Republic of the Philippines
Department of Education
Procurement Management Service
BAC Secretariat Division

Bids and Awards Committee II

September 9, 2021

BID BULLETIN NO. 3

PROJECT	**:**	Supply, Delivery, Installation, Testing, Training and Maintenance of Department of Education Central Office Network Rehabilitation Project
PROJECT NO.	**:**	2021-ICTS3(002)-BII-CB-017

This Bid Bulletin is hereby issued for the information and guidance of all prospective bidders. It shall form an integral part of the bidding documents issued earlier relative to above project.

1. **Section I. Invitation to Bid, Items 7 and 9, page 10, are hereby amended to be read as:**

> "…7. Bids must be duly received by the BAC Secretariat on or before ***2:00 P.M. of September 16, 2021*** ***at Bureau of Curriculum Development (BCD) Conference Room, Third Floor, Bonifacio Building, DepEd Complex, Meralco Ave., Pasig City***.
>
> Late bids shall not be accepted…."

> "…9. Bid opening shall be on ***September 16, 2021, 2:00 P.M.*** ***at Bureau of Curriculum Development (BCD) Conference Room, Third Floor, Bonifacio Building, DepEd Complex, Meralco Ave., Pasig City***. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity…"

2. **Section VII. Technical Specifications, Detailed Technical Specifications, pages 47-118, issued through Bid Bulletin No. 1 dated August 19, 2021, is hereby amended to be read as:**

Original Provision	Provision, as amended
FIBER OPTIC & STRUCTURED CABLING MATERIALS	
Bid Bulletin 1 The proposed Fiber Optic and Structured Cabling must include the following components: a. FOC OM4 Multimode mode 6 core Cable (3,000 Meters)	The proposed Fiber Optic and Structured Cabling must include the following components: a. FOC OM4 Multimode mode 6 core Cable (3,000 Meters)

Original Provision	**Provision, as amended**
b. FOC OS1/OS2 single mode 48 core outdoor armored cable (1,000 meters) c. Fiber Panel (ODF 24 Ports loaded w/ coupler and single mode LC pigtail (20 Pieces) d. Fiber Patch cord single mode (LC to LC duplex connector 3m) (100 Pieces) e. Fiber Patch cord multi-mode OM4 50/125 (LC to LC duplex connector 3m) (100 Pieces f. 4-PAIR CAT 6 UT Cable 305m/roll (350 rolls) g. 24-Port Patch Panel loaded (50 Pieces) h. Information Outlet (250 Pieces) i. Faceplate Duplex (2-Gang) (80 Pieces) j. Cat 6 Patch cord 1m (200 Pieces) k. Cat 6 Patch cord 2m (200 Pieces) l. Cat 6 Patch cord 3m (200 Pieces) m. IDF Mounted Rack (23 Pieces) n. 42U DATA RACK (MDF) (1 Unit)	b. FOC OS1/OS2 single mode ~~48~~ ***2 x 24 core outdoor*** armored cable (1,000 meters) c. Fiber Panel (ODF 24 Ports loaded w/ coupler and single mode LC pigtail (20 Pieces) d. Fiber Patch cord single mode (LC to LC duplex connector 3m) (100 Pieces) e. Fiber Patch cord multi-mode OM4 50/125 (LC to LC duplex connector 3m) (100 Pieces f. 4-PAIR CAT 6 UT Cable 305m/roll (350 rolls) g. 24-Port Patch Panel loaded (50 Pieces) h. Information Outlet (250 Pieces) i. Faceplate Duplex (2-Gang) (80 Pieces) j. Cat 6 Patch cord 1m (200 Pieces) k. Cat 6 Patch cord 2m (200 Pieces) l. Cat 6 Patch cord 3m (200 Pieces) m. IDF Mounted Rack (23 Pieces) n. 42U DATA RACK (MDF) (1 Unit)
CORE SWITCH	
Bid Bulletin 1 ***Core Switch (1 Set)***	Core Switch ***(1 Set = 2 units)***
Bid Bulletin 1 The switch must support 24 x 10/40 Gigabit SFP+ ports	The switch must support 24 x 10/40 Gigabit SFP+***/QSFP+*** ports
The proposed switch must be managed by a single network monitoring system (Please Elaborate)	The proposed switch must be managed by a single network monitoring system **~~(Please Elaborate)~~**
Bid Bulletin 1 ***Resiliency and High Availability Features*** a. The switch must support Dual Hot-swappable power Supplies b. The switch must support Virtualization Technology to allow to be managed as a single virtual chassis. The virtualization technology shall simplifies network operation by eliminating the complexity of Spanning Tree or VRRP. c. The switch must support VRRPv3 (Virtual Router Redundancy Protocol Version 3) for IPv4 and IPv6 based on RFC 5798 d. The Switch must support Automatic Link-Flap detection and shutdown e. The switch must support Control Plane Prioritization f. The switch must support up to Virtual Routing and Forwarding (VRFlite) Domains	***Resiliency and High Availability Features*** a. The switch must support Dual Hot-swappable power Supplies b. The switch must support Virtualization Technology to allow ***switches*** to be managed as a single virtual chassis. The virtualization technology shall simplifies network operation by eliminating the complexity of Spanning Tree or VRRP. c. The switch must support VRRPv3 (Virtual Router Redundancy Protocol Version 3) for IPv4 and IPv6 based on RFC 5798 d. The Switch must support Automatic Link-Flap detection and shutdown e. The switch must support Control Plane Prioritization f. The switch must support up to Virtual Routing and Forwarding (VRFlite) Domains
Bid Bulletin 1 ***Management***	***Management***

Original Provision	Provision, as amended
a. The switch must support Out-of- band 10/100/1000T Management port b. The switch must support USB port c. The switch must support built in Management Framework to provide the network with backup, recovery and firmware upgrade management without the need of any additional hardware modules or software. d. The switch GUI has a built-in network management system that includes a network map that displays details of centrally managed devices (wired and wireless) and other third- party devices. e. The switch must support Find Me feature to provide a visual way of identifying the switch for maintenance. f. The Network must support the ability to centrally manage switches over the WAN network for device backup, zero touch network node recovery and Centralized firmware upgrades with rolling reboots feature g. The Switch must support Built-in Self-Test h. The Switch must support ping polling for IPv4 and IPv6 i. The switch must support Simple Network Time Protocol (SNTP) and Network Time Protocol (NTP) version 4 based on RFC 4330 and RFC 5905. j. The switch must support SNMPv1/2c/3. k. The switch must support RMON (Groups 1, 2,3 and 9) based on RFC 2819 l. The switch must support Industry Standard Command Line Interface (CLI) which is similar to Cisco IOS and must support Web-based Graphical User Interface (GUI) m. The switch must support the following management interface: Console, telnet and SSH. n. The switch must support Syslog based on RFC 3164 o. The switch must support ICMP Router Discovery Protocol based on RFC 1256 and Energy Efficient Ethernet based on IEEE 802.3az p. The switch must support full environmental monitoring of PSUs, fans, temperature and internal voltages. q. The switch must have operational indicator light(s) for each port. r. The switch must be Software Defined Networking (SDN) ready and will	a. The switch must support Out-of- band 10/100/1000T Management port b. The switch must support USB port c. The switch must support built in Management Framework to provide the network with backup, recovery and firmware upgrade management without the need of any additional hardware modules or software. d. The switch GUI has a built-in network management system ~~**that includes a network map that displays details of centrally managed devices (wired and wireless) and other third- party devices.**~~ e. The switch must ~~**support Find Me feature to**~~ provide a visual way of identifying the switch for maintenance. f. The Network must support the ability to centrally manage switches over the WAN network for device backup, zero touch network node recovery and Centralized firmware upgrades with rolling reboots feature g. The Switch must support Built-in Self-Test h. The Switch must support ping polling for IPv4 and IPv6 ***or equivalent*** i. The switch must support ~~**Simple Network Time Protocol (SNTP) and**~~ Network Time Protocol (NTP) version 4 based on ~~**RFC 4330 and**~~ RFC 5905. j. The switch must support SNMPv1/2c/3. k. The switch must support RMON (Groups 1, 2,3 and 9) based on RFC 2819 l. The switch must support Industry Standard Command Line Interface (CLI) ~~**which is similar to Cisco IOS**~~ and must support Web-based Graphical User Interface (GUI) m. The switch must support the following management interface: Console, telnet and SSH. n. The switch must support Syslog based on RFC 3164 o. The switch must support ICMP Router Discovery Protocol based on RFC 1256 and Energy Efficient Ethernet based on IEEE 802.3az p. The switch must support ~~**full environmental**~~ monitoring of PSUs, fans, temperature and internal voltages. q. The switch must have operational indicator light(s) for each port. r. The switch must be Software Defined Networking (SDN) ready and will

Original Provision	Provision, as amended
support OpenFlow v1.3 or similar programmable network protocol s. The switch must support UDLD to prevent traffic from being sent across a bad link by blocking the ports at both ends of the link in the event that either the individual transmitter or receiver for that connection fails t. The switch must support configurable ACLs for management traffic	support OpenFlow v1.3 or similar programmable network protocol s. The switch must support UDLD to prevent traffic from being sent across a bad link by blocking the ports at both ends of the link in the event that either the individual transmitter or receiver for that connection fails t. The switch must support configurable ACLs for management traffic
POWER OVER ETHERNET (POE) SWITCHES	
Bid Bulletin 1 ***Management*** a. The switch must support USB Slot b. The Switch must support ping polling for IPv4 and IPv6 c. The switch must support Simple Network Time Protocol (SNTP) and Network Time Protocol (NTP) version 4 based on RFC 4330 and RFC 5905. d. The switch must support SNMPv1/2c/3. e. The switch must support RMON f. The switch must support Industry Standard Command Line Interface (CLI) which is similar to Cisco IOS g. The switch must support Web-based Graphical User Interface (GUI) h. The switch must support the following management interface: Console, telnet and SSH. i. The switch must support Syslog based on RFC 3164 j. The switch must support ICMP Router Discovery Protocol based on RFC 1256. k. The switch must support full environmental monitoring of PSUs, fans, temperature and internal voltages. l. The switch must have operational indicator light(s) for each port. m. The proposed switch must be managed by a single network monitoring system n. The proposed networking solution must be of the same brand for ease of management	***Management*** a. The switch must support USB Slot b. The Switch must support ping polling for IPv4 and IPv6 ***or equivalent*** c. The switch must support ~~**Simple Network Time Protocol (SNTP) and**~~ Network Time Protocol (NTP) version 4 based on ~~**RFC 4330 and**~~ RFC 5905. d. The switch must support SNMPv1/2c/3. e. The switch must support RMON f. The switch must support Industry Standard Command Line Interface (CLI) ~~**which is similar to Cisco IOS**~~ g. The switch must support Web-based Graphical User Interface (GUI) h. The switch must support the following management interface: Console, telnet and SSH. i. The switch must support Syslog based on RFC 3164 j. The switch must support ICMP Router Discovery Protocol based on RFC 1256. k. The switch must support ~~**full environmental**~~ monitoring of PSUs, fans, temperature and internal voltages. l. The switch must have operational indicator light(s) for each port. m. The proposed switch must be managed by a single network monitoring system n. The proposed networking solution must be of the same brand for ease of management
DISTRIBUTION SWITCH	
Bid Bulletin 1 Distribution Switch (5 Sets)	Distribution Switch (5 Sets ***= 10 Units***)
Bid Bulletin 1 ***Resiliency and High Availability Features*** a. The switch must support Dual Hot-swappable power Supplies b. The switch must support	***Resiliency and High Availability Features*** a. The switch must support Dual Hot-swappable power Supplies b. The switch must support

