GNDEC Tender No: ULWF /CCC/12015

Upgradation of LAN & Wi-Fi

Guru Nanak Dev Engineering College

Gill Road, Gill Park, Ludhiana - 141006 (Punjab)

Table of Contents

I) Notice Inviting Tender

Guru Nanak Dev Engineering College (GNDEC), Ludhiana a Prestigious Educational Institute, invites sealed tender in two-bid format for **Upgradation of LAN and Wi-Fi** at the Institute as per the specification given in the tender document. The Tender Document will be available online on college website i.e. http://gndec.ac.in/purchase/ from February 12, 2015 and same can be purchased from college cashier. The cost of tender form is Rs. 2,000/- (Rs. Two Thousand Only). The tender document downloaded from college website must be submitted alongwith a demand draft of Rs. 2,000/- (Rs. Two Thousand Only) or online using NEFT. The demand draft should be in the name of Director, Guru Nanak Dev Engineering College, Ludhiana. The demand draft / NEFT details need to be submitted alongwith the pre-bid query/ies. The signed tender document alongwith technical and financial bid should be submitted in the Reciept Section, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana after the uploading of modified tender.

The vendors fulfilling the eligibility criteria as per this tender document will be permitted to participate in pre-bid. For this, the vendors have to furnish proof of their eligibility along with their queries up to February 23, 2015 by 4.00 PM **(Refer clause 1.1 Pre-Qualification Criteria)** else the pre-bid queries are liable to be rejected. The pre-bid meeting will be held on March 2, 2015 at 10.00 AM in the Committee Room, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana.

Director, GNDEC reserves the right to reject any or all tenders without assigning any reason.

Corrigendum / Addendum or Cancellation of this tender, if any, shall be published on GNDEC website i.e. http://gndec.ac.in/purchase/

The details for NEFT are as under:-

Beneficiary Name: - Director, Guru Nanak Dev Engineering College, Ludhiana

Account Number: - SB 00211000050614

Bank Name: - Punjab & Sind Bank, Gill Branch, Ludhiana, Punjab

IFSC Code:- PSIB0000021

All the pages of the Technical / Financial Bid shall be page numbered and signed. All the relevant supporting documents as required must be enclosed.

Offer in the financial bid should be written in both figures and words and total should also be in both figures and words.

Envelope of technical bid and financial bid should be individually sealed and then placed in a third envelope, to be sealed and superscribed with Tender Name "Upgradation of LAN and Wi-Fi", Tender Number "ULWF /CCC/12015" and Due Date of Submission " March 25, 2015" addressed to:

The Director
Guru Nanak Dev Engineering College
Gill Park, Gill Road
Ludhiana – 141006 (Punjab)

Sealed tender must reach the Institute latest by **(March 25, 2015 up to 01:00 PM)**. Tenders received beyond the last date of submission will be rejected. No tender will be entertained by e- mail or FAX.

Technical bid(s) shall be opened on **March 25, 2015 at 3:00 PM)** in the **Committee Room, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana** in the presence of the tenderer(s) or their authorized representative(s), who will present on the scheduled date and time.

Date and time of the opening of the financial bid(s) will be decided after the technical bid(s) have been evaluated by the Institute.

The financial bid(s) of only those tenderer(s) will be opened, who qualifies the technical evaluation and proof of concept (POC).

The date, time & place of opening of the financial bid(s) will be intimated in due course of time.

In the event of the due date of receipt and opening of the tender being declared as a holiday for the Institute, then due date of receipt / opening of the tender will be the next working day at the same time.

The tenderer are requested to read the tender document carefully and ensure to compliance with all the instructions herein. Non-compliance of the instructions contained in this document will disqualify the tenderer from the tendering exercise.

The Institute reserves the right to select certain items in single or multiple units and reject the others or all as mentioned in the schedule and to revise or alter the specifications before acceptance of any tender and accept or reject any or all tenders, wholly or partly or close the tender without assigning any reason whatsoever. Corrigendum / Addendum, if any, shall be published on Institute's website only i.e.http://gndec.ac.in/purchase/ .

II) Important Dates and Timings

Event	Date	Time	Venue	Remarks
Availability of Tender Documents on Website / with the Cashier of GNDEC	February 12, 2015		http://gndec.ac.in/purchase/ or College Cashier	
Pre-Bid Queries	Up to February 23, 2015	4.00 PM	Reciept Section, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana	(All pre-bid queries have to be submitted in writing on or before February 23, 2015 by 04:00 PM) in the Reciept Section, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana or *via* email at *tcc@gndec.ac.in* and *testingandconsultancy@gmail.com* mentioning "Pre-bid queries for Upgradation of LAN & Wi-Fi" in subject.
Pre-Bid Meeting	March 2, 2015	10.00 AM	Committee Room, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana	
Uploading of Modified Tender. Corrigendum/addendum, if any, to be published	March 4, 2015 or later, if required	11.00 AM	http://gndec.ac.in/purchase/	
Site survey by vendors	March 5, 2015 to March 16, 2015	9.00 AM to 5.00 PM	Institution Campus	Vendor must seek prior appointment to come for site survey.
Receipts of Bids (Technical+Commercial)	March 25, 2015	1.00 PM	Reciept Section, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana	No bids will be entertained by e-mail and fax.
Opening of Technical Bids	March 25, 2015	3.00 PM	Committee Room, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana	Vendors to attend on their own expenses.
Demonstration / POC by Vendor / System Integrators / OEMs (Mandatory)	March 27, 2015 onwards	9.00 AM to 5.00 PM	Institution campus	The institute will call the eligible vendors for POC by communicating through e-mail, SMS and/or telephonically.

Chapter-1

Instructions to Tenderer

GNDEC has prepared a deployment plan and tentative number of data ports for up-gradation of LAN and Wi-Fi that cover the desired areas as per chapter 2.

Tenderer is advised to inspect the sites before quoting for the Tender.

Tender should be submitted in two parts, Part – A (Technical Bid) and Part – B (Financial Bid). Envelope of Part – A should be superscribed as "Tender for Upgradation of LAN and Wi-Fi", "Part – A Technical Bid" and Envelope of Part – B should be superscribed as "Tender for Upgradation of LAN and Wi-Fi", "Part – B Financial Bid".

While poof of concept (POC), the vendor will have to propose the Installation Plan, which should include the upgradation of existing network and number and type of Access Points required. Any other Hardware or item required to implement the total solution should be listed separately in the Bill of Material (BOM). The quantity mentioned in the Bill of Material is approximate and given for working lowest quote. All active network components (switches, wireless controller, and wireless access points) and network management software should be from established companies. All passive components should be from the same manufactures except, rack and conduit. The tenderer should also submit a detailed un-priced Bill of Material in tabular format with complete product part codes, product description, number, quantity, etc. This detailed un-priced Bill of Quantity should be attached / enclosed with the technical compliance both in hard copy as well as soft copy.

1.1 Pre – Qualification Criteria:

a) Only manufacturer(s) or their sole authorized distributor / authorised partners are eligible to bid.

