**ANEXO N° 09.**

**ANEXO TÉCNICO**

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Señores:

UNIVERSIDAD DE CUNDINAMARCA

ATTN: DIRECCIÓN DE BIENES Y SERVICIOS

Diagonal 18 No. 20 - 29 Fusagasugá

**REF: ADQUISICIÓN Y FORTALECIMIENTO DE LA RED WIFI PARA LA BIBLIOTECA CENTRAL DE LA UNIVERSIDAD DE CUNDINAMARCA - SEDE FUSAGASUGÁ**

Estimados señores:

[Nombre del representante legal o de la persona natural Proponente], identificado como aparece al pie de mi firma, [obrando en mi propio nombre o en mi calidad de representante legal de] [nombre del Proponente], manifiesto que:

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| **Ítem** | **AP INDOOR** | **Cumple(SI/NO)** | **# FOLIO** |
| **1** | **Wi-Fi Standards:**  • IEEE 802.11a/b/g/n/ac/ax |  |  |
| **2** | **Supported Rates:** • 802.11ax: 4 to 4800 Mbps • 802.11ac: 6.5 to 3467 Mbps • 802.11n: 6.5 to 600 Mbps  • 802.11a/g: 6 to 54 Mbps  • 802.11b: 1 to 11 Mbps |  |  |
| **3** | **Supported Channels**:  • 2.4GHz: 1-13 • 5GHz: 36-64, 100-144, 149-165 |  |  |
| **4** | **MIMO:** • 8x8 MU-MIMO • 8x8 SU-MIMO |  |  |
| **5** | **Spatial Streams:** • 8 MU-MIMO  • 8 SU-MIMO |  |  |
| **6** | **Radio Chalns and Streams:**  • 8x8:8 |  |  |
| **7** | **Channelization:**  • 20, 40, 80MHz |  |  |
| **8** | **Modulation:**  • OFDMA (up to 1024-QAM) |  |  |
| **9** | **Security:**  • WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i, Dynamic PSK  • WIPS/WIDS |  |  |
| **10** | **Other Wi-Fi Features**:  • WMM, Power Save, TxBF, LDPC, STBC, 802.11r/k/vHotspot  • Hotspot 2.0  • Captive Portal  • WISPr |  |  |
| **11** | **Antenna Type:**  **2.4GHz Antennas**  • Omni: 2 Antennas • BeamFlex+ Adaptive: 2 Antennas  • Polarization: 3 Vertical & 1 Horizontal  **5GHz Antennas**  • Omni: 4 Antennas  • BeamFlex+ adaptive: 4 Antennas  • Polarization: 6 Vertical & 2 Horizontal |  |  |
| **12** | **Antenna Gain (max):**  • Up to 2 dBi |  |  |
| **13** | **Frequency Bands**:  • 2.4 - 2.484 GHz  • 5.17 - 5.33 GHZ  • 5.49 - 5.71 GHz  • 5.735 - 5.835 GHz |  |  |
| **14** | **Controller Platform Support:**  • SmartZone  • ZD  • Standalone |  |  |
| **15** | **Mesh** • SmartMesh™ wireless meshing technology |  |  |
| **16** | **IP:**  • IPv4, IPv6 |  |  |
| **17** | **VLAN:**  • 802.1Q  • BSSID-based (16 BSSIDs / radio)  • Port-based  • Dynamic, per user based on RADIUS |  |  |
| **18** | **802.1x**:  • Wired & wireless  • Authenticator & Supplicant |  |  |
| **19** | **Tunnel**:  • RuckusGRE, SoftGRE |  |  |
| **20** | **Policy Management Tools:**  • Application Recognition and Control  • Access Control Lists  • Device Fingerprinting |  |  |
| **21** | **IoT Capable:**  • Yes |  |  |
| **22** | **Ethernet:**  • 1x 1/2.5/5 Gbps port, RJ-45  • 1x 10/100/1000 Mbps port, RJ-45 |  |  |
| **23** | **Wi-Fi Alliance:**  • Wi-Fi CERTIFIED™ a, b, g, n, ac  • Passpoint®  • Vantage |  |  |
| **24** | **Standards Compliance:**  • EN 60950-1 Safety  • EN 60601-1-2 Medical  • EN 61000-4-2/3/5 Immunity  • EN 50121-1 Railway EMC  • EN 50121-4 Railway Immunity  • IEC 61373 Railway Shock & Vibration  • EN 62311 Human Safety/RF Exposure  • UL 2043 Plenum  • WEEE & RoHS  • ISTA 2A Transportation |  |  |

