



1. Scope of Work

All supplied equipment must meet or exceed the required technical specifications. The selected vendor shall be responsible for delivering the equipment and completing the following detailed tasks to KCC standards:

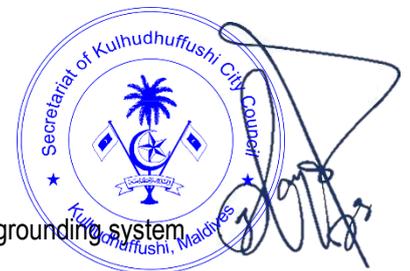
1.1. Fiber Optic Cable Installation and Termination

- a. Fiber Network Design
 - Design redundant fiber topology connecting 3 distribution racks to core network
 - Create fiber optic splice diagram showing ODF allocations and patch cord routing
 - Submit fiber optic network design document
 - Assign certified fiber optic technician (CFOT/FOA) for entire installation duration
- b. Cable Installation and Termination
 - Install 4-core OM3 fiber from distribution racks to the server room rack, cables will be laid by council staff.
 - Terminate all 12 fiber cores (3 racks x 4 cores) at server room ODF and distribution rack ODFs
 - Use fusion splicing for all fiber terminations (maximum 0.05dB splice loss)
 - Install LC duplex adapters on ODF
 - Use 2m duplex LC/LC patch cords for server room ODF to core switch uplinks
 - Use 1m duplex LC/LC patch cords for distribution rack ODF to access switch uplinks
 - Properly manage fiber slack: 3m service loop at each ODF
- c. OTDR Testing and Insertion Loss Testing
 - Perform bi-directional OTDR testing for all fiber cores using Fujikura AFL or equivalent
 - Events to document: splice points, connectors, macro-bends, end-to-end length
 - Conduct testing with light source and power meter
 - Test each fiber core in both directions
- d. Documentation
 - Provide OTDR trace files for each fiber core
 - Submit fiber optic test summary report with pass/fail summary
 - Provide ODF port allocation diagram showing patch panel assignments

1.2. Installation and Configuration of Central UPS and Central Power Distribution

The Vendor shall be fully responsible for the **design, supply, installation, configuration, testing, and commissioning** of the Central UPS and Power Distribution System to support the surveillance, access network, and communication infrastructure. All electrical works shall strictly comply with **local electrical regulations and manufacturer best practices**.

- a. System Design and Engineering
 - Conduct detailed site assessment and load verification.
 - Provide single-line electrical diagram (SLD) including:
 - Input power source
 - UPS
 - Battery banks
 - Smart PDU
 - Outgoing distribution circuits
 - Protection devices
- b. Installation of 24U Network Cabinet
 - Install the 24U network cabinet in the designated server room.
 - Ensure:
 - Proper floor leveling using adjustable stands
 - Wheel locking after positioning
 - Implement Proper earthing/grounding of rack frame to building grounding system
 - Structured cable routing for power and data separation





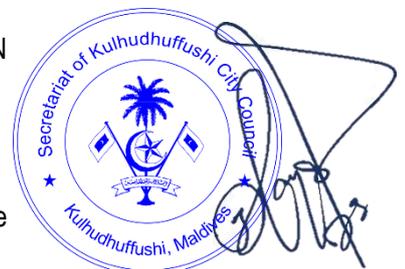
- Install cable management accessories to maintain clean and segregated routing.
- c. Installation and configuration of 6kVA Rack-Mount UPS
 - Mount UPS inside the 24U rack:
 - Install external battery packs below the UPS as per OEM wiring diagram
 - Install dedicated incoming AC supply from main distribution board (MDB) using:
 - Properly sized 3-core copper cable (Phase, Neutral, Earth)
 - Dedicated MCB/MCCB protection sized as per UPS input current
 - Configure automatic self-test schedule
 - Configure low battery alarm thresholds
 - Integrate UPS monitoring via SNMP card (if available)
 - Configure alerts for Power failure, Battery low, Overload, etc
- d. Installation and configuration of Smart Switched PDU
 - Install Smart Switched PDU inside the 24U rack.
 - Connect PDU input to UPS output distribution
 - Label each output branch corresponding to relevant load
 - Assign IP address within Management VLAN
 - Configure secure access via HTTPS
 - Configure monitoring, alarms
 - Configure Email/SNMP alert notifications
- e. Electrical Distribution to Floor Access Switch Racks

The Vendor shall design and implement electrical distribution from the Central UPS to three (03) floor access switch racks.

 - Install dedicated outgoing circuits from UPS output distribution panel to each floor rack.
 - Use appropriately sized **3-core copper power cables** from server room to each floor rack. Cables will be laid by council staff
 - Install mini distribution enclosure at server room with individual MCB for each floor rack
 - Ensure proper mechanical protection using PVC conduit or trunking
- f. Testing and Commissioning
 - UPS Functional Testing
 - Battery backup runtime verification
 - Verify load balancing
- g. Documentation and Handover
 - Vendor shall provide:
 - Single-line diagrams (SLD)
 - Rack power layout diagram
 - UPS configuration details
 - Test and commissioning

1.3. Installation, Configuration and Integration of Central VMS Platform

- a. VM Resource Provisioning
 - Deploy relevant virtual machines on Huawei SAN storage:
 - Configure VM high availability (HA) and vMotion capabilities
 - Allocate dedicated storage LUNs from Huawei SAN for VM disks
- b. Network Configuration
 - Create vSwitches for CCTV VLAN, Management VLAN, and Storage VLAN
 - Configure NIC teaming for redundancy (active-passive)
 - Enable jumbo frames (9000 MTU) on storage network interfaces
- c. Platform Deployment
 - Install VMS software
 - Configure any associated database with automated backup to SAN storage

