

**Corrigendum No-3**

**NOTICE INVITATING TENDER FOR THE SUPPLY OF IMAGING &  
RADIOLOGY EQUIPMENTS ON RENTAL / LONG TERM LEASE BASIS**

**Revised Bid Document**

**Tender No.HLL/CHO/HCS/MI/2016-17/02A Dated 05-11-2016**



**HLL LIFECARE LIMITED  
CORPORATE AND REGISTERED OFFICE  
HLL BHAVAN, POOJAPPURA  
THIRUVANANTHAPURAM -695 012  
PH.NO:0471-2354949**

**05-11-2016**

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HLL Lifecare Limited  
(A Government of India Enterprise)

**Corporate and Regd. Office:**  
**HLL Bhavan, Poojappura,**  
**Thiruvananthapuram-695 012**  
**Kerala,India.**  
**Ph: 0471-2354949**

**Dated: 25-08-2016**

### **NOTICE INVITING TENDER**

Sealed tenders are invited in single cover system from individuals or agencies, who are willing to provide the following imaging and radiology equipments on monthly rental / long term lease basis to HLL Lifecare Limited at various sites across the country.

Sl. No	Specification of equipments	Preferred make	Tender Publishing Date	Pre-Bid Meeting Date, Time & Venue	Tender submission details	
					Last Date & Time of submission	Bid Opening Date & Time
1.	3 Tesla MRI Machine	Philips/ GE/ Siemens / Hitachi make	25-08-2016	30-08-2016 at 2:00 PM  Venue:- Hindlabs Diagnostic Centre & Specialty Clinic, Sopanam Complex, Near Govt. Medical College, Trivandrum- 695 011 Phone No: 04712443445	17-11-2016 upto 15:00 Hrs	17-11-2016 on 16:00 Hrs
2.	3 Tesla MRI Machine with Cardiac application and Mammography	Philips/ GE/ Siemens / Hitachi make				
3.	1.5 Tesla MRI Machine	Philips/ GE/ Siemens / Hitachi make				
4.	1.5 Tesla MRI Machine with Cardiac application and Mammography	Philips/ GE/ Siemens / Hitachi make				
5.	128 Slice CT Machine	Philips/ GE/ Siemens / Hitachi make				
6.	16 Slice CT Machine	Philips/ GE/ Siemens / Hitachi make				
7.	Ultra Sound Scanning Machine	Philips/ GE/ Siemens / Allengers make				
8.	Mammography Machine	Philips/ GE/ Siemens / Allengers make				
9.	X-Ray -250 MA with CR system	Philips/ GE/ Siemens / Allengers make				
10.	X-Ray -500 MA with CR system					
11.	Portable X-Ray unit (300 MA) with CR System	Philips/ GE/ Siemens / Allengers make				

Place of Opening of Bid : HLL Lifecare Limited  
HLL Bhavan,  
Poojappura  
Trivandrum, Kerala- 695012  
Phone No – 0471 2354949

Address for Communication : Associate Vice President  
Healthcare Service Division  
HLL Lifecare Limited  
HLL Bhavan,  
Poojappura  
Trivandrum, Kerala- 695012  
Phone No – 0471 2354949

Email ID : [hindlabs@lifecarehll.com](mailto:hindlabs@lifecarehll.com)

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*Notes:*

- 1. Tender documents can be downloaded from the HLL web site [www.lifecarehll.com](http://www.lifecarehll.com) from 28-08-2016 onwards.*
- 2. Tenders should be submitted in cloth lined cover super scribing the Tender Title, Tender Number and Last Date of Submission details. Tenders without EMD will be summarily rejected.*
- 3. HLL Lifecare Limited, reserves the right to reject any or all tenders without assigning any reason thereof.*
- 4. Further details can be had from the website of HLL Lifecare Limited (or) Office of the Associate Vice President , Healthcare Service Division, HLL Lifecare Limited, HLL Bhavan, Poojappura P.O., Trivandrum- 695 012.*

## **GENERAL TERMS & CONDITIONS**

### **1. Eligibility criteria:**

- a. Bidder can be an individual / a firm / OEM
- b. The bidder should have sound financial background with net positive worth for the past three financial years. The balance sheet/ IT returns for the last three financial years duly certified by a Chartered Accountant shall be submitted as a proof along with the Bid.

### **2. The bidder should be ready to procure and install the equipment quoted at HLL's site as per the required specification /make by HLL, from time to time. The number of equipment which the bidder is ready to provide to HLL during the Financial Years 2016-17 and 2017-18 may be specified in the Finance Bid. **The rate for brand new machine and pre-owned machine shall be quoted separately as per the prescribed format of price bid.****

### **3. Technical Specification of Equipment**

1. General technical specification of each category of equipment is given as annexure- A
2. The bidder can quote either for Brand new machine or Pre-owned machine or both as per the given price bid format.
3. Pre-owned machines which are less than 2 year old and than 5 year valid CMC will be considered. Copy the original Performa invoice of machine, the warranty certificate, CMC copy and other relevant item mentioned in clause number: 15 from the OEM shall be provided along with Technical bid.
4. The Radiology equipment shall be type approved by Atomic Energy Regulatory Board.

### **4. Earnest money of Rs.2.00 Lakhs** in the form of a Demand Draft taken from a scheduled bank, payable at Thiruvananthapuram, Kerala issued in favor of **HLL Lifecare Limited, HLL Bhavan, Poojappura, Thiruvananthapuram, Kerala**, which should be placed in a separate sealed cover marked "**Earnest Money**" shall be submitted along with the tender. EMD of the unsuccessful bidders will be returned within 15 days from the date of issue of work order.

**5. Performance Security:**

- a. The successful bidder has to submit a performance security for each equipment in the form of Bank Guarantee from a nationalized bank valuing at least 5% of the equipment value, valid for the entire period of contract. This shall be submitted within 21 days of receiving of Notice for Award of Contract, failing which the EMD may be forfeited and the Contract may be cancelled. The EMD of the successful bidders will be returned within 15 days from the date of receipt of performance security. The bid has to submit a confirmation affidavit regarding furnishing Performance Security in case of award of contract along with the bid.
  - b. If the Selected Bidder / Service Provider violate any of the terms and conditions of contract, the Performance Security shall be liable for forfeiture, wholly or partly, as decided by the HLL and the contract may also be cancelled.
  - c. The HLL will release the Performance Security without any interest to the Selected Bidder / Service Provider on successful completion of Contractual term and/or its obligations.
- 6.** The filled & duly signed tender (signature on all pages of the tender) should be submitted to Office of the Associate Vice President, Healthcare Service Division, HLL Lifecare Limited, HLL Bhavan, Poojappura P.O., Trivandrum- 695 012 on or before **17-11-2016 by 15.00 Hrs.** The application shall be clearly marked **“Tender for the Supply of Imaging and Radiology Equipments on Rental / Long term Lease Basis”**. The tender will be opened at **16.00Hrs** on the same day itself in the presence of interested bidders or their authorized representatives who choose to attend at the time of opening of tender.
- 7.** A duly notarized declaration from the bidder in the format given in the “Appendix B” to the effect that the firm has neither been declared as defaulter or black-listed by any Competent Authority of Government of India or Government of any State
- 8.** The rate quoted vide this tender for rentals/ lease rental shall be valid for 2 years lease /rent period from the date of start of lease. In case of discrepancy in the quoted prices, the price written in words will be taken as final and valid.
- 9.** The rental rates shall be revised by 5% year on year after the completion of 2 years upto 5 years

**10. Late Bids**

- a) Bids received after the due date and the specified time (including the extended period if any) for any reason whatsoever, shall not be entertained and shall be returned unopened.
  - b) The bids submitted by telex/telegram/fax/e-mail etc. shall not be considered. No correspondence will be entertained on this matter.
  - c) HLL Lifecare Ltd shall not be responsible for any postal delay or non-receipt/non-delivery of the documents. No further correspondence on the subject will be entertained.
  - d) HLL Lifecare Ltd reserves the right to modify and amend any of the above-stipulated condition/criterion depending upon project priorities vis-à-vis urgent commitments.
- 11.** Rates quoted should be inclusive of all cost of equipments, installation charges at HLL's proposed sites, loading and unloading charges at the sites, CMC charges for Five years including the warranty period etc. The CMC shall be provided by the Lessor for the entire lease period.
- 12.** The Management reserves the right to accept or reject the Tender either partially or fully without assigning any reason what so ever.
- 13.** During the installation and commissioning of the equipment, the contractor or authorized representative should be present at site.
- 14.** The Contractor has to arrange necessary insurance coverage for the machine, workmen etc. deployed by him. He shall arrange all safety measures to protect his workmen and also the properties of HLL.
- 15.** Following documents related to the equipment should be attached along with bid document.
- a) Company brochure/catalog and Technical literature
  - b) Copy of the purchase invoice of the machine (applicable to bidders other than OEM's)
  - c) AERB approval copy in the case of the radiology equipments
  - d) Product certificate from OEM for each equipment in the case of non OEM bidders.

