

ANNEXURE-A

BUYER ADDED BID SPECIFIC ADDITIONAL TERMS AND CONDITIONS

1. PRE QUALIFICATION CRITERIA

JOB	Supply and installation of IP based CCTV Surveillance system & vehicle speed detection System including all necessary hardware & accessories for inter connectivity, software and licences etc, which shall be used for safety control and monitoring for the project. i) 1x800 MW NTPC Sipat Thermal Power Plant, PO-Ujjawal Nagar, Sipat ,Distt-Bilaspur,Chhatisgarh,PIN-495555 ii) 2X800 MW DVC KODERMA, BHEL SITE Office, Koderma Power Project, Banjhedih,PO-Jhumri Telaiya, Koderma ,Jharkhand,PIN-825409
------------	---

SL. NO	CRITERIA
1.0	FINANCIAL CRITERIA
	A. BIDDER SHOULD HAVE AVERAGE MINIMUM ANNUAL FINANCIAL TURNOVER OF RS. 49.81 LACS DURING THREE CONSECUTIVE FINANCIAL YEARS 2021-22, 2022-23 AND 2023-24 AND SHOULD SUBMIT THEIR AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT IN SUPPORT OF THE SAME. B. IN CASE AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT HAS NOT BEEN SUBMITTED FOR THAT THREE CONSECUTIVE YEARS INDICATED ABOVE, THEN THE APPLICABLE FINANCIAL AUDITED STATEMENTS SUBMITTED BY THE BIDDERS AGAINST THE REQUISITE YEARS WILL BE AVERAGED FOR THREE YEARS. C. IF FINANCIAL STATEMENTS ARE NOT REQUIRED TO BE AUDITED STATUTORILY, THEN INSTEAD OF AUDITED FINANCIAL STATEMENTS, FINANCIAL STATEMENTS ARE REQUIRED TO BE CERTIFIED BY CHARTERED ACCOUNTANT.
2.0	TECHNICAL CRITERIA
	THE COMBINATION OF OFFERED MAKE OF IP BASED CAMERA AND OFFERED MAKE OF VIDEO MANAGEMENT SOFTWARE ,FOR CCTV SYSTEM SHOULD HAVE BEEN IN SUCESSFUL OPERATION FOR A PERIOD OF NOT LESS THAN ONE(1) YEAR IN A LARGE INDUSTRIAL SETUP VIZ POWER PLANT, CEMENT PLANT ,PETROLEUM REFINERY, STEEL PLANT OR COAL MINE ,HAVING INSTALLITION OF MINMUM FORTY(40) NOS CAMERA IN LAST SEVEN (07) YEARS , AGENCY SHALL PROVIDE A DECLARATION IN THE GIVEN FORMAT TOWARDS THE SAME BIDDER SHALL HAVE TO SUBMIT RELEVANT DOCUENTS IN SUPPORT OF THE SAME.

GENERAL

1	CONSORTIUM/JV BIDDING IS NOT ALLOWED.
2	IN CASE THE JOB IS UNDER EXECUTION/ ONGOING JOB, THE VALUE OF EXECUTED PORTION OF THE JOB SHALL AT LEAST CORRESPOND TO THE RESPECTIVE VALUES SPECIFIED ABOVE, EVEN IF THE CONTRACT HAS NOT BEEN COMPLETED OR CLOSED.
3	BIDDER SHOULD SUBMIT VALID PERMANENT ACCOUNT NUMBER (PAN).

4	THE SUPPLIED QUANTITY MAY BE CONSIDERED AGAINST SINGLE/MULTIPLE PO TO MEET THE ABOVE PQ REQUIREMENT.
5	AFTER SATISFACTORY FULFILLMENT OF ALL THE ABOVE CRITERIA, OFFER SHALL BE CONSIDERED FOR FURTHER EVALUATION AND PARTICIPATION AS PER NIT AND ALL OTHER TERMS OF THE TENDER- SUBJECT TO CUSTOMERS'S APPROVAL OF THE BIDDER.

Chapter-I : Project Information

Sl. No.	Description	Details
1	Project Title	2X800MW KODERMA THERMAL POWER STATION (KTPS) PHASE-II
2	Customer	Damodar Valley Corporation (DVC)
3	Location	The Koderma Thermal Power Station project is located near Benjhidi Village of Koderma District in Jharkhand. National Highway NH-19, which is referred to Delhi-Kolkata highway is about 25 Km from the Site. The nearest National Highway NH- 20 is about 8 Km from the site. The Site is located at latitudes of 24°23'00" N and longitudes of 85°33'15" E respectively. The Site can be approached from District Head Quarters through National Highway NH-20 and thereafter the internal road of the town Town/City Nearest Town Koderma- About 7 Km District Head Quarters Koderma Collectorate -About 16 Km Nearest Major Town Hazaribagh- About 60 Km Nearest Major City Gaya About 115 Km
4	Nearest Airport	The nearest airport is Gaya Airport at Bodh Gaya at about 108 Km from the project site. Other Important Commercial Airport is Birsa Munda International Airport Ranchi at about 170 Km from the project site.
5	Access By Road/Major Cities	National Highway NH-19, which is referred to Delhi-Kolkata highway is about 25 Km from the Site. The nearest National Highway NH- 20 is about 8 Km from the project.
6	Temperature	Climatological data from nearest observatory is placed as a Annexure-II, as per Technical Specification of DVC, Section-VI Part-A (Copy Attached)
7	Seismic Zone	As per Technical Specification of DVC, Section-VI, Part-B, Sub-Section-D-1-12 (E), Civil Works Seismic Design Criteria. (Copy Attached)
8	Wind Speed	As per Technical Specification of DVC, Section-VI, Part-B, Sub-Section-D-1-12 (D), Civil Works Wind Design Criteria. (Copy Attached)

Chapter-II : Scope of Works and Technical Specifications & Tentative Technical Details

Scope of Work:

Supply, installation & maintenance of IP based CCTV surveillance system, vehicle speed detection system including all necessary hardware & accessories for interconnectivity, software and licenses, etc. which shall be used for Safety Control and monitoring of following projects.

1. 1X800MW NTPC Sipat Thermal Power Plant, PO-Ujjwalnagar, Sipat, DISTT. - Bilaspur, Chhattishgarh, PIN - 495555.
2. DVC , Koderma 2 x 800 MW, BHEL Site Office, Koderma Power Project, Bnaihedi, P.O. Jhumri Telaiya, District- Koderma, Jharkand, PIN - 825409

Safety Control Room and Equipment:

24/7 Safety Control room is envisaged for monitoring safety in plant area. The Contractor shall provide all hardware and software including IP based CCTV camera, Redundant Servers/PC workstations, network switches, furniture, power supply, cables, Joystick etc. for meeting the above requirement. - BOQ as attached.

Safety Analytics:

- Analytics for Personal Protective Equipment (PPE) detection for example safety vest, safety helmet is to be deployed on all cameras **and any safety violation shall be alerted through IP based announcement system.**
- Any over speeding of vehicle shall be warned through speakers automatically.

Interoperability of CCTV system.

1. CCTV system for safety control room shall be interconnected through L3 switch so that feed of any camera can be seen from any system as per requirement. However, these CCTV systems shall work independently and Interoperable with another CCTV system.
2. CCTV shall be monitored from Safety control room and other common areas including Office of Head of the Project, Office of O & M In-charge, Erection In-charge's Office, Central Fire Station, FGD control room, Plant Security Control Room, Main Gate of the Plant, and any other locations to be decided during detail engineering.
3. Wireless links if required for any system shall be provided on as required basis. The Wireless connectivity solution shall be based upon WPA3 security/AES 256 encryption complying with the requirements related to the used of wireless in the automation solution as per IEC 62443-2-4.

Safety Control Room:

Contractor shall supply and install IP based CCTV system which shall be used for monitoring safety during construction from Safety control room. These cameras shall be installed at all strategic locations in the plant area. These cameras can be wired or wireless as per suitability at site. Initially these installations will be temporary & locations will keep on changing depending upon the work in progress. After COF of last Unit these cameras are to be installed permanently at suitable locations in consultation with NTPC.

