

9. Bill of Quantity

A. WLAN Controller

Quoted Brand: H3C				
Quoted Model: WX3840H				
Description	Technical Specification	Qty	Rates	Amount
General	Wireless LAN Controller should be capable to support 1024 Access Points and 20,000 Users or higher	1	\$13,096	\$13,096
Ethernet Interfaces	2 x 10G SFP+ ports, 8 x 1G RJ-45 ports (Fixed / SFP) or Higher 1 x RJ45 OBM Port, 1 x console Ports or Higher			
High Availability	Support for Stateful switchover capability with 1:1 active-standby or N+1 redundancy Intelligent / Zero-IT failover between Wireless LAN Controllers			
Automation	installing configuration files on access points when they are being deployed in the network for the first time. API-driven configuration with support for NetConf using Yang data Models for available tool in automation. Or equivalent			
Forwarding Modes	Wireless LAN Controller must support both centralized and distributed forwarding modes with the flexibility to set each mode on per SSID basis.			
Management & Data Plane	Wireless LAN Controller must support different Network Planes for Data & Management traffic.			
Access Point Discovery & NAT	Support L2-L3 auto-discovery of Access Points Support NAT traversal between Access Point & Wireless LAN Controller			
Radio Management	* Wireless LAN controller should automatically adjust transmit power levels and RF channel assignments as needed to avoid interference. * Wireless LAN controller should prevent adjacent APs from interfering and enable redundant coverage in the event of an AP failure * Must support L2-L3 Roaming between Access Points			
QoS	Priority mapping L2-L4 packet filtering and traffic classification 802.11e/WMM			
Recognition & Visibility	Must have advanced application classification techniques with predefined and well-known application signatures.			
Wireless Standards	Must support 802.11a/b/g/n/ac (wave 1 & wave 2)/ax, 802.11K, 802.11w, 802.11u			
Security standards	*Must support Wi-Fi Protected Access (WPA), WPA2, MD5, 802.1X, RADIUS, EAP- TLS, EAP, Web-Based authentication, LDAP, AAA, TACACS or equivalent. *Must support rogue AP detection and countermeasure. WIPS (7-layer mobile security) must be supported *Must support VLAN & SSID based wireless user 2-layer isolation *Must support IPsec, SSL & GRE VPN			
Encryption standards	Must support Static Wired Equivalent Privacy (WEP), AES , SSL and TLS (RC4 128-bit and RSA 1024- and 2048-bit)			
Licenses	Access point licenses required for 160 access points			
Warranty and Services	3 Years Advanced Replacement 24x7 warranty for software and hardware with 24 Hours Technical Assistance Support			

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B. Software

Quoted Brand: H3C			
Quoted Model: IMC			
Description & Technical Specification	Qty	Rates	Amount
Network Management Software The solution must include a centralized network management software for access points with the following features: * Include license for 500 Wireless Access Points * Single pane of glass management * Deep Device visibility * Wireless clients' visibility * Centralized visibility of distributed networks * Must come in virtual machine form-factor with no extra requirement of OS, etc. * Have the capability to manage Wireless LAN etc. * Support Role-Based administration * Support customer user homepage & widget extension * Support automatic discovery topology, automatic discovery all network devices, custom modification, including device, link * Support device fault alarm real-time monitoring, unified browsing and multiple reminder. * Support task-based performance monitoring, send different level alarm according to different thresholds. * Provides intuitive device panel view to check the device, board and port working status, and provide device, board, and port configuration function based on the device panel. * Support device configuration centralized management, batch device configuration backup and restore. * Support device software intelligent upgrade and non-stop service software upgrade ISSU. * Support Syslog receiving, parsing and storage, provide Syslog feature analysis and policy registration capability, aggregate based on statistical rules to generate alarm (Trap) * Support illegal access device and mac address monitoring * Support VLAN network management and topology, batch deploy access port, trunk port, hybrid port and VLAN, and manages VLAN resource visually. * Provide multiple report styles, including row and column reports, main / sub reports, graphic summary reports, cross tables, TopN and BottomN reports. * Support daily / weekly / monthly / quarterly / semi-annual / yearly periodic report, support report logo customization and send to designated mailbox regularly * Support report export, including RTF, Excel, HTML, PDF, XML, CSV, TXT format Support manage third-party device registration, Mib compilation, configuration management and CLI delivery, configuration backup, software upgrade and system integration. * Provide REST and SOAP-based interface & northbound SNMP interface open capability	500	\$12.08	\$6,040
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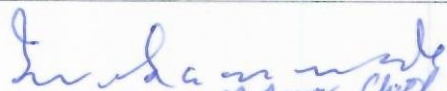
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- * Support wireless device topology, check the actual physical link connection between Wireless LAN Controller and Access Point, and Access Point currently online and details.
- * Support wireless terminal, Access Point and traffic, radio status and utilization, Rogue AP status and other wireless transition statistics reports.
- * For PoE-capable AP access port, can be enabled or disabled the PoE function to remotely perform a cold startup or shutdown of the AP must be supported
- * Support Wireless intrusion prevention system (WIPS) and functions like WIPS configuration, Information detection, Viewing security events, Intrusion prevention policy management)
- * Support a troubleshooting function, which allows performing RF ping or NQA operations to troubleshoot client access failures or unstable link status.
- * Support determining AP operating status and user experience in an area and optimize the network based on the evaluation result and records.
- * Support RF heatmaps for verifying the WLAN design before network setup.
- * Support records of client roaming to view client information, such as MAC address, signal strength, online duration, transmit power set, negotiated power set, RSSI, SSID, channel, associated AC, associated AP, and roaming records.
- * Must provide dashboard functionality to present Wireless LAN statistics such as online client quantity, AP quantity, data traffic, client-vendor distribution and so on.