- 16. Turnkey work at site:** The turnkey work of the bidder is limited to the safe unloading and handling of equipment at site, installation and commissioning. Major electrical, civil modification work shall be done by HLL at its own cost. In the case of MRI the supply of RF & shielding work will be under the scope of bidder.
- 17. Insurance coverage of equipment and accessories supplied along with machine:** The bidder has to provide insurance for the equipment for the entire leasing/ rental period.
- 18. Lease term / Rental term:** Minimum 5 years can be extended up to 7 years depending upon the condition and performance of system.
- 19. Financial offer: The offer is restricted to Rental/ Operational lease and financial lease models only. The bidder can quote for any or all the options.**
- 20. Taxes & Duties:** The quote shall be on a basic rate plus applicable taxes basis (both components separately quoted). The rate quoted vide this tender shall be valid for 2 years of lease /rent period.
- 21. Evaluation Process**
  - 1) HLL Lifecare Ltd will constitute a Bid Evaluation Committee to evaluate the responses of the bidders.
  - 2) The bids will be scrutinized by the Bid Evaluation Committee appointed by the HLL Lifecare Ltd to determine whether they are complete and meet the essential and important requirements, conditions set out by this tender document and whether the bidder is eligible and qualified as per criteria laid down in the Bid Documents. The bids, which do not meet the aforesaid requirements and/or do not provide requisite supporting documents / documentary evidence required to meet eligibility criteria are liable to be treated as non-responsive and may be ignored or rejected.
  - 3) The decision of the HLL Lifecare Ltd as to whether the bidder is eligible and qualified or not and whether the bid is responsive or not shall be final and binding on the bidders. No correspondence will be entertained outside the process of negotiation/ discussion with the Bid Evaluation Committee.
  - 4) The Bid Evaluation Committee reserves the right to reject any or all Bids on the basis of any deviations.



**22. Award Criteria**

HLL Lifecare Ltd will award the Contract to the successful bidder whose Bid has been determined to be technically responsive and having the least cost Financial Bid as per the process outlined in this tender.

**23. Signing of Contract**

After the Bid evaluation Authority notifies the successful bidder that its Bid has been accepted, HLL shall enter into a contract, incorporating all clauses, pre-bid clarifications and the Bid of the bidder between HLL Lifecare Ltd and the successful bidder.

**24.** Compensation for excess down time beyond the 98% standard Uptime: A proportionate deduction based on the average daily revenue of the previous month will be charged as compensation.

**25. Payment terms:** The rentals /lease rentals for the equipments quoted shall be paid by HLL on monthly basis on or before 5<sup>th</sup> day of every month. The rental period shall be started on completion of installation and one month successful trial run of the equipment.

**26.** If the import duty of the components / spares increased from the quoted import duty at the time of bidding, then, the revised import duty shall be applicable.

**27.** The bidder shall enter into a rental/ lease agreement with HLL for a minimum period of five years.

**28. Commencement of services and Liquidated Damages:** The bidder shall commission the facility within 120 days of the signing of the contract. In case of extension / renewal of the contract with the same bidder for an additional term, this time period shall not be valid. The Liquidated Damage for non-commencement of services for each phase will be applicable at the rate of Rs 10,000 per day per equipment. This will be recoverable from the Performance Security, and up to a maximum of 25% of the signed contract value (Maximum Value). Upon reaching the Maximum Value, this contract will be terminated as per termination procedure.

**29.** Software Up-gradation, Technology Up-gradation and Replacement of CT Tube: The machine shall be suitably upgraded by the Service Provider under following conditions:

1. Review by a board appointed by HLL for assessing the need for a software up-gradation. Such reviews shall be conducted every year from the date of signing of the contract.

2. If the equipment Provider understands the requirement of the technology up-gradation for the best interest of the contract, then bidder can request for such technology up-gradation from the HLL Authority and execute the up-gradation of the technology at its cost and based upon mutual consent.
  3. Upon declaration of any national or international guideline accepted by the Government prohibiting the use of earlier (currently installed) technology.
  4. CT tube will be replaced if found damage within the equipment uptime mentioned in the bid document at the cost of the bidder.
- 30.** The bidder shall ensure that the equipment provided shall be in workable condition for not less than 98% of the available time, failing which proportionate deduction will be made by HLL from the rent payable / performance security.
- 31. Settlement of Dispute:** Arbitration shall not be the means of settlement of dispute or claims or anything on account of this Contract. If any disputes and difference arising out of the contract are to be settled by a civil court at Thiruvananthapuram, Kerala.
- 32. Termination Clause:** Either party can terminate the contract by giving 90 days written notice to the other party. HLL shall terminate the agreement by giving 90 days notice to the other party, if the party is not meeting the machine up time requirement, not maintaining the equipment or not renewing the CMC contract on time. In such events, HLL will stop the payment of rentals/ lease amount to the other party from the date of notice. The party shall remove the equipment from the site at their own cost within a period of 90 days from the date of notice, failing which HLL willlll remove the machine and the security amount will be forfeited. HLL will not be responsible for any damage or lose of equipment. The other party can terminate the agreement by giving 90 days' notice if HLL is not engaging trained and qualified manpower for operating the machine or HLL is not promptly making the payment of rental / lease amount within the specified time even after giving notice to HLL.

**For HLL Lifecare Limited**

**Associate Vice President  
Healthcare Service Division**

**Appendix-A**

**PARTICULARS OF THE BIDDER'S COMPANY**

(To be submitted by all bidders)

1. Name
2. Registered Address
3. Phone/Fax/Mail id
4. Type of Organization: Individual /OPC./Partnership/Company/Consortium/Trust/ Not for Profit Organization
5. Service Centres in India for OEM (include location and address):

Location	Address
----------	---------
6. Whether the bidder has NABL/NABH/ISO or any other accreditation? (If yes, please attach documentary evidence of the same).
7. Registration. Nos (as applicable)
  - (a) EPF
  - (b) ESI
  - (c) Sales Tax
  - (d) VAT
  - (e) Service Tax
  - (f) PAN No.
8. Brief write-up about the firm / company. (use extra sheet if necessary)

9. Documents attached with the tender

- a) Company brochure/catalog and Technical literature of the quoted equipment
- b) Copy of the purchase invoice of the machine (applicable to bidders other than OEM's)
- c) AERB approval copy in the case of the radiology equipments
- d) Product certificate from OEM for each equipment in the case of non OEM bidders.
- e) EMD
- f) Audited Accounts Statement for past three financial years-
- g) Copy of Income Tax Return for past three financial years

Signature of Bidder

Date:  
Place:

Name

Office Seal

Appendix-B

**Affidavit**

(To be submitted in Rs.100/- stamp paper with necessary notarization)

1. I, the undersigned, do hereby certify that all the statements made in our Bid are true and correct.
2. The undersigned hereby certifies that neither our Company/Firm/Individual M/s .....nor any of its directors/President/Chairperson has abandoned any work for the Government of Uttar Pradesh or any other State Government during last five years prior to the date of this Bid.
3. The undersigned also hereby certifies that neither our Company/Firm/Individual M/s .....nor any of its directors/ President/Chairperson/Trustee have been debarred/blacklisted by Government of Uttar Pradesh, or any other State Government or Government of India for any work
4. The undersigned further certifies that
  - a. Our Company/Firm/Individual .....has not been punished for any offence and/or
  - b. The Director/President/Chairman/Partner of our Company/Firm/Individual .....has/has neither been convicted of any offence nor is/are any criminal case pending before any Competent Court.
  - c. We not have been found guilty and are not found to be involved in any pending /ongoing CBI Litigations.
5. The undersigned hereby authorize(s) and request(s) any bank, person, firm, Competent Authority or corporation to furnish pertinent information deemed necessary and requested by Department of Medical, Health & Family Welfare, Government of Uttar Pradesh, to verify this statement or regarding my (our) competence and general reputation.
  - a. The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Mission Director, National Health Mission, Uttar Pradesh
  - b. I / We .....agree that we shall keep our price valid for a period of 180 DAYS (One hundred and eighty days) from the date of opening of the Bid. I / We will abide by all the terms & conditions set forth in the Bid documents No.....  
.....