Original Provision	Provision, as amended
Virtualization Technology to allow multiple switches to be managed as a single virtual chassis. The virtualization technology shall simplify network operation by eliminating the complexity of Spanning Tree or VRRP. c. The switch must support VRRPv3 (Virtual Router Redundancy Protocol Version 3) for IPv4 and IPv6 based on RFC 5798 d. The switch must support link aggregation across stack. e. The Switch must support Automatic Link-Flap detection and shutdown f. The Switch must support loop protection mechanism g. The switch must support Control Plane Prioritization h. The switch must support diagnostic for copper cables to be able to know the status or faults that might exists in either the connected cable or in its terminations	Virtualization Technology to allow multiple switches to be managed as a single virtual chassis. The virtualization technology shall simplify network operation by eliminating the complexity of Spanning Tree or VRRP. c. The switch must support VRRPv3 (Virtual Router Redundancy Protocol Version 3) for IPv4 and IPv6 based on RFC 5798 d. The switch must support link aggregation across stack. e. The Switch must support Automatic Link-Flap detection and shutdown f. The Switch must support loop protection mechanism g. The switch must support Control Plane Prioritization ~~h.~~ The switch must support diagnostic for copper cables to be able to know the status or faults that might exists **~~in either the connected cable or in its terminations~~**
Bid Bulletin 1 ***Management*** a. The switch must support Out-of-band 10/100/1000T Management port b. The switch must support USB port c. The Network must support the ability to centrally manage switches over the WAN network for device backup, zero touch network node recovery and Centralized firmware upgrades with rolling reboots feature d. The Switch must support Event-based triggers and scripting e. The Switch must support ping polling for IPv4 and IPv6 f. The switch must support Simple Network Time Protocol (SNTP) and Network Time Protocol (NTP) version 4 based on RFC 4330 and RFC 5905. g. The switch must support SNMPv1/2c/3. h. The switch must support RMON i. The switch must support Industry Standard Command Line Interface (CLI) which is similar to Cisco IOS, and support Web-based Graphical User Interface (GUI) j. The switch must support the following management interface: Console, telnet and SSH.	***Management*** a. The switch must support Out-of-band 10/100/1000T Management port b. The switch must support USB port c. The Network must support the ability to centrally manage switches over the WAN network for device backup, zero touch network node recovery and Centralized firmware upgrades with rolling reboots feature **~~d. The Switch must support Event-based triggers and scripting~~** e. The Switch must support ping polling for IPv4 and IPv6 f. The switch must support **~~Simple Network Time Protocol (SNTP)~~** and Network Time Protocol (NTP) version 4 based on **~~RFC 4330 and~~** RFC 5905. g. The switch must support SNMPv1/2c/3. h. The switch must support RMON i. The switch must support Industry Standard Command Line Interface (CLI) which is similar to Cisco IOS, and support Web-based Graphical User Interface (GUI) j. The switch must support the following management interface: Console, telnet and SSH.

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k. The switch must support Syslog based on RFC 3164, and ICMP Router Discovery Protocol based on RFC 1256. l. The switch must support full environmental monitoring of PSUs, fans, temperature and internal voltages. m. The switch must have operational indicator light(s) for each port. n. The switch must be Software Defined Networking (SDN) ready and will support OpenFlow v1.3 or similar programmable network protocol o. The switch must support UDLD to prevent traffic from being sent across a bad link by blocking the ports at both ends of the link in the event that either the individual transmitter or receiver for that connection fails p. The switch must support configurable ACLs for management traffic	k. The switch must support Syslog based on RFC 3164, and ICMP Router Discovery Protocol based on RFC 1256. l. The switch must support ~~**full environmental**~~ monitoring of PSUs, fans, temperature and internal voltages. m. The switch must have operational indicator light(s) for each port. ***n.*** The switch must be Software Defined Networking (SDN) ready and will support OpenFlow v1.3 or similar programmable network protocol ***or equivalent*** o. The switch must support UDLD to prevent traffic from being sent across a bad link by blocking the ports at both ends of the link in the event that either the individual transmitter or receiver for that connection fails p. The switch must support configurable ACLs for management traffic
ACCESS POINTS	
Bid Bulletin 1 The proposed solution must support an integrated Bluetooth Low-Energy (BLE) and, as well as a USB port for maximum flexibility, providing secure and reliable connectivity for IOT devices and for implementing location services	The proposed solution must support an integrated Bluetooth Low-Energy (BLE) ~~**and**~~ ***radio***, as well as a USB port for maximum flexibility, providing secure and reliable connectivity for IOT devices and for implementing location services
Unified AP support—Flexibility to deploy in either controller-based (ArubaOS) or controller-less (InstantOS) networks.	~~**Unified AP support—Flexibility to deploy in either controller-based (ArubaOS) or controller-less (InstantOS) networks.**~~ ***Unified AP support—Flexibility to deploy in either controller-based or controller-less networks.***
Bid Bulletin 1 The proposed solution must have an uplink Ethernet port: • Supports up to 2.5 Gbps with NBase-T and IEEE 802.3bz Ethernet compatibility. • Backwards compatible with 1000Base-T.	The proposed solution must have an uplink Ethernet port: • Supports up to 2.5 Gbps with NBase-T and IEEE 802.3bz Ethernet compatibility. • Backwards compatible with ***100/***1000Base-T.
Bid Bulletin 1 The proposed solution must have a built-in Bluetooth Low-Energy (BLE) —Enables a wide range of IOT use cases, such as asset tracking and mobile engagement.	The proposed solution must have a built-in Bluetooth Low-Energy (BLE) ***radio***—Enables a wide range of IOT use cases, such as asset tracking and mobile engagement.
The proposed solution must be able to have the following Radio Frequency capabilities:	The proposed solution must be able to have the following Radio Frequency capabilities:

Original Provision	Provision, as amended
● Manage the 2.4 GHz and 5 GHz radio bands and actively optimizes the RF environment, including channel width, channel selection, and transmit power. • Adaptive Radio Management (ARM) technology provides airtime fairness and helps ensure that APs stay clear of all sources of RF interference to deliver reliable, high performance WLANs.	● Manage the 2.4 GHz and 5 GHz radio bands and actively optimizes the RF environment, including channel width, channel selection, and transmit power. ~~● **Adaptive Radio Management (ARM) technology provides airtime fairness and helps ensure that APs stay clear of all sources of RF interference to deliver reliable, high performance WLANs.**~~ ● ***Must have airtime fairness and helps ensure that APs stay clear of all sources of RF interference to deliver reliable, high performance WLANs.***
Must be capable of IP reputation and security services identify, classify, and block malicious files, URLs and IPs, providing comprehensive protection against advanced online threats.	~~**Must be capable of IP reputation and security services identify, classify, and block malicious files, URLs and IPs, providing comprehensive protection against advanced online threats.**~~
Bid Bulletin 1 Must be able continuously monitor and report its actual power consumption and optionally make autonomous decisions to disable certain capabilities based on the amount of power available to the unit. Software-configurable to disable capabilities in specified order of priority. The feature applies when the unit is powered by an 802.3af POE source.	Must be able continuously monitor and report its actual power consumption and optionally make autonomous decisions to disable certain capabilities based on the amount of power available to the unit. ~~**Software-configurable to disable capabilities in specified order of priority. The feature applies when the unit is powered by an 802.3af POE source.**~~
The proposed solution must support a custom deep-sleep mode to deliver significant power and cost savings	The proposed solution must ~~**support a custom deep-sleep mode to**~~ deliver significant power and cost savings ***feature***
Bid Bulletin 1 The proposed solution must have the following specifications: • AP type—Indoor, dual radio, 5 GHz 802.11ax 4x4 MIMO, and 2.4 GHz 802.11ax 4x4 MIMO • 5 GHz radio: • Four spatial stream Single User (SU) MIMO for up to 2.4 Gbps wireless data rate to individual 4SS HE80 or 2SS HE160 802.11ax client devices (maximum). • Four spatial stream Multi User (MU) MIMO for up to 2.4 Gbps wireless data rate to up to four 1SS or two 2SS HE80 802.11ax MU-MIMO capable client devices simultaneously (typical). • 2.4 GHz radio: • Four spatial stream Single User (SU) MIMO for up to 1.150 Gbps wireless	The proposed solution must have the following specifications: • AP type—Indoor, dual radio, 5 GHz 802.11ax 4x4 MIMO, and 2.4 GHz 802.11ax 4x4 MIMO • 5 GHz radio: • Four spatial stream Single User (SU) MIMO for up to 2.4 Gbps wireless data rate to individual 4SS HE80 or 2SS HE160 802.11ax client devices (maximum). • Four spatial stream Multi User (MU) MIMO ~~**for up to 2.4**~~ ***from 1.5-2.0*** Gbps wireless data rate to up to four 1SS or two 2SS HE80 802.11ax MU-MIMO capable client devices simultaneously (typical). • 2.4 GHz radio:

Original Provision	Provision, as amended
data rate to individual 4SS HE40 or 2SS HE40 802.11ax MUMIMO capable client devices simultaneously (typical). • Support for up to 1024 associated client devices per radio and up to 16 BSSIDs per radio • Supported frequency bands (country-specific restrictions apply): • 2.400 to 2.4835 GHz • 5.150 to 5.250 GHz • 5.250 to 5.350 GHz • 5.470 to 5.725 GHz • 5.725 to 5.850 GHz • Available channels— Dependent on configured regulatory domain. • Dynamic frequency selection (DFS) optimizes the use of available RF spectrum. • Supported radio technologies: • 802.11b: Direct-sequence spread-spectrum (DSSS) • 802.11a/g/n/ac: Orthogonal frequency-division multiplexing (OFDM) • 802.11ax: Orthogonal frequency-division multiple access (OFDMA) with up to 37 resource units (for an 80 MHz channel) • Supported modulation types: • 802.11b: BPSK, QPSK, CCK • 802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM (proprietary extension) • 802.11ac: BPSK, QPSK, 16- QAM, 64-QAM, 256-QAM, 1024-QAM (proprietary extension) • 802.11ax: BPSK, QPSK, 16- QAM, 64-QAM, 256-QAM, 1024-QAM • 802.11n high-throughput (HT) support: HT20/40 • 802.11ac very high throughput (VHT) support: VHT20/40/80/160 • 802.11ax high efficiency (HE) support: HE20/40/80/160 • Supported data rates (Mbps): • 802.11b: 1, 2, 5.5, 11 • 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 • 802.11n (5 GHz): 6.5 to 600 (MCS0 to MVC31, HT20 to HT40) • 802.11ac: 6.5 to 3,467 (MCS0 to MCS9, NSS = 1 to 4, VHT20 to VHT160) • 802.11ax (2.4 GHz): 3.6 to 1,147 (MCS0 to MCS11, NSS = 1 to 2, HE20 to HE40) • 802.11ax (5 GHz): 3.6 to 2,402 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE160) • 802.11n/ac packet aggregation: A-MPDU, A-MS • Transmit power— Configurable	• Four spatial stream Single User (SU) MIMO ~~for up to 1.150~~ ***500Mbps - 1.150*** Gbps wireless data rate to individual 4SS HE40 or 2SS HE40 802.11ax MUMIMO capable client devices simultaneously (typical). • Support ~~for up to 1024~~ ***from 200 to 1000*** associated client devices per radio and up to 16 BSSIDs per radio • ***NTC Type Approved Equipment*** • Supported frequency bands (country-specific restrictions apply): • 2.400 to 2.4835 GHz • 5.150 to 5.250 GHz • 5.250 to 5.350 GHz • 5.470 to 5.725 GHz • 5.725 to 5.850 GHz • Available channels— Dependent on configured regulatory domain. • Dynamic frequency selection (DFS) optimizes the use of available RF spectrum. • Supported radio technologies: • 802.11b: Direct-sequence spread-spectrum (DSSS) • 802.11a/g/n/ac: Orthogonal frequency-division multiplexing (OFDM) • 802.11ax: Orthogonal frequency-division multiple access (OFDMA) with up to 37 resource units (for an 80 MHz channel) • Supported modulation types: • 802.11b: BPSK, QPSK, CCK • 802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM (proprietary extension) • 802.11ac: BPSK, QPSK, 16- QAM, 64-QAM, 256-QAM, 1024-QAM (proprietary extension) • 802.11ax: BPSK, QPSK, 16- QAM, 64-QAM, 256-QAM, 1024-QAM • 802.11n high-throughput (HT) support: HT20/40 • 802.11ac very high throughput (VHT) support: VHT20/40/80/160 • 802.11ax high efficiency (HE) support: HE20/40/80/160 • Supported data rates (Mbps): • 802.11b: 1, 2, 5.5, 11 • 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 • 802.11n (5 GHz): 6.5 to 600 (MCS0 to MVC31, HT20 to HT40) • 802.11ac: 6.5 to 3,467 (MCS0 to MCS9, NSS = 1 to 4, VHT20 to VHT160) • 802.11ax (2.4 GHz): 3.6 to 1,147 (MCS0 to MCS11, NSS = 1 to 2, HE20 to HE40)

