Notice Inviting e-Tender

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SUPPLY OF HIGH END DIAGNOSTIC EQUIPMENTS IN THE HOSPITALS OF THE GOVERNMENT OF WEST BENGAL.

(Submission of Bid through *online*)

Bid Reference No.: WBMSCL /NIT-38/2016	Dated – 28.06.2016

Amendment - I

The specifications for 1.5 Tesla MRI Scanner and Site preparation including interiors and Air-conditioning has been revised in the tender document. The revised specifications are given below,

REVISED TECHNICAL SPECIFICATIONS for 1.5 Tesla MRI Scanner (SCHEDULE – I)

1. MAGNET

a) Should be Compact & Patient friendly 1.5 Tesla Actively Shielded Superconductive
b) Should have Wide magnet bore (at least 70 cm) patient bore diameter flared at both ends. The total Magnet length should be 170 cm or less
c) Exclusive Supercon compensation for heavy iron objects moving in vicinity.
d) Should have Cryocooler with Helium consumption aprox. of 0.03 ltr/hr. Refill not more than once in 3 years.
e) Should have both active shimming and passive shimming. Homogeneity should be better than ± 3.5 ppm at 45 cm FOV.
f) Equipment should be offered preferably with 2nd order SHIM to correct patient induced inhomogeneity.
g) Well ventilated and illuminated with in-built 2 way intercom system for communication with patient.
h) MR compatible patient headset for music in gantry and for administering auditory paradigms for fMRI.

2. ACTIVELY SHIELDED GRADIENT

a) Strength: Min 44 mT/m or higher true usable peak gradient amplitude in all 3 axes for high quality imaging at a true usable peak Slew rate of 200 mT/m/msec or higher to perform all fast sequences at 100% duty cycle. Water cooled gradient

amplifier should be offered. Acoustic noise reduction features should be available to facilitate increased patient comfort.

b) Min Slice thickness 2D: 0.5 mm, lower is preferable.
c) Min slice thickness 3D: 0.1mm , lower is preferable.
d) Min/Maximum FOV (2D and 3D: 10 mm or lower/ 40 cm or higher preferred in all 3 axes.
e) Acquisition Matrix in both 2D and 3D should be 1024 X 1024.
f) Please mention the gradient linearity and attach the datasheet mentioning it.

3. PATIENT BED

a) Patient friendly, lowest height: 70 cm
b) Travel: At least 200 cm
c) Halogen/LASER light beams for accurate positioning
d) Facility for easy administration of contrast.

4. RF Amplifier and Receiver

a) Fully digital, solid state Transmit with output power of 15 KW or higher
b) At least 32 dedicated digital receiver channels with Receiver Bandwidth of 1 MHz per channel or higher for superior RF performance.
c) Integrated preamplifiers with each coil shall be preferred
d) Multiple coil connection with active coil decoupling preferred

5. COMPUTER SYSTEM

a) Fast & Powerful Computer
b) 64 bit word length or better Host Computer and at least 5 GB RAM
c) Should have an image storage capacity of at least 200,000 images or more (256 X 256)
d) DVD Archival for image storage
e) 2D fast fourier with Image Reconstruction times of 5000 images/sec or higher at 256 X 256 matrix in full FOV. Better Reconstruction speed would be preferred
f) Features like ability to perform one touch repeat scans, export of protocols via internet will be essential

6. OPERATOR CONSOLE

a) 18" or higher, High Resolution LCD Monitor with at least 1024 X 1024 matrix display
b) Ergonomically designed
c) Mouse, Alphanumeric Keyboard
d) Two way intercom system for patient communication

7. PATIENT COMFORT ACCESSORIES

a) Soft mattress with head rest
b) Knee support, positioning wedges
c) Set of soft Velcro immobilization straps
d) MR compatible sandbags
e) Hand held nurse call device

8. COILS

a) High Quality Quadrature/ Circular Polarized (CP) Body Coil (integrated to magnet)

b) Head Coil for imaging and spectroscopy should be offered
c) PA Neurovascular Array coil (16 channels). Compatible with Parallel Imaging Technique for Scan time reduction factor of 4 or better in both 2D and 3D
d) Quadrature/ CP Array Phased Array Spine Array coil for Cervical, Thoracic and Lumber Spine imaging. Spine coil to be compatible with parallel imaging. It must be possible to combine parallel imaging in Lumber and Thoracic spine imaging as well
e) There should be facility to combine the Neurovascular coil and Spine coil to do the total neurovascular examination without repositioning the patient, using 16 channels
f) Dedicated coils for Shoulder (8 Ch or better), Knee (8 Ch or better), Ankle (8 Ch or better), Breast (8 Ch or better), wrist and other general purposes with parallel imaging factor 4 or better
g) 32 channel or more, PA Body Coil or coil combination compatible with Parallel Imaging Technique for scan time reduction factor of 4 or better in both 2D and 3D. It should offer at least 45 cm FOV
h) Suitable coil for high quality lower peripheral Angio in multi-station angiography study using parallel imaging
i) Coils with Built-in preamplifier in each coil to ensure high SNR preferred (Signal to Noise Ratio)
j) Breast and Liver spectroscopy and susceptibility weighted imaging facility should be available.