   Authorization letter from Original Equipment Manufacturer (OEM) in favour of authorized Partner to bid / negotiate / conclude the order against this tender, must be enclosed with technical bid.

b) The tenderer shall be required to submit the Earnest Money Deposit (EMD) for an amount of Rs.2,00,000/- (Rs. Two Lakh Only) which is refundable by way of demand draft only. The demand drafts shall be drawn in favour of "Director, Guru Nanak Dev Engineering College, Ludhiana" payable at Ludhiana. The demand draft for earnest money deposit must be enclosed in the envelope containing the technical bid.

c) The tenderer must be reputed System Integrator / OEM authorized representative and must have minimum turnover of Rs. **8 Crore** (annually) during last three financial years (FY 11-

12, FY 12-13, FY 13-14). Financial statement showing annual turnover and net profit duly certified by **Charted Accountants** for the last three financial years should be attached.

d) The System Integrator/ Tenderer must have successful executed orders in any combination of the below mentioned amounts during last three financial years i.e. 2011-12, 2012-2013, 2013-14 for similar (Wired / Wi-Fi System) projects. **(Certificate for successful installation and project completion from the client should be enclosed) .**

1. **One order of minimum Rs. 50 Lakh, or**
2. **Two orders of minimum Rs. 25 Lakh each**

e) All Switching Components like Core Switch, Distribution Switches, and Access Switches should be of single OEM (same make) and all Wi-Fi Components like WLAN Controllers, Access Points and POE injectors should be of single OEM (same make). Operating System Software of all active components should be same for ease of management and upgrades. All active components should be from leaders and visionary manufacturers and their authorized partner / dealers of wired network like Cisco / Juniper / Brocade / Extreme / HP etc. and Wi-Fi network like Cisco / Ruckus / Aruba / HP / Motorola etc. All active managed switches and their OS should be NDPP/ EAL common criteria certified and should have same type of operating system. All passive components should be from same OEM except racks. The passive components like CAT6 UTP Cable, Patch Panel, Patch Cord and Information Outlets, OFC Products should be from reputed OEM such as AMP/MOLEX/Actassi by Schneider/ PanNet by Panduit/ etc.

f) The tenderer should be in the business of Networking for the last minimum 5 years. The tenderer also should have their own after sales support facilities at least in one place within 200 km from Ludhiana. The support facilities should be fully owned by the tenderer and managed by their permanent employees (company payroll) and not through franchisee(s). **(Documentary proof of the same should be attached).**

g) The OEM should have two local spares depot in India in order to provide immediate support. **(Documentary proof of the same should be attached).**

h) The make offered by System Integrator / tenderer should at least have 3 successful deployments of minimum 75 numbers Access Points (AP) per site (controller based wireless network installation and commissioning) anywhere in India (at least one deployment in Government Organization / PSU / Autonomous Body / University of repute / Hospital / Higher Education Institute of repute) during last 3 years. **(Certificate for**

successful installation and project completion from the client should be enclosed).

i) The offered products in the solution against the supply order shall be of latest version and should not be "End of Life" for atleast next 5 years, however if any product which is declared end of life product by OEM during the supply period of material, then the tenderer should supply replaced model or next higher model / version of the product.

j) The tenderer should not have been debarred or blacklisted by any Central / State Government Departments of India.

k) Signed and stamped compliance sheet of the technical specification of the goods with technical printed literature along with Bill of Material mentioning all the terms and conditions clearly, must be enclosed with the technical bid.

l) The tenderer shall submit the copy of the tender document, with each page signed and stamped to confirm the acceptance of the entire terms and conditions of the tender.

m) The tender of any tenderer, who has not complied with one or more of the conditions of prequalification criteria and / or fail to submit the required documents in prescribed format as "mentioned" or "required" or "conditional tender" are liable to be summarily rejected.

n) The architecture, design and technical specifications of the offered wired and Wi-Fi solution will be evaluated by GNDEC, Ludhiana in terms of their functional requirements using "Proof of Concept" (POC). POC clearly indicates the capabilities and limitations of the offered solution and how it achieves the expectations / requirements of GNDEC. The eligible vendors will be given date and time schedule by the Institute. The same will be intimated to the vendors by e-mail, SMS or telephonically. It is mandatory to participate in POC for further tendering process (subject to minimum scoring of 70% Marks in POC). The POC will be divided into two parts as below:

I. Tenderer will provide the complete Solution Architecture Design and Implementation process along with node and connectivity details along with delivery and implementation schedule.

II. POC should be done as per details furnished by the SI / OEM with the WLAN Controller and Access points (same make and model as compliance with the specification quoted) for the offered Wi-Fi Solution. The solution should provide -65 dBm or better RSSI. The whole campus should be covered under same RSSI. Access Points should be capable to deliver Full HD video streams on atleast 10 multiple Wi-Fi devices without any jam / jerk in the streaming. The complete deployed system will be evaluated/ tested using various testing tools in terms of RSSI, throughput, download / upload streams etc.

The Technical committee will evaluate the POC with respect to the functional and quality requirements of end user. After evaluating the POC, the committee will decide the list of successful tenderers. The tenderer scoring 70% or above in the POC will be qualified for further participation in bids. Further, the Technical Committee has right to change the POC procedure or to amend the test parameters / test plan, if felt necessary. Failure in POC leads to rejection of bid. The decision of the Technical Committee will be final.

1.2 Earnest Money Deposit (EMD):

The tenderer shall be required to submit the Earnest Money Deposit (EMD) for an amount of Rs. 2,00,000/- (Rs. Two Lakh Only) which is refundable by way of demand draft only. The demand draft shall be drawn in favour of "Director, Guru Nanak Dev Engineering College payable at Ludhiana".

The demand draft for earnest money deposit must be enclosed in the envelope containing the technical bid. Any technical bid found without the demand draft of earnest money will be rejected. The Institute will not be liable to pay any interest on such an amount. The earnest money deposited shall be forfeited, if the tenderer withdraws its bid during the period of tender validity.

The earnest money of the tenderer, whose tender has been accepted, will be returned on the submission of the performance security. Earnest money deposit of the successful tenderer shall be forfeited, if it refuses or neglects to execute the order or fails to furnish the required performance security within the time frame as specified by the Institute.

After the award of the contract to the successful tenderer, the earnest money deposit of the unsuccessful tenderer(s) will be refunded within 60 days.

1.3 Pre-Bid Queries and Meeting:

All pre-bid queries addressed to **Chairman, Upgradation of LAN & Wi-Fi Committee, GNDEC, Ludhiana** have to be submitted in writing up to February 23, 2015 (4.00 PM) in the format given below on the letter head of the company in Reciept Section, Panth Rattan Jathedar Gurcharan Singh Tohra Block, GNDEC, Ludhiana or by e-mail at tcc@gndec.ac.in and testingandconsultancy@gmail.com

SN.	Page Number	Clause / Point Number	Subject	Clarification Sought	Remarks (if any)

The pre-bid meeting will be held on March 2, 2015 at 10.00 AM. Only two authorised people (representing OEM or System Integrator) will be allowed to attend the Pre-bid meeting. Interested tenderer may choose to attend pre-bid meeting at their own cost.

No queries or changes will be entertained after this allotted time frame i.e February 23, 2015 (4.00PM). As a result of the discussion in the pre-bid meeting, if it is considered necessary to modify the technical specifications or any tender conditions, the same shall be carried out. The final modified tender document will again be uploaded on website i.e. March 4, 2015.

1.4 Tender Evaluation:

The Institute will evaluate the entire tenders, strictly on the basis of the terms and conditions incorporated in the tender document to determine whether these are compliance in all respects.

During the evaluation / scrutiny of the tenders, at any stage, if it is found that any of the tenderer(s) terms and conditions are not compliant with tender document, Institute may seek the clarification within the specified target time and if the tenderer fails to reply / or not agree / accept the terms and conditions, their tender will be treated as unresponsive and it is liable for rejection. Bids of only POC qualified tenderer will be entertained.

Evaluation of the proposals shall be done in two stages as:

1.4.1. Stage – I (Technical Evaluation)

Technical evaluation of the proposals shall be done in two stages as:

Sub-Stage –1 A

• Institute will examine all the bidder have submitted the EMD and technical bid along with all the documents as mentioned / or required in the tender document. Further whether all the documents are in prescribed format and have been properly numbered, signed and stamped and complete and generally in order.

• Tender(s) unable to qualify Sub-Stage–A will not be considered for further evaluation.

Sub-Stage –1 B (Technical Specifications)

a) The tenderer should clearly specify and state the methodology to implement the project. The entire time schedule, with specific milestones must also be furnished. Approach paper should contain:

- Solution architecture design.
- Implementation methodology along with node and connectivity details.
- Issues, suggestions and risks.
- Project time schedule and dependency.
- Integration and Acceptance Test

b) The Institute will examine the detailed technical specifications of the quoted model, whether these are complying with the specifications as mentioned in the tender document.

c) The tender which is not compliant with the tender specifications will be rejected.

After the evaluation of technical bid(s), a list of the tenderer(s) who qualify the technical evaluation (Sub Stage – 1A & 1B) shall be made. Shortlisted tenderer(s) shall be informed for the date and time for POC. The successful bidders will be informed for the date, time and place of opening of the financial bid(s) and they may depute their representative/s to attend the opening of the financial bid(s). The financial bid(s) of the only technically qualified tenderer(s) will be opened.

