

SOW & Technical Specs for CCTV System at TP-Odisha Discoms

1. SCOPE of Work

TP ODISHA DISCOM (TPCODL, TPNODL, TPSODL, TPWODL) have established various grids for distributing power to consumers and various offices for day to day operations across Odisha. It is required to monitor the activities going on at these grids and locations on 24X7 basis. There is a requirement to implement (Security Surveillance system with CCTV cameras) for physical security of these grids and offices. The connectivity from PSS/Offices to Power System Control Centre is on various media such as OFC, IP MPLS and VSAT. This tender document describes scope of work, service level agreement, technical specifications etc. for “Security Surveillance system with CCTV cameras” for Grids and critical offices of TP ODISHA DISCOM to be procured, implemented and maintained. This system shall provide the visibility of the equipment and activities in Grids and offices to operators sitting in Command & Control Center of situated at each Discom.

The connectivity from PSS/Offices to the security control room and Data Centre is in the scope of the owner, however, the required design of the offered system for connectivity on various medias mentioned above and cabling / accessories inside PSS/ Offices as well as inside Security Control Room and Data Centre shall be in bidder’s scope.

This document covers the specific requirements for complete design, demo of the system with offered equipment at Owner’s premises, detailed engineering, manufacture, inspection & testing at supplier's works, packing, transportation, loading and unloading, delivery to site, storage at site, handling at site, erection, testing, commissioning, performance testing and handing over of Security Surveillance System.

All equipment, system and services covered under this specification shall comply with all current applicable statutory regulations and safety codes in the locality where the equipment is proposed to be installed. The equipment and systems shall also conform to the latest version of applicable codes and standards on the date of offer made by the Bidder unless otherwise indicated. Nothing in this specification shall be construed to relieve the Bidder of this responsibility.

Bidder to note that the proposed solution shall give more emphasis on the following aspects :

- Reliability
- High Availability
- Cyber Security Resilience

The bidder's broad scope includes design, engineering, material selection, manufacturing, inspection & testing at Vendor's and/or Sub-Vendor's works, packing for shipment and delivery, unloading & storage at site, unpacking & transportation to location, erection including civil works, testing & commissioning and handing over of Security Surveillance system as defined in the subsequent sections of this specification document. The system offered shall be state-of-the-art, of proven design for the intended application and conform to high standards of design and manufacture. The offered system shall be complete in all respects and any items, accessories etc. necessary to make the system complete is included in the scope of supply.

The specific scope requirements are detailed below-

Security Surveillance System shall be provided for security and surveillance of periphery and equipment monitoring for operations purpose. Scope of Security Surveillance system includes the following-

- Video Management system (VMS)
- Networking (Local area network)
- Servers to be installed in existing racks in TP ODISHA DISCOM Data Centre
- Workstations to be installed at Security Control Room for respective Discom
- Power supply, cabling and earthing
- Support structures, brackets, junction box etc. for camera & equipment mounting
- Training for identified persons
- Manufacturers Authorization Certificate for providing service support to the products

Bidder is strongly advised to visit and examine the site infrastructure and other facilities and obtain all information for themselves on their own responsibility that may be necessary for preparing the Bid and entering into the contract for the package. The price bid by the bidder will be construed as the evidence that the bidder has examined the site conditions in detail and Bidder shall not raise later any claims / disputes for any additional price or extension of contractual time for completion against the Owner.

Bids shall be evaluated technically based on the following, else will be liable for rejection:

- Adherence to Technical specifications
- Adherence to scope of work
- Deviations from the specifications
- Submission of bid with all the details asked in the tender

2. APPLICABLE STANDARDS

The design, manufacture and performance of the Security Surveillance System shall comply with all the requirements of the latest editions of international codes and standards applicable. Given below are the acceptable code and standards. The Bidder shall take Owners approval for use of other codes & standards. Nothing in this specification shall be construed to relieve the Bidder of his responsibility.

Standards		
1	IS: 9000	Basic environmental testing procedures for electronic and electrical items.
2	IS: 5572	Classification of Hazardous Areas for Electrical Installations
3	IS: 8130	Conductors for insulated electrical cables and flexible cords.
4	IS: 2148	Flame proof enclosure for electrical apparatus.
5	ANSI C 39.5 - 1974	ANSI C 39.5 - 1974 Safety requirements for electrical & electronic measuring and controlling instruments.
6	IEEE – 802.3 - 1988	Standard for Local Area Networks: Carrier Sense Multiple Access with collision detection CSMA-CD and Supplements

7	NEMA Ics Part-6-1978 (with Rev.14/80)	Types of Enclosures
8	VDE: 0815	Wiring cables for telecommunication and information processing system

If standards are not existing for any equipment or system, such equipment or system shall comply with the applicable recommended practices of the following professional institutes and established good engineering practice

Institute of Electrical and Electronic Engineers (IEEE)

Instrument Society of America (ISA).

American National Standards Institute (ANSI)

Deutsche Industries Norman (DIN)

International Electrotechnical Commission (IEC)

Verint Deutschar Eisechhuttenleute (VDE)

Indian standard Institute (IS)

Wherever, new standards and revisions are issued during the period of the contract, the Bidder shall attempt to comply with such standards, provided there is no additional financial implication to Purchaser. In the event of the bidder offers to supply material and/or equipment in compliance to any standard other than those listed herein, the bidder shall include with their proposal, full salient characteristics of the new standard for comparison.

3. BIDDER'S QUALIFYING REQUIREMENTS

As per QR in NIT documents

4. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C

4	Maximum Humidity	95%
5	Average Annual Rainfall	150 cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Speed	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TP ODISHA DISCOM service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed as high as 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

4. DESIGN REQUIREMENTS

This section details the design requirements to be applied for proposed Security Surveillance system

Design requirements of overall Security Surveillance system : Security Surveillance system shall be designed in such a way that there shall be one integrated Security system consisting of AI enabled cameras, Video Management system and networks etc.

Following design criteria shall be considered while designing the Security Surveillance system-

1. The system shall be flexible and user-friendly for operation by security personnel.
2. The system shall be designed to provide real time monitoring of events & alerts, logging and historization with MIS reporting. The monitoring shall include all components of the offered system.

3. Workstation based Graphical User Interfaces (GUIs) shall be provided for real time monitoring and operations in security cabin at main gate and operation control room displaying real time & historical information, alerts, video feeds etc. of all the subsystems of the offered Security Surveillance systems.
4. All critical components of the proposed Security Surveillance system shall have self-diagnostic feature to detect failures/abnormalities etc. All such conditions shall be displayed in real time on the respective GUIs in security cabin and main control room.
5. System shall be designed to take care of failsafe requirements during emergency conditions.
6. All computers supplied as a part of this specification shall be workstation grade suitable for 24x7 operations
7. Operating System shall be based on latest version of applicable Windows OS for both Workstations and Servers
8. The application software shall be in line with the existing software base installed across TP ODISHA DISCOM locations.
9. Alerts shall be categorized in to at least three priority levels and shall be user configurable.
10. Every alert shall appear on the operating display in a chronological way based on priority. It shall be possible to acknowledge and reset the alerts by the operator based on the pre-set criteria.
11. Operator screens shall be based on graphical schematics with visualization using maps and situational awareness. All such schematics shall be user configurable.
12. Each location must have the capability for local live monitoring of camera feeds.
13. A minimum of 90 days local storage (with appropriate memory backup/NVR solution) for video recording must be ensured.

Design requirements of Video Management System (VMS)

14. Design and selection of VMS components shall be based on following criteria
15. Video Management System (VMS) software shall be a central Software with analytics capabilities.
16. Power over Ethernet (PoE) shall be the default mode of supplying power to the cameras for cable distances not exceeding 80 meters, else fibre optic cable shall be considered for video transmission along with necessary media converters and separate power supply arrangements.
17. Indoor or outdoor cable laying shall be secured at 300mm below the floor level.
18. All the active components of the VMS such as cameras, switches, servers etc. shall be powered through UPS power supply. UPS along with batteries shall be housed in a perforated / ventilated enclosure.

19. All outdoor components such as network switches, power supply unit, media converters, camera etc. shall be compliant to IP67.

20. Camera shall be provided for monitoring, recording and alert generation for

- All operational areas such as open switchyard, panel rooms, ACDB/DCDB rooms, etc. general surveillance purpose
- AI enabled cameras to detect Human and Vehicles entering from gate
- Face recognition integration for min 30 people/camera with the system
- Automatic number plate recognition (ANPR) for min 30 vehicles.
- AI camera to detect the Personal Protective Equipment-PPE Kit
- AI camera will make digital fences for Perimeter Intrusion detection
- AI camera will be used for detection of fire or smoke in outdoor switchyard
- Live feed from operational cameras shall be made available in the Security Control Room as on demand basis, however support for monitoring facility should be available locally as well as remotely
- Camera locations shall be selected in such a way that the entire premises shall be covered without any blind spots. Bidder shall provide the necessary documentation to demonstrate this.
- The distance between two cameras for perimeter monitoring shall not exceed 40 meters. The location of the camera and their field of view shall be coordinated with the lighting layout such that field of view of camera is well lit and there shall be no lighting glare on camera lens.

Mail / SMS notification to the concerned in the event of any alert

- NVR at each PSS/OFFICES shall store the data for 90 days including all events and alerts and the system at Security Control Room shall store the data and alerts for 30 days. System should support archival of stored data as per TP DISCOM requirement.
- The NVR shall have the provision to get connected to a standard monitor to show the data in case of any disruption of connectivity between PSS/OFFICES and the Security Control Room.

Design requirements of Networking

The network shall be designed in such a way that it shall tolerate single point failures to avoid total shut down. The network shall be designed to have provisions of minimum 50% spare bandwidth under worst loading scenario while all components are connected and are operating normally.

1. LAYOUT REQUIREMENTS

The Security Surveillance system design shall meet the requirements on the finalised Substation layouts.

Bidder shall submit the BOQ and layout drawings to suitably design the overall layout for installation of the system indicating location of Cameras, power source, NVR, local storage etc.

6. OPERATION AND MAINTENANCE REQUIREMENTS

Real time monitoring of Security Surveillance alerts and on demand live video stream is proposed from Security

Control Room for security and operational monitoring of entire Primary Substation and offices. Workstation based Graphical User Interfaces (GUIs) are proposed for achieving the purpose. It shall be possible to retrieve historical data in video clips from these locations for post event analysis.

The system shall be easy and user-friendly suitable for operation by security personnel. System shall have failsafe features for emergency conditions.

Bidder shall provide facilities for carrying out online and offline maintenance of the components supplied as a part of the system. In general, this should include adequate testing equipment, tools, safety devices and other accessories. Bidder shall provide the details in their bid.

2. Upgrades & Modifications

Bidder shall continuously keep the Owner informed of all Software and Hardware upgrades as & when these are released. Bidder shall provide lifetime spares and service support (10 years) for the system, even if no upgrades are implemented. The system referred above includes Bidder's own as well as third party components.

3. Training

The Bidder shall include in his offer, training for Owner engineers. The training shall cover development, integration, installation and commissioning of both software & hardware components of the system. Bidder to consider 20 man-days training for Owner's personnel. The Bidder shall provide Classroom as well as hands-on training on the system. All required training materials such as system catalogues, test instruments, demo equipment and simulation jigs, etc. shall be provided by the Bidder. The training shall equip the Owner's engineers for installation, commissioning, operation and post warranty maintenance of hardware, software (Operating System, Administration and Applications), protocols and all third-party systems.

All clauses related to Transport, Lodging & Boarding, Local transport for Owner's personnel etc. shall be as per the defined terms and condition in the GCC. Bidder shall indicate their

Training facilities including test tools and simulation facilities. Bidder shall provide the training calendar & details of topics considered for the equipment offered.

Training Requirement

Bidder shall provide training to the Owner's personnel on the operation and maintenance of the system supplied.

General requirements relating to the training are specified below:

Personnel who speak understandable English and who are experienced instructors shall conduct training courses.

Bidder shall provide all necessary training material. Each trainee shall receive individual copies of the technical manuals and pertinent documents.

The Owner shall be permitted to video tape all training classes.

Class materials, including documents sent before the training classes and class handouts, shall become the Owner's property. The Owner may copy this material for in-house training and use only.

Training sessions shall accommodate the number of candidates as per the contract.

8. TECHNICAL REQUIREMENTS OF EQUIPMENT

Detailed technical requirements of major components of the Security Surveillance system are described below.

