DETAILED NOTICE INVITING TENDER

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

(A Govt of West Bengal Enterprise)

CHIEF ENGINEER (O&M-II), VIDYUT BHAVAN

NOTICE INVITING TENDERS

For

"Survey, Design, Supply, Installation, Testing & Commissioning of- a) CCTV surveillance system at the sub-stations of WBSETCL, b) An Integrated Command and Control Centre for CCTV; on a turn-key basis and as per technical specifications."

[Domestic Competitive Bidding]

REF: NIT No.: CE/O&M-II/WBSETCL/CCTV/23-24/18, DT: 11-01-2024.

West Bengal State Electricity Transmission Company Limited (WBSETCL) invites bids from the eligible bonafide bidders on turnkey basis through Domestic Competitive Bidding for Survey, Design, Supply, Installation, Testing & Commissioning including transportation & insurance and storage along with all other associated works as detailed below in respect of :-

2. **SCOPE OF WORK:**

The work covered under this tender shall be but not limited to the following:-

Survey, Design, Supply, Installation, Testing & Commissioning of:

a) CCTV surveillance system at 06 Nos. 400 KV, 27 Nos. 220 KV, 93 Nos. 132 KV & 08 Nos. 66 KV Sub-Stations of WBSETCL as per technical specification of WBSETCL.

b) An Integrated Command and Control Centre for CCTV at Kasba 220 KV Sub-Station as per technical specification.

However detail scope of work shall be given by the schedule of works.

Interested eligible bidders may obtain further information on the bidding documents from the **Office of the Chief Engineer(O&M)-II , WBSETCL** at the address given below:-
Vidyut Bhavan, 10th. Floor
D Block,
SaltLake, Block DJ
Sector II, Kolkata-91.

2.1 **Schedule of Work:**

Sl.No	Name of Work	Description works	Completion Period
1	CCTV SYSTEM	Survey, Design, Supply, Erection, Testing, & Commissioning of -CCTV surveillance system at 06 Nos. 400 KV, 27 Nos. 220 KV, 93 Nos. 132 KV & 08 Nos. 66 KV Sub-Stations of WBSETCL as per technical specification of WBSETCL.	18 (Eighteen) Months from placement of LOA
2	Integrated Command & Control Centre.	Survey, Design, Supply, Erection, Testing, & Commissioning of -an Integrated Command and Control Centre for CCTV at Kasba 220 KV Sub-Station as per technical specification.	

3.0 Estimated Cost for the Project: INR. 36.70 Crore. (Thirty Six Crore Seventy Lakh)

4.0 **WBSETCL** intends to finance this project.

5.0 Detailed Specification , scope of work and conditions are given in the bidding documents as per the following schedule :

SL.No.	Particulars	Date & Time
1.	Bidding document No	NIT No: CE/O&M-II/WBSETCL/CCTV/23-24/__ , DT: 11-01-2024
2.	Date of uploading of N.I.T. & other Documents (online) (Publishing Date)	11-01-2024 from 10.00 A.M.
3.	Documents download/sell start date (Online)	11-01-2024 from 3.00 P.M.
4.	Closing date of online or Hard copy submission of clarification/ pre-bid queries/ proposed modifications / additional information (if any)	22-01-2024 up to 12.00 A.M
5.	Pre-bid meeting to be held at Office of the Chief Engineer (Procurement), 10th Floor, B-Block Bidyut Bhawan.	25-01-2024 at 12.00 A.M.
6.	Bid submission start date (On line)	02-02-2024 from 06:00 P.M
7.	Bid Submission closing (On line)	19-02-2024 up to 03:00 P.M.
8.	Last Date of submission of original copies for the cost of Bidding Documents and Earnest Money Deposit (Off line) in sealed envelope. & legally enforceable documents as mentioned in General guidelines for e-	20-02-2024 up to 03:00 P.M.

	tendering in sealed envelope.	
9.	Bid opening date for Technical Proposals (Online)	21-02-2024 from 03:00 P.M.
10.	Date of uploading list for Technically Qualified Bidder(online)	Will be uploaded after completion of the techno-commercial evaluation.
11.	Date for opening of Financial Proposal (Online)	Will be published in due course.
12.	Cost of Bidding Document (INCLUSIVE OF 18 % GST)	**Rs 5,000/- + Rs. 900/- (18% GST) = Total Rs. 5,900/- (Rupees Five Thousand and Nine Hundred only).** **HSN/ SAC Code – 999799.**
13.	Completion Time	**18 (Eighteen) months from the placement of LOA.**

A complete set of bidding documents may be downloaded by any interested bidder. Cost of the Bidding document (non-refundable) as mentioned above in the form of a Demand Draft/Pay Order/Banker's Cheque drawn in favour of "WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED" from any scheduled bank payable at Kolkata shall have to be deposited physically at the office the Chief Engineer (O&M-II), D- Block, 10th Floor, WBSETCL, Bidyut Bhawan ***on or before 20-02-2023 up to 3.00 P.M***. Downloading the bidding documents shall not automatically construe that the bidder fulfils the Qualifying Requirements which shall be determined during bid evaluation based on data/documents uploaded by the bidder.

6.0 All bids must be accompanied by bid security for an amount of ***Rs. 73.4 Lakh (Rupees Seventy Three Lakh Forty Thousand only)***. Non submission of the acceptable bid security along with prescribed cost of bidding documents as specified here, bids shall be considered as non-responsive.

Details guidelines herein under for submission of bid-security

a. The bidder shall login to the e-Procurement portal of Government of West Bengal https://wbtenders.gov.in using his login Id and password.

b. The bidder shall select the tender to bid and initiate payment of EMD. Following payment options are available for paying EMD amount through online mode:

i. Net-banking through Payment Gateway.

ii. Submission of EMD through BG: For submission of EMD in the form of BG, bidders will have to opt for EMD Exemption in e-tender portal and upload scanned copy of BG ***(i.e. Bank Guarantee of an amount of Rs 73.4 Lakh (Rupees Seventy Three Lakh Forty Thousand only) with validity for a period of 240 days from the***

date of opening of Technical Bids with a claim period of another 90 days thereafter) along with requisite testimonials for proportional EMD in the EMD exemption document upload section. Physical copy of BG shall be submitted within the stipulated date at the office of the **Chief Engineer (O&M)-II, 10th Floor, D-Block, Bidyut Bhawan.**

For preparation of BG the Bank details of WBSETCL is given below:

STATE BANK OF INDIA
INDUSTRIAL FINANCE BRANCH, KOLKATA
4th & 5Th FOOLR ,JEEVAN DEEP BUILDING,1-MIDDLETON STREET
KOLKATA-700071
A/C No. 41456850307
IFSC CODE : SBIN0001936

c. EMD amount can be paid either in online mode or submitted through Bank Guarantee (BG) in full. Partial payment through online mode and remaining submission through BG is not allowed.

d. GENERAL INSTRUCTIONS FOR ONLINE PAYMENT:

- The bidder will have to mandatorily pay through Net-banking facility once Net-banking mode is opted for payment.
- Only a single value can be entered as EMD amount in e-tender portal for each tender. However, in case tender has fixed EMD on line item (multiple items) basis, then, for the cases when actual EMD value calculated as per NIT by the bidder is less than the one mentioned in e-tender portal, bidders shall mandatorily opt for Exemption for payment of actual EMD amount and upload the requisite testimonials for proportional EMD and its proportional amount is to be paid in form BG/ online mode.
- The bank account used for payment of EMD by the bidders shall be maintained operative until the completion of tendering process. All refunds will be made mandatorily to the Bank A/c from which the payment of EMD has been initiated.

e. Refund/Settlement of EMD Amount:

- For unsuccessful bidders, EMD amount submitted against the tender shall be refunded automatically, through an automated process, by NIC portal on receipt of updated status of any bid.
- For successful bid(s), EMD will be refunded from WBSETCL authority after completion of tendering process and following due procedures.
- The bank account used for payment of EMD by the bidders shall be maintained operative until the completion of tendering process. All refunds will be made mandatorily to the Bank A/c from which the payment of EMD has been initiated.
- For any queries related to payments and refunds, bidders will have to communicate with ICICI Customer Support, viz, 9836547320 and 8017094744 since payment gateway facility used by E-tender portal is maintained by ICICI.

7.0 Qualifying Requirement for bidders:

The Bidder must be a registered Indian company that on its own (credentials of past experience as a JV partner shall not be considered) meets all technical & financial qualifications, personal capabilities, experience and requirements set forth in the bidding document and must have to meet the following conditions: (In addition to the requirements stipulated under this Section, Instruction to Bidders (ITB) shall also apply.)

I. Technical Qualification

a) Bidder must have executed at least one contract independently on turnkey basis for similar type of work i.e. ***"Survey, Design, Supply, Erection, Testing, & Commissioning of Integrated Command and Control Centre for CCTV alongwith the CCTV surveillance system under CTU, STU, PSU, State Govt., Central Govt. or reputed industry"*** within the last 5 years from the date of NIT and shall not be less than ***Rs 22.02 Crore in a single contract.***
The above system(s) should be in successful operation for at least one year from the date of commissioning, as on the date of NIT. The bidder shall furnish satisfactory completion/ operation certificate from the concerned authority **(to be supported by Taking over Certificate).**

b) All equipment offered for supply should be tested as per latest IS/IEC and relevant specification.

c) All equipment must be supplied from the approved makers list and as per specification of WBSETCL.
(WBSETCL's Technical specifications cum compliance format are enclosed with this NIT.)

d) **The Bidder shall furnish valid and authenticated documents in support of his eligibility and technical qualification as required above.**

e) **Demonstration:** During technical scrutiny of bids, purchaser will ask to demonstrate the offered equipments & Command Control Software at purchaser's site. The bidder shall have to demonstrate at his own cost & responsibility for the offered equipment & Command Control software and which will be intimated in due course before opening of price bids.
If the offered equipment/software fails to pass in the demonstration, the bidder may be allowed to perform repeat test within seven days but not more than one of such request will be entertained.
The purchaser will evaluate the suitability of products for their application. The purchaser's decision will be final & unchallenged for acceptance/ non acceptance of product even, if product will comply other tender terms.
Final evaluation of technical bids will be determined after this demonstration.

II. Personnel Capability

The bidder must have full-fledged set up for executing similar turnkey projects. Details of execution set up to be deployed by the bidder shall be furnished in their offer.
Project Management team shall be headed by a Project Manager with at least 05 (Five) years of experience in execution of such contract of comparable nature.

III. Financial Qualification

a) Net worth at the end of last financial **year shall be positive.**

b) The **Minimum Average Annual Turnover (MAAT)** of the Bidder for the best 3 (three) years out of the last 5 (five) financial years for which the audited accounts are available shall not be less than **Rupees 36.70 Crore (Rupees Thirty Six Crore Seventy Lakh) only.**

c) Bidders shall have Liquid Asset (LA) and/or evidence of access to or availability of credit facilities of equivalent amount not less than **Rs. 6.12 Crore (Rupees Six Crore Twelve Lakh).**

8.0 WBSETCL reserves the right to accept or reject any bid partly or fully or cancel the bidding without assigning any reasons thereof and in such case no bidder/ intending bidder shall have any claim arising out of such action.

9.0 Address for Communication :

The Addl. C.E (O&M)-II & Nodal officer (9434910112),
O/o The Chief Engineer, CE(O&M)-II, 10th.Floor, 'B' Block,
Vidyut Bhavan, Block-DJ, Sector-II, Salt Lake,
Kolkata-700091.
WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED
FAX : 91-33-2359-1894
TELEPHONE : 91-33-23197713/ 91-33-23595041
E-mail : *cecontcl@gmail.com*
Website :www.wbsetcl.in

- **E-mail ID for online submission of Pre-Bid Queries: cecontcl@gmail.com**

CCTV SURVEILLANCE SYSTEM (SUB-STATION)

December 2023

Engineering Department

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

পশ্চিমবঙ্গ রাজ্য বিদ্যুৎ সংবহন কোম্পানি লিমিটেড

(পশ্চিমবঙ্গ সরকারের একটি উদ্যোগ)

Regd. Office: VidyutBhawan, Block – DJ, Sector-II, Bidhannagar, Kolkata – 700091.

