

BOQ

Table: Bill of Material for campus Wi-Fi extension to Admin Block and AB-2 building.

| S.No | Description | Qty. | Unit |
|---|---|------|-------|
| Ruckus Wi-Fi | | | |
| 1 | ZoneFlex R500 dual-band 802.11abgn/ac Wireless Access Point, 2x2:2 streams, BeamFlex+, dual ports, 802.3af PoE support with fixing accessories. | 50 | Nos. |
| 2 | ZoneFlex T300 Series (Dual-Band 2x2:2 802.11ac AP) with three year warranty and fixing accessories. | 6 | Nos. |
| 3 | ZoneDirector 3000 License Upgrade supporting an additional 50 ZoneFlex Access Points (909-0050-ZD00) | 1 | No. |
| Brocade 24 POE port managed switch | | | |
| 1 | 24-port 1GbE PoE switch with minimum 2x1GbE SFP+ (upgradeable to 10GbE) up-link ports | 5 | Nos. |
| 2 | Fiber Transceiver for Single mode fiber | 4 | Nos. |
| Copper Components (Cat-6 – Data) | | | |
| S.No | Description of Material | | |
| 1 | Cat 6, Power Cat Plus ,UTP Cable, 4 pair, 305 mtrs, Blue | 15 | Nos. |
| 2 | 24 port fully Loaded cat-6 Jack Panel | 7 | Nos. |
| 3 | PowerCat6 Data Gate Jack, Shuttered WHITE | 56 | Nos. |
| 4 | Synergy Wall Plate 1 Port - 86mmx86mm- White | 56 | Nos. |
| 5 | SMB | 56 | Nos. |
| 6 | CAT 6 Patch cord, 1 Mtr; Blue -LSZH | 112 | Nos. |
| 7 | SC-LC Style LSZH Single mode 9/125 micron Duplex Patch Cord (3 meter length) | 4 | Nos. |
| Accessories | | | |
| S.No | Description of Material | | |
| 1 | 25MM PVC Pipe (with required saddle,screws and gutties for surface wiring) | 1100 | meter |
| Services | | | |
| S.No | Description of Services | | |
| 1 | Laying of UTP cable | 4575 | meter |
| 2 | Laying of PVC Pipe | 1100 | meter |
| 3 | Termination of IO | 56 | Nos. |
| 4 | Jack-Panel Termination | 7 | Nos. |
| 5 | Installation & Dressing of Rack and labeling | 7 | Nos. |
| 6 | Installation and mounting of Aps | 56 | Nos. |
| 7 | Project Implementation | 1 | No. |

Note for the Bidder:

1. Bidder should have executed orders of similar nature in the past in at least three different Govt./Semi-Govt organizations.
2. The active components should be from Ruckus and Brocade as per requirement in the BoM so as to meet the backward compatibility of the existing Wi-Fi system of the Institute.
3. All Passive Components except accessories should be from the same OEM.
4. The bidder should be ISO 9001:2000 & QS: 9000 certified. In the changing needs of the global resources if the company has environmental management systems in place like ISO 14001 accreditation the same shall be added advantage.
5. Technical bid should accompany the part number, model number of the quoted items along with data sheets.
6. Before execution of work, bidder will prepare and submit the actual detail regarding earmarked AP locations in said buildings. The connectivity work in AB-2 building will be done in same fashion as in already commissioned AB-1 building.
7. 9U Racks will be provided from old stock available with us.

