Technical Specifications

1. Specifications for Item 1 of Schedule B:

Image sensor:1/1.9" or better Progressive scan CMOS sensor, 2 Megapixel or better.
Lens Mounting: CS Mount, Varifocal lens: 4K 12-50mm Varifocal lens F/1.8 @12mm – F/2.4@50mm to close, Lens length < 64mm TTL
Focus Range: 2.0m – infinity, Auto Iris,

Field of View:
Horizontal 36 degree – 8.6 degree,
Vertical: 26 degree – 6.5 degree,
Diagonal: 46 degree – 11 degree, Auto ICR,

Resolution: 1920x1080 @50/60fps, H265 Video compression, Excellent low light performance,
Colour: 0.001lux@F1.2 AGC ON;
B/W: 0.0001lux@F1.2 AGC ON,
Video: PAL/NTSC, Back Light compensation/High Light Compensation, Automatic White Balance, Wide Dynamic Range: >120dB ,
Four streams:
Stream 1: 1920x1080/1280x720 @50/60fps;
Stream 2: D1/VGA/640x360/CIF/QVGA @ 25/30fps;
Stream 3: VGA/CIF/QVGA @ 25/30fps,
Stream 4: 1/ 2, 1/3, 1/ 4, 1/5 fps of Stream 1/2,
Data rate of the streams:
Stream 1: 500kbps~ 12000kbps,
Stream 2: 100kbps ~ 6000 kbps,
Stream 3: 100 kbps ~ 3000 kbps,
Stream 4: 100kbps ~ 12000 kbps,
Shutter speed: 1/5-1/20000s, Must support Region Of Interest(ROI), Electronic Image stabilization(EIS), 3D DNR, Mirror, WDR, Auto Back Focus, Anti shake/Defog, HLC, Corridor mode, Digital Image Stabilization(DIS), Built-in Microphone, 2-ch Audio In, 1ch Audio Out, 1ch Alarm In, 1ch Alarm Out,
Edge storage: Micro SD/SDHC/SDXC slot supporting upto 128GB or higher along with memory card,
Network connectivity: 1-ch Ethernet(10/100 Base-T) RJ-45 connector,
Power: DC 12V /AC 24V/PoE, POE IEEE802.3af compliant, 0%-90% Relative Humidity, OEM Interface,

In-built analytic with Alarms: Perimeter, Single virtual fences, Double virtual fences, Loiter, Multi loiter, Object left, object removed, Abnormal speed, converse, illegal parking, Signal bad, Motion detection, Network disconnect, Disk alarm, I/O Alarm, Housing with heat blower, IP67 standard, ONVIF compliant of make: Bosch/Honeywell/Dahua or any make of international repute of proven reliability and quality.

Camera must be integrated with criminal analysis software (Eagle Eye software, mentioned in Item 3 of Schedule – B), capable of triggering notifications to mobile app.

Camera must comply with the other technical requirements as mentioned in clause **7 (A)** of these Specifications.

2. **Specifications for Item 2 of Schedule B:**

Image sensor: 1/2.8" or betterProgressive scan CMOS sensor, 8 Megapixel or better.
Resolution: 3840x2160@30fps, Excellent low light performance
Colour: 0.01lux@F1.2, AGC ON;
B/W: 0 lux@IR LED ON, 3.3~12mm Motorized Verifocal, 1m minimum distance, Smart H.265+ Video compression, 3.2-12mm Lens, Smart IR, IR Range upto 80 meter with built-in IR LEDs, Auto ICR,
Triple stream with H.265 video compression,
Stream 1: 3840x2160/3072x2048/2592x1520/1920x1080@25/30fps,
Stream 2: D1/VGA/CIF/QVGA@25/30fps,
Stream 3:VGA/CIF/QCIF@25/30fps,
Data rates of streams:
Stream 1: 200kbps ~ 16Mbps,
Stream 2: 10kbps ~ 6Mbps,
Stream 3: 10kbps ~ 3Mbps,
Shutter speed: 1/5-1/20000s, Camera must support AGC, Back Light Compensation, High Light Compensation, Automatic White Balance,2D/3D DNR, Smart defog, Corridor mode, Smart IR, Mirror, Region of Interest, Privacy Masking,
Pan: 0-360 degree,
Tilt: 0-90 degree, Rotation: 0-360 degree,
Angle of view: 108.6 degree~35 degree,
Lens F Number: F1.4, WDR: 120dB,
Power: DC 12V/PoE, PoE IEEE802.3af compliant,
Interface: built-in microphone,1-ch Audio In,1-ch Audio Out, 1-Ch Alarm In, 1-Ch Alarm Out, 1-ch Ethernet(10/100 Base-T) RJ-45 connector ,Built-in Micro SD/SDHC/SDXC slot with Card upto 128GB,
Supporting protocols: IPV4/IPV6, 802.1x, HTTP, HTTPS, TCP/IP, UDP/IP, RTSP, DHCP, NTP, RTCP/RTP, PPPoE, SMTP, DNS, UPnP, FTP, APR, SNMP,
Power consumption: 3.5W(IR LED OFF), 8W(IR LED ON), Reset button, RS485,
Analytics: Tripwire, Double Tripwire, Perimeter, Object abandon, Object Lost, Running, Loitering, Parking, Early warning, Crown, People counting, Face detection, Audio abnormal detection, Video Abnormal detection,
Alarm: perimeter alert and tripwire alert, Person-vehicle separation, IP67,ABS/ metal body, Vandal proof and impact resistant enclosure, ONVIF compliant of make Bosch/Honeywell/Dahua or any make of international repute of proven reliability and quality.