Video Management system (VMS)

VMS shall be located at Security Control Room of TP ODISHA DISCOM; however, storage of the video streams shall be stored locally at Substation and will be streamed to Security Control Room at remote location as per the demand. The system to be supplied includes IP based cameras along with necessary licenses, NVRs, mounting arrangements, poles, brackets, cables etc. Power over Ethernet (PoE) shall be the default mode of supplying power to the cameras for cable distances not exceeding 80 meters, else fiber optic cable shall be considered for video transmission along with necessary media converters and separate power supply arrangements. All the cameras shall be powered through UPS power supply. All outdoor components such as outdoor unit (ODU), power supply unit, media converters, camera etc. shall be compliant to IP67.

Components for the VMS shall meet the following minimum technical requirements, refer the data sheet table.

- Fixed Indoor/ outdoor Camera

- Networking Requirements:
- Network switches
- FO cable
- Server requirements
- Workstation
- Power supply, cable and earthing requirements.

All accessories including notice boards (you are under CCTV surveillance) is in bidder's scope at each PSS/OFFICES as well as at Security Control Room.

Requirements including connectivity

4. The entire system shall be capable to work over standard wired and wireless Local Area Network (LAN) as well as Wide Area Network over IP-MPLS (OPTICAL as well as wireless) connectivity.
5. Each of the components of the system shall be designed for robustness and reliability having a high MTBF (Bidder to indicate the MTBF).
6. The entire system shall use latest state-of-the-art advanced technologies and shall have a guaranteed life span and support commitment in terms of spares and service for 10 years (Documentary proof on OEM letter head needs to be submitted) . All the components offered as a part of the system shall be of the latest version and shall not be nearing end of life. Bidder need to certify that the equipment being/quoted is the latest model and that spares for the equipment will be available for a period of at least 10 years and also guarantee that they will keep the TP ODISHA DISCOM informed of any update of the equipment over a period of 10 years.
7. The Bidder shall submit a detailed techno-commercial proposal that should provide full technical details of each and every sub-system as well as devices proposed to be used within the system along with the make, model and technical data sheets. All devices should conform to international standards such as UL, ULC, FM, etc.
8. Overall system architecture should be provided clearly highlighting details of each and every component as well as its linkage to the rest of the system along with communication methodology.
9. The Bidder shall elaborate in full detail all the redundancies at various levels e.g. device, application, network, etc. designed into the whole system and explain this in a separate section.
10. TP DISCOM reserve the right to visit the recent field deployment of the similar system for better understanding. Bidder need to arrange the same as per the TP DISCOM request.
11. It is strongly advised to carry out due-diligence of each Discom before Bidding to get complete idea of network/ existing deployment if any.

9. QUALITY REQUIREMENTS, TECHNICAL DEMO & TESTING

QUALITY REQUIREMENTS

Bidder shall submit the following information along with the Technical Bid and project specific document after award of contract.

Quality Assurance Plan (QAP), Manufacturing Quality Plan (MQP), Field Quality Plan (FQP). To ensure that a well-engineered and contractually compliant system is produced. Vendor shall adhere to a quality assurance program for the preparation of all contract deliverables, which includes hardware, software and documentation. The program shall provide for early detection of actual or potential deficiencies, timely and effective corrective action, and a method of tracking all such deficiencies.

TECHNICAL DEMO SET UP AT OWNER'S PREMISES

1. Technical Demo Setup

The Bidder should arrange the components as quoted in the proposal for the demo setup at Owner's premises to showcase the features as per the specification requirements and evaluation criteria. The make & model should be same as per the bid proposal unless & otherwise specified, this means if the model numbers of all components do not meet as per the proposal, the bid is liable for rejection. This demo will be without any cost implication to TP DISCOM.

NOTE:

The place & date of Demo shall be intimated at least 7 days in advance so as to make necessary arrangements.

The Bidder responsibility to arrange the necessary equipment / components that are required for the completion of Demo.

The proposed solution should include the quality aspects like user friendliness, secure, interoperability, modifiability, integrity and extensibility, maintainability, scalability and modularity etc.,

It is the bidder responsibility to handover the recorded video stream of complete Demo to the Owner at the end of Demo.

The Owner may provide use cases to the qualified bidders at the time of Demo in addition to the bidder's use cases.

TEST PROCEDURE

Factory Acceptance Test (FAT)

The Vendor shall submit a test specification for factory acceptance test (FAT) and commissioning tests of the Security Surveillance System for owner's approval. Vendor to submit the type test certificates, pre-FAT testing reports and document before the start of FAT at Vendor's works. The manufacturing phase of the Security Surveillance shall be concluded by the factory acceptance test (FAT) of hardware, software and components in an integrated way.

The general philosophy shall be to deliver a system to site only after it has been thoroughly tested and its specified performance has been verified, as far as site conditions can be simulated in a test lab.

Commissioning

The commissioning of the system (hardware and software) including Site Acceptance Test and one-month Trouble-free Operation post handing over shall be the responsibility of vendor. Development and customization of all software components shall be in Bidder's scope.

Adequate number of competent engineers (Hardware & Software) as approved by Owner shall be posted at site during the entire period of installation & commissioning. In addition telecom specialists shall be deputed to site for establishing communication systems.

Daily site work shall be planned and executed as per due approvals from Owner's representative.

Vendor shall submit detailed site organization chart of Personnel for Owner's approval.

Owner reserves the right to review the same. Vendor's commissioning engineers shall also train Owner's engineers during commissioning apart from scheduled Training.

The responsibility for Installation, Commissioning, Performance Guarantee and Warranty shall remain with the vendor.

The vendor shall furnish procedures, protocols and time schedules for commissioning and Acceptance Test activities.

All tools (both hardware and software), test instruments, simulation jigs, documents, programming equipment etc. required for Installation, Testing & Commissioning are in the scope of bidder.

All passwords, access keys etc. are the property of the Owner and shall be handed over to the Owner.

All Inter-Operability Tables for interfacing to other systems shall be supplied.

Site Acceptance Test (SAT)

SAT shall cover all equipment and functions as specified for the complete system (all hardware & software) and connectivity with Owner's system. As such SAT shall cover all the tests listed in FAT along with site-specific tests including interconnections with field equipment and other systems. Apart from testing and commissioning, SAT shall include one month of continuous trouble-free operation of the complete system without major intervention. In case of interruptions, one-month trial shall be restarted after attending to the problem.

Vendor shall submit SAT procedure documents for owner's approval during detailed engineering.

10. PERFORMANCE REQUIREMENTS

TEST PROCEDURE

Winning bidder shall submit performance guarantee test procedure for owner's review and approval during detailed engineering.

Camera Performance: The Performance shall be demonstrated under all weather and lighting conditions including minimum 0.3 lux.

LAN Bandwidth 50%: In case the bidder is unable to meet the above performance requirements, even after utilizing opportunities for correction, the system is liable to be rejected.

11. SPARES AND SPECIAL TOOLS AND TACKLES

MANDATORY SPARES

The bidder shall supply mandatory spares which shall be strictly interchangeable with parts for which they are intended for replacement.

SPECIAL TOOLS & TACKLES

Bidder to consider and supply special tools and tackles required for erection, commissioning and maintenance of the offered system. After commissioning of the system all tools and tackles shall be handed over to Owner's team.

All tools (both hardware and software), test instruments, simulation jigs, documents, programming equipment etc. required for Installation, Testing & Commissioning are in the scope of bidder.

12. DATA SUBMISSION BY BIDDER

Bidder shall submit the following information along with the Technical Bid.

Technical solutions document with detailed functionality of the System.

Owner's switchyard and control room plans tentatively marked up with the Cameras, Server cabinet, etc. along with tentative BOQ considered.

General Arrangement Drawings for equipment offered

System architecture with all the hardware and other details

Details of application software along with database architecture indicating interfaces and other details.

Datasheets of major components

Dully filled in schedules and data sheets.

Quality Assurance Plan (QAP), Manufacturing Quality Plan (MQP), Field Quality Plan (FQP)

AFTER AWARD OF CONTRACT

The following documents shall be submitted for Owner's approval during detailed engineering:

1. Bidder to submit all datasheets, detailed GTP of the proposed system during detailed engineering for the approval and finalization by Owner.
2. Over all plot with outdoor & indoor cameras and other devices marked up after finalisation of the plot plan and building layouts
3. Equipment layout at Security control room
4. System Architecture Drawing. This drawing should show in detail of the following:
 - a. Network connections
 - b. Protocol used

5. Type of interconnecting cable
6. All cameras, workstations, network switches etc.
7. Functional Design Specification document
8. Step by Step test procedures for Factory Acceptance Test (FAT) and Site Acceptance Test (SAT)
9. Hardware, Software and Application manuals for all the equipment supplied including that of Third parties.
10. All Software Licenses (both own & third party), key for Hardware Locks
11. Guaranteed technical parameters & Guaranteed availability and reliability
12. Calculation for power sizing
13. Bill of Material listing equipment designation, make, type ratings, etc. of all the equipment supplied l)
14. Operator's Manual
15. Complete documentation of implemented protocols between various elements
16. Diagnostic and performance evaluation software and hardware tools
17. Details of software (Operating systems, application software, engineering tools,
18. Final as built drawings of all Security Surveillance system as final documents in AutoCAD & PDF
19. Technical catalogues, Test Certificates and Acceptance Test Reports.
20. Internal test report, FAT and SAT documents with test protocol formats shall be submitted for approval at least 4 weeks before Factory Acceptance Test.
21. SAT protocol shall be submitted for approval at least two weeks before SAT
22. Bidder shall also furnish Original plus one copy of all System Software (OS, Application and tools) along with delivery. Bidder shall submit two copies of all the configuration, application, display, database backup of all equipment on reliable secondary media.

13. SERVICES AND SUPPORT:

1. All the products should be with 7 years of warranty and support.
2. The bidder shall be responsible for providing required maintenance, service and necessary onsite support/OEM support for the entire contract duration from the date of successful completion of installation and commission /Final Acceptance Testing (FAT). It shall be the bidder's responsibility to replace any defective parts/equipment's without any additional cost to the TENDERER. The defective part so replaced shall be the property of the bidder. The bidder shall keep enough spares at the SITE location/its own location during warranty period to meet SLA parameters and the cost for the spareparts are to be borne by the bidder.

3. Bidder is required to keep some spares during contract period to provide immediate replacement during warranty period.
4. All the Networking equipment and spares shall be kept in good working condition and shall be repaired or replaced. In case of any equipment which is under warranty the bidder would ensure that all equipment's are repaired/ replaced.
5. All the electrical equipment and accessories, backup power sources, plugs, wires etc. shall be maintained and if required replaced by the successful bidder at its own cost.
6. The Successful bidder shall also maintain an up-to-date inventory of all supported equipment and spares and make the same available for review and inspections as per requirement.
7. The bidder shall also be responsible for performing/carrying out preventive maintenance activity at least once in a six month which includes cleaning, dusting and upkeep of interior and exterior, realignment of the deployed equipment's, configuration backup and software up gradation/update of all hardware.
8. The Bidder is required to submit preventive maintenance schedule for all equipment to TENDERER from time to time. After performing preventive maintenance activities, successful bidder is required to submit the detailed report of the same. All such activities should be done preferably during non- working hours or on non-working days/holidays.
9. Shifting of any camera or related equipment within the site on need basis should be done by the bidder without any additional cost to the TENDERER during the Warranty period.
10. All the products should be with 7 years of warranty the Time for Replacement of Defective Product during Warranty Period is 40 working hours.
11. The successful bidder must carry out proper electrical earthing (as per IS-3043) at all the Substation where cameras to be installed. The cost for the earthing will be borne by the bidder.
12. The bidder is responsible for protecting all the devices or equipment from input power i.e., overload, over voltage or current, spikes, surge etc.
13. Tenderer will provide electric point at single location in each Substation, thereafter, bidder is responsible for required electricity work for successful functioning of proposed surveillance system.
14. Bidders must install surge protection device/equipment and distribute the raw power to all the devices of surveillance system.
15. Appropriate call register and ticket handling status system should be in place to log and track troubleshooting activity.
16. The Bidder for better understanding may visit the site(s) with prior written permission from the TENDERER before submission of their bid. The bidders will

have to do their own assessment/ measurements for finalization of scope of work / supply before submission of their bids.