9. BASIC PULSE SEQUENCES

a) Spin Echo (SE) - Multi slice single echo, multi slice multi echo (8 echoes or more) with minimum TR & TE. SE with symmetrical and asymmetrical echo intervals.
b) Inversion Recovery (IR) including short TI -modified IRSE, FLAIR, DIR (Double Inversion Recovery)
c) MT with SE (Spin Echo) and FLAIR
d) STIR (Short Tan Inversion Recovery)
e) Gradient Echo - Gradient Echo with; transverse gradient / RF spoiling and transverse gradient re-phasing eg. GRASS etc. 3D gradient echo with shortest TR & TE, free choice of flip angle selection while maintaining SNR.
f) Dynamic study for Pre & post contrast scans time intensity studies (Wash in and wash out) and Kinematics

10. FAST SEQUENCES

a) FSE - Fast spine echo in 2D & 3D mode. T1, T2 and PD contrast capable of acquiring maximum of slices with a given TR and minimum TE, Echo train should be at least 256 or more in fast sine echo mode.
b) Ultra short fast spin echo
c) Half Fourier acquisition capabilities should be available with/without diffusion gradient and in combination with fast spine echo.
d) Fast spine echo with inversion recovery.
e) Fast gradient spin echo IT multi slice, multi echo mode with minimum turbo factor. Sequences should incorporate RF focusing to acquire ultra fast gradient spin echo. Pl supply Susceptibility weighted imaging.
f) Fast gradient echo sequences should incorporate RF spoiling & other techniques to acquire image in ultra fast 2D & 3D modes
g) Fat & water suppressed imaging sequences.

11. ULTRA-FAST SEQUENCES

a) EPI (Echo Planar Imaging) Single shot and multi shot optimized sequences for TI, T2 and PD imaging. Perfusion, regular diffusion values (3 directions) EPI - FLAIR, EPI - IR, EPI- FLAIR diffusion Tensor, EPI - MT - FLAIR. Tensor diffusion for diffusion studies, suitable artifact /fat suppression techniques to be incorporated in the sequence to have optimum image quality. There should be capability of calculating ADC map (Isotropic and anisotropy from regular diffusion and tensor data.) It should be possible to perform arterial spin labelling (ASL) of the brain, and the corresponding software to give various perfusion maps with quantification possibility.

b) Single shot selectable with all coils including phased array coils for very fast imaging of trauma patients.

c) Optimized sequence package for special applications

I. MR Angiography - Comprehensive Angiography software package with or without use of contrast for the whole body and brain.

II. 2D ToF (Time of Flight), 3D ToF, ToF overlapping sequence

III. 2D / 3D phase contrast with and without gating and magnetization transfer saturation

IV. Black Blood angiography for cerebral, pulmonary abdominal and peripheral vessels.

V. For Peripheral Angiography moving table Angiography must be provided so that complete limb can be examined in single go

VI. Bolus tracking software package must be provided.

VII. Sequences for breath hold angiography with contrast enhancement should be offered

VIII. Time resolved MRA with high temporal resolution and high spatial resolution.

12. Sequence Packages to be Offered

- Standard packages /Scan Tools / Core Packages
- Body, Onco, Ortho, Paediatric, neuro, Colonography
- Diffusion weighted Imaging, Perfusion Imaging
- Fast Imaging Techniques
- Spectroscopy (for single voxel & multi voxel)
- MRCP
- Urography
- EPI (Echo Planar Imaging)

13. SOFTWARE PACKAGES

a) Spin Echo (SE); Gradient Spin Echo Inversion Recovery (IR); Fluid Attenuated Inversion Recovery (FLAIR); Fast Field Echo (FFE)

b) Flow quantification

c) Fast Spin Echo Package which generates superb images with conventional SE contrast in scan times typically 10 time shorter for faster MRCP applications.

d) Complete Angio Software package including both 2D and 3D Angio and Non-contrast Angio for head and neck.

e) Angio technique without using contrast agent for peripheral Angios, with cardiac gating and subtraction

f) Contrast uptake analysis with time intensity diagrams

g) Automated Contrast Bolus Tracking Sequence
h) Fast Gradient Echo technique, 2D and 3D mode, ideal for contrast agent wash-in and wash-out studies.
i) Advanced version of Multi Phase Liver Imaging sequence package
j) Sequence for Breast imaging.
k) Single and Multi Shot EPI (Echo Planar Imaging). High resolution multi shot EPI with real time motion detection & correction capabilities.
l) Single-shot EPI based diffusion with ADC maps on console, perfusion with TTP color maps and functional imaging including processing (statistical maps) & real time fMRI studies
m) Diffusion Tensor Imaging
n) Flow Quantification (Measuring blood/CSF flow rate)
o) Variable Field of view (FOV), specify min to max
p) Artifact suppression for Respiratory, motion, moving blood etc.
q) Proton Spectroscopy with Single as well as Multi voxel Spectroscopy including color metabolite maps Spectro imaging Prostrate, Liver and Breast
r) A separate powerful workstation with identical post processing capabilities as in main console such as: advanced 3D Segmentation, BOLD processing, color maps of perfusion TTP maps, fMRI analysis, Quantitative Magnetization Transfer analysis, qFLOW packages, fiber tractography, stitching / pasting of multi-station studies, spectroscopy analysis & cardiac analysis to be supplied with CD / DVD recording and filming capabilities
s) Motion Correction Techniques
t) Non contrast angiography with cardiac triggering