Delivery Schedule:

- a. Delivery and Installation of the system shall be done by the agency after obtaining clearance from BHEL engineer at site.
- b. All items to be delivered at site within 30 days from the date of Purchase order or as instructed by site concerned. Dispatch clearance to be obtained from site before supply.
- c. Commissioning to be completed within 30 days from the date of site confirmation.
- d. Site may ask to install the system in phases. In that case installation time is 30 days from date of confirmation depending on clearance of work front.

Payment Terms:

1. Initial 70% payment of contract value shall be made within 90 days (45 days for MSE, 60 days for Medium Enterprises) through NEFT/RTGS on submission of GST Tax invoice after completion of supply of all hardware and software required for the entire contract and acceptance by BHEL official.
2. Next 10% on successful completion of the installation and commissioning of the entire contract supply and acceptance by BHEL official. - within 90 days (45 days for MSE, 60 days for Medium Enterprises)
3. Balance 20% payable on quarterly basis (divided into 8 quarters equally) on production of successful service report. - within 90 days (45 days for MSE, 60 days for Medium Enterprises)
3. Income Tax and GST TDS shall be deducted at source from the running bills as per applicable rules and other statutory requirements from time to time.
4. No advance payment will be paid under any circumstances. (NEFT format shall be enclosed along with the bill). For payment purposes NEFT format duly verified by concerned bank official & cancelled cheque may be submitted along with the first bill.

Documents required to be submitted along with invoice

- a. Original invoice (with triplicate copy)
- b. Newness certificate
- c. Original GST Compliant Tax Invoice
- d. Warranty/ Guarantee Certificate.
- e. O&M Manual
- f. Demonstration MOM/ Installation Certificate (jointly signed)
- g. Store Receipt Voucher (SRV) – delivery challan.
- h. Test Certificates

Liquidated Damages:

- Late delivery: Delay in supply of the system may cause a penalty of 0.5 % of total contract value per week up to a maximum of 10% of total contract value.
- For installation LD is 0.5 % per week of total contract value. However total LD is maximum up to 10% of total contract value.

Performance Bank Guarantee (PBG/ePBG): PBG of 5 % of the Total PO Value shall be applicable. As per GeM GTC, the ePBG will be applicable for the duration of 5 months after the completion of the Warranty period. Total Period for PBG shall be 29 Months.

Breach of Contract, Remedies and Termination:

In case of Breach of Contract, BHEL shall recover 10 % of the contract value from the vendor using following instruments:

- encashment of security instruments like EMD, performance security available with BHEL against the said contract.
- Balance amount (if value of security instruments is less than 10% of the contract value) from other financial remedies i.e. available bills of the vendor, retention amount etc. with BHEL.
- Balance amount from security instrument like EMD, Performance Security and other financial remedies i.e. available bills of the vendor, retention amount etc with other units of BHEL.
- If Recovery is not possible then Legal Remedies shall be pursued.

Following quantity of items shall be provided by contractor:

Bill of quantity for CCTV & ANPR system .

Sl. No.	Name of Item	UOM	DVC Koderma	NTPC Sipat	Total Qty (Q)
A	IP PTZ CCTV SYETM with redundant Storage server / VMS database				
01	IP based outdoor PTZ dome camera Optical zoom 32X, Night vision, 200 Meter IR (Specification attached)	Nos	25	25	50
02	Video Management Software (VMS) for management of CCTV system. Including of 30 IP camera license , recording management in storage, video analytics. Necessary client licenses (if any) for 4 nos. of concurrent view.	Set	1	1	2
03	Video Analytics software to cater the analytics with required license.	Set	1	1	2
04	Storage server / VMS database: for storing of 15 days backup for 30 nos. of CCTV camera feeds. (minimum 25 fps, full HD resolution) with redundancy of storage.	Nos	2	2	4
05	VA Server: with 12GB graphics card and 42 GB RAM	Nos	1	1	2
06	Workstation (Intel Core i7, 32 GB DDR5 RAM, 4GB graphics) with joystick	Nos	1	1	2
07	RF base station for creation Wi-Fi zone to connect all camera & PA Loudspeaker. All RF base stations should be connected with central location (Safety control room) with redundancy (RF or Fibre). Connected to central controll room . Backbone / backhole able to caryout the load of 25 PTZ & 5 Nos ANPR+30 Nos IP PA System + 4 Nos intercomm /paging Mic.	Set	3	3	6
08	Connectivity media: all Camera to be connected through P2P/PMP RF Links / Fiber network as required with base station / Control room. Max 30 nos. (Client station / access point) The P2P / PMP accesspoint shopuld able to carryout the Load of IP PA loud speaker along with camera load (BW).	Lot	1	1	2
09	42 Unit rack for Safety Control Room	Nos	1	1	2
10	3 KVA UPS for Safety Control Room for powering all active device.	Nos	2	2	4
11	Gigabit Switch (24 port) at Safety Control Room with static routing facility	Nos	2	2	4

12	Industrial switch (4/8 port), depending on nos. of active devices at each base station.	Nos	3	3	6
13	Power cable (armoured cable or cable with HDPE conduit) 2.5 sqm 3 core as required for raw power to all junction box.	Lot	1	1	2
14	Weather proof junction box with Fan, PDU, 0.6 KVA UPS and other required accessories like small switch (4/8 port), with POE injector or POE Switch etc. [for camera and PA Speaker installed at away from central place]	Nos	30	30	60
15	6-meter pole for fixing RF / PTZ camera / PA loudspeaker / RF device / UPS where illumination pole is not available.	Nos	20	20	40
16	9-Meter pole/Mast for fixing RF / PTZ camera / PA loudspeaker / RF device / UPS	Nos	4	4	8
17	Vehicle speed detection system with IP based outdoor Fixed bullet camera at road turning points - Optical zoom 12X, Night vision 90 Meter IR, (Specification attached) (ANPR - vehicle speed detection camera)	Nos	5	5	10
18	LED / OLED/LCD Display Screen – Min. 85" (inclusive of 2 Yr onsite OEM warrantee) of reputed Make.	Nos	2	2	4
19	Furniture : 2 Tr AC. Spli AC , with Stabilizer, MCB,Power cable, Supporting structure, Drain pipe , and other required accessories.	Nos	4	4	8
20	Furniture : 1 table , 2 Chair, 1 Almirah standard size	Lot	1	1	2
21	Shifting of node (Camera/PA Speaker/RF/JB, with all accessories) to other strategic location with in the plant area	Set	10	10	20
B	Installation commissioning testing				
22	Lumpsum installation & commissioning of the CCTV system including all accessories like RF mounting kit, Camera mounting kit, electrical accessories / adapter, Power cable, LAN Cable , Fiber Optic cable, patch cord, connectors, all required passive item, HDPE conduit for road crossing, etc.	Lot	1	1	2

Note:

Bidder to quote the total price after considering for both the Project 2X800

MW KODERMA & 1X800 MW SIPAT SITE.

- The BOQ quantity is tentative & may vary in actual implementation based on site requirement and may vary with site construction progress. Quantity variation upto value +/- 15% of total contract value is applicable for this contract .
- Where ever electric pole available may use for camera / PA /RF installation.
- CCTV vendor to build the backbone as per specification which should be able to cater the load of 25 nos of PTZ camera. 5 Nos of ANPR & 30 Nos of IP PA system load with backbone redundancy. Vendor to provide support for integration with IP based PA system for using the network backbone.
- IP PA system may work over the backbone which has been designed for CCTV system. CCTV vendor shall consider PA system load to design their backbone bandwidth.
- PA system vendor shall not be quoted anything for main backbone but should consider the small network accessories to integrate their IP PA system with main backbone.
- All statutory compliances as per law of land are applicable through out the contract period

RF connection:

Site is under construction site, hence underground, overhead cabling, fibre connection etc. are not suitable to establish all communication line. All the CCTV are to be installed at some strategic location (as desired by customer) and the location of the camera may change time to time and the CCTV feeds are to be provided to central control room or customer office premises and BHEL premises. RF is the most opted solution for establishing connection between CCTV field to central control room. Fibre is feasible where ever road / drain/fencing/cable trench etc. are available or exists. Rest portion are not feasible via cabling/wiring. Distance may vary from 1.5 KM to 3 KM depending on the site condition. Vendor has to establish minimum 3 nos of RF base station for creating the RF Zone throughout the project and backhaul may be on RF or fibre whichever is technically most suitable with redundancy.

