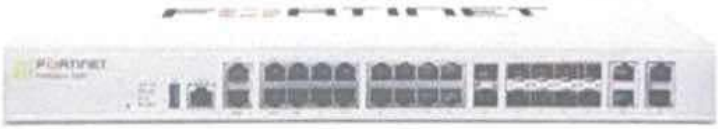
БАТЛАВ.
МИАТ ТӨХК-ИЙН
ГҮЙЦЭТГЭХ ЗАХИРАЛ .....
Б.МӨНХТАМИР

2025 оны .....р сарын .....-ны өдөр

ТЕХНИКИЙН ТОДОРХОЙЛОЛТ, ТАВИГДАХ ШААРДЛАГА

СҮЛЖЭЭНИЙ ТӨХӨӨРӨМЖ МИАТ/20250102225

Нийлүүлэх бараа нь дор дурдсан техникийн тодорхойлолт, стандартад нийцсэн байна.

№	Барааны нэр	Техникийн тодорхойлолт
1.	Fortigate FG-100F	Firewall Хүчин Чадал: 20 Gbps IPS Хүчин Чадал: 2.6 Gbps SSL Inspection: 1.4 Gbps VPN Хүчин Чадал: 1.2 Gbps Session-ийн дэмжлэг: 1.8 сая Нийт портын тоо: 22 RJ45 Ports: 12 x GE (1GbE) SFP Ports: 4 x GE SFP SFP+ Ports: 2 x 10GE LAG Support: Yes Management Ports: 1 x RJ45 Console, 1 x USB, 1 x Out-of-Band Management Эрчим хүчний хэрэглээ: 31.5W Лицензийн төрөл: Fortiguard Unified Threat Protection (UTP), Fortiguard Enterprise, Fortiguard Advanced Хамгаалалтын функцүүд: NGFW, IPS, Antivirus, Web Filtering Үйлчилгээний хугацаа: 1 жил Лицензийн идэвхжил: Cloud-based activation Ажиллах температур: 0°C – 40°C - Нийлүүлэгч компани албан ёсны партнер эрхтэй байх.
	Жишээ зураг: 	
2.	Gigabit Layer2 PoE Switch (16 порт)	Cisco C1300-16P-2G, түүнтэй дүйцэхүйц === Memory and Processor === - CPU: ARM Dual-Core 1.4 GHz, 1 GB DDR4 DRAM, 512 MB Flash memory, 1.5 MB Packet Buffer Size === Ports === - 16x Gigabit RJ45 PoE+ ports, 2x Gigabit SFP ports, 1x RJ45 Console port, 1x USB-C Console port, 1x USB port for storage === Indicator LEDs === - Per-port status: Link/Act, PoE, Speed - System status: System === Performance === - Forwarding rate (64-byte packets): 26.78 Mpps - Switching bandwidth: 36 Gbps === General === - Jumbo frames: Frame sizes up to 9000 bytes. The default MTU is 2000 bytes - MAC table: 16,000 addresses - Chip guard: Detects tampering attempts and responds during bootup - Boot integrity: Boot integrity visibility allows Cisco's platform identity and software integrity information to be visible and actionable

- Fanless

=== Layer 2 Switching ===

- Spanning Tree Protocol:
  - Standard 802.1d Spanning Tree support
  - Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default Multiple Spanning Tree instances using 802.1s (MSTP); 8 instances are supported
  - Per-VLAN Spanning Tree Plus (PVST+) and Rapid PVST+ (RPVST+); 126 instances are supported
- Port grouping/Link aggregation:
  - Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP)
  - Up to 8 groups
  - Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation
- VLAN:
  - Support for up to 4093 VLANs simultaneously
  - Port-based and 802.1Q tag-based VLANs, MAC-based VLAN, protocol-based VLAN, IP subnet-based VLAN
  - Management VLAN
  - Private VLAN, Private VLAN Edge (PVE), Dynamic VLAN assignment via RADIUS server along with 802.1X client authentication Customer premises equipment (CPE) VLAN, Auto surveillance VLAN (ASV)
- Voice VLAN, Multicast TV VLAN, VLAN translation, Q-in-Q, Selective Q-in-Q, Generic VLAN Registration Protocol (GVRP)/Generic Attribute Registration Protocol (GARP), Unidirectional Link, Detection (UDLD), DHCP relay at Layer 2 (DHCP Option 82), Internet Group Management Protocol (IGMP) versions 1, 2, and 3 snooping, IGMP querier, IGMP proxy, Head-of-Line (HOL) blocking, Loopback detection