CIN: U40101WB2007SGC113474; Website: www.wbsetcl.in

Technical Specification for IP Based CCTV Surveillance System (for Sub-Station)

1.0 General

The specification covers design, supply, erection, testing and commissioning of the complete CCTV surveillance system including cameras, Network Digital video recorder, computer with peripherals, mounting arrangement for cameras, network switches, cables etc. for effective visual monitoring of total Sub-Station premises.

The number of cameras and their locations shall be decided considering the following:

- Entire Boundary wall portion to detect any intrusion.
- Complete Switch yard portion with clear view of each equipment and their operations.
- Coverage of front & rear portion of equipment like - Gas Insulated switchgears, Control Relay & Protection Panels, ACDB, DCDB, Battery Chargers & Batteries, 33 kV & 11 kV switchgears, Communication equipment etc. – to detect any fault and unwanted events.
- Sub-Station main gates and Entrance of key areas like – Store, Colony, Control room building, fire-fighting pump house, GIS Hall etc.

The mounting poles / structures for the cameras are to be provided by the bidder. However, if existing structures are available, the same can be utilised without damaging the structure and hampering other activities.

2.0 Technical requirements

- The system should provide inter-operability of hardware, operation protocols; system expansion should be possible through off-the-shelf available System, software, networking, printing, database connectivity, reporting & communication hardware.
- Proposed CCTV system shall be an open standard based integrated system with IP Network and management architecture aimed at providing high-speed Manual / automatic operation for best performance.
- The system shall use video signals from various types of indoor/outdoor IP based colour cameras installed at different locations, process them for viewing on workstations/monitors and simultaneously record all the cameras after compression using suitable standard. Mouse-Keyboard controllers shall be used for Pan, Tilt, Zoom, and other functions of desired cameras.
- The System shall provide sufficient storage. It shall be ensured that data once recorded shall not be altered by any means. The recording resolution and frame rate for each camera shall be user programmable. The provision for transfer of recorded data to separate external media shall be ensured.
- The required NVR software shall run on common off the shelf available servers.
- The surveillance CCTV System shall operate on 230 V, 50 Hz single-phase power supply.
- **The camera and supplied software both shall be ONVIF (Open Network Video Interface Forum) compliant for easy integration with different make of cameras and hardware for future expansion.**

3.0 System requirements:

a) Camera with external encoder shall be used for image capture.

b) Cameras for Switchyard portion shall be Day/Night PTZ Dome type. All other cameras shall be with fixed focal length lens suitable for Day-Night use.

c)

d) All camera recordings shall have Camera ID & location/area of recording as well as date/time stamp. Camera ID, Location/Area of recording & date/time shall be programmable by the system administrator with User ID & Password.

e)

f) System to have facility of additional camera installation beyond the originally planned capacity.

g) System shall be triplex i.e. it should provide facility of simultaneous recording, playback & network operation.

h) The offered system shall have facility to export the desired portion of clipping (from a desired date/time to another desired date/time). Viewing of this recording shall be possible on standard PC using standard software like windows media player etc.

i)

j) System shall have provision for remote monitoring and control.

k) All the workstations in LAN should be provided with software to view and control the cameras and retrieve the recorded video images from the camera server seamlessly

The equipment should generally conform to Electromagnetic compatibility requirements for outdoor equipment in EHV switchyards. Type test reports to establish compliance with this requirement shall be submitted during detailed engineering.

The major EMC requirement for cameras and other equipment shall be-

1. Electrical Fast Transient -As per IEC 61000-4-4,
2. Damped Oscillatory (1MHz and 100 KHz) -As per IEC 61000-4-18,
3. AC voltage Dips & Interruption / Variation -As per IEC 61000-4-11,
4. Electrostatic Discharge -As per IEC 61000-4-2.
5. Power Frequency Discharge - As per IEC 61000-4-8,
6. Ripple on DC input power supply port immunity test -As per IEC 61000-4-17

4.0 VIDEO SURVEILLANCE APPLICATION SOFTWARE

l) The required software used shall be of open protocol for ease of future expansion.

m) Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of devices such as cameras, video encoder, Servers, NAS boxes/Raid backup device etc.

n) Surveillance control software should be compatible with MS Windows operating system.

c) Software should have inbuilt facility to store configuration of encoders and cameras.

d) The software should Support flexible Windows Split screen display mode or scroll mode on the PC monitor.

e) The software should be able to control all cameras i.e. PTZ control, Iris control, auto / manual focus, color balance of camera, Selection of presets, Video tour selection etc.

f) The software should have user access authority configurable on per device or per device group basis. The user shall have the facility to request the access and control of any camera for a pre-determined time period. Control of camera shall be released automatically after expiry of the pre-determined time period.

g) The system shall provide user activity log with user ID, time stamp, action performed.

h) The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user.

i) It should have recording modes viz. continuous, manual, or programmed modes on date, time and camera-wise. All modes should be disabled and enabled using scheduled configuration. It should also be possible to search and replay the recorded images on date, time and camera-wise. It should provide onscreen controls for remote operation of PTZ cameras. It should have the facility for scheduled recording. Different recording speeds (fps) and resolution for each camera should be possible.

j) The software for clients should also be working on a browser based system for remote users. This will allow any authorized user to display the video of any desired camera on the monitor with full PTZ and associated controls.

k) Retrieval: The VMS application should allow retrieval of data instantaneously or any date / time interval chosen through search functionality of the application software. The system should also allow for backup of specific data on any drives like DVD's or any other device in a format which can be replayed through a standard PC based software. Log of any such activity should be maintained by the system.

5.0 Network video recorder

The Personal Computer based network digital Video recorder is to be provided. The computer shall include the latest configuration available in the market.

6.0 Camera for Visual Monitoring System (VMS)

The VMS camera shall be suitable for wall mounting, ceiling mounting and switchyard structure mounting. The VMS camera should be color high resolution, , Weatherproof, Dome / bullet type. The Camera shall have an internal amplifier that applies gain to the signal. The amplifier must operate when there is insufficient light in the scene to produce an acceptable video

output level, and must only apply as much gain as is necessary. The camera shall incorporate one level of automatic gain Compensation (AGC), allowing the user to achieve the optimal balance of noise and low light performance in demanding environments.

Fixed Dome/Bullet Camera

The High-Resolution DSP Color Camera (Digital Signal Processing using a DSP chip) shall include the following features:

a) The Dome Camera shall support the use of P Iris/ Direct Drive lens connected to the camera via 4-pin molex socket located from the inside of the camera housing. The camera must provide power to the lens. In case of bullet camera, factory fitted lens and housing shall be offered.

b) The Camera shall use Varifocal lens so that focal length can be adjusted as per site condition for larger area surveillance and better picture quality.

c) The power consumption of the High-Resolution DSP Color Dome/Bullet Camera shall be minimum.

PTZ-Control

The features of PTZ shall include:

- Fully functional dynamic keyboard controllers with joystick / mouse for smooth camera movements.
- Controls all pan, tilt, zoom, iris, preset functions.
- Many preset options for quick access to frequently monitored areas and advanced tour programming
- Compatible with all cameras and Control all units including future ones from a single keyboard.

Technical particulars cum compliance sheet

(To be submitted by Bidder during Detailed Engineering)

IP based Fixed Indoor Dome camera			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1.	Image Sensor	Minimum 1/2.8" Progressive Scan CMOS / CCD with Day/Night Function (IR corrected)	
2.	Minimum illumination	Color: 0.01 Lux and B/W: 0.005 Lux 0 lux with IR	
3.	Focal Length	3.4-10.5 mm, motorized varifocal zoom lens, auto focus	
4.	Camera Enclosure Type	IP52 and IK10 or better	
5.	Iris Type	DC Iris / P - Iris	
6.	WDR	120 dB or better image quality as per IEC 62368	
7.	Video Compression	H.265, H.264 and MPEG 4 user selectable	
8.	Resolution	1920x1080	
9.	Image settings	Wide dynamic range (WDR), colour, brightness, sharpness, white balance, exposure control	
10.	Local Storage	SD/SDHC/SDXC support upto 1 TB to be available. 128 GB memory card to be provided with each camera.	
11.	Users	5 or more simultaneous Users / Unlimited users in multicast mode.	
12.	IR Distance	40m or better	
13.	ONVIF Conformant	ONVIF Profile S, G, T and M compliance	
14.	Supported Protocols	IPv4/v6, HTTP, FTP, SMTP, UPnP, SNMP, RTP, TCP, UDP, IGMP, ICMP, DHCP, HTTPS	
15.	Operating Temperature	minus 10~+60°c or better	
16.	Operating Humidity	10~90% (non-condensing)	
17.	Intelligent Video Analytics	Motion detection, Audio detection, Object Loitering, Object crossing beam, Direction Violated, Object Appears in Area, Object leave	

		Area, Deep Learning Analytics which can classify Human	
18.	Cybersecurity	Onboard FIPS 140-2 L3 certified TPM	
19.	Mount	Facility of Ceiling / Wall mount should be available and all accessories for its support to be provided.	
20.	Certification	UL/CSA/EN/IEC 62368-1, IEC 62471	
21.	Electromagnetic Emissions	FCC Part 15 Subpart B (Class B), IC ICES-003 (Class B), EN 55032 (Class B), EN 61000-6-3, EN 61000-3-2, EN 61000-3-3	
22.	Electromagnetic Immunity	EN 55035, EN 61000-6-1, EN 50130-4, EN 50121-4	

IP based Outdoor Bullet camera (for Long range & Short range)			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1.	Image Sensor	Minimum 1/2.8" Progressive Scan CMOS / CCD with Day/Night Function (IR corrected)	
2.	Minimum Illumination	Color: 0.01 Lux and B/W: 0.005 Lux 0 lux with IR	
3.	Focal Length	- 4.8-40.8 mm or better Motorized varifocal lens – for Long range - 2.8-12 mm or better Motorized varifocal lens – for short range	
4.	Image settings	Wide dynamic range (WDR – 120DB image quality as per IEC 62368), white Balance, backlight compensation	
5.	Iris Type	P Iris	
6.	Video Compression	H.265, H.264 and MPEG 4 user selectable	
7.	Resolution	2048x1536 pixels or better	
8.	Users	5 or more simultaneous Users/Unlimited users in multicast mode	
9.	IR Distance	- 80 Mtr or better (for long range) - 40 Mtr or better (for short range)	
10.	ONVIF Conformant	ONVIF Profile S, G, T and M compliance	
11.	Supported Protocols	IPv4/v6, HTTP, FTP, SMTP, UPnP, SNMP, RTP,TCP, UDP, IGMP, ICMP, DHCP, HTTPS	

12.	Operating Temperature	minus 10~+60°c or better	
13.	Operating Humidity	90% (non-condensing)	
14.	Intelligent Video Analytics	Motion detection, Audio detection, Object Loitering, Object crossing beam, Direction Violated, Object Appears in Area, Object leave Area, Deep Learning Analytics which can classify Human	
15.	Local Storage	SD/SDHC/SDXC support upto 1 TB to be available. 128 GB memory card to be provided with each camera.	
16.	Cybersecurity	Onboard FIPS 140-2 L3 certified TPM	
17.	Mount	Facility of Pole / Structure Mount should be available and all accessories for its support to be provided	
18.	Certification	UL/CSA/EN/IEC 62368-1, IEC 62471	
19.	Casing	IP67 and IK10 or better	
20.	Electromagnetic Emissions	FCC Part 15 Subpart B (Class B), IC ICES-003 (Class B), EN 55032 (Class B), EN 61000-6-3, EN 61000-3-2, EN 61000-3-3	
21.	Electromagnetic Immunity	EN 55035, EN 61000-6-1, EN 50130-4, EN 50121-4	