Vendor should survey properly before submitting the bid and bid the optimised solution in compliance of specification, which will stable, durable and economic in nature are able to cater the specified service level agreement (SLA) for uptime of the system. The interconnectivity and powering of all active devices is/are with vendor scope. RF are to be installed properly as per OEM specification, should be power with UPS power and should have proper earthing. Raw power will be provided up to a certain point, afterwards power cable to be arranged by vendor and as per site norms.

Storage Sever & VMS database server:

The same server shall be used as Storage server and VMS database server. Two no's of storage should be there for data redundancy (primary and secondary concept) and ensure no losses of recording and continuity of storage of CCTV feed. Detail specification as mentioned in annexure.

VMS software for video recording, running of analytics and should be licensed. The VMS should be from reputed OEM and supports all kind of ONVIF camera and other CCTV device. Should be able to manage video streaming, storage management and video analytics alarm generation. Analytics and trap alarm generation should be customisable. It shall be possible to view and record at different resolutions and frame rates and this shall be individually programmable on every camera/ feed. VMS database redundancy should be present in the solution to ensure that all configuration information, video recordings, and user database etc. is suitably replicated.

The video feed may be required to be shared with another network and shall be carried out by vendor with the L3 switch. The display shall run 24x7. Necessary accessories for display shall be provided by vendor. Resident engineer duty hour is as per normal office hour. However, he/she is required to manage the occasional requirement and customer requirement.

Should support Artificial Intelligence based Unified Video Intelligence Platform

VA Server:

Detail specification is attached in annexure. Workstation is for configuring all server / software and other control purpose.

Location of Safety Control Room: / Command control system.

CCTV cameras are to be installed by the vendor at strategic locations in the plant and where erection commissioning activities are being carried out (as decided by Customer / BHEL site engineer). The feeds of these cameras are to be stored in the servers and the same shall be monitored for safety violation and alarm on defined activity (line crossing etc analytics as opted in this tender). Location of these cameras may change depending upon the requirement of the site.

Insurance:

It is the sole responsibility of the contractor to insure his materials, equipment, workmen etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per Workmen's Compensation Act. The work will be carried out in a

protected area and all the rules and regulations of the client / BHEL in the area of project which are in force from time to time will have to be followed by the contractor.

General Requirements:

1. All the casing / conduits/ cable trays, power packs, erection hardware (viz. junction boxes, brackets, glands, nut-bolts etc.) are included in the bidder's scope.
2. The bidder shall guarantee satisfactory performance of the equipment under stipulated variations of voltage and frequency.
3. Any other equipment, module, software required for the safe and satisfactory operation, control, protection, monitoring, testing and maintenance of the system shall also be included by the bidder within the quoted price.
4. All equipment supplied shall meet the requirements of the applicable international codes and standards or their amendment. Camera certification has to be CE/FCC/UL or equivalent.
5. The CCTV system shall be designed as a standalone IP based network architecture with simultaneous recording of all video streams using H.264 or better compression technique. System shall ensure that once recorded, video cannot be altered.
6. Facility shall be provided to select a camera or a group of cameras in a zone for recording in CIF, 2CIF, 4 CIF, HD (720P) & Full HD (1080P) resolution.
7. It shall be possible to export selected portion of recording to portable media devices. The exported clip shall be in commonly used movie file formats e.g. mpg, avi, mp4, etc. and no special software shall be required to view the same.
8. Server software shall allow the clients seamless operation of all cameras regardless of the actual connection to different recording servers. Software shall allow client applications to interact with all the camera/database servers simultaneously and allow simultaneous display of live video/recorded video regardless of the zone in which the client is connected.
9. The system operation would be of covering the complete view of areas with pan/tilt/ zoom, propositioning of the cameras and with programmability to monitor any camera on any monitor either manually or automatically in a defined switching. The system shall be suitable for installation and shall be able to work in dust prone thermal power plant environment.
10. All fixtures, mounting accessories, cables, etc. to be provided by the agency.
11. Supplied items are to be brand new.
12. Loading/Unloading, Storage, Transportation of Material within Project Premises is in Vendor's Scope. However, Storage Space for Material will be provided by BHEL free of Cost.
13. The Bidder Shall Guarantee Satisfactory Performance of the Equipment under Stipulated Variations of Voltage and Frequency.

Special Terms & Conditions:

1. Non-Disclosure Agreement: The selected bidder after placement of work order and prior to commencement of work must sign the Non-Disclosure Agreement (NDA) as per the format specified by BHEL or any other as mutually agreed.
2. Agency shall coordinate with various stakeholders including BHEL, its sub-agencies and NTPC, wherever required to execute the contract.
3. Agency has to arrange for Personal Protective Equipment (PPEs) for safety of its staff and workmen for site visits.
4. Agencies shall make their own arrangements of accommodation, local transportation and logistics such as Computers/laptops /printers/stationary etc. to execute the scope of work.
5. All Statutory Compliance (issued by GOI - as applicable) for execution of the scope of work, shall be in the scope of Agency. No Extra charges shall be made against any statutory compliance.
6. No extra payment shall be made for any work executed on Sunday/holidays or beyond official working hours.
7. All the software/license procurement, installation for connection/integration to BHEL/ NTPC/DVC systems shall be in scope of agency.

8. Agency shall deploy all hardware and software to be used during execution of scope of work.
9. For connecting the internal system of BHEL/NTPC, suitable hardware / software for secured access is to be provided and configured by the agency in consultation with BHEL /NTPC.
10. Watch and ward of resources deployed by the agency, at site shall be in the scope of the agency. No claim shall be entertained in case of any theft/damage of resources deployed by the agency.
11. All taxes, insurance charges, local law and order obligations (if any) will be complied with/borne by the Bidder.
12. Arranging requisite Gate passes (Temporary/permanent/ Sunday / holiday / Night pass) for entering inside the plant area is Agency's responsibility.
13. No compensation shall be payable on account of accidental damage, idling due to reasons / conditions beyond the control of BHEL.
14. Contractor has to ensure that his employees shall take all safety measures for performing the work safely to avoid any untoward incident.
15. BHEL shall not be responsible for any accident / injury to the persons employed by the contractor for working in the BHEL, site premises, however first-aid facility will be provided by BHEL free of cost in case of any injury.
16. The contractor will ensure that they release payment to their workers / supervisors as per norms published by factory/state or central govt. norms.
17. The contractor shall observe / perform all the laws / enactment rules and regulations of the central and state govt. which are in force from time to time.
18. In case of a bidder absconding from the work, BHEL reserves all rights to get the unfinished work completed at the risk & cost of the bidder.
19. Warranty shall be of minimum 2 years on-site and deputation of service engineer in case of any equipment/part failure within the warranty period shall be in the scope of the agency. Replacement of any faulty part(s) is to be provided within 7 working days. If agency fails to comply the same, BHEL will procure and replace the material at agency's risk and cost with applicable overhead.
20. BHEL engineer at site shall do quality check and inspection of the material for acceptance. Before, despatch of items, BHEL/NTPC/DVC may insist for carrying out inspection of items at Manufacturer's works. Also there may be requirement for obtaining approval of MQP and FQP for the tendered items from BHEL/NTPC/DVC.
21. Training and demonstration of the system to the concerned officials shall be in the scope of the agency.
22. The CCTV system shall be designed for visibility in all weather conditions to facilitate 24x7 operation for high availability.
23. Transportation and Installation charges to be included in the price quote.
24. Transit insurance shall be in BHEL's scope
25. The Contract or any part thereof shall not be Subcontracted / Assigned or otherwise transferred without obtaining Prior consent in writing from BHEL PSER.
26. Contractor has to ensure that his Employees shall take all Safety Measures for Performing the Work safely to avoid any untoward Incident.
27. BHEL shall not be responsible for any Accident / Injury to the Persons Employed by the Contractor for working in the BHEL, Site Premises, however First-Aid facility will be provided by BHEL free of Cost in case of any injury.