Signed by an authorized Officer of the Lead Bidder:

Title of Officer:

Name of Company/Firm/Individual :

Date:

## Appendix-C

## FINANCE BID

## A. Brand new Machine

Sl. No	Equipment Specification	Make	Expected requirement for 2016-17 & 2017-18	Monthly premium in INR for rental/ operational lease model			Monthly premium in INR for financial lease model		Number of equipment bidder agrees to supply during the FY 2016-17 & 2017-18
				Basic Rate	Taxes	Total			
1	3 Tesla MRI Machine		1 to 2 Machines/ year						
2	3 Tesla MRI Machine with Cardiac application and Mammography		1 to 2 Machines/ year						
3	1.5 Tesla MRI Machine		2 to 5 Machines/ year						
4	1.5 Tesla MRI Machine with Cardiac application and Mammography		1 to 2 Machines/ year						
5	128 Slice CT Machine		2 to 5 Machines/ year						
6	16 Slice CT Machine		2 to 5 Machines/ year						

7	Ultra Sound Scanning Machine		2 to 5 Machines/ year						
8	Mammography Machine		2 to 5 Machines/ year						
9	X-Ray -250 MA with CR system		2 to 5 Machines/ year						
10	X-Ray -500 MA with CR system		2 to 5 Machines/ year						
11	Portable X-Ray unit(300 MA)with CR System		2 to 5 Machines/ year						

## Appendix-D

## FINANCE BID

## B. Pre-Owned machine

Sl. No	Equipment Specification	Make and year of purchase	Expected requirement for 2016-17 and 2017-18	Monthly premium in INR for rental/ operational lease model	Monthly premium in INR for financial lease model	Number of equipment bidder agrees to supply during the FY 2016-17 and 2017-18
1	3 Tesla MRI Machine		1 to 2 Machines/ year			
2	3 Tesla MRI Machine with Cardiac application and Mammography		1 to 2 Machines/ year			
3	1.5 Tesla MRI Machine		2 to 5 Machines/ year			
4	1.5 Tesla MRI Machine with Cardiac application and Mammography		1 to 2 Machines/ year			
5	128 Slice CT Machine		2 to 5 Machines/ year			
6	16 Slice CT Machine		2 to 5 Machines/ year			
7	Ultra Sound Scanning Machine		2 to 5 Machines/ year			
8	Mammography Machine		2 to 5 Machines/ year			
9	X-Ray -250 MA with CR system		2 to 5 Machines/ year			
10	X-Ray -500 MA with CR system		2 to 5 Machines/ year			
11	Portable X-Ray unit(300 MA)with CR System		2 to 5 Machines/ year			



**Appendix-E****General Technical Specification**

<b>1.5 Tesla MRI Machine</b>	
Operational requirements-	The system should be 1.5Tesla MRI System with state-of-the-art latest features commercially available at the time of supply. It should be European CE/ US FDA approved. The system should be cost effective, with user friendly platform, reliable and capable of providing excellent performance for clinical imaging and research.
MAGNET SYSTEM	Should be whole Body 1.5Tesla Magnetic Resonance Imaging System optimized for higher performance in Whole Body and Vascular examinations with superconducting magnet, high performance gradients and digital Radio Frequency System.
	Should be 1.5 Tesla active shielded super conducting magnet with length less than 200 cm.
	It should have at least 60 cm patient bore with flare opening.
	It should be well illuminated, ventilated with built in 2 way intercom for communication with patient and should have mirror.
	The magnet should be shielded from the external interferences.
	The homogeneity of the magnet should be mentioned in relation to 10 and 40 cm DSV.
	Give details of the number of planes, plots and number of measurement per planes, to measure the homogeneity.
	Highly stable shim system with active and passive shimming for highly homogenous magnetic field should be available.
	Automated patient specific on line shimming should be available.
	Specify the weight of the magnet including the gradient and covers etc.
	Emergency Ramp down facility should be available.
	It should have a built in cryo-cooler such that helium consumption does not exceed 0.05 lit/hr or zero boil off under normal conditions.
GRADIENT	Actively shielded Gradient system with strength of at least 33 mT / m with slew rate of 120 mT / m /

SYSTEM	sec .These true slew rates should be available in each axis independently, for overall better duty cycle performance of the gradient.	
	The duty cycle should be 100 percent.	
	The Gradient system should have effective eddy current compensation.	
	Field of View should be at least 45 cm in all three axes.	
	Should have Powerful cooling system for gradient coil and power supply to limit rise in temperature.	
	Minimum TE & TR in 2D / 3D should be specified for all sequences.	
	Minimum Slice Thickness in 2D & 3D should be specified in relation to the sequence.	
	Echo Train Length in both Spin Echo and Gradient Echo should be at least 256 or more.	
	The measurement matrix should be from 128x128 to 1024x1024 in both 2D and 3D imaging as well	
RF SYSTEM	RF system should be fully digital & solid state with transmit power of at least 10 kW or more	
	RF system should have at least minimum of 16 independent RF receiving channels with each having bandwidth of 1MHz or more along with necessary hardware to support quadrature ICP array/matrix coils.	
	Should allow remote selection of coils and/or elements.	
	Specify frequency stability and amplifier resolution.	
	RF system should be compatible with parallel imaging techniques. It should be able to support time reductions with compatible coils in 2D/3D imaging in Body /Neuro imaging up to acceleration factor of at least 4.	
RF COILS	The main body coil integrated to the magnet must be Quadrature/ CP.	
	Head and Neck coil.	
	Spine Coil for thoracic and Lumbar spine imaging. Mention the number of coil elements available.	
	Phased Array Body coil, capable of doing abdomen, pelvis, MRCP and peripheral imaging. It should have at least 12 elements and 45 cm FOV. Please specify the time reduction factor with parallel acquisition techniques.	
	Flexible Coil – Medium FOV	
PATIENT HANDLING SYSTEM:	The table should be fully motorized with computer controlled table movements in vertical and horizontal directions.	
	The position accuracy should be at least +/- 1mm or better.	
	The table should be able to withstand patient load of 180 kgs.	
	The table should have facility for manual traction in case of emergency.	
	The table should have patient auto alarm system. .	

	The table should support automatic table movement for automatic bolus chasing protocols in such as peripheral angio.	
<b>HOST COMPUTER/ MAIN CONSOLE AND IMAGE PROCESSOR</b>	Computer system should be latest in the industry, fast and efficient. It should have at least 2 GB RAM.	
	The system should have image storage capacity of at least 1,00,000 images in 256x256 matrix	
	The main Host computer should have at least 19inch TFT/LCD type Color monitor.	
	The system should have CD/DVD archiving facility on the main console.	
	500 high storage DVD's to be provided.	
<b>APPLICATION SOFTWARE / HARDWARE</b>	The system should have basic sequences package with Spin Echo, Inversion Recovery, Fast Spin Echo and Gradient Echo with echo train length of 256 to 255.	
	The application software for image smoothing and edge sharpness etc for improvement in image resolution.	
	Single and Multi shot EPI imaging techniques.	
	MR Angio Imaging: Should have 2D/3D TOF, 2D/3D PC, MTS and TONE, CEMRA for head, spine and body applications.	
	Fat and water excitation - please specify the application package	
	Please specify the motion correction algorithm/package for high-resolution motion free Diffusion weighed imaging with multishot / segmented EPI techniques. It should be possible to have FLAIR diffusion with generation of corresponding ADC maps.	
	Perfusion Imaging to enable large anatomy coverage of the brain and in line calculation of the resulting hemodynamic as well as physiological parameters. The perfusion analysis should have capability to calculate colour display of rMTT, rCBV, rCBF, corrected CBV, permeability constant and volume leakage. If the perfusion analysis is not possible on the main console the same should be available in the workstation	
	The system should have facility for quantification of the CSF flow data on the main console and / or the workstation.	
	The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, multislice 2D, 3D Spectroscopy and also the Chemical shift imaging in 2D/3D. The complete processing / post - processing software including color metabolite maps should be available.	
	The system should be supplied with ECG Trigger, respiratory trigger, peripheral pulse trigger and external trigger electrodes	
	The system should have facility to do Head to Toe imaging without changing coil.	
	Should be ready for DICOM connections.	
<b>WORKSTATION</b>	Workstation with latest advanced post processing software with complete DICOM functionalities as the main console with 19 inch TFT/LCD colour monitor, with hard disk of at least 1,00,000 image storage in	