IP based Outdoor PTZ Camera			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1.	Image Sensor	Minimum 1/2.8” Progressive Scan CMOS / CCD	
2.	Security	Multiple user access with password protection, User Access Log	
3.	Resolution	1920 x 1080 pixels	
4.	Video Compression	H.264, H.265 and MJPEG selectable	
5.	Preset	256 or better	
6.	Signal to noise Ratio (SNR)	Better than 50 dB	
7.	Frame Rate	Upto 60 fps	
8.	Low Light Sensitivity (lux)	Color@0.1 (33ms) & B/W@0.05(33ms), Color @0.025(125 ms) , B/W@0.01(125ms)	

9.	ONVIF Conformant	ONVIF Profile S, T and G compliance	
10.	Lens Type	IR Optical Corrective, Motorized Varifocal	
11.	IR Distance	500ft (150m)	
12.	Lens Zoom	Minimum 360x (30X Optical Zoom and 12X Digital Zoom)	
13.	Focal Length	Minimum 4.5-135mm	
14.	Lens Aperture	f/1.6 ~ f/4.4, 59.8° (wide) ~ 2.34° (tele)	
15.	Panning travel	Complete 360 degree Continuous	
16.	Pan Speed	Adjustable , 0.1 degree / second ~100 degrees/ second	
17.	Tilt Travel	+15° ~ -90°	
18.	Tilt Speed	0 to 145 Deg/Sec	
19.	In built Storage	SD/SDHC/SDXC support to be available. 128 GB memory card to be provided with each camera.	
20.	IP class	IP66 and IK10 or better, Type 4X	
21.	Working Temperature	minus 10 to +60 deg C	
22.	Working Humidity	90% RH (non-condensing)	
23.	Certification	UL/CE, FCC, EN	
24.	Alarm I/O	2 In & 2 Out	

IP based Outdoor Thermal camera			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1.	Image Sensor	320 x 256 Uncooled VOx Microbolometer or better	
2.	Pixel Pitch	12µm	
3.	Spectral Range	8µm to 14µm	
4.	Aspect Ratio	05:04	
5.	Imaging Rate	Up to 30 fps (-1 models up to 8.6 fps	
6.	Dynamic Range	minus 40°C to 225°C (-40°F to 437°F) [may vary based on operating temperature]	
7.	Resolution Scaling	320 x 256, can be scaled up to 640 x 512	
8.	Sensitivity	NETD ≤50 mK (NETD ≤40 mK on 30 fps models when Frame Averager feature is enabled)	
9.	Thermal Palettes	White Hot, Black Hot, Rainbow, RainHC, IronBow, Lava, Artic, GlowBow, GradedFire, Hottest	
10.	Image Uniformity Optimization	Automatic Flat Field Correction (FFC) - Thermal and Temporal	
11.	Lens	4.3 mm, F1.0 or better	

12.	Image Compression Method	H.264, H.265, Motion JPEG	
13.	Streaming	Multi-stream H.264, Multi-stream H.265, Motion JPEG	
14.	Motion Detection	Pixel and Classified Objects	
15.	Tamper Detection	Yes	
16.	Privacy Zones	Up to 64 Zones	
17.	Audio Compression Method	Opus, G.711 PCM 8 kHz	
18.	ONVIF	ONVIF Profile S, G, T and M compliance	
19.	Security	Password protection, HTTPS encryption, digest authentication, WS authentication, user access log, 802.1x port based authentication	
20.	Protocols	IPv6, IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, ARP	
21.	USB Port	USB 2.0	
22.	Onboard Storage	microSD/microSDHC/microSDXC slot – video speed class card required. Class V10 or better.	
23.	External I/O Terminals	Alarm In, Alarm Out	
24.	Audio Input/Output	Line level input and output	
25.	Enclosure Body	Aluminium	
26.	Operating Temperature	minus 40 °C to +65 °C (-40 °F to 149 °F)	
27.	Certifications	UL, cUL, CE, UKCA, ROHS, RCM, BIS, NOM	
28.	Electromagnetic Emissions	FCC Part 15 Subpart B (Class B), ICES-003 (Class B), EN 55032 (Class B), EN 61000-6-3, EN 61000-3-2, EN 61000-3-3	
29.	Electromagnetic Immunity	EN 55035, EN 61000-6-1, EN 50130-4	
	RADIOMETRIC EVENTS		
30.	Temperature Below, Above, Match Pre-Defined Value	The event is triggered when the temperature in the region of interest is below, above or match a pre-defined temperature value.	
31.	Temperature Changed	The event is triggered when the temperature changed a predefined value during a designated period of time.	

Video Management System Software			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1	Features	The Video Monitoring System Shall be an Integrated System with IP Network Centric functional and Management architecture aimed at providing high-Speed manual/automatic operation for best performance.	
2		Capable of handling multi-vendor products and open standard. The system should support seamless integration of all ONVIF compliant cameras.	
3		The system should facilitate viewing of live and recorded images and controlling of all cameras by the authorized users.	
4		The system shall use video signals from various indoor/outdoor CCD/CMOS cameras installed at different locations, process them for viewing and simultaneously record all the cameras after compression using H264/H265/MPEG4 or better standard. Mouse/Joystick- keyboard controllers shall be used for pan, Tilt, Zoom and other functions of desired cameras.	
5		The Video display should be intelligent enough so that it can –	
		i) Automatically change view based on the event such as motion started/stopped, video analytic, camera digital input contact closed/opened.	
		ii) Display map with all camera health status	
		iii) Device states shown by icons, including network connection loss, video loss etc.	
6		The system shall provide sufficient storage of all the camera recordings (minimum 36 IP cameras to be considered) for a period of 24hrs * 60 days or more @25 FPS, at 1080P or better quality using necessary compression techniques. It shall be ensured that data once recorded shall not be altered by any means. The recording resolution and frame rate for each camera shall be user programmable.	
7		System Requirements:	
a)		System must provide build-in facility of watermarking of digital certificate to ensure tamperproof recording.	
b)		All cameras may be connected through a suitable LAN which shall be able to perform in High Voltage sub-station environment without fail. The equipment should generally conform to Electromagnetic compatibility requirements for outdoor equipment in EHV switchyards. Type test reports to establish compliance with the above requirement shall be submitted during detailed engineering.	
c)		All camera recordings shall have camera ID & location/area of recording as well as date/time stamp. Camera ID, location/area of recording & date/time shall be programmable by the system administrator with user ID & password.	
d)		Facility of camera recording in HD (1920x1080p), (1280x720p), DI, 4CIF, CIF, VGA as well as in any combination i.e any camera can be recorded in any quality.	

e)		System to have facility of 100% additional camera installation beyond the originally planned capacity.	
f)		System shall be triplex i.e. it should provide facility of viewing, multiple recording & Replay simultaneously.	
g)		The offered system shall have facility to export the desired portion of clipping (from a specific date/time to another specific date/time). Viewing of this recording shall be possible on standard pc using standard software like windows media player etc. The Video Management System software shall provide fast evidence export by exporting in video to various formats, including video from multiple cameras in encrypted native database format with an included viewer.	
h)		System shall have provision of WAN connectivity for remote monitoring.	
8		Video Surveillance Application Software	
a)		Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of devices such as cameras, Video encoder, servers, NAS boxes/Raid backup device etc.	
b)		The Software should support flexible 1/2/4/8/16/32 windows split screen display mode and scroll mode on the PC monitor	
c)		The Software should be able to control all cameras i.e. PTZ control , Iris control , audio/manual focus, color balance of camera, Selection of presets, Password and firmware change of multiple cameras at one go, video tour selection etc.	
d)		The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user. The VMS software must be integrated with windows active directory.	
e)		It should have the facility for scheduled recording. Different recording speeds (fps) and resolution for each recording mode for each camera should be possible.	
f)		The software for clients should also work on a browser based and mobile app with biometrics authentication system for remote users. This will allow any authorized user to display the video of any desired camera on the monitor with full PTZ and associated controls.	
g)		Retrieval: The VMS application should allow retrieval of data instantaneously or any date/time interval chosen through search functionality of the application software. In case data is older than 30 days and available, the retrieval should be possible. The system should allow for backup of specific data on any drives like DVD's or any other device in a format which can be replayed through a standard PC based software. Log of any such activity should be maintained by the system.	
h)		VMS shall provide the full functionality reporting tool which can provide reports for user login/logoff, Camera accessibility report, server health check reports etc.	

9		The camera and supplied software both shall be ONVIF (Open Network Video Interface Forum) full member or Affiliate to Parent Company or Contributing membership level	
10		The system should have the capability to integrate with Central Control Unit for control and monitoring through common third party software without any commercial involvement.	
11		VMS shall have API based integration with the major camera vendors in order to support features such as, up to 3 Multi-streams, SD Card storage sync, Camera based Edge Analytics support, Camera I/O support, Camera Audio support	
12		VMS manufacturer shall provide their SDK (or any other integration means) libraries and documentation to ensure a seamless integration with any other system	
13		The VMS should support video data grooming feature to enables reduction of video recording data size by reducing the frame rate of the video data.	
14		The system should have built-in, real-time, camera-independent motion detection with the ability to generate motion metadata for Smart Search. The Recording server shall have the ability to handle Video Motion detection without any dependency on camera.	
15		To ensure safety from cyber attacks ,The VMS has the ability to operate in a FIPS 140-2 compliant mode and GDPR compliant	
16		The Video Management System shall support 56-bit encryption of video for export purposes. The 56-bit encryption shall meet the requirements on export limits for encryption.	
17		The Video Management System shall include a Software Development Kit (SDK) that offers important capabilities for integrating the Video Management System with third party software and applications.	
18		The recording server must accept, display and record individual streams of video from each camera that supports it, for example, display a stream in H.264 format and record another stream in MPEG4 format. The intent of this functionality shall be providing independent streams of video from the camera to the server with different resolution, encoding and frame rate.	
19		The VMS software must not be banned/blocked/replaced by any govt authority in India or globally for any support or malfunctioning issue.	
20		The VMS system shall support the Open ID Connect (OIDC) protocol, for enhancing security and authorization control	
21		Mobile Client shall support mobile device management (MDM) for management and secure devices, apps, and data from a unified console	
22		The VMS mobile application should support biometric support for secure access to application data. It should be supported on Android as well as on Apple users.	
23		The VMS shall support mapping of one camera audio with another camera	

24		The system should have the capability to integrate with Central Control Unit for control and monitoring through common third-party software without any commercial involvement.	
25		VMS should consist of only one Base license and Channel Licenses.	
26		The system shall support automatic failover for recording servers. The system shall provide monitoring of all failover servers from the graphical alarm management module.	
27		Full Viewing Client, Web Client and Mobile Client User Interface must be available in English and Hindi languages with unlimited nos. without any additional cost.	
28		The system must have capability to keep a desired portion of video until it is not asked to delete	
29		The VMS shall support online maps such as google, Bing, Open street and accordingly, live view, playback, alarms should support the visualisation of alarms on the online map.	