14. Service Level Agreement (SLA) and Penalties

Penalty for Delay

Type of Fault	Maximum Allowable Time to Repair	Penalty beyond allowable time.
Faults requiring no Spare Replacement	2 Working days	Rs.1000/- per day
Faults requiring Spare Replacement	7 Working days	Rs.2000 per day
Delay in Delivery and Installation	NA	Rs.10000/- Per week delay

Note: Maximum Penalty cap for penalty for delay is 10% of respective RO value.If there is a delay in delivery of the supply of hardware, applicable penalty for delay in delivery of delayed/non-supplied hardware will be levied. Due to delay in delivery, if installation gets delayed further applicable penalty for delay in installation and commissioning will also be levied for that non- supplied and non-installed hardware. For calculation of delay any dependencies from TP DISCOM side will be excluded.

Operational Penalties:

S/N	SLA	Target	Penalties
1.	Timeline for Retrieval of video	As per SLA	Rs. 500 for every instance of late retrieval as per the SLA

	feeds from the Storage		Note: Data Retrieval Request Through a Request Log Mechanism
2.	*Uptime of all IT components installed at site	99.50% (at each individual component level)	For each component Above 99.50% = No penalty. 99.50 - 99.00% - $\geq 0.25\%$ of QP. 98.99 - 98.00% - $\geq 0.5\%$ of QP. 97.99 - 97.00% - $\geq 1.0\%$ of QP. 96.99 - 96.00% - $\geq 1.5\%$ of QP. Less than 96.00% - $\geq 2\%$ of the QP. If the uptime goes below 95% consequently for two quarters, then in that case tenderer may terminate the contract and forfeit the PBG.
3.	Availability of Video Recording	100% (365 x 24 hours) Excluding power cut duration	A penalty of Rs. 1000/- per camera per hour or part thereof shall be levied in case of unavailability of Video Recording.

*uptime mentioned here is required to achieve for each site/Substation's IT components.

Note: The overall operational penalty would be generally capped at 10% and will be recovered against the quarterly payment invoice and performance bank guarantee (if required) submitted by the successful bidder.

15. TRAINING

The contractor shall provide training for a batch (maximum of 10 people). Contractor personnel who are experienced instructors and who speak understandable English and Hindi shall conduct training. The Contractor shall provide all necessary training material including configuration document in advance (before FAT or during FAT). Each trainee shall receive individual copies of all technical manuals and all other documents used for training. These materials shall be sent to Employer at least two months before the scheduled commencement of the particular training course. Class materials, including the documents sent before the training courses as well as class handouts, shall become the property of Employer. Employer reserves the right to copy such materials, but for in-house training and use only. Hands-on training shall utilize equipment identical to that being supplied to Employer.

Note: 1. Bidder has to consider required material such as any hardware or software, civil work, mechanical work, apart from the BOM mentioned above, to complete the successful installation and commissioning of surveillance system.

2. On-Site Support and Internet Provisioning:

For any configuration, integration, or commissioning activities related to cameras, NVRs, VMS servers, VA servers, LPUs, VMS software, VA software, and associated components, the concerned personnel from both the bidder and the OEM shall be physically present at the site until the system is successfully commissioned and the final handover is completed. In case any online support is required for purposes such as patch updates or firmware upgrades, the bidder shall arrange the necessary internet connectivity at their own cost and responsibility.

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In case any online support is required for purposes such as patch updates or firmware upgrades, the bidder shall arrange the necessary internet connectivity at their own cost and responsibility.

ANNEXURE I Price Schedule for Rate contract for CCTV Installation Work at Stores and PSS						
		Quantity for PSS		Quantity for Store and Office location		
Sl. No	Item	TPCODL QUANTITY	TPNODL QUANTITY	TPCODL QUANTITY	TPNODL QUANTITY	Unit
1	32" industrial LED Display24X7	0	0	20	19	Nos

ANNEXURE I Price Schedule for Rate contract for CCTV Installation Work at Stores and PSS						
		Quantity for PSS		Quantity for Store and Office location		
Sl. No	Item	TPCODL QUANTITY	TPNODL QUANTITY	TPCODL QUANTITY	TPNODL QUANTITY	Unit
2	Local Processing Unit for VA at PSS	50	60	0	0	Set
3	Wall Mount Rack 19"X9UX600mm, with Colling Fan,Cantilever Tray-19"X1U and 6SKT Surge protection PDU (Make:-Netrck, Legrand,Valrack)	0	60	0	24	Set
4	6U Wall Mount Rack 550D with 5/15A PDU and 2 sets of hardware screw, 1 no. cooling fan and 1 no. shelf	50	0	0	0	Set
5	Wireless Mouse, Make:- (Any Standard make)	0	0	20	22	Nos
6	HDMI Cable(10 meter)-8K (Any Standard make)	0	0	20	31	Nos
7	NVR 16 Channel 2 SATA Surveillance grade Hard Disk Drive	50	60	20	24	Nos
8	Surveillance SSD-10TB,-Tosiba/Seagate	0	60	0	52	Nos
9	General Surveillance Indoor Dome Camera (4MP IP IR Network)	100	120	120	50	Nos
10	General Surveillance outdoor Bullet Camera (4MP IP IR Network , Range - 30Mtrs)	400	60	20	61	Nos
11	General Surveillance outdoor Bullet Camera (4MP IP IR Network , Range - 50 Mtrs)	0	60	0	25	Nos
12	General Surveillance outdoor Bullet Camera (4MP IP IR Network , Range - 60 Mtrs)	0	60	0	76	Nos
13	IP IR Network PTZ Camera	0	0	0	4	Nos
14	IP IR ANPR Network Camera,	50	20	0	5	Nos
15	Armored Outdoor Cat-6 Cable (Make - Phinolex/Digisol/Molex)	17500	15000	2000	7760	Mtrs
16	1" PVC Pipe(10Ft each Pipe)	0	2000	0	910	Nos
17	Cable Casing Channels (7.5FT each Case)	0	5000	0	2360	Nos

ANNEXURE I Price Schedule for Rate contract for CCTV Installation Work at Stores and PSS						
		Quantity for PSS		Quantity for Store and Office location		
Sl. No	Item	TPCODL QUANTITY	TPNODL QUANTITY	TPCODL QUANTITY	TPNODL QUANTITY	Unit
18	POE Ethernet Switch: 8 Ethernet ports and 2 Fiber optic ports	0	30	0	6	Nos
19	POE Ethernet Switch: 16 Ethernet ports and 2 Fiber optic ports with SFP loaded	50	30	20	19	Nos
20	1G SFP TX/RX,	0	8	0	28	Nos
21	SC Type 12 Ports LIU(Loaded)	0	4	0	20	Nos
22	Optical fiber Patch Cord LC SC-3Mtrs, :-	0	6	0	28	Nos
23	24 Core Optical Fiber Cable,	0	400	0	2155	Mtrs
24	HDPE PLB Pipe-40Mm Dia, ISI marked or Telecom approved	5000	500	0	2855	Mtrs
25	6 Mtr Cylindrical Camera Pole with accessories and earthing	225	25	0	18	Nos
26	IP66 & Water proof Pole Mount Outdoor rack ISI marked	0	25	0	26	Nos
27	Outdoor Junction Box; ISI marked	400	300	0	0	Nos
28	3 Core 2.5 sq mm Armored Power Cable - ISI Standard	4375	500	1000	1151	Mtrs
29	32Amp DP MCB	0	25	0	25	Nos
30	16A Dual Pole AC MCB to be installed at ACDB panel for protection and isolation of inverter AC supply.	50	0	0	0	Nos
31	16A Dual Pole DC MCB to be installed inside the rack for isolating and protecting DC supply from inverter to rack-mounted equipment.	50	0	40	0	Nos
32	VMS Software for Camera Management	0	1	1	0	Nos
33	Per Camera VMS Channel License	500	750	80	0	Nos
34	Chemical earthing including 5 ft digging; customized	50	0	0	18	Set

ANNEXURE I Price Schedule for Rate contract for CCTV Installation Work at Stores and PSS						
		Quantity for PSS		Quantity for Store and Office location		
Sl. No	Item	TPCODL QUANTITY	TPNODL QUANTITY	TPCODL QUANTITY	TPNODL QUANTITY	Unit
35	3 KVA Online UPS with 60 mins Battery backup and Enclosure	50	0	20	0	Set
36	Stabilizer for UPS	100	0	0	0	Nos
37	Armored 4 Pair Serial Cable	250	0	0	0	Nos
38	2 Socket 5/15A PDU; ISI marked	500	0	0	0	
39	Surge Protection Device for camera	250	60	0	20	Nos
40	RS 485 to RS 232 Converter	100	0	0	0	Nos
41	Laying of OFC, Power cable& Cat-6 Cable through the Pipe with installation attributes	0	15000	0	7760	Mtrs
42	Laying of PLB Pipe in ground in 4feet depth	0	500	0	2855	Nos
43	Civil Foundation Of Camera mounting Pole	0	25	0	18	Nos
44	Installation, configuration & testing charges of Rack,Camera, NVR	50	60	20	19	Nos
45	Reinstallation of existing camera	0	0	0	25	Nos
46	License for Video analytics software for PPE Detection (helmet, shoes, gloves)	50	25	0	5	Nos
47	License for Video analytics software for Face recognition for 30 people	50	25	0	5	Nos
48	License for Video analytics software for Fire and Smoke Detection	50	25	0	5	Nos
49	License for Video analytics software for Perimeter Intrusion Detection	350	200	0	5	Nos
50	Installation, testing and commissioning of Control center as well as at Data Centre	1	1	0	0	Set

16. Technical Specification

2A. 32" LED Industrial		
S.No	Features	Specifications
1	General	
2	Display Size	32 inch
3	Screen Type	LED
4	Color	Black
5	Smart TV	Yes
6	Resolution Standard	4K
7	Resolution (pixels)	1,920 x 1,080
8	Dimensions	
9	Width x Height x Depth (without stand)	970 mm x 571 mm x 58 mm
10	Connectivity features	
11	No of HDMI Port	2
12	No of USB Port	2
13	Wi-Fi Type	Wi-Fi Certified 802.11a/b/g/n
14	Built In Wi-Fi	Yes
15	Bluetooth	Yes
16	Ethernet (RJ45)	1
17	Headphone Jack	Audio/Headphone Outputs: 1 (Rear Hybrid with Headphone Out, Audio Out and Subwoofer Out)
18	Digital Audio Output	1 Bottom
19	Analog Audio Input	Yes
20	RF Connectivity Input	1 Side
21	Audio features	MPEG1/2 Layer1, MPEG1/2 Layer2, MPEG1/2/2.5 Layer3, AAC, HEAAC, WMA, WMA Pro, LPCM, IMA-ADPCM/MS-ADPCM, AC3, EAC3
22	Number of Speakers	2
23	Speaker Type	Bass Reflex Speaker
24	Sound Technology	Dolby Digital, Dolby Digital Plus, Dolby Pulse, Dolby AC-4, DTS Digital Surround
25	Surround Sound	S-Force Front Surround
26	Speaker Output RMS	20 W
27	Power features	

28	Power Consumption	74 W, 0.5 W (Standby)
29	Remote control features	
30	RF Capable	Yes
31	Smart tv features	
32	Operating System Present	Yes
33	Operating System	Android
34	Screen Mirroring	Yes
35	Video features	
39	Upscaling	Yes
40	Other Video Features	Gamma Engine (Colour Space Mapping Dynamic Contrast AntiAliasing), HDR10+ Decoding, HDR10, HLG, Chromecast built-in, DLNA, Miracast
41	Storage	2 GB RAM, 8 GB Storage

1F. Industrial Grade Local Processing Unit (LPU) at PSS for VA		
S. No	Parameter	Specification
1	Processor	latest Gen Intel Core i9 with 2.1 Ghz processor or better
2	Chipset	Intel H610
3	Graphics	Intel UHD Graphics 630
4	Memory	16 GB DDR5 or higher
5	GPU Support	1*full size Mini-PCIe
6	Ethernet	2x1G RJ45
7	USB	2xUSB3.0
8	Video Port	1xHDMI/DVI-D port and 1xVGA/DP port
9	Serial Port	2 x RS-232/422/485 ports
10	Storage	1x internal SATA port for 2.5" HDD/ SSD
11	EMC	CE/FCC Class A
12	Compatibility	Shall be compatible with Video Analytics software. Undertaking from Video Analytics OEM on Letterhead Shall be submitted for compatibility and Performance

		1R. 6U/9U Wall Mount Indoor Rack
Sr. No .	Parameter	Specification
1	Technical parameters	6U/9U, 19" 550mm Depth, Wall Mount Networking Enclosure
2		It should confirm to DIN 41494 or equivalent standard
3		It should be welded construction with steel frame
4		Lockable tough ended glass front door
5		19" mounting angle made of formed steel
6		Powdered coated standard finish
7		Top & Bottom welded cover with vented & cable entry exit cut outs
8		2 pair of 19" mounting rails
9		1U Cable Manager
10		Roof Mounted Fan Unit

11		230V AC, 6 way, 5 /15 Amp Power Distribution Unit
12		Mounting Hardware set.
13		OEM should be ISO-9001, ISO-14001, ISO-45001 certified.