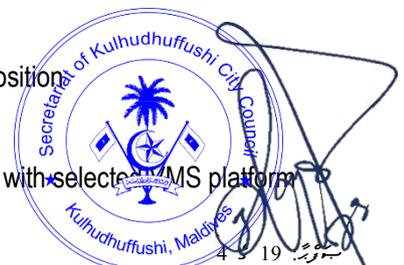




- Deploy web client and mobile app services with SSL certificates
- Integrate with Active Directory/LDAP for user authentication
- d. Licensing & Module Activation
 - Configure camera license allocations
- e. Recording Architecture
 - **Central Site:** Direct-to-server recording from 60 cameras to VMS Recording Server
 - **Remote Sites:** Configure edge recording on local NVRs with 7-day retention
 - **Central Archiving:** Schedule nightly sync from remote NVRs to central archive server
 - Configure bandwidth throttling: 5-10Mbps per remote site during sync
 - Implement hierarchical storage: 7 days on edge, 30 days central archive
- f. Retention Policies
 - Continuous recording at 1080p/15fps, H.265+ compression
 - Configure auto-overwrite after 30 days with "locked video" protection for alarms
 - Enable video watermarking for integrity verification
- g. Video Wall Integration
 - Configure video decoder integration with VMS platform
 - Create video wall layout templates
 - Set up automatic camera pop-up on alert conditions
 - Configure user roles for video wall control
- h. Network Security Integration
 - Configure firewall rules on Ubiquiti Dream Machine Pro:
 - Allow VMS server to camera ports
 - Block direct internet access for cameras
 - Enable DPI for video traffic analysis
 - VMS logs Syslog forwarding (if applicable)
- i. Monitoring & Alerting
 - Configure SNMP traps for system health (CPU, RAM, storage, camera status)
 - Set up email alerts for critical events (video loss, system failure)
 - Implement health check dashboard with real-time status of all components
 - Configure automated system health reports
- j. Testing & Validation
 - Validate recording throughput
 - Test concurrent client connections: 5+ users viewing live/recorded video
 - Verify AD authentication for test users across different roles
 - Validate video export functionality with watermarking

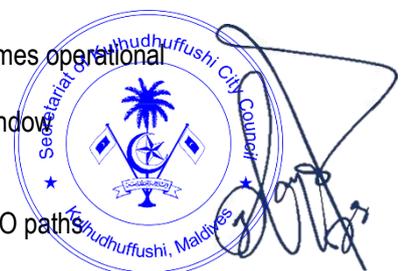
1.3.1. Installation, Configuration and Integration of Hybrid CCTV Recording Storage

- a. Storage Architecture Design
 - The recording storage appliance shall be configured with 12 × 8TB surveillance-grade HDDs (96TB raw capacity) in RAID6 configuration, providing approximately 80TB usable storage
 - **Central Site Recording:** Create and allocate appropriate LUN for direct recording from 60 central site cameras
 - **Remote Site Archiving:** Create and allocate appropriate LUN for centralized archiving of video from remote sites
 - **Edge Recording:** Each remote site shall maintain local recording on NVR appliances with 7-day retention for operational continuity during network outages
 - **Central Archiving:** The central recording storage appliance shall serve as the primary archive repository, synchronizing video from remote sites
- b. Physical Installation & Setup
 - Install the recording storage appliance in the designated server room rack position
 - Install redundant power supplies
 - Install power cabling, management cabling and data cabling
 - Power on appliance and update firmware to latest stable version compatible with selected VMS platform
 - Configure RAID6 array with hot-spare drive





- Initialize storage pool
- Configure storage pool alerts: disk failure, RAID degradation, temperature warnings
- c. Network Configuration & Integration
 - **Data Interfaces:** Configure 2 × 1GbE ports in LACP bond for video recording traffic, assigned to relevant VLAN
 - **Management Interface:** Configure dedicated 1GbE port on Management VLAN for web-based GUI and SNMP monitoring
 - **iSCSI Interface:** Enable iSCSI protocol on data interfaces for VMS integration, configure MPIO for load balancing
 - Enable jumbo frames on all storage network interfaces
- d. VMS Platform Integration
 - Configure direct storage protocol integration, enable automatic storage provisioning
 - **Protocol Support:** Enable RTSP and ONVIF protocols for direct camera recording compatibility
 - **Recording Configuration:** Set recording mode to "Timing Recording" for continuous 24/7 operation with event-based video protection
- e. Remote Site Archiving Configuration
 - Configure each remote site NVR as "subordinate storage" in VMS hierarchy
 - Set up automated archive tasks: transfer video files older than 7 days from remote NVRs to central the storage appliance
 - Configure bandwidth throttling
 - Configure automatic retry mechanism for failed archive transfers
 - Set up alerts for incomplete archive jobs: email notification to administrators
 - Implement manual archive trigger capability for emergency video retrieval
 - Document procedure for remote site NVR storage overflow handling
- f. Retention & Overwrite Policies
 - Configure auto-overwrite for recordings older than 30 days
 - Set video lock protection for alarm events: locked videos retained
 - Enable storage trend analysis: generate quarterly capacity utilization reports
- g. Network Security Integration
 - Change default admin credentials and disable default accounts
 - Enable HTTPS/SSL for all web management access (TLS 1.2 or higher)
 - Configure IP whitelist: allow VMS servers and management workstations only
 - Disable unused services: FTP, SNMP v1/v2, Telnet
 - Enable audit logging: all access and configuration changes logged to syslog server (if applicable)
 - Integrate with Ubiquiti Dream Machine Pro firewall: block all internet access, allow only internal VLANs
- h. Monitoring & Alerting Integration
 - Configure SNMP v3 for monitoring system integration
 - Set up SNMP traps for: disk failure, RAID degradation, power supply failure, temperature exceedance
 - Configure email alerts for critical events
 - Set up VMS dashboard integration: display storage health status in VMS client
- i. Testing & Commissioning
 - Verify VMS platform successfully records to the storage appliance
 - Test video retrieval from both primary storage and archive storage
 - Validate remote site video archive sync
 - Test video lock functionality
- j. Acceptance Criteria
 - Storage capacity verification
 - RAID health status: Optimal with 1 hot-spare drive active
 - Network connectivity: All interfaces reachable, LACP bond active, jumbo frames operational
 - VMS integration: All camera recording paths active, no video loss
 - Archive sync: Complete nightly sync for all remote sites within configured window
- k. Documentation Requirements
 - Storage pool configuration report with RAID layout and disk assignments
 - Network configuration document: IP addresses, VLANs, LACP settings, MPIO paths