Customer Approval: Applicable

Bidders credentials shall be verified by the customer for Technical Suitability for Price Bid Opening.

Provenness Criteria: (customer requirement – Format attached)

The combination of offered make of IP based camera and offered make of video management software, for CCTV system, should have been in successful operation for a period of not less than one (1) year in a large industrial setup viz power plant, cement plant, petroleum refinery, steel plants or coal mine, having installation of minimum forty 40 nos. cameras in last seven (07) years. Agency shall provide a declaration in the given format towards the same.

Force Majeure:

The service provider/vendor shall not be responsible for delay in delivery resulting from acts / events beyond his control, the service provider shall provide notice of the happening of any such act / event to the purchaser within 15 days from the date of its occurrence. Such acts / events shall include but not be limited to acts of God, war, floods, earthquakes, strikes, lockouts, epidemics, riots, fire or Governmental regulations superimposed after the date of order / contract.

Price Variation Clause: Not Applicable**Over Run Charges:** Not Applicable

SECURED RECOVERABLE ADVANCE: NOT APPLICABLE

Splitting of contract: Not-Applicable

All participating bidders shall be asked to confirm the % of GST considered in their quoted price during commercial clarification stage of the tender

RIGHTS OF BHEL:

BHEL reserves the following Rights in respect of this Contract without entitling the Contractor for any Compensation:

- a. To Terminate the Contract any time by giving one Month's Notice without Assigning any reasons thereof.
- b. To recover any Money due from the Contract on any Account due to the Contractor, under this Contract or any other Contract.
- c. To effect recovery of any amount due from the Contract Under this or any other Contract etc. or in any other form, the sum of the money BHEL_PSER is forced to pay anybody due to Contractor's failure to fulfil any of his obligations.
- d. In the event of any Dispute of any nature, the Decision of BHEL-PSER shall be final and binding on the Contractor.

MANDATORY HSE COMPLIANCE/ OBLIGATIONS:

- a. Bidder/vendor/agency has to ensure that their deployed personnel/manpower shall follow and comply with, during their entire period of deployment at the site while supplying and installation of material, all extant HSE rules & regulations at the project site as is applicable for general

workplace safety as well as. Mandatory for safe execution of their work & discharging their prescribed roles.

- b. The personnel/manpower of the bidder deployed at the site shall be guided by & shall be accountable to the BHEL site HSE management for all matters pertaining to health, safety & environment during the entire tenure of deployment. They shall conduct themselves in line with BHEL safety culture.
- c. The bidder shall ensure that their personnel/manpower deployed at the site, besides being qualified for the prescribed job, are physically and mentally sound to execute the same. It is the sole responsibility of the bidder to provide to their personnel/manpower deployed at the site necessary medical support in case any of them suffers from any medical condition.
- d. It is the sole responsibility of the bidder/vendor/agency to ensure that their personnel/manpower deployed at the site possess and use at work all standard quality ppes as are mandatory to execute their prescribed job safely including basic ppes like safety shoes and safety helmet.
- e. The personnel/manpower of the bidder/vendor/agency deployed at the site shall be responsible & held accountable for the safety of self, of others, of material/asset and of the environment. Accordingly, the bidder/vendor/agency. Accordingly, the bidder/vendor/agency shall ensure that their personnel/manpower deployed at the site shall not indulge in any act of commission or omission that would jeopardise the safety of man, material or environment.
- f. In case any type of incident occurs due to negligence and/or non-observance or non-compliance of necessary HSE rules, regulations or guidelines and other precautions by the personnel/manpower of the bidder/vendor/agency causing injury or ill-health to any other person(s)/public, the vendor/agency shall have to pay necessary compensation and other expenses, if so decided by the bhel-pser authorities.
- g. In case any type of damage occurs to the property/asset and personnel of bhel, customer, government or any third party due negligence of non-observance or non-compliance of necessary HSE rules, regulations or guidelines as well as other precautions by the personnel/manpower of the bidder/vendor/agency and if bhel is unable to recover in full, the cost from the insurance company, the balance will be recovered from the vendor/agency's bill.

Other Documents:

Bidder must not be under bankruptcy code proceedings (IBC) by NCLT or under liquidation / BIFR, which will render him ineligible for participation in this tender and shall submit undertaking to this effect.

Bidder must not be blacklisted/ De-registered/ debarred by any Government department/ Public Sector Undertaking/ Private Sector and shall submit undertaking to this effect.

DECLARATION

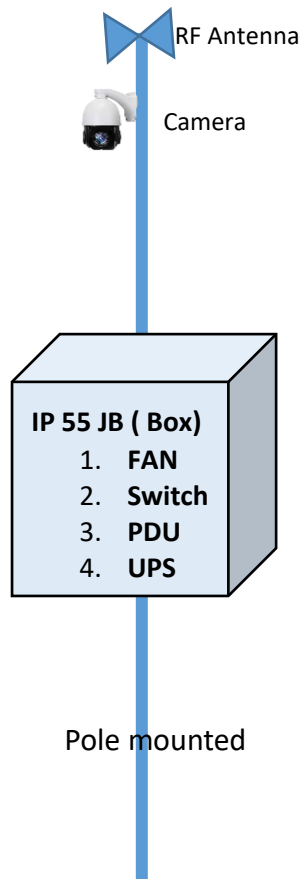
CCTV SYSTEM

We/our sub-vendor (M/s.....) confirm that we meet the provenness requirements specified above of provenness requirement. In this regard we declare that the combination of offered make of IP based camera and offered make of video management software, for CCTV system, has been in successful operation for a period of not less than one (1) year in a large industrial setup viz power plant, cement plant, petroleum refinery, steel plants or coal mine, having installation of minimum forty (40) nos. cameras, the details of which are given below.

Sl.No.	Item Description	Plant No.1
(i)	Make/Model/Version of IP based camera & video management software	
(ii)	Client Name & Address	
(iii)	Name of Industry (Power plant, cement plant, petroleum refinery, steel plant, coal mine)	
(iv)	Number of cameras in above reference installation	
(v)	Whether above offered combination of IP based camera & video management software for CCTV has been in successful operation for a period of not less than one (1) year in a large industrial set up viz power plant, cement plant, petroleum refinery steel plant or coal mine having installation of minimum forty (40) nos. cameras	* Yes / No
(vi)	End user certificate Attached	* Yes / No

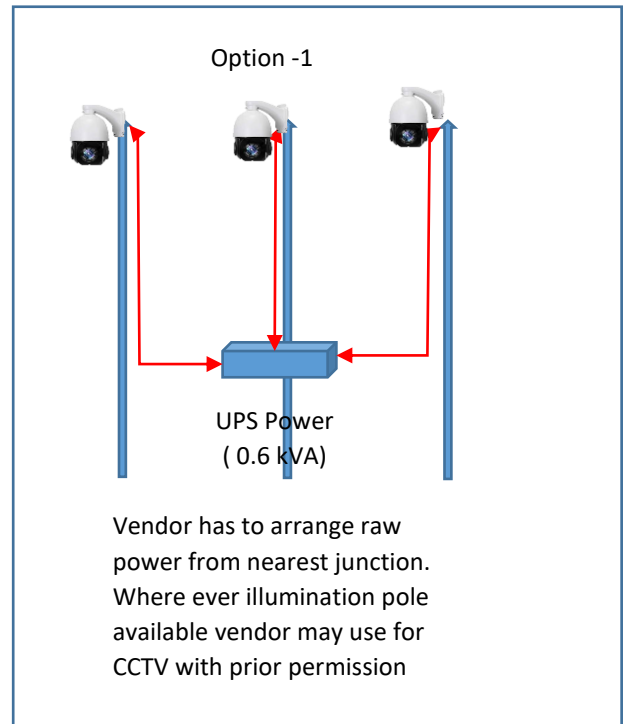
Seal & Signature of Authorised person

Tentative Consideration



Switch and other active device should be able to sustain up to 55 Degree Celsius ambient temperature. Suggested for Industrial grade device for outdoor setup.