Camera must comply with the other technical requirements as mentioned in clause **7 (A)** of these Specifications.

3. **Specifications for Item 7 of Schedule B:**

Interfaces: 1 Gigabit WAN port, 3 Gigabit WAN/LAN ports, 1 Gigabit LAN port,
Network media: 1000Base-T: UTP of category, reset button,
Flash memory: 32MB, DDR3 512MB,
Features: Intelligent Load balancing, online detection of links, IP based bandwidth control, Remote management, Web Management interface for maintenance, Export and Import configuration,
Power: 100~240V AC, 50-60Hz

4. **Specifications for Item 1 of Schedule C:**

Video compression: H.265, Recording
Bandwidth: 400Mbps@80ch, Bandwidth In/Out 400 Mbps/200 Mbps,
Video Playback: 2-ch 12MP/4-ch 4K/6MP/5-ch 5MP/8-ch 4MP/9-ch 3MP/16-ch 1080P/32-ch 720P/64-ch 4CIF,
Recording resolution: must support all resolutions @25fps,
Supported Image resolution: Till 12MP,
Operating System: Embedded Linux, Support128-ch Intelligent Analysis Process, must support 4K resolution JBOD, RAID, RAID1, RAID5, RAID6, RAID10,Supports HDD Quota, and Group management,
Power: Dual and redundant power supply, 100~240V AC, 6.3A, 50-60Hz, Supports dual Gigabit network interfaces, Recording resolution upto 12MB Harddisk capacity upto 10TB Supporting ANR function, Support N+M Hot Standby Function,
Video Interface: 2-ch(HDMI1 & VGA1 same source & HDMI2 & VGA2 same source), Different video source with maximum resolution upto 4K(8MP),
Network Interface: 2x RJ45 10/100/1000Mbps Self Adaptive Ethernet Interface,
USB Interfaces: 2x USB2.0, 1x USB3.0, Alarm In/Out 16/4, Audio In/Out 1/2, 2x RS485, 1xRS232, 8 SATA for 16 HDDs@7200rpm Ports must support upto 128 TB(8TB Capacity for each HDD),
Chassis Mounting: 19" Rack Mount 2U Chassis. Metal Body, IP64 standard,
ONVIF compliant of make: Bosch/Honeywell/Dahua or any make of international repute of proven reliability and quality.

The NVR must comply with the other technical requirements as mentioned in clause **7 (B)** of these specifications.

5. **Specifications for Item 4 of Schedule C:**

Processor: 2 x Intel Xeon 4210 (Ten Core, 13.75M cache, 2.2 GHz, 9.6GT/sec UPI),
GPU Accelerator: 4 x GTX 1660Ti (Gigabit),
Chipset: Intel ® C621 Chipset, RAM: 4 x 16GB (Total 64GB) DDR4-2666 ECC REG.(Max 1.5TB, 16 DIMMs),
HDD: 1 x 1TB SATA Ent. 7200 RPM 3.5", RAID: SATA3 (6 Gbps); RAID 0,1,10(RAID 5 Windows only),
Management: IPMI 2.0 with virtual media onboard,
Graphics: 1 x GT 710 (2 GB) Graphic card,
NIC: 3 x 10GBase - T LAN ports (Auto-negotiable to 1G), Exp.
slots: 6 PCI-E 3.0 x 16 slots, 1 PCI-E 3.0 x 4(in x 8 slot),
Ports: 2 COM ports (1 rear, 1 Header), 5 USB 3.0 ports(2 rear, 2 via header, 1 Type A), 4 USB 2.0 ports(2 rear, 2 via headers), 1 x VGA, 2 RJ45 10GBase-T ports, 1 x RJ45 Management port,
Chassis: Tower convertible to 4 U rack mountable with optional railkit(8x3.5" Hot-swap SAS/SATA Drive Trays),
Power Supply: 2200W Redundant Power Supplies Titanium Level,
Cooling: 4 Heavy Duty Fans, 4 Exhaust Fans, and 2 active heat sink with optimal fan speed control,
Hot swap IPSAN, 2000 channel management, decode output to connect to Video Wall