Original Provision	**Provision, as amended**
• Maximum (aggregate, conducted total) transmit power (limited by local regulatory requirements): • 2.4 GHz band: +21 dBm • 5 GHz band: +24 dBm • Note that conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain. • Cyclic delay/shift diversity (CDD/CSD) for improved downlink RF performance; • Transmit beamforming (TxBF) for increased signal reliability and range. • 802.11ax Target Wait Time (TWT) to support low-power client devices. • Four integrated dual-band downtilt omni-directional antennas for 4x4 MIMO with peak antenna gain of 3.5 dBi in 2.4 GHz and 5.0 dBi in 5 GHz. Built-in antennas are optimized for horizontal ceiling mounted orientation of the AP. • Ethernet Port • Auto-sensing link speed (/1000/2500/BASET) and MDI/MDX • 2.5 Gbps speed complies with NBase-T and 802.3bz specifications • USB 2.0 host interface (Type A connector): • Bluetooth Low Energy (BLE5.0) and Zigbee (802.15.4) radio: • Visual indictors (two multicolor LEDs)—For System and Radio status • Reset button—Factory reset, LED mode control (normal/off) • Serial console interface • Kensington security slot • Reliability • Mean Time Between Failure (MTBF)— at least 200,000 hours • Regulatory Compliance • FCC/ISED • CE Marked • UL/IEC/EN 60950	• 802.11ax (5 GHz): 3.6 to 2,402 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE160) • 802.11n/ac packet aggregation: A-MPDU, A-MS • Transmit power— Configurable • Maximum ~~**(aggregate, conducted total)**~~ transmit power ~~**(limited by local regulatory requirements):**~~ • 2.4 GHz band: +21 dBm • 5 GHz band: +24 dBm • Note that conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain. • Cyclic delay/shift diversity (CDD/CSD) for improved downlink RF performance; • Transmit beamforming (TxBF) for increased signal reliability and range. • 802.11ax Target Wait Time (TWT) to support low-power client devices. • Four integrated dual-band ~~**downtilt**~~ omni-directional antennas for 4x4 MIMO with peak antenna gain of 3.5 dBi in 2.4 GHz and 5.0 dBi in 5 GHz. Built-in antennas are optimized for horizontal ceiling mounted orientation of the AP. • Ethernet Port • Auto-sensing link speed (/1000/2500/BASET) and MDI/MDX • 2.5 Gbps speed complies with NBase-T and 802.3bz specifications • USB 2.0 host interface (Type A connector): • Bluetooth Low Energy (BLE5.0) and Zigbee (802.15.4) radio: • Visual indictors (~~**two multicolor**~~ LEDs)—For System and Radio status • Reset button—Factory reset, LED mode control (normal/off) • Serial console interface • Kensington security slot ***or equivalent*** • Reliability • Mean Time Between Failure (MTBF)— at least 200,000 hours • Regulatory Compliance • FCC/ISED • CE Marked • UL/IEC/EN 60950
EMPLOYEE AND GUEST MANAGEMENT SYSTEM	
Policy creation tools: a. Pre-configured templates b. Wizard based interface c. LDAP browser for quick look-up of AD attributes	Policy creation tools: a. Pre-configured templates **b.** ~~**Wizard based interface**~~ c. LDAP browser for quick look-up of AD attributes

Original Provision	**Provision, as amended**
d. Policy simulation engine for testing policy integrity e. Policy model should support incorporation of several contextual elements including identity, endpoint health, device, authentication method & types, and conditions such as location, time, day, etc.	**~~d. Policy simulation engine for testing policy integrity~~** e. Policy model should support incorporation of several contextual elements including identity, endpoint health, device, authentication method & types, and conditions such as location, time, day, etc.
Must have the ability to create multiple CA Servers (either as a Root CA or Subordinate CA) within the appliance. Device provision by such CA must allow to roam across multiple network cluster if required	Must have the ability to create multiple CA Servers (either as a Root CA or Subordinate CA) within the appliance. **~~Device provision by such CA must allow to roam across multiple network cluster if required~~**
Support for Automatic Sign On (ASO), which captures the user's initial 802.1X, credentials and uses these to automatically sign the user into their SAML supported applications.	**~~Support for Automatic Sign On (ASO), which captures the user's initial 802.1X, credentials and uses these to automatically sign the user into their SAML supported applications.~~**
Profiling capabilities included in base licensing to offer full visibility of the devices present on the network.	Profiling capabilities **~~included in base licensing~~** to offer full visibility of the devices present on the network.
Must support multiple AD domains and AD forest queries seamlessly.	Must support multiple AD domains and AD forest **~~queries seamlessly.~~**
Support intuitive policy configuration templates and visibility troubleshooting tools.	Support **~~intuitive~~** policy configuration templates and **~~visibility~~** troubleshooting tools.
Supports multiple authentication/authorization sources (AD, LDAP, SQL dB) within one service.	Supports multiple authentication/authorization sources (AD, LDAP**~~, SQL dB~~**) within one service.
Self-service device onboarding with built-in certificate authority (CA) for BYOD	Self-service device onboarding with **~~built-in~~** certificate authority (CA) for BYOD
Comprehensive integration with third party systems such as SIEM, Internet security and EMM/MDM.	**~~Comprehensive~~** integration with third party systems such as SIEM, Internet security and EMM/MDM.
Support automatic cluster upgrade.	Support **~~automatic~~** cluster upgrade.
Support the following identity stores: a. Microsoft Active Directory b. RADIUS c. Any LDAP compliant directory d. Any ODBC-compliant SQL server e. Token servers f. Built-in SQL store, static hosts list g. Kerberos	Support the following identity stores: a. Microsoft Active Directory b. RADIUS c. Any LDAP compliant directory d. Any ODBC-compliant SQL server e. Token servers **~~f. Built-in SQL store, static hosts list~~** g. Kerberos
Bid Bulletin 1 Support the following RFC standards: 2246, 2248, 2548, 2759, 2865, 2866, 2869, 2882, 3079, 3576, 3579, 3580, 3748, 4017, 4137, 4849, 4851, 5216, 7030	Support the following RFC standards: 2246, **~~2248~~**, 2548, 2759, 2865, 2866, 2869, 2882, **~~3079~~**, 3576, 3579, 3580, 3748, 4017, **~~4137~~**, **~~4849~~**, 4851, 5216, 7030
Support information assurance validations FIPS 140-2 – Certificate #2577	Support information assurance validations FIPS 140-2 **~~Certificate #2577~~**
Support the following frameworks and protocols: a. RADIUS, RADIUS CoA, TACACS+, web authentication, SAML v2.0	Support the following frameworks and protocols: a. RADIUS, RADIUS CoA, TACACS+, web authentication, SAML v2.0

Original Provision	Provision, as amended
b. EAP-FAST (EAP-MSCHAPv2, EAP-GTC, EAP-TLS) c. PEAP (EAP-MSCHAPv2, EAP-GTC, EAP-TLS, EAP-PEAP-Public, EAP-PWD) d. TTLS (EAP-MSCHAPv2, EAP-GTC, EAP- TLS, EAP-MD5, PAP, CHAP) e. EAP-TLS f. PAP, CHAP, MSCHAPv1 and 2, EAP-MD5 g. NAC, Microsoft NAP h. Windows machine authentication i. MAC auth j. Audit (rules based on port and vulnerability scans) k. Online Certificate Status Protocol (OCSP) l. SNMP generic MIB, SNMP private MIB m. Common Event Format (CEF), Log Event Extended Format (LEEF) n. TLS 1.2	b. EAP-FAST (EAP-MSCHAPv2, EAP-GTC, EAP-TLS) c. PEAP (EAP-MSCHAPv2, EAP-GTC, EAP-TLS, EAP-PEAP-Public, EAP-PWD) d. TTLS (EAP-MSCHAPv2, EAP-GTC, EAP- TLS, EAP-MD5, PAP, CHAP) e. EAP-TLS f. PAP, CHAP, MSCHAPv1 and 2, EAP-MD5 **g. ~~NAC, Microsoft NAP~~** h. Windows machine authentication i. MAC auth j. Audit (rules based on port and vulnerability scans) k. Online Certificate Status Protocol (OCSP) l. SNMP generic MIB, SNMP private MIB m. Common Event Format (CEF), Log Event Extended Format (LEEF) n. TLS 1.2
Bid Bulletin 1 ***Appliance*** a. Single platform approach that combines AAA, NAC, BYOD, MAM and Guest Access by incorporating identity, health, physical/device information, and conditional elements into one set of policies. b. Must have ability to scale to 5,000 devices per appliance or virtual appliance c. Solution must be Agnostic to existing wired, wireless and VPN network in place today. d. Appliance must be pre-built and ready to be imported (OVF) into VMware virtualization environment (building from ISO not acceptable). e. Shell protected by CLI providing configuration for base appliance settings. f. Ability to mix and match virtual and hardware appliances in one deployment. g. Platform must be deployable in an out-of-band model and support for clustering with N+1 redundancy model. h. Flexibility to operate all features/functions on any appliance in the cluster. i. Hardware platform must be running on hardened operating system	***Appliance*** a. Single platform approach that combines AAA, NAC, BYOD, MAM and Guest Access by incorporating identity, health, physical/device information, and conditional elements into one set of policies ***or equivalent***. ~~b.~~ Must have ability to scale to 5,000 devices per appliance **~~or virtual appliance~~** ~~c.~~ Solution must be Agnostic to existing wired, wireless and VPN network **~~in place today.~~** **~~d. Appliance must be pre-built and ready to be imported (OVF) into VMware virtualization environment (building from ISO not acceptable).~~** ~~e.~~ Shell protected by CLI providing configuration for base appliance settings ***or equivalent***. ~~f.~~ Ability to mix and match virtual and hardware appliances in one deployment~~.~~ **~~g. Platform must be deployable in an out-of-band model and support for clustering with N+1 redundancy model.~~** h. Flexibility to operate all features/functions on any appliance in the cluster. i. Hardware platform must be running on hardened operating system
Reliability / Performance	***Reliability / Performance***

