Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
An ISO 9001 Company
CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING

ENQUIRY	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : tvenkat@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2620700077	**14.08.2007**	**28.09.2007**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order.			

Item	**Description**	**Quantity**	**Delivery (Item required at BHEL on)**
10	Real Time Radiography for STBW - I (Real Time Radiography System with 320 KVA Constant Potential X – Ray Equipment with Swivelling Arrangements and Digital Flat Panel Detector for Industrial Application) as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	2 Nos.	30.01.2009
20	Real Time Radiography for STBW - II (Real Time Radiography System with 320 KVA Constant Potential X – Ray Equipment with Swivelling Arrangements and Digital Flat Panel Detector for Industrial Application) as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	30.01.2009
30	New Real Time Radiography Testing Station for the Existing FT Stn.II (Real Time Radiography System with 320 KVA Constant Potential X – Ray Equipment with Swivelling Arrangements and Digital Flat Panel Detector for Industrial Application) as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	30.03.2008
Note:- The technical specifications (Part – A & Part – B) are common for all the above three items.			

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Item	Description	Quantity	Delivery (Item required at BHEL on)
	BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats along with technical specifications can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2620700077".		
Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present		Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED Manager / Capital Purchase / MM / Manufacturing	

PART A

SECTION – I: QUALIFYING CRITERIA

The BIDDER / VENDOR (OEM) has to meet the following requirements to get qualified for submitting an offer for REAL TIME RADIOSCOPY SYSTEM with DIGITAL FLAT PANEL SYSTEM.

S. No.	REQUIREMENTS	VENDOR's COMMENTS
1	The Bidder / Vendor (OEM) shall have a minimum of FIVE Years of Continuous Experience in the field of Design, Manufacture "Real Time Radioscopy System (RTR) with 320kV constant potential X-Ray system and Digital Flat Panel systems". Indicate the actual experience.	
2	Only those vendors (OEMs) should quote, who have supplied and commissioned at least one "Real Time Radioscopy System (RTR) with 320kV constant potential X-Ray system and Digital Flat Panel systems" in the past Ten years (on the date of opening of Tender) and such machine should presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender), However, if such equipment has been supplied to BHEL, then the same must be currently working satisfactorily for not less than six months (as on date of Tender Opening) from the date of commissioning and acceptance.	
2.1	**Performance certificate from the customers regarding satisfactory performance of such equipment supplied to them in attached format should ~~to~~ be enclosed along with technical offer.**	
2.2	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION – II

The BIDDER/ VENDOR (OEM) is requested to furnish the following information:

S. No.	PARTICULARS	VENDOR's RESPONSE
3	Profile of the Company bringing-out the years of Experience of the BIDDER in the field of design, manufacture and supply of "Real Time Radioscopy System(RTR)with 320kV constant potential X-Ray system and Digital Flat Panel systems"	
4	Number of "Real Time Radioscopy System(RTR)with 320kV constant potential X-Ray system and Digital Flat Panel systems" supplied, installed and commissioned till date (with details on equipment type / model, configuration, customer and quantity)	
5	Details on International Standards / Design Process Codes followed in Design and Manufacture of the Equipment.	
	Comprehensive Details on Performance Testing - of the Equipment quoted, to be ensured in presence of BHEL Executives, prior to dispatch from Supplier's Works	
6	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centers in India. Competency & Experience of the Local Service Agency are to be provided.	
7	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER/ VENDOR (OEM) to note the following:

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
8	The BIDDER / VENDOR (OEM) shall submit the offer in TWO PARTS -Technical **[with PART A & PART B]** & Commercial and Price Bid.	
9	The Technical Offer shall be supported by Product Catalogues & description.	
10	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement against clauses where details have been sought may lead to disqualification of the Technical Offer.	
11	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation of the inclusion of all the accessories, toolings, attachments, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
12	BIDDER / VENDOR (OEM) has to indicate the Country of Origin for the supply of equipment.	