C. Cloud Services


Quoted Brand: H3C			
Quoted Model: IMC			
Description & Technical Specification	Qty	Rates	Amount
Centralized Management & Control Provide centralized management & control of Wireless LAN Controllers & Access Points on Cloud/On-premise from single pane of glass with following features: * Centralized graphical user interface dashboard, including devices operating status (list of Wireless LAN Controllers, Access Points and associated STAs), system utilization (Top 5 CPU and RAM utilization), multi-dimensional alarms and report * Overall health of wireless system * Provide multiple administrative roles with different privilege, i.e. super user to manage the whole wireless network for the tenant, subaccounts for operation and management by multiple administrators. * Support O&M features like Network health monitoring, Client connection snapshot, Problem location and analysis, Wireless network optimization, One-click diagnosis and optimization, VIP policy for AP and Client, WIPS, Client access analysis. * Provide network management features like Full network monitoring, Sites management, Devices management (including Wireless LAN Controllers & Access Points), Clients management, Alarm management, Operation logs, System messages, Fault reports, Sub-accounts management.	1	FOC	FOC



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D. Outdoor Access Points

Quoted Brand: H3C				
Quoted Model: WA6630X				
Description	Technical Specification	Qty	Rates	Amount
Throughput	5.3 Gbps or higher	6	\$937.71	\$5626.26
General	802.11ax compliant outdoor access point with internal antennas			
Ethernet Interfaces	1 x 100/1000M/2.5G/5G/10G, RJ-45, 1 × 100M/1G Ethernet port & 1x Management console port (RJ-45) or higher			
Radios	2.4 GHz & 5 GHz (Dual band concurrent)			
Clients	Number of Clients per Radio: 512			
Transmit Power	2.4GHz: 24dBm 5GHz: 24dBm or higher			
Standards	IEEE 802.11a/b/g/n/ac/ax, 802.11k and 802.11v smart and 802.11r fast transition roaming, IEEE 802.3ae, IEEE 802.af			
Security	802.11i, 802.11w, Wi-Fi Protected Access 2 (WPA2), WPA, WPA3, 802.1X/AES/TKIP, EAP-Transport Layer Security (TLS), Protected EAP (PEAP) v0 or EAP-MSCHAP v2, WIDS/WIPS, DAI, IP Source guard			
Integrated Antennas	Built-in Omnidirectional Radio 3: 5dBi or more antenna gain @2.4GHz Radio 2: 4dBi or more antenna gain @5GHz Radio 1: 4dBi or more antenna gain @5GHz			
MIMO & Data Rates	5GHz Radio 1, 4x4:4 MU-MIMO 2.4Gbps 5GHz Radio 2, 4x4:4 MU-MIMO 2.4Gbps 2.4GHz Radio 3, 2x2:2 MU-MIMO 575Mbps			
AP working Modes	The proposed AP must be able to work in Standalone mode, managed & control via Wireless LAN Controller, managed & control via cloud controller.			
Architecture	Supporting RF spectrum analysis, wireless intrusion prevention system, dynamic frequency selection to prevent interference. Airtime fairness, Airtime optimization & Call Admission Control (CAC), Load Balancing			
Environmental	Operating Temp: -40 °C~65°C Storage Temp: -40°C~85°C Humidity: 0% to 100% (non-condensing) Protection Class: IP68 Power Saving: Green AP mode, Dynamic MIMO power saving, E-APSD, WMM Power Save			
Wi-Fi Certified	The proposed AP must be WIFI Alliance certified			
Warranty and Services	3 Years Advanced Replacement 8x5xNBD warranty for hardware with 24 Hours Technical Assistance Support			