Specification Sheet

Ruckus Wi-Fi

A. Indoor WIRELESS ACCESS POINT Ruckus R500

| S. No | Specification / Requirement |
|-------|--|
| 1 | The APs should support the 802.11a, 802.11b, 802.11g and 11n and ac standards. It should also support 802.11ac standard in the 5 GHz band. |
| 2 | Simultaneous client support on both dual band radio is essential. |
| 3 | Shall provide Min 22 dBm Radio output power for both Radio's. |
| 4 | Should support minimum 2x2 or higher MIMO on both radio bands for an aggregate capacity of 1.150Gbps |
| 5 | The access points should be centrally managed but In some small isolated environments the AP should be able to function as a full-fledged stand-alone access point without the requirement of a controller. |
| 7 | Security mechanisms should be in place to protect the communication between the Access Point controller and the Access Points. |
| 8 | Since most radio interference come from the WLAN network itself the vendor should specify what mechanisms such as beam steering/ adaptive antenna technology/ beamforming are available in combination to focus the energy on the destination STA and minimize radio interference with the surrounding of the AP. The vendor should specify if the activation of such feature is still compatible with 802.11n spatial multiplexing. |
| 9 | Since the WLAN network will be using an unlicensed band the solution should have mechanisms that reduce the impact of interference generated by other radio equipment operating in the same band. Describe techniques supported. |
| 10 | The access point should be able to detect clients that have dual band capability and automatically steer those client to use the 5GHz band instead of the 2.4GHz band. |
| 11 | The antennas to be dual polarised and should be integrated inside the access point enclosure to minimize damage and create a low profile unit that does not stand out visually. |
| 12 | The access point should have at least 1 10/100/1000Mbps Ethernet ports with POE support for 802.11af standard. |
| 13 | The access point should support 802.1q VLAN tagging |
| 14 | The access point should support WPA2 enterprise authentication and AES/CCMP encryption. AP should support Authentication via 802.1X and Active Directory. |
| 15 | Implement Wi-Fi alliance standards WMM, 802.11d, 802.11h and 802.11e |
| 16 | The Access Point should provide for concurrent support for high definition IP Video, Voice and Data application without needing any configuration. This feature should be demonstrable. |
| 18 | Channel selection based on measuring throughput capacity in real time and switching to another channel should the capacity fall below the statistical average of all channels without using background scanning as a method. |
| 19 | Should support Transmit power tuning in 1dB increments in order to reduce interference and RF hazards |
| 20 | Device antenna gain (integrated) must be at least 3dBi and should provide automatic interference rejection of about 10dB. |
| 21 | Should support up to 200 clients per AP |
| 22 | Should support DHCP Option 82 in standalone mode (without Controller) as well as in Managed mode (with Controller) |
| 23 | For troubleshooting purposes, the administrator should have the ability to remotely capture 802.11 and / or 802.3 frames from an access point without disrupting client access. |

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| 24 | Operating Temperature: 0°C - 45°C |
| 25 | Operating Humidity: 10 % - 95% non-condensing. |
| 26 | Should be plenum rated and comply to RoHS |
| 27 | Should be WiFi certified; WiFi certificate to be enclosed |
| 28 | Should be WPC approved; ETA certificate to be enclosed |
| 29 | Device should be UL 2043 Plenum Rated. |

B. ZoneFlex T300 Series (Dual-Band 2x2:2 802.11ac AP) with three year warranty and with fixing accessories.

1. Access Points proposed must include radios for both 2.4 GHz and 5 GHz.
2. Must have a robust design for durability
3. AP Must be IP 67 Certified and outdoor rated (datasheet of the Access Point should have IP- 67 mentioned).
4. Operating temperature: -10 degree to 55 degree
5. Should be able to handle up to 250 Concurrent users.
6. Must support 2X2 multiple-input multiple-output(MIMO).
7. Must support simultaneous 802.11a/b/g/n/ac
8. For better performance on Smart devices like phones and tablets, the access point should support diverse multiple polarization of integrated antennas.
9. Must support data rates up to 300Mbps on 2.4GHz Radio and 867 Mbps on 5GHz.
10. AP should provide minimum 26dBm transmission power for 2.4Ghz and 25dBm for 5Ghz. (EIRP should limited as per govt regulation for indoor AP's).
11. The Wireless AP should have the technology to improve downlink performance to all mobile devices including one and two spatial stream devices on 802.11n. The technology should use advanced signal processing techniques and multiple transmit paths to optimize the signal received by 802.11 clients in the downlink direction without requiring feedback and should work with all existing 802.11 clients.
12. Must support AP enforce load-balance between 2.4Ghz and 5Ghz band.
13. Must have Channel selection based on measuring throughput capacity in real time and switching to another channel should the capacity fall below the statistical average of all channels without using background scanning as a method. Should also support coverage hole detection and performance optimization.
14. Must support Proactive Key Caching and/or other methods for Fast Secure Roaming.
15. Should support locally-significant certificates on the APs using a Public Key Infrastructure (PKI).
16. Must support IDS/IPS.
17. Access Points must support a distributed encryption/decryption model.
18. Access Points must support encryption on CAPWAP/LWAPP Standard. Monitoring
19. Mesh support should support QoS for voice over wireless.
20. Must support 16 WLANs per AP for SSID deployment flexibility.
21. Must support HTTP/S, telnet and/or SSH login to APs directly for troubleshooting flexibility.
22. Must support Power over Ethernet 802.3af.
23. 802.11e and WMM
24. Must support QoS and Call Admission Control capabilities.

