

Amendment No.7

Date: 17.11.2014

Subject: Amendment no.7 to the Tender Enquiry Document**Ref: (i) Tender Enquiry No.: HLL/PCD/PMSSY-II/05/14-15 dated 20.06.2014 and subsequent amendments thereafter.****Section I**
Notice Inviting Tenders(NIT)**For:**

Procurement & Consultancy Services Division of HLL Lifecare Limited, for and on behalf of Govt. of India, Ministry of Health & Family Welfare, invites sealed tenders, from eligible and qualified tenderers for supply of Medical Equipment to the institutions i.e. Government Medical College - Amritsar, Jawahar Lal Nehru Medical College (Aligarh Muslim University) –Aligarh , Pt.B.D.Sharma Post Graduate Institute of Medical Sciences,Rohtak and Dr. Rajendra Prasad Government Medical College - Tanda which are getting upgraded under Pradhan Mantri Swasthya Suraksha Yojna (PMSSY) Phase II:

Sl. no.	Short description of items	Total Qty.	EMD (Rs.)
1	MRI 3.0 T	1	2,400,000

Read as:

Procurement & Consultancy Services Division of HLL Lifecare Limited, for and on behalf of Govt. of India, Ministry of Health & Family Welfare, invites sealed tenders, from eligible and qualified tenderers for supply of Medical Equipment to the institutions i.e. Government Medical College - Amritsar, Jawahar Lal Nehru Medical College (Aligarh Muslim University) –Aligarh , Pt.B.D.Sharma Post Graduate Institute of Medical Sciences,Rohtak and Dr. Rajendra Prasad Government Medical College – Tanda and **for Six AIIMS** which are getting upgraded under Pradhan Mantri Swasthya Suraksha Yojna (PMSSY):

Sl. no.	Short description of items	Total Qty.	EMD (Rs.)
1	MRI 3.0 T	7	1,68,00,000

The due date of submission of bids for Schedule No.1, MRI 3T is as follows:

Sl. No.	Description	Schedule
i.	Dates of sale of tender enquiry documents for Schedule No.1, MRI 3T	20.06.2014 to 01.12.2014 , 1000 hrs to 1600 hrs IST
vi.	Closing date & time for receipt of Tender	02.12.2014 , 1400 hrs IST
vii.	Time and date of opening of Techno – Commercial tenders	02.12.2014 , 1430 hrs IST

Note:

- (i) **If EMD is submitted in the form of BG, then the validity of the BG should be at least 165 days from the date of tender opening, i.e, upto 16.05.2015.**

**SECTION - VI
LIST OF REQUIREMENTS**

Part I

List of item with quantities, warranty & CMC period.

For:

Sl. no.	Short description of items	Consignee	Qty.	Total Qty.	Warranty (Years)	CMC (Years)
1	MRI 3.0 T	Rohtak	1	1	5	5

Read as:

Sl. no.	Short description of items	Consignee	Qty.	Total Qty.	Warranty (Years)	CMC (Years)
1	MRI – 3T	Pt.B.D.Sharma Post Graduate Institute of Medical Sciences, Rohtak	1	7	5	5
		AIIMS – Bhopal	1			
		AIIMS – Raipur	1			
		AIIMS – Patna	1			
		AIIMS – Jodhpur	1			
		AIIMS – Rishikesh	1			
		AIIMS – Bhubaneswar	1			

Section VII
Technical Specifications

Schedule No.1, MRI-3T

The specification has been amended and is to be read as follows:

Whole body 3.0 Tesla Magnetic Resonance Imaging system optimized for higher performance in cardiac and neurological examinations with short superconducting magnet, high performance gradients and digital Radio frequency system. The system should have 32 channels RF system. The system should be totally new and should not contain refurbished or having recycled items.

1 MAGNET

- a. 3.0T active shielded super conductive magnet with best homogeneity. Field stability over time should be < or equal to 0.2 ppm/hr
- b. Length should be short with at least 70cm bore.
- c. It should have facilities of better illumination ventilation and designed to avoid patient claustrophobia.
- d. 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.
- e. Please specify upto what FOV gradient linearity is maintained.
- f. 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.
- g. 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.
- h. Helium level monitoring equipment in the magnet and facility for appropriate quick shutdown of the magnet in The event of emergency
- i. Helium refill time should not be < 2years. Please mention the helium refill time.
- j. Noise level inside the examination room should be minimum as possible. Specify db level
- k. Physiological signal display on Gantry
- l. Built - in 2 way Intercom facility to communicate with patient is required
- m. Emergency helium release button should be provided at least in two places [inside MR examination room and console room]

2 SHIM SYSTEM

- a. High performance and highly stable shim system with global and localized manual and auto-shimming for high homogeneity magnetic field for imaging. Specify time for shimming. Quote the number of shim coil used

- b. Off-centre shimming should be possible.
- c. Auto shim (global and voxel shim) should take minimum time to shim the magnet with patient in position.