=== Layer 3 ===

- IPv4 routing:
  - Wire-speed routing of IPv4 packets
  - Up to 990 static routes and up to 128 IP interfaces
- IPv6 routing
  - Wire-speed routing of IPv6 packets
- Layer 3 interface
  - Configuration of a Layer 3 interface on a physical port, LAG, VLAN interface, or loopback interface
- Classless Interdomain Routing (CIDR), Routing Information Protocol (RIP) v2, Policy-Based Routing (PBR), DHCP server, DHCP relay at Layer 3, User Datagram Protocol (UDP) relay

=== Stacking ===

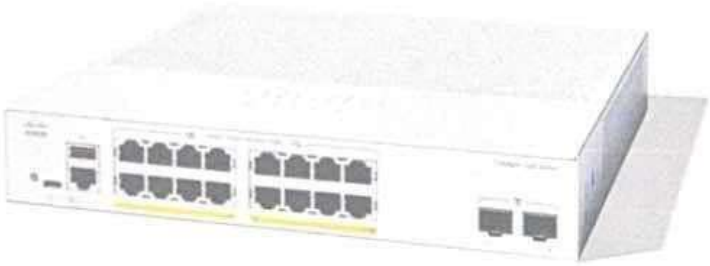
- Hardware stacking: Up to 8 switches in a stack. Up to 200 ports managed as a single system with hardware failover
- High availability, Plug-and-play stacking configuration/management, Hot swap of units in stack, High-speed stack interconnects (10 Gigabit Ethernet fiber interfaces)

=== Security ===

- Secure Shell (SSH) Protocol v1 and v2, Secure Sockets Layer (SSL), IEEE 802.1X, Web-based authentication, STP Bridge Protocol Data Unit (BPDU) Guard, STP Root Guard, STP loopback guard, DHCP snooping, IP Source Guard (IPSG), Dynamic ARP Inspection (DAI), IP/MAC/port binding (IPMB), Secure Core Technology (SCT), Secure Sensitive Data (SSD), Private VLAN, Layer 2 isolation Private VLAN Edge (PVE), Port security, RADIUS/TACACS+, RADIUS accounting, Storm control, DoS prevention, Multiple user privilege levels in CLI, ACLs (Support for up to 1024 rules)

=== Quality of service ===

- Priority levels: 8 hardware queues
- Scheduling: Strict priority and Weighted Round-Robin (WRR)
- Class of service
  - Port-based, 802.1p VLAN priority-based, IPv4/IPv6 IP precedence/Type of Service (ToS)/DSCP-based, Differentiated Services (DiffServ), classification and remarking ACLs, trusted QoS
  - Queue assignment based on DSCP and Class of Service (802.1p/CoS)
- Rate limiting: Ingress policer; egress shaping and rate control per VLAN, per port, and flow based; dual-rate 3-color (2R3C) policing