	256x256 matrix, and 2 GB RAM.
	Image documentation should be possible from the main as well as the workstation.
	The workstation should have display of Cardiac cine images in movie mode with rapid avi creation.
	The workstation should have availability of Cardiac(optional), perfusion analysis, Processing of 2D/3D CSI data, Processing of Real Time BOLD imaging data(optional), with color metabolite mapping, quantification of the CSF flow data, vascular analysis package and volume rendering technique.
	Should have printing facility when connected with the laser printer (paper) and Dry Laser Imager
	The system should be supplied with DICOM 3.0 (like send, receive, print, record on CD/ DVD, acknowledge etc)
<b>Others</b>	Online UPS of suitable rating should be supplied for complete system with minimum 30 minutes backup.

<b>3 Tesla MRI Machine</b>	
Operational requirements-	The system should be 3 Tesla MRI System with state-of-the-art latest features commercially available at the time of supply. It should be European CE/ US FDA approved. The system should be cost effective, with user friendly platform, reliable and capable of providing excellent performance for clinical imaging and research.
<b>MAGNET SYSTEM</b>	3.0T active shielded super conductive magnet with best homogeneity. Field stability over time should be < or equal to 0.2 ppm/hr
	Length should be short with at least 70cm bore.
	It should have facilities of better illumination ventilation and designed to avoid patient claustrophobia.
	The homogeneity of the magnet should be mentioned in relation to 10, 20, 30, 40 cm DSV. Automatic shimming in phantom should be better than 3.5ppm in 40 DSV.
	Please specify upto what FOV gradient linearity is maintained.
	Magnet should be shielded from external interferences. Smaller fringe field preferred 5 Gauss and 10 Gauss Line in X, Y, Z axis specify yours Quote value for 5 gauss and 10 gauss line. The 5 Gauss line will have to be marked.
	Cryogen vessel to be of Helium only with appropriate super thermal shielding and refrigeration facility for minimum Helium boil-off, Specify the Helium tank capacity and boil-off rate.

	Helium level monitoring equipment in the magnet and facility for appropriate quick shutdown of the magnet in the event of emergency
	Helium refill time should not be < 2years. Please mention the helium refill time.
	Noise level inside the examination room should be minimum as possible. Specify db level
	Physiological signal display on Gantry
	Built - in 2 way Intercom facility to communicate with patient is required
	Emergency helium release button should be provided at least in two places [inside MR examination room and console room]
GRADIENT SYSTEM	Activity shielded Gradient System with strength of at least 44 mT/m with slew rate of 200T/m/sec. Quote the minimum rise time at 44mT/m. The rise time should not be more than 250 microsec. to reach the maximum gradient strength.
	These true slew rates should be available in each axis independently, for overall better duty cycle performance of the gradient.
	The duty cycle should be 100 percent.
	The Gradient system should have provision for eddy current compensation. Mention level of Eddy current compensation in %
	Field of View should be at least 45 cm in all three axes.
	Minimum TE & TR in 2D/3D should be specified in relation to the sequences.
	Minimum Slice Thickness in 2D & 3D should be specified in relation to the sequences.
	Echo Train length in both Spin echo and Gradient Echo should be at least 255 or more.
	The measurement matrix should be from 128x128 to 1024x1024 in both 2D and 3D imaging as well.
RF SYSTEM	A fully digital RF system capable of transmitting power of at least 25 KW or more dual RF power amplifiers. System should be capable of Multi Transmit with Multi amplifier driving /true shape for better B1 homogeneity
	It should also have at least minimum of 32 independent ADC hardware RF channels with each having bandwidth of 1MHz or more along with necessary hardware to support Quadrature/CP array coils. (Capability of faster reconstruction, please specify)
	It should support Parallel acquisition techniques like ASSET/SENSE/iPAT with a factor of at least 4. Higher sectors if available should be offered optionally
RF COILS	The system body Coil integrated to the magnet must be quadrature /CP.

	32 channels or more head coil-capable of multi frequency MR spectroscopy (1H).
	Neck phased array coil 8 channel or more.
	Neurovascular coil of 16 channels or more
	Spine phased array coil 32 channels or more
	Body phased array coils 32 channels of more (single or in combination) at least 45 cm z-axis coverage for imaging of abdomen, with at least 32 channels acquisition for body parts.
	Suitable Coil / Coil combination for Peripheral Angiography 32 channels or more; with coverage of 80cm or more.
	The supplier should quote coils or their combinations exclusively for each application.
<b>PATIENT HANDLING SYSTEM:</b>	<b>Patient Table</b>
	The table should be fully motorized, MRI Compatible computer controlled table movement in vertical and horizontal directions Position accuracy should be +/- 1.0 C mm or better.
	Should be able to take at least 140 kg load.
	The table should have facility for manual traction in case of emergency.
	Cushions and other patient comfort accessories. All parts of the table should be protected from liquid spill
	The table should have patient auto alarm system.
	The CCTV system with LCD display to observe the patient.
	The table should deliver the protocols for automatic bolus chasing in peripheral angio with automatic table movement.
	Two-way communication should be possible with the patient from the console room
<b>HOST COMPUTER/MAIN CONSOLE AND IMAGE PROCESSOR</b>	Computer should be latest in the industry, fast and efficient

	One colour console for acquisition, all calculations, post processing etc Console must have full colour with user define protocols with programmable inter scan delay. Necessary image processor with large RAM for ultra-fast image reconstruction should be provided It should be at least 8 GB RAM. Please specify RAM and reconstruction speed in images per second for full FOV 256 matrix. Higher will be preferred.
	Computational Speed to match the single shot Echo Planar Imaging (EPI). Interactive angiogram, multi-planar three dimensional (3D) reconstruction, surface rendering, dynamic Imaging, vascular Imaging/angiography. functional imaging, DTI etc. The main host computer should have at least 18-inch or more TFT/LCD type colour monitor.
	The main console should have facility for music system for the patient in the magnet room.
	Filming and adequate storage for images and other applications .
	Total hard disk memory to be sufficient to store at least 250,000 images of 256 x 256 matrix data size.. Systems offering higher' storage will be preferred. The system should have CD/DVD archiving facility on the main console and work station.
	DVD write/CD Read/Rewrite drive for writing of images, spectra and raw data along with the necessary software for reading the Images and spectra on DVD/CD storing capabilities. Provision for archival of k-space data and raw (unprocessed) images.
	There should be a provision of retrieval of the reconstruction data (raw files) in an user friendly manner.
	DICOM interface to hook DICOM dry/laser camera capable of storing printing 1024 x 1024 matrix size images at least in 16 format without loss of digital resolution.