Original Provision	Provision, as amended
a. Appliances have ability to be clustered in any combination via local and remote network connections providing unlimited scale, redundancy, and access load balancing. b. Platform must be deployable in an out-of-band model and support for clustering with N+1 redundancy model. c. Failure of master node should not impact the ability for backup appliances to continue servicing authentication traffic. d. Must support several deployment modes including centralized, distributed, or mixed. e. Must support Virtual IP to allow seamless failover for Web-based services such as Guest portal without a need for external load balancer. f. Core product should have been available in the market for at least 4 years. g. Ability to scale up to 1 million unique endpoint authentications.	a. Appliances have ability to be clustered ~~**in any combination via local and remote network connections providing unlimited scale, redundancy, and access load balancing.**~~ b. ~~**Platform must be deployable in an out-of-band model and support for clustering with N+1 redundancy model.**~~ c. Failure of master node should not impact the ability for backup appliances to continue servicing authentication traffic. d. Must support several deployment modes including centralized, distributed, or mixed. e. Must support Virtual IP to allow seamless failover for Web-based services such as Guest portal without a need for external load balancer. f. Core product should have been available in the market for at least 4 years. g. Ability to scale up to 1 million unique endpoint authentications.
Guest Access a. Solution must be capable of providing sponsored and self- provisioned Guest Access. It must also have an ability to provide free or billable Guest Access with built in payment solution that can integrate with payment solution providers. b. Must be able to provide custom branding. c. Ability to send automated SMS or email credentials to the Guest User. d. Ability to set Account Details including Time Frame, Bandwidth Contract etc. Once account timeframe expires the User Account becomes inactive automatically. e. Solution must be capable of providing Advertising Services (Play Video before Access, offer current Promotions, Advise of Health Alerts) f. Guest solution should manage the individual guest credentials in a partitioned database and not pollute the user store with account credentials for guest users. g. Ability to perform caching of MAC address post guest authentication to avoid the need for guest to re-authenticate during the period of their	***Guest Access*** a. Solution must be capable of providing sponsored and self- provisioned Guest Access. It must also have an ability to provide free or billable Guest Access with built in payment solution that can integrate with payment solution providers. b. Must be able to provide custom branding. c. Ability to send automated SMS or email credentials to the Guest User. d. Ability to set Account Details including Time Frame, Bandwidth Contract etc. Once account timeframe expires the User Account becomes inactive automatically. e. Solution must be capable of providing Advertising Services (Play Video before Access, offer current Promotions, Advise of Health Alerts) f. Guest solution should manage the individual guest credentials in a partitioned database and not pollute the user store with account credentials for guest users. g. Ability to perform caching of MAC address post guest authentication to avoid the need for guest to re-authenticate during the period of their

Original Provision	Provision, as amended
visit (3G like user experience after first authentication via captive portal).	visit (3G like user experience after first authentication via captive portal).
h. Auto-login for self-registration workflow – no need for the guest to retrieve account credentials from email or SMS for initial login.	h. Auto-login for self-registration workflow – no need for the guest to retrieve account credentials from email or SMS for initial login.
i. Anonymous login support with per device policy still applied.	i. Anonymous login support with per device policy still applied.
j. Access token login support for single credential login to guest network – event management, scratch cards etc.	j. Access token login support for single credential login to guest network – event management, scratch cards etc.
k. Bulk import of guest accounts with ability to trigger notification of credentials via email.	k. Bulk import of guest accounts with ability to trigger notification of credentials via email.
l. Bulk import of NAS devices for large scale deployments.	**l. ~~Bulk import of NAS devices for large scale deployments.~~**
m. Sponsored approval workflow for guest self-registration where open SSID registration can be protected by requiring internal staff to approve the creation of guest account.	m. Sponsored approval workflow for guest self-registration where open SSID registration can be protected by requiring internal staff to approve the creation of guest account.
n. Prevent employees from accessing the guest network on the corporate laptop.	n. Prevent employees from accessing the guest network **~~on the corporate laptop~~.**
o. Apple Captive Network Assistant bypass for managing end to end guest workflow. For example, post login welcome page display on iOS and Mac OS Lion and above devices	o. Apple Captive Network Assistant bypass for managing end to end guest workflow. **~~For example, post login welcome page display on iOS and Mac OS Lion and above devices~~**
p. Post login session statistics page displayed to users so they can monitor usage or quota assigned.	p. Post login session statistics page displayed to users so they can monitor usage or quota assigned ***or equivalent***
q. Support URL persistence so users originally requested webpage can be displayed post login.	q. Support URL persistence so users originally requested webpage can be displayed post login.
r. Location based captive portal – display different landing page based on where guest is connecting to the network.	r. Location based captive portal – display different landing page based on where guest is connecting to the network.
s. Support guest access across multi-vendor access network	s. Support guest access across multi-vendor access network
t. Fully customizable self-registration or guest creation pages with user interface controls such as drop down, check list, radio button. It must also have authenticated self- registration for partner / joint venture account provisioning.	t. Fully customizable self-registration or guest creation pages **~~with user interface controls such as drop down, check list, radio button. It must also have authenticated self-registration for partner / joint venture account provisioning.~~**
u. Published API's to allow 3rd party system to manage guest accounts.	u. Published API's to allow 3rd party system to manage guest accounts.
v. NAC health checking should support agent and agentless methods and be available as a permanent or dissolvable health agent for Windows,	v. NAC health checking should support agent and agentless methods and be available as a permanent or

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Linux, and Macintosh endpoint platforms. In addition to authenticating the user, the solution must gather granular information about the endpoint device, perform advanced health checks on Windows platforms (services, processes, peer-to-peer apps, registry keys, USB device usage, Windows Hot fixes, patch management agents), and perform standard health checks on Linux and Mac platforms (Anti- virus, Anti-spyware, Firewall). w. Support persistent agent, dissolvable agent, Microsoft NAP agent. x. Support Windows, Apple, Linux Operating System. y. Gather granular information about the endpoint device z. Perform advanced health checks on Windows platforms (services, processes, peer-to-peer apps, registry keys, USB device usage, Windows Hot fixes, patch management agents), and perform standard health checks on Linux and Mac platforms (Anti-virus, Anti- spyware, Firewall).	dissolvable health agent for Windows, Linux, and Macintosh endpoint platforms. In addition to authenticating the user, the solution must gather granular information about the endpoint device, perform advanced health checks on Windows platforms (services, processes, peer-to-peer apps, registry keys, USB device usage, Windows Hot fixes, patch management agents), and perform standard health checks on Linux and Mac platforms (Anti- virus, Anti-spyware, Firewall) ***or equivalent***. **w.** ~~**Support persistent agent, dissolvable agent, Microsoft NAP agent.**~~ x. Support Windows, Apple, Linux Operating System. y. Gather granular information about the endpoint device z. Perform advanced health checks on Windows platforms (services, processes, peer-to-peer apps, registry keys, USB device usage, Windows Hot fixes, patch management agents), and perform standard health checks on Linux and Mac platforms (Anti-virus, Anti- spyware, Firewall) ***or equivalent***.
CONTROLLER	
The proposed solution must have a Wi-Fi Alliance Certification for 802.11 a/b/g/n/ac	The proposed solution must have a Wi-Fi Alliance Certification for 802.11 a/b/g/n/ac/***ax***
The proposed solution must have a newly installed controllers automatically synchronized with the already existing controller(s), without requiring a separate network management server	~~**The proposed solution must have a newly installed controllers automatically synchronized with the already existing controller(s), without requiring a separate network management server**~~
Bid Bulletin 1 The proposed solution must support the following certifications: a. Wi-Fi Alliance certified (802.11a/b/g/n/d/h/ac, WPA™ b. Personal, WPA™ Enterprise, WPA2™ Personal, WPA2™ c. Enterprise, WMM™, WMM Power Save) d. FIPS 140-2 validated (when operated in FIPS mode) e. Common Criteria EAL-2 f. RSA certified	The proposed solution must support the following certifications: a. Wi-Fi Alliance certified (802.11a/b/g/n/d/h/ac, WPA™ b. Personal, WPA™ Enterprise, WPA2™ Personal, WPA2™ c. Enterprise, WMM™, WMM Power Save) d. FIPS 140-2 validated (when operated in FIPS mode) e. Common Criteria EAL-2 ~~**f. RSA certified**~~
The proposed solution must support full set of northbound APIs that enable deep visibility into the network. The NBAPIs provide RF health metrics, app utilization,	~~**The proposed solution must support full set of northbound APIs that enable deep visibility into the network. The NBAPIs provide RF health metrics, app**~~

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device type and user data in an easy to integrate format. 3rd party applications can receive information from the controller and analyze all these metrics for better visibility and monitoring	~~**utilization, device type and user data in an easy to integrate format. 3rd party applications can receive information from the controller and analyze all these metrics for better visibility and monitoring**~~ ***The proposed solution must support Open Standard APIs for automation***
Bid Bulletin 1 The proposed solution must support ability to dynamically update individual service modules, without requiring an entire system reboot	~~**The proposed solution must support ability to dynamically update individual service modules, without requiring an entire system reboot**~~
The proposed solution must eliminate sticky clients and boosts Wi-Fi performance ensuring that clients associate with the best access point. It also groups the MU-MIMO clients together for simultaneous transmission to multiple devices, improving the overall WLAN capacity.	The proposed solution must eliminate sticky clients and ***have the ability to*** boosts Wi-Fi performance ***by having capability to self-optimize the wireless network and mitigate impacts of wireless interference*** ~~**ensuring that clients associate with the best access point. It also groups the MU-MIMO clients together for simultaneous transmission to multiple devices, improving the overall WLAN capacity.**~~
The proposed solution must support Advanced Cryptography (ACR) module brings military-grade Suite B cryptography to Controllers, enabling user mobility and secure access to networks that handle sensitive, confidential and classified information. Approved by the U.S. National Security Agency (NSA), Suite B improves performance and eliminates unwieldy workflows and strict handling requirements.	~~**The proposed solution must support Advanced Cryptography (ACR) module brings military-grade Suite B cryptography to Controllers, enabling user mobility and secure access to networks that handle sensitive, confidential and classified information. Approved by the U.S. National Security Agency (NSA), Suite B improves performance and eliminates unwieldy workflows and strict handling requirements.**~~
Authentication & Encryption Support the following authentication types: a. IEEE 802.1X (EAP, LEAP, PEAP, EAP-TLS, EAP-TTLS, EAP-FAST, EAP-SIM, EAP-POTP, b. EAP-GTC, EAP-TLV, EAP-AKA, EAP-Experimental, EAP-MD5) c.RFC 2548 Microsoft vendor-specific RADIUS attributes d. RFC 2716 PPP EAP-TLS e.RFC 2865 RADIUS authentication f. RFC 3579 RADIUS support for EAP g. RFC 3580 IEEE 802.1X RADIUS guidelines h. RFC 3748 extensible authentication protocol i. MAC address authentication	***Authentication & Encryption*** Support the following authentication types: a. IEEE 802.1X (EAP, LEAP, PEAP, EAP-TLS, EAP-TTLS, EAP-FAST, EAP-SIM, ~~**EAP-POTP,**~~ b. EAP-GTC, ~~**EAP-TLV,**~~ EAP-AKA, ~~**EAP-Experimental,**~~ EAP-MD5) c. RFC 2548 Microsoft vendor-specific RADIUS attributes d. RFC 2716 PPP EAP-TLS e. RFC 2865 RADIUS authentication f. RFC 3579 RADIUS support for EAP g. RFC 3580 IEEE 802.1X RADIUS guidelines h. RFC 3748 extensible authentication protocol i. MAC address authentication