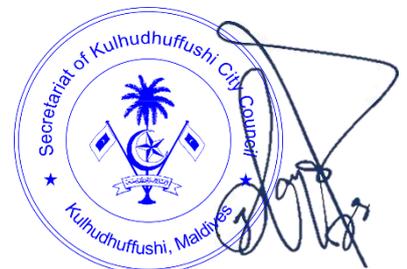
- Retention policy configuration: screen captures of VMS storage settings
- Archive sync schedule and bandwidth configuration details
- Physical connectivity diagram to network, power, and VMS servers
- Logical storage architecture diagram: showing edge, central, and backup storage hierarchy
- Network integration diagram: VLANs, interfaces, and traffic flows in CCTV environment

1.3.2. Documentation and Training Service

- a. As-Built Documentation
 - **Technical Documentation Package**
 - **Network Topology Diagrams:** Layer 2/Layer 3 diagrams
 - **IP Addressing Scheme:** Excel spreadsheet with all device IPs, VLANs, subnets
 - **Cable Schedule:** Detailed cable list with labels, routes, test results
 - **Rack Layout Diagrams:** Physical layout showing all equipment placement
 - **Fiber Optic Documentation:** OTDR reports
 - **VMS Configuration Guide:** Screenshots of all VMS settings, user roles, retention policies
 - **Storage Configuration:** SAN LUN allocation, RAID configuration, capacity planning
 - **Security Policies:** Firewall rules, ACLs, 802.1X configuration
 - **Operational Documentation**
 - **System Administration Manual:** Step-by-step procedures for daily operations
 - **VMS User Guide:** How to view live/recorded video, export clips, use video wall
 -
- b. System Administrator Training (3 days)
 - **Day 1:** VMS Administration
 - **Day 2:** Network & Storage Management
 - **Day 3:** Integration & Security
- c. Operator Training (1 day)
 - VMS client software installation and configuration
 - Live video monitoring and camera control
 - Playback and video search techniques
 - Video wall operation and layout management
 - Alarm handling and event response
 - Basic troubleshooting: video loss, camera offline
- d. Configuration Warranty
 - 3-month warranty covering all configurations and settings
 - Any configuration-related issues resolved at no charge within 48 hours
- e. Post-Deployment Support
 - 12-month technical support: 8x5 phone/email support
 - Critical issues: 4-hour response, 24-hour resolution
 - Minor issues: 24-hour response, 5-day resolution

1.4. Installation of Distribution Rack

- a. Rack Installation
 - Install 3x 12U wall-mount racks at distribution locations
 - Install 6/8-port PDU in each rack with 16A
- b. Power Distribution
 - Connect PDU to dedicated 16A circuit to central server room UPS
 - Install circuit breaker labeling





Minimum technical requirements for all deliverables

Item 01: 24 port PoE Network Switch

Warranty: Minimum 1 Year

Quantity: 6

Authorization Letter: Required

Feature	Specification
Product Type	Managed Layer 3 Lite Ethernet Switch
Form Factor	1U Rackmount (1.75" height)
Total Ports	24 RJ45 Fixed Ports + 2 SFP+ Uplinks
1GbE RJ45 Ports	16 Ports Total: 8 x PoE+ (IEEE 802.3at) Ports 8 x PoE++ (IEEE 802.3bt) Ports
2.5GbE RJ45 Ports	8 Ports Total: 8 x PoE++ (IEEE 802.3bt) Ports
Uplink Ports	2 x 10G SFP+ Ports
Total PoE Power Budget	400 W
Switching Capacity	112 Gbps
Forwarding Rate	83.33 Mpps
MAC Address Table Size	16,000 entries
VLAN Capacity	4094 supported VLANs (802.1Q)
Power Supply	Universal Input 100–240V AC
Management	Centralized Software/Cloud Interface

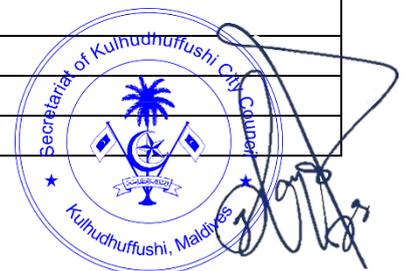
Item 02: Wi-Fi Access Point

Quantity: 12

Warranty: Minimum 1 year

Authorization Letter: Required

Feature	Specification
Wi-Fi Standard	Wi-Fi 7 (802.11be)
Frequency Bands	Tri-band operation (2.4 GHz, 5 GHz, 6 GHz)
Spatial Streams	6 streams (2x2 MIMO on all three bands)
Max. Throughput (6 GHz)	5.8 Gbps (320 MHz channel)
Max. Throughput (5 GHz)	4.3 Gbps (240 MHz channel)
Max. Throughput (2.4 GHz)	688 Mbps (40 MHz channel)
Network Interface	1x 10 GbE RJ45 Port
Power Input	PoE+ (802.3at)
Max. Power Draw	22W
Dimensions	Ø206 x 32.5 mm (Ø8.1 x 1.3")
Weight	750 g (1.7 lb)
Operating Temp	-30 to 40° C (-22 to 104° F)
Key Wi-Fi Features	MLO, 4096-QAM, Preamble Puncturing
Security	WPA3, PPSK, 802.1X