	The system should be capable to connect to PACS through RIS/HIS at no extra cost. Highest version of DICOM connectivity to be provided.
<b>APPLICATION SOFTWARE / HARDWARE</b>	The system should have basic sequences package with Spin Echo, Inversion Recovery, Fast Spin Echo and Gradient Echo with echo train length of 256 to 255.
	The application software for image smoothing and edge sharpness etc for improvement in image resolution.
	Single and Multi shot EPI imaging techniques.
	MR Angio Imaging: Should have 2D/3D TOF, 2D/3D PC, MTS and TONE, CEMRA for head, spine and body applications.
	Fat and water excitation - please specify the application package
	Please specify the motion correction algorithm/package for high-resolution motion free Diffusion weighed imaging with multishot / segmented EPI techniques. It should be possible to have FLAIR diffusion with generation of corresponding ADC maps.
	Perfusion Imaging to enable large anatomy coverage of the brain and in line calculation of the resulting hemodynamic as well as physiological parameters. The perfusion analysis should have capability to calculate colour display of rMTT, rCBV, rCBF, corrected CBV, permeability constant and volume leakage. If the perfusion analysis is not possible on the main console the same should be available in the workstation
	The system should have facility for quantification of the CSF flow data on the main console and / or the workstation.
	The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, multislice 2D, 3D Spectroscopy and also the Chemical shift imaging in 2D/3D. The complete processing / post - processing software including color metabolite maps should be available.
	The system should be supplied with ECG Trigger, respiratory trigger, peripheral pulse trigger and external trigger electrodes
	The system should have facility to do Head to Toe imaging without changing coil.
	Should be ready for DICOM connections.
	Sequences for MRI imaging of joints with Metal implants like WARP/Maverick should be offered.
	Contrast Kinematics like TWIST / TRICKS / 4DTRAK should be offered.
	Image fusion should be offered
	Optimized breath hold sequences for abdominal studies including angiogram.



	Non Contrast perfusion Imaging software like 2D-ASL and its post processing should be offered.
<b>WORKSTATION</b>	<p>One thin client server to serve 2 concurrent licenses to be supplied with the system.  <b>Licenses:</b> Concurrent license here implies the capability to process all the loaded software to be accessible and usable on all the 2 systems simultaneously without any processing delay. The software should also include a reputed antivirus software of a perpetual type or renewed by the supplier.</p> <p><b>Hardware Server:</b> The server (single/dual configuration) should have image storage capacity of at least 3 Tera bytes, minimum 40,000 concurrent slice processing power and at least 64GB RAM. The server hardware to be included with 18" or more TFT/LCD monitor with dual processor. DICOM 3.0 compatibility and interfacing with other modalities must be possible. The workstation shall have the resolution, software and all functionality of a stand-alone workstation</p> <p>All necessary software including post-processing software for all offered applications (point no. 9,10) including evaluation for fMRI, perfusion (Contrast perfusion and T1 perfusion), diffusion, DTI with fibre tracking, cardiac evaluation, and other associated post processing like MIP, MPR, surface reconstruction should be provided.</p> <p>The workstation should have the following features:</p> <p>a. Cardiac perfusion analysis &amp; Processing of Real Time BOLD imaging data, with colour metabolite mapping, quantification of the CSF flow data.</p> <p>b. Image Fusion software should be provided for Inter-modality and Intra-modality fusion.</p> <p>c. Software for vascular properties like IAUC, KEP as standard.</p> <p>d. DSA images should be viewable in Subtraction mode.</p> <p>e. Necessary and adequate hardware and software for sending and receiving the patient data {text + images}. Printing of films should be possible from both main console and workstation.</p> <p>f. Workstation should also be able to function independent of the main console.  Post processing of the MRS data including for CSI with paramagnetic metabolic mapping</p>

	g. Capability to calculate colour display of real MTT, real CBV, and real CBF
	h. Compatibility with data from other MRI system for post processing.
	i. Output in the form of jpeg, avi / equivalent formats should be possible.
	<b>Cardiac Package:</b> The workstation should have display of Cardiac cine images in movie mode with rapid avi creation and should have comprehensive cardiac post processing software including for coronary MRA with regular free upgrades in future. Calculation of ventricular area and volume, stroke volume, ejection fraction and relative ejection fraction, Time volume diagram generation, filling rates and myocardial wall motion, Graphic display of output calculation of flow and velocity parameter with colour coded display of velocity parameters. Diffusion tensor Imaging, 3D myocardial tagging should be possible.
	<p>Voice Recognition Software (2 Licenses) on two separate computers</p> <p>Minimum System Requirement:</p> <ul style="list-style-type: none"> <li>• 18" LED Display, All-in-One Desktop PC.</li> <li>• 4GB RAM, 2.2 GHz Intel Dual Core or equivalent.</li> <li>• 2 MB processor, cache memory.</li> <li>• 1 TB HDD, DVD RW Drive.</li> <li>• 16 bit sound card, Stereo Speakers, Microphone</li> <li>• 2 x USB 2.0 ports</li> <li>• Wireless keyboard, Wireless Mouse.</li> <li>• Voice Recognition software including medical vocabularies (two licenses) - Mawell software solution / Dragon Medical/M*Modal Fluency Direct Dragon Naturally Speaking Premium – Speech recognition Software(Licensed)</li> <li>• Microsoft Office Suite (Licensed)</li> <li>• Window 8.1, 64 Bit. (Licensed)</li> <li>• LASER Printer (HP Laser Jet Pro MFP or equivalent)</li> <li>• Appropriate UPS with 30 mins backup -2 no.s.</li> </ul>
<b>Others</b>	Online UPS of suitable rating should be supplied for complete system with minimum 30 minutes backup.

128 Slice CT Machine	
The system should be latest state of art, independent 64 or more rows of detectors with acquisition of at least 128 slices per rotation capable of integrating with any PACS/HIS system. The system should be DICOM - ready with true isotropic volume acquisition and sub millimeter resolution. The model quoted should be, AERB Type approved and US FDA / European CE certified. The essential requirements of the system are as follows:-	
<b><u>Gantry:</u></b>	<ul style="list-style-type: none"> <li>•Aperture: 70 cms or more</li> </ul>
	<ul style="list-style-type: none"> <li>•FOV: 50 cms or more</li> </ul>
	<ul style="list-style-type: none"> <li>• 3-D laser lights for positioning.</li> </ul>
<b><u>X-Ray Generator:</u></b>	<ul style="list-style-type: none"> <li>•High Frequency type.</li> </ul>
	<ul style="list-style-type: none"> <li>•Power output : 70 kW or higher. The generator with the higher power output would be preferred. Also the bidder should mention whether the system would be capable of tackling the dual energy applications if there is an upgrade.</li> </ul>
	<ul style="list-style-type: none"> <li>•mA Range: 20-600 mA (With incremental steps of 10 mA)</li> </ul>
	<ul style="list-style-type: none"> <li>•KV Range: 80-110 or more</li> </ul>
<b><u>X-Ray Tube:</u></b>	<ul style="list-style-type: none"> <li>•Tube Voltage: 80-110 kV or more</li> </ul>
	<ul style="list-style-type: none"> <li>•Anode Heat Storage Capacity of at least 7.0 MHU or direct cooling tube</li> </ul>
<b><u>Patient Table:</u></b>	<ul style="list-style-type: none"> <li>•Load carrying capacity at least of 180 Kg with positional accuracy of 1 mm or less</li> </ul>
	<ul style="list-style-type: none"> <li>•Metal free scan-able range of 150 cm or more</li> </ul>
	<ul style="list-style-type: none"> <li>•Floating table top with foot pedal/hand control for positioning.</li> </ul>
<b><u>Spiral Acquisition:</u></b>	<ul style="list-style-type: none"> <li>•Scan Time should be 0.4 sec or less for full 360 degree rotation.</li> </ul>
	<ul style="list-style-type: none"> <li>•Minimum slice thickness should be 0.625 mm or less.</li> </ul>
	<ul style="list-style-type: none"> <li>•Pitch Factor (volume pitch): freely selectable in auto mode and also manually variable between 0.5 to 1.5 or more. Specify all possible pitch selections.</li> </ul>
	<ul style="list-style-type: none"> <li>•Bolus Triggered or bolus chase spiral acquisition should be available.</li> </ul>
	<ul style="list-style-type: none"> <li>•Real time x-ray dose reduction which combines both Z axis and angular tube current modulation to adjust the dose to the size and shape of individual.</li> </ul>
<b><u>f)Image Resolution:</u></b>	High contrast resolution should be at least 15 lp/cm for axial and spiral scan at 0% MTF with full FOV.