1.4.2 Stage – II (Financial Evaluation):

Financial bid(s) of the only technically qualified tenderer(s) will be opened for financial evaluation. Prices should be inclusive of taxes and duties, else applicable taxes and duties must be clearly mentioned with rate. The financial bid(s) will be evaluated on the basis of the total cost as quoted. The quoted rates should be applicable for Educational Institutions and if any cost advantage received in lieu thereof should be passed on to the Institute.

If there is any discrepancy between the unit price and total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly and same is to be conveyed to the tenderer with specified target time, if the tenderer does not agree with the observation of the Institute, the tender is liable to be ignored.

The rates should be quoted in Indian Rupees on FOR at destination with complete description.

Name of the manufacturer, model number must be indicated clearly in the Proforma invoice / quotation, failing which the same shall be liable for rejection.

If required, Institute can provide excise and customs exemptions certificate.

1.5 Validity:

Quoted rates must be valid for a period of 90 days from the date of the tender closing. The overall offer for the assignment and all the prices quoted by tenderer shall remain unchanged during the period of validity. If the tenderer quotes the validity shorter than the required period, the same will be treated as unresponsive and it may be rejected.

In case the tenderer withdraws, modifies or changes his offer during the validity period, the tender is liable to be rejected and the earnest money deposited shall be forfeited without assigning any reason thereof. The tenderer should also be ready to extend the validity, if required, without changing any terms and conditions of their originally quoted tender.

1.6 Delivery and Installation:

All the goods ordered should be delivered within 6 weeks from the date of the receipt of the purchase order. Maximum time of 12 weeks will be given for satisfactory installation / commissioning and handover of the equipment. Within 12 weeks after the reciept of purchase order the network should be ready to use.

Satisfactory Installation: Satisfactory installation / commissioning and handing over of the equipment mean the network is working smoothly without any delays / problems for more than 30 days.

Extension of Delivery & Installation Period: If the supplier is unable to complete the project / order within the stipulated time, for which the supplier is responsible, it is required to request for the extension of the delivery period, it may be extended by competent authority if so desired.

In case the supplier fails to complete the order / project within the stipulated time, Institute reserves the right to cancel the contract / order and performance security and / or EMD may be forfeited.

1.7 Warranty:

Tender must be quoted with the three (03) years comprehensive on-site Warranty.

1.8 Performance / Bank Guarantee:

The successful bidder will submit Performance / Bank Guarantee of 10% of the total cost for three years before claiming the final payment of project.

1.9 Training of Personnel:

The supplier shall be required to provide the technical training to the personnel involved in the use of the equipment at the Institute premises on administration and troubleshooting of the network and services, immediately after completing the installation of the equipment for a minimum period of two weeks at the company cost at the campus of GNDEC.

1.10 Award of Contract:

After due evaluation of the financial bid(s), the Institute will award the contract to the lowest evaluated responsive tenderer (herein after referred to as the "Supplier") However, the Institute also does not bind itself to accept the lowest or any tender or assign any reason for non-acceptance.

1.11 Payment Terms:

I. 50% payment of the order value shall be released after the receipt of material in good condition at the Institute premises.

II. 25% payment of the order value shall be released after the installation, commissioning and handing over of the project to the Institute.

III. Balance 25% payment of the order value shall be released after submission of the test report and satisfactory performance to be observed or tested over a period of one month. Also the final testing should be matched with POC given.

IV. Payment for miscellaneous items like HDPE pipe, chambers, PVC conduit, digging etc. shall be made on actual basis on pro-rata basis.

1.12 Jurisdiction:

All disputes shall be subject to the jurisdiction of the Court of Law at Ludhiana, Punjab.

CHAPTER-2

Schedule of Requirements and Scope of the Work

The scope of work shall consist of preparation of design, supply, installation, up-gradation and drawings, testing and commission of LAN / Wi Fi system complete in all respects and its maintenance during warranty period to the following (to be extended as per requirement) :

1. Supply and installation of switches, indoor/outdoor access points, Wireless LAN controllers, other related accessories and software as per the specifications outlined in the tender document.
2. All the proposed solution should be managabled from a centralized location.
3. The existing OFC must be used where ever possible. All the connectivity to various departments / labs and other areas where existing switches and network are working has to be connected with the campus network.
4. Solution must support Zero IT Configuration for wireless on end-user device.
5. The System Integrator / Tenderer shall provide complete end to end solution, configuration, administration and operational documentation, implementation instructions. Network Documentation along with Labelling of Cables, I/Os, Jack Panel, Switches and Access Points. OTDR to be done from both sides of OFC.
6. The digging for laying the fibre cable should be along the roadside / pavement only. No diagonal crossing of roads, lawns, grounds will be allowed. In case of any damages occurred to college property due to such digging, laying etc. in the campus the same will be repaired by the supplier else the supplier will be liable to pay the expenses for such repairs.
7. Design of wireless systems for all the location of access points as to provide coverage as outlined in the documents. The coverage criteria shall be:
   a) At least -65dBm at 95% of the intended coverage locations
   b) At least -70dBm at 100% of the intended coverage locations.

   (If failed, extra access points to be added at their own cost to meet the GURU NANAK DEV ENGINEERING COLLEGE requirements). In hostels and residential area, Wi- Fi must cover all rooms, mess, and common area.
8. Design of multiple VLANs and IP addressing scheme for the wired and wireless network and configure the wired and wireless to implement the design.
9. Design and Implementation of Wireless LAN security and authentication system for providing secure access to students, faculty and guests.
10. Supplier will make sure that the network installed is in sync with exsisting UTM and other infrastructure (network, hardware, software) of the college.
11. Proper physical protection to be given to all the access points.
12. The firm shall be responsible to draw complete site plan and network layout in the form of diagram or chart of work done and the equipment installed at the site.
13. The system proposed by the supplier should be scalable for future expansion without any performance constraints.

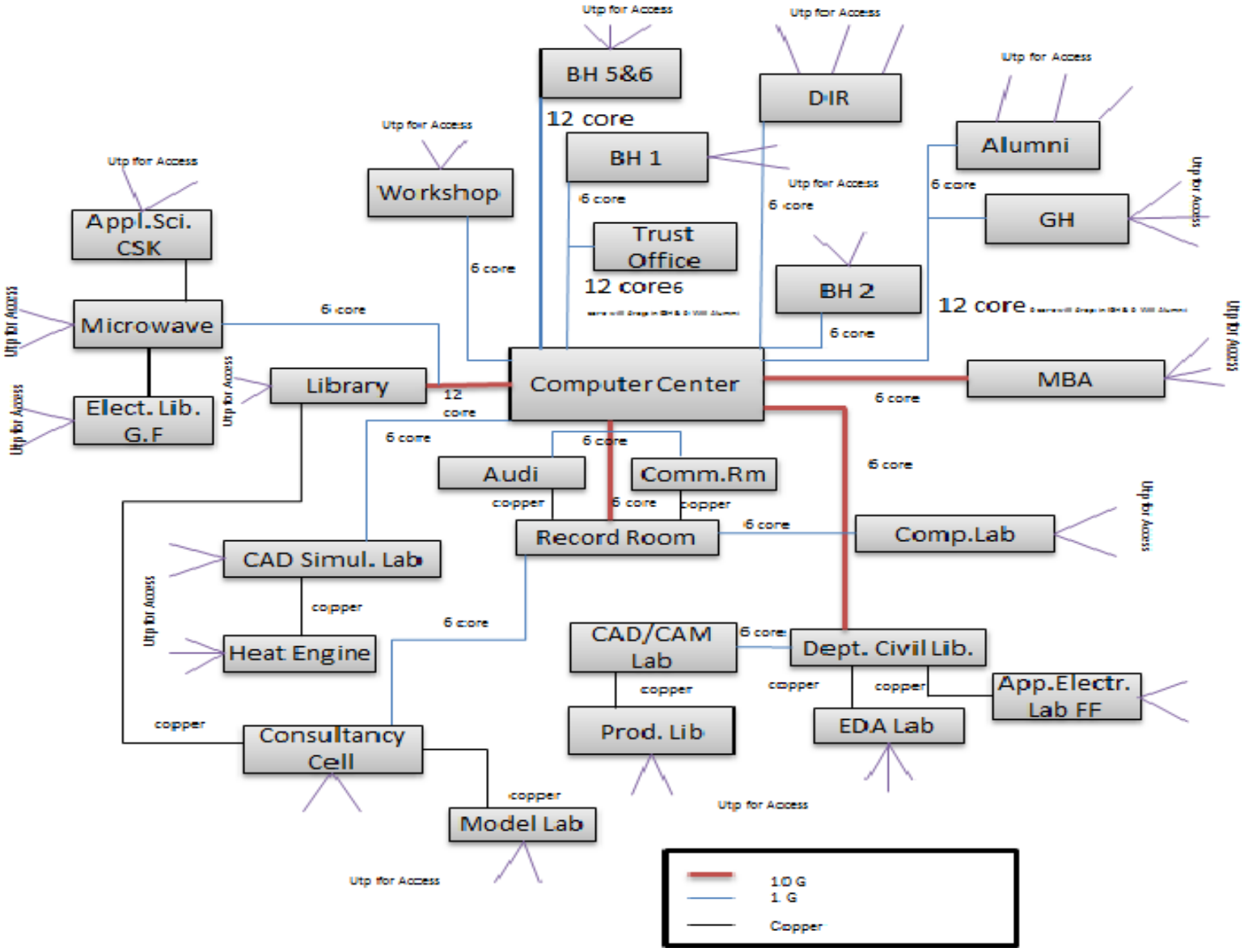
14. The system should be able to provide network and internet access to any device which is Wi-Fi enabled. The user can access the internet on any of their internet ready devices such as Smart Phones, Laptops and Tablets etc. regardless of software browser and operating system.