Industrial grade media converter			
Sl. No	**Parameter**	**Tender Specification**	**Compliance (Yes/No)**
1.	Connector Type	1000 Base-X to 1000 Base-T Type Media Convertor	
2.	Fiber Type	Single Mode	
3.	Type	Industrial Grade	
4.	Compliance	Should be of IEEE standards	
5.	Operating Temperature	-10ºC to 75ºC	
6.	Certifications	Should comply with EN, FCC, TUV, UL, VCCI standards as well RoHS complied. Protection Rating should be IP30. Standalone or DIN rail mount.	
7.	Features	Auto-negotiation (IEEE 802.3u-compliant)/ Auto MDI/MDI-X/ Support Missing Link and Smart Missing Link and Transparent to IEEE 802.1Q VLAN packets, 8K MAC table, 10KB Jumbo Frame	
8.	Status Indicators	System and port LEDs should there to show the status	

PC based Network Video Recorder			
Sl. No	**Parameter**	**Tender Specification**	**Compliance (Yes/No)**
1	Operating System	MS WINDOWS latest (64 bit)	
2	Compression Method	IP Cameras using MJPEG, H.264, H.265 or better	
3	Supported IP Cameras	Must Support minimum 40 numbers Multi-Brand IP cameras	
4	CPU	Intel Xeon or better	
5	RAM	32 GB	
6	Storage	20 TB or as per requirement with RAID 5/6	
7	Monitor Output	HDM and VGA – 2 or more simultaneous monitors	
8	Keyboard, Mouse, Joystick	Included	
9	Monitoring Option	Split screen for 1 – 2 – 4 – 8 – 16 -32 cameras	
10	Operation	Triplex operation (simultaneous recording, playback, network operation)	
11	Software	Video management Software with permanent license complied with GDPR and FIPS 140-2	
12	Recording	Must have different recording modes like Manual, Continuous, Motion Detection etc.	
13	Playback Options	Play, Pause, Stop, Rewind, Fast Play, Slow Play etc Search Mode: Time / Date, Alarm, Motion Detection	
14	Remote Operation	Monitor, Playback, System Setting, File Download, PTZ control etc.	
15	Input Voltage	230V AC	
	Network Operation Capable	Using WAN or LAN router.	
16		Must support standard network protocol like HTTP, TCP/IP etc	
17	ONVIF Conformant	ONVIF full member	
18	Ethernet Card	1 Gbps	
19	Communication Ports	Minimum 1 Gbps adaptive Ethernet Interface, 2 USB2.0 interface ports, 1 USB 3.0 interface port (Ethernet ports Type and quantity shall be as required for the system configuration)	
20	Certification	CE, FCC	

Next Generation Firewall / Cyber Security Gateway System				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Hardware Architecture & Performance	The appliance based security platform should be capable of providing firewall, application visibility, Web Protection and IPS functionality in a single appliance		
2		The appliance hardware should be a multicore CPU architecture with a hardened 64 bit operating system to support minimum 8GB memory. Should have additional NPU processor with 4 GB RAM for hardware acceleration .		
3		Should support minimum 120 GB SSD for logs & reports		
4		The appliance should support atleast 8 * 1G ports 2 * 1G SFP ports . The appliance should have option to support additional 4 * 10G ports in future.		
5		Should support atleast 30 Gbps Firewall throughput & 6 Gbps of NGFW throughput		
6		Solution should have 15 Gbps of IPSec VPN throughput		
7		Firewall Should support atleast 1.2 Gbps of Threat Protection Throught (Measured with Firewall, IPS, Application Control, and Malware prevention enabled)		
8		Solution should have 1.4 Gbps SSL/TLS inspection throughput		
9	Industry Certification	Solution should have FIPS & ICSA certified		
10		Solution should provide make in India certificate with minimum 65% local content		
11		Solution should be NSS lab certified with minimum 93% exploit block rate		
12		Solution should be in latest gartner magic quadrant		
13	General Management	Purpose-built, streamlined user interface and firewall rule management for large rule sets with grouping with at-a-glance rule feature and enforcement indicators		

14		Firewall should support TLS 1.3 inspection of encrypted traffic		
15		Firewall should support Xstream FastPath technology for application acceleration		
16		Firewall should be ready for Xtender Detection & Response and Synchronized SDWAN		
17		Full command-line-interface (CLI) accessible from GUI		
18		Automated firmware update notification with easy automated update process and roll-back features		
19		Reusable system object definitions for networks, services, hosts, time periods, users and groups, clients and servers		
20		Backup and restore configurations: locally, via FTP or email; on-demand, daily, weekly or monthly		
21	Firewall, Networking & Routing	Stateful deep packet inspection firewall		
22		Network Flow FastPath acceleration for trusted traffic		
23		User, group, time, or network based policies		
24		Access time polices per user/group		
25		Enforce policy across zones, networks, or by service type		
26		Zone isolation and zone-based policy support		
27		Default zones for LAN, WAN, DMZ, LOCAL, VPN and WiFi		
28		Custom zones on LAN or DMZ		
29		Customizable NAT policies with IP masquerading and full object support to redirect or forward multiple services in a single rule		
30		Routing: static, multicast (PIM-SM), and dynamic (RIP, BGP, OSPF)		
31		Protocol independent multicast routing with IGMP snooping		

32		Bridging with STP support and ARP broadcast forwarding		
33		VLAN DHCP support and tagging, VLAN bridge support		
34		WAN link balancing: multiple Internet connections, auto-link health check, automatic failover, automatic and weighted balancing, and granular multipath rules		
35		Full configuration of DNS, DHCP and NTP, 802.3ad interface link aggregation		
36		IPv6 tunnelling support including 6in4, 6to4, 4in6, and IPv6 rapid deployment through IPSec		
37		Set user-based traffic quotas on upload/download or total traffic and cyclical or non-cyclical		
38	Authentication	Synchronized User ID utilizes Synchronized Security to share currently logged in Active Directory user ID between Sophos endpoints and the firewall without an agent on the AD server or client		
39		Authentication via: Active Directory, eDirectory, RADIUS, LDAP and TACACS+		
40		Server authentication agents for Active Directory SSO, STAS, SATC		
41		Single sign-on: Active directory, eDirectory, RADIUS Accounting		
42		Browser SSO authentication: Transparent, proxy authentication (NTLM) and Kerberos		
43		Browser Captive Portal		
44	Next Gen VPN Support	Site-to-site VPN: SSL, IPSec, 256- bit AES/3DES, PFS, RSA, X.509 certificates, pre-shared key		
45		L2TP and PPTP, Route-based VPN		
46		Remote access: SSL, IPsec, iPhone/iPad/ Cisco/Android VPN client support, IKEv2 Support		
47		SSL client for Windows and configuration download via user portal		
48		Encrypted HTML5 self-service portal with support for RDP, HTTP, HTTPS, SSH, Telnet, and VNC		

49		Authentication: Pre-Shared Key (PSK), PKI (X.509), Token and XAUTH		
50		Enables Synchronized Security and Security Heartbeat for remote connected users		
51	Intrusion Prevention (IPS)	High-performance, next-gen IPS deep packet inspection engine with selective IPS patterns that can be applied on a firewall rule basis for maximum performance and protection		
52		Advanced Threat Protection (detect and block network traffic attempting to contact command and control servers using multi-layered DNS, AFC, and firewall)		
53		Security Heartbeat instantly identifies compromised endpoints including the host, user, process, incident count, and time of compromise		
54		Security Heartbeat policies can limit access to network resources or completely isolate compromised systems until they are cleaned		
55		Lateral Movement Protection further isolates compromised systems by having healthy -managed endpoints reject all traffic from unhealthy endpoints preventing the movement of threats even on the same broadcast domain		
56	Web Protection and Control	Fully transparent proxy for anti-malware and web-filtering		
57		Enhanced Advanced Threat Protection		
58		Malware scanning: block all forms of viruses, web malware, trojans and spyware on HTTP/S, FTP and web-based email		
59		Advanced web malware protection with JavaScript emulation		
60		Live Protection real-time in-the-cloud lookups for the latest threat intelligence		
61		Second independent malware detection engine for dual-scanning		
62		Web keyword monitoring and enforcement to log, report or block web content matching keyword lists with the option to upload customs lists		

63		Block Potentially Unwanted Applications (PUAs)		
64	Application Protection and Control	Synchronized App Control to automatically, identify, classify, and control all unknown Windows and Mac applications on the network by sharing information between Sophos-managed endpoints and the firewall		
65		Signature-based application control with patterns for thousands of applications		
66		Cloud Application Visibility and Control to discover Shadow IT		
67		App Control Smart Filters that enable dynamic policies which automatically update as new patterns are added		
68		Micro app discovery and control		
69		Application control based on category, characteristics (e.g., bandwidth and productivity consuming), technology (e.g. P2P), and risk level		
70	Zero Day Protection	Inspects executables and documents containing executable content (including .exe, .com, and .dll, .doc, .docx, docm, and .rtf and PDF) and archives containing any of the file types listed above (including ZIP, BZIP, GZIP, RAR, TAR, LHA/LZH, 7Z, Microsoft Cabinet)		
71		Aggressive behavioural, network, and memory analysis		
72		Suspicious files subjected to threat intelligence analysis in parallel with full sandbox analysis		
73		Machine Learning technology with Deep Learning scans all dropped executable files		
74		Includes exploit prevention and Cryptoguard Protection technology from endpoint security		
75		In-depth malicious file reports and dashboard file release capability		
76	48 months License from the date of	Network Protection Subscriptions (IPS,HTML5, ATP, Anti-malware),		
77		Web Protection Subscriptions (URL, AppCtrl, Web/App Traffic Shaping),		

78	commissioning includes :	Zero Day Protection		
79		24 X 7 hardware & warranty support from OEM		

Display Monitor, 24 X 7 operation			
Sl. No	**Parameter**	**Tender Specification**	**Compliance (Yes/No)**
1.	Display Type	4K UHD	
2.	Screen Size	40"	
3.	Resolution	3840x2160 (16:9)	
4.	Brightness	500 Nit	
5.	Response Time	8 ms	
6.	Interface	HDMI, USB, RJ-45	
7.	Colour	16.7 M	
8.	Viewing Angle	Horizontal 178°, Vertical 178°	
9.	Speaker	2 X10 W, 2 built in speakers	
10.	Make	Sony, LG, Samsung	

2 KVA UPS with 30 minutes Battery Back-up			
Sl. No	**Parameter**	**Tender Specification**	**Compliance (Yes/No)**
1.	Rated Power	2 KVA	
2.	Battery Type	12V Sealed Lead Acid Maintenance Free	
3.	Battery charging	Constant Current & Constant voltage	
4.	Topology	True On-line Double conversion	
5.	Backup Time	30 Minutes for Full Load (2 KVA @ 0.8 PF)	
6.	Output waveform	Sinewave	
7.	Protection	Mains Over/Under Voltage , DC Over/Under Voltage , Inverter Over /Under Voltage, Inverter Overload, Overheat etc	
8.	Input Voltage	200 to 260 V AC, 50 Hz ,Single Phase	
9.	Display	LCD Display	
10.	Charger	Built in solid state float cum equalizing charger with automatic boost / trickle charge modes with current limiting features.	

24Port Managed Network Switch			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1.	Interface	Switch Should have 24*10/100/1000T ports with minimum 4 numbers fibre support	
2.	Performance	The switch should have min 52Gbps or higher Switching capacity with 8K mac address	
3.	Quality of Service	IEEE 802.1p tagging. Port-based priority. Four priority queues per port.	
4.	Security	Should support ACLs, Remote authentication through RADIUS. Destination MAC filtering. Broadcast storming control.	
5.	Management	Should Support SNMPv1/v2c/v3. Configuration backup/restore by FTP and HTTP. Support Web-based configuration.	
6.	Compliances	UL 1950, FCC/EN55022 Class A, VCCI Class A, C-Tick, EN60950 (TUV), EN55024, CE, CSA / CUL and RoHS.	