6. **Specifications for Item 5 of Schedule C:**

LCD Technology: PA/VA,
Screen haze: 44%, BackLight
source: Direct LED,
Resolution: Full HD(1920x1080), Luminance 800 cd/sq.m,
Dimensions: 1211.4x682.2x86.5 mm,
Contrast ratio: 4000:1,
Aspect Ratio: 16:9,
DP1.2 Input: 2 No.s,

DP1.2 Output: 1 No.,
HDMI port: 2 No.,
USB Ports: 2 No.s,
Ethernet port: 2No.s,
HDCP External control interface,
PCI Express slots in chassis: 7 No.s,
Back-light lifetime: 1 Lakh hours,
Dual redundant hot swappable power supply,
Data wall management software,
with 1 Year OEM Warranty
Make: Samsung/LG/Sony or any make of international repute of proven reliability and quality.

7. Other Technical Conditions/Requirements.

A. Cameras in Item 1 & 2 of Schedule-B

1. All the IP Cameras must be sourced from the same OEM.
2. OEM Interface to detect the camera automatically and configure network settings.
3. Cameras shall support superimposing the title and date and time on the video.
4. All Cameras shall support Starlight Technology for 24x7 colour feeds.
5. Suitable and required network protocol stack to work camera in TCP/IP based Ethernet network environment. (As required for system working).
6. MAC Address of the IP Camera must be registered in the name of the OEM supplying the cameras.
7. The quoted models must appear on the ONVIF website and a confirmation certificate for the offered models should be provided at the time of supply.
8. Regulatory Approval/Certifications are to be provided from BIS.

B. Network Video Recorder(NVR)

1. The NVR must have in-built Video Management System(VMS) supporting all the analytics mentioned in clause 1 and 2 of these specifications.
2. The NVR should be able to record all channels simultaneously at FHD resolution.
3. The NVR must be RAID enabled providing seamless video recording with no breakage.
4. NVR must be N+M Technology enabled, wherein recording is continuous.
5. Suitable and required network protocol stack to work camera in TCP/IP based Ethernet Network environment (as required for system working).
6. OEM Interface must be present to detect the cameras automatically and configure network setting.
7. The quoted models should appear on the ONVIF website and a confirmation certificate for the offered models should be provided at the time of supply.
8. Regulatory Approval/Certifications are to be provided from BIS.

C. Minimum Software Requirements

1. Face Recognition Algorithm must be NIST (National Institute of Standards and Technology). FRVT certified.
2. Face Recognition Algorithm should support Neural Network and Artificial Intelligence.
3. Intellectual Property Rights(IPR) for the facial biometrics algorithm should be owned by the OEM who is evaluated by NIST.
4. Must have high Accuracy GPU based system, with failure rate not more than **1 in million**.

5. ISO-19794-5/ICAO (Best practice of Digital Facial Portrait) compliant.
6. Message-Queue communication module to communicate FR results to Command Control Centre and publish-subscribe mechanism to accept any new criminal records/updates from Command Control centre.
7. Integration of all application software's using REST APIs and Web services.
8. Data archiving and data back-up features must be available.
9. Node Health Check Module to know the status of each Node.
10. All communication must be on 2048-bit SSL encrypted lines for network security and to be setup in all servers.
11. Strong firewall configuration with all communication only on SSL or VPN.
12. Regular Operating System updates and security patches to be installed.
13. User authentication and strong password for all applications/software's; credentials must be stored in encrypted format.

D. Police One Software

1. Must allow adding faces in bulk manually and also integrate images from CCTNS (Crime and Criminal Tracking Network and Systems) Application through API.