3 GRADIENT SYSTEM

- a. 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.
- b. These true slew rates should be available in each axis independently, for overall better duty cycle performance of the gradient.
- c. The duty cycle should be 100 percent.
- d. The Gradient system should have provision for eddy current compensation. Mention level of Eddy current compensation in %
- e. Field of View should be at least 45 cm in all three axes.
- f. Minimum TE & TR in 2D/3D should be specified in relation to the sequences.
- g. Minimum Slice Thickness in 2D & 3D should be specified in relation to the sequences.
- h. Echo Train length in both Spin echo and Gradient Echo should be at least 255 or more.
- i. The measurement matrix should be from 128x128 to 1024x1024 in both 2D and 3D imaging as well.

4 RF SYSTEM

- a. A fully digital RF system capable of transmitting power of at least 25 KW or more (Single/ dual) with a combination of RF power amplifiers. System should be capable of Multi Transmit with Multi amplifier driving /true shape for better B1 homogeneity
- b. 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)
- c. 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.

5 RF COILS

The system body Coil integrated to the magnet must be quadrature /CP. In addition to this coil, following Coils (preferably be with equal number of elements as the channels) be quoted. RF coils in addition to main body coil (Transmit / Receive or receive coils) auto tune, array or no tune coils. Coils for the following applications should be available with the system. Circular polarized (CP) Array coils should included in the offer. Coil / RF design should support compatibility to coils manufactured by other manufacturers. Please confirm that the system can adapt to coils developed and manufactured by other manufacturers. Please substantiate this with examples. Please specify the measures taken

to prevent dielectric artifacts. (Quadrature design & EPI compatible) in addition to main body coil. All array coils should be compatible with parallel imaging technique/s. Please specify the number of channels and elements available for each coil. Please mention the true acceleration factor for each of the array coils.

- a) 32 channels or more head coil-capable of multi frequency MR spectroscopy (1H).

Dedicated Multinuclear/ Multi-frequency MR Spectroscopy Coil capable of H-1 and P-31 Spectroscopy should be quoted **separately as an OPTIONAL item."**

- b) Neck phased array coil 8 channel or more.
 c) Neurovascular coil of 16 channels or more
 d) Spine phased array coil 32 channels or more
 e) Body phased array coils 32 channels or more (single or in combination)
 f) Suitable Coil for peripheral angiography 32 channels or more
 g) Suitable Carotid coil.
 Dedicated third party Coil for Carotid imaging **to be quoted as OPTIONAL.**
 h) Breast coil 16 channel or more capable of spectroscopy
 i) Suitable Phased array coil for faster and high resolution Cardiac imaging – 32 channels or more; 31 Phosphorus spectroscopy also to be possible.
 j) Shoulder coil – Multi channel (8 channels or more) flex loop or rigid type – 2nos. (One large and one small)
 k) High resolution knee coil 12 channel or more
 l) High resolution foot/ ankle coil – 8 channels or more
 m) Multi Nuclear Spectroscopy coil (1H, 31P, 23Na, and 13C) for Head and Liver **to be quoted separately as an OPTIONAL item.**

PROVIDE THE LIST AND NUMBER OF ALL RECEIVER COILS QUOTED.

6 PATIENT TABLE

- 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.

7 COMPUTER SYSTEM IMAGE PROCESSOR / OPERATOR CONSOLE

- 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.
- c. 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.
 - d. The main console should have facility for music system for the patient in the magnet room.
 - e. Filming and adequate storage for images and other applications .
 - f. 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.
 - g. Dual 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.
 - h. There should be a provision of retrieval of the reconstruction data (raw files) in an user friendly manner.
 - i. 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.
 - j. The system should be capable to connect to PACS through RIS/HIS at no extra cost. Highest version of DICOM connectivity to be provided.

8 WORKSTATION

- 1 One thin client server to serve 5 concurrent licenses to be supplied with the system.
 Licenses: Concurrent license here implies the capability to process all the loaded software to be accessible and usable on all the 5 systems simultaneously without any processing delay. The software should also include a reputed antivirus software of a perpetual type or renewed by the supplier.
 Hardware: Node: Out of the 5 concurrent licenses (software), the vendor has to supply the hardware in the form of CPU and medical grade monitor (18" or more) for 2 nodes.
 Hardware: Server: The server (single/dual configuration) should have image storage capacity of at least 3 Tera bytes, minimum 20,000 concurrent slice processing power and at least 64GB RAM. The server hardware to be included with 18" or more TFT/LCD Medical Grade (2 megapixel or more resolution) monitor with dual processor, separate hard drive with image storage of at least 2.5 lakh images (256 x 256 matrix) with CD RW or DVD RW. 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.

- 2 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.