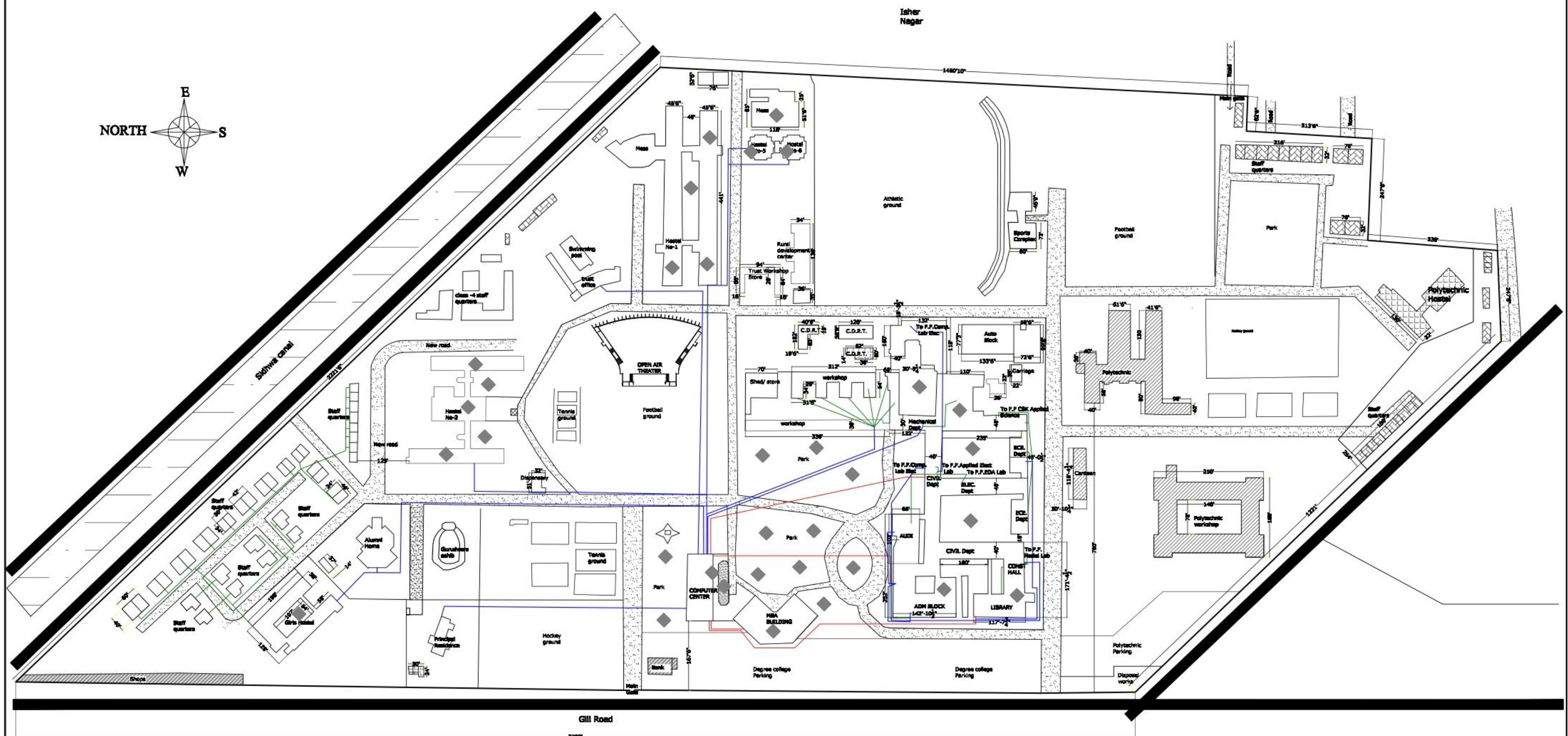
15. Testing may also be carried out at the discretion of the Institute, from the lot of finished product brought at site by the supplier. In case such tests have been carried out by the principal manufacturer at its testing facility, the same will be provided by the supplier for consideration. Also provide any certification carried out on the cabling.

16. Penta-scanning should be done at minimum 250 MHz, report less than 250MHz should not be considered and component should not be accepted. The report should be submitted in PDF format.

17. Bidder can suggest changes or alterations in existing server room, hardware / software / network infrastructure and proposed network plan to some extent, if required for some better solution

2.1 Proposed Network Plan





CAMPUS PLAN: G.N.D.E.COLLEGE.

10G CABLE-
1G CABLE-
COPPER-
WIFI-

LAY OUT PLAN OF GURU NANAK DEV ENGINEERING COLLEGE, LDH.		
SHEET NO-1	DRAWN BY:- YOGESH KUMAR	10-03-13

2.3 Tentative Ports Requirement

Main Locations	Sub Locations	No. Of Data Points
Computer Centre	Ground Floor	36
MBA	Ground Floor	24
	First Floor	24
	Second Floor	10
Record room	Ground Floor	34
Committee Room	Ground Floor	4
Central Library	Ground Floor	7
	First Floor	24
Consultancy Cell	Ground floor	18
Model Lab Civil	First Floor	9
Teachers Sitting Hall (Main Block)	Ground Floor	23
Auditorium	Ground Floor	3
Departmental Civil Library	Ground Floor	30
EDA Lab	First Floor	10
Computational Lab Electrical	First Floor + Second Floor	56
CAD Simulation Lab	First Floor	10
Applied Electronics Lab	First Floor	5
CSK applied Science	First Floor	20
Microwave Lab Electronics	Ground Floor	39
Electronics Library	Ground Floor	12
Heat Engine Lab	Ground Floor	18
Workshop Store	Ground Floor	14
Production Lab	Ground Floor	24
Director’s Residence	Ground Floor	4
Trust Office	First Floor	8
Alumni Home	Ground Floor	4

ALL THE LAWNS, DEPARTMENTS SHOWN AS ABOVE TO BE COVERED WITH WIFI CONNECTIVITY. NUMBER OF DATA PORTS CAN BE ALETERD, IF REQUIRED.