Item 03 :IP bullet Camera (Outdoor Specialized))

Quantity: 70

Warranty: Minimum 1 year

Authorization Letter: Required

Feature	Specification
Max Resolution	2688 x 1520
Sensor Type	1/1.8" Progressive Scan CMOS
Minimum Illumination	0.0005 Lux @ (F1.0, AGC ON), 0 Lux with supplemental light
Lens	2.8 mm
Supplemental Light	Smart Hybrid Light (IR & Warm White Light), up to 60 m
Audio	Built-in mono microphone
Connectivity	RJ45 10/100M Ethernet
Video Compression	H.265+/H.265/H.264+/H.264
WDR	130 dB
Smart Features	AcuSense (human/vehicle classification)
Storage	MicroSD card slot (up to 512 GB)
Power	12 VDC or PoE (802.3af)
Ingress Protection	IP67
Material	Metal

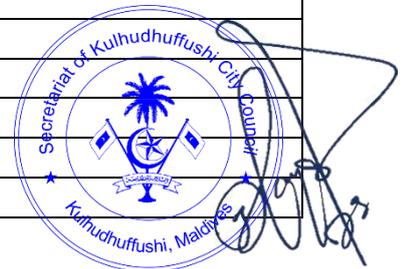
Item 04: IP Dome Camera

Quantity: 40

Warranty: Minimum 1 year

Authorization Letter: Required

Features	Specification
Preferred Brand	Axis, Pelco, or Hikvision or equivalent
Camera Type	4 MP Fixed Dome Network Camera with Built-in Microphone
Image Sensor	1/3" Progressive Scan CMOS
Resolution	2688 × 1520 (4 Megapixels)
Min. Illumination	Color: 0.005 Lux; B/W: 0 Lux with IR
Day/Night	IR Cut Filter with Auto Switch
Lens Options	2.8 mm Fixed Focal
Field of View	Horizontal 103°, Vertical 55°, Diagonal 122°
IR Illuminator	Up to 30 m, 850 nm wavelength
Video Streams	Main: 25–30 fps (HD) Sub: 25–30 fps (SD) Third: 10 fps (optional)
Video Compression	H.265+/H.265, H.264+/H.264, MJPEG
Audio	Built-in Mic, Noise Filtering
Network & Security	TCP/IP, HTTPS, IPv4, 802.1x, user access log, ONVIF
Live View & Clients	Up to 6 channels
API / SDK	ONVIF (S, G, T), ISAPI, SDK
Image Enhancements	120 dB WDR, BLC, HLC, 3D DNR
Interface	1 × RJ45 (10/100M) with PoE 802.3af
Storage	Built-in microSD (supports up to 256 GB)





Events & Functions	Motion Detection, Tamper Alarm, Exception Alarm, Face Detection, Perimeter Protection
Power	PoE
Protection	IP67 Weatherproof, IK10 Vandal Proof
Languages	English Default

Item 05: Junction Box (For IP Bullet Camera)

Quantity: 70

Specification	Description / Features
Junction Box (For IP Bullet Camera)	Material: Aluminum alloy or tough, UV-resistant plastic. Weather Rating: IP66 for outdoor use. Cable Management: Features multiple concealed ports for wire entry. Mounting: Pre-drilled holes for compatibility with most bullet camera bases. Dimensions: Varies; check the specific product for measurements. Should support Bullet camera's base

Item 06: Junction Box (For IP dome camera)

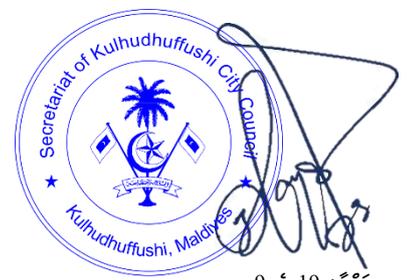
Quantity: 20

Specification	Description / Features
Junction Box (For IP dome camera)	Material: Aluminum alloy or tough, UV-resistant plastic. Weather Rating: IP66 for outdoor use. Cable Management: Features multiple concealed ports for wire entry. Mounting: Pre-drilled holes for compatibility with most bullet camera bases. Dimensions: Varies; check the specific product for measurements. Should support Bullet camera's base

Item 07: Surveillance Hard Disk (8TB)

Quantity: 5

Parameter	Specification
Capacity	8 TB
Interface	SATA 6 Gb/s
Form Factor	3.5-inch Internal
Drive Class	Surveillance (24/7 operation)
Cache Size	128 MB or 256 MB
Max Cameras Supported	Up to 64 HD cameras
Workload Limit	180 TB/year
Key Technology	AllFrame (reduces frame loss)
MTBF	1.0M to 1.5M hours



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Item 08: NVR

Quantity: 5

Warranty: Minimum 1 year

Authorization Letter: Required

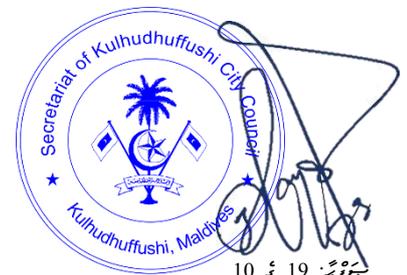
Feature	Specification
IP Video Input Channels	8
Incoming Bandwidth (Maximum)	80 Mbps
PoE Ports	8 independent network interfaces supporting Power-over-Ethernet
PoE Power Budget (Maximum Total)	120 W
PoE Standards Supported	IEEE 802.3 af/at
Storage Interfaces	2 SATA interfaces
Maximum Capacity per Storage Drive	Up to 10 TB (per drive)
Decoding Capability (Maximums)	2-ch @ 8 MP (25fps) or 4-ch @ 4 MP (30fps) or 8-ch @ 1080p (30fps)
Network Interface (Uplink)	1 self-adaptive 10/100/1000 Mbps Ethernet interface
USB Interfaces	1 × USB 2.0 (front panel), 1 × USB 2.0 (rear panel)
Power Supply	100 to 240 VAC