The workstation should have the following features:

- a. Cardiac perfusion analysis & Processing of Real Time BOLD imaging data, with colour metabolite mapping, quantification of the CSF flow data.
- b. Fusion software should be provided.
- c. Should mention whether software for vascular properties like IAUC, KEP is available.
- d. DSA images should be viewable in Subtraction mode.
- 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.
- 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.
- 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.

Cardiac Package: 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.

3. Voice Recognition software (two licenses) on two separate computers with all essential hardware.

9 DATA ACQUISITION

- a. The system should be capable of 2D and 3D acquisitions in conventional, fast & ultra-fast spin echo and gradient echo modes so that real-time online images can be observed if needed.
- b. 2D multi-slice imaging should be possible in all planes (axial, sagittal, coronal, oblique and double oblique).
- c. 1024 x 1024 matrix acquisition for all applications
- d. Half Fourier or other techniques to reduce scan acquisition time while maintaining adequate SNR
- e. 3D volume, multiple contiguous slabs, multiple interleaved and multiple overlapping slabs
- f. Slice thickness in 2D and partition in 3D to be freely selectable
- g. Dynamic acquisition (serial imaging) with capability to initiate scan sequences either from the magnet panel or from the console.

- h. Dynamic acquisition number of repeat scans with delay time either identical time interval or selectable.
- i. Auto slices positioning from the localizer images.
- j. Maximum -off centre positioning both anterior-posterior and lateral direction and should be selectable.
- k. Gating: physiological signals like ECG, pulse, respiratory, external signal triggering (interface for triggering input pulse from external source).
- l. Simultaneous acquisition, processing and display of image data in 2D multi-slice mode.
- m. Selection of voxel from oblique slices should be possible while doing spectroscopy.
- n. The application software for image smoothing and edge sharpness etc. for improvement in image resolution should be quoted.
- o. Artifact reduction/motion correction techniques/imaging enhancement/image filtering/image subtraction/addition multiplication/division techniques:
- p. Flow 1st and 2nd order flow artifact compensation.
- q. Presentation slabs: a number of relocatable saturation bands to be placed either inside or outside the region of interest.
- r. Magnetization transfer saturation: Off resonance RF pulses to suppress signals from stationary tissue in FOV phase contrast capability in 2D & 3D mode.
- s. Breath Hold Acquisition for Cardiac and Abdominal Imaging must be possible.
- t. Fat saturation techniques: frequency selective RF pulses to suppress fat signal in the measured image FO. ROI selective (regional) fat suppression should also be given.
- u. Magnetization transfer saturation; OFF-resonance RF pulses to suppress signals from stationary issue in FOV.
- v. Phase contrast capability in 2D and 3D mode.
- w. Image intensity correction.
- x. Breath hold acquisition

10 EPI MODE

- a. Single and multi shot EPI imaging techniques.
- b. Data acquisition in all three standard planes (axial, sagittal coronal) and oblique and double oblique planes
- c. Multi-coil acquisition in order to optimize throughput increase and increased effective FOV. Individual acquisition of every coil should be mentioned.
- d. Higher matrix acquisition capability in single shot EPI, Acquisition time, TR TE and slice thickness should be clearly mentioned and supported by data sheet reference.
- e. BOLD, SWI, T2 Perfusion (with all post processing licences as standard)
- f. Complete Functional MRI of Brain package as standard. It should be a goggle based system.(incl. of patient camera, goggles, headphone and all other related hardware).
- g. Susceptibility-weighted Phase Imaging to differentiate calcification & haemorrhage.

11 IMAGING SEQUENCES

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- a. The system should be capable of selecting TR and TEs as per requirement in majority of the pulse sequences.
 - b. Spin echo (SE); multi-slice single echo, multislice multi-echo (B echo or more) with minimum TR and TE. SE with symmetrical and asymmetrical echo intervals: MT-SE imaging sequence.
 - c. Inversion recovery (IR) including short TI, modified IRSE, FLAIR, DIR (Double Inversion Recovery) MT and FLAIR.
 - d. Gradient echo (GE) 3D gradient echo with shortest TR and TE, free choice of flip angle selection while maintaining SNR