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| **Ítem** | **AP OUTDOOR OMINIDIRECCIONAL y SECTORIAL** | **Cumple(SI/NO)** | **#FOLIO** |
| **1** | **Wi-Fi Standards**  IEEE 802.11a/b/g/n/ac |  |  |
| **2** | **Supported Rates**   * 802.11ac: 6.5 to 1,733Mbps (MCS0 to MCS9, NSS = 1 to 4 for VHT20/40/80) * 802.11n: 6.5Mbps to 600Mbps (MCS0 to MCS 31) * 802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6Mbps * 802.11b: 11, 5.5, 2 and 1 Mbps |  |  |
| **3** | **Supported Channels**   * 2.4GHz: 1-13 * 5GHz: 36-64, 100-144, 149-165 |  |  |
| **4** | **MIMO**  • 4x4 SU-MIMO  • 4x4 MU-MIMO |  |  |
| **5** | **Radio Chains and Streams**  • 4x4:4 |  |  |
| **6** | **Channelization**  • 20, 40, 80MHz |  |  |
| **7** | **Security**  • WPA-PSK, WPA-TKIP, WPA2 AES, 802.11i, Dynamic  PSK  • WIPS/WIDS |  |  |
| **8** | **Other Wi-Fi Features**  • WMM, Power Save, Tx Beamforming, LDPC, STBC,  802.11r/k/v  • Hotspot  • Hotspot 2.0  • Captive Portal  • WISPr |  |  |
| **9** | **Antenna Type**  • BeamFlex+ adaptive antennas with polarization  diversity  • Adaptive antenna that provides over 4,000 unique  antenna patterns per band |  |  |
| **10** | **Antenna Gain (max)**  • Omni - Up to 3dBi  • Sector - Up to 8dBi |  |  |
| **11** | **Controller Platform Support**  • SmartZone  • ZoneDirector  • Unleashed2  • Cloud Wi-Fi  • Standalone |  |  |
| **12** | **IP**  • IPv4, IPv6 |  |  |
| **13** | **VLAN**  • 802.1Q (1 per BSSID or dynamic per use based on RADIUS  • VLAN Pooling  • Port-based |  |  |
| **14** | **802.1x**  • Authenticator & Supplicant |  |  |
| **15** | **Client Capacity**  • Up to 512 clients per AP |  |  |
| **16** | **Ethernet**  • 2 x 10/100/1000 Mbps ports, RJ-45  • LACP |  |  |
| **17** | **Peak PHY Rates**  • 2.4GHz: 600Mbps  • 5GHz: 1733Mbps |  |  |
| **18** | **Wi-Fi Alliance**  • Wi-Fi CERTIFIED™ a, b, g, n, ac  • Passpoint®, Vantage |  |  |
| **19** | **Standards Compliance**  • EN 60950-1 Safety  • EN 60601-1-2 Medical  • EN 61000-4-2/3/5 Immunity  • EN 50121-1 Railway EMC  • EN 50121-4 Railway Immunity  • IEC 61373 Railway Shock & Vibration  • UL 2043 Plenum  • EN 62311 Human Safety/RF Exposure  • WEEE & RoHS  • ISTA 2A Transportation |  |  |

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| **Ítem** | **EQUIPO ACTIVO - SWITCH DE ADMINISTRACIÓN** | **Cumple (SI/NO)** | **#FOLIO** |
| **1** | **I/O port and slots**  44 Autosensing 10/100/1000  Ports (IEEE 802.3 Type 10 BASE-T,  IEEE 802.3u Type 100BASETX,  IEEE 802.3ab Type 1000Base-T,  IEEE 802.3at PoE+); Duplex:  10ABSE-T/100BASE-TX:half or  full; 1000BASE-T:full only  1 modulo SFP+ 10GbE de 4 puertos |  |  |
| **2** | **Additional ports and slots**  1 RJ-45 Serial Console Port  1 Uplink Slot  2 Power Supply Slots  1 transceivers SFP+ LC |  |  |
| **3** | **Memory and processor**  Dual Core ARM Cortex A9 @ 1016 MHz  1 GB DDR3,  Packet buffer size: 12.38MB 4.5MB ingress/7.875MB Egress,  4GB eMMC |  |  |
| **4** | **Performance**  1000 Mb Latency: < 3.1 µs  10 Gbps Latency: < 3.4 µs  Throughput: 112 Mpps  Switching Capacity: 176 Gbps  Routing table size: 2000 entries IPv4, 1000 entries IPv6 in hardware, 200 OSPF, 256 Static, 10000 RIP  MAC address table size: 32768 entries |  |  |
| **5** | **Electrical characteristics**  Frequency; 50/60 Hz  Imput voltage: 110V – 240V AC  Power capacity: 2 Fuentes de 1050W  Idle power: 73 W  PoE+ |  |  |

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| **Ítem** | **EQUIPO ACTIVO - SWITCH DE ACCESO** | **Cumple (SI/NO)** | **#FOLIO** |
| **1** | **I/O ports and slots**  24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only  4 SFP+ 1/10GbE ports; PHY-less |  |  |
| **2** | **Additional ports and slots**  1 RJ-45 Serial Console Port  1 transceivers SFP+ LC |  |  |
| **3** | **Memory and processor**  Dual Core ARM Cortex A9 @ 1016 MHz, 1GB DDR3 SDRAM; Packet buffer size: 12.38MB 4.5MB Ingress/7.785 Egress, 4GB eMMC |  |  |
| **4** | **Performance**  1000 Mb Latency < 3.8 µs  10 Gbps Latency < 2.9 µs  Throughput 95.2 Mpps  Switching capacity 128 Gbps  Routing table size 2000 entries IPv4, 1000 entries IPv6 in hardware, 200 OSPF, 256 Static, 10000 RIP  MAC address table size 32768 entries |  |  |
| **5** | **Electrical characteristics**  Frequency; 50/60 Hz  AC voltaje: 100 - 127/200 – 240VAC  Current: 4.9/2.4 A  Maximum power rating: 445 W  Idle power: 36.8 W  PoE power: 370 W PoE+ |  |  |
| **6** | **Safety**  UL 60950-1: 2nd Edition;  EN 60950-1:2006 + A11:2009 + A1:2010 +A12:2011 +A2:2013;  IEC 60950-1:2005 +A1:2009 +A2:2013;  CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825-1:2014 Class 1 |  |  |
| **7** | **Management**  IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager |  |  |

En constancia de lo anterior firmo este documento a los [Insertar información] días del mes de [Insertar información] de [Insertar información].

Atentamente,

**Nombre o razón social:**

**Nombre del representante legal:**

**Documento de identificación:**

**Firma del representante legal/ persona natural:**