Consideration (tentative)



All the active device should be UPS powered

Control room to store area connectivity - Dual backbone over RF. Shall be able to take over the bandwidth load.
Distance may vary from 1 to 4 KM
The schematic is tentative, may vary depending on the actual site condition

NTPC Sipat



Project Area – NTPC Sipat



Project Area - DVC Koderma

IP Camera Specification (Fixed / PTZ)		
Sl. No.	Parameter	Acceptable Value
1	Image Sensor Type	Progressive Scan CMOS
2	Image Sensor Size	1/2.8" ~ 1/3"
3	Camera Image Sensing Capacity (Picture Mode)	2 MP or Better
4	Resolution	Full HD (1920 x 1080 Pixel) at 25/30 IPS
5	Day & Night Capable	Yes
6	IR Illumination Range (Mtr.)	200 or Better (For PTZ)
7	Focal Length	4.45-4.7 ~ 142.4-150.4 mm (For PTZ)
8	Iris Range	F1.6 ~ F2.9 (For PTZ)
9	Electronic Shutter	1/50 ~ 1/10000 Auto
10	Sensitivity (at 6dB)	Color mode: 0.6 Lux; B/W mode: 0.04 lux @ 30IRE, F1.6 (For PTZ)
11	Horizontal Angle of View	55.4 deg (Wide) ~ 3.5 deg (Tele) or Better
12	Frame Rate (fps)	25 or Better
13	Lens Type	--
14	Type of Camera housing	Dome type (For PTZ)
15	IP Camera	Yes
16	Pan/Tilt Range	360 Deg Continuous / 90 Deg (For PTZ)
17	Optical Zoom	32X or Better (For PTZ)
18	Back Light Compensation	Required
19	White Balance	Automatic with mode selection options
20	Audio Support	Full Duplex or 2-way
21	Alarm Support	Minimum 2 Alarm I/Ps & 1 Alarm O/p (For PTZ)
22	Signal to Noise Ratio	>50 dB
23	Automatic Gain Compensation	Up to 18 dB
24	IR cut-filter	Yes
25	Installation Type	Outdoor
26	Protection	IP 65 or Better
27	Vandal resistant housing	Yes (with Sun shroud)
28	Mounting Bracket	Pole Mounted
29	Power Input	12/24 V DC / 24 V AC (Adapter to be provided), PoE
30	Operating Conditions	0 DegC to +60 DegC / 0% to 90% RH
31	Warranty (Years)	2
32	ONVIF Support	Yes
33	Preferred Make	Bosch, Pelco, Axis, Or Equivalent (Subject to approval & acceptance from NTPC/DVC. In case the offered make of camera / accessories is not acceptable to NTPC/DVC, then offer shall be liable to be rejected and not considered.)

Specification of vehicle speed detection system

Sl. No.	Parameter	Acceptable Value
1	Description	Long distance Radar for speed detection integrated with fixed bullet cameras and Automatic Number Plate Recognition (ANPR) Software
2	Objects Tracking	128 Objects
3	Lane Coverage	2-3 lanes each direction with single sensor
4	Detection Range	150 M (+/- 2%)
5	Speed Detection	120KM / Hr +/-1% accuracy
6	Communication Interfaces	Ethernet, USB, RS 485
7	Refresh time	75 MS
8	Power Supply	12V DC
9	Power Consumption	20W
10	Operating Temperature	-40 to 85 ° C
11	Environment Protection	IP66/67
12	Frequency	As per govt. Guidelines, the speed sensor OEM should have proper certifications or approvals in accordance to frequency approvals in India
13	Speed Certification	Speed detection accuracy of the system should have been Certified and tested for speed accuracy from government agency/s under Central Motor Vehicle Rule (CMVR) 126 like ARAI, ICAT, VRDE, GARC etc.)
14	Speed Display on VMD	Shall be provided with external outdoor VMD board integrated with Radar for displaying the detected speed of the vehicle with LED light and 2-digit display.
15	Vehicle detection	The System should automatically detect a vehicle in the camera view using video detection and activate Registration plate recognition.
16	Registration plate recognition	The System should automatically detect the registration plate (for all states & UTs of India) including new and old registration marks, in the captured video feed in real-time and the system should perform Optical Character Recognition (OCR) of the registration plate characters
17	Speed Violation Detection	The system should be hybrid mode camera video and using multilane radar-based technology to monitor speed violation detection from long distance for multiple lanes in one direction.
18	Speed limit setting	The system should allow the operator to set different speed limits for different categories of vehicles and different stretches of road.
19	Licensing	Software shall be deployed on central server. Licenses supporting monitoring of all the vehicle

		speed detection systems deployed shall be provided by the vendor.
--	--	---

Specification for VA Server:

Sl. No.	Parameter	Acceptable Value
1	CPU	24 core CPU or better
2	RAM	42 GB RAM DDR5 or better
3	Storage	1 TB SSD/SAS HDD RAID-5 or better
4	Graphics	12 GB Graphics Memory or better
		Rack mounted
		Should be with license operating system and antivirus & other required software required for CCTV, I
		I/O peripherals, USB, HDMI port etc.
		enabled with secondary backup facility like CD/DVD /USB backup

Specification for Storage /VMS database:

Sl. No.	Parameter	Acceptable Value
1	CPU	16 core CPU or better
2	RAM	32 GB RAM DDR5 or better
3	Storage	30 cameras 25 FPS FHDX 15 days backup facility with RAID-5
4	Graphics	4 GB Graphics Memory or better
		rack mounted
		Should be with license operating system and antivirus & other required software required for CCTV, I
		I/O peripherals, USB, HDMI port etc.
		enabled with secondary backup facility like CD/DVD /USB backup

Specification for Workstation:

Sl. No.	Parameter	Acceptable Value
1	CPU	Intel Core i7 or better
2	RAM	32 GB RAM DDR5 or better
3	Storage	1TB SSD/HDD or better
4	Graphics	4 GB Graphics Memory or better
	Monitor	24 Inch full HD monitor (+/- 5 tolerance)
	Accessories	Default Keyboard, Mouse, Joystick,
	Speaker	External speaker 6 Watt or better

Specification for VMS software

Parameters	
1	The IP Video Management Software should allow Live Viewing, Recording and Management solution of Network Video surveillance systems & shall not have any Limit on the Number of Cameras to be Connected & shall be Scalable to Unlimited IP Cameras in Future by Augmentation of Camera channel Licenses& server Hardware Components.

2	The Video Management Software shall be Client-Server based IP Video security solution that shall provide seamless management of Digital Video, Audio and data across an IP network. The video management Software shall provide full virtual matrix switching and control capability. Video from sites shall be possible to view from single or numerous workstations simultaneously at any time. Cameras, recorders and viewing stations may be placed across the terminal in the IP network.
3	The IP Video Management Software shall be Licensed – at least valid for 5 years.
4	The Video Management System shall be a fully distributed solution, designed for limitless multi-site and multiple server installations requiring 24/7 surveillance with support for devices from different vendors. The Video Management System shall offer centralized management of all devices, servers and users and must empower a flexible rule-based system driven by schedules and events.
5	The VMS system shall be a scalable client – server architecture built using well known operating systems
6	The VMS management server shall be able to intelligently scan an IP network for new devices (cameras or servers) along with automatic model detection.
7	The Video Management System : The recording servers shall process the recordings and playback the video streams.
8	Recording Parameters: Should record H.265+, H265, H.264, MPEG4 or MJPEG in at minimum 5 fps to 30 FPS at minimum CIF to Full HD (1080p) and 4K resolution.
9	Should support multiple brand IP cameras and encoders- ONVIF .
10	Should support dual streaming, with Streaming and recording at different qualities of videos. (Min. different Streams should be available in the Cameras.)
11	Option to do recordings on NAS, iSCSi, DAS, local or network drive. Defining different drive for each individual camera.
12	Should have ability record audio along with video in same recording file.
13	Option to define multiple recording paths
14	Pre-buffer and Post buffer recordings up to 10 minutes.
15	Export the desired portion of video in mp4, avi and asf formats in DVD/USB or any external device
16	Export recording possible in client and remote PC also with proper authentication.
17	Option for Window- Pop up, Email, Sound alarm, Phone call, SMS on recording/ video loss or any event.
18	Storage and Bandwidth calculation: Option to check disk 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 SMS (Through SMS Gateway)
21	Automatic archiving after set number of days and automatic recording deletion after disk full.