Fast Sequences

- a. Fast spin echo in 2D and 3D mode T1, T2 and PD contrast capable of acquiring maximum number of slices with a given TR a minimum TE. echo train should be at least 128 or more in fast spin echo mode.
- b. Half Fourier acquisition capabilities should be available with/ without diffusion gradients and in combination with fast spin echo.
- c. Fast inversion recovery with spin echo.
- d. Fast gradient spin echo, IR multi-slice multi-echo mode with maximum turbo factor Sequences should incorporate RF focusing to acquire ultra fast gradient spin echo.
- e. Fast gradient echo sequence should be provided to acquire images in ultra-fast 2D and 3D mode.
- f. Fat and water suppressed imaging sequences including the sequence which should give 4 contrast (in phase, opposed phase. FAT and Water) images in a single acquisition to be quoted as standard. EPI optimized sequences for T1, T2, PD imaging. perfusion, regular diffusion values (5b, 3 directions), EPI-FLAIR. CPI-IR, IPI-FLAIR diffusion tensor. EP1-MT-FLAIR, tensor diffusion (5b values in minimum in six directions) for diffusion studies. Suitable artifact/fat suppression techniques to be incorporated in the sequence to have optimum image quality. There should be capability of generation of ADC map (isotropic and anisotropy from the regular diffusion and tensor data). Facility of online generation of ADC map should be there. Optimized sequence package for special applications.
- g. MR angio; 2D/3D TOF, 2D/3D Phase contrast (with and without gating) magnetization transfer saturation, black blood angiography for cerebral, pulmonary, abdominal and peripheral vessel For peripheral angio moving table angiography should be offered so that complete limb can be examined in one go Bolus tracking software package should be offered. Sequences for breath hold angiography with contrast enchainment should also be offered.
- h. NON Contrast Angiography like Native, Inhance, Trance for whole body applications to be quoted as standard.
- i. Contrast bolus tracking (including single shot whole body MRA, interactive and automatic, etc.
- j. 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. Full comprehensive cardiac sequences which includes, (a) MR cardiology package for evaluation of heart in long and short axis with black blood cardiac imaging, (b) package for- prospective and retrospective gating, etc. Advanced Cardiac Applications: morphology, wall motion, perfusion imaging myocardial viability imaging, Cardiac functions including EF, ED/ES volume, Cardiac output, and wall thickness. This processing can be in workstation and console.
- k. Sequence package for diffusion study including DTI (tractography) in organs like brain, kidney, muscle, heart, etc
 - l. Perfusion study in organ systems like kidney, brain, heart etc. Evaluation package for calculating CBV, CBF, MTT, perfusion map etc. Post processing of perfusion should be available in console also.
 - m. Sequences for MRI imaging of joints with Metal implants like WARP/Maverick should be offered
 - n. Fat quantification of liver
 - o. Iron quantification of liver should be quoted as optional (**Optional**)
 - p. Hardware and sequences post processing software for MR Elastography of abdomen. (**Optional**)
 - q. Contrast Kinematics like TWIST / TRICKS / 4DTRAK should be offered.
 - r. Colour T2 mapping of cartilage should be offered as optional. (**Optional**)
 - s. Image fusion should be offered
 - t. Whole body imaging of 200 cm should be offered
 - u. Programming environment under research agreement should be offered for creating and modifying pulse sequences and working on the system.
 - v. Flow quantification in vessels and CSF, hepatobiliary system.
 - w. MRI neurofunctional imaging sequence including BOLD/ Mosaic etc.
 - x. Optimized breath hold sequences for abdominal studies including angiogram.
 - y. Sequence package for functional mapping of brain.
 - z. Internal ear imaging. 3D acquisitions like CUBE. SPACE, VISTA to be quoted as standard.
 - aa. Susceptibility Weighted imaging should be provided as essential.
 - bb. High SNR even in small FOV should be available. (Specify the details of the smallest FOV and the technique)
 - cc. Non Contrast perfusion Imaging software like ASL and its post processing should be offered
 - dd. MR Cholangiography and Pancreatogram: Both breath-hold and respiratory triggered - Specialized sequences and processing to perform MRCP.
 - ee. Pulmonary 2D/3D MRA sequence, including single breath hold sequence.
 - ff. MR ventriculography and Cisternography, Myelography.
 - gg. Parallel acquisition technique such as SENSE/SMASH/ASSET/iPAT, ARC and other new sequences to be quoted as standard.

- hh. Specify the factor by which the acquisition time is reduced for similar acquisition with and with out parallel imaging technique. A scan time reduction factor 4 for head, body, cardiac, angio and ortho application is required.
- ii. Flow quantification packages for CSF with dynamic CSF flow imaging, aqueduct. and spinal canal In-line motion correction for uncooperative' patients/pediatric applications, that is motions/patient movement correction sequence and algorithm (not just faster scanning or parallel imaging techniques) for non-cooperative/sick patients/children should be provided.