Item 09: UPS Power Backup 1000VA / 600W

Quantity: 15

Warranty: Minimum 1 year

Feature	Specification
UPS Topology	Line Interactive
Rated Power (VA)	1000 VA
Rated Power (Watts)	600 W
Input Voltage (Nominal)	230 V
Output Voltage (Nominal)	230 V
Output Connections	4 universal receptacles (all with battery backup & surge protection)
Automatic Voltage Regulation (AVR)	Yes
Waveform Type	Stepped approximation to a sinewave
Transfer Time	6 ms typical / 10 ms maximum
Surge Energy Rating	156 Joules
Battery Type	Maintenance-free sealed Lead-Acid
Battery Capacity	9.0 Ah
Typical Recharge Time	8 hours
Dimensions (H x W x D)	9.25 cm x 16.05 cm x 30.5 cm
Net Weight	5.7 kg
USB Compatible	No
Mounting Mode	Not rack-mountable; suitable for floor/wall mount



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Item 10: CAT6 Network Cable (Standard CAT6 Cables)

Quantity: 6

Specification	Description / Features
Cat6 Network Cable roll	Data rate support: 1000Base-T (Gigabit) and maximum to 10GBase-T, over shorter distances. Space management: The thinner size is ideal for high-density environments, such as patch panels in server racks, as it promotes better airflow and is easier to route. PoE support: Can be used with PoE (Power over Ethernet) switches, but performance may be limited to lower-power applications due to the smaller conductors, which can get hotter. Shielding: Most found in an unshielded twisted pair (UTP) configuration. Roll should have at least 305 meters of length

Item 11: 12U Wall Mount Network Cabinet kit

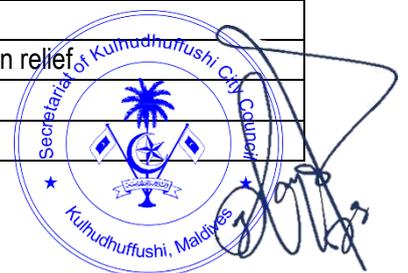
Quantity: 3

Feature	Specification
Rack Units (RU/U)	12U
Mounting Type	Wall Mountable
Width	600 mm
Depth	600 mm
Height	635 mm
Cooling (Active)	Two (2) integrated top-mounted cooling fans
Power Distribution	One (1) UK-type 4-port Power Distribution Unit (PDU) assembled
Front Door	Lockable tempered glass door
Side Panels	Removable side panels with quick-install latches
Cable Management	Top and bottom cable entry knockout plates
Material	SPCC quality cold-rolled steel (approx. 1.2mm thickness)
Static Loading Capacity	Minimum 60 kg
Standard Compliance	19-inch standard equipment mounting
Surface Finish	Electro-static powder coating (typically RAL 9004 or RAL 9005)
Other	Mounting hardware, wall-mount brackets, key set, and installation guide must be included

Item 12: 24-Port CAT6 UTP Patch Panel

Quantity: 6

Feature	Specification
Port Density	24 Ports
Category Rating	Category 6 (Cat 6)
Shielding Type	Unshielded Twisted Pair (UTP)
Configuration	Fully Loaded (includes 24 pre-installed keystone jacks)
Form Factor	19-inch Rack Mountable, 1U Height
Termination Type	180-degree punch down
Contact Gold Plating	50 micro-inches gold plating over nickel
PCB/Module Material	Flame retardant UL 94V-0 rated
Wiring Standards	Dual T568A & T568B color coding
Rear Support	Integrated or detachable rear cable management bar for strain relief
Front Identification	Integrated labelling strips with clear plastic covers
Chassis Material	SPCC cold-rolled steel with black powder coating





Item 13: Fiber Optic Terminal Box ODF 12Port

Quantity: 4

Parameter	Specification
Rack Units	1U (1.75" / 44.45 mm height)
Mounting Type	Sliding-Type Drawer Design
Adapter Capacity	12 SC/ LC
Material	Cold-Rolled Steel (SPCC)
Splice Tray Capacity	24 fibers (12 slots per tray)
Finish	Electrostatic Powder Coating (Black)
Cable Management	Integrated pigtail/patch cord guides
Cable Entry	Rear entry ports for distribution cables

Item 14: Fiber Pigtail, LC UPC, Simplex, OM3 Multimode, PVC, 0.9mm, Aqua

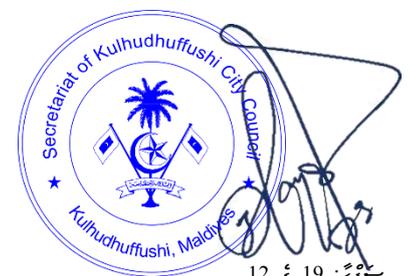
Quantity: 24

Parameter	Specification
Fiber Type	OM3 Multimode (Laser-Optimized)
Fiber Core/Cladding	50/125 μm
Connector Type	LC Simplex
Polish Type	UPC (Ultra Physical Contact)
Length	1.0 Meter
Jacket Material	PVC (OFNR Riser Rated)
Jacket Color	Aqua (Standard for OM3)
Jacket Diameter	2.0 mm
Insertion Loss	≤ 0.3 dB
Return Loss	≥ 30 dB
Data Rate Support	10 Gbps up to 300m; 40/100 Gbps up to 100m

Item 15: Multimode adapter LC OM3 (Aqua)