C. Wireless Controller Upgrade License for Ruckus Zone Director 3000

| Technical Specification |
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| Wireless Controller:- |
| Essential Features |
| General Feature |
| 50 Access Point Upgrade License for Existing Zone Director 3000 |
| System should provide real-time charts showing interference for access point, on a per-radio, per channel basis thru existing controller |
| Ability to map SSID to VLAN and dynamic VLAN support for same SSID thru existing controller |
| Support automatic channel selection for interference avoidance thru existing controller |
| Access points can discover controllers on the same L2 domain without requiring any configuration on the access point thru existing controller |
| Access points can discover controllers across Layer-3 network through DHCP or DNS option thru existing controller |
| Security & Monitoring |
| WIRELESS SECURITY: WEP, WPA-TKIP, WPA2-AES, 802.11i |
| AUTHENTICATION : 802.1X, local database External AAA servers : Active Directory, RADIUS, LDAP thru existing controller |
| System should provide DOS attacks and Intrusion Detection & Prevention and Control for any Rogue Access Points. thru existing controller |
| The AP should be able to scan for rogue access points and the controller should be able to locate them on a floor map. The controller should be able to send a notification to the administrator when a rogue AP has been detected. thru existing controller |
| Controller should support CAPWAP/LWAPP protocol. thru existing controller |
| System must be able to provide L2/L3/L4 Access Control. thru existing controller |
| Controller should support L2 Client Isolation so User cannot access each other's devices. Isolation should have option to apply on AP or SSID's thru existing controller |
| Controller should support Access Control based on Identity/Role/ Device/Time or Application. thru existing controller |
| IPv4 & IPv6 support from Day 1 thru existing controller |
| Should support onboard and external DHCP server thru existing controller |
| Controller should support integrated or External AAA server including Microsoft AD and Linux based open source AAA servers. thru existing controller |
| The proposed architecture should be based on controller based Architecture with thick AP deployment. While encryption / decryption of 802.11 packets should be able to perform at the AP. thru existing controller |
| The Controller should support OS/Device finger printing and device type based policies i.e allow or deny, Bandwidth rate limit, VLAN mapping thru existing controller |
| The controller shall be manageable using CLI, Telnet/SSH, HTTP based GUI and SNMPv2/v3. |
| The controller should be able to present a customizable dashboard with information on the status of the WLAN network. thru existing controller |

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| The controller should be able to raise critical alarms by sending an email. The email client on the controller should support SMTP outbound authentication and TLS encryption. thru existing controller |
| 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. |
| Self-healing (on detection of RF interference or loss of RF coverage) and vendor should provide their Interference mitigation techniques for same Domain interference (interference from AP's connected to same Controller) and from other AP's and 2.4Ghz devices (Microwave's, Radio's etc.) thru existing controller |
| Regulatory |
| Wi-Fi Alliance certified |