12 IMAGING SEQUENCES

- a. MRS: Proton (1H) MRS- Single voxel (SV), Multi-voxel CSI -2D and 3D- in both short and long TE
- b. Multi nuclear – 31P, 23Na and 13C with compatible necessary hardware **(Optional)**
- c. MRS – 31P – Specify details of sequences and preparatory pulses used.
- d. Specify future upgradability for 23Na & 13C MRS with necessary hardware/coil.
- e. Fat and iron quantification of liver: standard

13 POST PROCESSING AND EVALUATION

- a. 3DMultiplanar reconstruction (MPR) in any arbitrary plane including curved planes with freely selectable slice thickness and slice Increments.
- b. 3D Surface reconstruction and evaluation on reconstructed images with minimum time.
- c. MIP in 2D and 3D mode, targeted/segmented MIP in any orthogonal axis with minimum processing time and capable of displaying in cine mode.
- d. Full cardiac evaluation Operator selective or automatic contour mapping and calculation of Cardiac parameters like wall thickness, stroke volume EF, filling rate myocardial wall motion including display of data in label, graph and in cine mode. Blood flow quantitation, velocity mapping, pressure gradient quantification shunt quantification, regurgitation calculation, stenosis blood flow, etc. These should be usable on main or on the work station. Evaluation and display of diffusion images, fMRI reference of EPI optimized sequence
- e. Full Perfusion imaging with necessary post processing with time intensity graph and other statistical parameters.
- f. Flow quantification and evaluation for vascular (high and low). CSF, bladder outlet and cine display Full Fledged Advanced Functional MRI: Whole brain coverage using high temporal resolution T2* - weighted BOLD) imaging Single-shot EP1 for multi-slice imaging. Complete fMRI processing software, Automatic real-time processing of functional BOLD MR data sets into functional activation map
- g. Full post processing for SVS, CSI, metabolic mapping with colour coding
- h. Image statistics: measurement of distance, area, volume (2D and 3D), angle, SD, mean, image addition subtraction, multiplication, division, interpolation, segmental, threshold, histogram (ROC) Evaluation features like zoom, rotation,

scroll, image synthesis, multi point T1 and T2 calculation (more than 8) window searching, text dialogues graphics. Sorting, searching, archiving, recalling, etc.

14 UPS

The system should be provided with the suitable UPS system for the complete system (MR + accessories except Chiller supplied) with at least 30 minutes back up.

15 DOCUMENTATION

- a. The dry imager system should have digital DICOM 3.0 dry chemistry camera with resolution of 16 bits/ 600 dpi or more. The system must have at least three online film sizes, and should be capable to print on any of the 8 x 10, 10 x 12, 11 x 14, 14 x 14 x 17 sizes. The system should be freely configurable by the user, to use any of the above mentioned size.
- b. A colour laser printer for printing colour images and protocols on plane in 1200 dpi resolution and more than 20 ppm.

16 ACCESSORIES

1. Storage box for all coils
2. Dual Syringe Pressure injector : Independent dual-Syringe Pressure injector with following Features; Non-ferrous, automatic syringe size detection, performs single and dual phase contrast injections, provides Saline flush delivery and allows timed contrast delivery Must be compatible with 10, 15, 20 & 30ml pre-filled contrast syringes and 50 ml syringes for both saline & contrast (200 Nos of 50 ml Syringes with 500 nos. of tube connectors should be provided) Must be able to observe progress of injection and view injection result
3. MRI Compatible ECG leads (with 1000 no.s Disposable Electrodes for MRI Image gating)
4. MRI-Compatible Pulse oximeter with MRI Compatible Adult & Paediatric Probes and Electrodes ; Adult probe – 2 no.s , Paediatric Probe – 2 no.s)
5. MRI Compatible Anaesthesia Machine with integrated Ventilator, 2 vaporiser, circle absorber
 - a) Capable of ventilating adult, pediatric and neonates.
 - b) Soft ware for ventilation should support Volume control, Pressure control and Pressure support modes.
 - c) Should have oxygen, nitrous oxide and air flow meters
 - d) Isoflurane and sevoflurane vaporisers
 - e) All safety alarms
6. One MRI compatible Multiparameter Vital Signs Patient Monitor in MRI Room and One Slave monitor in console room with following modules provision to monitor the following –
 - a. Heart rate
 - b. ECG
 - c. NIBP – Size of Cuffs (adult & pediatric neonatal)
 - d. Respiration (Capnograph)
 - e. Two IBP – Pressure transducer with the MRI compatible stand.
 - f. Oxygen saturation – Pulse oximeter with adult, pediatric probe, and neonatal probes - 2 sets (with the spare probes), Should have plethysmograph perfusion factor.

- g. ETCO2 and ETAA (end tidal anesthetic agents)
- h. Temperature (adult and pediatric)
- 7. MRI compatible infusion pump – 3 Nos.
- 8. Arrangement of Gas lines in recovery room and magnet room – MRI compatible high pressure gas outlet for :
 - a. Oxygen
 - b. Air
 - c. Nitrous Oxide with MRI compatible indexed system.
 - d. Vacuum suction
- 9. MRI Compatible 2 sets of Laryngoscope :4 sizes blades- Neonatal, paediatrics, adult, extra large.
- 10. MRI compatible Magill forceps : Adult & paediatric size- Two each.
- 11. Stylet for endotracheal tube : Ault, paediatric size- Three each
- 12. MRI compatible Clamps 2 Nos : Either towel clip or artery forceps.
- 13. MRI Compatible two IV stands. (if not provided already)
- 14. MRI compatible suction apparatus - 2 No.s
- 15. Two Anaesthesia bed/trolley for recovery.
- 16. Non magnetic IV stand.
- 17. Two non-magnetic patient transfer trolleys should be provided
- 18. Metal detectors three in number, two of which are hand held.
- 19. Phantoms to be provided for regular QA studies.
- 20. Complete manuals and other necessary documentation's should be provided.

