense
	Configuration of L2 and L3 IPsec VPNs
	Automatic and flexible IP address allocation and distribution across entire remote branch network
Reporting/ Monitoring	Dashboard widgets organized into pre-defined or customizable perspectives
	Bandwidth network bandwidth control
	Real-time monitoring of alarms and events

SCOPE of WORK

1. Removal of existing 6-core single-mode OFC (both overhead and underground) in consultation with site engineer.

2. Bidder shall provide detailed and clear cable layout diagram and machine generated (OTDR/Cable Tester etc. on LinkWare Cable Test Measurement software only) test report (both OFC & UTP) for the existing network. The diagram should depict connection from room no, I/O box no., Patch Panel (or LIU) no. and port & Switch port no. The test report should clearly indicate location where existing fiber core(s) need cleaning/polishing/retermination/replacement. Further, the report for UTP should clearly indicate location where retermination/replacement of patch cord/replacement of IO Box etc. are required.

3. The bidder shall label every end-point (both UTP and Fiber) following the nomenclature as specified by the site engineer. The labeling will include Information Outlet Box, UTP Patch Panel, Switch, Rack, LIU and UTP & Fiber Patch cords using cable tie etc.

4. Dressing of UTP as well as Fiber cables/Patch cords in racks for ensuring sufficient air-flow and cooling. All materials shall be arranged by the bidder.

5. Bidder shall submit the detailed report as mentioned at serial 02 above, to the Institute. Upon review of the same by the Institute, the bidder shall be informed about the location, quantity and nature of repair work to be undertaken which will then be a binding on the bidder.

6. Lying of Single Mode Optical Fiber through ISI mark silicon lubricated 40mm-pn6-63grade HDPE Pipe with Standard 1 meter Digging, (2 meter in case of road crossing) & Filling using sand as per the instructions of Site Engineer. All materials shall be arranged by the bidder/contractor except Single Mode Optical Fiber cable.

7. Lying of Single Mode Optical Fiber through ISI mark G.I Pipe (during road crossing only) including Road Cutting/Boring as per the instructions of Site Engineer. All materials shall be arranged by the bidder/contractor except Single Mode Optical Fiber cable.

8. Cleaning and Polishing of fiber core wherever necessary as specified by site engineer. All materials shall be arranged by the bidder.

9. Termination of 19" rack-mountable 6-port Line Interface Unit (LIU). All materials shall be arranged by the bidder.

10. Splicing of fibers cores in the said LIU. All materials shall be arranged by the bidder.

11. Splicing of fiber core on the field. All materials shall be arranged by the bidder including enclosure used for such splicing.

12. Installation of Floor standing rack / Wall mounted Rack with all accessories as per the instructions of site Engineer. All materials shall be arranged by the bidder.

13. Fixing, termination and testing of 24 Port CAT6 Patch Panel with RJ-45 Outlet. All materials are to be arranged by the bidder.

14. Laying & testing of Cat-6 UTP cable through PVC Pipe/ Channel/ Cable tray/ Casing -Capping as per the requirements during execution of work. All materials required to execute the above work shall be arranged by the bidder.

15. Fixing, termination and testing of Information Outlet Box as per the requirements during execution of work. All materials shall be arranged by the bidder.

16. Existing Logical Network analysis & implementation of Managed Switches for optimum network performance as per requirement of the Institute. All materials shall be arranged by the bidder.

17. Bidder shall provide detailed and clear cable layout diagram and machine generated (OTDR/Cable Tester etc. on LinkWare or similar Cable Test Measurement software only) test report (both OFC & UTP). The diagram should depict connection from room no, I/O box no., Patch Panel (or LIU) no. and port & Switch port no. All materials shall be arranged by the bidder.

18. The quantity indicated herein are purely estimated and prospective bidders should therefore undertake a detailed survey of the existing network devices, servers, storage etc. and new requirements before submission of their bid at their own cost and arrangement with prior permission of the competent authority of NIT Silchar. The bid evaluation shall be done on the whole work only.

19. Repair/Refurnishing work owing to damage caused due to cabling or any other work related to this Project. All materials shall be arranged by the bidder. There should not be any hanging or uncovered wire.

20. Bidder shall configure or reconfigure, as the case may be, all active network devices as per requirement of NIT Silchar and shall be responsible for showing end-to-end connectivity (over wired and wireless both) of data, voice and video while maintain quality.