1G. 16 Channel Network Video Recorder (NVR)		
SL No.	Feature	Specification
1	Processor	Industrial-grade processor
	Internal HDD	Should have 180 days recording backup (Bite rate-2048Kbps) storage capacity.
2	IP Camera Input	16 channels
3	Operating System	Embedded LINUX
4	User Interface	Web, Local GUI
5	Video Output	1 VGA:1920 × 1080, 1280 × 1024, 1280 × 720
		1 HDMI:3840 × 2160, 1920 × 1080, 1280 × 1024, 1280 × 720
		Heterogeneous video source output for HDMI and VGA
6	Video Compression	H.265+, H.265, H.264+, H.264, MJPEG
7	Decoding Capability	AI Disabled: 2 Channel 32 MP@25 fps, 2 Channel 24 MP@25 fps, 4 Channel 16 MP@30 fps, 5
		Channel 12 MP@30 fps, 8 Channel 8 MP@30 fps, 10 Channel 6 MP@30 fps, 12 Channel 5
		MP@30 fps, 16 Channel 4 MP@30 fps
		AI enabled: 1 Channel 32 MP@25 fps, 1 Channel 24 MP@25 fps, 2 Channel 16 MP@30 fps, 4
		Channel 12 MP@30 fps, 6 Channel 8 MP@30 fps, 8 Channel 6 MP@30 fps, 8 Channel 5 MP@30 fps, 12 Channel 4 MP@30 fps
8	AI by NVR	Face detection, Face recognition, Perimeter protection, SMD Plus

9	AI by Camera	Face detection, Face recognition, Video metadata (Human, Motor vehicles, Non-motor vehicles), Perimeter protection, SMD Plus, Stereo analysis, Crowd distribution, People counting, ANPR, Vehicle density, Heat map
10	Resolution	32 MP, 24 MP, 16 MP, 12 MP, 8 MP, 6 MP, 5 MP, 4 MP, 3 MP, 2MP, 720p, 960p, D1, CIF, QCIF
11	Network Bandwidth	AI disabled: 384 Mbps incoming, 384 Mbps recording and 384 Mbps outgoing
		AI enabled: 200 Mbps incoming, 200 Mbps recording and 200 Mbps outgoing
12	Video Display Split	Main screen: 1/4/8/9/16 , Sub screen: 1/4/8/9/16
13	Perimeter Performance AI by NVR (Number of Channels)	4 Channels, 10 IVS rules for each Channel
14	Perimeter Performance of	All Channels (16 Targets/s)
	AI by Camera (Number of Channels)	
15	SMD Plus by NVR	8 Channels: Secondary filtering for human and motor vehicle, Reducing false alarms caused by leaves, Rain and lighting condition change
16	SMD Plus by Camera	All Channels (32 Targets/s)
17	Metadata Performance of	8 Channels
	AI by Camera (Number of Channels)	
18	Audio Input / Output	1/1 Channel RCA
19	Audio Compression	G.711a, G.711u, PCM, G726, AAC
20	Alarm Input / Output	4 / 2 Channel
21	Hard Disk	2 SATA ports, Each disk can contain up to 20 TB.
22	Multi-channel Playback	Up to 16 Channels
23	Interface Ports	2 USB Ports (1 front USB 2.0 port, 1 rear USB 3.0 port), 1 RS232, 1 RS485
24	Ethernet	1 x (10/100/1000 Mbps Ethernet port, RJ-45)
25	Protocols	HTTP, HTTPS, TCP/IP, IPv4, UDP, NTP, DHCP, DNS, SMTP, UPnP, DDNS, Alarm Server, Multicast,

		P2P, Auto Registration, iSCSI, ONVIF 23.12(Profile S, Profile T, Profile G), CGI, SDK
26	Power Supply	12 VDC, 4Amp
27	Certification	CE, FCC, RoHS, BIS

1Q. 10 TB Surveillance Grade Hard Disk Drive		
Sr. No.	Parameter	Specification
1	Capacity	10TB
2	Form Factor	3.5-Inch
3	Connector/Interface	SATA
4	Transfer Rate	up to 265MB/s
5	Disk Speed (RPM)	7200 RPM
6	Cache Size	256MB
7	Operating Temperature	0°C to 65°C
8	Certifications	CE, FCC, RCM, UKCA, TUV, UL

1A. Network Dome Camera		
SL No.	Parameter	Specification
1	Camera Type	Dome Camera
2	Image Sensor	1/2.8" 2MP PS CMOS Image Sensor
3	Minimum Illumination	0.006 Lux@F1.6(Color,30IRE), 0.0006 Lux@F1.6(B/W,30IRE) 0 lux (IR on)
4	Shutter Speed	Auto/Manual 1/3 s–1/100,000 s
5	Lens	2.7mm~13.5mm
6	Lens Type	Motorized
7	Back Light Compensation	BLC / HLC / WDR(120dB)
8	Stream Capability	Quad Stream
9	S/N Ratio	>56 dB
10	Video Compression	H.265, H.264+, H.265, H.264, H.264H, H.264B, MJPEG
11	Noise Reduction	3D DNR
12	Image Stabilization	Electronic Image Stabilization (EIS)
13	Motion detection	OFF/ON (4 Areas, Rectangular)
14	Privacy Mask	4 Area

15	Two-Way Talk	Support
16	Audio Input / Output	1 Channel (RCA port)
17	Audio	Built-in Mic
18	Alarm IN	1 channels in: 5mA 3V–5V DC
19	Alarm Out	1 channel out: 300mA 12V DC
20	Protocol	SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP V1/V2/V3, TCP/IP, PPPoE, UPnP, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, ONVIF (Profile S, Profile G, Profile T), unicast, Multicast
21	Ethernet	RJ-45 (10/100Base-T)
22	Cyber Security	AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, WSSE, account lockout, syslog, video encryption, IP/MAC filtering, HTTPS, trusted upgrade, trusted boot.
23	Storage	SFTP, Micro SD card (support max. 512 GB), NAS
24	Frame Rate	Main stream: 2MP/1.3MP/1MP/D1 @(1-25/30fps) Sub stream 1: D1/VGA/CIF@(1-25/30fps) Sub stream 2: 2MP/1.3MP/1MP/D1@(1-25/30fps) Sub stream 3: D1/VGA/CIF@(1-25/30fps)
25	IR Distance	40 Mtr. (IR)
26	Defog	Support
27	Weatherproof Standard	IP67 & IK10
28	Power Source	12 VDC/24 VAC/PoE (802.3af)
29	Certificates	MTBF Certificate from STQC, ISO9001, STQC approved compliance report

		Network Bullet Camera
S. No.	Feature	Specification
	Camera	
1	Image Sensor	1/2.8" CMOS

2	Max. Resolution	2560x1920 (5MP)
3	ROM	4 GB
4	RAM	1 GB
5	Scanning System	Progressive
6	Electronic Shutter Speed	Auto/Manual, 1/5s - 1/32000s
7	Minimum Illumination	0.006 Lux@F1.6(Color), 0.0006 Lux@F1.6(B/W), 0 lux (IR on)
8	S/N Ratio	≥ 52 dB
9	Illumination Distance	40~ 50 m (IR)
10	Illuminator Number	4 (IR LED)
	Lens	
11	Lens Type	Motorized vari-focal
12	Mount Type	$\phi 14$
13	Focal Length	2.8 mm–12 mm or better
14	Max. Aperture	F1.6 ~ F3.3
15	Field of View	114° ~ 32° (Horizontal), 68.8° ~ 21.5° (Vertical), 138° ~ 35.9°(Diagonal)
	Professional, Intelligent	
16	IVS	Intrusion, tripwire, loitering detection, people gathering
17	Smart Object Detection	Smart abandoned object; smart missing object
18	Smart Search	Work together with Smart NVR to perform refine intelligent search, event extraction and merging to event videos
19	Video Metadata	Object Detection: People, Vehicle (4-wheeled, 2-wheeled); Attribute Extraction: People (gender, clothing color, bag, hat), Vehicle (bike, bus, car, motorcycle, truck, color); Re-Search Extraction; Path Extraction, Smart Motion Detection, Smart VCA (Intrusion detection, Loitering detection, Line crossing detection, Unattended object detection, Missing object detection, Face detection, Crowd detection.

20	Smart Sound Detection	Yes
	Video	
21	Video Compression	H.265; H.264; MJPEG
22	Video Frame Rate	Main stream:
		30fps@2560x1920,2048x1536,1920x1440,1600x1200,1280x960,800x600,640x480 (4:3)
		Sub stream: 30fps @ 1920x1440, 1600x1200, 1280x960, 800x600, 640x480 (4:3)
		Third Sub stream: 30fps @ 1280x960, 800x600, 640x480 (4:3);
23	Stream Capability	3 streams
24	Resolution	30 fps @ 2560x1920 (5MP)
25	Bit Rate Control	CBR/VBR
26	Video Bit Rate	H.264: 32 kbps–16384 kbps; H.265: 12 kbps–11776 kbps
27	Day/Night	Auto(ICR)/Color/B/W
28	WDR	120db
29	White Balance	Auto/natural/street lamp/outdoor/manual/regional custom
30	Gain Control	Auto/Manual
31	Noise Reduction	3D DNR
32	Motion Detection	OFF/ON (4 areas, rectangular)
33	Region of Interest (RoI)	Yes (4 areas)
34	Defog	Yes
35	Image Rotation	0°/90°/180°/270°
	Alarm	

36	Alarm Event	Audio detection, camera tampering detection, cybersecurity events (brute force attack event, cyberattack event, quarantine event), digital input, manual trigger, motion detection, periodical trigger, recording notification, SD card life expectancy, shock detection, system boot
	Network	
37	Network	RJ-45 (10/100 Base-T)
38	SDK and API	Yes
39	Protocol	IPv4; IPv6; HTTP; TCP; UDP; ARP; RTP; RTSP; RTCP; SMTP; FTP; SFTP; DHCP; DNS; DDNS; QoS; UPnP; NTP; Multicast; ICMP; IGMP; PPPoE; SNMP
40	Cyber Security	Access list, CSRF protection, digest authentication, HTTPS , IEEE 802.1x, Password protection, secure boot, signed firmware, brute force, attack event, cyberattack event, quarantine event , user access log, user account management, Built-in FIPS 140-2 Level 2 certified, Trusted Platform Module (TPM)
41	Interoperability	ONVIF G,S,T & M
42	User/Host	20 (Total bandwidth: 64 M)
43	Storage	FTP/; SFTP;/ Micro SD card (support max. 512 GB); NAS
44	Browser	IE: IE 9 and later Chrome: Chrome 102 and later Firefox: Firefox 88 and later
45	Mobile Phone	IOS; Android
	Certificate	
46	Certifications	CE-EMC: Electromagnetic Compatibility Directive FCC Part 15, BIS, STQC approved compliance, MTBF Certificate from STQC
	Ports	
47	Audio Input/audio compression	1 channel (RCA port) ,
48	Audio Output	1 channel (RCA port)
	Power	

49	Power Supply	12 VDC ($\pm 30\%$);/ PoE (802.3af)
	Environment	
50	Operating Conditions	minus 10 to +60°C /less than 95%
51	Protection Grade	IP66 or better
	Structure	
52	Casing	Metal
53	3rd party Analytics support	The camera should support 3rd party Analytics.
54	Mount	Wall Mount/ Pole Mount, With mounting accessories