	Low contrast resolution – 5mm or less at 3.0 HU using 20 cm CATPHAN phantom on 10 mm slice thickness.
<b><u>Data Acquisition System:</u></b>	<ul style="list-style-type: none"> <li>•Detector- Capable of acquiring 64 slices per 360 degree of rotation.</li> </ul>
	<ul style="list-style-type: none"> <li>•At least 64 rows of independent detectors with acquisition of at least 128 slices per rotation with maximum Z-axis coverage</li> </ul>
	<ul style="list-style-type: none"> <li>•Solid state or rare earth detectors of latest technology free from repeated calibration.</li> </ul>
<b><u>Image Reconstruction:</u></b>	<ul style="list-style-type: none"> <li>•High speed real time reconstruction with display matrix of 1024x1024 or more.</li> </ul>
	<ul style="list-style-type: none"> <li>•Reconstructed slice thickness should be sub-millimeter to 10mm freely selectable.</li> </ul>
<b><u>Operator Console:</u></b>	<ul style="list-style-type: none"> <li>• High resolution medical grade LCD color monitors of 19” or more.</li> </ul>
	<ul style="list-style-type: none"> <li>•Should perform Registration, scheduling, protocol selection, Volume rendering, volume measurements, Multi-planar Reconstruction, and standard evaluation application and all available post processing functions without the help of the satellite workstation.</li> </ul>
	<ul style="list-style-type: none"> <li>• Raw Data storage with at least 500 GB Hard disc having image storing capacity of 5,00,000 or more in 512x512 format.</li> </ul>
	<ul style="list-style-type: none"> <li>• Auto-voice capability with custom designed key board and mouse.</li> </ul>
	<ul style="list-style-type: none"> <li>• Archiving options: CD-R, DVD, should be available. 5000 rewritable DVDs should be provided.</li> </ul>
<b><u>Post Processing Software</u></b>	Perfusion CT for brain
	CT Angio, VRT, MIP, MPR, 3-D Shaded Surface display, Image Fusion, Vessel segmentation, luminal view
	Virtual Endoscopy with facility for virtual dissection and computer aided detection of polyps.
	Advanced cardiac package including Coronary Artery Imaging, Calcium Scoring, Myocardial Viability software, Cardiac functional analysis and advanced Vessel Analysis including stenosis assessment. Facility for prospective and retrospective ECG gating, facility for automatic selection of rotation speed according to heart beat and step and shoot for low dose acquisition should be available.
	Automatic bone Removal facility.
	Interactive & Automatic Cine display should be available.
<b><u>Image</u></b>	Parallel evaluation of multiple ROI in circle, irregular and Polygonal forms,

<b>Evaluation Tools:</b>	
	Statistical Evaluation for area/ volume, S.D, Mean/Max and Histograms.
	Distance & angle measurement, freely selectable, positioning of co-ordinate system, grid and image annotation.
<b>Workstation</b>	<p>One independent post processing workstation with all the software as in the main console should be available. It should be a high speed (minimum post-processing frame rate of 16 frames/sec) CPU with a speed of 3.0 GHz or better and with an independent image storage capacity of atleast 10 tera byte storage capacity with expansion slot of additional tera bytes memory.</p> <p>19 inches or more high resolution medical grade colour LCD monitors .</p> <p>The necessary connectivity etc. for proper functioning should be provided by the vendor .</p> <p>All post processing facility and data archiving should be available in the workstation. The workstation shall be capable of simultaneously viewing and performing all post processing functions and filming independently without the help of main console.</p> <p>Memory of the workstation should be independent of the console.</p> <p>Two way data transfer between the operator console &amp; the satellite workstation should be automatic and standard.</p>
<b><u>Patient communication system:</u></b>	An integrated intercom and Automated Patient Instruction System (API) should be provided.
	Two closed circuit TV for patient monitoring.
	<b><u>System Configuration Accessories, spares and consumables:</u></b>
	•Standard Patient positioning accessories and restraining devices - 02 sets.
	•Lead Glass 100 cm x 150 cm of 2 mm Lead equivalence as per the requirement of the equipment. Should adhere to AERB recommendations
	•Reputed Online UPS of suitable rating should be supplied for the complete system including Gantry, computer system, with at least 30 minutes back up.
	•System must be PACS, HIS/RIS interface ready without any new hardware or software.
	• A free comprehensive software update guarantee for entire life of scanner must be provided.
	AERB site approval: Vendors shall be provide the all necessary documents like site-drawings , equipment details etc to the Consignee for getting AERB Site Plan approval prior to installation.
<b>16 Slice CT Machine</b>	
The Model offered should be AERB APPROVED ; the latest High end model under current production, should be Slip Ring Technology. <b><i>The Offer should meet the Specifications as follows</i></b>	

<b>Gantry :</b>	The CT Scanner should have low Voltage Slip Rings incorporated in the Gantry
	The Minimum scan time for a 360 Degree rotation should be Sub Second & not more than 0.8 Seconds.
	The gantry should have a minimum tilt of 30 degrees on either side and remote tilt should be available as standard.
	The gantry should be provided with User control panels on either side for easy positioning
	The sub millimeter Slice @ 0.63 mm or less in 16 Row acquisition should be available .
	The Gantry should have 3D Positioning Laser lights.
	The Scan field of view ( FOV ) in acquisition mode should be at least from 200mm to 500 mm with intermediate Steps for scanning different anatomies.
	Aperture should be at least 70 cm diameter.
<b>X ray Section :</b>	The X ray Generator should be compact and inbuilt in the Gantry.
	The System X ray power should be 40 kw and above
	The MA range available should be between 10 to 300 MA or more with increments in steps of not more than 10 ma .
	The X ray Tube should be essentially Dual Focus with capacity of at least 3.5 MHU.
	Specify the focal Spots of the X ray tube.
	The X ray tube should have a cooling rate of not less than 700 KHU per min
	The X ray tube Cooler Unit should be in built in the Gantry
<b>Data Acquisition System:</b>	<ul style="list-style-type: none"> <li>•Detector- Capable of acquiring 16 slices per 360 degree of rotation.</li> </ul>
	<ul style="list-style-type: none"> <li>•At least 16 rows of independent detectors with acquisition of at least 16 slices per rotation with maximum Z-axis coverage</li> </ul>
	<ul style="list-style-type: none"> <li>•Solid state or rare earth detectors of latest technology free from repeated calibration.</li> </ul>
<b>Patient Couch :</b>	The patient table offered should have a minimum load bearing capacity of at least 170 KG.
	The Minimum table top height should not be more than 55 cms from the floor level for easy transport of trauma patients
	The range of metal free scan should be atleast 165 cms.
	Remote UP/DOWN , FWD/BWD of the Patient Couch should be standard
<b>Spiral / Helical Section :</b>	The system offered should have Spiral Capability of at least 100 seconds & above.
	The System should be able to perform at least 60 Seconds of Continuous Helical / Spiral Scan @120 KV / 200 MA without Drop in MA to maintain the Low Contrast Resolution.
	The range of Spiral facility in Axial Direction should be more than 100 cms.
	The Reconstruction Time in Spiral scan should not be more than 130 Milliseconds. ( At least 8 Images / second )
	The system should have the Smart Prep or equivalent facility & ability to track Contrast medium to trigger scan should be included in the scope of Supply. More than 2 No:s ROI is required for such Contrast Chase & Exposure Trigger facility.
<b>Operator</b>	<ul style="list-style-type: none"> <li>• High resolution medical grade LCD color monitors of 19" or more.</li> </ul>