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E. Indoor Access Points

Quoted Brand: H3C				
Quoted Model: WA6620				
Description	Technical Specification	Qty	Rates	Amount
Throughput	1.7 Gbps or more	40	\$173.15	\$6,926.00
General	802.11ax compliant Indoor Access point with internal antennas			
Ethernet Interfaces	At least 1 x 100/1000M RJ-45 & 1 x Console Port			
PoE Support	802.3af			
Radios	2.4 GHz & 5 GHz (Dual band concurrent) with Built-In Bluetooth 5.0			
Clients	Number of Clients per Radio: 512			
Transmit Power	2.4GHz: 20dBm 5GHz: 20dBm or higher			
Standards	IEEE 802.11a/b/g/n/ac/ax, 802.11k and 802.11v smart and 802.11r fast transition roaming, IEEE 802.af			
Security	802.11i, 802.11w, Wi-Fi Protected Access 2 (WPA2), WPA, WPA3, 802.1X/AES/TKIP, EAP-Transport Layer Security (TLS), Protected EAP (PEAP) v0 or EAP-MSCHAP v2, WIDS/WIPS, DAI, IP Source guard			
Integrated Antennas	Must have Built-in antenna At least 3dBi antenna gain @2.4GHz At least 5dBi antenna gain @5GHz			
802.1ax MU-MIMO & Data Rates	2.4GHz: 2 x 2 MIMO supporting speed of at least 575 Mbps 5GHz: 2 x 2 MIMO supporting speed of at least 1.2 Gbps			
AP working Modes	The proposed AP must be able to work in Standalone mode, managed & control via Wireless LAN Controller, managed & control via cloud controller.			
Forwarding Modes	Must support both distributed and centralized forwarding.			
Architecture	RF spectrum analysis, wireless intrusion prevention system, dynamic frequency selection to prevent interference. Airtime fairness, Airtime optimization & Call Admission Control (CAC), Load Balancing			
Wi-Fi Certified	The proposed AP must be WIFI Alliance certified			
Warranty and Services	3 Years Advanced Replacement 8x5xNBD warranty for hardware with 24 Hours Technical Assistance Support			

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F. Indoor Access Points

Quoted Brand: H3C Quoted Model: WA6638				
Description	Technical Specification	Qty	Rates	Amount
Throughput	5.9 Gbps or more	22	\$428.32	\$9,423.04
General	802.11ax compliant Indoor Access point with internal antennas			
Ethernet Interfaces	At least 1 x 100/1G/2.5G/5G/10G RJ-45, 1 x 100M/1G RJ-45 & 1 x Console Port			
PoE Support	802.3bt/at			
Radios	2.4 GHz & 5 GHz (Dual band concurrent) with Built-In Bluetooth, RFID & ZigBee			
Clients	Number of Clients per Radio: 512			
Transmit Power	2.4G: 25dBm or more 5G: 30 dBm or more			
Standards	IEEE 802.11a/b/g/n/ac/ax, 802.11k and 802.11v smart and 802.11r fast transition roaming, IEEE 802.3ae,			
Security	802.11i, 802.11w, Wi-Fi Protected Access 2 (WPA2), WPA, WPA3, 802.1X/AES/TKIP, EAP-Transport Layer Security (TLS), Protected EAP (PEAP) v0 or EAP-MSCHAP v2, WIDS/WIPS, DAI, IP Source guard			
Integrated Antennas	Must have Built-in antenna At least 3dBi antenna gain @2.4GHz At least 4dBi antenna gain @5GHz At least 4dBi antenna gain @5GHz			
802.11ax MU-MIMO & Data Rates	5GHz Radio 1, 4x4:4 MU-MIMO 2.4Gbps 5GHz Radio 2, 4x4:4 MU-MIMO 2.4Gbps 2.4GHz Radio 3, 4x4:4 MU-MIMO 1.1Gbps			
AP working Modes	The proposed AP must be able to work in Standalone mode, managed & control via Wireless LAN Controller, managed & control via cloud controller.			
Architecture	RF spectrum analysis, wireless intrusion prevention system, dynamic frequency selection to prevent interference. Airtime fairness, Airtime optimization & Call Admission Control (CAC), Load Balancing			
Forwarding Modes	Must support both distributed and centralized forwarding.			
Wi-Fi Certified	The proposed AP must be WIFI Alliance certified			
Warranty and Services	3 Years Advanced Replacement 8x5xNBD warranty for hardware with 24 Hours Technical Assistance Support			