Technical Specification of PTZ Camera		
S.No	Features	Specifications
1	Form factor	PTZ
2	Sensor	1/2.7"
3	Day/ Night Operation	Yes with Auto/Color/B&W/Schedule
4	Minimum illumination	AGC On: Color: 0.5 lux, B/W : 0.05 lux, 0 lux with IR
5	Focal Length	Min 4.3-141.9mm
6	Zoom	Min 30X optical Zoom ,12 X Digital Zoom
7	Electronic Shutter	1 / 5s ~ 1 / 100,000 s
8	Image resolution	5 MP (2592 X 1944)
9	Video Compression	H.265/H.265+/H.264/H.264+
10	Frame Rate and Resolution	H.265/H.264 5M (2592 X 1944) @20 fps , 2 MP (1920 X 1080) @20 FPS
11	Simultaneous Stream	Minimum 2 streams should be configurable at 1920 X 1080p simultaneously
12	White Balance	Auto/Manual/Outdoor
14	Field of view	H : 59 (W) -2.4 (T)
15	Noise Reduction	2D DNR , 3D DNR
16	Resolution	5 MP (2592 X 1944)
17	Multiple Stream	Quad Stream
18	Frame Rate (Main stream)	20FPS at all resolutions.
19	Video Streams	Quad Stream

		Mobile Stream VGA(640x480), QVGA (320x240) Fourth Stream VGA(640x480), QVGA (320x240)
20	Image Setting	Saturation, Brightness, Contrast, Sharpness,Hue adjustable
21	Focus	Auto/Semiauto/Manual
22	TF card	Support SD2.0 standard Micro SD(TF) card with a maximum capacity of 128G
23	Two way audio	Line in , Line Out
24	WDR	120 dB
25	Audio Compression	G.711 , G.711, G.726 , AAC
26	Iris	fixed
27	IR	Inbuilt IR , IR distance upto 200 mtr
28	Illumination Adjustment	Smart IR
29	Alarm	1 input , 1 Output
30	Edge Video Content Analytics	Camera should have in-built Edge Based Analytics, Pedestrian Intrusion Detection, Line cross Detection, SOD-Stationary Object Detection, Vehicle Detection, face Detection (PID/LCD/SOD/PD&VD/FD/CC/SOD)
31	Edge Storage	Built in SD card slot with support upto 128 GB SD card
32	Protocols	TCP/IP,HTTP,DHCP,DNS,DDNS,RTP/RTSP,PPPoE, SMTP,NTP,UPnP,SNMP,HTTPS,FTP,
33	Text Overlay	Date & time, and a customer-specific text etc
34	Security	HTTPS , IP Filter , IEEE 802.1X
35	Firmware Upgrade	The firmware upgrade shall be done through web interface, The firmware shall be available free of cost
36	Privacy Mask	4 Zones
37	PTZ	Pelco D, Pelco P, Protocol Support
38	PAN	360 ° endless , Manual speed 0.6°~200°/S , preset speed 200°
39	Tilt	-10°~90° (Auto Flip) , Manual speed 0.6°~100°/S ,
40	Presets	255
41	PTZ Operation	1 sequence , 1 cruise , Auto pan

42	Alarm	1 Input / 1 output
43	BNC	1 X BNC
44	Ethernet Interface	1 X RJ 45
45	Certifications	UL ,CE,FCC
46	Compatibility	ONVIF profile S , G and Q
47	Supported Web browser	Internet Explore (8) abobe
48	Weather Proof	IP 66
49	Operating Temperature	-20°C~+70°C
50	Power Supply	AC24/DC12V/POE+

2D. Technical Specification of ANPR Camera		
S.No	Features	Specifications
1	Name	Intelligent ANPR Camera
2	Processor	Hisilicon, specialized license plate recognition chip
3	Sensor Type	1/2.8" Progressive Scan CMOS
4	Minimum illumination	0.1 Lux
5	Electronic shutter	0–1ms, 0-2ms, 0-3ms, 0-4ms
6	Lens	CS mountable, fixed iris, 6mm prime lens
7	WDR	120dB
8	Plate recognition rate	95~99% (if the optimal recognition condition met)
9	Recognizable license plates	10 Arabic numbers (0-9) and 26 English letters (A-Z) License plates
10	Triggering mode	Video triggering, coil trigger, vehicle capturing rate≥99%
11	Image output	1080P (1920×1080) ,960P (1280x960) , 720P (1280x720) , D1 (704x576)
12	Picture output	2 mega-pixel JPEG

13	Video compression format	H.264B/H.264M/H.264H/H.265/MJPEG
14	Network interfaces	10/100M network adaptive, RJ45 adaptor
15	Protocols	TCP(IPv4&6)/UDP/HTTP/HTTPS/RTSP/FTP/NTP/DHCP/DNS/SMTP/SNMP/UPnP
16	IO interface	4 input/2 output
17	Audio interface	1 audio input (line in)/1 audio output (line out)
18	Serial interfaces	1 RS485
19	TF card	Support SD2.0 standard Micro SD(TF) card with a maximum capacity of 128G
20	Power supply	12V DC, 24V AC, PoE+
21	Power consumption	< 20 W
22	Working temperature	-20°C ~ +60°C
23	White Balance	Full auto, auto color temperature range, customized color temperature
24	Capture Distance	8 m–30 m (26.25 ft to 98.42 ft)
25	Protection Level	IP67
26	3rd party Analytics support	The camera should support 3rd party Analytics.
27	Mount	Wall Mount/ Pole Mount, With mounting accessories
28	Certifications	CE-EMC: Electromagnetic Compatibility Directive FCC Part 15, BIS, STQC approved compliance, MTBF Certificate from STQC

1P. CAT 6 SF/UTP FR-PVC Cable

Sr. No.	Parameter	Specification
1	Technical parameters	Cat 6, 23 AWG Bare Copper Solid Conductor SF/UTP (Overall foil and braid shield) FR-PVC Jacketed Cable, roll of 305 Mtr, in accordance to ANSI/TIA 568 C.2, IEC 60332-1, IEC 60754 -1, IEC 60134 and ISO/IEC 11801–2nd Edition, 250 Mhz Bandwidth, RoHS Complied, UL 444, 7.4 mm Nominal Diameter
2		Suitable for 1GBASE-T with Min. 250Mhz of Bandwidth
3		4 Twisted Pair alongside PE / PVC Cross Separator
4		Conductor: 23AWG Solid Annealed Bare Copper
5		Conductor Diameter: $0.55 \pm 0.025\text{mm}$
6		Insulation: High Density Polyethylene, Diameter $1.05 \pm 0.05\text{mm}$
7		Core Wrapping: Overall PET tape
8		Shielding: Overall AL-PET Tape (Mylar)+Tinned Copper Conductor Braiding
9		Jacket: Grey colour FR-PVC complying to IEC 60332-1 Flame Rating,
10		Cable Outer Diameter: $7.3 \pm 0.50\text{ mm}$ Nominal
11		Operating Temperature: -20°C to $+70^{\circ}\text{C}$
12		Bend Radius: 8 X Cable Diameter (Min.) or Better
13		Conductor Resistance: $\leq 9.38\ \Omega /100\text{m}$
14		Resistance Unbalance: 4% Max
15		Mutual Capacitance: $\leq 5.6\text{nF}/100\text{m}$
16		Delay Skew: 45ns Max.
17		Pulling force: 115 N Max.
18		RoHS Complied

1Z. 8-Port POE switch		
S.No	Features	Specifications
1	Ports	2x 100/1000 speed SFP ports with modules
		6x10/100/1000 speed RJ45 ethernet Port.
		Auto sensing/ Auto negotiating Ports
		Must have console port.

		IPv4&6&6 Ready
2	Performance	Should have wire speed Switching Capacity
3	Standards & Protocols	General: IEEE 802.1AX Link Aggregation, IEEE 802.1D MAC Bridges, IEEE 802.1p Priority, IEEE 802.1Q VLANs
		IEEE 802.1s Multiple Spanning Trees, IEEE 802.1v VLAN, IEEE 802.3af and 802.3at Power over Ethernet, Security: IEEE 802.1X Port Based Network Access Control/Port level mac binding.
4	Security	Switch port Security, MAC Security
5	Management Features	command-line interface; Web browser; configuration menu; out-of-band management; SNMP Manager; Telnet; RMON1,SSH
6	Power Suply	AC 120V- 260V, DC 12V-72V
7	Operating Temperature	-20°C~+70°C
8	Relative humidity	5 to 95% (non-condensing)
9	PoE Output Power	Min 78 W

1J. 16-Port PoE Gigabit Switch		
Sr. No.	Parameter	Specification
	Hardware	
1	Layer	Layer 2
2	Data Transmission Port	Port 1–16: 16 × RJ45 10/100/1000 M (PoE) Port 17–18: 2 × RJ45 10/100/1000 M (uplink) Port 19–20: 2 × SFP 1000 M (uplink)
3	Power Supply	100V AC–240V AC
4	Operaing Temperature	–10 °C to +55 °C (+14 °F to + 131 °F
5	Operating Humidity	5%–95% (RH)
6	Power Consumption	Idling: 7W Full load: 190W
	Performance	
7	Capacity	52 Gbps

8	Packet Forwarding Rate	29.76 Mpps
9	Packet Buffer Memory	4 Mbit
10	MAC Table Size	8K
11	Communication Standard	IEEE802.3, IEEE802.3u, IEEE802.3x, IEEE802.3ab, IEEE802.3z
	PoE	
12	PoE Standard	IEEE802.3af, IEEE802.3at, Hi-PoE, IEEE802.3bt
13	PoE Power	190 W
14	PoE Pin Assignment	PoE/Hi-PoE: 1, 2, 4, 5 (V+), 3, 6, 7, 8 (V-)
15	Statics Protection	Air discharge: 8 kV Contact discharge: 6 kV
16	Thunder-proof	Common mode: 4 kV Differential mode: 2 kV
17	Certificate	FCC, DOT approved & TTP Listed

Transreciever (SFP)		
Features	Specification	Compliance (Yes/No)
Preferred Makes	Syrotech, Digisole, Dlink	
Capacity	1G	
Type	Single Mode dual Fiber SFP (Compitable)	
Dual data rate	1.25 Gbps/1.063Gbps operation	
Digital Diagnisic Monitoring	Internal Calibaration or External Calibration	
Speed	1000 Mbps	
Forward Rate	1.25 Gbps	
Bandwidth	1.25Gbps	
Additonal Features	1310nm FP lasaer and PIN Photo detector for 20km transmission	
Operating Temperature	Satndard: -5 to +70 degree. Industrial: -40 to +85 degrees.	

CAT6 Armoured Cable		
Features	Specifications	Compliance (Yes/No)
Make & Model	To be specified by the bidder	

Cat 6, 23 AWG U/UTP, Inner FR-PVC Jacket IEC 60332-1 Rated, ECCS Corrugated Tape Armor (Thickness $\geq 0.125\text{mm}$), Outer HDPE Jacket Operating Temperature: -20 to +70Deg, Rodent Resistant Outdoor Cable		
Conductor	Solid Bare Electrolytic Grade Copper	
Insulation	Insulation: High Density Polyethylene, Diameter $1.0 \pm 0.05\text{mm}$	
Nominal Conductor Diameter	23/24* AWG	
Cross Filler	UV Resistant HDPE Outer Jacket	
Pairing	Twisted into Two core	
Outer Sheath	PVC Sheath/ LSZH	
Operating Temperature	-20 to +60°C	
Storage Temperature	-20 to +75°C	
Approximate OD	5.80mm	
Impedance	$100 \pm 15\% \Omega$	
Resistance Unbalance	5% Max	
Colour of Sheath	Grey, Option Available	
Sequential Marking	Every Meter	
Armor	ECCS Corrugated Tape, $\geq .125\text{mm}$	
Suitable for bandwidth	Suitable for 1GBASE-T with Min. 250Mhz of Bandwidth	
Packing	305 Mtrs	

1M. 6/12/24 Fiber Port, LC or SC Single mode Fiber Panels		
Sr. No.	Parameter	Specification
1	Technical parameters	12/24Fiber Port in 1U x 19" LIU Loaded with Single mode OS2 LC or SC Adapters & LSZH Pigtailed along with Splice Trays
2		The Fiber Panel shall have Telescopic Sliding Shelf for easy smooth maintenance add/move/changes.
3		The optical fiber Pigtailed shall be factory loaded inside each individual Port of the panel. Pigtailed shall be LSZH with Single mode 9/125 μm fiber