2.4 BILL OF MATERIAL

AS PER PROPOSED PLAN

S.No	DESCRIPTION	UoM	Unit	Unit Price	Total
1	Core switches as per the specs	Nos.	1		
2	Distribution Switch Type 1 as per the specifications	Nos.	8		
3	Access Switch Type 1 as per the specifications	Nos.	27		
4	Access Switch Type 2 as per the specifications (These are as per the wireless Access Point Proposed) (Bidder to quote as per their design.)	Nos.	Quote as per your design		
5	Access Switch Type 3 as per the specifications (These are as per the wireless Access Point Proposed) (Bidder to quote as per their design.)	Nos.	Quote as per your design		
6	NMS as per the specs with Real time reporting via Email and SMS.	Nos.	1		
7	10G Lasers SM @1310 nm	Nos.	10		
8	1G Lasers SM @ 1310 nm	Nos.	36		
	WIRELESS				
9	Indoor Access Point - A as per the specifications (Tentative)	Nos.	160		
10	Indoor Access Point - B as per the specifications (Tentative)	Nos.	20		
11	Outdoor Access Point as per the specifications (Tentative)	Nos.	40		
12	Wireless Controller with AP License as per proposed Access Point by bidder. (Number of licenses in controller should be Number of APs bided + 50 licenses)	Nos.	2		
13	POE injectors Gigabit (Tentative)	Nos.	56		
	PASSIVE COMPONENTS - COPPER				
14	Cat 6 cable (Tentative)	Box	Quote as per your design		
15	Cat 6 Patch Panel with rear cable manager (Tentative)	Nos.	61		
16	Cat 6 Information outlet (Tentative)	Nos.	700		
17	Cat 6 Patch Cords 0.5 mtrs (Tentative)	Nos.	210		
18	Cat 6 Patch Cords 1.0 mtrs (Tentative)	Nos.	500		
19	Cat 6 Patch Cords 2.0 mtrs as per (Tentative)	Nos.	500		
20	Face Plate with Back Box 3x3 (Tentative)	Nos.	700		
21	Cable Managers 1 U with plastic rings (Tentative)	Nos.	61		
22	Cat 6 Outside plant U/UTP cable roll of 305 (Tentative)	Box	Quote as per your design		

	FIBER MATERIAL SM OS2				
23	Fiber cable SM OS2 12 core as per Specifications (Bidder to quote as per their design.)	Mtrs.	Quote as per your design		
24	Fiber cable SM OS2 6 core as per Specifications. (Bidder to quote as per their design.)	Mtrs.	Quote as per your design		
25	LIU loaded 24 Port Drawer Style with Splice tray	Nos.	3		
26	LIU loaded 12 Port Drawer Style with Splice tray	Nos.	21		
27	Pigtails SM OS2 as per Specifications	Nos.	260		
28	Patch Cords SC -LC SM OS2 3 mtrs as per specifications	Nos.	40		
	OTHER MISCELLANEOUS ITEMS				
29	HDPE pipe with inside thread and accessories.	Mtrs.	Quote as per your design		
30	PVC Pipe 32 MM ISI mark with accessories (Bidder to quote as per their design.)	Mtrs.	Quote as per your design		
31	Rack 9 U as per Specifications	Nos.	27		
32	Rack 15 U as per Specifications	Nos.	6		
33	Poles for Outdoor Access Points	Nos.	Quote as per your design		
	SERVICES				
34	Installation of Copper point on Cat 6 which includes termination, jack panel installation, testing, Feruling, Labeling, Dressing, Rack installation, Switch mounting, AP mounting, Patching, Penta testing, Site Certification, Documentation etc.	Nos.	As per Actual		
35	Laying of Fiber (Actuals)	Mtrs.	As per Actual		
36	Splicing Per Core with OTDR from Both Sides	Nos.	260		
37	Laying of HDPE pipe (Actuals)	Mtrs.	As per Actual		
38	Trenching Soft / Hard Soil (Actuals)	Mtrs.	As per Actual		
39	Other charges, if any	Nos.	As per Actual		
40	Cost of Resident Engineer for atleast 1 years if any		1		

2.5 Technical Compliance Sheet - Switches

NOTE: All the Switches and OFC/Copper Module should be of Single OEM

Core Switch

SN.	Description	Complied (Y/N)	Remarks
1	Switch architecture should be modular / virtual chassis based.		
2	Switch should have internal redundant power supplies and fans.		
3	Switch should have wire-speed, non-blocking and distributed forwarding on all the ports.		
4	The Core Switch should have the following ports from day one in any combination: • 12x 10G SFP+ or more • 20x 1G SFP or more • 20x 10/100/1000 BaseT or more • 6x 40G QSFP or more		
5	Should support minimum 800 Gbps or more backplane capacity.		
6	Should support minimum forwarding rate 595 Mpps or more		
7	Support for IPv4 and IPv6 from day one.		
8	Should support Q-in-Q VLAN tagging or equivalent feature.		
9	Should have Static Routing, RIP, OSPF, VRRP, ISIS and PIM from day one.		
10	Should support PVST / PVST+ or equivalent spanning tree protocol		
11	Should support Hot Standby Router Protocol (HSRP) or equivalent protocol to create redundant topologies.		
12	Should support Unidirectional Link Detection Protocol (UDLD) or equivalent protocol to allow unidirectional links failure detection		
13	Should support minimum 8 ports or more of Bandwidth aggregation through Ether Channel or equivalent protocol enhances fault tolerance and offers higher-speed aggregated bandwidth		
14	Should support VTP or equivalent protocol for dynamic VLAN		
15	Should support min 28K MAC addresses and min 4096 active VLANs.		
16	Support management using CLI, GUI, using Web interface. Additionally, management can also be done using NMS.		
17	Hardware and Software of the switch should be common criteria EAL / NDPP certified.		
18	Should support MPLS and ISIS		
19	Should be quoted with 3 years direct OEM TAC support and next business day hardware shipment.		

Distribution Switch

SN.	Description	Complied (Y/N)	Remarks
1	Switch should have wire-speed, non-blocking and distributed forwarding on all the ports.		
2	Switch should have minimum of 24x 10/100/1000 RJ45 Ethernet ports plus 2x 10G SFP+ based ports for uplinks and support redundant external / internal power supply.		
3	Should support stacking up to 6 units or more in a single stack managed by a single IP address and necessary stacking ports should be available from day		
4	Should support minimum 88 Gbps or more switch fabric capacity.		
5	Should support minimum forwarding rate 65 Mpps or more		
6	Should Support for IPv4 and IPv6 from day one.		
7	Should support Q-in-Q VLAN tagging or equivalent feature.		
8	Should have Static Routing, ECMP, IGMP Snooping (v1/v2/v3) from day 1		
9	Should support PVST / PVST+ or equivalent spanning tree protocol		
10	Should support Hot Standby Router Protocol (HSRP) or equivalent protocol to create redundant topologies.		
11	Should support Unidirectional Link Detection Protocol (UDLD) or equivalent protocol to allow unidirectional links failure detection		
12	Should support minimum 8 ports or more of Bandwidth aggregation through Ether Channel or equivalent protocol enhances fault tolerance and offers higher-speed aggregated bandwidth		
13	Should support VTP or equivalent protocol for dynamic VLAN registration		
14	Should support min 12K MAC addresses and min 2000 active VLANs.		
15	Support management using CLI, GUI, using Web interface. Additionally, management can also be done using NMS.		
16	Hardware and Software of the switch should be common criteria EAL / NDPP certified.		
17	Should support MPLS and ISIS		
18	Should be quoted with 3 years direct OEM TAC support and Next Business day hardware shipment.		

Access Switch (Type 1)

SN.	Description	Complied (Y/N)	Remarks
1	Switch should have wire-speed, non-blocking and distributed forwarding on all the ports.		
2	Switch should have minimum of 24x 10/100/1000 RJ45 Ethernet ports plus 4x 1G SFP based ports for uplinks.		
3	Should support stacking up to 4 units or more in a single stack managed by a single IP address and necessary stacking ports should be available from day		
4	Should support minimum 56 Gbps or more switch fabric capacity.		
5	Should support minimum forwarding rate 41 Mpps or more		
6	Should support Q-in-Q VLAN tagging or equivalent feature.		
7	Should support IGMP Snooping (v1/v2/v3) from day one.		
8	Should support PVST / PVST+ or equivalent spanning tree protocol		
9	Should support Unidirectional Link Detection Protocol (UDLD) or equivalent protocol to allow unidirectional links failure detection		
10	Should support minimum 8 ports or more of Bandwidth aggregation through Ether Channel or equivalent protocol enhances fault tolerance and offers higher-speed aggregated bandwidth		
11	Should support VTP or equivalent protocol for dynamic VLAN registration		
12	Should support min 8K MAC addresses and min 1000 active VLANs.		
13	Support management using CLI, GUI, using Web interface. Additionally, management can also be done using NMS.		
14	Hardware and Software of the switch should be common criteria EAL / NDPP certified.		
15	Should support MPLS and ISIS		
16	Should be quoted with 3 years direct OEM TAC support and next business day hardware shipment.		