Quantity: 12

Parameter	Specification	Standard/Compliance
Product Type	Fiber Optic Adapter / Coupler	
Connector Type	LC to LC Duplex (Female to Female)	
Fiber Mode	OM3 Multimode 50/125μm	
Body Style	Duplex (two fibers)	
Polish Type	UPC (Ultra Physical Contact)	
Color	Aqua	Standard color coding for OM3 fiber
Mounting Type	Full Flanged (Snap-in installation)	Stainless steel clips for tool-less install
Housing Material	Plastic (UL94-V0 flammability rating)	



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Item 16: Fiber cable roll OM3

Quantity: 1km

Feature	Specification
Fiber Category	OM3 Multimode (Laser-Optimized)
Core / Cladding Diameter	50/125 µm
Fiber Count	6 Cores
Cable Construction	Indoor Distribution / D-Type
Buffer Type	900 µm Tight Buffer
Strength Member	Aramid Yarn
Jacket Material	Low Smoke Zero Halogen (LSZH)
Maximum Attenuation	≤ 2.7 dB/km @ 850nm; ≤ 0.6 dB/km @ 1300nm
Minimum Bandwidth	≥ 2000 MHz·km @ 850nm (Effective Modal); ≥ 500 MHz·km @ 1300nm
Transmission Distance	Supports 10G Ethernet up to 300 meters
Jacket Color	Aqua (standard for OM3)
Standards Compliance	IEC 60794-2-20/21, YD/T 1258.4, and RoHS
Flammability Rating	LSZH (Flame retardant, non-corrosive, low smoke)

Item 17: SFP transceiver

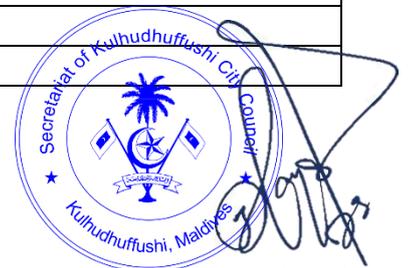
Quantity: 12

Parameter	Specification
Product Type	SFP+ Transceiver (Hot-pluggable)
Application	10GBASE-SR
Data Rate	10 Gbps
Fiber Type	Multimode Fiber (MMF)
Wavelength	850 nm
Max Distance	300m (on OM3 fiber)
Connector	LC Duplex
Features	Digital Diagnostics (DDM/DOM)

Item 18: OM4 Duplex Fiber Patch Cords (1m)

Quantity: 15

Parameter	Detailed Specification
Fiber Type	OM3 Multimode (Laser-Optimized)
Fiber Count	Duplex (2 Fibers)
Connector Type	LC to LC (Duplex)
Polish Type	UPC to UPC (Ultra Physical Contact)
Length	1.0 Meter (3.3 ft)
Jacket Material	PVC (OFNR) Riser Rated
Jacket Color	Aqua (Standard for OM3)
Core/Cladding	50/125 µm
Data Rate Support	10G
Max Distance	300m at 10Gbps; 100m at 40/100Gbps





Item 19: MTP-12 OM3 Multimode Fiber cable 15m

Quantity: 1

Parameter	Specification
Product Type	Fiber Optic Harness (Breakout) Cable
Fiber Type	OM3 Multimode (Laser-Optimized)
Fiber Count	8 to 144 Fibers (Customizable)
Connector A	MTP®-12 Male (Pinned) or Female (Non-Pinned)
Connector B	Duplex LC
Insertion Loss	Max 0.35 dB (Elite/Low Loss option)
Cable Jacket	Plenum (OFNP) or LSZH (Low Smoke Zero Halogen)
Jacket Color	Aqua (Standard for OM3)
Core/Cladding	50/125 µm
Minimum Bend Radius	7.5 mm (Bend Insensitive Fiber)

Item 20: 1U High-Density (HD) Fiber Enclosure

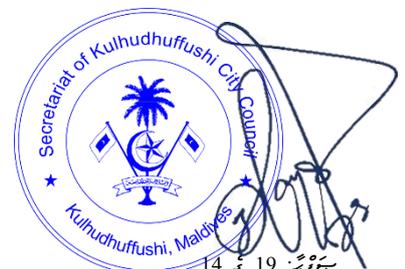
Quantity: 1

Parameter	Specification
Product Type	High Density (HD) Rack Mount Enclosure
Rack Units	1U (1.75 inch height)
Installation Type	Fixed/Sliding Mount
Capacity	Holds up to 4x FHD® Modular Cassettes/Panels
Access Design	Tool-less removable top cover and sliding tray
Material	Cold-Rolled Steel (SPCC)
Finish	Black Powder Coated
Cable Management	Integrated rear cable management spools
Dimensions	482.6 mm (W) x 44 mm (H) x 300 mm (D)

Item 21: FHD MTP-24 to 12xLC OM4 Cassette

Quantity: 1

Parameter	Specification
Product Type	Fiber Optic Cassette Module
Fiber Type	OM4 Multimode (Laser-Optimized)
Fiber Count	24 Fibers Total
Connector A	1x MTP®-24 Male (Pinned) port (Rear)
Connector B	12x LC Duplex ports (Front)
Adapter Color	Aqua
Polarity Type	Type A (Straight-Through Wiring)
Insertion Loss	Max 0.35 dB (Elite/Low Loss option)



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Item 22: RJ45 patch cords 1m

Quantity: 150

Parameter	Specification
Product	Cat6 UTP Patch Cord
Length	1.0 Meter
Speed	1 Gbps (1000Base-T)
Max Speed	10 Gbps (Short distance)
Bandwidth	250 MHz
Conductor	24 AWG Stranded Copper
Connectors	RJ45 (50µ Gold Plated)
Features	Snagless, PoE++ (100W)