		- Congestion avoidance: A TCP congestion avoidance algorithm is required to minimize and prevent global TCP loss synchronization - iSCSI traffic optimization: A mechanism for giving priority to iSCSI traffic over other types of traffic === IPv6 === - IPv6, IPv6 QoS, IPv6 ACL, IPv6 First Hop Security, Multicast Listener Discovery (MLD v1/2) snooping, MLD proxy - IPv6 applications: Web/SSL, Telnet server/SSH, ping, traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), SNMP, RADIUS, syslog, DNS client, Telnet client, DHCP client, DHCP auto-config, IPv6 DHCP relay, TACACS+ === Management === - Cisco Business Dashboard, Cisco Business mobile app, Cisco Network Plug and Play (PnP) agent, Web user interface, SNMP (versions 1, 2c, and 3 with support for traps, and SNMP version 3 User-Based Security Model (USM)), Standard MIBs, Private MIBs, Remote Monitoring (RMON), IPv4 and IPv6 dual stack, Firmware upgrade, Port mirroring, VLAN mirroring, Flow-based redirection and mirroring, Remote Switch Port Analyzer (RSPAN), sFlow agent, DHCP (options 12, 59, 60, 66, 67, 82, 125, 129, and 150), Secure Copy (SCP), Auto-configuration with SCP file download, Text-editable configuration files, Smartports, Auto Smartports, Text view CLI, Localization, Login banner === Discovery === - Bonjour, Link Layer Discovery Protocol (LLDP) (802.1ab) with LLDP-Media Endpoint Discovery (MED) extensions, Cisco Discovery Protocol === Electrical === - Power supply: 100-240V, 50-60 Hz, Internal, Universal - PoE+ power budget: 120W === Warranty === - 2 years - Нийлүүлэгч компани албан ёсны партнер эрхтэй байх. (БНХАУ-ын бренд биш байх)
	Жишээ зураг:	
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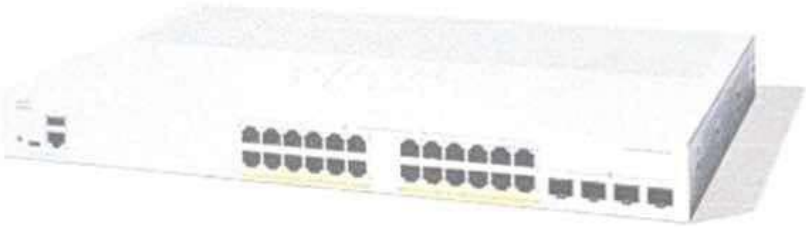
	Жишээ зураг:	
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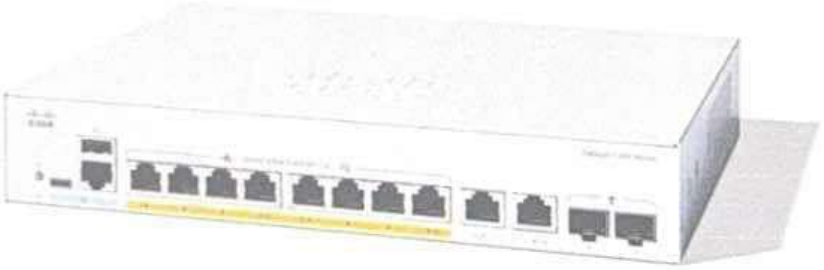
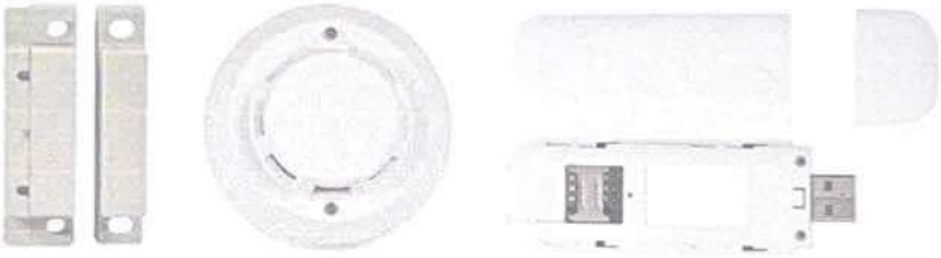
	Жишээ зураг: 	
5.	Gigabit Layer3 Switch (24 порт)	C9300-24T-A, түүнтэй дүйцэхүйц === Features === - Cisco IOS XE - Based on the Cisco UADP 2.0 Application-Specific Integrated Circuit (ASIC) with programmable pipeline and micro-engine capabilities, along with template-based, configurable allocation of Layer 2 and Layer 3 forwarding, Access Control Lists (ACLs), and Quality of Service (QoS) entries - Cloud management and monitoring in Meraki dashboard - Support for AES-256 with the powerful MACsec 256-bit encryption algorithm === Ports === - 24x Gigabit RJ45 ports, 1x USB mini-Type B Console port, 1x USB port for storage === Configuration === - Modular Uplinks and Speeds: 10G, 25G, 40G and mGig - Stacking Bandwidth Support: Stackwise-480 (480 Gbps) - mGig Density: 48x5G and 24x10G - Cisco StackPower: Yes - HW-Based IPsec: No - App hosting Capacity: Yes - Uplink: Modular Uplinks === Performance === - Total number of MAC addresses: 32,000