17 TRAINING

Qualified personnel nominated by the deptt, should be given application training by the vendor at their cost at site.

18 STANDARD AND SAFETY

Should be FDA or CE approved product.

19 GUARANTEE

5 years guarantee of complete MRI system along with all accessory equipment supplied i.e. Camera, AC, Chiller, UPS etc. The warranty should start from the day of complete satisfactory installation of equipment.

20 SERVICE

After warranty CMC for next Five years for complete MR system and all that is supplied with the system including ACs, etc.

21 SPECIAL CONDITIONS

In case the company can offer any other technical features which are better than these specifications of would be available at the time of machine is installed. Point wise technical compliance report supported along with the original product data sheet must be submitted in all truthfulness and shall be the essence of the technical bid. In the absence of this the offer may liable to be rejected. The offered unit must be FDA/CE approved. All operating, service and technical manuals of main and sub system must be supplied in duplicate.

22 TURN KEY INSTALLATION

- a. The system should be installed and handed over in working condition with all necessary electrical, air conditioning and civil work undertaken by the vendor in consultation with the user dept.
- b. All necessary interconnecting interfaces, cable, modules, and other hardware and software to fully integrate the system for full operational status.
- c. Diesel Generator of adequate capacity to be installed , to provide power backup for normal functioning of the MRI with all accessories as well as room lighting and air-conditioning of the MRI scan centre area.

The Turnkey Scope of Work - MRI

The Supplier should inspect the proposed site offered by the Consignee in which the MRI system has to be installed and they are required to submit the plan for the complete MRI Scan Centre on a turnkey basis. Prospective bidders are advised to acquaint themselves with access to site , location of work , local labour problems and any other matter relating to availability and carriage of construction materials. The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Air-conditioning, Fire fighting and miscellaneous works for the construction of MRI Scan Centre.

While preparing the plan, the following aspects have to be addressed.

- a. The MRI should be sited in such a manner; in order to minimise the effect of fringe magnetic field on surrounding areas. The areas lying within 5 Gauss line should be clearly demarcated and cordoned off with adequate warning.
- b. Care should be taken to provide easy negotiation of the patient stretchers/ trolleys through corridors and doors.
- c. RF shielding for doors, walls, glass viewer etc.
- d. Furniture like desk, chairs, shelves etc.
- e. Patient stretcher and other furniture/ accessory to make the scan centre functional.

The cost of Turnkey for the area of 1500sq.ft and Air-conditioning of Tonnage **25 TR** will be considered for Ranking / Evaluation purpose.

Moreover Bidders will have to quote the Unit Rates of the following components of turnkey work and detailed BOQ should be mentioned.

- a. Civil works (in units like sq.m / cubic m , kg etc)
- b. Electrical work (in unit s like per metre price , unit price for panel , isolation etc)
- c. Public health (plumbing and sanitary fittings like per metre of pipe, number of points etc.)
- d. Air Conditioning (HVAC)-rate of tonnage, type of false ceiling and sq.m rate etc
- e. Interior Furnishing & Furniture
- f. Miscellaneous

Scope of work for turnkey MRI unit works:-

The supplier should inspect the proposed site and submit all the detailed structural and architectural drawings and BOQ for the proposed MRI Scan Centres along with technical bid of the tender.

The MRI SCAN CENTRE shall consist of the following rooms:

- a. MRI Room
- b. Console room
- c. Equipment room
- d. Patient preparation room
- e. Reporting room
- f. Patient waiting area
- g. Radiologist room

The actual area of turnkey works done will be considered for payment, based on the site measurements.

Civil work

Any *ab initio* new construction or demolition of existing structure/walls etc and reconstruction is unambiguously included in the turnkey scope of work. This includes, but is not limited to expanding the area of MRI gantry room so as to make it compliant for installation of a 3T strength magnet.