14. DICOM compatible Dry Imager Camera of 500 dpi or higher
15. Chiller for cryocooler and gradient amplifiers

Equipment must be offered under turnkey basis and the site plan must be made in consultation with the appropriate authority including HOD, Radiology of the Medical College

16. Accessories to be Supplied

a. Non-magnetic IV stand
b. Pipeline oxygen supply facility should be made available.
c. Phantoms (Imaging & Spectroscopic) including structured phantoms and quality assurance as per AAPM standard
d. Imported UPS cum Power Conditioner of appropriate KVA for the entire system including camera to be supplied to back up the system for at least 30 mins
e. The equipment should be new and unused. The manufacturing date should not be more than 180 days when it would reach the consignee address.

Standard & Safety

Should be of US FDA & CE ("Conformité Européene") approved

- Vendor should Top up Helium during handing over

Warranty & CMC will include the following:

(a) The equipment including all other accessories and ancillaries as given in the specifications of the equipment including refilling of Helium, UPS, Chiller, UPS Battery etc.

(b) All the accessories and ancillaries including Air conditioning machine required for the site preparation and interiors

REVISED TECHNICAL SPECIFICATIONS for Site preparation including interiors and Air-conditioning

The interior work and lighting at the Magnet room, equipment room, console room, patient waiting area should be of good quality and standard. Selected bidder will be handed over covered space of carpet area around 1000 sq feet.

1. **Area to be Prepared including interiors:** carpet area of 1000 sq. feet approx.

2. **RF Cabin:** The RF cabin should be imported type. Required RF shielding should be as per the guidelines of the competent authority

3. **Height of the room (up to false ceiling):** 3.0 m and above

4. General

a) **Floor:** Floor (except of RF cabin) should be of premier quality double charged joint less vitrified mirror polished tiles. Antistatic floor for RF cabin.

b) **Ceiling:** Ceiling (except of RF cabin) should be of Mineral fiber board with aluminum grid. 2/3 coats of distemper on true ceiling. RF cabin should be fitted with suitable good quality false ceiling.

c) **Wall:** Walls (except of RF cabin) should be of premier quality double charged joint less vitrified mirror polished tiles up to false ceiling. Wooden panel to be fitted on RF cabin wall should be of good quality and reputed make.

d) **Door:** First quality seasoned shagoon wooden door of minimum 40 mm thick double leaf of width 1500 mm with 150 mm X 150 mm vision panel, plastic kicking plate fixed with headless screw, high gloss wax polish. The door should be fitted with proper locking arrangement, door closure, handle and stopper. Wooden frame from 125 mm x 100 mm of good quality Shal / Shagoon wooden block.

e) **Paint:** 2 coats synthetic enamel paints over 2 coats primer over wall putty (if required)

f) **Viewing Window:** RF shielded Viewing window (4 feet X 4 feet).

5. **Air-conditioning machine:** The total carpet area mentioned (i.e 1000 cu ft. for one tone) has to be properly air-conditioned. Split / Ductable Split type AC machines having appropriate rating to bring down and maintain room temperature to be 20° ± 2° celsius. There should be sufficient number of the AC machines to run the service round the clock (i.e 100 % backup). The service should be uninterrupted in case of breakdown of any of the AC machine(s).

   A/C ducting to be prepare, if required. Humidifier and Dehumidifier should be provided to maintain the humidity level at 40-60 % at equipment room, MRI room and in other area(s), if technically required.

6. High quality room lighting (LED up to 400 LUX of illuminance)

7. Medical Gas Pipeline system [O_2, N_2O, Air (4 Bar) and Suction] with MRI compatible imported outlet points along with matching adapter etc. should be provided. Inside pipeline in the MRI room to be completed in all respect and the entry points of the pipelines should be terminated at a suitable place outside the MRI room with medical grade isolation valves.

8. The bidders to submit drawing layout plan of the interior. At least 15 patient holding positions have to be mentioned in the drawing layout plan. Sufficient furniture to be supplied for the console room.

9. The bidder should build required infrastructure/base, shed, fencing etc for the units (example chiller, AC unit etc) to be installed in the open area / outside the MRI premises.

10. Supplier to top up Helium during handing over.

11. **Wiring System**:
    a) Light, Fan, 5 Amp Plug: 3 X 1.5 sq. mm copper conductor FRLS wire should be provided.
    b) Power Plug (15 Amp): 2 X 2.5 + 1 X 1.5 sq. mm copper conductor FRLS wire should be provided.
    c) Split / Duct able Split AC wiring: 2 X 4 + 1 X 2.5 sq. mm / suitable gauge copper conductor FRLS wire should be provided.

12. **Earthing**: Two nos. Copper plate earthing as per PWD schedule

Note: The items mentioned above are indicative in nature