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G. Indoor Access Points

Quoted Brand: H3C				
Quoted Model: WA6330				
Description	Technical Specification	Qty	Rates	Amount
Throughput	3.2 Gbps or more	12	\$227.51	\$2,730.12
General	802.11ax compliant Indoor Access point with internal antennas			
Ethernet Interfaces	At least 1 x 100M/1G/2.5G RJ-45, 1 x 100M/1G RJ-45 & 1 x Console Port			
PoE Support	802.3at/802.3af			
Radios	2.4 GHz & 5 GHz (Dual band concurrent) with Built-In Bluetooth, RFID & ZigBee			
Clients	Number of Clients per Radio: 512			
Transmit Power	2.4G: 20dBm or more 5G: 20 dBm or more			
Standards	IEEE 802.11a/b/g/n/ac/ax, 802.11k and 802.11v smart and 802.11r fast transition roaming, IEEE 802.af			
Security	802.11i, 802.11w, Wi-Fi Protected Access 2 (WPA2), WPA, WPA3, 802.1X/AES/TKIP, EAP-Transport Layer Security (TLS), Protected EAP (PEAP) v0 or EAP-MSCHAP v2, WIDS/WIPS, DAI, IP Source guard			
Integrated Antennas	Must have Built-in antenna At least 5dBi antenna gain @2.4GHz At least 5dBi antenna gain @5GHz At least 5dBi antenna gain @5GHz			
802.1ax MU-MIMO & Data Rates	5GHz Radio 1, 2x2:2 MU-MIMO 1.2 Gbps 5GHz Radio 2, 2x2:2 MU-MIMO 1.2 Gbps 2.4GHz Radio 3, 2x2:2 MU-MIMO 867 Mbps			
AP working Modes	The proposed AP must be able to work in Standalone mode, managed & control via Wireless LAN Controller, managed & control via cloud controller.			
Forwarding Modes	Must support both distributed and centralized forwarding.			
Architecture	RF spectrum analysis, wireless intrusion prevention system, dynamic frequency selection to prevent interference. Airtime fairness, Airtime optimization & Call Admission Control (CAC), Load Balancing			
Wi-Fi Certified	The proposed AP must be WIFI Alliance certified			
Warranty and Services	3 Years Advanced Replacement 8x5xNBD warranty for hardware with 24 Hours Technical Assistance Support			