- a) Civil construction work including construction of brick wall, plastering, flooring as per the approved plan and equipment layout plan.
- b) Concrete bed at MRI equipment area.
- c) Platform for unloading and shifting the MRI should be provided if necessary.
- d) Platform for Chiller unit would be provided. Fencing and weather protection facility should be provided for the Chiller unit.
- e) Cable tray, trench & channel – necessary trenches, cable tray and channels at required location would be provided.
- f) All the construction work to be done as per the final plan approved by the purchaser.
- g) Active and passive room shielding for magnetic, fringe field should be provided as per the requirement of the equipment.
- h) The entire complex will be made rodent/pest proof.

a) Flooring

Providing and laying approved quality , colour, design and shade fully homogeneous 600 x 600 mm(thickness to be specified by the manufacturer) **vitrified tile flooring (Marbonite or Granamite**, confirming to IS code 15622 with water absorption less than 0.08%) flooring in pattern as detailed in drawing or as directed by the EIC and grouted with matching colour approved quality readymade grout, curing, cleaning etc to required line level etc. all complete at all leads, lifts and heights to the entire satisfaction of the EIC. Providing and fixing 2-3mm thick POP protection over polythene covering sheet to flooring areas till handed over and cleaning, etc all complete as per drawings & specification and as directed by EIC with 100mm tile skirting to match in MRI room , console room , equipment room , patient preparation room, reporting room , patient waiting area and radiologist room. Note: Mode of measurement (Finished surface area of the tiles shall be measured and paid.

Rate shall be inclusive of providing and laying levelling course, PVC spacers, providing and applying epoxy grout and no additional payment shall be made for wastages).

50 mm thick cement concrete flooring at all heights and locations including scaffolding , preparing the surfaces , neat cement finished to correct line or as required to receive architectural finish , level and plumb , curing wherever required complete as per requirements and drawings , with Vinyl flooring in MRI equipment / UPS room.

b) Painting

Two coats Plastic Emulsion Paint over 2 coats of wall putty including primer in patient preparation area, Lobby area, console room, MRI equipment room etc.
Pre laminated particleboard wall panelling in MRI examination room.

c) False Ceiling

Acoustical tile for ceiling with light weight insulating material of high quality supported on grid or finished seamless with support above ceiling. Finished with white paint or powder coated with white paint, if metallic. Ceiling height to suit the equipment mount and clearances.

d) Plumbing work

- I. All water pipes and fittings shall be of high density polythene of approved and standard make. The gratings shall be brass chrome plated. All plumbing accessories should be of standard make.
- II. Copper pipes to be used for plumbing the Chiller to the MRI.

Note:

1. Tenderers are advised to visit the site of work to acquaint themselves about the levels of sub soil water, drainage facility for dewatering, accessibility to site etc. and quote the rates accordingly.
2. All sanitary wares & CP brass fitting & fixtures shall be of first quality with ISI mark (unless otherwise specified) and shall be of the make as per the latest approved list of materials as per list of approved make/model, if any. They shall be got approved by the Engineer-in-charge before incorporating in the work.
3. All the items include testing after completion of the work. Concealed/underground GI pipe line is to be wrapped with hessian cloth and painted with two coats of anticorrosive paint.

Disposing off: The surplus excavated materials by mechanical transport lead up to 2KM to the nearby dumping pits/dumping areas within institute campus identified by Engineer in charge, including all lifts, loading, unloading, stacking etc. complete as per specifications & as directed by the EIC.

e) Electrical work

The supplier shall be required to specify the total load requirements for the MRI scan centre including the load of air conditioning , room lighting and for the accessories if any. The supply line will be provided by the Institute up to one point within the MRI Scan centre area. The distribution panel shall be provided by the vendor. Few lights in each room shall be connected to the UPS to provide emergency lighting.

The electrical work shall include the following:

- a. Wiring – All interior electrical wiring- with main distribution panel board, necessary MCBs, DB, joint box, switch box etc. the wires shall be of copper of different capacity as per the load and should be renowned make as listed below.
 - b. Switches light and power points should be of modular type and of standard make as listed below.
 - c. General lights – Mirror optical type 1X28 W or 2X28 W/CFL fittings 2X36, 3X36 W with electronic ballasts.
 - d. MRI compatible lights for MRI examination room. The bulbs used within the RF cage should be easy replaceable and locally available.
 - e. All wires used must be FRLS (Fire Retardant with low smoke) type only.
- f) AIR CONDITIONING:**
- i. Total capacity of the Air-Conditioning (duct-able + split) for the entire MRI scan centre area should be at least 25 TR.
 - ii. Ductable package air conditioners and split AC units may be used according to room requirement and suitability. Humidity control should be effective to eliminate moisture condensation on equipment surface. . The Air conditioning should be designed with standby provision to function 24 hours a day. a)
 - iii. The outdoor units of AC should have grill coverings to prevent theft and damage.
 - iv. Ventilation is required in toilet.
- g) Environment specifications:**
- i. Humidity range: Relative humidity 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment.
 - ii. Temperature ranges: $22 \pm 2^{\circ}$ C in all areas except equipment room which shall be as per requirement of the equipment.
 - iii. Air conditioning load: The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the bidder
- h) Furniture:**
- i. Revolving chairs height adjustable, medium-back with hand-rest in the Control room, Radiologist room and viewing area. – 4 NO.S
 - ii. Chairs for patient waiting area – Three seater (chrome plated). - 10 NO.S
 - iii. Cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement. – 3 NO.S
 - iv. Drug trolleys for patient preparation area.- 1 NO.
 - v. Patient trolley with rubber foam mattress to be kept in the patient preparation room.
 - vi. Tables for Workstation and Radiologist in reporting room.- 2 NO.S
 - vii. Changing rooms should have change lockers and dressing table.
 - viii. Dustbins (plastic with lid) to be provided as required.
 - ix. All the rooms in the complex will be signposted. Sun film & ventilation blinds / curtain will be put up in all windows.
 - a. All furniture items should be of standard make as mentioned in the table below.
- i) Miscellaneous:**