		- Total number of IPv4 routes (ARP plus learned routes): 32,000 (24,000 direct routes and 8000 indirect routes) - IPv6 routing entries: 16,000 - Multicast routing scale: 8,000 - QoS scale entries: 5,120 - ACL scale entries: 5,120 - Packet buffer per SKU: 16 MB buffer for 24-or 48-port Gigabit - Ethernet models; 32 MB buffer for 24 and 48-port Multigigabit - FNF entries: 64,000 flows on 24-and 48-port Gigabit Ethernet models; 128,000 flows on 24-port Multigigabit - DRAM: 8 GB - Flash: 16 GB - VLAN IDs: 4094 - PVST Instances: 300 - STP Virtual Ports (Port* VLANs) for PVST: 13000 - STP Virtual Ports (Port* VLANs) for MST: 13000 - Total Switched Virtual Interfaces (SVIs): 1000 - Jumbo frames: 9198 bytes - Total routed ports per Catalyst 9300 Series stack: 448 - Switching capacity: 208 Gbps - Switching capacity with stacking: 688 Gbps - Forwarding rate: 154.76 Mpps - Forwarding rate with stacking: 511.90 Mpps === License === - C9300-DNA-A-24-3Year (Network Advantage) === Warranty === - 2 years - Нийлүүлэгч компани албан ёсны партнер эрхтэй байх. (БНХАУ-ын үйлдвэрлэгч биш байх)
	Жишээ зураг:	
6.	Optic media converter	GT- 806A15/B15, түүнтэй дүйцэхүйц 10/100/1000BASE-T to 1000BASE-LX (WDM) Media Converter (SM, WDM, 1310nm, 15km) Speed: 10/100/1000T to 1000LX (WDM) Mode: Single Mode WDM Wavelength: TX: 1310nm RX: 1550nm Distance: 15km Fiber Connection: SC TAA Compliant - Нийлүүлэгч компани албан ёсны партнер эрхтэй байх.
	Жишээ зураг:	

7.	Гадна талын хяналтын камер	UNV IPC324LB-AF28-A2 4MP Fixed IR Dome Network Camera • High quality image with 4MP, 1/3.0" CMOS sensor • 4MP (2560*1440) @25/20fps; 3MP (2304*1296) @30/25fps; 2MP (1920*1080) @30/25fps • Support accurate Human Body Detection 2.0 • Ultra H.265, H.265, H.264 • Built in Mic • Smart IR, up to 30m (98ft) IR distance • Day/night functionality • 2D/3D DNR (Digital Noise Reduction) • DC12V or PoE (IEEE 802.3af) power supply • IP67 protection • IK10 vandal resistant • 2 Axis • Нийлүүлэгч компани үйлдвэрлэгчээс шууд нийлүүлэх албан ёсны дистрибютор эрхтэй байх (Борлуулагчийн зөвшөөрлийг тооцохгүй) Жич: Одоо ашиглаж байгаа UNV камерын систем, бичигч дээр нэмж ашиглах учир тус камер байх шаардлагатай
	Жишээ зураг:	
8.	Мэдээлэл лавлагааны төвийн дуудлагын утасны нөөц холбооны төхөөрөмж	Grandstream UCM6308A Series *Unified Communication & Collaboration Solution* This series of IP PBXs provide a platform that unifies all business communication on one centralized network, including voice, video calling, video conferencing, video surveillance, web meetings, data, analytics, mobility, facility access, intercoms and more. • Supports up to 3000 users and up to 450 concurrent calls • Zero configuration provisioning of Grandstream SIP endpoints • Built-in conferencing & meetings platform; supports desktop, Wave app, and SIP endpoints • Wave for Android, iOS, Chrome and Firefox browsers allows communication with all UCM6300 users & solutions • API available for third-party integrations, including CRM and PMS platforms • Advanced security protection with secure boot, unique certificate and random default password to protect calls and accounts • Three Gigabit auto-sensing RJ45 network ports with integrated PoE+ and support NAT router • Automated NAT firewall traversal service facilitates secure remote connections • Supports Full-Band Opus voice codec and H.264/H.263/ H.263+/H.265/VP8 video codec, jitter resilience up to 50% packet loss • Compatible with GDMS for cloud setup, management and monitoring • Based on Asterisk* version 16 open source telephony operating system • Нийлүүлэгч компани албан ёсны дистрибютер байх, ашиглалтын support дэмжлэг үзүүлэх чадамжтай байх Жич: Одоо ашиглаж байгаа Granstream UCM6308 төхөөрөмжтэй нөөц бэлэн байдалд зэрэг ажиллаж, тохиргоо хамт хийгдэж явах учир энэ төхөөрөмж байх шаардлагатай.
	Жишээ зураг:	