Item 23: Cable Manager

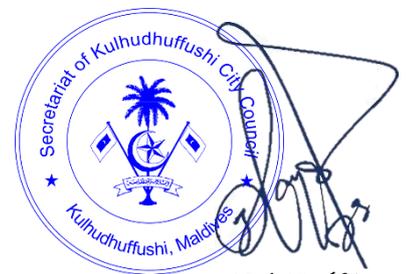
Quantity: 12

Parameter	Specification
Product Type	Horizontal Finger Duct Cable Manager
Rack Units	1U (1.75 inch height)
Width	19" Standard Rackmount
Design	Duct with Vertical Fingers
Cover	Removable Hinged Cover
Depth	3.5" (Standard Depth)
Pass-Throughs	Rear open ports for front-to-back routing
Installation	Includes #12-24 and M6 rack screws

Item 24: 1U Universal Rack PDU

Quantity: 4

Feature	Requirement	Technical Detail
Form Factor	1U Horizontal	Must fit standard 19" rails
Socket Type	Universal	Precision modules compatible with US, UK, EU, and AU plugs.
Outlet Quantity	6 to 10 Outlets	
Voltage Range	110V – 250V AC	Full range support for global power standards (50/60Hz).
Current Rating	13A to 16A (Minimum)	High-conductivity internal copper busbar (phosphor bronze preferred).
Protection	Surge & Overload	Integrated surge suppressor (min. 900J) and resettable circuit breaker.
Input Plug	Specify Local Type	E.g., UK 13A (Type G)
Cable Length	2.5 Meters (8ft)	Heavy-duty 3-core power cord (minimum 1.5mm ² thickness).
Safety Switch	Master Power Switch	Must include a protective "flip-cover"



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Item 25: Wireless IP Phone model A

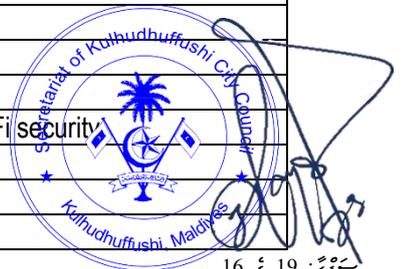
Quantity: 10

Parameter	Specification
Brand	Yealink, Grandstream, Fanvil or equivalent
Product Type	Wireless Enterprise IP Handset
Connectivity	Dual-Band Wi-Fi 6 (2.4GHz & 5GHz)
Roaming Support	Seamless fast roaming protocols
Bluetooth	Integrated Bluetooth 5.0
Audio	HD Voice Handset & Speakerphone
Noise Filtering	Smart Noise Cancellation Technology
SIP Accounts	Up to 4 SIP accounts
Display	2.4" TFT Color Screen
Battery Capacity	2000 mAh Rechargeable Li-ion
Talk Time	Up to 9 hours (approx.)
Standby Time	Up to 200 hours (approx.)
Charging Interface	USB Type-C port; includes charging cradle
Function Keys	9 Configurable Keys
Additional Features	Vibration alert, 5-way conferencing, 3.5mm headset jack
Mounting	Wall-mountable and stand-mountable
Security	SRTP, TLS 1.3, 256-bit AES encryption

Item 26: Wireless IP Phone model B

Quantity: 60

Feature	Specification
Brand	Yealink, Grandstream, Fanvil or equivalent
Product Type	Corded IP Phone
VoIP Accounts	Up to 2 SIP accounts
Conferencing	Local 5-way audio conferencing
Dimensions (WxDxHxT)	188 x 189 x 162 x 50 mm
Mounting Options	Adjustable stand (2 angles), Wall-mountable
Colour	Classic Grey
Display Type	2.3-inch graphical LCD with backlight
Display Resolution	132x64 pixels
Line Keys	2 (with LED)
Feature Keys	6 (transfer, message, headset, redial, mute, hands-free speakerphone)
Navigation Keys	5
Audio Quality	HD Voice (Handset & Speaker)
Noise Filtering	Smart Noise Filtering technology
Speakerphone	Full-duplex hands-free with Acoustic Echo Cancellation (AEC)
Wideband Codecs	G.722
Narrowband Codecs	G.711(PCMU/PCMA), G.723.1, G.729AB, G.726, iLBC
Wi-Fi	Built-in dual-band (2.4GHz/5GHz, IEEE 802.11a/b/g/n/ac)
Ethernet Ports	2 x RJ45 10/100M
PoE Support	Yes (IEEE 802.3af, class 2)
Headset Port	1 x RJ9 (4P4C)
Headset Support	EHS wireless headset support
Security Protocols	TLS 1.3, SRTP, AES encryption, WPA2/WPA3 Wi-Fi security
Configuration	Browser, phone interface, auto-provisioning
Local Phonebook Entries	Up to 1000
Phonebook Support	Blacklist, XML/LDAP remote phonebook

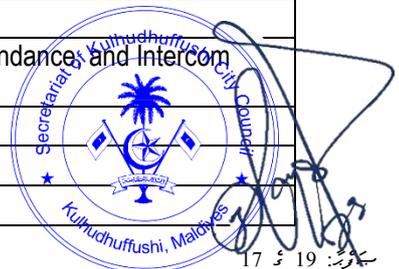




Management	Compatible with 3CX phone system
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Item 27: Centralized VMS -VM Edition