Industrial grade 8 Port PoE Network switch			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1.	General Features	Industrial grade Managed switch with minimum 8x10/100/1000 RJ-45 PoE+ ports and 2x100/1000 Base-X SFP ports.	
2.		Switch should support maximum PoE Budget of 240watt	
3.		The switch should have minimum switching capacity of 20Gbps.	
4.		Switch Should support minimum 2K MAC addresses and 4000 VLAN simultaneously.	
5.	Supported protocols	Should support SNMP v1/v2c/v3v6, Web, Telnet and SSHv6, etc.	
6.	Temperature	Operating Temperature of switch should be -10°C to 75°C	

Fiber Optic LIU 6 / 12 / 14 Port loaded with SC Adapter, Splice Tray, SC Pigtail and Splice Protector			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1	Fiber optic patch Panel	The 1U Multi-Function Fibre Enclosure is a configurable rack mount unit for storing and terminating incoming fibre cable.	
		The fibre enclosure has been designed to accommodate various termination types and adapter configurations. Accommodates up to 4 Modlink Cassettes or up to 4 nos of 6 or 12-Pak adapter plates.	
		The enclosure must, have a sliding drawer for ease of reconfiguring fibers, incorporates a heavy-duty ball bearing slide mechanism, allowing easy access to fibers	
		The adapter plates must be an interchangeable front plate which can facilitates upgrades as & when required	
		Copper grounding stud tie down points at each cable entrance point.	
		The enclosure must have front cable management to properly route patch cords.	
		Fibre management enclosures that can be used as rack mount enclosure for integrated applications.	
2	Material	Powder coated Mild Steel	
		Rugged steel construction in graphite finish	
		Rear, side & base access for Incoming / Outgoing fiber cables	
3	Cable Management rings	Management rings within the system to accommodate excess fibre cordage behind the through adapters and maintain fibre bend radius.	
4	Sliding cover	Panel cover is of slide out for easy maintenance. Incorporates heavy-duty ball bearing slides for smooth and limited extension of the drawer unit, allowing for patch cable access while protecting installed patch and trunk cables from damage during re-entry of the enclosure	
5	Optical Fibre Adapter Plates	SC Adpter SM Plate - loaded with 6 /12 / 24 Nos SC Adapter	
6	Pigtails	SC, Singlemode, 9/125 µm - 1.5 mtrs (6 / 12 / 24 Nos)	
7	Splice Tray	12 Port Splice Tary - 1 / 2 No	

CAT6 UTP Cable			
Sl. No	**Parameter**	**Specification**	**Compliance (Yes/No)**
1	Type	Category 6 shielded Twisted Pair 4 pair cable shall be compliant with ANSI/TIA/EIA-568-B.2-1 Additional Transmission Performance Specifications for 4-pair Category 6 Cabling.	

a)		Category 6 UTP cables shall extend between the work area location and its associated telecommunications closet and consist of 4 pair, 23 AWG, UTP.	
b)		Supports ultrahigh speed data networks such as Gigabit Ethernet (1000 Base-T and 1000 Base-TX) and beyond.	
2	Jacket:	The cable jacket shall be LSZH and LSZH sheath should Complying to: a. Fire rating IEC 60332-1, b. Acid gas IEC 60754-2 c. Smoke density IEC 61034-2	
3		Incorporates central spine maintaining pair separation during installation to ensure premium performance after installation.	
4	Mechanical Characteristics	Construction: 4 twisted pairs separated by internal X shaped, 4 channel, polymer spine / full separator. Half shall not be accepted. Conductor Solid Copper Conductor Diameter 0.56±0.005mm (23 AWG) Insulator Polyolefin Outer Diameter 6.0±0.4mm Max. Temperature 70°C	
5	ROHS/ELV	Compliant	
6	ETL Test Report @700 MHz	Cable should have test by ETL / Intertek @700 MHz and test report should be subbmitted.	

List of Main Materials

Sl. No	Description
1.	IP based Outdoor PTZ Camera with necessary Mounting accessories, External IR illuminators and power supply
2.	IP based outdoor Bullet camera
3.	IP based Indoor Dome camera
4.	IP based Thermal camera
5.	Video Management software supporting 40 cameras or more with license for server and workstations
6.	PC based Network Video Recorder
7.	MS Windows Prof. OS
8.	40" display monitor
9.	Work station for Control & Monitoring
10.	Gateway with firewall
11.	Industrial grade media converter
12.	Network Switch
13.	Single mode SFP modules for the switch
14.	Armoured CAT 6 cable
15.	Armoured Optical Fiber (Minimum 6 core)
16.	HDPE pipe
17.	Poles and structures for mounting outdoor cameras
18.	2KvA UPS
19.	3C X 2.5 Sq. mm LT Power cable
20.	12 Port rack mount LIU fully loaded with Pigtails, LC connectors, splicing tray and other accessories
21.	Floor standing / Wall mount rack
22.	Computer table & rolling chair

23.	Other items like connector etc. to complete the system and all other required involvements for Control & Monitoring from Remote location

Approved Vendors

Sl. No	Description	Vendors
1.	CCTV Camera	Axis, Pelco, Bosch
2.	Video Management software	Camera OEM, Milestone, Verint, Axxonsoft
3.	Display monitor	Sony, LG, Samsung, Panasonic
4.	Server, Work station , Network Video Recorder	HP, Dell, Advantech
5.	Industrial grade media converter	Allied Telesis, Cisco, D-Link, Sixnet, Korenix
6.	UPS	Emersion, Hitachi HI-Rel, Liveline, Numeric
7.	HDPE pipe	Tirupati, Supreme, Ashish pipe, Narayani
8.	Armoured Fibre Cable	Aksh Opticfibre Ltd., Apar Industries Ltd., KEC International Ltd.
9.	CAT 6 cable, Patch cord LIU	Panduit, RIT, Molex
10.	Power cable	Finolex, Polycab, Havells, KEI
11.	Ethernet Switch	Ruggedcom, Hirschman, Allied Telesis
12.	Surge Protection Device (SPD)	Tercel, Citel, Zotup, Schirtec

TECHNICAL SPECIFICATION CUM COMPLIANCE FORMAT FOR INTEGRATED COMMAND & CONTROL CENTRE

December 2023

Engineering Department

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

পশ্চিমবঙ্গ রাজ্য বিদ্যুৎ সংবহন কোম্পানি লিমিটেড

(পশ্চিমবঙ্গ সরকারের একটি উদ্যোগ)

Regd. Office: VidyutBhawan, Block – DJ, Sector-II, Bidhannagar, Kolkata – 700091.

CIN: U40101WB2007SGC113474; Website: www.wbsetcl.in

TECHNICAL SPECIFICATION CUM COMPLIANCE FORMAT

FOR INTEGRATED COMMAND & CONTROL CENTRE

Integrated Command & Control Centre Software				
Sr. No.	**Parameter**	**Features**	**Compliance (Yes/ No)**	**Remarks**
1	General Requirements	The open integrated surveillance management platform shall be an efficient, scalable, easy to use, command and control management system. The system shall seamlessly integrate with multiple manufacturer's, CCTV analogue & digital IP video equipment, Intruder Detection Systems (IDS), Perimeter Detection Systems (PIDs), Video Analytics, etc to enable a fully featured operator software platform integrating disparate system into a common Graphical User Interface (GUI)		
2		The open integrated surveillance management software should provide integration using the manufacturers Software Development Kit (SDK) or Application Programme Interface (API) to ensure that all available functionality is supported for the devices.		
3		The open integrated surveillance management software platform shall be installed on standard Client/Server hardware architecture.		
4		Hardware shall be connected to the GUI via standard TCP/IP LAN connections. The LAN connection shall be via a Network Switch. All hardware supplied will be via internationally recognised suppliers and represent best of breed capability.		
5		The open integrated surveillance management platform shall be developed utilising the latest Microsoft .NET architecture and the back bone of the systems database will be a Microsoft SQL server.		

6		The server environment shall be capable of being proposed as a software only option that fully supports Microsoft cloud and virtualised environments to enable optional installation into a separate server location / data centre provided by others.		
7		The integrated surveillance management platform should not have any limitations regarding the number of users or administrators, each system user/administrator user login will provide a fully customisable (Graphical User Interface).		
8	GIS Map Integration	Graphical Information System (GIS) utilising vector graphics for dynamic zoom and jump to particular area across a whole state wise map. The GIS is to include the ability to place interactive icons representing devices, icons are to be fully configurable for both live colour change and transition reflecting the device status.		
9		To avoid mapping clutter, it must be possible to group icons within a Sub Station so that when an operator zooms out the icons are represented as a group icon and automatically are place as individual icons at the preconfigured zoom level. The GIS system must be integral to the core open integrated surveillance management platform and not a separate installable software entity.		
10		The integrated surveillance management system shall provide the ability to seamless connect to RFID systems, RFID readers are geolocated within the GIS and assigned to a Guard Tour inbuilt into the core system software.		
11	Features	Incident Management, KPI and Reporting functionality including full auditing to cover all aspects of the GDPR regulations along with performance indicators and in-house check reporting and provide a live system dash board must be integral to the core open integrated surveillance management platform and not a separate installable software entity.		
12		Incident location details are to be identified utilising customisable schemes with drop down filters for Zone/Scheme, Sub Station, Area, Equipment.		

13		The integrated surveillance management platform shall include fully configurable lookup tables where naming conventions, categories and drop-down filters for the administrator of the system to force operators to utilise the prescribed data applied.		
14	Evidence Store	An evidence store shall be provided that can be maintained and managed by a System Administrator with automatic notifications been sent to the corresponding users with correct priority levels.		
15		The storage of the media will be placed on the native hardware platform within the scheme and accept downloads from all supported encoding and digital recording solutions. The media will be accessible by multiple authorised workstations either via review, operator or supervisor stations.		
16	Operator and Review Workstation	The integrated surveillance management platform should support the simultaneous downloading of footage for multiple cameras and VMS systems as a single export		
17		The integrated surveillance management platform should support the simultaneous playback of at least four cameras concurrently to include a separate timeline for each camera		
18		Any video footage tagged to an active incident should be available for instantaneous playback and review by a user by double clicking the relevant camera detailed within the 'Incident' record 'Footage' Tab		
19		As part of the standard operator positions which can review footage additional dedicated review stations can be installed.		
20		The integrated surveillance management software shall provide the ability to add Video Clips to an active incident where the camera was not automatically selected as part of an incident.		

21		The integrated surveillance management software shall provide the ability to burn video footage directly from an active incident record.		
22	Access rights	Operator groups or individuals users must have the ability to be configured within the systems hierarchal structure to allow full, limited or site customised access to the operator workstations.		
23	Retrieval & replay	Operators (access rights allowing) must have the ability to search and retrieve CCTV footage from the provided video via the operator workstation. In addition, the retrieved CCTV footage must have the ability to be displayed on the any associated video monitor.		
24	Events Panel	A fixed area (configurable on setup) that displays all event driven information such as, but not limited to, alarm inputs, access control notifications and hardware failures.		
25	Mapping and Navigation Panel	A mapping area panel depicting either and/or multiple sources such as GIS, CAD, jpeg or bitmap images and web-based maps such as Open Street Map, and jpg / bmp files. The maps support multi-layer drill down functionality with hyperlinks for intuitive navigation across the maps. The mapping function will support zoom functions either by clicking a selected area or via arrows.		
26	Camera Selection Panel	Camera selection can be presented in numerous formats from Zone/Scheme to Area/SubStation; via camera number, camera name or by selection on the map. Camera selection can be limited in the User Profile list.		
27	Incident Panel	A list of live and recently recorded incidents shall be available for instant selection by operators.		
28	Functional Icons	A fixed area shall be allocated for the selection of commonly used icons. The System Administrator shall be able to assign functions and devices.		

29	Maintenance/Fault Logging	The ability to log a fault or maintenance visit, with warnings presented to the operators via an Organiser screen. Reports are created to show faulty items of equipment, time taken to fix etc. Automatic emails are generated and distributed to predefined lists.		
30	Full Incident Management	View, Add, Edit and Deletion of Incident provided via correct Access Rights. Logging of information on Incident Category, Call Source, Activity Type, Description, Actions Taken, People Involved, Responses (such as Police, Fire or Ambulance), Tasks, Daily Log Entry, Mapping Hot Spot, Result and Media/Cameras Used.		
31	Video Replay/Retrieval	Replay and review of footage shall be allowed from any workstation, given the correct privileges. Regardless of manufacturer the replay will be done in the same format.		
32	Media Management and Tracking	The burning of disks and replication of media shall be tracked and noted within the system to provide a full audit trail.		
33	Repeat Offender	A full repeat offender database shall be included in the client application to provide easy access and identifying of known offenders. Data to include description, pictures, incident details, vehicles and associates.		
34	Audit/Database Searching	Full auditing provided to cover all aspects of the Data Protection Act 1998 and GDPR regulations along with performance indicators and in-house check reporting.		
35	Incident Reporting	The system shall include over 250 search and report options covering all facets of the system; user generated reports shall also be included.		