22	Edge Recording Synchronization: VMS Server and Camera should sync recordings in case of network or other communication failure between camera and VMS
23	Encryption: Ability to encrypt video while exporting. Options of 56 bit, 128 bit and 256 bit encryption
24	Export of videos Synopsis based on events in a particular time period
25	The Fail over and Fall-back management and recording Server shall be on hot standby, ready to take over during the primary management server fails. No manual action from the user shall be required. The fail over time should not be beyond 30 Seconds.
26	Export of Signed video using public/private key
27	Live, Playback & PTZ Control Parameters
28	Configurable Matrix views with size and number of cameras. Pre-defined views from full screen, 1x1 to 8x8.
29	View sequencing with user driven time interval.
30	Dual Streaming and Automatic Switching from Low to High Quality on Full screen mode.
31	It should support live view and Playback from minimum 10 clients- Both local and remote
32	It should support event-based playback.
33	Customized camera views based on: User input number of cameras. User chosen shape and size.
34	Digital Zoom: Should be available On Live and Playback Videos. Zoom available on snapshots too.

35	• PTZ: PTZ option available through mouse and joystick • Direct Live View from Map: Access live video feeds directly from the map for real-time monitoring and response • Polygon-Based Map Navigation: Easily switch between maps with a single click by selecting pre-defined polygon regions, enhancing navigation efficiency across different zones. • Map Edit Lock: Lock or unlock map editing as needed, controlling access to map modifications • Right-Click Map Options: Access key actions with a right-click on the map, showing options to initiate actions, rotate or remove devices, and play footage directly from the serve • Custom Area Mapping: Draw specific areas on the map using polygons, allowing focused monitoring in defined regions. • Polygon Mapping: Create and map polygonal shapes for precise, targeted area surveillance. • Map Presets: Users can set specific map locations as presets, allowing for quick access without the need to search locations each time • Support for Multiple GIS Maps: View multiple GIS map layers to cover a comprehensive geographical scope. • Timestamped Alerts: Alerts include a timestamp, and if an alert is not closed manually, it will automatically close after a set timeout period. • Gaming joystick as well as PTZ joystick options available • On screen PTZ control with Click and Zoom facility • PTZ presets and tours setting
36	Software should allow creation of multiple camera sequences. It should be possible to set the dwell time for the cameras within the sequence.
37	Software should allow sequences control (pause/play, skip forwards, skip backwards).
38	Live view and Playback available at the same time with Playback window running side by side with live view window.
39	Event window with specific snapshot of that event should be shown simultaneously in Live view screen. Clicking on the event should play recording of that event time.
40	Playback Navigation Tree View with Recording server, camera list and date
41	Playback option for frame-by-frame
42	Playback should have Video lock feature.
43	Option of Common Timeline for syncing of multiple cameras while playback.
44	Ability to make bookmark of any portion of video and view list of all bookmarks
45	Instant Playback and Quick Search of event-based recordings.
46	Event based search: Event based Time line to quickly show coloured dots in Timeline and view recorded videos at the event time.
47	Playlist with files listed for each date. User can click on a date to play recordings.
48	Easy Map Navigation: Quickly move between multiple maps for flexible monitoring across different areas.

49	E-map client should show icon blink and voice alert of the event. Should be able to take snapshots from Google Map if connected to internet. It should be possible to click on icon in a map to initiate PTZ camera present, run PTZ pattern, view camera.
50	Mobile Surveillance & Remote Viewing Parameters via Web Client
51	Ability to view live video on iOS and Android phones or devices via web client.
52	Ability to make a Phone call/IVR on any alert or alarm
53	Streaming Parameters
54	Authentication parameters (username, password) for streaming to remote clients.
55	Administration & Failover Parameters
56	Automatic discovery of devices using UPnP and/or ONVIF
57	No software limit on number of cameras supported in single recording server (Any increase in the number of cameras should be possible by augmentation of hardware and license components)
58	Add all cameras with single click. Apply settings to multiple cameras of same model with single click.
59	Failover- Automatic switch of user selected cameras to back-up server in case of failure.
60	Automatic Health check-up and activation of optimization modules once CPU reached more than 85%.
61	Add multiple recording servers under same management server.
62	User role-based cameras and feature access. Define users with passwords and access to only specific cameras
63	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.
64	VMS control of cameras and monitoring on client workstations shall be done through the administrator interface.
65	System watchdog feature be available to alert in case of failure of cameras and servers .
66	Camera Support Parameters
67	Should support multiple brand IP cameras. No restriction on camera hardware.
68	Alarm Centre Parameters
69	Option to view cameras only on alarm. Matrix grid size should change automatically if alarms are generated from multiple cameras simultaneously
70	Automatic or manual reset & close option of video panel
71	Advance Features
72	Failover: System should support N: 1 or N: N failover. Failover time should not be more than 30 seconds.

73	Option to do failover of selected cameras in case of recording server failover.
74	Option to add multiple recording servers under single Management Server.
75	The VMS licensing shall require MAC Id of Server/ Recorder only, not of camera devices.
76	Option to configure video analytics in same client as VMS
77	VMS Web Client
78	The VMS Web Client shall have Dashboarding Capabilities, such that the Dashboard should Support for Drawings/Maps GIS Layer, OSM Layer, .JPEG file format, , Customized Video Grid for Live& Playback of Video & Events Table
79	The VMS Web Client shall show the Camera details with Key Performance Indicators like, Total Cameras connected, Total Cameras Disconnected, Status Visualization in the form of Pie Chart
80	The VMS Web Client shall have a Reporting functionality in the form Camera Uptime, Downtime.
81	The VMS Web Client shall also show the Recording server status Report, Storage Space Available status & Reports.
82	The VMS Web Client must support for H.265 Codec Live & Playback Streaming.
83	The Video Management Software (VMS) Application should be an Open Platform Application & should not be from the Same Camera OEM.
84	Standard Operating Procedures (SOPs): Structured SOPs guide incident management, with customizable steps where certain procedures are mandatory and others are optional, allowing flexible response
85	Incident Filtering: Filter incoming incidents to see essential details such as device name, device ID, area, location, and time, aiding efficient incident review.
86	Action Templates: Use a single template to perform multiple actions—such as sending emails, displaying popups, and starting recordings—streamlining incident response
87	The Video Management Software (VMS) Application shall support Integration with 3rd Party Devices like Physical Perimeter Intrusion Detection Systems (PIDS), Radars, IoT Sensors/Modules & Various 3rd Party Applications.