PERFORMANCE CERTIFICATE

(On Customer's Letter Head)

1. Supplier of the machine :

2. Make & Model of the Equipment :

3. Month & Year of Commissioning :

4. Application :

5. Jobs Performed in the machine :

   Rating of Power source :

6. Performance of the Machine : Best in the market /
   (Strike off whichever is not applicable) Satisfactory /
   Good /
   Average /
   Not Satisfactory

7. Any other remarks:

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART-B

TECHNICAL SPECIFICATIONS FOR REAL TIME RADIOSCOPY (RTR) SYSTEM WITH 320KV CONSTANT POTENTIAL X-RAY EQUIPMENT WITH SWIVELING ARRANGEMENT AND DIGITAL FLAT PANEL DETECTOR FOR INDUSTRIAL APPLICATIONS.

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
1.0	Description of the Real Time Radioscopy System	The Real Time Radioscopy System,(RTR) consists of an X-Ray Source(320 kV constant potential X-Ray system with swiveling arrangement)and an Imaging System (Digital Flat Panel Detector).The out put of the over all system shall be Digital Radioscopic Image meeting the sensitivity as well as other requirements ,as outlined subsequently in this technical specification. Section-I: 320 kV constant potential X-Ray system Section-II: Digital Flat Panel Detector	
2.0	Area of Application	Online Radioscopic Inspection of Straight Tube Butt welds in Steel for detection of defects and to meet the 2% quality level (IQI Sensitivity ASTM 2-2T) as per ASME section V.	
2.1	Job Details	Butt Welds of Seamless Steel Tubes of Diameter 25.4 mm to 89 mm and Double wall Thickness ranging from 8mm to 30 mm.	

Section –I: 320 kV Constant Potential X-Ray system

Sl. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
3.0	Principle of Operation	320 kV constant potential X-Ray equipment is the Radiation source in the RTR system .It Generates continuous X- rays by bombardment of high speed electrons on high atomic number Target (Tungsten)and it will have 100% duty cycle.	
4.0	Design Base	Constant potential Bi polar metal ceramic X ray tube with capacity 320 Kv/10mA (by varying potential difference across the electrodes (15 kV to 320 kV) with varying tube current 0 to 10 mA High frequency: 40 kHz out put for stability, low ripple and better sensitivity.	

5.0	Equipment Configuration	The minimum desired features are enlisted below	
5.1	Operating Parameters	**Tube voltage:** Minimum 15 Kv to 320 Kv (Variable insteps of 0.2 kV). **Tube Current** Minimum 0.5 mA to 10mA (Variable in steps of 0.1mA).	
5.2	Focal Spot	Dual focal spot preferable (with large focus 1.8 mm and mini focus 0.8mm) as per IEC 336	
5.3	Tube current	To be specified by supplier for large focus and mini focus at 320kV.	
5.4	Exposure Time	Digital display: 1 Second, in steps up to 60minutes	
5.5	Pre warning	1 to 30 seconds	
5.6	Programmed operation	For storing 100 data sets, with read out message for error (With passwords), supplier to specify	
5.7	Inherent filter	Preferably Beryllium filters. Supplier to specify	
5.8	High voltage connections	Two plugs socket with locking lever and safety features, to be specified by the bidder.	
5.9	High Voltage cables	High Voltage cables to have Anode and Cathode connections with 10 meters in length, both ends Rubber cone covered plugs.	
5.10	Dose out put with inherent filter	Supplier to specify	
5.11	Dose-Rate	in Sv/min (R/ min) at 1 M with and without filter - Supplier to specify	
5.12	Leakage level radiation (at full load)	Shall not exceed 1R / 1Hour /1metre from focal spot.	
5.13	Control Unit	Digital Control Unit containing Power Module, Control Module [with clear text in English], Control Cabinet [with table top], Standard Operating Programs, Inter-Connecting Cables [with length of approximately 20 meters], Control Unit Lock & Key, etc.	
5. 14	Cooling Unit	a. Heat Exchanger Type Cooling Unit with suitable rating and efficient coolant pump, to meet the peak-load operational requirements. b. The unit shall have the in-built warning system for unit failure, low level of coolant, lack of flow, leakage, etc. and connected with the tripping mechanism of the main equipment. c.BIDDER to furnish complete details on the Cooling System with Accessories provided and to list down Essential Spares like Cooling Fans, pair of Coolant	