Feature	Specification
Product Type	Centralized Video Management System (VMS) Software – Virtual Machine Edition
Preferred Model	Professional Enterprise grade VMS : NxWitness, MileStone or Hikvision or equivalent
Application Type	Virtualized deployment for centralized surveillance and video management
System Architecture	Server–Client architecture with central management, recording, and event processing
Supported Virtualization Platforms	VMware ESXi, Microsoft Hyper-V, KVM (Linux-based virtualization supported)
Licensing Type	License for up to 170 IP camera channels (expandable via additional licenses) and any additional license required for centralized archiving to external storage
Supported Devices	Onvif supported IP Cameras, NVRs, Access Control, and ONVIF-compliant devices
Operating System Compatibility	64-bit Windows Server 2019/2022, or Linux-based virtual host
Database	Built-in PostgreSQL (default), supports external SQL integration
Client Access	Web Client, Desktop Client, Mobile App (iOS / Android)
Device Protocols Supported	ONVIF, ISAPI, RTSP
Video Streaming Protocols	TCP/UDP, HTTP, RTSP, HTTPS
Recording Modes	Continuous, Scheduled, Event-based, Alarm-triggered
Storage Management	Local, NAS, or iSCSI-based storage allocation storage support
Backup & Redundancy	Manual and scheduled database/video backup supported
Live View	Multi-channel real-time monitoring with adaptive streaming
Playback	Synchronous playback up to 16 channels, with timeline and smart search
Event & Alarm Management	Motion detection, video loss, tampering, intrusion, and custom event rules
User & Role Management	Multi-level user roles with granular permissions
Video Analytics Support	Supports AI-based analytics, facial recognition
Map Integration	2D/3D MAP support with camera and alarm linkage
System Health Monitoring	Resource usage, channel status, and storage monitoring support
Failover Support	Supported via backup server configuration
Video Channel Capacity	170 channels base (expandable via additional channel license packs)
Concurrent Clients	50 or more concurrent sessions (depending on resources)
Storage Retention	Configurable per camera – supports auto-overwrite and retention policies
Data Encryption	HTTPS/SSL communication and encrypted credential storage
Access Control	Multi-factor authentication, role-based access management
Logs & Auditing	Comprehensive system, event, and user activity logs
Compliance Standards	ONVIF, GDPR-ready (user data management), ISO/IEC 27001 (vendor compliance)
SDK & API Support	Open API and SDK for third-party integration
Integration Features	Supports integration with Access Control, Alarm Panels, Attendances, and InterCom systems
Uptime Availability	99.9% with proper redundancy
Backup and Restore	Full system and database backup supported
License Type	Perpetual Base License for 150 Channels





Upgrade Options	Expandable via additional device/channel and module licenses support
Warranty & Support	1-Year software support with updates, patches, and manufacturer

Item 28: 6KVA Rack mount UPS

Quantity: 1

Warranty: 1 Year

Feature	Specification
Capacity	6kVA
Input Phase, Voltage	Single Phase, 208/220/230/240Vac
Output Phase, Voltage	Single Phase, 208/220/230/240Vac
Output Power Factor	1
Current Crest Ratio	3:01
Output Frequency	50/60Hz
Harmonic Distortion	≤3%(100% linear load)
Efficiency	94%
Battery Voltage	240Vdc
Battery Charging Current	4A Max.
Rack Unit	2U
Key Features	Protection functions such as overload, short circuit, over voltage, under voltage and bypass Online double-conversion UPS

Item 29: Rack mount VRLA battery package

Quantity: 1

Warranty: 1 Year

Feature	Specification
Type	Rack Mounted VRLA Battery Pack
Nominal Voltage	240Vdc
Capacity	9Ah x 20
Rack Unit	3U
Compatibility	Should be compatible with the proposed UPS

Item 30: 24U network cabinet kit

Quantity: 1

Warranty: 1 Year

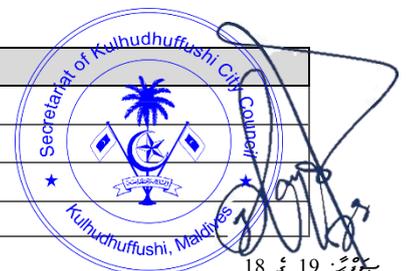
Feature	Specification
Type	24U open cabinet
Dimension	600mm(W)*1100mm(D)*1200mm(H).
Other	Includes front door, rear double door, top panel, bottom panel, rugged metal frame, dual front side sealing kit, wheels and stand-levels

Item 31: Smart Switched PDU

Quantity: 1

Warranty: 1 Year

Feature	Specification
Type	Smart Switched PDU
Input	32A, Single Phase, 110-250V, 50-60Hz
Input Indication	Power light
Input Connection	Terminals





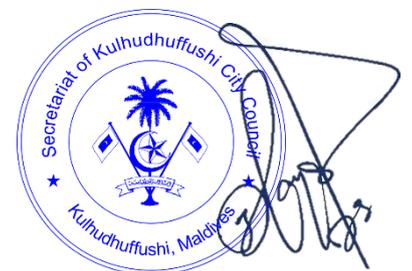
Output	06 x C13 and 02 x C19
Input Monitoring	Current, Voltage, kW, kVA
Socket Monitoring	Current, Voltage, kW, kVA
Socket Switching	ON, OFF
Web Access	HTTP/HTTPS
Monitoring Protocol	SNMP
Mounting	19-inch Rack-mounted, Horizontal

Item 32: Centralized CCTV Recording/Archiving Storage

Quantity: 1

Warranty: 1 Year

Feature	Specification
Form Factor	4U Rack-mount Chassis
Controller & Cache	Controller: Single controller with 64-bit multi-core processor. Cache: 4 GB (extendable to 64 GB)
Installed HDD Capacity	12 x 8TB Surveillance HDDs configured in RAID6
HDD Slots & Interface	24 slots supporting hot-swappable SATA HDDs (4TB to 16TB)
Supported RAID Levels	RAID 0, 1, 3, 5, 6, 10, 50, Hot-Spare
Network Interfaces	Data: 4 x 1GbE, Management: 1 x 1GbE.
External Interfaces	2 x USB 3.0, 1 x USB 2.0, 1 x MiniSAS
Supported Protocols	iSCSI, RTSP, ONVIF
Recording Management	Recording mode: Timing recording, manual recording, alarm recording Video protection: Lock key video, N+1 service protection, video loss detection and alarm Searching mode: Search by time and event Downloading mode: Quick download, batch download, download by segment, download by merging
Performance (Video)	512 channels at 2 Mbps stream rate
Management	Web-based GUI, serial port CLI
Power Supply	Redundant 550W power supplies



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