Specification for Antenna:

Sl. No.	Technical Specification
1	Frequency Range 4.9 or 5.97 GHz Unlicensed band
2	Antenna Type Access Point sector
3	Gain 18 dBi
4	Port to Port Isolation >-30 dB
5	6dB Beam width - Azimuth 120 degree
6	3dB Beam width - Azimuth 90 Degree
7	3dB Beam width - Elevation 6 Degree
8	Polarization Dual Linear, Horizontal/Vertical
9	Maximum input Power 5W
10	Input impedance 50 Ohms
11	Front to back ratio >35 dB
12	Mechanical Downtilt -2 Degree

RF Device specification

Item No.	Technical Specification
1	System must operate in unlicensed band frequency spectrum of ISM-III Unlicensed band. Operating frequency range: 5 GHz: 4910 – 5970 MHz (exact frequencies as allowed by local regulations)
2	System should employ bandwidth per channel of 20 MHz, 40 MHz and 80 MHz
3	System efficiency should be at least 8.75 bps/Hz in a 20MHz, 40 Mhz and 80Mhz channel size
4	System must support actual aggregate throughput of more than 600+ Mbps
5	System Should support IPv4/IPv6 Dual Stack
6	System Should support 10/100/1000 BaseT
7	Transmit power standard of system should be minimum 27 dBm with 1 dBm interval
8	Transmit power should employ automatic power back off (Automatic Transmit Power Control). System should change TX power in accordance with required received signal.
9	Rx sensitivity of the system must be -87 dBm or better
10	System Should support Online spectrum analyzer
11	System should have the capability to adapt the hitless modulation mode depending on the link environment ensure best throughput while maintaining the link despite drop in link

	budget due to NLOS situation. Modulation level shall be dynamically adaptive between MCS0(BPSK)to MCS9 (256QAM5/6)
12	System Should support 65000 PPS
13	System must support the MTU size of 1700 Bytes
14	System Should support Spanning tree protocol for Layer 2 redundancy
15	System Should support DHCP server and client functionality
16	System should also define the priority of Broadcast, Multicast and voice traffic and rate limiting for broadcast traffic.
17	System should support Encryption 128-bit AES (CCMP mode)
18	System should also support a management VLAN and data vlan for further security Measure
19	System must have the ability to tag vlan as per requirement
20	System should support the Layer 2 and layer 3 firewall based on source and destination to protect from any security breach
21	System should also provide the filtering on basis of specific TCP port
22	System must support device event log
23	Software upgrade to system is done over the air as well as through the network
24	System should have integrated 25 dBi Antenna
25	System should provide the complete statistic of Ethernet and wireless with detail of send/receive packet of unicast, multicast and broadcast
26	System must support the syslog feature
27	System must support the basic troubleshooting feature such as Ping, Traceroute
28	Operating Temperature -30°C to +60°C (-22°F to +140°F)
29	System must have inbuilt surge suppressor of 1 Joule
30	System should have at least IP 55 environmental protection
31	Maximum power consumption should not exceed 12 W.
32	Antenna Frequency Range 4910 - 5970 MHz
33	System should have 3dB Beamwidth-Azimuth 6-10 degrees
34	System should have 3dB Beamwidth-Elevation 6-10 degrees
35	System should have Front-To-Back Isolation 25 dB
36	System should have Cross Polarization 20 dB
37	Certifications: Standard certification as required by GOI

P2P Specification

Sl.	Features	Description
1	Frequency	5.150 to 5.950 GHz or 2.4 Ghz (+/-)
2	Band Support	Radio Must support licence free band GHz or Unlicensed band
3	NLOS, nLOS operation	Radio Must support NLOS, nLOS condition with iOFDM
4	Throughput	System should support maximum of 1.36 Gbps aggregate throughput
5	Channel Bandwidth	Radio must support 2 channels, each channel with 20, 40, and 80 MHz
6	SPECTRAL EFFICIENCY	8.5 bps/Hz maximum
7	Channel Selection	Fixed frequency or DSO*
		Automatic selection on start-up
		Continual Self-optimization to avoid interference
8	Max Output Power at Antenna port	Up to 27 dBm, Varies with modulation mode and setting
9	Modulation	MCS 0 to MCS 9 (BPSK to 256 QAM)
10	Duplex Scheme	Time Division Duplex (TDD) Multiple transmit/receive duty cycles Split frequency operation allows separate transmit and receive frequencies where allowed by regulation.
11	Channel Bonding	System should support channel bonding
12	Sensitivity	-90 dBm
13	Distance Coverage	Up to 122 miles (200 km)
14	VLAN Support	VLAN support based on IEEE 802.1Q
15	Security	1AES 128 Encryption
		Identity-Based user account
		Configurable password rules
16	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Upload and download percentage should be user configurable.
17	MIMO	Physical Layer 2X 2x2 MIMO
18	Interfaces	* 1 Gigabit Ethernet * 1 SPF port
19	IPv6 support	System must support IPv6/IPv4 Dual stack support

20	Asymmetric non-adjacent channel Bonding	System should provide the flexibility for different band to configure different TX and RX frequency for master and slave radio
21	Spectrum analyzer mode	Built in Online Spectrum analyzer. Running spectrum should not affect the link performance
22	Support for Dynamic Spectrum Optimization	System should support DSO Technology to deliver the hitless performance. There must not be any outage in case of Spectrum analyzer run
23	Installation	Built-in e-alignment using GUI on Radio to assist in installation
24	Management	IPv6/IPv4 dual-stack management support SNMPv2 and SNMPv3, https, WPA-PSK2 Online spectrum analyzer (no impact on payload traffic)
25	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority, dynamic port VID
26	ARQ	System should have the support of ARQ
27	Ethernet Latency	Latency should be below 10ms with 90% Load condition
28	Antenna Type	External Dual Polarized Antenna support of desired gain
29	GPS synchronization	System should support GPS synchronization technique to eliminate interference
30	Operation Temp.	40°C to 55°C Outdoor (Including solar radiation)
31	Wind survival	Minimum 200 km/h
32	Protection	IP66 and IP67
33	Certificates	5.x GHz: FCC Part 15E ; RSS 247 Issue 2; EN 302 502; EN 301 893
		Safety: UL60950-1/22; IEC60950-1/22; EN60950-1.22; CSA-C22.2 No. 60950-1/22; CB approval with all National Deviations
		EMC: US Part 15B, Canada RSS-GEN, Europe – EN 301 489-1 and -17

RF Client Station specification

Item No.	Technical Specification
1	System must operate in unlicensed band frequency spectrum of ISM-III Unlicensed band. Operating frequency range: 5 GHz: 4910 – 5970 MHz (exact frequencies as allowed by local regulations)
2	System should support 20MHz, 40 Mhz and 80Mhz channel size
3	System must support Sector aggregate throughput of 600 Mbps
4	Ethernet Interfaced 100/1000BaseT, rate auto negotiated

5	System Should support Channel Spacing Configurable on 5 MHz increments
6	System Should have 1.8 GHz dual core ARM processor
7	System must support 2X2 MUMIMO/OFDM
8	System Should support IPv4/IPv6 Dual Stack
9	System Should support Input voltage 30 Volts Nominal (14V to 30V Range)
10	System Should support Protocols UDP, TCP, IP, ICMP, SNMPv2c, HTTPs, STP, SSH, IGMP Snooping
11	Management HTTPs, SNMPv2c, SSH
12	Transmit Power Range 0 to +29 dBm (combined, to regional EIRP limit) (1 dB interval)
13	System Should support spectrum analyzer
14	System should have the capability to adapt the hitless modulation mode depending on the link environment ensure best throughput while maintaining the link despite drop in link budget due to NLOS situation. Modulation level shall be dynamically adaptive between MCS0(BPSK)to MCS9 (256QAM5/6)
15	System must support the MTU size of 1700 Bytes
16	System Should support Spanning tree protocol for Layer 2 redundancy
17	System Should support DHCP server and client functionality
18	System should also define the priority of Broadcast, Multicast and voice traffic and rate limiting for broadcast traffic.
19	System should support Encryption 128-bit AES (CCMP mode)
20	System must have the VLAN 802.1Q with 802.1p priority
21	System should support the Layer 2 and layer 3 firewall based on source and destination to protect from any security breach
22	System Should support 120 Subscribers per Sector
23	Nominal Receive Sensitivity (w/FEC) @20 MHz Channel MCS 0 , -89 MCS 8 -66dBm Nominal Receive Sensitivity (w/FEC) @40 MHz Channel MCS0, -87 MCS9, -64 dBm Nominal Receive Sensitivity (w/FEC) @80 MHz Channel MCS0, -84, MCS9 - 59dBm Modulation Levels (Adaptive) MCS0 (BPSK) to MCS 9 (256 QAM 5/6)
24	GPS Synchronization via Internal GPS or Cambium Sync (Internal GPS receiver also contains a patch antenna and can be used without the external puck antenna)
25	System must support device event log
26	Software upgrade to system is done over the air as well as through the network
27	System should provide the complete statistic of Ethernet and wireless with detail of send/receive packet of unicast, multicast and broadcast
28	Quality of Service Three level priority (Voice, High, Low) with packet classification by DSCP, COS, VLAN ID, IP & MAC Address, Broadcast, Multicast and Station Priority, MIR/CIR support