Access Switch (Type 2) POE

SN.	Description	Complied (Y/N)	Remarks
1	Switch should have wire-speed, non-blocking and distributed forwarding on all the ports.		
2	Switch should have minimum of 24x 10/100/1000 POE+ RJ45 Ethernet ports plus 4x 1G SFP based ports for uplinks.		
3	Should support stacking up to 4 units or more in a single stack managed by a single IP address and necessary stacking ports should be available from day		
4	Should support minimum 56 Gbps or more switch fabric capacity.		
5	Should support minimum forwarding rate 41 Mpps or more		
6	Should support Q-in-Q VLAN tagging or equivalent feature.		
7	Should support IGMP Snooping (v1/v2/v3) from day one		
8	Should support PVST / PVST+ or equivalent spanning tree protocol		
9	Should support Unidirectional Link Detection Protocol (UDLD) or equivalent protocol to allow unidirectional links failure detection		
10	Should support minimum 8 ports or more of Bandwidth aggregation through EtherChannel or equivalent protocol enhances fault tolerance and offers higher-speed aggregated bandwidth		
11	Should support VTP or equivalent protocol for dynamic VLAN registration		
12	Should support min 8K MAC addresses and min 1000 active VLANs.		
13	Support management using CLI, GUI, using Web interface. Additionally, management can also be done using NMS.		
14	Hardware and Software of the switch should be common criteria EAL / NDPP certified.		
15	Should support MPLS and ISIS		
16	Should be quoted with 3 years direct OEM TAC support and next business day hardware shipment.		

Access Switch (Type 3) (FOR WIRELESS SOLUTION ONLY)

SN.	Description	Complied (Y/N)	Remarks
1	Switch should have wire-speed, non-blocking and distributed forwarding on all the ports.		
2	Switch should have minimum of 4/8/12 port of PoE+ (As per the bidder wireless design)		
3	Should have 2 x 1G SFP ports for uplinks available from day one.		
4	Should support non-blocking switching fabric capacity. This will depend on the number of ports of the switch.		
5	Should support maximum forwarding rate depending upon the number of ports of the switch.		
6	Should support Q-in-Q VLAN tagging or equivalent feature.		
7	Should support IGMP Snooping (v1/v2/v3) from day one		
8	Should support PVST / PVST+ or equivalent spanning tree protocol		
9	Should support Unidirectional Link Detection Protocol (UDLD) or equivalent protocol to allow unidirectional links failure detection		
10	Should supportaccordigly minimum ports or more of Bandwidth aggregation through EtherChannel or equivalent protocol enhances fault tolerance and offers higher-speed aggregated bandwidth		
11	Should support VTP or equivalent protocol for dynamic VLAN registration		
12	Should support min 8K MAC addresses and min 1000 active VLANs.		
13	Support management using CLI, GUI, using Web interface. Additionally, management can also be done using NMS.		
14	Hardware and Software of the switch should be common criteria EAL / NDPP certified.		
15	Should support MPLS and ISIS		
16	Should be quoted with 3 years direct OEM TAC support and next business day hardware shipment.		

2.6 Wireless Controller

SN.	Description	Complied (Y/N)	Remarks
1	WLAN Controller should have minimum 2 nos. of 10/100/1000 Ethernet Ports and one Console port. It should be 1/2U Rack Mountable.		
2	Proposed Controller should be ready for supporting extra 50 Acess Points from day one with scalability for 500 Acess Points support in future without adding any new hardware. Each controller (primary and Redundant) should be able to support minimum 6000 devices and 500 campus connected AP's or more with support of seamless roaming access over L2/L3 Network. **(50 extra licenses means e.g. if as per bidder survey, number of Acess Points is 250, then the bidder will be quotating controller with 300 Access Point Licenses.)**		
3	Redundancy Features: Controller Must provide Active: Active / Active: Standby with 1+1 and N+1 redundancy. The controllers will be implemented in HA mode so When the primary controller fails secondary controller comes up immediately. There should be 100% redundancy for Primary controller i.e. N: N including Hardware and desired licenses to support Access Points		
4	Controller should support minimum 256 WLAN's		
	General Features		
5	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.		
6	Controller should support Spectrum Analysis feature to Detect interference from different sources. System Should provide real-time charts showing interference for access point, on a per-radio, per-channel basis.		
7	Ability to map SSID to VLAN and dynamic VLAN support for same SSID.		
8	Controller must support 802.11k and 802.11r.		
9	Access points can discover controllers across Layer-3 network through DHCP or DNS option		
	Security & Monitoring		
10	Controller should support following for Security & Authentication		

11	WIRELESS SECURITY: WEP, WPA-TKIP, WPA2-AES, 802.11i		
12	AUTHENTICATION: 802.1X, local database External AAA servers : Active Directory, RADIUS, LDAP		
13	System should provide DOS attacks and Intrusion Detection and Prevention and Control for any Rough Access Points.		
14	The Acess Point should be able to scan for rogue access points and the controller should be able to locate them on a floor map. The controller / System should be able to send a notification to the administrator when a rogue Acess Point has been detected.		
15	System must be able to provide L2/L3/L4 Access Control.		
16	Controller should support L2 Client Isolation so that End Users cannot access each other's devices. Isolation should have option to apply on Acess Point or SSID's.		
17	Controller should be able to create local database of up to 6000 users.		
18	IPv4 & IPv6 support from Day 1		
19	Controller should support integrated or External AAA Server including Microsoft AD and Linux based open source AAA servers.		
20	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 Access Point.		
21	The Controller should support OS/Device identification and device type based policies i.e allow or deny, Bandwidth rate limit, VLAN mapping.		
22	When Mesh is enabled the controller should be able to show the mesh topology on floor plans.		
23	The Controller/System 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.		
24	The vendor should specify if all features are available with the basic access controller pricing or if the support of some features require the acquisition of some licenses. The vendor should specify which feature requires which type of licensing including its cost.		

25	Controller should have BYOD features and Guest Access management procedure where user may use internet without entering to Enterprise SSID and should be time restricted.		
	QoS features		
26	Per SSID or dynamic Per user bandwidth Rate Limiting		
27	Support advanced multicast features and WMM support to provide best performance on Video applications.		
28	Should have Voice Call Admission control		
	Client Management		
29	The controller should provide a Guest Login portal in order to authenticate users that are not part of the organization.		
30	The Controller 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.		
31	System should be able to send password direct through Email and SMS to the user.		
32	System should be able to generate one click password for single user, multiple users or single user multiple devices.		
33	System should support user management features like Rate limiting based on time based WLAN Access and User profile per WLAN etc.		
	Regulatory		
34	Wi-Fi Alliance certified		

2.7 Indoor Access Points – A and B

Indoor Access Point (AP) - A			
SN.	**Description**	**Complied (Y/N)**	**Remarks**
1	The Access Point should have minimum 1 Port 10/100/1000Mb PoE Uplink port.		
2	802.11n Access Point should be able to power up using standards 802.3af POE input, and at the same time Operate in full MIMO mode. It must have option to power through 12V DC Power Adaptor also.		
3	AP should have Dual Radios to support 2.4 GHz and 5 Ghz concurrent users with 802.11 a/b/g/n/ac capability. AP Must support 2x2 MIMO.		
4	AP should be able to handle 200 or more Concurrent users.		
5	AP should provide minimum 23 dBm Transmit power for 2.4Ghz and 21 dBm for 5Ghz radio. (EIRP should be limited as per government regulation for indoor AP's).		
6	AP should have -99 dB or better Receiver Sensitivity.		
7	Access Points can perform encryption / decryption on itself so as not to bottleneck the controller		
8	SSID support : 16 BSSID (8 BSSID per Radio)		
9	AP should support 300Mbps in 2.4Ghz 802.11b/g/n and 850 Mbps in 5Ghz 802.11/a/n/ac or higher datarates.		
10	The access point should support 802.1q VLAN tagging		
11	Antenna: Integrated omni-directional, with min 3 dB Gain for 2.4Ghz and 5Ghz both.		
12	Implement Wi-Fi alliance standards WMM, 802.11d, 802.11h and 802.11e		
13	AP Must support spectrum analysis to detect RF Interference in indoor area.		
14	AP should have technique to provide better reception for hard to hear clients and consistent performance while clients change their orientation i.e. beam forming / polarization.		
15	AP should support the operating temp 0° to 45° C and Humidity: 15 to 95% non-condensing.		
16	The access point should support following securitymechanism: WEP, WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i.		