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H. Indoor Access Points

Quoted Brand: H3C Quoted Model: WA6622				
Description	Technical Specification	Qty	Rates	Amount
Throughput	2.9 Gbps or more	12	\$240.64	\$2,887.68
General	802.11ax compliant Indoor Access point with internal antennas			
Ethernet Interfaces	At least 1 x 100M/1G/2.5G/5G RJ-45, 1 x 100M/1G RJ-45 & 1 x Console Port			
PoE Support	802.3at/802.3af			
Radios	2.4 GHz & 5 GHz (Dual-band concurrent) with Built-In Bluetooth, RFID & ZigBee			
Clients	Number of Clients per Radio: 512			
Transmit Power	2.4G: 25 dBm or more 5G: 30 dBm or more			
Standards	IEEE 802.11a/b/g/n/ac/ax, 802.11k and 802.11v smart and 802.11r fast transition roaming, IEEE 802.af			
Security	802.11i, 802.11w, Wi-Fi Protected Access 2 (WPA2), WPA, WPA3, 802.1X/AES/TKIP, EAP-Transport Layer Security (TLS), Protected EAP (PEAP) v0 or EAP-MSCHAP v2, WIDS/WIPS, DAI, IP Source guard			
Integrated Antennas	Must have a Built-in antenna At least 5dBi antenna gain @2.4GHz At least 5dBi antenna gain @5GHz			
802.1ax MU-MIMO & Data Rates	5GHz Radio 1, 4x4:4 MU-MIMO 2.4 Gbps, 2.4GHz Radio 2, 2x2:2 MU-MIMO 575 Mbps			
AP working Modes	The proposed AP must be able to work in Standalone mode, managed & control via Wireless LAN Controller, managed & control via cloud controller.			
Forwarding Modes	Must support both distributed and centralized forwarding.			
Architecture	RF spectrum analysis, wireless intrusion prevention system, and dynamic frequency selection to prevent interference. Airtime fairness, Airtime optimization & Call Admission Control (CAC), Load Balancing			
Wi-Fi Certified	The proposed AP must be WIFI Alliance certified			
Warranty and Services	3 Years Advanced Replacement 8x5xNBD warranty for hardware with 24 Hours Technical Assistance Support			

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I. Indoor Access Points

Quoted Brand: H3C Quoted Model: WA6320H				
Description	Technical Specification	Qty	Rates	Amount
Throughput	1.7 Gbps or more	1	\$150.19	\$150.19
General	802.11ax compliant Indoor Access point with internal antennas			
Ethernet Interfaces	At least 4 x 100/1000Mbps Ethernet ports 1x RJ45, 1x USB port, 1x Console port 1x uplink 100M/1GE port, 1 x RJ45			
PoE Support	802.3af			
Radios	2.4 GHz & 5 GHz (Dual band concurrent) with Built-In Bluetooth 5.0			
Clients	Number of Clients per Radio: 512			
Transmit Power	2.4GHz: 20dBm, 5GHz: 20dBm or higher			
Standards	IEEE 802.11a/b/g/n/ac/ax, 802.11k and 802.11v smart and 802.11r fast transition roaming, IEEE 802.af			
Security	802.11i, 802.11w, Wi-Fi Protected Access 2 (WPA2), WPA, WPA3, 802.1X/AES/TKIP, EAP-Transport Layer Security (TLS), Protected EAP (PEAP) v0 or EAP-MSCHAP v2, WIDS/WIPS, DAI, IP Source guard			
Integrated Antennas	Must have Built-in antenna At least 3dBi antenna gain @2.4GHz At least 3dBi antenna gain @5GHz			
802.11ax MU-MIMO & Data Rates	2.4GHz: 2 x 2 MIMO supporting speed of at least 575 Mbps 5GHz: 2 x 2 MIMO supporting speed of at least 1.2 Gbps			
AP working Modes	The proposed AP must be able to work in Standalone mode, managed & control via Wireless LAN Controller, managed & control via cloud controller.			
Forwarding Modes	Must support both distributed and centralized forwarding.			
Architecture	RF spectrum analysis, wireless intrusion prevention system, and dynamic frequency selection to prevent interference. Airtime fairness, Airtime optimization & Call Admission Control (CAC), Load Balancing			
Wi-Fi Certified	The proposed AP must be WIFI Alliance certified			
Warranty and Services	3 Years Advanced Replacement 8x5xNBD warranty for hardware with 24 Hours Technical Assistance Support			

Total Amount (A + B + C + D + E + F + G + H + I) (please refer to "Instruction" clause "i") (C&F Foreign Currency)		Currency: <u>US\$</u>	\$46,879.29
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Total Amount C&F Foreign Currency (in words) Forty-Six Thousand Eight Hundred Seventy-Nine & Twenty-Nine Cents US\$ only/-

M. Anwar, Chief Librarian
MEMBER
CENTRAL PURCHASE COMMITTEE
INSTITUTE OF BUSINESS ADMINISTRATION
KARACHI

S/S
MEMBER (EXTERNAL)
CENTRAL PURCHASE COMMITTEE
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KARACHI
Stamp & Signature

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