Original Provision	Provision, as amended
~~j.~~ Web-based captive portal authentication	j. Web-based ~~captive portal~~ authentication
Support the following encryption protocols: a. CCMP/AES b. WEP 64- and 128-bit c. TKIP d. SSL and TLS: i RC4 128-bit ii RSA 1024-bit iii RSA 2048-bit e. L2TP/IPsec (RFC 3193) f. XAUTH/Ipsec g. PPTP (RFC 2637)	***Support the following encryption protocols:*** a. CCMP/AES b. WEP 64- and 128-bit c. TKIP d. SSL and TLS: i RC4 128-bit ii RSA 1024-bit iii RSA 2048-bit **~~e. L2TP/IPsec (RFC 3193)~~** **~~f. XAUTH/Ipsec~~** ~~g. **PPTP (RFC 2637)**~~
Web-Based Authentication (e.g. WebAuth/Captive Portal): a. Integrated into the controller/switch. b. User name and password authentication, as well as support for token based authentication. c. Option for simple logging of user name used for entry. d. Facilitate process for non-IT staff to create temporary guest IDs and passwords to automatically age out / expire. e. Ability to customize the pre-authentication network access rights beyond DHCP response (e.g. to allow PCs and MACs to finish network scripts and network boot ups), Airtime-based bandwidth contract for the guest SSID to preserve channel access for particular SSIDs. As an example, granting a higher percentage of airtime to employee SSIDs as opposed to guest SSIDs. f. Packet rate based bandwidth contract for individual guest users for increased control of guest traffic usage. g. 802.1X based guest access using a local database on the switch/controller that can be used to authenticate users. h. Time-of-day / duration based access per guest user of increased control and security. i. Time-of-day availability of guest SSID for increased control and security j. Secure tunnelling via IPSec/GRE to a generic L3 switch/router for ease of deployment and reduced cost	***Web-Based Authentication (e.g. WebAuth/Captive Portal):*** a. Integrated into the controller/switch. b. User name and password authentication, as well as support for token based authentication. **c.** **~~Option for simple logging of user name used for entry.~~** d. Facilitate process for non-IT staff to create temporary guest IDs and passwords to automatically age out / expire. e. Ability to customize the pre-authentication network access rights **~~beyond DHCP response (e.g. to allow PCs and MACs to finish network scripts and network boot ups), Airtime-based bandwidth contract for the guest SSID to preserve channel access for particular SSIDs. As an example, granting a higher percentage of airtime to employee SSIDs as opposed to guest SSIDs.~~** f. Packet rate based bandwidth contract for individual guest users for increased control of guest traffic usage ***or equivalent***. g. 802.1X based guest access using a local database on the switch/controller that can be used to authenticate users. h. Time-of-day / duration based access per guest user of increased control and security. i. Time-of-day availability of guest SSID for increased control and security **j.** **~~Secure tunnelling via IPSec/GRE to a generic L3 switch/router for~~**

Original Provision	Provision, as amended
	~~**ease of deployment and reduced cost**~~
Bid Bulletin 1 *__Wireless LAN controller__* a. Support up to 256 APs. b. Support over 10,000 number of concurrent connected wireless clients. c. Support 2 x 10Gbase-X (SFP+) ports and 4 x 1G Combo (Copper and Fiber)	*__Wireless LAN controller__* a. Support up to 256 APs. b. Support ~~**over**~~ ***up to*** 10,000 number of concurrent connected wireless clients. c. Support 2 x 10Gbase-X (SFP+) ports and 4 x 1G ~~**Combo**~~ (Copper ~~**and Fiber**~~)
Support the following regulatory and safety compliance a. FCC part 15 class A CE b. Industry Canada Class A c. VCCI Class A (Japan) d. EN 55022 Class A (CISPR 22 Class A), EN 61000-3 e. EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 f. EN 61000-4-5, EN 61000-4-6, EN 61000-4-8 g. EN 61000-4-11, EN 55024, AS/NZS 3548 h. EN 61000-3 i. UL 60950, EN60950 j. CAN/CSA 22.2 #60950 k. CE mark, cTUVus, CB, C-tick, Anatei, NOM, MIC	***Support the following regulatory and safety compliance*** a. FCC part 15 class A ~~**CE**~~ b. Industry Canada Class A c. VCCI Class A (Japan) d. EN 55022 Class A (CISPR 22 Class A), EN 61000-3 **e.** ~~**EN 61000-4-2, EN 61000-4-3, EN 61000-4-4**~~ **f.** ~~**EN 61000-4-5, EN 61000-4-6, EN 61000-4-8**~~ **g.** ~~**EN 61000-4-11, EN 55024, AS/NZS 3548**~~ h. EN 61000-3 i. UL 60950, EN60950 j. CAN/CSA 22.2 #60950 **k.** ~~**CE mark, cTUVus, CB, C-tick, Anatei, NOM, MIC**~~
AP-to-Controller Communication a. Use of industry standards-based (IEEE or IETF) tunnelling protocols; specify standard that the tunnelling mechanism is based on. b. Option to encrypt control path between the AP and the controller via standards-based protocols; specify standard that the encryption mechanism is based on. c. Centralized Encryption/De-encryption on switch/controller in data center. d. Optionally support distributed Encryption/De-encryption (e.g. on AP's) without the need for specialized hardware with support mixed mode operations from a single switch/controller. e. Support secure connection (e.g. IPSEC/VPN) of APs to centralized switch over "untrusted" (e.g. public WAN) network transport, without requiring external hardware and without requiring dedicated switch/controller.	***AP-to-Controller Communication*** a. Use of industry standards-based (IEEE or IETF) tunnelling protocols; specify standard that the tunnelling mechanism is based on. b. Option to encrypt control path between the AP and the controller via standards-based protocols; specify standard that the encryption mechanism is based on. c. Centralized Encryption/De-encryption on switch/controller in data center. ~~**d. Optionally support distributed Encryption/De-encryption (e.g. on AP's) without the need for specialized hardware with support mixed mode operations from a single switch/controller.**~~ ~~e. **Support secure connection (e.g. IPSEC/VPN) of APs to centralized switch over "untrusted" (e.g. public WAN) network transport, without requiring external hardware and without requiring dedicated switch/controller.**~~
AP Management	***AP Management***

Original Provision	Provision, as amended
a. Automatic updates of firmware and software on all APs without user intervention. b. Support discovery protocol from APs to find and sync with switch/controller, that works over routed and switched subnets and that does not require reconfiguration or features on routers or switches. c. All AP configuration and service delivery information centrally managed and maintained via the switch/controller. d. Centralized switch/controller provides a mechanism to support different groups of APs that share the same configuration of SSIDs, user VLANs, etc. – without requiring a separate management interface. e. AP management performed through the use of groups and profiles for ease of scalability and deployment.	a. Automatic updates of firmware and software on all APs without user intervention. b. Support discovery protocol from APs to find and sync with ~~**switch/**~~controller, that works over routed and switched subnets and that does not require reconfiguration or features on routers or switches. c. All AP configuration and service delivery information centrally managed and maintained via the ~~**switch/**~~controller. d. Centralized ~~**switch/**~~controller provides a mechanism to support different groups of APs that share the same configuration of SSIDs, user VLANs, etc. – without requiring a separate management interface. e. AP management performed through the use of groups and profiles for ease of scalability and deployment.
RF Management a. Automatic adjustment of individual AP power and channel setting to maximize performance around other APs, limit the effects of interference (both 802.11 and non-802.11), and detect and correct any RF coverage holes. b. Voice-aware RF management that provides the capability to pause channel scanning if an active voice-call(s) is detected. c. Dynamic load balancing to automatically distribute clients to the least loaded channel and AP; load balancing must not require any client specific configurations or software. d. Load balancing across bands and steering of dual-band capable clients from 2.4GHz to 5GHz in order to improve network performance without the use of client specific configurations or software. e. Traffic shaping capabilities to offer air-time fairness across different type of clients running different operating systems in order to prevent starvation of client throughput in particular in a dense wireless user population without the use of client specific configurations or software. f. Co-channel interference management in order to prevent adverse effects of operating multiple APs in the same channel while in close proximity (for	***RF Management*** a. Automatic adjustment of individual AP power and channel setting to maximize performance around other APs, limit the effects of interference (both 802.11 and non-802.11), and detect and correct any RF coverage holes. b. Voice-aware RF management that provides the capability to pause channel scanning if an active voice-call(s) is detected ***or equivalent***. c. Dynamic load balancing to automatically distribute clients to the least loaded channel and AP; load balancing must not require any client specific configurations or software. d. Load balancing across bands and steering of dual-band capable clients from 2.4GHz to 5GHz in order to improve network performance without the use of client specific configurations or software. e. Traffic shaping capabilities to offer air-time fairness across different type of clients running different operating systems in order to prevent starvation of client throughput in particular in a dense wireless user population without the use of client specific configurations or software. f. Co-channel interference management in order to prevent adverse effects of operating multiple APs in the same channel while in close proximity ***or equivalent*** ~~**(for instance within**~~

Original Provision	Provision, as amended
instance within 2.4GHz band where 3x 802.11 channels are available). g. WLAN infrastructure should employ radio management techniques to handle the high density of mobile devices. It should assign fair amount of airtime to all devices connected to the same radio, load balance clients across 802.11 channels available and load balance clients across 2.4GHz and 5GHz frequency bands. h. Continuous steering client to the best AP, even after client is associated to AP. To ensure client is always connected to best AP. i. Steering client decision is based on the probes request from the client which takes the client's perspective of the network into account. j. Continuously steers clients to 5Ghz radio, even post association to move capable clients to a cleaner RF spectrum k. Continuously balances clients across the available number of APs and channels for increased system throughput l. Moving sticky clients to a better AP, factoring in AP load and client traffic, to optimize overall system throughput m. Displays interference source on a map without need for additional appliances other than NMS	~~**2.4GHz band where 3x 802.11 channels are available).**~~ g. WLAN infrastructure should employ radio management techniques to handle the high density of mobile devices. It should assign fair amount of airtime to all devices connected to the same radio, load balance clients across 802.11 channels available and load balance clients across 2.4GHz and 5GHz frequency bands. h. Continuous steering client to the best AP, even after client is associated to AP. To ensure client is always connected to best AP. i. Steering client decision is based on the probes request from the client which takes the client's perspective of the network into account. j. Continuously steers clients to 5Ghz radio, even post association to move capable clients to a cleaner RF spectrum k. Continuously balances clients across the available number of APs and channels for increased system throughput l. Moving sticky clients to a better AP, factoring in AP load and client traffic, to optimize overall system throughput m. Displays interference source on a map without need for additional appliances other than NMS
Access Control *a.* Security enforcement for wireless users through the use of a role-based, stateful firewall that can be directly integrated with the roles defined within existing authentication servers. b. Dynamic, stateful (as defined by ICSA) access rights into the network once authenticated based on source, destination, and/or ports. c. Rules for access rights based on any combination of time, location, user identity, device identity, and extended attributes from the authentication database. d. The firewall must be able to take action including to allow the traffic, deny the traffic, reject the traffic, route the traffic, destination or source NAT the traffic, modify the QoS level of the traffic, and blacklist (remove from the network) the client for policy matches. e. Offers bandwidth contract on a per application basis (voice, video and data)	***Access Control*** *a.* Security enforcement for wireless users through the use of a role-based, stateful firewall that can be directly integrated with the roles defined within existing authentication servers. b. Dynamic, stateful ~~**(as defined by ICSA)**~~ access rights into the network once authenticated based on source, destination, and/or ports. c. Rules for access rights based on any combination of time, location, user identity, device identity, and extended attributes from the authentication database. d. ~~**The firewall must be able to take action including to allow the traffic, deny the traffic, reject the traffic, route the traffic, destination or source NAT the traffic, modify the QoS level of the traffic, and blacklist (remove from the network) the client for policy matches.**~~