<b>Console:</b>	
	<ul style="list-style-type: none"> <li>•Should perform Registration, scheduling, protocol selection, Volume rendering, volume measurements, Multi-planar Reconstruction, and standard evaluation application and all available post processing functions without the help of the satellite workstation.</li> </ul>
	<ul style="list-style-type: none"> <li>• Auto-voice capability with custom designed key board and mouse.</li> </ul>
	<ul style="list-style-type: none"> <li>• Archiving options: CD-R, DVD, should be available. 5000 rewritable DVDs should be provided.</li> </ul>
	It should have facility to store at least 100,000 Images in the system HDD.
	The system should be supported with archiving facility of DVD & CD DICOM facility to send , store , print , receive, Query / Retrieve , MWM , MPPS etc should be standard .Remote Diagnosis & Fault detection should be standard.
	PC Based connectivity should be standard for easy transfer of Images & Report.
	An Advanced Work station with at least 4 GB RAM , Archival on DVD / CD with CT Angiography , Colonoscopy , 3D VRT , SSD , CT / MRI Fusion as well as DICOM Print should be included in the Scope of Supply. DVD / CD Archival is Required.
<b>Image Processing section :</b>	The Main Console should have standard software like 3D Volume rendering, MIP , CT Angio, .ColorAngio Display, 3D ArtefactSuppressions , Pre set 3D Reconstruction & Display Protocols, Auto Bone Removals , CT Based DSA .
	The following software should be offered as standard (MPR , ROI , VOLUME CALCULATION , CT NUMBER measurement of between –10, 000 to + 25,000 , WINDOW WIDTH , WINDOW LEVEL , TOPOGRAM DISPLAY , CINE DISPLAY , HRCT LUNG, DYNAMIC SCAN )
<b>Workstation</b>	<p>One independent post processing workstation with all the software as in the main console should be available. It should be a high speed (minimum post-processing frame rate of 16 frames/sec) CPU with a speed of 3.0 GHz or better and with an independent image storage capacity of atleast 10 tera byte storage capacity with expansion slot of additional tera bytes memory.</p> <p>19 inches or more high resolution medical grade colour LCD monitors .</p> <p>The necessary connectivity etc. for proper functioning should be provided by the vendor .</p> <p>The software as above and Specialized Software such as Virtual Endoscopy, Colonoscopy, CT Perfusion , CT DSA , CT Angiography , Bone Removals , CT / MRI Fusion should be available on the Work Station .</p> <p>The post processing facility and data archiving should be available in the workstation. The workstation shall be capable of simultaneously viewing and performing all post processing functions and filming independently without the help of main console.</p> <p>The memory of the workstation should be independent of the console.</p> <p>The two way data transfer between the operator console &amp; the satellite workstation should be automatic and standard</p>
<b>Resolution :</b>	The System Spatial Resolution should be mentioned with parameters.
	The low contrast resolution should not be more than 4 mm at 0.3 %. Shoulder ,Pelvis Streak Artefact suppression Software should be standard.

	Noise Suppression protocols to maintain LCR at low dose should be standard.
	Special Software ( Like MA Modulation in Routine ) to ensure Dose efficiency should be standard.
	Specify the CT Dose Index
	<b><u>System Configuration Accessories, spares and consumables:</u></b>
	•Standard Patient positioning accessories and restraining devices - 02 sets.
	•Lead Glass 100 cm x 150 cm of 2 mm Lead equivalence as per the requirement of the equipment. Should adhere to AERB recommendations
	•Reputed Online UPS of suitable rating should be supplied for the complete system including Gantry, computer system, with at least 30 minutes back up.
	•Software for Remote Diagnostics Service should be provided.
	•System must be PACS, HIS/RIS interface ready without any new hardware or software.
	• A free comprehensive software update guarantee for entire life of scanner must be provided.
	AERB site approval: Vendors shall be provide the all necessary documents like site-drawings , equipment details etc to the Consignee for getting AERB Site Plan approval prior to installation.
	Interior Furnishing & Furniture
	Miscellaneous

### Ultra Sound Scanning Machine

The system should be latest fully Digital Color Doppler Ultrasound System and can be used for applications like Abdominal, Obs. / Gynae , small parts, Endocavitary, Pediatric & Vascular applications. The system should have following essential features:

1. The system should have the following image modes: 2D, M mode ,PW, Tissue Harmonic mode , Color Doppler, Power Doppler mode.
2. The system should have minimum 1500 or more digital processing channels and 256 or more grey shades.
3. The system should have a very high dynamic range of 170dB or more and should
4. The system should have a very high frame rate for B-mode & Colour mode. Maximum frame rate should be greater than 350 fps for B-mode & colour mode.
5. The system should be able to support all type of transducers (Convex, Endocavitary, Linear, Phased array and Intraoperative Transducers). Frequency range of all transducers should be 2-14Mhz.
6. The system should have Advanced measurement packages for all applications.
7. The system should an integrated high resolution TFT/LCD of 15 inches or more with facility of tilt and swivel facility alongwith convenient grip.
8. The system should have minimum three active universal ports & two parking ports. Active ports can be directly selectable from the control panel.



- 9.The system should have scanning depth in the range of 2- 28cms.
  10. The system should have a very high capacity of Hard Disc Drive min.80GB or 1000 images for storage of images.
  11. The system should have inbuilt CD/DVD R/W and USB ports for image export.
  12. The system should have zoom facility both in real time and frozen image and it should be minimum 6 times or more in both real time & frozen modes.
  13. The system should have minimum 6 steps transmitting focusing (transmit focal zones) and adjustable gain should be available up to 100 dB for B-mode & M-mode.
  14. The system should have Directional Power Doppler to define the low blood flow directions.
  15. The system should have HD-flow/Advanced dynamic flow to acquire the blood flow with directions in the deeper region at a very high frame rate.
  16. The system should have automatic optimization in B-mode and auto adjustment of Doppler base-line & velocity range.
  17. The system should have B-mode image steering &Color Doppler steering .
  18. The system should have the facility of on-screen adjustment for Dynamic range, Frequency selection, Presets, Name of the patient,etc.
  19. The system should have the facility to view the Thumbnail images and system can be programmed for various users with the facility of user passwords.
  20. The system should have the Trapezoid scan facility for linear probes.
  21. The system should have Compound Imaging and Contrast Harmonic Imaging.
  22. The system should be US-FDA or European CE approved product.
  - 23.System should be offered with the following probes and accessories:
    - (a) Convex probe with frequency range of 3.0-6.0 Mhz.
    - (b) TV/TR probe with frequency range of 5.0-7.5 Mhz. And minimum field of view of 140 degree.
    - (c) Linear probe with frequency range of 6.0-11.0 Mhz.
    - (d) B/w Thermal Printer with 100 paper rolls.
- Above mentioned probes must have multifrequency selection and THI.

### **Mammography Machine**

<b>Special Features</b>	<b>Automatic filter selection with KV. Automatic release of compression with termination of exposure in case of power failure. Display of mAs in AEC mode after exposure.</b>
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A)	<b>X-RAY GENERATOR</b>		
	•	X-ray generator	High frequency 40 KHz x-ray generator
	•	Maximum power	3.5 KW *
	•	Maximum mA output	70mA
	•	Maximum KV output	35KV
	•	High voltage cable	1 No.
B)	<b>X-RAY TUBE</b>		
	•	X-ray tube	Rotating anode x-ray tube.
	•	Focal spot	- Small focus = 0.1 mm - Large focus = 0.3 mm
	•	Target material	Molybdenum
	•	Tube angle	12°
	•	Inherent filtration	Ba 0.5mm
	•	Anode heat storage capacity	300KHU
	•	Anode rotation	2700 RPM
C)	<b>CONTROL PANEL</b>		
	•	Control Panel	Micro processor controlled feather touch control panel with LCD
	•	KV range	22 to 35 KV in steps of 0.5 KV each.
	•	mAs range	1 mAs to 700 mAs
	•	Technique selection	Manual two point technique (KV, mAs)
	•	Anatomic programmed radiography	Auto selection of exposure factors with APR for small, medium and large breasts.
	•	Film screen combination	5 film screen combinations are provided.
	•	Automatic exposure control(AEC)	Inbuilt three chamber AEC for better exposure control and diagnosis
	•	Film density control	5 step film density control is provided.
	•	Filter selection	Filter is automatically selected as per the KV selected (molybdenum filter (for 29.5 to 35 KV) and aluminium filter (for 22 to 29KV))
	•	Digital displays	LCD display on control panel <ul style="list-style-type: none"> <li>• KV</li> <li>• mAs</li> </ul>

