

## **Amendment No. 9**

**Date: 03/12/2014**

**Subject: Amendment No.09 to the Tender Enquiry Document**

**Ref: (i) Tender Enquiry No.: HLL/PCD/PMSSY-II/05/14-15 dated 20/06/2014 for Schedule 01, MRI,3T.**

**(ii) Amendment No.07 dated 17.11.2014 & Amendment No.08 dated.29.11.2014.**

### **SECTION - VII** **TECHNICAL SPECIFICATIONS**

#### **Item Sl. No.1** **MRI 3T**

**Sch.01- MRI - 3T**

**1. EXISTING PARA:**

**Para: 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

**READ AS:**

**Para: 4. RF SYSTEM**

a. 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 for better B1 homogeneity.

**2. EXISTING PARA:**

**Para: 5. 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."

**READ AS:**

**Para: 5.**

**a) Head Coils :**

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

2) Dedicated Multinuclear/ Multi-frequency MR Spectroscopy Coil capable of **31-P Spectroscopy** should be quoted separately as an **OPTIONAL** item.

**3. EXISTING PARA:**

**Para: 5. e)** Body phased array coils 32 channels or more (single or in combination)

**READ AS:**

**Para: 5. e)** Body phased array coils 32 channels or 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.**

**4. EXISTING PARA:**

**Para: 5.f)** Suitable Coil for peripheral angiography 32 channels or more

**READ AS:**

**Para: 5.f)** Suitable Coil / **Coil combination for Peripheral Angiography 32 channels or more; with coverage of 80cm or more.**

**5. EXISTING PARA:**

**Para: 5 (i)** Suitable Phased array coil for faster and high resolution Cardiac imaging – 32 channels or more; 31 Phosphorus spectroscopy also to be possible.

**READ AS:**

**Para: 5 (i) Cardiac Coil:**

a) Suitable Phased array coil for faster and high resolution Cardiac imaging – 32 channels or more **with Proton Spectroscopy.**

**b) Non-Proton Spectroscopy Cardiac Coil – for 31 P Spectroscopy should be quoted separately as an OPTIONAL item.**

**6. EXISTING PARA:**

**Para: 5 (g)** Suitable Carotid coils.

Dedicated third party Coil for Carotid imaging to be quoted as **OPTIONAL**

**READ AS:**

**Para: 5 g) Carotid Coil:**

1. Suitable Carotid coil **as standard.**

2. Dedicated third party Coil for Carotid imaging to be quoted separately as an **OPTIONAL** item; **if available.**

**7. EXISTING PARA:**

**Para: 5. m)** Multi Nuclear Spectroscopy coil (1H, 31P, 23Na, and 13C) for Head and Liver to be quoted separately as an OPTIONAL item.

**READ AS:**

**Para: 5. m)** Multi Nuclear Spectroscopy coil (31P, 23Na, and 13C) **for Liver** to be quoted separately as an OPTIONAL item.

**8. EXISTING PARA:**

**Para: 12. Imaging Sequences: c. :** MRS – 31P – Specify details of sequences and preparatory pulses used.

**READ AS:**

**Para: 12. Imaging Sequences: c.** Multi nuclear – 31P, **23Na and 13C (Optional) with compatible necessary hardware and software.**

**9. EXISTING PARA:**

**Para: 5. k)** High resolution knee coil 12 channels or more

**READ AS:**

**Para: 5. k)** High resolution knee coil **8 channels or more; Tx & Rx.**

**10. ADDED under Para 5. RF COILS**

The supplier should quote coils or their combinations exclusively for each application. The number of coils should be thus mentioned as independent and not be having overlapping applications.

**11. EXISTING PARA:**

**Para: 7. 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.

**READ AS:**

**Para: 7. g.** **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.

**12. EXISTING PARA:**

**Para: 8. Workstation:**

**1 Hardware & Licenses:**

**c. 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.

**READ AS:**

**Para: 8. Workstation:**

**1 Hardware & Licenses:**

**c. 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; **2 megapixels or more resolution**) for 2 nodes.

**13. EXISTING PARA:**

**Para: 8. Workstation:**

**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.

**READ AS:**

**Para: 8. Workstation:**

**Hardware: Server:** 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.

**14. EXISTING PARA:**

**Para: 8. 2. c.** Should mention whether software for vascular properties like IAUC, KEP is available.

**READ AS:**

**Para: 8. 2. c.:**Software for vascular properties like IAUC, KEP **as standard**.

**15. EXISTING PARA:**

**Para: 8. 3.** Voice Recognition software (two licenses) on two separate computers with all essential hardware.

**READ AS:**

**Para: 8. 3.**

Voice Recognition Software (2 Licenses) on two separate computers

Minimum System Requirement:

- 18" LED Display, All-in-One Desktop PC.
- 4GB RAM, 2.2 GHz Intel Dual Core or equivalent.
- 2 MB processor, cache memory.