4		Panel shall have Min. 4 No. of Cable Entry Slots at back of the Panel supplied with Cable Holders inside Panel.
5		Completely Enclosed without any open area to avoid any Rodent Entry
6		Pigtail Parameters Loaded inside Panel shall meet below mentioned requirements: -
7		Pigtail Buffer Jacket Material: LSZH complying to IEC 61034-1, IEC60332-1, IEC-60754-1
8		Connector Insertion loss should be better than 0.35 dB
9		Return Loss ≥ 50 for UPC and ≥ 65 for APC
10		Attenuation: 1310/1550: 0.3 /0.2 dB/KM
11		RoHS Complied, Meets ANSI/TIA 568.3-D
12		Repeatability: ≤ 0.2 DB 1000 Times Mating Cycles

1N. LC-SC OS2 Single mode Duplex Fiber Patch Cord, 1 Meter & 3 Meter		
Sr. No.	Parameter	Specification
1	Technical parameters	Fiber Patch Cord, LC Duplex - SC Duplex, 9/125 μ m OS2 Single mode Duplex Zip Cord (≤ 2.0 mm), IL ≤ 0.35 dB, RL ≥ 50 dB, LSZH Jacket IEC 60332-1, Operating Temperature -40°C to +85°C, Meets ANSI/TIA 568.3D
2		Cable: LC/LC or LC/SC or SC/SC, 9/125 μ m OS2 Single mode Duplex Zip Cord (≤ 2.0 mm). OEM Name shall be mentioned on the patch cord cable.
3		Connectors: The optical fiber patch leads shall comprise of Single mode 9/125 μ m fiber
4		Connector Insertion loss ≤ 0.35 dB
5		Return Loss ≥ 55 for UPC and ≥ 65 for APC

6		Jacket Material: LSZH complying to IEC 61034-1, IEC-60332-1, IEC60754-1
7		Length: 3 Meter
8		Attenuation: 1310/1550: 0.35/0.20 dB/KM
9		Operating Temperature: -40°C to +85°C
10		Repeatability: <= 0.2DB 1000 Times Mating Cycles
11		OEM Name shall be printed on the Patch Cord Cable.
12		RoHS Complied, Meets ANSI/TIA 568.3-D

10. LC-LC Single mode Armoured LSZH Fiber Patch Cord		
Sr. No.	Parameter	Specification
1	Technical parameters	Fiber Patch Cord, LC Duplex - LC Duplex, Spiral Steel Armoured, 9/125µm OS2 Single mode Round Cord (4.0 +/- 0.2mm) IL <= 0.3dB, RL>= 50dB, LSZH Jacket IEC 60332-1, Operating Temperature - 20°C to +70°C, Meets ANSI/TIA 568.3-D, Length 3 Meter
2		Spiral Steel Armor (<= 1.8mm Diameter) , Aramid Yarn, Tight Buffer Fiber
3		Connectors: The optical fiber patch leads shall comprise of Single mode 9/125µm fiber G652.D
4		Connector Insertion loss <= 0.3 dB
5		Return Loss >= 50 for UPC and >= 55 for APC
6		Jacket Material: LSZH complying to IEC 61034-1, IEC-60332-1, IEC60754-1

7		Length: 3 Meter
8		Attenuation: 1310/1550: 0.35/0.22 dB/KM
9		Operating Temperature: -20°C to +70°C
10		Repeatability: <= 0.2DB 10 Times Mating Cycles
11		Tensile Strength: 750N
12		Crush Resistance: 1000N/100mm
13		RoHS Complied, Meets ANSI/TIA 568.3-D

1P. CAT 6 SF/UTP FR-PVC Cable		
Sr. No.	Parameter	Specification
1	Technical parameters	Cat 6, 23 AWG Bare Copper Solid Conductor SF/UTP (Overall foil and braid shield) FR-PVC Jacketed Cable, roll of 305 Mtr, in accordance to ANSI/TIA 568 C.2, IEC 60332-1, IEC 60754 -1, IEC 60134 and ISO/IEC 11801–2nd Edition, 250 Mhz Bandwidth, RoHS Complied, UL 444, 7.4 mm Nominal Diameter
2		Suitable for 1GBASE-T with Min. 250Mhz of Bandwidth
3		4 Twisted Pair alongside PE / PVC Cross Separator
4		Conductor: 23AWG Solid Annealed Bare Copper
5		Conductor Diameter: 0.55 ± 0.025 mm
6		Insulation: High Density Polyethylene, Diameter 1.05 ± 0.05 mm
7		Core Wrapping: Overall PET tape
8		Shielding: Overall AL-PET Tape (Mylar)+Tinned Copper Conductor Braiding
9		Jacket: Grey colour FR-PVC complying to IEC 60332-1 Flame Rating,
10		Cable Outer Diameter: 7.3 ± 0.50 mm Nominal
11		Operating Temperature: -20°C to +70°C
12		Bend Radius: 8 X Cable Diameter (Min.) or Better
13		Conductor Resistance: $\leq 9.38 \Omega$ /100m

14		Resistance Unbalance: 4% Max
15		Mutual Capacitance: £ 5.6nF/100m
16		Delay Skew: 45ns Max.
17		Pulling force: 115 N Max.
18		RoHS Complied

1L. 6 Core Armoured
Outdoor Fiber Cable

Sr. No.	Parameter	Specification
1	Technical parameters	6 Core Singlemode (OS2) 9/125 Fiber Cable, ITU G.652.D, ECCS Armoured Uni-Tube Filled with Thixotropic Jelly, UV-HDPE Jacket, Strength Member 2 No. of Steel Wires embedded in HDPE Jacket
2		Application: The fiber cable should be installed in Outdoor, Duct, Trenches & Underground application.
3		Features: The fiber cable should have excellent features of Tensile, Crush, Water Prevention with Jelly &/Or Moisture Barrier Tape
4		Cable Construction
5		Uni-tube (Central Loose Tube) with color coded fibers
6		Central Loose Tube: PBT Loose Tube filled with Thixotropic Jelly
7		Armouring: Corrugated ECCS Tape Armouring (0.155 mm Nominal thickness)
8		Outer Sheath: UV Resistance HDPE
9		Moisture Barrer : Water Blocking Tape Under Armor
10		Strength Member: 2 No. of Steel Music Wires ($\geq 1.0\text{mm}$) embedded in HDPE Jacket
11		Physical / Mechanical Characteristics
12		Outer Diameter: 7.5 +/- 0.5 mm
13		Nominal Jacket Thickness: 1.5 mm
14		Tensile Strength: ≥ 1000 Newton (IEC 60794-1-2-E1)
15		Bending Radius: $\leq 20 \times \text{OD}$ (IEC 60794-1-2-E11) (OD=Cable Outer Diameter)

16	Crush Resistance: ≥ 2000 Newton/100mm (IEC 60794-1-2-E3)
17	Water Penetration: Meets IEC 60974-1-2 (24 Hr, 3Meter Sample, 1Meter Height)
18	Weight: ≤ 65 Kg/km
27	Environmental Characteristics
26	Operating Temperature: IEC 60794-1-2-F1 @ -20
25	°C
22	to +70
23	°C
24	Storage Temperature: EC 60794-1-2-F1 @ -30
	°C
	to +60
	°C
	Installation Temperature: EC 60794-1-2-F1 @ -15
	°C
	to +60
	°C
	Safety: ROHS to be mentioned in data sheet
	Optical Characteristics
	Fiber Type: SM (9/125) OS2 as per G.652.D
	Max. Attenuation: 0.35 dB/km @ 1310nm, 0.22 dB/km @ 1550nm
	Mode Field Diameter @ 1310nm: $9.2 \pm 0.4 \mu\text{m}$
	Dispersion: ≤ 3.5 ps/nm.km & ≤ 18 ps/nm.km
	Fiber cut of Wavelength: ≤ 1320
	Cable Cut of Wavelength: ≤ 1260
	Zero Dispersion Wavelength: 1300-1324 nm
	Zero Dispersion Slope: ≤ 0.092 ps/nm ² .km
	Coating Diameter: $245 \pm 10 \mu\text{m}$
	Cladding Diameter: $125 \pm 0.7 \mu\text{m}$
	Fiber Curl: ≥ 4 m radius curve
	Cladding Non-Circularity: $\leq 1\%$
	Mode Field Concentricity error: $\leq 0.6 \mu\text{m}$
	Coating/Cladding Concentricity Error: $\leq 12 \mu\text{m}$

1S. 6U/9U Wall/Pole Mount Outdoor Rack

Sr. No.	Parameter	Specification
1	Technical parameters	6U/9U, 19" IP55 Rated Outdoor Pole Rack - 550mm Depth or as per requirement
2		Compact design, welded structure with front accessible
3		Front Door with Filter, Louver & Lock
4		90CFM, 230V AC Fan - 2 Nos, front door
5		Pole Mounting Bracket
6		Powder Coated Surface
7		6 Socket PDU 5 Amp - 1 No.
8		Horizontal Cable Manager 1U loop type – 1no.
9		H/W screws (20 Nos/pkt) 2 pkt

1T. 3 KVA Online UPS system with 60 min Battery backup

Sr. No.	Parameter	Specification
1	Capacity (in kVA / kW)	3kVA/2.7kW 1-Phase Input / 1-Phase Output with IGBT Rectifier with Inbuilt Battery
2	Input Voltage Range	110-280VAC
3	Input Frequency Range	40 - 70Hz
4	Nominal Output voltage	200/208/220/230/240 VAC
5	O/P Voltage	200/208/220/230/240Vac
6	Efficiency(Min)	88%
7	Out put Socket	Output Socket . Minimum 3 nos - Indian Socket
8	Backup Required	60 min
9	Display	LCD
10	RS485 Port & SNMP enabled	Require
11	Protocol	Modbus
12	Product IP	IP 20
13	Inbuilt Automatic Bypass	Require
14	Intelligent Battery	Require

	Management	
15	Battery Deep Discharge Protection	Require
16	ECO Mode	Require
17	Manufacturer	QMS: As per ISO 9001: 2008
		EMS: As per ISO 14001: 2004
		ISO 45001: 2018 Factory calibration lab of manufacturer shall be NABL accredited in India
18	ROHS	Require
19	Enclosure	17U, Floor standing, purpurate, with fittings/accessories, UPS and Batteries shall be kept in separate floor mount Rack.

	1U. Surge Protection Device (SPD)
Parameter	Specification
Interface Connections	RJ45 Female Connector
Maximum Operating Voltage (Uc)	58V-60V DC
Discharge Current	Maximum discharge current - 16KA & Impulse Discharge current 4 kA
Protection Level	<1000V (L/L) ; < 700V(L/PE)
Maximum Capacitance	<5.0 pF @ 1 MHz
Data Line Protection	RJ45 10/100/1000 Ethernet
IEEE 802.3af and 802.3at compliant for	Yes
PoE and PoE Plus	
Operating Temperature	0 to 65° C
Failsafe Mode	Transmission Cut off - Fault mode 2
Mounting	Wall Mount, Suitable fitting to be provided for mounting
Additional Feature	The Ethernet Surge Protector should be compatible with the Cameras and other active components as in the BOQ, and should support PoE/ PoE+ power to the cameras.
Earthing	The Ethernet Surge Protector should be properly grounded.

