Amendment-II

HSCC (INDIA) LIMITED

HSCC/PUR/MUR/Med.Equipt/2023 Date: 22.12.2023

Sub.: Tender for Supply, Installation, Testing and Commissioning of Medical Equipments for New Flacq Teaching Hospital, Mauritius: - Through Enivida portal for Amendment-II.

Ref: 1. HSCC/PUR/Mauritius/New Flaq Teaching Hospital/2023/01 Dated 21.11.2023

Based on the bidders queries raised during pre- bid meeting held on 29.11.2023, all bidders are requested to note the following amendments in the aforesaid tender:

	NAME OF EQUIPMENTS	Qty. (Nos)
1	256 Slice CT Scanner Machine	1
2	Digital Mobile X_Ray	2
3	Digital Panoramic X-Ray System	1
4	Direct Digital Remote - Controlled Radiography with Fluroscopy (R/F) System	1
5	Full Field Digital Mammography Unit	1
6	Digital Radiography System	2
7	3D/4D High End (Premium) Echocardiography Machine	2
8	Digital 1.5T MRI	1

All other terms and conditions of the tender enquiry document shall remain unchanged.

Prospective bidders are advised to regularly visit HSCC website/ CPPP website for corrigendum /amendments etc. if any, as these will be notified on these portals only. No separate advertisement will published in the news papers in this regard.

s/d
Senior Chief Executive,
Ministry of Health & Wellness,
Republic of Mauritius.

Encl: Technical Specification Amendment 1 to 8 items

SPECIFICATIONS FOR SUPPLY, INSTALLATION AND COMMISSIONING OF256-SLICE COMPUTED TOMOGRAPHY SCANNER

FOR RADIOLOGY DEPARTMENT, NEW FLACQ HOSPITAL

Each of the following requirements must be shown and highlighted in the brochure/technical specifications by the bidder. In case the information required is not found in the brochure/technical specifications, authentic documentations, signed by the manufacturer, must be submitted by the bidder to provide evidence of compliance and/or details of non-compliance and degree of deviation from the specifications.

Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation
GENERAL DESCRIPTION		
1. The system must be a top-of-the-line spiral multi-slice CT scanner capable of acquiring 256 slices/images per 360° rotation for comprehensive routine scans, as well as, advanced lung, cardiac, neuro, chest and abdomen, musculoskeletal, vascular and angiographic examinations.		
2. Bidder to specify:		
a) Make of equipment		
b) Model of equipment		
c) Country of Manufacture		
3. Original Certificate from manufacturer specifying the release date of the model quoted to be specified.		
4. Original manufacturer certified brochure including full technical specifications including release date of the model to be submitted. The original brochures and technical specifications must bear the seal of the manufacturer. In case the catalogue is a copy of the original, the bidder must certify the copy by writing 'Certified to be a true copy of the original seen by me' on each page of the document, signing it, dating it, printing their name under the signature and adding their occupation.		
5. Should have US FDA approval and European CE mark Certification. Original certificates of compliance to be submitted with manufacturer's name and model of equipment.		
6. Equipment should appear as a current product on manufacturer's website. Bidder to submit website with the appropriate links.		
7. Bidder to submit **10 reference sites worldwide including Europe and USA** where the CT scanner proposed is used. An obsolete system will not be accepted.		
8. **GANTRY**		
a) Rotate-Rotate slip-ring designed gantry technology.		
b) Scan time of 0.3 sec or less for full 360 degree rotation.		
c) Aperture size of at least 70cm.		
d) Tilt of at least ±30 degrees.		
e) Scan Field of View should be up to at least 50cm.		
f) Gantry tilt controls from console and dual control panel on gantry.		