9.	Мэдээлэл лавлагааны тасгийн серверийн ерөөний аюулгүй байдлын тоног төхөөрөмж	Нэвтрэлтийн мэдрэгч – 1ш NTI E-M-DCS3, түүнтэй дүйцэхүйц - Compatible with Enviromux E-2D/5D/16D - Monitors access with a magnetic bridge sensor, which responds to any magnetic material (no special inserts necessary) - For normally closed circuit connection Утааны мэдрэгч – 1ш NTI E-SDS-CELC-V2, түүнтэй дүйцэхүйц - Compatible with Enviromux E-2D/5D/16D - Photoelectric smoke detector - Smoke sensitivity: 0.5 dB/m ±0.1 dB/m. - Maximum cable length: 1,000 ft (305 m). - Current: Standby 100μA, Alarm 30 to 35mA - Powered by E-2D/5D/16D SMS модем – 1ш - Compatible with Enviromux E-2D/5D/16D - USB портоор холбогдож мессеж явуулах боломжтой байх
	Жишээ зураг: 	
10.	Сүлжээний тестер	NetAlly LSPRNTR-300 + LSPRNTR-HOLSTER, түүнтэй дүйцэхүйц === Key Features === - Mobile Device Pairing - Add pictures and comments to Link-Live - Discover the nearest switch name and port information via CDP/LLDP/EDP - Check Link Speed & Duplex, VLAN ID, and connection to TCP/IP networks - Verify the Power-over-Ethernet (PoE) voltage from power sources in line with the 802.3af/at standards - Cable Test & Flash Switch Port === General Specifications === - Power: 2 AA Alkaline, or PoE - Cable types: 100 Ω Unshielded Twisted Pair (UTP) LAN cables; 100 Ω Shielded or Screened Twisted Pair (SeTP) LAN cables; TIA Category 3, 4, 5, 5e, and 6. ISO Class C, D, E and F - Measurable cable length: 1-200m (3-656ft) === WIFi Hotspot === - Specification compliance: IEEE 802.11b/g - Frequency channels: 802.11 Channels 1-11 (Default is 11) - Operating frequency: 2.412-2.484GHz, ISM Band - Regulatory domain: EN 301 489-1/17 - Browser: Internet Explorer 9.0, Firefox 3.6, Chrome 5.0, Safari 5.1 (minimum revision) - LEDs: Wi-Fi LED, Cloud LED, Gateway LED, DHCP LED, Link LED, PoE LED - Buttons: Power button - Holster for LinkSprinter === Warranty === - 1 year

	Жишээ зураг:	
11.	Утасгүй сүлжээний Controller техееремж	Cisco C9800-L-C-K9, түүнтэй дүйцэхүйц - Maximum number of access points: 250 - Maximum number of clients: 5000 - Maximum throughput: 5 Gbps - Maximum WLANs: 4096 - Maximum VLANs: 4096 - Fixed uplinks: 2x 10G/Multigigabit copper - Power supply: 110W, 12V DC, AC/DC adapter - Maximum power consumption: 86.9W (with 4.5W USB load) - Deployment modes: Centralized, Cisco FlexConnect, and fabric - Form factor: 1RU; half-width chassis allows side-by-side installation in standard 19-in. rack - License: Smart License enabled - Software: Cisco IOS XE - Management: Cisco DNA Center, Cisco Prime Infrastructure, and third party (open standards APIs) - Interoperability: AireOS-based controllers - Access points: Cisco Aironet 802.11ac Wave 1 and Wave 2 access points, Cisco Catalyst 9100 802.11ax access points (C9115AXI-H) - Management interfaces: Web-based HTTP/HTTPS, Telnet, Secure Shell (SSH) Protocol, serial port, Cisco Prime Infrastructure - Ports: 1x RJ-45 management port, 1x RJ-45 redundancy port, 1x RJ-45 console port, 1x Micro USB console port, 1x USB 3.0 port, 2x Uplink 10G/Multigigabit copper ports, 4x RJ-45 2.5G/1G Multigigabit Ethernet ports - LEDs: Service port LED, Redundancy port LED, System LED, Alarm LED, High availability LED - Buttons: Reset button === Warranty === - 2 years - Нийлүүлэгч компани албан ёсны партнер эрхтэй байх. (БНХАУ-ын бренд биш байх)
	Жишээ зураг:	
12.	Утасгүй сүлжээний антенна	Mikrotik SXTsq Lite5 (International), түүнтэй дүйцэхүйц - Architecture: MIPSBE - CPU: AR9344 - CPU core count: 1 - CPU nominal frequency: 600MHz - Operating System: RouterOS - RAM: 64MB - Storage: 16 MB FLASH - Power: Passive PoE in, 10-30V DC, 6W max.