- 1 Reporting room should have LED X-ray Film viewer with adjustable brightness; capable of holding 3 films of 14"x17" size. – 2 no.s
- 2 Cabling of Network (LAN) connectivity for camera system, console system, workstation and computers etc
- 3 Broadband connection: for REMOTE SERVICE of MRI system.
- 4 Dry chemical power type fire extinguisher of 5kgs capacity, with initial filling in brand new cylinder with power coated finish, fitted with Gun metal union, high pressure CO2 gas cartridge, discharge hose, wall mounting bracket etc. complete, confirming t IS:2171 of approved make & complete as directed by EIC.

LIST OF ITEMS AND SUGGESTED MANUFACTURERS.

SL NO	ITEMS	PREFERRED MAKES
A	FLOORING VITRIFIED TILES	Somany, Kajaria , H&R Johnson, Marbonite, Granamite
B	PAINT	Dulux, Asian Paints , Nerolac
C	PLUMBING	Kohler, Jaguar , Grohe , Roca
D	SANITARY ITEMS	CERA, Hindware, Parryware
E	ELECTRICAL	
1	CABLES	Finolex, Havells ,V-Guard
2	SWITCHES	Legrand, L&T, Crabtree , Roma
3	DISTRIBUTION BOX , MCB	Legrand, L&T, Siemens, Havels
4	LIGHT FITTINGS	Philips / Crompton / Wipro.
F	AIR CONDINTIONING	Daikin, Hitachi, Blue Star, Voltas.
G	FURNITURE	Hermen Miller , Godrej , Featherlite

GENERAL POINTS:

All items of work under this contract shall be executed strictly to fulfill the requirements laid down under "Basis of design" in the specifications. Type of equipment, material specification, methods of installation and testing and type of control shall be in accordance with the specifications, approved shop drawings and the relevant Indian Standards, however capacity of each component and their qualities shall be such as to fulfill the above mentioned requirement.

The rate for each item of work included in the schedule of quantities shall, unless expressly stated otherwise, include cost of;

- a. All materials, fixing materials, accessories, appliances tools plants, equipment, transport, labour and incidents required in preparation for and in the full and entire execution, testing, balancing, commissioning and completion of work called for in the item and as per specifications and drawings.
- b. Wastage on materials and labour.
- c. Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and for the job in accordance with the contract documents, good practice and recognize principles.

Mode measurement shall be as per specification.

In the event of conflict between schedule of quantities and other documents including the specifications, the most stringent shall apply. The interpretation of the Architect/ Engineer shall be final and binding.

Section – XXI Consignee List

Added Consignee List:

Consignee Code	Medical Institutions	Contact Address.	AirPort	Sea Port / Dry Port
Bhopal	All India Institute of Medical Science, Bhopal	The Director, All India Institute of Medical Science, Near Saket Nagar, Bhopal-462020	NEW DELHI	KOLKATA
Bhubaneswar	All India Institute of Medical Science, Bhubaneswar	The Director, All India Institute of Medical Science, AIIMS-Bhubaneshwar, Near Biju Patnaik Police Academy, Village-Sijua, Bhubaneshwar-751019, Orissa	KOLKATA	KOLKATA
Jodhpur	All India Institute of Medical Science, Jodhpur	The Director, All India Institute of Medical Science, Basani Ph-2, Jodhpur-342005, Jodhpur	NEW DELHI	KANDLA
Patna	All India Institute of Medical Science, Patna	The Director, All India Institute of Medical Science, AIIMS-Patna, Phulwari Sharif, Infront of DAV School, WALMI, Danapur, Patna-801105, Bihar	KOLKATA	KOLKATA
Raipur	All India Institute of Medical Science, Raipur	The Director, All India Institute of Medical Science, AIIMS-Raipur, Old TB Hospital, Tatibandh, Raipur-492001, Chattisgarh	KOLKATA	KOLKATA
Rishikesh	All India Institute of Medical Science, Rishikesh	The Director, All India Institute of Medical Science, AIIMS-Rishikesh, Barrage Road, Pashulok, Rishikesh-249203, Uttarakhand	NEW DELHI	KANDLA

All other terms and conditions of the tender enquiry remain unaltered.