Original Provision	Provision, as amended
f. Offers bandwidth contract on a per AP-Group g. Acts as a VPN gateway to terminate traffic from remote home/office users with a VPN soft client h. Securely connects different networks using site to site VPN i. DoS attack identification and classification without an additional appliance j. Offers wireless containment using Tarpitting k. Offers wired containment with ARP poisoning l. Secures wired and wireless traffic with a layer 2 sec tunnel on top of dot1x m. Secures the controller-to-controller communication using a xSec point-to-point tunnel n. National Security Agency (NSA) approved o. Accurate method of classifying real Rogues (on network) versus interfering neighbor networks whether Rogues have encryption or not and without client software or upgrades to current network. p. Blacklisting of wireless devices after firewall / ACL access rule violations are detected within the centralized switch / controller q. Automatically recognize the type (eg. Apple iOS) and model (eg. iPhone, iPad) of the mobile device connecting to the network. r. Identify over 1500+ applications, including cloud and web-based mobile apps like Lync, SharePoint, Box, GotoMeeting and Salesforce.com. s. Able block, apply QoS and bandwidth control based on the application. t. Support web content policy and reputation in firewall policy with: • 460+ million domains scored and classified • 83+ categories • 45+ languages • 74`0+ million IP addresses analyzed • 12+ million dangerous IPs identified u. Directs/redirects traffic using GRE tunnels v. Support roles based include unique web content policies w. Support roles based include unique web reputation policies x. Offers bandwidth contract on a per application basis (voice, video and data)	e. Offers bandwidth contract on a per application basis ~~(voice, video and data)~~ f. Offers bandwidth contract on a per AP-Group g. ~~Acts as a VPN gateway to terminate traffic from remote home/office users with a VPN soft client~~ h. ~~Securely connects different networks using site to site VPN~~ i. ~~DoS attack identification and classification without an additional appliance~~ j. ~~Offers wireless containment using Tarpitting~~ k. ~~Offers wired containment with ARP poisoning~~ l. ~~Secures wired and wireless traffic with a layer 2 sec tunnel on top of dot1x~~ m. Secures the controller-to-controller communication using a xSec point-to-point tunnel n. National Security Agency (NSA) approved o. Accurate method of classifying real Rogues (on network) versus interfering neighbor networks whether Rogues have encryption or not and without client software or upgrades to current network. p. ~~Blacklisting of wireless devices after firewall / ACL access rule violations are detected within the centralized switch / controller~~ q. Automatically recognize the type (eg. Apple iOS) and model (eg. iPhone, iPad) of the mobile device connecting to the network. r. Identify ~~over 1500+~~ applications, including cloud and web-based mobile apps ~~like Lync, SharePoint, Box, GotoMeeting and Salesforce.com.~~ s. ~~Able block,~~ apply QoS and bandwidth control based on the application. t. ~~Support web content policy and reputation in firewall policy with:~~ ~~• 460+ million domains scored and classified~~ ~~• 83+ categories~~ ~~• 45+ languages~~ ~~• 74`0+ million IP addresses analyzed~~ ~~• 12+ million dangerous IPs identified~~ u. Directs/redirects traffic using GRE tunnels ~~v. Support roles based include unique web content policies~~

Original Provision	Provision, as amended
	~~**w. Support roles based include unique web reputation policies**~~ ~~**x. Offers bandwidth contract on a per application basis (voice, video and data)**~~
Mobility a. The system must support L2 roaming capabilities across APs (terminated on the same and different controllers) with no special client-side software required. b. The system must support L3 roaming capabilities across APs (terminated on the same and different controllers) with no special client-side software required. c. The system must support Opportunistic Key Caching (OKC). d. The system must support Pairwise Master Key (PMK) caching. e. The system must support seamlessly connectivity with roaming handoff times of 2-3 milliseconds, delay-sensitive and persistent applications such as voice and video experience uninterrupted performance, included: f. Fast roaming: 2-3 msec intra-controller, 10-15 msec inter-controller g. Roaming across subnets and VLANs: session do not drop as clients roam on the network h. Proxy mobile IP: automatically establishes home agent/foreign agent relationship between Mobility Controllers i. Proxy DHCP: prevent clients from changing IP address while roaming • VLAN Pooling: automatically load balances clients across multiple VLANs	***Mobility*** a. The system must support L2 roaming capabilities across APs (terminated on the same and different controllers) with no special client-side software required. b. The system must support L3 roaming capabilities across APs (terminated on the same and different controllers) with no special client-side software required. c. The system must support Opportunistic Key Caching (OKC). d. The system must support Pairwise Master Key (PMK) caching. e. The system must support seamlessly connectivity ~~**with roaming handoff times of 2-3 milliseconds**~~, delay-sensitive and persistent applications such as voice and video experience uninterrupted performance, included: f. Fast roaming: ~~**2-3 msec**~~ intra-controller, ~~**10-15 msec**~~ inter-controller g. Roaming across subnets and VLANs: session do not drop as clients roam on the network h. Proxy mobile IP: automatically establishes home agent/foreign agent relationship between Mobility Controllers i. Proxy DHCP: prevent clients from changing IP address while roaming • VLAN Pooling: automatically load balances clients across multiple VLANs
Quality of Service (QoS) a. The system must be WMM-certified by the Wi-Fi alliance b. Upstream and downstream packet tagging between AP and controller/switch using standard tagging mechanisms; specify exact tagging support. c. Per user, per device, and per application/TCP-port prioritization. d. Advanced voice QoS services that prioritize voice streams over data for mixed mode devices (e.g. traffic-based instead of SSID-based prioritization) for any authentication method used e. Dynamic voice-aware load balancing (call admission control) that takes into	***Quality of Service (QoS)*** a. The system must be WMM-certified by the Wi-Fi alliance b. Upstream and downstream packet tagging between AP and controller/switch using standard tagging mechanisms; specify exact tagging support. c. Per user, per device, and per application/TCP-port prioritization. d. Advanced voice QoS services that prioritize voice streams over data for mixed mode devices (e.g. traffic-based instead of SSID-based prioritization) for any authentication method used e. Dynamic voice-aware load balancing (call admission control) that takes into

Original Provision	Provision, as amended
effect which voice protocol is used by the voice handset. This load balancing should pre-emptively move voice clients across APs while they are out-of-call in order to improve network performance	effect which voice protocol is used by the voice handset ***or equivalent***. ~~**This load balancing should pre-emptively move voice clients across APs while they are out-of-call in order to improve network performance**~~
f. Automatic call recognition of Initiation Protocol (SIP), Skinny Client Control Protocol (SCCP), VOCERA, Spectralink Voice Protocol (SVP) VoWLAN protocols	f. ~~**Automatic call recognition of Initiation Protocol (SIP), Skinny Client Control Protocol (SCCP), VOCERA, Spectralink Voice Protocol (SVP) VoWLAN protocols**~~
g. Battery-saving features such as proxy ARP for clients, multicast/broadcast filtering, large DTIM configurations, multicast/broadcast to unicast conversion integrated into the AP and controllers without requiring client side software components	g. Battery-saving features such as proxy ARP for clients, multicast/broadcast filtering, large DTIM configurations, multicast/broadcast to unicast conversion integrated into the AP and controllers without requiring client side software components
h. Apply different QoS and bandwidth policies to different users based on their role within the organization and the device type they currently use, even when these different users/devices are connected to the same SSID.	h. Apply different QoS and bandwidth policies to different users based on their role within the organization and the device type they currently use, even when these different users/devices are connected to the same SSID.
i. Display MOS scores for active voice sessions	i. ~~**Display MOS scores for active voice sessions**~~
j. Support ALGs for common voice protocols (SIP, SCCP, H323, NOE, Vocera, Lync and Jabber)	j. ~~**Support ALGs for common voice protocols (SIP, SCCP, H323, NOE, Vocera, Lync and Jabber)**~~
k. Offers real time call quality analysis	k. ~~**Offers real time call quality analysis**~~
l. Web content filtering and web reputation in built natively in the platform	l. ~~**Web content filtering and web reputation in built natively in the platform**~~
m. Can rate limit multiple applications at the same time (>10 applications)	m. Can rate limit multiple applications at the same time (>10 applications)
Bid Bulletin 1	
Network Services	***Network Services***
a. The system must support internal routing, bridging and spanning tree capabilities across its ports within the centralized switch/controller in order to enable ease of deployment and scalability.	~~**a. The system must support internal routing, bridging and spanning tree capabilities across its ports within the centralized switch/controller in order to enable ease of deployment and scalability.**~~
b. Interfaces on the switch/controller must be able to be set for DHCP in order to operate where static IP addressing is not available.	b. Interfaces on the switch/controller must be able to be set for DHCP in order to operate where static IP addressing is not available.
c. An internal DHCP server for ease of deployment and scalability must be available and must be able to redistribute dynamically learned information such as DNS, WINS, and local DNS suffix entries in the DHCP response.	c. An internal DHCP server for ease of deployment and scalability must be available and must be able to redistribute dynamically learned information such as DNS, WINS, and local DNS suffix entries in the DHCP response.
SECURITY MONITORING SYSTEM	

Original Provision	Provision, as amended
Manage Security Service The service provider must provide the following security services: a. 24 x 7 SOC monitoring, alerting and notification b. 100% 'Out of the Box' supported log sources c. SOC pre-defined standard correlation rules for event correlation and reports d. MSS Portal to access reports e. Real-time access to log data f. Custom reports or custom correlation rule to address non-standard use cases g. Perform in-scope vendor software upgrades, such as required security patches or version updates including vendor recommended critical/emergency patching as needed h. Notify Customer if any Log Sources require changes. i. Provide break-fix support, rebuild, and configure the implemented SmartConnector VM/Server solution located in DepEd's environment when infrastructure is available and online.	***Manage Security Service*** The service provider must provide the following security services: a. 24 x 7 SOC monitoring, alerting and notification b. 100% 'Out of the Box' supported log sources c. SOC pre-defined standard correlation rules for event correlation and reports d. MSS Portal to access reports e. Real-time access to log data f. Custom reports or custom correlation rule to address non-standard use cases g. Perform in-scope vendor software upgrades, such as required security patches or version updates including vendor recommended critical/emergency patching as needed h. Notify Customer if any Log Sources require changes. i. Provide break-fix support, rebuild, and configure the implemented **~~SmartConnector~~** VM/Server solution located in DepEd's environment when infrastructure is available and online.
Support Services The bidder must provide the following support services: a. Provide 8x5 onsite support b. Receives customer's inquiries or requests for technical support either through email, ticket monitoring or phone base. c. Records all support requests and related activities using either CRM system or manual forms. d. Ensures all ticket information are accurate and updated e. Provide immediate solutions based on tested scenarios and within agreed Service Level Agreement f. Proceeds with onsite execution resolution with approval from DepEd g. Reports any fraudulent, suspicious acts or unlawful activities / transactions immediately to immediate head to preempt potential risks to DepEd. h. Provide solution documentation for maintenance agreement.	***Support Services*** The bidder must provide the following support services: a. Provide 8x5 onsite support b. Receives customer's inquiries or requests for technical support either through email, ticket monitoring or phone base. c. Records all support requests and related activities using either **~~CRM~~** ***Helpdesk*** system or manual forms. d. Ensures all ticket information are accurate and updated e. Provide immediate solutions based on tested scenarios and within agreed Service Level Agreement f. Proceeds with onsite execution resolution with approval from DepEd g. Reports any fraudulent, suspicious acts or unlawful activities / transactions immediately to immediate head to preempt potential risks to DepEd. h. Provide solution documentation for maintenance agreement.
CIVIL & ELECTRICAL WORKS	
Door Access System (Biometrics, Face and RFID Reader) a. Display 3-inch Touch Screen b. Face Capacity 1,500 (1:N) c. Fingerprint Capacity 2,000 d. ID Card Capacity(optional) 10,000	***Door Access System (Biometrics, Face and RFID Reader) (1 unit)*** a. Display 3-inch Touch Screen b. Face Capacity 1,500 (1:N) c. Fingerprint Capacity 2,000 d. ID Card Capacity(optional) 10,000