36		The system shall trigger an incident report via an operator action, this is usually activated by the operator selecting an incident button either; on-screen, via a keyboard button or via a joystick button. When the incident button is triggered, the system starts to record the operator's actions; the system automatically starts an incident report and completes which cameras have been used, the location on the camera and time of incident.		
37		The open integrated security application platform shall allow two or more operators to work on the same incident, at the same time. A second operator must be able to click the 'Join Incident' button on their screen to prompt the system to start recording their camera movements.		
38		When the incident button is triggered the footage is automatically recorded and tagged the system presents to the operator pre and post event CCTV footage for all the supported encoding and digital recording system manufacturers listed herein. This footage is then attached to the incident form and can be replayed at a touch of a button.		
39		The open integrated security application platform must be able to decode multiple video channels from many sources and display these on video walls or spot monitors. They also must include instant playback access to archived video, to be replayed alongside live video feeds.		
40		The system shall have over 120 graphically enriched reports that can be scheduled to run automatically. The open integrated security application platform provider shall also provide assistance and a custom report writing service.		
41	Alarm Handling	The open integrated security application platform must include alarm receiving capabilities with cause and effect across connected technologies to enable a fully featured operator software platform integrating disparate technologies into a common Graphical User Interface (GUI) .		

42		The system shall integrate CCTV monitoring functions to allow visual verification to reduce false alarm scenarios.		
43		The open integrated security application platform shall pre-prioritise alarms, according to different criteria. The alarm stack is to be presented to the operator in an easy-to-understand format, clearly and efficiently, as part of the integrated solution priority Levels are to be configured to equipment notifications, alarm inputs and user levels.		
44		It must be possible to configure the alarm events cause and effect so that they automatically trigger or when an operator manually selects the alarm from the alarm stack, handling an alarm must create a unique incident record, additional operators must be able to join the incident with individual operator time stamps for actions and data input.		
45	Alarm Actions	The operator is to be presented with pre and post event CCTV footage for all the supported encoding and supported digital recording systems manufacturers, together with streams from the appropriately located group of cameras associated with the alarm.		
46		The mapping system will jump to the associated map plan at the pre-configure zoom level. An inset icon is to be highlighted by both colour change and icon transition clearly identifying the location of the device in alarm. Hovering over the icon will confirm device identification and location, selecting the device is to provide an additional menu configured with available functions from the technology manufactures SDK/API and user authority, such as isolating, arming, opening, setting, un-setting, switching on the device, displaying status etc.		

47		The alarm handling form is to present clear instructions (SOP) for the operator to follow with detailed work flows and procedures to follow, these are to be fully configurable by the administrator of the system. It must be possible for an operator to be able to escalate an alarm to a manager/supervisor and or to raise a full incident management form		
48		The open integrated security application platform shall include a response planning section and a comprehensive opening / closing schedule.		
49	Command & Control OEM Criteria	OEM must have registered office in India. In case the C&C OEM headquarters are outside India, then Indian registered company must be a subsidiary of their group company.		
50		OEM offered must be cyber security certified with UL Cyber security certificate/ GDPR/ NIST/ TPM/ CERT-IN or any other cyber security certificate from Indian Government body for mitigating cyber security risk.		
51		C&C Operator Terminal Application must be a 'Secured Desktop Client' with multi monitor display capabilities. C&C application client interface cannot be entirely web based.		
52		C&C OEM must have minimum 3+ existing Indian customers using its Integrated Command & Control Software, as desktop client operator terminal application, in any vertical. Customer reference letters may be requested on demand.		

Video Wall System				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Overview Display	The displays shall utilize direct LED lit LCD panel technology with 100,000 Hours Life time of LED, with a matrix of 4(C) and 2(R)		
2	Panels	All panels shall of 55” diagonal size with Screen gap <0.88mm		
3	Native Resolution per Panel	In order to achieve acceptable image quality for both video and graphics, and to avoid pixel loss, the LCD panel must be of native resolution of 1920 x 1080.		
4	Aspect Ratio	16:9,		
5	Backlight	Direct LED with 500 Nits of brightness and 100,000 Hours lifetime of LED minimum		
6	Brightness	The “Typical” Luminance specification must be 500 Cd/m2 (nits) or higher with a “Typical” Static Contrast Ratio of 1500:1 or greater in normal operation.		
7	Viewing angle	Each display shall utilize a high contrast screen (anti-glare) with sizes of 55” diagonal. The screen shall have a H 178°/V 178° viewing angle or greater with a screen “haze” value of 28% or greater for wide viewing angles for operators.		
8	Connectivity	2 DP , 2 HDMI , 2 USB , 2 LAN		
9	HDCP	Yes		
10	Ethernet ports	2		
11	Redundant Power supply	Inbuilt Dual Redundant Power supply for Fail safe Operations.		

12	Service	Front Access only		
13	Power consumption (Max)	Less than 190 watt in Full Brightness Mode		
14	Operating Temperature	system shall be operate properly under 0ºC to 40ºC Temperature		
15	Heat Dissipation (Max)	Less than 650 BTU/Hr in Full Brightness Mode		
16	Humidity	upto 80% (non-condensing)		
17	Automatic calibration	Each LCD panel shall be equipped with two (2) built-in sensors, permitting the brightness level of each LED Backlight to be controlled and adjusted automatically.		
18	Supplier/OEM	Health monitoring of video wall can also be possible on Cloud for pro-active diagnosis and maintenance		
19		OEM should be in this market for past 10 Years . Proof of same to be enclosed.		
20		OEM for Video wall display should be ISO 9000 & 14000 Certified organisation.		

Video Wall Controller				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	System Hardware Processors CPU Operating System Codec Support	Rackmount enterprise server system CPU: Intel; GPU: Nvidia Windows latest, 64bit pre-configured for video wall applications OS on mirrored 2.5” SSDs GPU: H.264, H.265, MPEG2, MJPEG, VC8 CPU: All ffmpeg codecs – see www.ffmpeg.org/general.html#Video-Codecs		
2	PERFORMANCE Decode Channels Stretch Video Dewarp	All at 30 FPS (higher channel counts available with lower frame rates) 94 at D1 resolution 88 at 720p resolution 72 at full HD resolution 20 at 4K UHD resolution Yes, across up to 6 screens Yes Yes, across up to 6 screens Yes		
3	Network Ethernet	1 x 10 Gigabit Ethernet interface and 1 x Gigabit Ethernet interface		
4	Connections Power Ethernet USB Display	2 x IEC 13 2 x RJ45 Gigabit Ethernet 2 x USB 3.1 A connections and 1 x USB 3.1 C connection 6 x DisplayPort 1.2 and 3 x USB 3.1 C connection		

5	POWER INPUT Input Voltage Power Supply Power Consumption	100V to 240V AC, 50/60Hz 550W dual-redundant 250W typical, 350W under full load		
6	Operating Temperature Storage Temperature Relative Humidity Safety & Compliance	0°C to +35°C [32°F to +95°F] -20°C to +70°C [-4°F to +158°F] 85% non-condensing CE, FCC Class A, UKCA, UL, TÜV, ROHS and WEEE		

Rack-mount Server (Application Server / Database Server)				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Form factor	Rack mount		
2	Chassis type	8 SFF with options for additional 2 SFF drive bays, 4 LFF		
3	Processor	Intel Xeon 4310 or better, 2.1GHz, 12-core/24- Thread (Up to 2 capacity)		
4	Cache	18 MB		
5	RAM	64 GB (2 x 32GB) DDR4 2667 MT/s or better		
6	Hard Disk Drive	3 x 600GB SAS 10K SFF BC MV HDD		
7	NIC	Gb		
8	Power Supply	800W hot plug		
9	Operating System	MS WS22 16C Std		
10	Keyboard & Mouse	Yes		

Rack-mount Server (Storage Server)				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Form factor	Rack mount		
2	Chassis type	4 LFF		
3	Processor	Intel Xeon 3206R, 1.90GHz, 8-core/8- Thread		
4	Cache	11 MB		
5	RAM	16 GB DDR4 DDR4-2133 or better		
6	Hard Disk Drive	4 x 2TB SAS 7.2K LFF SC MV HDD		
7	NIC	Gb		
8	Power Supply	500W hot plug		
9	Operating System	MS WS22 16C Std		
10	Keyboard & Mouse	Yes		
11	All Servers should be from same OEM for better performance			

Monitoring Workstation				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Processor	12th Generation i7 12700, 12C, 2.10 Ghz		
2	RAM	16GB DDR4 3200 MHz		
3	Hard Disk Drive	1TB M.2 PCIe NVMe		
4	Optical Drive	DVDRW		
5	Operating Systems	Win 11 Prof		
6	Connectivity	VGA		
7	Graphics Card	8 GB Graphics		
8	Monitor	2 x 21.5" TFT Monitor		
9	Keyboard & Mouse	Yes		

30 KVA Online UPS System				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Capacity (in kVA / kW)	30 KVA/ 30 KW 3-Phase Input / 3-Phase Output DSP Controlled IGBT Rectifier True On Line UPS (1+1) Redundancy with Common Battery Bank		
2	Input			
2.1	Input Voltage Range	305~477 Vac (At Full load)		
2.2	Input Frequency Range	40 - 65 Hz		
2.3	Input Power Factor	> 0.99 on Full Load		
2.4	Current Harmonic Distortion (THDi)	< 3%		
3	Output			
3.1	Nominal Output voltage	415VAC		
3.2	Output Voltage Regulation	±1%		
3.3	Nominal Output Frequency	50 / 60 Hz (Auto selectable)		
3.4	Voltage Distortion (THDu)	< 2% (For Linear Load)		
3.5	Crest Factor	3: 1 On Full Load (Minimum)		
3.6	Automatic & Bi-directional static by-pass (In-built)	Yes		
3.7	Maintenance Bypass	Built in Manual By pass		

4	Efficiency			
4.1	Overall Efficiency (AC to AC) -	> 95%		
4.2	ECO Mode Efficiency	> 98 %		
5	Overload			
5.1	Inverter Overload capacity	125% for 10Min. ,		
		150% for 60 sec		
6	In-build LC Display & LED			
6.1	Measurements (On LCD)	Input: Voltage / Frequency		
		Bypass: Voltage / Frequency		
		Output: Voltage / frequency		
		Battery: Remaining time / Battery Level Indicator		
		Load: Percentage / Load Level Indicator		
6.2	Fault Indication (On LCD)	Charger Failure		
		Battery Failed		
		Battery Low		
		Overload		
6.3	Indications (LCD)	AC indicator/Battery Mode of Operation / Bypass feeding the load / UPS Fault		
7	Audible Alarms	Battery Low beep / DC Fault beep/ UPS Overload beep/ o/p short ckt fault beep/ Shutdown beep		
8	Battery Backup / Battery Bank & Charger			
8.1	Backup Required	60 min		
8.2	Battery Bank Voltage	384V DC or higher		
8.3	Battery Bank VAh	Min.31200 Vah for 30min. Backup		
		Min. 48000VAH for 60min back up		
8.4	Batteries Type	Sealed Maintenance Free (SMF) - 12V Cells		

8.5	Battery Makes	Amara Raja / Exide		
8.6	Inbuilt Battery Charger	Mi.15Amp		
8.7	Number of Battery Banks	Single		
9	Interfaces			
9.1	Serial Communication RS232 Port	Yes		
10	Restart / Testing Capability			
10.1	Automatic Restart	UPS should start up automatically on mains resumption after battery low shutdown		
10.2	Self Diagnosis	UPS should be capable to carry out self test of Rectifier / Charger /Battery & Inverter module during start-up		
11	Physical			
11.1	Operating Humidity	0% ~ 95%RH (No Condensing)		
11.2	Operating Temp	0-40*C		
11.3	Noise Level	< 59 dbA at 1 meter distance		
12	Product Safety Certifications	EN 50091-2:1995,Class A		
		ESD:IEC61000-4-2: level4		
		RS : IEC61000-4-3: level3		
		EFT: IEC61000-4-4:level4		
		SURGE: IEC61000-4-5:level4		
		CS: IEC61000-4-6: level3		
		Conducted Magnetic Field:IEC61000-4-8: level3		
		CE declaration of conformity		

Industrial grade 48-Port Managed Switch				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Port Density	Enterprise grade switch should have minimum 48x10/100/1000 Base-T ports and 4x1/10G SFP+ ports. Should be populated with required module from day 1. Should have dual power supply from day 1.		
2	Switch architecture & Performance	The Switch should support a minimum of 176Gbps of Switching Fabric Capacity. The Switch should support a minimum of 130Mpps of forwarding capacity and 16K MAC address or better.		
3	High Availability	Should support stacking for single IP management. Minimum stacking bandwidth should be 40Gbps or more. All the necessary accessories should be provided from day 1.		
4	Layer 2 and Layer 3 Feature	Should support 4K active Vlan, Port base, MAC base, Protocol base and Voice VLAN, Loop Detection and Loop protection, RSTP, MSTP, <50ms ring recovery, RIPv1&v2, OSPF V3, BGP, Policy-based routing, VRRP V3, PIMv6-SM and SSM.		
5	Multicast Support	MLD snooping and IGMP snooping v1, v2 and v3		
6	Quality of Service	IEE 802.1p compliance, DSCP Prioritization, Wire speed traffic classification with low latency essential for VOIP and real time streaming media applications. Policy-based QoS based classifying traffic based on MAC, Port, VLAN, Protocol, L3 Parameters.		

