Magnetic Resonance Imaging Sysem 1.5 T (MRI)

No.	*Item Specifications*	*Fill your Specification*
1	***Introduction:***	
1.1	***Vendors are invited to a tender of state of the art whole body high resolution 1.5 tesla magnetic resonance imaging scanner.***	
2	***General Requirements:***	
2.1	***The system must be high resolution, high performance, whole body scanner covering all routine & specialized MR imaging.***	
3	***Type & Configuration of magnet:***	
3.1	***1.5 Tesla superconducting magnet with active shielding***	
3.2	***Patient bore diameter to be 70 cm or more & short tunnel including system covers. The shorter the better.***	
3.3	***Homogeneity of the magnetic field must be stated (the lower the better) and guaranteed (not typical) for large FOV (the larger the better) in all directions. Homogeneity measurement method must be stated.***	
3.4	***Zero helium boil off technology is preferred and will be rated.***	
4	***Gradient system:***	
4.1	***Gradient field strength per axis (in x-, y-, z- direction) 30 or more mT/m .***	
4.2	***Minimum slew rate per axis (in x-, y-, z- direction) more than 120 T/m/s.***	
4.3	***Noise reduction technique should be included and not affecting imaging parameters, timing or image quality.***	
5	***Radio Frequency (RF) system:***	
5.1	***High end Digital RF system with the latest digital technology.***	
5.2	***Multi-array QD/CP technology.***	
6	***PT. Communication, comfort & safety system:***	
6.1	***The bore should include an inter-come between patient & operator.***	
6.2	***There should be a patient observation system with monitor at operator console.***	
6.3	***The system should include a flow controlled air stream through the magnet bore.***	
7	***Patient positioning, comfort and supervision:***	
7.1	***Short gantry not exceeding approx.. 155 cm whole gantry length including covers. Bore aperture 70 cm .***	
7.2	***Maximum patient weight (valid for vertical and horizontal table movements) not less than 200 KG.***	
7.3	***Patient comfort, active patient alarm, oxygen monitor, intercom system, SAR calculation, CCD camera for patient observation during scanning, lighting & ventilation of bore and noise reduction for acoustic gradient noise during scanning with fast sequences without affecting scanning parameters, speed or quality.***	

No.	Item Specifications	Fill your Specification
7.4	The lowest table height from floor will be evaluated. The lower the better for uncooperative patients easy positioning.	
8	Computer system:	
8.1	Maximum speed of image reconstruction, more than 10,000 images per second FFT.	
8.2	Image can be stored, Matrix 256^2 , more than 1,000,000 images.	
8.3	Color LCD screen monitor 1024 x 1024 matrix	
8.4	Multitasking capabilities to be able to perform simultaneous post-processing of a patient at the same time during date acquisition of current patient scanning.	
8.5	System should be compatible with DICOM3 & PACS for import, export & print.	
9	Sequence Techniques and parameters:	
9.1	Maximum FOV must be confirmed by homogeneity values.	
9.2	Minimum FOV must be 5mm or less.	
9.3	Minimum slice thickness 2D is 0.5 mm or less, minimum slice thickness 3D is 0.5 mm or less.	
9.4	Acquisition matrix 1024x1024 .	
10	Advanced Applications:	
	The system should include the following software application packages:	
10.1	Complete application packages including all standard and advanced sequences with SE, FSE, FE, FFE, IR, IR, EPI single and multi-shot.	
10.2	3D scanning, MRCP, MRM.	
10.3	Complete Angiography sequences including contrast enhanced, TOF, PC, MTC, time resolved MRA	
10.4	Complete MR angio package without contrast	
10.5	Diffusion weighted imaging including neuro and body diffusion	
10.6	Diffusion tensor imaging DTI and Tractography package	
10.7	Complete EPI package	
10.8	Single & multi voxel MR spectroscopy and chemical shift imaging. 2D, 3D with color mapping	
10.9	Neuro and orthopedics packages	
10.10	Fat suppression for all sequences	
10.11	Complete motion correction package for neuro and body imaging	
10.12	Bilateral Breast imaging package including silicon imaging	
10.13	Advanced CSF imaging with high sensitivity	
10.14	Whole body imaging with automatic registration of multiple neighboring images to form one extended view image.	
10.15	Functional MRI package	
11	Pulse Sequences:	
11.1	System should include all routine & advanced pulse sequences.	
11.2	Motion artifact suppression technique (MAST).	
11.3	System must be able to perform respiratory compensation & cardiac gating.	