		- Wireless 5GHz: 802.11a/n, max data rate 300Mbps, dual chain - Antenna: 16 dBi for 5GHz - Ethernet: 1x 10/100Mbps - Additional: QM-X (quickMOUNT-X additional axis for pole-mounting SXTsq devices) === Warranty === - 1 year
	Жишээ зураг:	
13.	Хүчдэл тасралт мэдрэгч	NTI E-ACVDRLY-C14, түүнтэй дуйцэхүйц - Compatible with Enviromux E-2D/5D/16D - Measurement range: detects mains voltage from 50 to 250 VAC. - Measurement indication: Alarm or Normal. - Sensor type: open/closed contact switch. - Includes internal relay: Maximum close voltage: 90VAC @ 60Hz, 108VAC @ 50Hz; Minimum open voltage: 10VAC @ 60Hz, 12VAC @ 50Hz - Universal 250V IEC C14 socket on attached 6-inch (0.15-meter) cord - Maximum switching current: 500mA - Maximum hold-off voltage: 250VDC - Galvanic isolation: 1.5kVDC/peak AC
	Жишээ зураг:	

14	Утасгүй сүлжээний Access Point төхөөрөмж	8ш	Cisco C9115AXI-H, түүнтэй дүйцэхүйц - Enterprise class - Software: Cisco Unified Wireless Network Software Release 8.9 or later, Cisco IOS XE Software Release 16.11 or later - Internal Antenna, 2.4 GHz, peak gain 3 dBi; 5 GHz, peak gain 6 dBi; omnidirectional in azimuth - Interfaces: 1x 100, 1000, 2500 Multigigabit Ethernet (RJ-45) IEEE 802.3bz; Management console port (RJ-45); USB 2.0 (enabled via future software) - Indicators: Status LED indicates boot loader status, association status, operating status, boot loader warnings, and boot loader errors - Wi-Fi 6 - 4x4 MIMO with four spatial streams; Maximal Ratio Combining (MRC); 802.11 Dynamic Frequency Selection (DFS); Cyclic Shift Diversity (CSD) support, Packet aggregation: A-MPDU (transmit and receive), A-MSDU (transmit and receive) - 802.11n version 2.0 (and related) capabilities: 802.11n and 802.11a/g beamforming; 20- and 40-MHz channels; PHY data rates up to 890 Mbps (40 MHz with 5 GHz and 20 MHz with 2.4 GHz) - 802.11ac: 802.11ac beamforming; 20-, 40-, 80-, and 160-MHz channels; PHY data rates up to 3.47 Gbps (160 MHz with 5 GHz) - 802.11ax: Uplink/downlink OFDMA; TWT; BSS coloring; MRC; 802.11ax beamforming; 20-, 40-, 80-, and 160-MHz channels; PHY data rates up to 5.38 Gbps (160 MHz with 5 GHz and 20 MHz with 2.4 GHz) - Regulatory Domain: H - System memory: 2048 MB DRAM, 1024 MB flash - Input power requirements: 802.3at Power over Ethernet Plus (PoE+), 802.3bt Cisco Universal PoE (Cisco UPOE+, Cisco UPOE); Cisco power injector, AIR-PWRINJ6= - Cisco C9800-L-C-K9 Wireless Controller төхөөрөмжтэй CAPWAP туннелиэр холбогдож ажиллах боломжтой, холбогдоход шаардлагатай Air Network, Air DNA лицензтэй байх === Warranty === - 1 years - Нийлүүлэгч компани албан ёсны партнер эрхтэй байх. (БНХАУ-ын бренд биш байх)
	Жишээ зураг:		
15	Wireless Router (WIFI Цацагч)	2ш	Linksys EA7500S-AH, түүнтэй дүйцэхүйц - Equipped with Linksys Smart Wi-Fi software for easy setup - Max-Stream Dual-Band AC1900 WiFi 5 Router, External Antenna - Provides up to 1,500 square feet of Wi-Fi coverage for 15plus wireless devices - Supports Both Desktop and Wall Mounting
	Жишээ зураг:		