17	System should support Authentication via 802.1X, Local (controller based) authentication database, support for RADIUS and Active Directory.		
18	Web User Interface (HTTP/S) • CLI (Telnet/SSH),SNMP v1, 2, 3		
19	AP should be managed by Controller or standalone, if required		
20	WEEE/RoHS compliance, EN 60601-1-2, Wi-Fi Alliance certified, UL 2043 compliant		
21	AP should be WPC approved; ETA certificate to be enclosed		

Indoor Access Point (AP) - B (For Director's Office / HODs offices)			
SN.	**Description**	**Complied (Y/N)**	**Remarks**
1	The AP shall be indoor type and can be mounted on wall / ceiling. Required mounting kit should be included with each AP.		
2	The AP shall have at least one Gigabit Ethernet port supporting 10/100/1000BaseT with 802.3af/at PoE support, 3 port 10/100 including 1 port PoE out to power VOIP phone and One Digital PBX Pass through port support.		
3	AP shall support 802.11n standard along with legacy 802.11a/b/g standards.		
4	AP shall have Dual radio to operate in 2.4 GHz and 5 GHz band simultaneously.		
5	AP shall have integrated / external antenna with minimum 2x2 MIMO with 2 spatial streams.		
6	AP shall give 600 Mbps per AP (300 Mbps / Radio) or higher throughput.		
7	The AP shall have auto channel selection feature to avoid interference.		
8	The AP shall support indoor wireless mesh configuration.		
9	AP shall provide at least 8 BSSID's per radio.		
10	Transmit power shall be configurable as per India specific norms for indoor deployment and shall be adjustable within the permissible range.		
11	AP shall be able to optimize capacity and performance using airtime fairness feature.		
12	AP shall provide Radio transmit power of at least 19 dBm for 2.4 GHz and 16 dBm for 5 GHz bands. (Max power should be limited as per Govt EIRP limit for indoor)		

13	802.1Q based VLANs to be supported.		
14	AP should provide L2TP/PPoE or equivalent tunnelling support.		
15	AP shall support 802.11e based QoS features.		
16	AP shall provide software queues for prioritization of latency prone traffic like voice and video.		
17	AP shall support ToS and/or VLAN based traffic classification.		
18	Support for Spectra link Voice or WMM with U-APSD		
19	AP shall support per user or per WLAN based rate limiting.		
20	AP shall have WISPr support for walled garden deployments as well as provisioning Wi-Fi hotspots with time based user access/session control.		
21	AP shall support WEP, WPA2-AES, WPA-PSK, WPA-TKIP.		
22	AP shall support 802.11i, 802.1x based authentication		
23	AP shall support Captive portal for guest user authentication.		
24	AP shall support centralized authentication with external RADIUS, LDAP or Active Directory.		
25	Operating Temperature: 0 to 50 degree Centigrade.		
26	Operating Humidity: 15% - 95% non-condensing.		
27	IPv4, IPv6, dual-stack Should be supported		

2.8 Outdoor Access Point (AP)

SN.	Description	Complied (Y/N)	Remarks
1	The Access Point should have minimum 1 Port 10/100/1000Mb POE in Ethernet port.		
2	802.11n Access Point should be able to power up using standards 802.3af/at POE input, and at the same time operate in full MIMO mode.		
3	AP should have Dual Radios to support 2.4 GHz and 5Ghz concurrent users with 802.11 a/b/g/n capability. AP Must support 3x3 or 2x3 or 2x2 MIMO with 2 Radio Chain		
4	AP should be able to handle minimum 200 Concurrent users.		
5	AP should provide minimum transmission power of 25 dBm in 2.4Ghz and 5Ghz.		
6	Wireless Interface: Dual radio; 802.11a/b/g/n/ac; 2.4Ghz		
7	SSID support : 16 BSSID (8 BSSID per Radio)		
8	AP should support 6.5Mbps – 130Mbps (20MHz), upto 300Mbps (40MHz) or higher datarates in 802.11n.		
9	The access point should support 802.1q VLAN tagging		
10	Antenna: Integrated/External for Sectorial/Omni-directional (as specified in BOQ) coverage, with min 4 dB aggregate Gain for 2.4Ghz and 5Ghz both.		
11	AP should support the operating temp -10° to 55° C and Humidity: 15 to 95% non-condensing.		
12	AP Must be IP 67 certified for outdoor deployment. AP must be outdoor rated and no AP will be accepted which is indoor and installed in outdoor casing.		
13	The access point should support following security mechanism: WEP, WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i.		
14	System should support Authentication via 802.1X, Local (controller based) authentication database, support for RADIUS and Active Directory, LDAP.		
15	Web User Interface (HTTP/S) • CLI (Telnet/SSH), SNMP v1, 2, 3		
16	AP should be managed by Controller or standalone if Required		
17	WEEE/RoHS compliance •Wi-Fi Alliance certified		
18	AP should be WPC approved; ETA certificate to be enclosed		

2.9 IMPORTANT POINTS

1. **FOR WIRELESS SOLUTION**

   The quantities mentioned for Wi-Fi Solution is as per our design and survey. Bidders are requested to survey the campus and give their own solution for wireless. The no of POE Switches will be changed as per the bidder design. The payments will be on actual quantities quoted as per bidder design.

2. **FOR LAN AND CAMPUS CONNECTIVITY**

   Quantities for Core, Distribution and Access Switches for Data are fixed. For Data Solution no other charges would be payable by the Institute.

3. **FOR SERVICES**

   Quantities will be as per actuals for services. Bidder has option to quote unit price or lumsum price. The payment will be made after successful implementation.

2.10 SPECIFICATIONS FOR PASSIVE AND OTHER MISCELLANEOUS ITEMS

	ITEM WISE SPECIFICATION		
SN.	**Description**	**Complied (Y/N)**	**Remarks**
A	**Category 6 UTP Roll of 305 Mtrs**		
	Category 6 Unshielded Twisted Pair 100W cable shall be compliant with EIA/TIA 568-C.2		
	Should be 4 pair, 23 AWG		
	Cable should be CM rated		
	Cable Should Have Internal cross separator		
	Jacket: LSZH (Low smoke zero halogen)		
	Fire Propagation Test:IEC 60332-3-22 (Test Certificate Need to be provided along with the bid)		
	Should be ETL verified. (Certificate Need to be provided along with the bid)		
B	**FACE PLATE**		
	Single Gang square plate, 86mmx86mm		
	Plug in Icons – Icon tree – to be supplied with plate		
	Write on labels in transparent plastic window – supplied with plate		
	Material : ABS Plastic		
C	**INFORMATION OUTLET**		
	Category 6, EIA/TIA 568-C.2		
	All information outlets for 100 W, 22-24 AWG copper		
	Should have integrated shutter on I/O or Faceplate		
	Should be UL Listed and ETL verified		
	Contact Plating: 50 µinches gold over 100 µ inches Nickel		
	Operating Life: Minimum 200 Re-terminations		
D	**24 PORT JACK PANEL**		
	Should Be made of cold rolled steel		
	Should conform to TIA / EIA 568-C.2 Component Compliant		
	Should terminate 24 UTP CAT 6 (4 pair) Cables		
	Ports should be with individual dust cover and individual replaceable		
	Should confirm to EIA/TIA 568A wiring Pattern		
	Should have labelling strips for identification.		
	Should have integral cable management shelf.		
	Should be ETL verified		
E	**MOUNTING CORDS (0.5 , 1 and 2 METER)**		
	Should be 4 Pairs 24 AWG copper cables.		