		Circulation ,Hoses with end connectors, etc.	
5.15	Flash Lamp	A Warning Flash Lamp with fail-proof safety circuit shall be supplied with 20-meter long cable.	
5.16	X-Ray Unit Manipulator	a.A suitably designed Manipulator having arrangement for swiveling from **+ 45** Degrees to **Zero** and then to **– 45** Degrees, for the movement of the X-Ray Head. b.The Manipulator has to be operated from the Control Room.	
6.0	Weight	Approximately 35 Kg (Supplier to specify.)	
7.0	Safety interlocks	Built in safety interlocks to switch off the system in case of emergency and safety with door interlocks.	
7.1	Input Electric Power Supply	a. BHEL will provide Electric Input Power Supply at ONE POINT only, With 230 ± 10 % V, 50 Hz, Single Phase AC through a 3 wire system [Phase, Neutral & Protective Earthing]. **O R** With 415 ± 10 % V, 50 Hz, Three Phase AC through a 3 wire system [No Neutral Conductor, 4^{th} wire for Protective Earthing]. b. BIDDER to take supply from this SINGLE Point to all the sub-systems of the equipment through proper step-up or step-down transformers.	
7.2	Ambient Condition	a.The uncontrolled ambient room conditions are : 1)Temp:18 to 40° C 2)Relative Humidity : 45 to 85 % b.BIDDER to specify the atmospheric conditions, as the working environment for the OFFERED Equipment to deliver precise results and serve for a prescribed life of the Equipment.	
7.3	Accessories	BIDDER to list down (with UNIT RATE) the various ACCESSORIES to be procured with the EQUIPMENT to enhance the Operating Efficiency and Features of the OFFERED EQUIPMENT, over and above those mentioned in the SPECIFICATIONS.	
7.4	Safety and Quality Standards	a. Supplier to ensure Safety and Quality of X-Ray System, which shall conform to International Standards. b. Conformance certificate to be given along with the equipment	
8.0	Scope of supply	Total Number of X-Ray systems-3 Numbers. (One for each RTR system) Following shall be supplied compulsorily with the each system : 1. X ray head as per BHEL specifications- 2. High voltage Generators	

		3. High Voltage Cables: 1 pair. 4. Power connection cables : 5. Digital Control unit 6. Cooling system: 7. Warning flash lamp 8. Programmable motor control Diaphragm 9. Manipulator having swivel arrangement from +45 degrees to Zero to –45 degrees, for movement of x-ray head to be operated from control room. 10. HT Silicon paste:1 kg (in 100 grams pack) 11. Service tool kit 12.Necessary Standard/Certificate traceable to National/International Standard. 13. Optional/Compulsory Accessories 14..Spares & Consumables 15.Lead shutters (X & Y movement) mounted on the X-Ray port, operable from the control room 16. Inspection at Supplier's Works & Training 17.Installation, Commissioning & Performance Prove-Out and Training on Operation, Trouble Shooting & Maintenance 18.Documentation: Testing & Calibration Certificates O & M Manuals [3 Sets] Radiation Safety equipments (for Three systems together) a) Radiation Zone monitor (Wall mountable) with range 0 to 100 mR/hr-3 No.s	
9.0	Consumables for Main Equipment & Accessories	BIDDER has to list down the CONSUMABLES to be used in the Operation of the Equipment and QUOTE with UNIT RATE for all the listed consumables, to be procured with the equipment.	

10.0	Spares for Main Equipment & Accessories	a. BIDDER has to list down the SPARES under Mechanical, Electrical & Electronic Category for the Main Equipment & Accessories for Equipment Operation in 3 shifts a day and for 365 days in a year. b. BIDDER has to compulsorily quote for the following Commissioning Spares with the TECHNICAL OFFER: 1) High Voltage Cables for 320kV - 1 Pair 2) All types of PCBs for X-Ray Control System-1Set 3) Critical Spares for X-Ray Head and HT Transformer-1Set 4) All Signal Cables - 1 No. each 5)All Fuses – 3 Sets.	