Brocade 24 POE port managed switch

| S. No. | 24-port 1GbE switch PoE+ 360W with minimum 2x1GbE SFP+ (upgradeable to 10GbE) up-link ports |
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| 1 | Should be fully managed type |
| 2 | Should have 24 x 1G POE ports |
| 3 | Should have minimum 2x1GbE SFP+ (upgradeable to 10GbE) unlink ports |
| 4 | Should be 1U rack mountable |
| 5. | Should be supplied with complete mounting bracket and screws. |

Copper Components (Cat-6 - Data)

1. Cat 6, Power Cat Plus ,UTP Cable, 4 pair, 305 mtrs, Blue

| A | Category 6 UTP Cable |
|-----|--|
| A.1 | Category 6 Unshielded Twisted Pair 100W cable shall be compliant with EIA/TIA 568-C.2 |
| A.2 | Should be 4 pair, 23 AWG |
| A.3 | Cable should be CM rated |
| A.4 | Cable Should Have Internal cross separator |
| A.5 | Jacket: LSZH (Low smoke zero halogen) |
| A.6 | Conductor: Solid Copper |
| A.7 | All the Cat6 cabling components should be tested and verified by ETL with data transmission frequencies min 250 MHz or higher. |
| A.8 | Should have performance warranty for 20/25 years |
| A.9 | Cable roll should be of 305 meter length |

2. 24 port fully Loaded cat-6 Jack panel

| C | 24 PORT CAT6 Jack Panel |
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| C.1 | Should Be made of cold rolled steel |
| C.2 | Should conform to TIA / EIA 568-C.2 Component Compliant |
| C.3 | Should terminate 24 UTP CAT 6 (4 pair) Cables |
| C.4 | Ports should be with individual dust cover . |
| C.5 | Should confirm to EIA/TIA 568A wiring Pattern |
| C.6 | Should have labeling strips for identification. |

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| C.7 | Should have individual bend limiting boots/caps on Information Outlets on the back. |
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3, 4 & 5. Cat-6 Information Outlet with with Face Plate and Gang-Box

| B | Cat 6 Information Outlet with Face Plate and Gang Box Complete |
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| B.1 | Category 6, EIA/TIA 568-C.2 |
| B.2 | Use insulation displacement connectors |
| B.3 | All information outlets for 100 W, 22-24 AWG copper |
| B.4 | Should have shutter on I/O |
| B.5 | Should have Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent |
| B.6 | Contact Plating: 50 μinches gold over 100 μinches nickel |
| B.7 | Operating Life: Minimum 200 Re-terminations |
| B.8 | Single Gang square plate, 86mmx86mm |
| B.9 | Plug in Icons – Icon tree – to be supplied with plate |
| B.10 | Write on labels in transparent plastic window – supplied with plate |

6. Cat-6 Patch Chord

| D | Patch Chords (1 meter) |
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| D.1 | Should be 4 Pairs 24 AWG copper cables. |
| D.2 | The Outer Jacket should be Low Smoke Zero Halogen. |
| D.3 | 24 AWG stranded bare copper |
| D.4 | Should minimum comply with proposed ANSI/TIA/EIA-568-C.2 |
| D.5 | Should be verified by ETL (ETL certificate to be enclosed with the Bid) |
| D.6 | UL listed (UL certificate to be provided along with the Bid) |
| D.5 | Should Have cross separator |

7. SC-LC Style LSZH Single mode 9/125 micron Duplex Patch Cord

| SNo. | Specifications | Requirement |
|------|-----------------|--|
| 1 | Make and Type | SC to LC Duplex Fiber Optic Patch Cord Single Mode OS2 , 3 Mtr, 9/125 Micron |
| 2 | Cable Sheath | LSZH |
| 3 | Ferrule | Ceramic |
| 4 | Buffer Diameter | 900 micron meter |
| 5 | ROHS | ROHS/ELV Compliant |

Accessories

| S. No. | 25MM PVC Pipe (with required saddle,screws and gutties for surface wiring) |
|--------|---|
| 1. | PVC pipe should be of ISI standard mark |
| 2. | Fixing accessories like saddle and screws required should be supplied with the conduits |