7	Security Feature	ACLs, DHCP snooping, STP Root Guard, IP source guard and Dynamic ARP Inspection (DAI), RADIUS and TACACS+ accounting and authentication, MAC address filtering and MAC address lock-down, Tri authentication: MAC-based, web-based and IEEE 802.1x, DoS attack blocking.		
8	Management Feature	SNMPv6, Telnetv6 and SSHv6, SNMPv1, v2 and v3, RMON, Sflow /NetFlow or equivalent, 1xRJ45 Console port, USB or equivalent memory card slot for backup. Should support Openflow for SDN.		
9	Other Essential Feature	Should support UDLD or equivalent feature to prevent loops on detecting unidirectional links, Connectivity Fault Management, Monitoring Temperature, Supply voltage, Average transmit power, Average receive power and Laser bias current of the FO module, should have feature if any intrusion is detected on fiber link the particular port should be shutdown automatically.		
10	Certification	EN55022**,** EN55024**,** UL60950-1, FCC class A, VCCI class A, cUL and RoHS compliant		
11	Operating Temperature	0°C to 50°C or better		

Next Generation Firewall / Cyber Security Gateway System				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Hardware Architecture & Performance	The appliance based security platform should be capable of providing firewall, application visibility, Web Protection and IPS functionality in a single appliance		
2		The appliance hardware should be a multicore CPU architecture with a hardened 64 bit operating system to support minimum 8GB memory. Should have additional NPU processor with 4 GB RAM for hardware acceleration .		
3		Should support minimum 120 GB SSD for logs & reports		
4		The appliance should support atleast 8 * 1G ports 2 * 1G SFP ports . The appliance should have option to support additional 4 * 10G ports in future.		
5		Should support atleast 30 Gbps Firewall throughput & 6 Gbps of NGFW throughput		
6		Solution should have 15 Gbps of IPSec VPN throughput		
7		Firewall Should support atleast 1.2 Gbps of Threat Protection Throught (Measured with Firewall, IPS, Application Control, and Malware prevention enabled)		
8		Solution should have 1.4 Gbps SSL/TLS inspection throughput		
9	Industry Certification	Solution should have FIPS & ICSA certified		
10		Solution should provide make in India certificate with minimum 65% local content		

11		Solution should be NSS lab certified with minimum 93% exploit block rate		
12		Solution should be in latest gartner magic quadrant		
13	General Management	Purpose-built, streamlined user interface and firewall rule management for large rule sets with grouping with at-a-glance rule feature and enforcement indicators		
14		Firewall should support TLS 1.3 inspection of encrypted traffic		
15		Firewall should support Xstream FastPath technology for application acceleration		
16		Firewall should be ready for Xtender Detection & Response and Synchronized SDWAN		
17		Full command-line-interface (CLI) accessible from GUI		
18		Automated firmware update notification with easy automated update process and roll-back features		
19		Reusable system object definitions for networks, services, hosts, time periods, users and groups, clients and servers		
20		Backup and restore configurations: locally, via FTP or email; on-demand, daily, weekly or monthly		
21	Firewall, Networking & Routing	Stateful deep packet inspection firewall		
22		Network Flow FastPath acceleration for trusted traffic		
23		User, group, time, or network based policies		
24		Access time polices per user/group		

25		Enforce policy across zones, networks, or by service type		
26		Zone isolation and zone-based policy support		
27		Default zones for LAN, WAN, DMZ, LOCAL, VPN and WiFi		
28		Custom zones on LAN or DMZ		
29		Customizable NAT policies with IP masquerading and full object support to redirect or forward multiple services in a single rule		
30		Routing: static, multicast (PIM-SM), and dynamic (RIP, BGP, OSPF)		
31		Protocol independent multicast routing with IGMP snooping		
32		Bridging with STP support and ARP broadcast forwarding		
33		VLAN DHCP support and tagging, VLAN bridge support		
34		WAN link balancing: multiple Internet connections, auto-link health check, automatic failover, automatic and weighted balancing, and granular multipath rules		
35		Full configuration of DNS, DHCP and NTP, 802.3ad interface link aggregation		
36		IPv6 tunnelling support including 6in4, 6to4, 4in6, and IPv6 rapid deployment through IPSec		
37		Set user-based traffic quotas on upload/download or total traffic and cyclical or non-cyclical		

38	Authentication	Synchronized User ID utilizes Synchronized Security to share currently logged in Active Directory user ID between Sophos endpoints and the firewall without an agent on the AD server or client		
39		Authentication via: Active Directory, eDirectory, RADIUS, LDAP and TACACS+		
40		Server authentication agents for Active Directory SSO, STAS, SATC		
41		Single sign-on: Active directory, eDirectory, RADIUS Accounting		
42		Browser SSO authentication: Transparent, proxy authentication (NTLM) and Kerberos		
43		Browser Captive Portal		
44	Next Gen VPN Support	Site-to-site VPN: SSL, IPSec, 256- bit AES/3DES, PFS, RSA, X.509 certificates, pre-shared key		
45		L2TP and PPTP, Route-based VPN		
46		Remote access: SSL, IPsec, iPhone/iPad/ Cisco/Android VPN client support, IKEv2 Support		
47		SSL client for Windows and configuration download via user portal		
48		Encrypted HTML5 self-service portal with support for RDP, HTTP, HTTPS, SSH, Telnet, and VNC		
49		Authentication: Pre-Shared Key (PSK), PKI (X.509), Token and XAUTH		
50		Enables Synchronized Security and Security Heartbeat for remote connected users		

51	Intrusion Prevention (IPS)	High-performance, next-gen IPS deep packet inspection engine with selective IPS patterns that can be applied on a firewall rule basis for maximum performance and protection		
52		Advanced Threat Protection (detect and block network traffic attempting to contact command and control servers using multi-layered DNS, AFC, and firewall)		
53		Security Heartbeat instantly identifies compromised endpoints including the host, user, process, incident count, and time of compromise		
54		Security Heartbeat policies can limit access to network resources or completely isolate compromised systems until they are cleaned		
55		Lateral Movement Protection further isolates compromised systems by having healthy -managed endpoints reject all traffic from unhealthy endpoints preventing the movement of threats even on the same broadcast domain		
56	Web Protection and Control	Fully transparent proxy for anti-malware and web-filtering		
57		Enhanced Advanced Threat Protection		
58		Malware scanning: block all forms of viruses, web malware, trojans and spyware on HTTP/S, FTP and web-based email		
59		Advanced web malware protection with JavaScript emulation		
60		Live Protection real-time in-the-cloud lookups for the latest threat intelligence		
61		Second independent malware detection engine for dual-scanning		

62		Web keyword monitoring and enforcement to log, report or block web content matching keyword lists with the option to upload customs lists		
63		Block Potentially Unwanted Applications (PUAs)		
64	Application Protection and Control	Synchronized App Control to automatically, identify, classify, and control all unknown Windows and Mac applications on the network by sharing information between Sophos-managed endpoints and the firewall		
65		Signature-based application control with patterns for thousands of applications		
66		Cloud Application Visibility and Control to discover Shadow IT		
67		App Control Smart Filters that enable dynamic policies which automatically update as new patterns are added		
68		Micro app discovery and control		
69		Application control based on category, characteristics (e.g., bandwidth and productivity consuming), technology (e.g. P2P), and risk level		
70	Zero Day Protection	Inspects executables and documents containing executable content (including .exe, .com, and .dll, .doc, .docx, docm, and .rtf and PDF) and archives containing any of the file types listed above (including ZIP, BZIP, GZIP, RAR, TAR, LHA/LZH, 7Z, Microsoft Cabinet)		
71		Aggressive behavioural, network, and memory analysis		

72		Suspicious files subjected to threat intelligence analysis in parallel with full sandbox analysis		
73		Machine Learning technology with Deep Learning scans all dropped executable files		
74		Includes exploit prevention and Cryptoguard Protection technology from endpoint security		
75		In-depth malicious file reports and dashboard file release capability		
76	48 months License from the date of commissioning includes :	Network Protection Subscriptions (IPS,HTML5, ATP, Anti-malware),		
77		Web Protection Subscriptions (URL, AppCtrl, Web/App Traffic Shaping),		
78		Zero Day Protection		
79		24 X 7 hardware & warranty support from OEM		

42U Floor-mount Rack				
Sr. No.	**Parameter**	**Specifications**	**Compliance (Yes/ No)**	**Remarks**
1	Features	Racks manufactured out of steel sheet punched, formed, welded and Powder coated		
2		Rack should be from ISO 14001 ,27000 Certified Company & UL Listed		
3		Rack should have 2 no's of removable side panel with slam latch.		

4		Rack should have provision to mount on Floor		
5		Rack should be 42U(1U = 44.45 mm) in Height.		
6		It should be 800MM Wide,1000MM Deep and Overall height 2115 MM.		
7		Rack should Conforms to DIN 41494 or Equivalent EIA /ISO / EN Standard		
8		Rack should have Adjustable mounting depth,		
9		Rack 4 No Adjustable, 19" verticals with Punched 9mm Square Hole and Universal 12.7mm-15.875mm-15.875mm alternating hole pattern offers greater mounting flexibility, maximizes usable mounting space.		
10		Rack should have Numbered U positions,		
11		Rack should have 100% assured compatibility with all equipment conforming to DIN 41494		
12		Rack should have Proper Grounding & Bonding		
13		Rack should have Fan module Mount Provision on top Cover		
14		Rack should have Fan tray with 4 no's 90 CFM Fan		
15		Rack should have 1 No Fixed shelf with 715mm depth for mounting NON Rack mountable Equipment		
16		Rack should have 1 No Key Board shelf with 715mm depth		
17		Rack should have 2 Horizontal Cable manager		
18		Rack should have 2 No Server /IT Rack mount power distribution unit, 1Ph, 230V, 32A, 50/60Hz, Zero U standard with 12 X Indian Round Pin 5/15A, 16A MCB X 2 Circuits- PDU Rating 7.3KVA/Bottom feed-3Mt/ Black/ Inlet Plug Not Installed		
19		Rack should have provision for cable entry Exit from Both top & Bottom.		