Section –II: DIGITAL FLAT PANEL DETECTOR **FOR REAL TIME RADIOSCOPY SYSTEM**

Compatible with 320 kV X Ray constant potential system

S. No.	PARTICULARS	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
11.0	Principle of Operation	The Digital Flat Panel Detector is an imaging device in lieu of Photographic film / Image intensifier used for RTR of welds.X-Rays are made to pass through the weld and the image of the weld is captured concurrently with x ray irradiation. The Flat Panel Detector converts X ray image into Visible Digital Image and displays On a computer monitor.	
12.0	Radioscopic Technique	Double wall double Image Technique to achieve 2% Penetrameter sensitivity.	
13.0	Mechanical specification	The Flat Panel with an active area of 200 x 200 mm, with weight less than 20kg,with power supply connector, trigger connector, provision for grounding, plug for potential equalization mounted on Flat Panel. Electronics of the system (such as chip on board module (COB) for charge amplifiers and rod drivers, Pre-controlling COBs, PCB signal generation, Main PCB for interconnecting all the PCBs, FPGA control	

		and HIIB generation) shall preferably be mounted beside the active area, to avoid the direct exposure to radiation. Flat Panel Housing shall be of preferably Aluminum. The sensor/scintillator shall be protected. Supplier to specify the size of the Panel.	
13.1	Operating Parameters for Flat Panel	(a) Input X Ray Radiation 15 to 320 kV, @intensity 1-10mA (b) Environmental condition: Temperature-Room Temperature (20-40 ^{0} C) RH maximum 85%**;** Mains supply 240V + / - 10V Frequency: 50-60 Hz	
13.2	Technical Features	As follows	
13.2.1	Flat Panel Detector System	The Flat Panel system shall include: (1) **Acquisition System** including (a) Detector Panel (b) Panel Controller (c) Panel Temperature Control (d) Real Time Image Display monitor and Real Time Image Controller (e) Acquisition Control Station (Computer, software and data interface cables) (f) Mechanical fixture for mounting the panel in line with the X-Ray system, and connected to swiveling arrangement such that the Source to detector distance and height can be adjusted. (2) **Image Review Station to Review images** (a) Computer with CD archival unit, monitor, keyboard and mouse (b) Image Review Software Data and image storage and management system essential	

13.2.1.1	Detector specification	**(1)(a) Detector Panel:** ***Receptor type:*** *Amorphous Silicon* ***Conversion screen (Scintillator)*****:** supplier to specify ***Active area*****:** 200 x 200mm^2(minimum) (Supplier to specify) ***Pixel matrix*****:** 1024 x 1024(minimum), (supplier to specify) ***Pixel pitch*****:** 200micron or lesser (supplier to specify) ***Other selectable fields*****:** supplier to specify. ***Controllable detector adjustments*****:** Offset,Gain,Non linearity,pixel correction. (Supplier to specify) ***Electronics:*** ADC – Atleast 14-bit Dark current- <1pA/Pixel Saturation charge of ASIC- Supplier to specify ***Applicable fields of X-Ray voltage*****:** 15kV to 320kV. ***Conversion factor*****:** - supplier to specify in Cd/M^2 / μGy/second ***Limiting visual resolution*****:** Supplier to specify(Without magnification & With magnification) ***Modulation Transfer Function (MTF)***-Supplier to specify ***Non Linearity*****:** <+- 2% ***Dynamic Range:*** Atleast 3500:1. ***Integral distortion in percentage*** *(%)*- Supplier to specify. ***Mode*****:** Real Time (Dynamic). ***Frames Rate:*** 30 Frames/Second.(Supplier to specify the Frame rate to achive the real time image) ***Integration time:*** Supplier to specify corresponding to 30frames/second ***Image Capturing Time:*** Supplier to specify ***Shutter arrangement to be operated from control room*****-** Specify whether it is an integral part of the system or not. It is to be separately quoted if it is not a part of the system, but an accessory. (Supplier to specify.)	
		BLOOMING: Confirm that there will not be any blooming of the quoted Digital Flat Panel, due to direct exposure of it, when used without masking the job, up to 320 kV of X-Ray Voltage. How ever the filters (Aluminium, Copper etc.) can be used at the X-Ray port for controlling the Blooming. Clearly specify any other method including softwares which can be used to avoid the blooming problem and ensuring an image free from blooming meeting 2% penetrameter sensitivity requirement	