- 1 TB HDD, DVD RW Drive.
- 16 bit sound card, Stereo Speakers, Microphone
- 2 x USB 2.0 ports
- Wireless keyboard, Wireless Mouse.
- 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)
- Microsoft Office Suite (Licensed)
- Window 8.1, 64 Bit. (Licensed)
- LASER Printer (HP Laser Jet Pro MFP or equivalent)
- Appropriate UPS with 30 mins backup -2 no.s.

**16. EXISTING PARA:**

**9 DATA ACQUISITION:** c. 1024 x 1024 matrix acquisition for all applications.

**READ AS:**

**9 DATA ACQUISITION:** c. 512 x 512 matrix acquisition for all applications; ( 1024 x 1024 matrix acquisition to be offered wherever available.)

**17. EXISTING PARA:**

Para: **Fast Sequences**

11. n. Fat quantification of liver

11. o. Iron quantification of liver should be quoted as optional (Optional)

**READ AS:**

**DELETED**

**18. EXISTING PARA:**

**Para: 11. cc.** Non Contrast perfusion Imaging software like ASL and its post processing should be offered.

**READ AS:**

**Para: 11. cc.** Non Contrast perfusion Imaging software like **2D-ASL** and its post processing should be offered.

**19. EXISTING PARA:**

**Para: 11. gg.** Parallel acquisition technique such as SENSE/SMASH/ASSET/iPAT, ARC and other new sequences to be quoted as standard.

**READ AS:**

**Para: 11. gg.** Parallel acquisition technique such as SENSE/SMASH/ASSET/ **GRAPPA** , iPAT, ARC and other new sequences to be quoted as standard.

**20. EXISTING PARA:**

**11 IMAGING SEQUENCES Para: Fast Sequences**

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.

**READ AS:**

**11 IMAGING SEQUENCES Para: Fast Sequences**

**J1.** 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 colour metabolite maps should be available.

**J2.** 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, Myocardial tagging, Cardiac functions including EF, ED/ES volume, Cardiac output, and wall thickness. This processing can be in workstation and console.

**21. EXISTING PARA:**

**11 IMAGING SEQUENCES Para: Fast Sequences:**

k. Sequence package for diffusion study including DTI (tractography) in organs like brain, kidney, muscle, heart, etc

**READ AS:**

**11 IMAGING SEQUENCES Para: Fast Sequences**

k. Sequence package for diffusion study including DTI (tractography) in organs like brain, kidney, muscle, heart etc if available . **Unavailable techniques to be provided as and when available without any additional cost.**

**22. EXISTING PARA:**

**Para. 8 WORKSTATION 2.b.** Image fusion should be offered.

**READ AS:**

**Para. 8 WORKSTATION 2.b.** Image Fusion **software should be provided for Inter-modality and Intra-modality fusion.**

**23. EXISTING PARA:**

Para. 13 POST PROCESSING AND EVALUATION

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 with standard cardiology reporting set in Bull eye method. 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.

**READ AS:**

13 POST PROCESSING AND EVALUATION

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 **with standard cardiology reporting set in BullsEye method.** 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.

**24. EXISTING PARA:**

13 POST PROCESSING AND EVALUATION.

g. Full post processing for SVS, CSI, metabolic mapping with colour coding.

**READ AS:**

13 POST PROCESSING AND EVALUATION.

g . Full post processing for SVS, CSI, metabolic mapping with colour coding **for BRAIN , BREAST , LIVER & PROSTRATE.**

**25. EXISTING PARA:**

Para: 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.

**READ AS:**

Para: 15 DOCUMENTATION

a. The dry imager system should have digital DICOM 3.0 dry chemistry camera with resolution of 16 bits/ **500 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.

**26. EXISTING PARA:**

**Para: 22 TURN KEY INSTALLATION**

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.

**READ AS:**

**Para: 22 TURN KEY INSTALLATION**

c. Diesel Generator of **minimum 250KVA 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.**(price to be quoted separately).**

**27. EXISTING PARA:**

Para: 22 TURN KEY INSTALLATION

AIR CONDITIONING: f) Total capacity of the Air-Conditioning (duct-able + split) for the entire MRI scan should be at least 25 TR.

**READ AS:**

Para: 22 TURN KEY INSTALLATION

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.**(incl. standby airconditioning)**