CAT6 UTP Cable LSZH				
Sr. No.	**Parameter**	**Features**	**Compliance (Yes/ No)**	**Remarks**
1	Type	Category 6 shielded Twisted Pair 4 pair cable shall be compliant with ANSI/TIA/EIA-568-B.2-1 Additional Transmission Performance Specifications for 4-pair Category 6 Cabling.		
a)		Category 6 UTP cables shall extend between the work area location and its associated telecommunications closet and consist of 4 pair, 23 AWG, UTP.		
b)		Supports ultrahigh speed data networks such as Gigabit Ethernet (1000 Base-T and 1000 Base-TX) and beyond.		
2	Jacket:	The cable jacket shall be LSZH and LSZH sheath should Complying to: a. Fire rating IEC 60332-1, b. Acid gas IEC 60754-2 c. Smoke density IEC 61034-2		
3		Incorporates central spine maintaining pair separation during installation to ensure premium performance after installation.		
4	Mechanical Characteristics	Construction: 4 twisted pairs separated by internal X shaped, 4 channel, polymer spine / full separator. Half shall not be accepted. Conductor Solid Copper Conductor Diameter 0.56±0.005mm (23 AWG) Insulator Polyolefin Outer Diameter 6.0±0.4mm Max. Temperature 70°C		

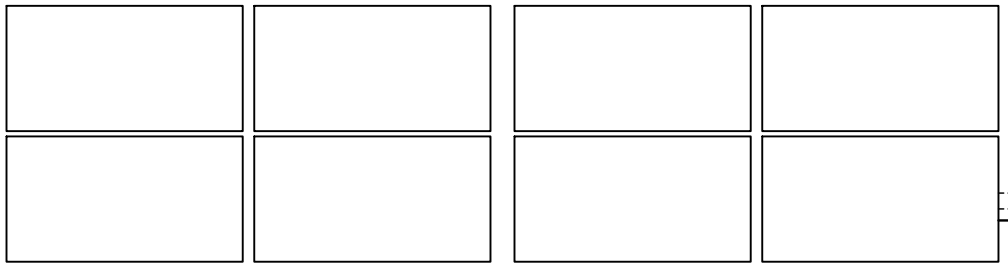
Fiber Optic LIU 24 Port loaded with Adapter, Splice Tray, Pigtail and Splice Protector				
Sr. No.	**Parameter**	**Features**	**Compliance (Yes/ No)**	**Remarks**
1	Fiber optic patch Panel	The 1U Multi-Function Fibre Enclosure is a configurable rack mount unit for storing and terminating incoming fibre cable.		
		The fibre enclosure has been designed to accommodate various termination types and adapter configurations. Accommodates up to 4 Modlink Cassettes or up to 4 nos of 6 or 12-Pak adapter plates.		
		The enclosure must, have a sliding drawer for ease of reconfiguring fibers, incorporates a heavy-duty ball bearing slide mechanism, allowing easy access to fibers		
		The adapter plates must be an interchangeable front plate which can facilitates upgrades as & when required.		
		Copper grounding stud tie down points at each cable entrance point.		
		The enclosure must have front cable management to properly route patch cords.		
		Fibre management enclosures that can be used as rack mount enclosure for integrated applications.		
2	Material	Powder coated Mild Steel		
		Rugged steel construction in graphite finish		
		Rear, side & base access for Incoming / Outgoing fiber cables		
3	Cable Management rings	Management rings within the system to accommodate excess fibre cordage behind the through adapters and maintain fibre bend radius.		
4	Sliding cover	Panel cover is of slide out for easy maintenance. Incorporates heavy-duty ball bearing slides for smooth and limited extension of the drawer unit, allowing for patch cable access while protecting installed patch and trunk cables from damage during re-entry of the enclosure		
5	Adapter Plates	SC Adpter SM Plate - loaded with 24 Nos SC Adapter		
6	Pigtails	SC, Single mode, 9/125 µm - 1.5 mtrs (24 Nos)		
7	Splice Tray	12 Port Splice Tary - 2 Nos		

Furniture for Central Control & Command Centre				
Sr. No.	**Parameter**	**Features**	**Compliance (Yes/ No)**	**Remarks**
1	Control Desk for 4 Monitors (for 2 Operators)	Table Top is ia made of 25mm MDF Board . .		
2		Structure: Powder Coated Aluminium Sturdy Structure		
3		Shutters: Made of Powder Coated CRCA Sheet.		
4		Proper Cooling arrangement for CPU Cabinet		
5		Slide out CPU tray		
6		Ergonomic design considering proper Leg space		
7		Approx Dimension of complete desk :-2350mm(W) X 1050mm(D) X 750mm(H).		
8	Chairs	Executive Chairs for Operators having 4 wheels and short back rest		
9	Working Table	Wooden frame and sunmica top with 4 nos. executive chairs having 4 wheels and short back rest		
10	Cupboard	6' tall and 4' wide Cupboard with wooden frame and board and sunmica finish. There should be 4 compartments inside with lock and key arrangement.		

KVM Switch				
Sr. No.	**Parameter**	**Features**	**Compliance (Yes/ No)**	**Remarks**
1	Features	KVM Switch should have 8 Ports		
2		Switch should be remotely accessible over the Net i.e. through LAN, WAN, Internet,		
3		KVM Switch should support 1 Local and 1 Remote User i.e. 2 Concurrent sessions		
4		KVM Switch should have a Network Ports supporting 10/100/1000mbps speed		
5		Single Power Source capable of handling 110-240V		
6		Local and Remote Console should be same		
7		KVM Switch should support Bios Level Access and Control of connected devices both from Local and Remote Console with appropriate CIM		
8		KVM Switch should support Virtual Media for software installations, patch updates, etc. from remote console when connected with appropriate modules		
9		KVM Switch should support absolute mouse synchronisation when connected with appropriate modules		
10		KVM Switch should support VGA, DVI, HDMI and DP interfaces		
11		KVM Switch should support different protocols viz. HTTP, HTTPS, UDP, SNMP, PAP, CHAP, etc.		
12		KVM Switch should support both IPV4 and IPV6 network operating environment		
13		KVM Switch should support Second generation platform with 1080p and 1200p video at 15 frames/second		
14		KVM Switch should support accessing up to 256 computers connected on tiered KVMs, from single console		
15		KVM Switch should support Multiplatform connectivity		

COMMAND & CONTROL CENTRE : APPROVED MAKE LIST		
Sr. No.	**Product Description**	**Approved Make**
1.	Rack-mount Server (Application Server / Database Server / Storgae Server), Workstation PC	HP, Dell, Advantech
2.	Command & Control Software system	Genetec, Veracity, Milestone, Hexagon, Verint or Bidder's own product
3.	Video Wall and Video Wall Controller System	NEC, Barco, Planar
4.	Network Switch	Ruggedcom, Hirschman, Allied Telesis
5.	Network Rack	President, WQ, Netrack, Valrack
6.	Next Generation Firewall / Cyber Security Gateway	Sophos, Checkpoint, Palo Alto, Fortinet
7.	KVM Switch	Netrack, Aten, WEYTEC
8.	Uninterruptible Power Supply	Emersion, Hitachi HI-Rel, Liveline, Numeric
9.	Control Desk for Control Room	Harmony, Godrej, Cosmos

COMMAND AND CONTROL CENTRE



VIDEO WALL DISPLAY

VIDEO CAB LE

UTP CAB LE

VIDEO CAB LE

42U RACK-1
24 PORT LIU
UTP PATCH PANEL
CORE SWITCH-1
ACCESS SWITCH
APPL.SERVER-1
DATABASE SERVER
STORAGE SERVER
NGFW
KVM SWITCH
VW CONTROL

VIDEO CAB LE

42U RACK-2
24 PORT LIU
UTP PATCH PANEL
CORE SWITCH-2
ACCESS SWITCH
APPL.SERVER-2
VW CONTROLLER
KVM SWITCH
NGFW

CAT 6 CAB LE

EXISTING SDH



OPERATOR STATION

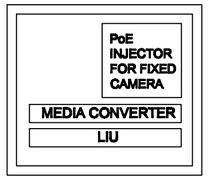




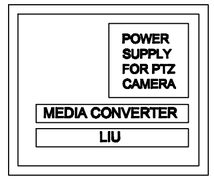
REDUNDANT UPS WITH BATTERY

LEGENDS

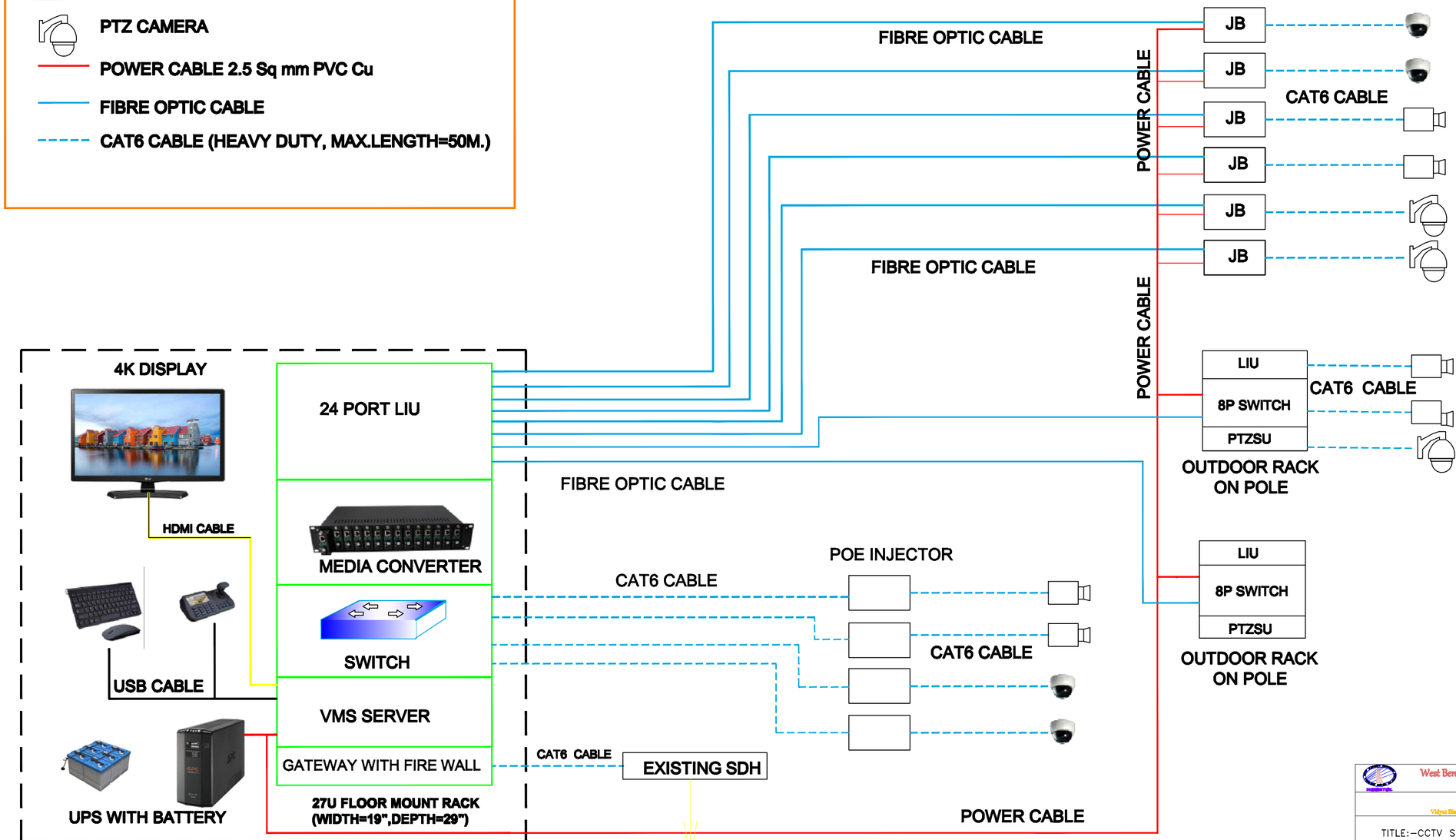
- DOME CAMERA
- BULLET CAMERA
- PTZ CAMERA
- POWER CABLE 2.5 Sq mm PVC Cu
- FIBRE OPTIC CABLE
- CAT6 CABLE (HEAVY DUTY, MAX.LENGTH=50M.)



TYPICAL DETAIL OF FIXED CAMERA JUNCTION BOX



TYPICAL DETAIL OF PTZ CAMERA JUNCTION BOX



West Bengal State Electricity Transmission Company Ltd.
(A Govt. of West Bengal Enterprise)
Office of the Chief Engineer
(Engineering Department)
Vidyut Bhawan, 9th floor , D-block,Salt Lake City, Kolkata-700091

TITLE:–CCTV Surveillance System Architecture – SubStation level

DRAWN BY:–	CHECKED BY:–		
SCALE :–N.T.S	RECOM. BY:–		
DRG. NO.–SB/2175	APPROVED BY:–		
DATE:– 29/09/2023		ELEC.	CIVIL.