No.	Item Specifications	Fill your Specification
12	Table:	
12.1	Must be able to support (200 KG) or more.	
12.2	Table must be docked & undocked for patient transfer to the scanner or & an MR compatible trolley should be provided for that.	
12.3	Should include mattress & all accessories & positioning aids.	
13	RF-Coils:	
13.1	Integrated Whole Body coil	
13.2	Head coil	
13.3	CTL Spine, high resolution whole spine imaging.	
13.4	Neurovascular (or equivalent combination with other coils with simultaneous coils scanning as one coil)	
13.5	Complete head-neck-spine (HNS) (or equivalent combination with other coils with simultaneous coils scanning as one coil)	
13.6	Body/Torso/Pelvis.	
13.7	Joints and extremities coil	
13.8	Bilateral Breast	
13.9	General purpose flex coils	
13.10	Ability to connect and scan using more than one coil simultaneously is a must.	
13.11	Cardiac coil.	
14	Operation Console:	
14.1	Should include a single not less than 19'' color flat panel, high resolution monitor with display capability in (1024 & 1024 format or Better).	
14.2	The observation monitor should be fixed by the console.	
14.3	The cryogen monitor should be fixed at the console.	
15	The independent work station:	
15.1	Should be processing & viewing station.	
15.2	Should be capable of the same functions as the operators console.	
15.3	Should have its own CPU & capable of interfacing with other similar systems.	
15.4	Monitor screen not less than 19''.	
15.5	Must be able to communicate & send images to PACS, RIS, HIS.	
15.6	Should support multi-modality connections (Display & manipulate) CT, MRI, CR, DR, NM images.	
15.7	It's the vendors responsibility to connect this station to all DICOM modalities.	
15.8	Should be made ready to print on all dep. Printers.	
16	Manuals & software CDs:	
16.1	All necessary manuals (operating, processing, programming & maintenance) for each system components should be provided.	
16.2	All software should be provided pre-installed on CD for further reinstallation.	

No.	Item Specifications	Fill your Specification
16.3	Calibration & adjustment procedures.	
17	Installation:	
17.1	Job must include all civil works & other works that might be necessary (Shielding & redesigning of area).	
17.2	A design drawing for the installation should be provided to be approved by the end-user prior to the installation.	
18	Further Conditions:	
18.1	Contracted must include a new chiller system with the offer to be connected to the building management system of the hospital.	
18.2	Vendar should guarantee support for both hardware & software for at least 10 years.	
18.3	Feature software upgrade should be provided free of change.	
19	Training:	
19.1	Should be provided at the factory or approved training Center for 4 tech., 2 biomed engineer & 2 physician.	
19.2	Should be provided on site for rest of staff.	
20	Warranty duration (including spare parts & Helium):	
20.1	Comprehensive warranty for 2 years.	
20.2	Maintenance Service During Warranty Period	
20.3	Preventive & Corrective Maintenance:	
20.4	During the warranty period supplier must ensure planned preventive maintenance (PPM)	
21	Safety features:	
21.1	The magnet system should include an Emergency Ramp Down unit.	
21.2	The magnet should have quench bands that contain the fringe fields to a specified value in the event of a magnet quench.	
21.3	The system shall have manual override of the motor drive for quick removal of the patients from the magnet bore.	
22	UPS:	
22.1	On line UPS with MF batteries with rack for the backupfor the Complete System for at least 30 minutes.	
23	RF inclusive & shielding:	
23.1	RF room shielding, RF Door screen, and interiors for the same should be carried out suitably.	
23.2	All necessary shielding should be provided such that the filed strength/RF outside the scanning room is within acceptable limit and have no effect on nearby equipment.	
24	Accessories:	
24.1	Dual Head MRI Compatible Pressure Injector.	
24.2	One non-ferromagnetic patient transfer trolley.	
24.3	Fire fighting system, detectors and 6 fire extinguishers.	

No.	Item Specifications	Fill your Specification
24.4	Hand held metal detector and doors metal detectors.	
24.5	Two operators chairs.	
24.6	Coil Cabinet	
24.7	Mini Packs	
25	Delivery period:	
25.1	Should be within 4 months of contract Sign.	
25.2	A design drawing of the MRI room & controls should be provided.	
26	Operating Environment:	
26.1	The system offered shall be designed to operate normally under the conditions of Sudan. The conditions include Power Supply, Climate, Temperature, Humidity, Dust , etc.	
26.2	Power supply: 380-415VAC 3 phase 50Hz fitted with appropriate plug. The power cable must be at least 3 metres in length.	
26.3	Provide Servo controlled stabilizer/CVT .	
26.4	UPS of at least 30 minutes operation with suitable rating shall be supplied for the complete system .	
27	Standards & Safety Requirements:	
27.1	Must submit ISO 13485:2003/AC: 2007 and CE (93/42 EEC Directives) or USFDA approved product certificate.	
27.2	Installation, Inspections and Commissioning	
27.3	Supplier must accomplish proper installation and commissioning of the equipment on site.	
27.4	Inspections to verify the compliance of the offered equipment as per specifications will be conducted by the technical team appointed by the purchaser.	
28	Documentation:	
28.1	User (Operating) manual in English.	
28.2	Service (Technical / Maintenance) manual in English.	
28.3	List of important spare parts and accessories with their part numbers and costing.	
28.4	Certificate of calibration and inspection from factory.	
28.5	QC and software Kits	
28.6	Log book with instruction for daily, weekly, monthly and quarterly maintenance checklist.	
28.7	The job description of the hospital technician and company service engineer should be clearly spelt out	
28.8	Manufacturing Date must be less than 6 months before delivery	