		LAG- Preferably <10%. Supplier to specify	
		Signal to Noise Ratio: Supplier to specify	
13.2.1.2	Mechanical Fixture over which Flat Panel is mounted	The flat Panel shall be mounted on a Mechanical fixture in line with the X-Ray system, and connected to swiveling arrangement such that 1) Source to detector distance shall be adjusted between 700 to 1250mm 2) Height - adjustable between 1 to 1.5 meter. NOTE:The Inner dimensions of the X-Ray hall is apprx 4 x 3 meters.	
13.2.1.3	Acquisition Station	**(a)Acquisition Control Computer**- -Hard drive with over 2GHz processor, with Industrial Rack mount chassis, dual processors, min 1GB RAM, min 80GB hard disc capacity with Additional Graphics Card, DVD/CD, 100Base T network interface with RJ-45 socket, minimum 1280x1024 pixel &0.25mm(maximum) pitch antiglare flicker free TFT/LCD color monitor, , key board and optical mouse. The acquisition system shall have sufficient disk space for temporary storage of over 2400 full frame digital radiographs. - Supplier to specify Display: preferably, Automatic Gray scaling (16 to 8 bit conversion) for monitor display (supplier to specify)	
		(b) Acquisition Control Software- -With graphical user interface. The software shall include a sequenced, graphical user interface to guide the operator through system initialization, calibration and validation, plus selection of each part. -Real Time Images shall be displayed on a monitor connected directly to detector controller for Real time Image Processing, and to average and store multiple static images.	
		-The images must be available for programming the ADR in real time. For this, the Supplier shall provide the source code of the image acquisition software or, Provide the images in standard image format (BMP is preferred) in real-time (**with out user specification or user prompted file saving**) in a fixed location in the PC hard drive.	

13.2.1.3	Review Station	Image Review station shall be networked to acquisition stations, and static images shall be automatically transferred to review station after acquisition. **(a)Review station computer**: (The system shall have the following minimum specifications Hard drive- over 2GHz processor, 1 GB (min) RAM, MIN 80GB hard disc, with Additional Graphics Card • Archival drive-DVD/CD Reader and Writer. • Monitor, key board, mouse	
		(b)Review software: It shall be compatible with NIMA DICOM3.0 standard and with ASTM DICONDE standard for image format and functionality. It shall have the facility to make the image automatically available in BMP, JPEG and TIFF image file format for use in standard applications. Image Processing functions: The software should be capable of performing the following functions - Noise reduction through integration. - Contrast enhancement - Edge enhancement - 16 bit filter capability, with different Kernel sizes. - Law pass filter, high Pass filter, median, crisping, pseudo 3D etc. - 8-bit type predefined filters for all type of image processing.	
13.4	Dose overload	(Supplier to specify)	
13.5	Temperature control system	The ambient temperature can be up to 40^0 c. The detector shall have a low maintenance, closed loop temperature regulating system, and triple regulated power supplies to stabilize detector operation.	
13.6	Input Electric Power Supply	230 ± 10 % V, 50 Hz, Single Phase AC through a 3 wire system [Phase, Neutral & Protective Earthing]	
13.7	Calibration	Factory calibration	
13.8	Ambient Condition	The uncontrolled ambient room conditions are: a) Temperature: 18 to 40 ° C, b) Relative Humidity: 45 to 85 % BIDDER to specify the atmospheric conditions, as the working environment for the OFFERED Equipment to deliver precise results and serve for a prescribed life of the Equipment.	