	The Outer Jacket should be Low Smoke Zero Halogen.		
	24 AWG stranded bare copper		
	Should minimum comply with proposed ANSI/TIA/EIA-568-C.2		
	Should have cross separator		
F	**OPTICAL FIBER CABLE ARMORED SINGLE MODE 6/12 CORE - OS2**		
	Should be ISO.IEC 11801 - 2nd Edition, type OS2 and ITU-T REC G 652D		
	Tube Identification : Single / Multiple tube		
	Strength member: Two steel wires on periphery / Two FRP rods on periphery / Central strength member FRP		
	Fibre protection(Tube) : Polybutylene Terephthalate (PBT)		
	Water Blocking : Thixotropic Gel (Tube) and Petroleum Jelly (Interstices)		
	Core Wrapping : Polyethylene Terephthalate		
	Armouring : Corrugated Steel Tape Armour (ECCS Tape)		
	Sheath : UV Stabilized Polyethylene (HDPE)		
	Tensile Strength : 1250 N or better		
	Mass (Nominal) : 95 kg/km		
G	**FIBER PATCH PANELS – RACK MOUNT 12/24 PORT LOADED**		
	Have sufficient slots to accommodate Four 6 Pak SC adaptor plates		
	Should have fibre management provision inside		
	Have earthing lugs and other accessories.		
	Provide self-adhesive, clear label holders for labelling		
	Should be rack mountable 1U		
	Should have Separate Splice holder for 24 Fiber cores		
	Should be Sliding Drawer Style		
	Should be made of Cold Rolled Steel		
H	**OPTICAL FIBER PIGTAILS SINGLE MODE OS2, 1.5 MTR**		
	Precision ferrule endface geometry		
	Factory polished, tested and serialized.		
	Buffer Diameter: 900um tight buffer		
	Minimum bend radius: install: 30 mm		
	Retention Strength: 100N		
	Cable: 900um Buffered		
I	**OPTICAL FIBER EQUIPMENT CORDS**		
	(MINIMUM 3 METER)		

	All optical fiber patch leads shall comprise of Single mode 9/125µm OS2 fiber SC -LC		
	Jacket should be LSZH sheath		
	Connector: Zirconia ceramic ferrule		
	Cable: 9/125, SM OS 2 Strength member: Aramid Yarn		
J	**CAT 6 Outside Plant UTP Cable**		
	Type: 4 Pair Cat 6 UTP Outdoor cable with 2 Jackets primary and secondary / Cat 6 armoured UTP cable with two jackets primary and secondary		
	Conductors Wire gauge: 23 AWG solid copper		
	Should have two Overall Jackets Primary Jacket and Secondary Jacket		
	Cross Filler: Star cross fillers to separate the individual pairs		
	Application : Outdoor Application		
	Operating Temparature: 10 Deg C to 70 Deg C		
	Performance: should meet ISO/IEC 11801;TIA/EIA-568.C.2 Standards		
	Minimum Outer Diameter : 8.5 mm		
	Should be suitable for outdoor installation		

2.11 Proof of Concept (POC)

The architecture, design and technical specifications of the offered wired and Wi-Fi solution will be evaluated by GNDEC Ludhiana in terms of their functional requirements using "Proof of Concept" (POC). The POC will be divided in two parts as below:-

Part A. The tenderer should provide the following for the offered solution.

Overview of the Proposed Solution, Overall architecture, Scalability and Redundancy and Delivery and Implementation Schedule.

Sr No	Activity	Schedule in weeks
1	LAN and Wi-Fi System Design, Layout diagram and cable route identification and approval of same.	
2	Supply of Active and Passive components.	
3	Installation of Passive Components like Cable laying, Termination, IO box fixing, Rack Mounting etc. and testing thereof	
4	Installation and Configuration of Active Components like, WLAN Controller, Access Points (AP) etc.	
5	Testing of the entire LAN and Wi-Fi System including Integration with Server and other Network devices, Fine-tuning as per best performance and Security polices thereof.	
6	A centralized network management system should be supplied along with the hardware, making it possible to manage and monitor the entire network from a single location. **Real time reporting over the network and programmable alarms over e-mail and SMS should be possible in all network switches in the proposed solution IS VERY IMPORTANT.** All network switches should support IPv6 in the proposed configuration, without addition of any hardware, software or license requirement. **SPECIAL POINTS WILL BE GIVEN FOR THE FOLLOWING:** • Technical rating of the overall proposal: • Features related to network management system: • Features related to alarms in case of a failure.	

7	Deployment of 1 Resident Network Engineer for the period of atleast 1 years (Immediately after Final inspection)	
8	Training of officials/Users	
9	Handover of Installed items providing details of quantity, Warranty, Escalation Matrix, Network diagrams/Layout, Documentation, Configuration,	

Part B. The **GURU NANAK DEV ENGINEERING COLLEGE, LUDHIANA** is expecting that offered Wi-Fi solution will provide following functionalities:-

- Good Coverage
- Sustained Throughputs to the Clients, even in the presence of interference/noise.
- Good AP Performance under load (high density usage).
- Ability to support Multimedia (Multimegabit/Multicast applications).
- Ease of Use.
- The Enterprise class secured Wi-Fi Solution.

During POC, The tenderer should submit Heatmap along with number and type of tentative access points required. POC will be done using the same make and model which are complying as per the technical specifications mentioned in tender document. All offered Wi- Fi & LAN equipment's should be as per IEEE standards. All Wi-Fi equipment specifications are subject to Indian Government guidelines and any frequency/transmission power/Antenna Gain shall stand amended automatically to that extent.

Sr. No.	Test Description	Expected Results	Maximum Marks	Marks Obtained	Results Obtained/ Remarks
1	Run in SSIDer to check the Max Distance with RSSI of -65dB or better.	Note the max distance covered by AP with -65dB (on 2.4 GHz or 5 GHz) in provided Sheet. Check for AP with Max coverage Location 1 on -65dB RSSI = 10 Marks Location 2 on -65dB RSSI = 12 Marks Location 3 on -65dB RSSI = 15 Marks (locations will be marked by Technical team during POC and will be same for all vendors)	15		

2	Throughput Test with 20-25 Clients using Iperf / Jperf for 2.4Ghz and 5Ghz Clients.	Record the throughput at different locations (inside AP coverage Area at multiple rooms) for TCP uplink / Downlink and uplink / downlink at same time. (sheet will be provided for each result capture) Maximum marks will be given to highest throughput provider and therefore 2 marks will be deducted of throughput provider in downwards tendencies.	15		
3	HD Video Streaming on single AP (at least 10 on 2.4 GHz and 15 on 5GHz). Devices will be spread across the Coverage Area of Access Point	All devices should work without disruption or jitter at coverage distance (sheet will be provided to users to provide result)	15		
4	Demonstrate time based, Role based and device based access	Should able to give Access on time basis, Role basis and based on device type. For example Android devices should be restricted for limited bandwidth and should connect on a particular VLAN only.	2.5		
5	Rough AP detection and neighbour AP classification.	IDS functionality test	2.5		
6	Demonstrate per User / per SSID bandwidth	Should able to limit the Bandwidth as per user as well as per SSID or Not?	5		
7	Integration with Active Directory/Radius/ LDAP	Demonstrate integration of system with Active Directory/ Radius/ LDAP = 2 Marks Demonstrate 802.1x for Valid users = 2Marks Captive portal Authentication for Guest User = 2 Marks	6		

8	Demonstrate guests Access with password generation and how your Network is secure from Guest Access. Demonstrate customize registration page for guest access.	Guest Access with Password Generation. Restricted access to *Office data from Guest Access *Password sharing to Guest through Email and SMS	5		
9	Demonstrate Dashboard customization and troubleshooting of WLAN Network.		5		
10	Roaming	Does the SUT provide fast secure roaming between Access Points on the SAME VLAN?	5		
11	Demonstrate how you see the type of devices brought by an individual user. (Device Fingerprinting)	Whether able to see the type of device user is carrying or Not?	4		
12	NMS Featureset for Wired and Wireless NMS	Real Time Reporting Via SMS and email for wired network. Guest Login Authentication for Wireless via SMS and email.	20		
Total			100		