Original Provision	Provision, as amended
e. Log Capacity 100,000	e. Log Capacity 100,000
f. Camera High Resolution Infrared Camera	f. Camera High Resolution Infrared Camera
g. Communication TCP/IP, RS232/485, USB-host	g. Communication TCP/IP, RS232/485, USB-host
h. Access Control Interface for 3rd party electric lock, door sensor, exit button, alarm, wired doorbell	h. Access Control Interface for 3rd party electric lock, door sensor, exit button, alarm, wired doorbell
i. Anti-pass back Function	i. Anti-pass back Function
j. Wiegand Signal Input & Output	j. Wiegand Signal Input & Output
k. Standard Access Control Function: Time Zone, Group, Multi-identification Duress mode, Anti-pass back, Tamper alarm	k. Standard Access Control Function: Time Zone, Group, Multi-identification Duress mode, Anti-pass back, Tamper alarm
l. Optional Functions ID Card, Mifare Card	l. Optional Functions ID Card, Mifare Card
m. Power Supply 12V DC	m. Power Supply 12V DC
n. Operating Temperature 0 - 45 16-32 °C	n. Operating Temperature 0 - 45 °C
o. Operating Humidity 20% -80%	o. Operating Humidity 20% -80%
p. Dimension(L×H×D)mm 209.4×87.5×91.6	~~p. **Dimension(L×H×D)mm 209.4×87.5×91.6**~~
q. Gross Weight 0.87kg	q. ~~**Gross Weight 0.87kg**~~
IP-PBX	
B. Operator Phone (1 Unit)	**B.** ***Operator Phone (1 Unit)***
a. 12 dual-color line keys (with 6 SIP accounts), 5 XML programmable contextsensitive soft keys Dual switched auto-sensing 10/100/1000 Mbps Gigabit Ethernet ports with integrated PoE	a. 12 dual-color line keys (with 6 SIP accounts), 5 XML programmable context sensitive soft keys b. ***Dual switched auto-sensing 10/100/1000 Mbps Gigabit*** Ethernet ports with integrated PoE
b. 48 digitally programmable & customizable BLF/fastdial keys, and supports up to 4 cascaded GXP2200EXT Modules	c. 48 digitally programmable & customizable BLF/fastdial keys, and supports up to 4 cascaded ~~**GXP2200EXT**~~ Modules
c. Built-in Bluetooth for syncing headsets and mobile devices for contact books, calendars & call transferring	d. Built-in Bluetooth for syncing headsets and mobile devices for contact books, calendars & call transferring
d. HD (High Definition) handset and speakerphone with support for wideband audio	e. HD (High Definition) handset and speakerphone with support for wideband audio
e. Supports full duplex speakerphone	f. Supports full duplex speakerphone
f. Graphic Display 4.3 inch (480x272) TFT color LCD	g. Graphic Display 4.3 inch (480x272) TFT color LCD
g. ***Feature Keys:*** 12 line keys with up to 6 SIP accounts, 5 XML programmable context sensitive softkeys, 5 navigation/menu keys, 11 dedicated function keys for : MESSAGE(with LED indicator), PHONEBOOK, TRANSFER, CONFERENCE, HOLD, HEADSET, MUTE, SEND/REDIAL, SPEAKERPHONE, VOL+, VOL	h. ***Feature Keys:*** 12 line keys with up to 6 SIP accounts, 5 XML programmable context sensitive softkeys, 5 navigation/menu keys, 11 dedicated function keys for : MESSAGE(with LED indicator), PHONEBOOK, TRANSFER, CONFERENCE, HOLD, HEADSET, MUTE, SEND/REDIAL, SPEAKERPHONE, VOL+, VOL
h. ***Voice Codecs:*** Support for G7.29A/B, G.711µ/a-law, G.726, G.722(wide-band), in-band and outof-band DTMF(in audio, RFC2833, SIP INFO)	i. ***Voice Codecs:*** Support for G7.29A/B, G.711µ/a-law, G.726, G.722(wide-band), in-band and out-of-band DTMF(in audio, RFC2833, SIP INFO)
i. Auxiliary Ports: RJ9 headset jack (allowing EHS with Plantronics headsets), USB, extension module port	j. Auxiliary Ports: RJ9 headset jack (allowing EHS with Plantronics headsets), USB, extension module port

Original Provision	Provision, as amended
j. ***Telephony Features:*** Hold, transfer, forward, 5-way conference, call park, call pickup, shared-call-appearance(SCA)/bridged-line-appearance(BLA), downloadable phonebook(XML, LDAP, up to 2000 items), call waiting, call log(up to 500 records), XML customization of screen, off-hook auto dial, auto answer, click-to-dial, flexible dial plan, hot desking, personalized music ringtones and music on hold, server redundancy and fail-over	k. ***Telephony Features:*** Hold, transfer, forward, 5-way conference, call park, call pickup, shared-call-appearance(SCA)/bridged-line-appearance(BLA), downloadable phonebook(XML, LDAP, up to 2000 items), call waiting, call log(up to 500 records), XML customization of screen, off-hook auto dial, auto answer, click-to-dial, flexible dial plan, hot desking, personalized music ringtones and music on hold, server redundancy and fail-over
k. ***Supports Extension Module***: Can power up to 4 GXP2200EXT modules which features a 128x384 graphic LCD, 20 quick-dial/BLF keys which dual- color LED, 2 navigation keys, and less than 1.2W power consumption per unit.	l. ***Supports Extension Module***: Can power up to 4 ~~**GXP2200EXT**~~ modules which features a 128x384 graphic LCD, 20 quick-dial/BLF keys which dual- color LED, 2 navigation keys, and less than 1.2W power consumption per unit.
l. ***Supports QoS***: Layer 2 QoS (802.1Q, 802.1P) and Layer 3 (ToS, DiffServ, MPLS) QoS	m. ***Supports QoS***: Layer 2 QoS (802.1Q, 802.1P) and Layer 3 (ToS, DiffServ, MPLS) QoS
m. ***Security:*** User and administrator level passwords, MD5 and MD5-sess based authentication, 256-bit AES encrypted configuration file, SRTP, TLS, 802.1x media access control	n. ***Security:*** User and administrator level passwords, MD5 and MD5-sess based authentication, 256-bit AES encrypted configuration file, SRTP, TLS, 802.1x media access control
n. ***Power:*** Universal power adapter included: Input:100-240V ; Output: +12V, 1.0A ;Integrated Power-over-Ethernet(802.3af) Max power consumption : 5.4W(without GXP2200EXT) or 9.2W(with 4 cascaded GXP2200EXTs)	o. ***Power:*** Universal power adapter included: Input:100-240V ; Output: +12V, 1.0A ;Integrated Power-over-Ethernet(802.3af) Max power consumption : 5.4W~~**(without GXP2200EXT)**~~ or 9.2W(with 4 cascaded ~~**GXP2200EXTs**~~ ***modules***)
C. IP PHONES (110 Units)	**C.** ***IP PHONES (110 Units)***
a. ***Features and Specifications:*** 2 lines, 2 SIP accounts, up to 2 call appearances	a. ***Features and Specifications:*** 2 lines, 2 SIP accounts, up to 2 call appearances
b. Graphic Display 132 x 48 backlit graphical display	b. Graphic Display 132 x 48 backlit graphical display
c. ***Feature Keys:*** 2 line keys with dual-color LED and 2 SIP accounts, 3 XML programmable context sensitive soft keys, 5 (navigation, menu) keys. 13 dedicated func- tion keys for MUTE, HEADSET, TRANSFER, CONFERENCE, SEND and REDIAL, SPEAKERPHONE, VOLUME, PHONEBOOK, MESSAGE, HOLD, PAGE/INTERCOM, RECORD, HOME	c. ***Feature Keys:*** 2 line keys with dual-color LED and 2 SIP accounts, 3 XML programmable context sensitive soft keys, 5 (navigation, menu) keys. 13 dedicated ~~**func- tion**~~ ***function*** keys for MUTE, HEADSET, TRANSFER, CONFERENCE, SEND and REDIAL, SPEAKERPHONE, VOLUME, PHONEBOOK, MESSAGE, HOLD, PAGE/INTERCOM, RECORD, HOME
d. ***Protocols/Standards:*** SIP RFC3261, TCP/IP/UDP, RTP/RTCP, HTTP/HTTPS, ARP/RARP, ICMP, DNS (A record, SRV, NAPTR), DHCP, PPPoE, SSH, TFTP, NTP, STUN, SIMPLE,	d. ***Protocols/Standards:*** SIP RFC3261, TCP/IP/UDP, RTP/RTCP, HTTP/HTTPS, ARP/RARP, ICMP, DNS (A record, SRV, NAPTR), DHCP, PPPoE, SSH, TFTP, NTP, STUN, SIMPLE,

Original Provision	Provision, as amended
LLDPMED, LDAP, TR- 069, 802.1x, TLS, SRTP e. ***Network Interfaces:*** Dual switched auto-sensing 10/100 Mbps Ethernet ports, integrated PoE f. ***Voice Codecs:*** Support for G.711µ/a, G.722 (wide-band), G.723 (pending), G.726-32, G.729 A/B, iLBC (pending), Opus (pending), in- band and out-of-band DTMF (In audio, RFC2833, SIP INFO), VAD, CNG, AEC, PLC, AJB, AGC g. ***Telephony Features:*** Hold, transfer, forward (unconditional/no-answer/busy), 3- way conferen- cing, call park/pickup, shared-call appearance (SCA) / bridged-line-appea-rance (BLA), Downloadable phone book (XML, LDAP, up to 500 items), call waiting, call history (up to 200 records), off-hook auto dial, auto answer, click-to-dial, flexible dial plan, hot desking, personalized music ringtones, server redundancy & fail-over h. Supports Headset Jack: RJ9 headset jack (allowing EHS with Plantronics headsets) i. HD (High Definition) handset and speakerphone with support for wideband audio j. QoS: Layer 2 QoS (802.1Q, 802.1P) and Layer 3 (ToS, DiffServ, MPLS) QoS k. *Supports the following Security:* User and administrator level access control, MD5 and MD5- sess based authentication, 256-bit AES encrypted configuration file, TLS, SRTP, HTTPS, 802.1x media access control l. Automated provisioning options include TR-069 and XML config files	LLDPMED, LDAP, TR- 069, 802.1x, TLS, SRTP e. ***Network Interfaces:*** Dual switched auto-sensing 10/100 Mbps Ethernet ports, integrated PoE f. ***Voice Codecs:*** Support for G.711µ/a, G.722 (wide-band), G.723 (pending), G.726-32, G.729 A/B, iLBC (pending), Opus (pending), in- band and out-of-band DTMF (In audio, RFC2833, SIP INFO), VAD, CNG, AEC, PLC, AJB, AGC g. ***Telephony Features:*** Hold, transfer, forward (unconditional/no-answer/busy), 3- way ~~**conferen- cing**~~ ***conferencing***, call park/pickup, shared-call appearance (SCA) / bridged-line-~~**appea- rance**~~ ***appearance*** (BLA), Downloadable phone book (XML, LDAP, up to 500 items), call waiting, call history (up to 200 records), off-hook auto dial, auto answer, click-to-dial, flexible dial plan, hot desking, personalized music ringtones, server redundancy & fail-over h. Supports Headset Jack: RJ9 headset jack (allowing EHS with Plantronics headsets) i. HD (High Definition) handset and speakerphone with support for wideband audio j. QoS: Layer 2 QoS (802.1Q, 802.1P) and Layer 3 (ToS, DiffServ, MPLS) QoS k. *Supports the following Security:* User and administrator level access control, MD5 and MD5- sess based authentication, 256-bit AES encrypted configuration file, TLS, SRTP, HTTPS, 802.1x media access control l. Automated provisioning options include TR-069 and XML config files
E. Smart-UPS (22 Units) Branded and Brand New a. **Output:** i. Output power capacity: 1.0 KWatts / 1.5 kVA ii. Max Configurable Power (Watts): 1.0 KWatts / 1.5 kVA iii. Nominal Output Voltage: 230V iv. Output Voltage Distortion: Less than 5% v. Other Output Voltages: 220, 240 vi. Output Frequency (sync to mains): 47 - 53 Hz for 50 Hz nominal, 57 - 63 Hz for 60 Hz nominal	***E. Smart-UPS (22 Units)*** Branded and Brand New a. **Output:** i. Output power capacity: 1.0 KWatts / 1.5 kVA ii. Max Configurable Power (Watts): 1.0 KWatts / 1.5 kVA iii. Nominal Output Voltage: 230V iv. Output Voltage Distortion: Less than 5% v. Other Output Voltages: 220, 240 vi. Output Frequency (sync to mains): 47 - 53 Hz for 50 Hz nominal ***or*** 57 - 63 Hz for 60 Hz nominal vii. Other Output Voltages: 220, 240