OEM criteria	OEM should not be technically rejected in any Govt. tender in India.
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1V. 6 Meter Self-supporting Cylindrical CCTV Pole		
Sr. No.	Parameter	Specification
1	Height	6 meter above ground surface Bottom section: 3-meter Middle Section: 2-meter Top Section: 2 meters
2	Foundation	Minimum 1m
3	Pole Diameter (Outer)	Bottom section: 139.7mm Middle Section: 114.3mm Top Section: 88.9mm
4	Bottom Base Plate	300mm x 300mm x 6mm
5	Material	GI
6	Mounting Facility for	CCTV Camera, Junction Box
7	Design	Pole with climbing facility. An upper cap/sealing arrangement to ensure water resistance inside the pole.
8	Surface Coating	Silver
9	Design	Round
10	Wall Thickness Mm	3.5.mm
Pole Installation		
11	Depth	1.2 M depth from Road Level
	PCC Diameter	0.4 M Dia from top to bottom
	PCC	M20 Grade(1:1.5:3)
	Pedestal PCC	M20 Grade(1:1.5:3) Height-150MM After Road Level

1W. 8 Meter Self-supporting Cylindrical CCTV Pole		
Sr. No.	Parameter	Specification
1	Height	8 meter above ground surface Bottom section: 4-meter Middle Section:

		2-meter Top Section: 1.5 meters
2	Foundation	Minimum 1m
3	Pole Diameter (Outer)	Bottom section: 139.7mm Middle Section: 114.3mm Top Section: 88.9mm
4	Bottom Base Plate	300mm x 300mm x 6mm
5	Material	GI
6	Mounting Facility for	CCTV Camera, Junction Box
7	Design	Pole with climbing facility. An upper cap/sealing arrangement to ensure water resistance inside the pole.
8	Surface Coating	Silver
9	Design	Round
10	Wall Thickness Mm	3.5.mm
Pole Installation		
11	Depth	1.2 M depth from Road Level
	PCC Diameter	0.4 M Dia from top to bottom
	PCC	M20 Grade (1:1.5:3)
	Pedestal PCC	M20 Grade (1:1.5:3)
		Height-150MM After Road Level

	1X. Armoured Power Cable
Parameter	Specification
Category	3 core 2.5 sq mm Armoured Power Cable
Material	Annealed Bare Electrolytic Grade, Copper conductor as per IS:8130/84, Multi strand conductor
Insulation Material	Extruded PVC type B or better as per IS 5831
Inner Sheath material	Extruded PVC
Armouring Material & Size	G.I Steel round wire as per IS3975
Outer Sheath	Extruded PVC
Certification	As per applicable IS code

1Y. Armoured Serial Cable

1	RS 485 Cable	Armored 4 Pair, 24 AWG Tinned Copper, PE Insulation, Overall Foil + Tinned Copper Braid (90%) Shield, PVC Outer Jacket
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2C. Outdoor Junction Box		
S.No	Features	Specifications
1	Industrial grade	Yes
2	Conformance	Min. IP66
3	Compliances	RoHS,
4	Size(mm)	600H x 400W x 300D
5	Accessories	Toughened glass window in the front door
		Document pocket
		wide range of terminals and terminal blocks
		pole mounting clamps
		natural and forced fan filter cooling solutions
		Customized cut outs on door, mounting plate
		bolted cable entry gland plate at the bottom
		CFL light
		stainless steel studs for grounding
		PDU Horizontal 3 Nos. female socket – Indian standard Round Pin 6A/16A dual type with 2 Nos of 16A MCB.

1C. Functional Requirement Specification for Video Management Software (VMS) License	
S . N o .	Description
2	The Offered VMS Software license should be ONVIF (S,G,T and M) Compliant. The Declaration of ONVIF shall be available on ONVIF Official Website www.onvif.org in the Conformant Devices. VMS OEM to Submit a Valid Certificate to Substantiate the Proof.
3	The OEM shall have existing ONVIF membership for open integration with 3rd party system / devises integration to meet project objective and functionality.

4	Should record H.264 / H.265, MPEG4 or MJPEG in at minimum 25 fps at minimum Full HD (1080p) resolution for 30 days
5	Bidder should quote with central server for all surveillance camera.
6	Supports RTP over UDP, RTP over TCP and http streaming
7	Should support multiple brand IP camera and encoders
8	Should support dual streaming and recording at different qualities of videos
9	Option to do recordings on NAS, iSCSi, DAS, local or network drive. Defining different drive for each individual camera
10	Should have ability record audio along with video in same recording file.
11	VMS OEM should have ISO latest certificates: ISO 9001:2015, ISO- 27001, ISO 14001:2015, ISO/IEC 20000-1:2018, ISO/IEC 27001:2013, ISO 45001:2018
12	Pre-buffer and Post buffer recordings up to 20 minutes
13	Calculate storage size based on number of cameras, days and drives available in the system at full resolution and frame rate.
14	Option to record at low frame rate in no-alarm condition, and at high frame rate in alarm condition, with post-alarm high framerate recording interval setting up to 5 mins, configurable independently for each of the cameras.
15	Export recordings in SEF (Secured export format) / .avi / .mp4 / .asf formats. Must be playable in any OS Windows or Linux or Unix or Apple Mac
16	Export recording possible in client and remote PC also with proper authentication
17	Option for Window-Pop up, Email, Sound alarm on recording or video loss
18	Storage and Bandwidth calculation: Recording size estimation for each hard drive attached to the server. Option to check drive size of individual camera
19	Image Enhancement on recorded videos. The image enhancement should be able to enhance videos of fog, rain and low light conditions
20	The option of email and Video Pop up on Low disk space event. The system should alert user on low disk space event
21	Automatic archiving after set number of days and automatic recording deletion after disk full
22	The software should comply that all client to server and server to server communications are compressed and encrypted and connection specific key should be 256 bit AES and data encryption should be 256 bit AES.

2 3	VMS software should have the Encryption algorithm of 1024 / 096-bit RSA and hashing of SHA -512 for tamper proof data. VMS OEM must be CMMi Level-3 certified and listed on www.cmmiinstitute.com
2 4	The exported video should be saved in SEF (Secure Export Format) / AVI / MP4 / ASF with option to digitally sign the exported video files; to allow verification of exported video files, to confirm files are nontampered, at any time
2 5	In the event of failure of connectivity to the central server the camera shall record video locally on the NVR automatically. After the connectivity is restored, VMS shall support these recordings to be automatically merged with the server recording such that no manual intervention is required to transfer the SD card-based recordings to server.
2 6	Live View possible for upto 144 live videos and upto 64 playback videos simultaneously on 1 screen or multiple monitors using software video wall.
2 7	VMS software should support using 2 simultaneous streams from the camera, and automatic switching to high resolution stream in full screen mode. VMS software should intelligently capture any of the 2 streams from the camera, only when required, to use minimal resources.
2 8	VMS server software and VMS client software should support capturing multicast streams from the cameras. VMS client software should support option to capture live video from VMS server OR from camera.
2 9	It should support live view and Playback from minimum 10 clients- Both local and remote
3 0	Customized camera views based on: User input number of cameras. User chosen shape and size. View sequencing with user driven time interval. Configure and use one or more 'customized camera views', with user defined rows and columns in the customized camera view, and ability to merge any nearby cells to allow one or more bigger size hotspots in the customized camera view.
3 1	Live view and Playback available at the same time with Playback window of live view window
3 2	Instant Playbacks available as window pop up on click of an event from Event Screen
	Image Enhancement Analytic available in Playback.

3 3	Option to sharpen the video image, adjust brightness, adjust contrast, switch to black and white or color, edge detection on/off, add custom text, print support.
3 4	Playback Navigation View with Recording server, camera list, and calendar view displaying recorded video availability for each day in the calendar, 24-hour time-line indicating recorded video availability and detailed 10 mins time line indicating recorded video availability. Clicking on any of the time lines allows video playback from the timestamp associated with the point of click on the time line.
3 5	E-map should support map presets, allowing users to switch to specific region within the map E-map from different sources should support using multiple images and quick access links to switch from one image to other map preset of another image. E-Map should support displaying area of camera view coverage on the map.
3 6	Two-way audio communication between camera and VMS. Option to send/broadcast Audio to multiple cameras
3 7	VMS OEM should have ISO latest certificates: ISO 9001:2015 / 27001
3 8	Ability to view live video on iOS/Android phones or devices with or without installing proprietary Apps.
3 9	Ability to receive alerts on Mobile phones with SMS.
4 0	PTZ Control on Mobile App and Remote Locations
4 1	VMS and Mobile App support for multiple sites spread across WAN to be controlled and viewed from central location.
4 2	Remote Administration over internet.
4 3	Option for RTSP, HTTP, RTSP over HTTP streaming or both simultaneously at individual camera level.
4 4	Option to Transcode to lower bit rate stream at recording server level.
4 5	Authentication parameters (username, password) for streaming to remote clients.
4 6	Automatic discovery of devices using UPnP and/or ONVIF
4 7	No software limit on number of cameras supported in single recording server
4 8	Add all cameras with single click. Apply settings to multiple cameras of same model with single click.

4 9	Automatic Health check-up and VMS should always run fully optimized, to ensure no loss of functionality.
5 0	Add multiple recording servers under same management server.
5 1	User role-based cameras and feature access. Define users with passwords and access to only specific cameras and to only specific type of alarms Support for user profiles and policies like periodic password expiry, locking user on pre-defined number of successive failed login attempts.
5 2	Complete server logs including login access, system settings change, archiving events, video or recording loss and all activity done by administrator or any other user in the system. VMS software should be able to capture all edge-based analytics alarms supported by the camera; and add these to VMS alarms database. All alarm handling configuration should be available for these alarms, similar to any other native alarms generated by the VMS Watchdog for monitoring VMS processes and identifying any issues and resolving them. Any issues observed, which are outside VMS software control (eg offline cameras, offline servers, network loss, storage failure, incorrect configuration etc) should be displayed as ‘System notifications. The ‘System notification’ window cannot be closed by the operator. Any ‘System notification’ should be removed automatically from the list, when the related issue is resolved. Automatic daily back up of VMS configuration. It should be possible to use this configuration back up to restore the configuration, in case of OS reinstallation on the computer hosting VMS software.
5 3	User configurable scheduled daily alarm reports generation and scheduled daily alarm reports e-mails to pre-defined recipients.
5 4	VMS software should allow use of multiple sub-networks – (a)Input sub-network – cameras and VMS servers (b)Output sub-network – VMS servers and VMS clients Storage sub-network – network storage devices and VMS servers
5 5	The VMS software should use off-line licensing. Internet connectivity should not be required for VMS software license management. The VMS software licenses once activated should remain valid for hardware life, unless hardware/OS is changed / updated, the activated license should continue to function.

	The VMS software licenses should be linked with computer hardware on which VMS software is hosted. The VMS software license should NOT be linked with the camera devices, to ensure cameras can be replaced any time, as and when required.
5 6	Should support multiple brand IP camera, encoders and DVRs. No restriction on camera hardware. VMS OEM must have R&D center in India with minimum 50 technical experts on direct payroll in India to ensure technical expertise capability. Valid documents of manpower list, qualification and employ payment must be submitted.
5 7	Should support ONVIF protocol including Profile-S, G & T.
5 8	VMS should be capable to integrate community surveillance cameras of any make and type; as long as the cameras are ONVIF Profile S, G and T certified. Viewing, and record retrieval capabilities from ICCC via edge gateway should be possible if required in future at no extra cost. VMS software API / SDK should be available for the same, and integration will be in ICCC scope through VMS software API/SDK.
5 9	The Offered Video Management Software (VMS) Application should Valid Application Audit Certificate from a CERT-IN Empaneled Agency for the VMS Application, to Mitigate Cyber Security Attacks. The Application must have already undergone Audit Certification/Auditing on or before the Bid Publishing Date. The Audit Certificate must be Submitted as a Documentary Evidence/Proof.

1D. VMS Management Server Hardware with storage drive	
Parameter	Specification
Dimensions	748.79mm×482.0mm×42.8mm (29.47"×18.98"×1.69") (L×W×H, suspension loop included) or better as per system requirement
Main Processor	16 core Intel Xeon/AMD processors with compatibility of Windows Server 2019 or latest Operating System
Operating System	Windows Server 2019 or latest
Controller	Single controller or better
RAM	2GB*4 DDR4, up to 1TB, ECC memory or better
Power Redundancy	1+1 redundant power or better

Network	2X 10 Gigabit ports supported
VGA	1
USB	2*USB3.0 ports
Quantity of Hard Drive	2 * 960GB SSDs or better
Installation	Standard rack-mounted support or better as per system compatibility

1E. Functional Requirement Specifications for Artificial Intelligence Based Video Analytics Platform		
Parameters	Specifications	
Platform-wise features	Single Unified System	Unified AI Based Video Platform - The existing unified AI-based video analytics platform shall be seamless integrated with any OnVIF compliant IP Camera (existing/new both) and additional VA licenses in existing Video Analytics Platform. This VA platform shall be supplied with required additional licenses, server and storage for alerts data upto 7days. It shall be capable to real-time insights, enhanced situational awareness, and scalable deployment across diverse environments.
	Mobility	The application should effectively show mobility characteristics across Android mobile devices (Smartphone/Tablets) with responsive designs, certain offline functionalities, data synchronization, and Security.
	Integrations	Integration Capability- The platform's integration capabilities include seamless connectivity with any VMS, ICCC, sensors, and external systems through APIs, allowing for streamlined data exchange and realtime analytics. It shall support flexible integration with legacy systems and future expansions, enabling a unified interface for centralized monitoring, control, and advanced AI-driven insights across diverse technologies.