			<ul style="list-style-type: none"> <li>Interlocks indicating the fault in the machine</li> <li>Filter selected</li> </ul>
			LCD display on the stand <ul style="list-style-type: none"> <li>Compression force in Kg</li> <li>Compressed breast thickness</li> <li>Degree scale</li> </ul>
	•	Switches	Focal spot selection switch Machine on/off switch X-ray switch Emergency stop switches – mushroom type emergency switch provided on both sides of 'C'. This switch releases the breast by moving the compression paddle in case of any power failure
	•	Indicators	X-ray 'ON' indicator.
<b>D)</b>	<b>STAND ASSEMBLY</b>		
	A compact stand on which c-arm containing x-ray tube and bucky assembly is mounted.		
	•	Vertical movement(motor operated)	550 mm
	•	Angular movement of x-ray tube and bucky	$\pm 180^0$
	•	Focus film distance	650 mm
	•	Breast Compression	Motorised compression up-to 15Kg with the switch for activation and release. Adjustable compression force.
	•	Compression paddles	Compression paddles for normal and magnification mode (spot compression). Compression scale: 0 to 10 cm
	•	Magnification device	1.8 X
	•	Bucky	18 x 24 cm bucky, motor operated oscillating grid of size 18 X 26 cm, 5:1, 30 lines/cm focal distance 60 to 70 cm.
	•	Collimator	Light beam collimator with halogen lamp with auto shut off timer.
	•	Collimation Plate	18 x 24 cm collimation plate
	•	Cone	Cone for localization and radiation protection
	•	Automatic Exposure Control (AEC)	Inbuilt three chamber AEC for better exposure control and diagnosis.
	•	'C' Arm movement	Switches for up/down movement of 'C' Arm, placed conveniently on

			both sides of 'C' Arm
	•	Exposure switch	Hand switch with retractable cord for initiation of exposure
	•	Film marking device	Film marking device. Alpha numeric identification system
	•	Protective barrier for operator	Free standing fully transparent lead glass screen for operator protection.
X-Ray -250 MA			
SPECIAL FEATURE		<ul style="list-style-type: none"><li>• 40KHz – Less skin dose</li><li>• APR as standard</li></ul>	
X-RAY GENERATOR		250mA, 125KVP high frequency x-ray generator for general radiography	
GENERAL RATING			
KV RANGE		40 to 125KVP	
MA RANGE		250mA	
MAs RANGE		1-200mAs	
CONTROL		<p>A very compact, soft touch control panel having following functions &amp; indications. The panel can be supplied in floor or wall mount and has a spill proof design. Following features are available on the control panel.</p> <ul style="list-style-type: none"><li>• Machine ON/OFF switch.</li><li>• Digital display of KV and mAs</li><li>• KV and mAs increase and decrease switches.</li><li>• Ready and x-ray on switch with indicators</li><li>• Bucky selection switch.</li><li>• Self diagnostic programme with indicators for earth fault error, KV error, filament error and tube's thermal overload.</li><li>• Anatomical programming up to 216 programmes.</li></ul> <p>A dual action hand switch with retractable cord is provided for radiation protection of operator.</p>	
X-RAY TUBE		<p>A rotating anode, dual focus Toshiba- E-7239X x-ray tube of 21/43 KW rating. The x-ray tube is thermally protected and has focal spot of 1 &amp; 2 mm<sup>2</sup>.<b>Anode storage capacity (HU):140KHU.</b></p>	

<b>H.V. TANK</b>	A very compact H.V. tank filled with high dielectric transformer oil. The H.V tank contains H.V. transformer, filament transformers, H.V. rectifiers and H.V. cable receptacles.
<b>H.V. CABLE</b>	One pair of 8 meter H.V. cable compatible with the x-ray tube.
<b>COLLIMATOR</b>	A manual geared, light beam diaphragm for adjustment of exposure area is provided.
<b>TUBE STAND</b>	Floor to ceiling stand and with counter balanced tube head (rotatable $\pm 180$ degree) 360 degree rotatable; mounted on floor ceiling rails for convenient movements.
<b>MULTIPOSE</b>	Multi position, hand tilt, five position table ; 15 Degree trendelenburg to vertical, motorised bucky consisting of 8:1, 85 lines/inch grid size 17 ¼" X 18 7/8"; stainless steel cassette tray and foot rest.
<b>POWER SUPPLY</b>	3 Phase, 440Volts AC 50Hz with line resist less than 0.4 Ohms. Line regulation 10%.

**X-Ray -500 MA with CR system**

<b>1</b>	<b>Description of Function</b>
	Used for Radiography of abdomen, limbs, skeleton, head, chest and other parts in supine position, lateral position
<b>2</b>	<b>Technical Specification</b>
<b>2.1</b>	<b>Generator:</b>
<b>a</b>	Generator should be high frequency/inverter type for constant output.
<b>b</b>	Max KVp : 125
<b>c</b>	Max mA: 500 mA
<b>d</b>	Should have 500 mA at 100 KVp and 320mA at 125 KV.

<b>e</b>	It should have automatic exposure control device.
<b>f</b>	It should have digital display of KV & mAs.
<b>g</b>	Anatomical programming radiography should be possible.
<b>h</b>	It should have over loading protection.
<b>2.2</b>	<b>X – Ray Tube and Collimator:</b>
<b>a</b>	The x-ray tube should be rotating anode high speed, compatible with the generator and must have dual focus. Focal spots of following sizes:
	Large Focus: 2.0 mm or less.
	Small Focus: 1.2 mm or less .
	Tube with anode heat storage capacity 250 KHU or more.
<b>b.</b>	Should have Motorized collimator, having additional filters ( for Dose Reduction) and auto shut provision for the light.
<b>2.3</b>	<b>X – Ray Table:</b>
<b>a</b>	Horizontal table with floating table top.
<b>b.</b>	It should have transverse $\pm 10$ cm or more and longitudinal movements $\pm 35$ cm or more with electromagnetic brakes.
<b>c</b>	It should be radiolucent table top with negligible x-ray absorption, stain free, break resistant and water proof. .
<b>d.</b>	It should be provided with bucky which can hold all standard sizes of cassettes upto 14"x17".
<b>e</b>	Bucky should have a grid ratio 12:1 or more with 40 lines per cm.
<b>3</b>	<b>Essential Accessories:</b> All essential accessories to be provided with the unit.
	Unit should be type approved by AERB (Atomic Energy Regulatory Board) for Radiation Safety.

	<p>Should be FDA or CE approved product</p> <p>Calibration/Acceptance test certificate from the factory required.</p> <p>Manufacturer/Supplier should have ISO certification for quality standards.</p>
<b>Portable X-Ray unit (300 MA) with CR System</b>	
<p><b>Operational requirements</b></p> <ol style="list-style-type: none"> <li>1.Compact, lightweight, easily transportable mobile radiographic unit suitable for bedside x-rays.</li> <li>2.The unit must have an effective braking system for parking and transport. The tube stand must be fully counterbalanced with rotation in all directions</li> <li>3.Exposures with remote control should be available.</li> <li>4.The unit must have cassette storage facility for all size of cassettes</li> </ol> <p style="text-align: center;"><b>Technical Specifications</b></p> <p><b><u>The Generator:</u></b></p> <ol style="list-style-type: none"> <li>1. Microprocessor controlled high frequency, output 20 KW or above.</li> <li>2. It should have a digital display of mAs and kV.</li> <li>3. KV range:40kV to 120kV</li> <li>4. mA range: 300 mA or more</li> </ol> <p><b><u>X-Ray Tube:</u></b></p> <ol style="list-style-type: none"> <li>1. Rotating anode with at least 2500 rpm and focal spot size should be 1 mm. or less.</li> <li>3Light Beam Collimator of multi leaf type with auto cut off switch</li> <li>3.The exposure release switch should be detachable with a cord of sufficient length as per ICRP recommendation</li> </ol> <p><b><u>Standards and safety</u></b></p> <ol style="list-style-type: none"> <li>1.Should comply with AERB /BIS/ICRP Guidelines for radiation leakage and X-Ray equipments.</li> <li>2.The unit should be AERB type approved</li> </ol>	

CR System	
1	<p><b>Description of Function</b></p> <p>Used for Radiography of abdomen, limbs, skeleton, head, chest and other parts in supine position, lateral position</p>
2	<p><b>Technical Specification</b></p> <p>CR system configuration shall include</p> <ul style="list-style-type: none"> <li>a) Imaging plates (IP)</li> <li>b) Image reader system</li> <li>c) CR workstations with Mammography reading facility</li> <li>d) RIS interface</li> <li>e) Remote ID and Preview stations</li> <li>f) Essential Accessories: All essential accessories to be provided with the unit.</li> </ul> <p>3. CR Compatible imaging plates</p> <p>Following sizes are required –</p> <ul style="list-style-type: none"> <li>a. 35 cm x 43 cm - 2 Nos.</li> <li>b. 24 cm x 30 cm - 3 Nos.</li> <li>c. 18 cm x 24 cm - 3 Nos.</li> <li>d. 35 cm x 35 cm - 2 Nos.</li> <li>e. Long view cassettes for limbs - 1 set</li> </ul>