I. Person of Interest Module of the Police One Software

1. Crime Scene Mapping: must perform crime mapping from the spot of crime, view crime mappings in the jurisdiction, search for various crime mapping and performance analysis.
2. Visual and Audio alerts must be generated when any person in watch list is identified in the Criminal Database Management Module, displaying the person's complete profile and case history.
3. Mapping of details of photo identified with Central Criminal Database.
4. Extensive Search feature based on Name, Date Range, Criminal ID/Number etc.,
5. MIS Report Generation Module based on various parameters with analysis report generation, graphs, statistics.
6. Must operate with unlimited number of records in the enrolment database and create unlimited number of lists (black list, white list, watch list etc) within enrolment data.
7. Face detection and tracking in digital video stream and quality with in-built quality assessment and choosing the best frame from the track.
8. Biometric template extraction and recognition, age, gender classification. Storing all detected faces in the archive with any track length or first best frame.
9. Must be capable of being installed as Mobile App as well as in server in Command Control Centre.
10. 100 faces per second or more to match the huge footfall at Railway Station.
11. Software must be capable of historical data search when a new photo is introduced to the system; it should be able to search from historical data if the match is found and how many times.
12. Provision of 1:1 and 1:N face recognition.
13. Must support industry-standard graphic and video formats as well as live cameras.
14. Must match faces from recorded media and detect a face from a group photo and detect a face from stored videos in any format.

15. The system should work on partial occlusion of face, glasses, scarf, change of facial expression etc.
16. Details of persons in the database must be searchable at any point on name, father's name, age, address etc and matched in FR.
17. Must be capable of handling 25 users at a time.

II. Smart Finger Print Identification Module of the Police One Software

1. Software must create a database as well as match with existing database and it should work on mobile app and Command Control Centre.
2. The mobile application must be capable of extracting fingerprint of person being examined from the connected fingerprint scanner and perform live fingerprint identification by securely communicating with the Biometric Services Gateway in the central server. The central server having the Fingerprint Database behind a secure firewall should analyze and return the fingerprint results to the officer's smartphone on the spot.

III. Face Recognition Mobile App/Module of the Police One Software

1. Mobile Application FR backend to accept and process face recognition requests from Police One Mobile App.
2. Mobile App must have security authentication module, User Management & Device Management module.
3. Real-time Face Recognition notifications to officers' mobile phone app.
4. Compatibility/integration with Person of Interest and Police One Software's.
5. Authentication of Officer must include IMEI Number.

E. Other Special Conditions

1. Power Supply to the cameras must be extended from the 10KVA UPS and the cameras should be suitably earthed.
2. Power Supply to the Network equipments, Servers, Video Wall etc at the Command Control Centre to be extended from 10KVA UPS.
3. Two Earths are to be provided, out of which, one earth is to be extended to all the cameras, one earth for the network equipments, servers etc in the Command Control centre, and one as Electrical Earth.
4. Special tools and instruments required for installation and commissioning of the work shall be arranged by the contractor at his own cost.
5. All tests and measuring instruments and other arrangements required for carrying out the acceptance tests etc shall be provided by the contractor at his own cost.
6. The supply of equipment and documents like drawings, instruction books/Manuals/Licences/CDs and completion plans and material shall be supplied in two sets of printed documents from Original Equipment Manufacturer for all equipments.
7. Inspection of materials by Engineer in charge of the wok as decided by the Competent Authority.
8. Immediately after the completion of the work, contractor shall certify and advise the purchaser in writing that the installation is (i) complete (ii) ready for satisfactory service and (iii) ready to be handed over.
9. The work carried out and equipment supplied by the Contractor shall be guaranteed against defects for a period of Three Years from the data of issue of Completion Certificate. The contractor shall provide comprehensive warranty maintenance for all the items supplied and work carried out by him against this tender. If during the execution, any equipment, etc. is to be added or deficiencies are to be rectified, to make the system work satisfactorily, the same also will have to be done by the contractor free of cost.

10. OEM or OEM Certified Vendors to participate in the Tender.
11. It is desirable that all the IP devices proposed in the tender are IPV6 enabled and **AI-ready** to facilitate future up gradation.
12. Crossing of track, if any, should be negotiated by underground cables running at right angles to the track as far as possible.
13. Any Telecommunication circuits in the vicinity of AC Traction running parallel to 25KV lines are liable to be affected by AC induced voltage. Therefore suitable precautions should be taken to eliminate the possibility of induced voltage affecting equipment and human beings.
14. Demonstration of the Face recognition algorithm and other software's mentioned in Item-6 of Schedule B, with 1 No. of FR Camera mentioned in Item-1 of Schedule B and 1 No. of 8MP camera mentioned in Item-2 of Schedule B to be done for a period of 1 week. Successful demonstration shall form part of fulfillment of technical eligibility criterion. Unsuccessful/unsatisfactory demo will lead to summarily rejection of offer.

15. **Tenderer shall submit a copy of comparative statement of specifications mentioned in the Tender Document and specification of items being offered in the same sequence/format. The Tenderer shall also mention the brand/make with model no. invariably for the items (including software) being offered. If not submitted, the offer will be summarily rejected.**