		Seamless integration capability with Edge Analytics Cameras (old/new IP). Ability to push relevant Metadata to any third-party system.
	User and role management	The system should have an interface to manage (CRUD) users/groups with varying rights and responsibilities including the modifications of rights capabilities.
	Cloud compatibilities	Deployment Mode - The unified AI-based video analytics platform supports multiple deployment modes, including hybrid, multi-cloud, and deployment on hyperscalers, Public & Private cloud for robust scalability. It also offers a fully on-premises solution for organizations requiring complete control over data and infrastructure.
	Information Security	The system should comply with all global security best practices, regulatory directives, encryptions, access control rights, disaster recovery, and others. The platform is highly scalable and secure, integrating encryption and role-based access control (RBAC) to safeguard data. OEM must be having CMMi Level-3 certification and listed on www.cmmiinstitute.com
	Architecture Flexibility	Centralized Deployment: The system should enable the deployment of multiple VA use-case(s) onto a single centralized server, allowing these VAs to be accessible and utilized across various systems. For Traffic and Vehicular use-cases, the system shall be able provide all feeds at a centralized place for monitoring.
		Distributed Architecture - The video analytics platform operates on a distributed architecture using clustering and multisite environments to ensure scalability, reliability, and efficient real-time video processing. It supports cross-site synchronization and edge processing to handle high volumes of video data from multiple locations, with load balancing and failover mechanisms providing fault tolerance.

		Near Edge Architecture: The video analytics platform is designed to support near-edge architecture, enabling efficient data processing closer to the source of video capture. This reduces latency and bandwidth usage by performing real-time analytics on edge devices, while still allowing integration with centralized systems for more advanced processing. The distributed model ensures seamless data flow between edge nodes and central hubs, providing scalable and resilient performance. With secure data transmission and local storage capabilities, the platform offers flexibility for on-site analytics while maintaining robust security and scalability for large-scale deployments across diverse industries.
		API/Microservices: - Irrespective of platform hosting destination, user can consumer Platform service (s) through APIs.
	Advanced AI/ML Compatibility	Flexible VA-Camera Linking: Users should be able to associate any VA with any camera, providing flexibility in system configuration. To ensure quality and provenness of the platform the proposed VA and VMS same OEM should have ISO latest certificates: ISO 9001:2015, ISO- 27001, ISO 14001:2015, ISO/IEC 20000-1:2018, ISO/IEC 27001:2013, ISO 45001:2018
	Advanced AI/ML Compatibility	Independent VA Management: The system must support the simultaneous deployment, enabling, disabling, and upgrading of VAs without disrupting the functionality of other VAs currently in operation.
	Development Capability	OEM must have R&D center in India with minimum 50 technical experts on direct payroll in India to ensure technical expertise capability. Valid documents of manpower list, qualification and employment must be submitted.
	Parallelism	User Level: Multiple users should be able to simultaneously access and modify different parts of the application without interference.

		Machine Level: The system should enable the distribution of application components across multiple machines for efficient processing and scalability.
	Scalabilities	Platform shall be highly scalable, allowing it to easily adapt to growing demands. It supports the addition of new cameras, sensors, and thirdparty integrations without compromising performance. Whether deployed on-premises, in the cloud, or across hybrid environments, the platform can handle increasing data volumes and computational workloads, ensuring continuous, efficient operation as the system expands.
GUI-based Features	Live View	The system will include a dashboard providing a centralized overview of cameras, alerts, and use-cases. This dashboard will offer tools to generate reports, manage use-case configurations, and make modifications. The main dashboard (landing page) will display, frequently-used features like:
		Live Footage: The system shall be able to display live video feeds from selected cameras. Search: Users can search and choose specific cameras to view live footage. Floating Grid View: The live feed shall be viewed in grid layouts with various camera combinations upto 16 at a time, in multiple combinations (2x2, 4x4, 3x3, 1x6 etc) Dynamic Camera grouping: Users can create and save groups of cameras for quick access. Customized camera view: User can also save their preferred camera combinations (as 'Preferred Cameras') for automatic display of their feeds upon login. Auto-rotate: The system shall allow for automatic changing of camera footage if enabled (using toggle) one after another.
	Notifications	Auto Email/SMS: System shall be able to configure predefine email/sms using external Email/SMS Gateway account.

		Navigation tabs: The dashboard shall include navigation options (common for all pages) for accessing different system functions and performing various tasks.
	Business	A dedicated dashboard shall display statistics on critical and high-priority alerts, including time-to-action, acknowledged or unacknowledged, and details of escalation cases. Users can view/download the summary (graphs, maps) and generate detailed reports with filters, search options. Dashboard Architecture - Should support nested dashboard (s) architecture, comprising Master dashboard and associated contextual dashboard. Each showcasing its own interactive count cards.
	Intelligence Dashboard(s)	-- Multi site dashboard, Global console, Local site dashboard -- Role based dashboard Single click on an item from the alerts list: Shall have feature of Single click on a Card would redirect you to an Alert page where it shows list of alerts for the selected analytics/cameras. Filters - Date, Analytics, Camera(s), Camera Group(s), Time range etc. Data Visualization Charts - Line, Bar Chart, and Pie Charts Trend data: Hourly, Daily, Weekly, Monthly, Yearly
	Alert Monitoring	The system shall provide a user interface for viewing, searching, and downloading alert details based on camera, location, time range, or use case. Users must be able to open individual alerts to view specific details such as time, location, camera name, and use case type. The alert details screen shall allow users to download associated video or image files, add comments, flag alerts for annotation, and mark incorrect alerts requiring human review. Periodic search: Users shall be able to search for alerts at specified intervals, such as daily, hourly, or minutely.

		Offline search: All search filters and options available for online videos will also be accessible for offline (manually uploaded) videos.
		Use-case specific search: Users shall be able to filter search results based on one or multiple use cases.
		Attribute-based search: Advanced search options will be available to filter results based on object attributes like color, clothing, gender, and object classification.
	System Health Monitoring	It should shows connect camera(s) status - - Total cameras, Down camera, Duration of camera down, Location of cameras in tabular form. Filters - date, camera, time range
		It shall show Server(s) components status like RAM usage, CPU usage, GPU usage, Disk usage, Temperature, total uptime or as configured.
	SOP	Platform is capable of creating customizable SOP(s) on the basis of criticality and severity of alerts & notifications.
		Notifications: The system must be able to send notifications (via web, app, Mail, SMS) for all detected use-case violations. Each notification will include details such as alert name, timestamp, description, image, and use-case type. Users can view details, snooze, or dismiss alerts.
		Notification Customization: Authorized users shall be able to customize notifications by:
		Configuring different sound alerts for different analytics Enabling or disabling specific alert types. Prioritizing alerts (e.g., critical alerts only). Setting time-based alerts (e.g., 2-4 PM). Specifying camera, camera group, or location for alerts. Choosing alert display page within the application.

		Alert Acknowledgement: The authorized user shall be able to mark usecase or camera specific alerts as high priority, critical alerts and set mandatory call to action - Acknowledged, Resolved, or Escalate. Later, the system should show those alerts in the list with call to action taken using the label clearly in different color schemes. In case, the user fails to take specified call to action, the system shall show reminder (if pre-configured) with a timer and the alert would be escalated to user at higher in the hierarchy (as configured).
		Alert Escalations: The system shall provide tools for the user to configure/manage escalation hierarchy (level 1, level 2) and then the follow-up actions, reminder time, and time-frame to (say within 5 minutes) take the acknowledgement for all the users with access to critical alerts. This will also notify other relevant users about the recent configurations via Email, SMS, or Web/In-app notifications.
	User Preferences	The system shall offer customizable features for each user, including: Count format (e.g., Indian or International). Date format preferences. Notification settings (sound on/off, same/different sounds, only for specific use-cases). Ability to show or hide specific alert notifications on individual or multiple pages of the interface. Selection of preferred cameras for live feed display on the main page.
	Camera Manager	The system shall be able to provide a dedicated interface for managing cameras, including: Camera Views and Statistics: Users can view cameras in list or map format, with stats such as total no. of cameras, enabled, disabled, down, and location.

		Camera Management: Users can view camera details, generate and download camera reports, add, remove, or modify cameras, and view configured use cases for each camera.
		Bulk Camera Configuration: Camera settings, zones, and use cases can be configured for multiple cameras simultaneously.
		VMS Camera Integration: The system shall be able to connect to various VMS platforms, import cameras, and configure use cases for these integrated cameras.
		Camera Groups: Users can view groups of cameras with associated details like camera name, and location.
		Camera Reference Images: Users can capture and store reference images for each camera (usually when a fully set-up camera starts capturing the images) for comparison purposes (specially when the current camera image is not as it was during the configuration).
		The system shall support integration with various Video Management System (VMS) platforms, allowing the import and configuration of cameras from these platforms. It should enable the definition of use cases for the integrated cameras. Alerts generated from the VMS shall be monitored and managed within the Video Analytics (VA) platform, with notifications available in both image and video formats.
	Activity tracker	The system shall have an interface to view the trails of user's session and activities - actions, modules worked on, impacted modules, etc.
	Downloads	The system shall keep track of all downloads (e.g., reports, videos, summary reports) under progress.
	Role	The system shall allow the admin to control the access of what a user or group can do, like accessing specific modules, locations, managing cameras, or controlling other users' privileges. This ensures efficient administration by granting access based on individual needs.
	Management	

	User Management	The system shall provide an interface to create, enable, and disable users. It should also include features like showing user stats - (total users, total enabled users), assigning of a group to a user and modifying the user's access to various modules of the system.
	Rule Management	The system shall allow users creation and save a set of filters called rule by combining conditions, for example, Object type (Person, Animal), Gender (Male, Female), Clothing (Upper body, Lower body, Color), and/or Accessories (Handbag, Backpack, Baggage). This ensure a for quick and easy filtering instead of setting individual values each time.
	Category Management	The system shall allow users to create and manage categories. A category (like "Banned Person") shall act as a predefined response to specific situations. You create it by combining: Actions: Define a type of an alert or alarm should trigger (e.g., siren, notification). Analytics type: Choose analytics type to trigger the action (e.g., "Intrusion"). Face or image: Link the category to a specific person or object image. Working Methodology: Event triggers action: Upon chosen analytics type even occurs (e.g., someone enters a restricted zone), the system shall check for associated categories. Category dictates response: once associated face is detected, the defined action within that category triggers (e.g., sounding an alarm).
	Offline Video	The system shall be capable to process offline videos (manually uploaded) in the same way as live video feeds, though on a dedicated intuitive UI, - upload video using USB, or drag n drop, configure use-case, get alerts, etc. This shall include configuring use-cases, giving access to specific users, generating alerts, showing detailed view, allowing

	Ingestion	search filters, and providing detailed reports of detected violations.
	Scheduling	The user shall be able schedule any use case for a specific duration - minutely/hourly/daily/weekly. The system shall also allow the user to create multiple zones/area of interests to be monitored and then select a use case to activate for a specific duration of the day.
Use-case-specific Features	Camera Edge Analytics	Camera Edge Analytics: The system shall be able to get integrated with existing /new camera to receive edge camera analytics alerts like the incidents of camera tempering etc using edge camera detection. The system shall detect a camera tempering incident when a camera is partially or fully Defocused, Covered, View Changed, Flash-lighting, and Spray painted.
	Face Detection and Recognition	The system shall analyze video feeds and extract the faces of people appearing in the camera view for upto 5 camera. The system shall then show various information about the detected faces. The user also be able to:
		Face Upload: Store the details of the faces along with details-name, age, designation, etc. using bulk upload.
		Configuration: Configure system to receive alerts for specific (individual's) faces with place, timestamp, emotions, camera names, etc.
		Face Search: Search (individual's) faces to detect the presence of an individuals at specific gate, premise, or area.
		Filters: Apply filters using attributes like, age, gender, cloth, etc. and search alert details of historical data.
		Dashboard: View the stats on the dashboard.
	PPE detection	The Central VA platform shall be capable to detect PPE Helmet, Shoe, Gloves violations at the PSS premise in the selected camera filed of view(FoV).
	Fire & Smoke	The Central VA platform shall be capable to detect the incident of Fire & Smoke at the PSS premise in the selected camera filed of view(FoV)

	Perimeter Intrusion	The Central VA platform shall be capable to detect Perimeter Intrusion at fencing area of the PSS premise in the selected camera filed of view(FoV)
	Vehicle Detection	The Central VA platform shall be capable to detect and capture the images of vehicle entering at the PSS premise in the selected camera filed of view(FoV)
	NVR Alert Integration with VA:	The system shall support integration of all alerts generated at the NVR level into the Video Analytics (VA) platform. These alerts shall be available in both image (snapshot) and video clip formats within the VA system for monitoring and further analysis.