13.9	Accessories	BIDDER to list down (with UNIT RATE) the various ACCESSORIES to be procured with the EQUIPMENT to enhance the Operating Efficiency and Features of the OFFERED EQUIPMENT, over and above those mentioned in the SPECIFICATIONS.	
14.0	Scope of supply	Total number of Flat Panel systems-3 No (One for each RTR system) Following (except accessories) shall be supplied compulsorily with each Equipment: a) Digital Flat Panel System as per specification – b) Power cables as well as other required inter connecting cables c) Mountable operator control panel with keypads and cables. d) Remote Control Shutter for Flat Panel e) Necessary Standard / Certificates traceable to National / International Standards. f) Spares. All signal cables-1 set. All PCBs –1 set All fuses-1set <u>Accessories:</u> Total 2 Sets for the entire system 1) Duplex wire type IQI EN 462 Part 5 2) Converging Line pair Quality indicator 3) Linearity Quality indicator	
15.0	Consumables for Main Equipment& Accessories	BIDDER has to list down the CONSUMABLES to be used in the Operation of the Equipment and QUOTE with UNIT RATE for all the listed consumables, to be procured with the equipment.	
16.0	Spares for Main Equipment & Accessories	BIDDER has to list down the SPARES Printed Circuit Boards – PCBs, etc.) Coming under the Category of Mechanical, Electrical & Electronic Spares for the Main Equipment as well for the essential and optional desirable Accessories. To be replaced with actual spares and accessories. BIDDER to QUOTE with UNIT RATE for all the listed SPARES, to be procured with the equipment.	

17.0	Performance Prove-Out at BHEL	The Supplier has to conduct demonstration of the following in accordance with ASME Boiler and Pressure vessel code section V. **Resolution of the Digital Flat Panel System:** Resolution shall be minimum 2.5 line pair /mm. (at MTF>20%) **IQI Sensitivity-** 2 - 2T(2%), using ASTM strip hole type pentameters for Single wall Steel thickness ranging from 4 to 12 mm.	
18.0	Inspection & Acceptance	**The over all system and accessories shall be offered for Inspection to BHEL Engineers at vendors works. The RTR system (consisting of the items described as per section – I and Section-II) shall be demonstrated for it's Performance Prove-Out using the samples of Steel tubular butt weld joints with single wall thickness ranging from 4 to 12 mm, and using a Double Wall Double Image Technique, to meet the quality requirements a specified in Clause 17.**	
19.0	Installation and commissioning	The over all RTR system and accessories (consisting of the items described as per section –I and Section-II) is to be installed & commissioned at BHEL Works, FREE OF COST, by the SUPPLIER.	
20.0	Documentation in ENGLISH Language	3 Copies (In English) of the Operation & Maintenance Manuals containing Electric Schematics, Circuit Diagrams, PCB Drawings, Trouble Shooting Charts, Mechanical Sub-Assemblies, Rating of Bought-Out Items, etc. shall be supplied, at the time of inspection by BHEL Engineers. In addition, one SOFT COPY in CD to be supplied.	
21.0	Performance Guarantee	The over all RTR system and accessories (consisting of the items described as per section –I and Section-II, including Bought-Out Items) are to be guaranteed for its performance for a minimum period of two years from the date of performance acceptance at BHEL Works.	
22.0	Service and Spares Support Requirements	Vendor shall ensure after the guarantee period, through trained service personnel in India for next 5 years as and when need arises. Spares to be made available with in 1 week.	
23.0	Training on	Complete Training for BHEL Engineers is to be given on Operation &	

	Operation & Maintenance	Maintenance of the OFFERED system.	
24.0	Annual Maintenance Contract - AMC	The BIDDER has to QUOTE for AMC with detailed scope of work.	
25.0	Safety and Quality Standards	Supplier to ensure that Safety and Quality of Digital Flat Panel shall conform to International Standards. Conformance certificate to be along with the equipment.	