29	System must support the syslog feature
30	System must support the basic troubleshooting feature such as Ping, Traceroute
31	Operating Temperature -30°C to +60°C (-22°F to +140°F)
32	System must have inbuilt surge suppressor of 1 Joule
33	System should have at least IP 67 environmental protection
34	Maximum power consumption should not exceed 12 W Maximum
35	Certifications: ECA , WPT , CE

TAXES AND DUTIES :

1	Bidder's quoted/ accepted rates/ price shall be inclusive of all taxes including GST, Charges, Royalties, any State or Central Levy and other taxes for materials if any obtained for the work and for execution of the contract. Any increase of above at any stage during execution of contract, including extension of the contract, shall have to be borne by successful bidder contractor. However, any increase of GST subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period (including extension, if the same is not attributable to you), shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. Benefit of any decrease of taxes including GST, Charges, Royalties, any State or Central Levy and other taxes for materials if any obtained for the work and for execution of the contract; subsequent to due date of offer submission as per NIT & TCN, by statutory authority shall be passed on to BHEL.
2	Successful bidder shall furnish proof of GST registration with GSTN Portal covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by successful bidder on BHEL for this project / work.
3	Since GST on output will be paid by BHEL as enumerated above, bidder's your quoted rates / price should be after considering the Input Credit under GST law at bidder's end.
4	TDS under Income Tax Act shall be deducted as per prevailing IT rules from the bills.
5	TDS under GST shall be deducted as per prevailing GST rules from the bills.
6	You may collect TCS under section 206C(1H) of Income Tax Act, 1961 if applicable.
7	In case, you collect TCS under section 206C(1H) of Income Tax Act, 1961, following compliance is required.
8	TAN and PAN of vendor should appear in all invoices/claims. Copy of TAN /TCS registration is to be submitted.
9	Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice.
10	You shall be required to submit certificate of TCS in Form no. 27D within 15 days from the due date for furnishing the statement of tax collected at the source.
11	In case, you do not collect TCS under section 206C(1H) of Income Tax Act, 1961, following declaration is to be submitted alongwith each invoice: - "I/We hereby declare that I/We are not required to collect TCS under section 206C(1H) of Income Tax Act, 1961, on this bill.

12	In event of failure to comply with the provisions of the Act, or proper certificate not issued, or if tax collected but not remitted to the Government, or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the vendor with applicable interest.
13	You shall comply with all statutory amendment/notifications in this respect.
14	Bidder shall note that GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred thereunder) wherein the 'Bill To' details shall encompass following. BHEL GSTN – 10AAACB4146P1ZU Name - BHARAT HEAVY ELECTRICALS LIMITED Address - Shall be intimated later. Specific details of BHEL GSTN, Name and Address as stated above, have been specified elsewhere in the tender.
15	Successful bidder to intimate immediately on the day of removal of goods (in case of any supply of goods) to BHEL along with all relevant details and send a scanned copy of Tax Invoice to BHEL through following communication mode for enabling BHEL to meet its GST related compliances. Portal address and Email address – Shall be intimated later. Specific details of above shall be intimated to successful bidder by BHEL at appropriate juncture.
16	In case of delay in submission of above-mentioned documents on the date of despatch, BHEL may incur penalty/ interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from successful bidder, in case such delay is not attributable to BHEL.
17	In case of raising any Supplementary Tax Invoice (Debit / Credit Note), successful bidder shall issue the same containing all the details as referred to in Section 34 read with Section 31 of GST Act & Rules referred there under.
18	Successful bidder shall comply with the Time Limit prescribed under the GST Law and rules thereof for raising of the Tax Invoice. If any supply of goods is applicable, successful bidder shall also ensure prompt delivery of goods after despatch.
19	Bidder shall note that in case GST credit is delayed / denied to BHEL due to delayed / non receipt of goods and / or Tax Invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons, not attributable to BHEL, GST amount shall be recoverable from successful bidder along with interest levied/ leviable on BHEL, as the case may be.
20	Successful bidder shall upload the invoices raised on BHEL in IFF/GSTR-1 within the prescribed time as given in the GST Act, and the same should be available to BHEL in FORM GSTR-2B electronically through the common portal; and confirmation of payment of such GST to the Government through filing of GSTR-3B of corresponding month/quarter. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the successful bidder along with interest levied / leviable on BHEL.

21	Successful bidder to arrange for e-waybill for any movement of goods for the execution of the contract. Successful bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit / Way Bill, if required, shall be arranged by successful bidder and BHEL will not supply any Road Permit/ Way Bill for this purpose.
22	Any new taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period (including extension, if the same is not attributable to you), shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.
23	Benefits and / or abolition of all existing taxes must be passed on to BHEL against new taxes, if any, proposed to be introduced at a later date.

ANNEXURE B PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ 1 through its Unit at.....(name of the Unit) having agreed to exempt (Name of the Vendor / Contractor / Vendors) with its registered office at _____ 2 (hereinafter called the said "Contractor" which term includes vendors), from demand under the terms and conditions of the Contract reference No. _____ dated _____ 3 valued at Rs.4 (Rupees -----)4 (hereinafter called the said Contract), of Security Deposit for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs. _____ 5 (Rupees _____ only), we ____ (indicate the name and address of the Bank) having its Head Office at _____ (address of the head Office) (hereinafter referred to as the Bank), , at the request of _____ [Contractor(s)], being the Guarantor under this Guarantee, do hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer, , an amount not exceeding Rs. _____ without any demur, immediately on demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____. We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal. The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment. We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) or acceptance of the final bill or discharge of this guarantee by the Employer, whichever is earlier. This guarantee shall initially remain in force upto and including _____ 6 and shall be extended from time to time for such period as may be desired by the Employer. Unless a demand or claim under this guarantee 13 | P a g e is made on us in writing on or before the _____ 7, we shall be discharged from all the liability under this guarantee thereafter. We, ____ (indicate the name of the Bank) ____ further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us. The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor,

in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities. This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s). We,..... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing. Notwithstanding anything to the contrary contained hereinabove: a) The liability of the Bank under this Guarantee shall not exceed..... 5 b) This Guarantee shall be valid up to6 c) Unless the Bank is served a written claim or demand on or before _____7 all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank. We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the _____ Bank.

\$Q\?FODLP?RU?GLVSXWH?DULVLQJ?XQGHU?WKH?WHUPV?RI?WKL?*XDUDQWHH?VKDOO?EH?VX
EMHFW?WR?WKH?H[FOXVLYH?MXULVGLFWLRQ?RI?WKH?FRXUW? DW?.RONDWD?RQO\? Date
_____ Day of _____ for ____ (indicate the name of the Bank) (Signature of Authorised
signatory) 14 | P a g e 1

ADDRESS OF THE EMPLOYER. I.e Bharat Heavy Electricals Limited 2 ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER . 3 DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE 4 CONTRACT VALUE 5 BG AMOUNT IN FIGURES AND WORDS 6 VALIDITY DATE 7 DATE OF EXPIRY OF CLAIM PERIOD Note: 1. Units are advised that expiry of claim period may be kept 3-6 months after validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor. 2. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee. 3. In line with the GCC, SCC or contractual terms, Unit may carry out minor modifications in the Standard BG Formats. If required, such modifications may be carried out after taking up appropriately with the Unit/Region's Law Deptt. 4. In Case of Bank Guarantees submitted by Foreign Vendors? a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located. b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank) b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements. b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed. b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). The BG Format provided to them should clearly specify the same.