Original Provision	Provision, as amended
vii. Other Output Voltages: 220, 240 viii. Topology: Line Interactive ix. Waveform type: Sine wave b. **Input:** i. Nominal Input Voltage: 230V ii. Input frequency: 50/60 Hz iii. Input Connections: IEC-320 C14 iv. Input voltage range for main operations: 160 - 286V v. Input voltage adjustable range for mains operation: 151 - 302V vi. Other Input Voltages: 220, 240 c. **Batteries & Runtime** i. Battery type: Maintenance-free sealed Lead-Acid battery with suspended electrolyte leak proof ii. Typical recharge time: 2-4hour(s) d. **Communications & Management** i. Interface Port(s): RJ-45 Serial, SmartSlot, USB ii. Control panel: Multi-function LCD status and control console iii. Audible Alarm: Alarm when on battery: distinctive low battery alarm: configurable delays iv. Emergency Power Off (EPO): Optional v. Available SmartSlot™ Interface Quantity: 1 e. **Surge energy rating : 459Joules**	viii. Topology: Line Interactive ***or Online Double Conversion*** ix. Waveform type: Sine wave b. **Input:** i. Nominal Input Voltage: 230V ii. Input frequency: 50/60 Hz iii. Input Connections: IEC-320 C14 iv. Input voltage range for main operations: 160 - 286V ~~**v. Input voltage adjustable range for mains operation: 151 - 302V**~~ vi. Other Input Voltages: 220, 240 c. **Batteries & Runtime** iii. Battery type: Maintenance-free sealed Lead-Acid battery with suspended electrolyte leak proof iv. Typical recharge time: ***2-***4hour(s) d. **Communications & Management** vi. Interface Port(s): RJ-45 Serial, ~~**SmartSlot**~~, USB vii. Control panel: Multi-function LCD status and control console viii. Audible Alarm: Alarm when on battery: distinctive low battery alarm: configurable delays ix. Emergency Power Off (EPO): Optional x. Available ~~**SmartSlot™**~~ Interface Quantity: 1 e. **Surge energy rating: *300 -* 459 Joules**
IP BASED PAGING SYSTEM HARDWARE	
a. (205 Units) Ceiling Speaker 6" cone type, 6W(100V), Sensitivity: 90 dB (1 W, 1 m) (500 Hz - 5 kHz, pink noise), Freq. response: 65 Hz - 18 kHz (peak -20 dB)	a. (205 Units) Ceiling Speaker 6" cone type, 6W(100V), Sensitivity: 90 dB (1 W, 1 m) (500 Hz - 5 kHz, pink noise), Freq. response: 65 Hz - 18 kHz (peak -20 dB)
b. Multi-functional Amplier with 5 zones, 4 audio inout for bgm, Rated power: 240 watts,Freq. response: 50Hz – 16kHz, Output Connection: Speaker output, Direct speaker line output,Line output,Recording output, Preamplifier output.	b. Multi-functional Amplier with 5 zones, 4 audio inout for bgm, Rated power: 240 watts,Freq. response: 50Hz – 16kHz, Output Connection: Speaker output, Direct speaker line output,Line output,Recording output, Preamplifier output ***or equivalent***
c. (2 Units) Remote Microphone(unidirectional mic) connect to vm-2240, Freq. response: 100-20, S/N ratio: 60dB or more	c. (2 Units) Remote Microphone (unidirectional mic) ~~**connect to vm-2240**~~, Freq. response: 100-20, S/N ratio: 60dB or more
d. Playback-only Voice Announcing board, Freq. response: 20 - 20,000 Hz (44.1 kHz sampling) 20 - 14,000 Hz (32 kHz sampling), Distortion: Under 0.3 % (44.1 kHz, recording method: Extremely	d. Playback-only Voice Announcing board, Freq. response: 20 - 20,000 Hz (44.1 kHz sampling) 20 - 14,000 Hz (32 kHz sampling), Distortion: Under 0.3 % (44.1 kHz, recording method: Extremely

Original Provision	Provision, as amended
High) e. 4 channels: 500 W × 4 (100 V line M4 screw terminal, Class D Amp, Freq. response: 50 Hz - 20 kHz (-3 dB), S/N Ratio: 100 dB (A-weighted) f. (3 Units) 30 Watts Tared input, Wide Range Weatherproof Speaker(outdoor), Sensitivity: 98 dB (1 W, 1 m), Freq. Response: 120 - 15,000 Hz, Horizantal Directivity: Constant directivity horn 90 °(±45 °horizontal from front axis), 93 dB or more (1 W, 1 m), 3 kHz at ±45, Bracket already included g. Line Transformer converts unbalanced to balance h. Mobilisation and Demobilisation i. Hardware and Consumable Materials Engineering Services	High) ***or equivalent*** e. 4 channels: 500 W × 4 (100 V line M4 screw terminal, Class D Amp, Freq. response: 50 Hz - 20 kHz (-3 dB), S/N Ratio: 100 dB (A-weighted) f. (3 Units) 30 Watts Tared input, Wide Range Weatherproof Speaker(outdoor), Sensitivity: 98 dB (1 W, 1 m), Freq. Response: 120 - 15,000 Hz, Horizantal Directivity: Constant directivity horn 90 °(±45 °horizontal from front axis), 93 dB or more (1 W, 1 m), 3 kHz at ±45, Bracket already included g. Line Transformer converts unbalanced to balance h. Mobilisation and Demobilisation i. Hardware and Consumable Materials Engineering Services
SMART-UPS 3000VA LCD RM 2U 230V	
SMART-UPS 3000VA LCD RM 2U 230V (8 Units) **Output** a. Output power capacity: 2.7 KWatts / 3.0 kVA b. Max Configurable Power (Watts): 2.7 KWatts / 3.0 kVA c. Nominal Output Voltage: 230V d. Output Voltage Note: Configurable for 220: 230 or 240 nominal output voltage e. Output Frequency (sync to mains) : 47 - 53 Hz for 50 Hz nominal, 57 - 63 Hz for 60 Hz nominal f. Other Output Voltages: 220, 240 g. Topology: Line Interactive h. Waveform type: Sine wave i. Output Connections: j. (3) IEC Jumpers (Battery Backup) k. (1)IEC 320 C19 (Battery Backup) l. (8) IEC 320 C13 (Battery Backup) m. Transfer Time: 4ms typical : 8ms maximum **Input** a. Nominal Input Voltage: 230V b. nput frequency: 50/60 Hz +/- 3 Hz (auto sensing) c. Input Connections: British BS1363A, IEC-320 C20, Schuko CEE 7/EU1-16P d. Cord Length: 2meters e. Input voltage range for main operations: 160 - 286V f. Input voltage adjustable range for mains operation: 151 - 302V g. Number of Power Cords: 1 h. Other Input Voltages : 220, 240 **Batteries & Runtime**	***SMART-UPS 3000VA LCD RM 2U 230V (8 Units)*** **Output** a. Output power capacity: 2.7 KWatts / 3.0 kVA b. Max Configurable Power (Watts): 2.7 KWatts / 3.0 kVA c. Nominal Output Voltage: 230V d. Output Voltage Note: Configurable for 220: 230 or 240 nominal output voltage e. Output Frequency (sync to mains) : 47 - 53 Hz for 50 Hz nominal, 57 - 63 Hz for 60 Hz nominal f. Other Output Voltages: 220, 240 g. Topology: Line Interactive ***or Online Double Conversion*** h. Waveform type: Sine wave i. Output Connections: j. (3) IEC Jumpers ***Power Cord*** (Battery Backup) k. (1)IEC 320 C19 (Battery Backup) l. (8) IEC 320 C13 (Battery Backup) ~~**m. Transfer Time: 4ms typical : 8ms maximum**~~ **Input** a. Nominal Input Voltage: 230V b. Input frequency: 50/60 Hz +/- ~~**3**~~ ***5*** Hz (auto sensing) c. Input Connections: ~~**British BS1363A**~~, IEC-320 C20, ~~**Schuko CEE 7/EU1-16P**~~ d. Cord Length: 2meters e. Input voltage range for main operations: 160 - 286V f. Input voltage adjustable range for mains operation: 151 - 302V g. Number of Power Cords: 1 h. Other Input Voltages: 220, 240

Original Provision	Provision, as amended
a. Battery type: Maintenance-free sealed Lead-Acid battery with suspended electrolyte : leak proof b. Typical recharge time: 3 hour(s) c. Replacement Battery d. Expected Battery Life (years): 3 – 5 **Communications & Management** a. Interface Port(s): USB b. Control panel: LED status display with On Line: On Battery: Replace c. Battery and Overload indicators, Multi-function LCD status and control console d. Audible Alarm: Alarm when on battery: distinctive low battery alarm: configurable e. Available SmartSlot™ Interface Quantity : 1 **Surge Protection and Filtering** a. Surge energy rating: 320 Joules i. Standard warranty : Standard warranty	**Batteries & Runtime** e. Battery type: Maintenance-free sealed Lead-Acid battery with suspended electrolyte: leak proof f. Typical recharge time: ~~**3**~~ ***2 – 4*** hour(s) g. Replacement Battery h. Expected Battery Life (years): 3 – 5 **Communications & Management** f. Interface Port(s): USB g. Control panel: LED status display with On Line: On Battery: Replace h. Battery and Overload indicators, Multi-function LCD status and control console i. Audible Alarm: Alarm when on battery: distinctive low battery alarm: configurable j. Available ~~**SmartSlot™**~~ Interface Quantity: 1 **Surge Protection and Filtering** b. Surge energy rating: ~~**320**~~ ***300-320*** Joules i. Standard warranty: ~~**Standard warranty**~~ ***3 years***

All other provisions not herein modified shall remain in full force and effect.

For your information and guidance.

Atty. REVSEE A. ESCOBEDO
Undersecretary and Chairperson