g) 3D laser positioning system.		
h) ECG gating hardware.		
i) Emergency stop switch on gantry for patient safety.		
9. **PATIENT TABLE**		
a) Load carrying capacity at least of 200 kg		
b) Lowest table height should be in the range of 400 ~ 600 mm.		
c) The scan range of the table-top must at least 1700 mm.		
d) Table top width to be at least 42 cm.		
e) Accuracy of table positioning ±0.5mm at any speed.		
f) Operation of table from left and right of gantry		
g) Patient positioning accessories to include headrest support, table leg extender, security straps, infant immobilizer, flat table-top, arm support, knee support and immobilizing straps		
10. **DETECTORS**		
a) Solid-state detector technology using low-dose with high-resolution acquisitions.		
b) 256 rows of independent detectors in the Z-axis. Detector Z-axis anatomical coverage per rotation (in mm) should be more than 80 mm.		
c) Multi-slice detector technology capable of acquiring at least 256 slices per 360 degree gantry rotation.		
11. **X-RAY GENERATOR**		
a) Mounted on slip-ring yoke in gantry.		
b) High frequency generator of at least 80 kW.		
c) kV range 80 – 140 kV or more.		
d) Variable mA settings up to at least 600 mAwith increment steps of 10 mA.		
12. **X-RAY TUBE**		
a) High-speed rotating anode tube with dual focal spot size.		
b) Anode heat storage capacity of at least8.0 MHU.		
c) Should include computer controlled monitoring of tube heat including warnings at the console.		
13. **OPERATOR CONSOLE**		
a) Modern user interface with logical and intuitive operation.		
b) The operator must have the possibility to start a scan, pause and re-start or cancel a scanning session at any time.		
c) 3D post processing functionality must be available on the operator console.		
d) At least 300 pre-programmed scan protocols required.		
e) Dual operator console with independent monitor, keyboard and mouse.		
f) Should support simultaneous scanning, reconstruction, viewing, archiving and printing		
g) Clinical grade monitor at least 20 inch TFT LCD colour with 2560 x1024 display resolution.		
h) Integrated intercom with pre-recorded voice messages for patient monitoring and communication.		
i) Emergency stop switches for patient safety.		
j) Should be supplied with one professional grade console desk and one ergonomic chair.		

14. **COMPUTER SYSTEM/RECONSTRUCTION**		
a) Real time reconstruction speed: At least 20 images per second at 512 x 512 matrix.		
b) Display matrix: 1024 x 1024 or more.		
c) Reconstructed slice thickness range should be less than one mm (<1) to 10mm.		
d) HU scale:-1000 to +3000 absorption range.		
15. **SPIRAL MODE PERFORMANCE**		
a) Minimum slice thickness should be 0.625 mm or less.		
b) Pitch factor (volume pitch): Variable between 0.5 to 1.5 or more and should be user selectable.		
c) Spiral length should be at least 150cm.		
d) Single continuous 'spiral-on time' should be at least 100 seconds.		
e) Facility of multi-spiral, bi-directional spiral scans including tilted-spiral scans		
f) Bolus triggered spiral acquisition should be available.		
16. **IMAGE QUALITY**		
a) High contrast resolution should be at least 15 lp/cm for axial and spiral scan at 0% MTF with full FOV.		
b) Low contrast resolution – 5mm or less at 3.0 HU using 20 cm CATPHAN phantom on 10 mm slice thickness.		
c) International CATPHAN performance phantom should be supplied.		
d) All QA tools and other phantoms for calibration should be supplied.		
17. **IMAGE STORAGE**		
a) Storage capacity of at least 500,000 images in 512 x 512 format.		
b) At least 1 TB for raw scan-data storage.		
c) CD-R/DVD Drive for image archiving.		
d) Recorded CD should include DICOM viewer for viewing on any PC.		
e) A spare CD/DVD writer should be supplied.		
f) Mini PACS Archiving system ~ 6 Terabytes should be supplied.		
18. **IMAGE EVALUATION**		
a) Parallel evaluation of multiple ROI		
b) ROI shapes including point, rectangular, polygonal, elliptical and irregular shapes.		
c) Measurement of distance, angle, surface and volume Image filters		
d) Image rotation, mirroring, roaming, subtraction and averaging.		
e) Image filters: Edge enhancement, low contrast enhancement, smoothing.		
f) Image annotation and labelling		
g) Statistical evaluation: area/volume, standard deviation, mean value, min/max values and histogram.		
19. **DOSE REDUCTION TECHNIQUES**		
a) Should have a dose management and reduction technique including low dose protocols for paediatric and infant scanning.		
b) Bidder to state and detail the iterative reconstruction technique and latest software used to reduce dose.		
20. **DICOM 3.0 COMPLIANCE**		
a) DICOM 3.0 compliant to send, receive, query, retrieve, print, store work list,HIS (Hospital Information System), RIS (Radiology Information System), body part examined.		

b) Seamless connectivity with all DICOM 3.0 imagers and other DICOM 3.0 workstations.		
21. **SOFTWARE APPLICATION PACKAGES**		
a) Dedicated software for Neuro CT examinations, including advanced brain perfusion functionality.		
b) Dedicated software for Lung CT examinations, including lung nodule evaluation.		
c) Dedicated software for Cardiac CT examinations, including cardiovascular morphology and function, calcium scoring, and coronary package.		
d) Dedicated software to allow for Virtual Endoscopy/Colonoscopy – Insufflator to be included.		
e) Dedicated software for Oncology CT examinations.		
f) Dedicated software for Osteoporosis CT examinations.		
g) Automatic Bone Removal facility.		
h) CT coronary Angio and vascular package For performing cardiacangiography, full set of accessories including ECG cables, disposable electrodes and ECG gel must be supplied for at least 50 cases at time of commissioning.		
i) The equipment should provide for **Remote Diagnostic facility** to be connected to the manufacturer's**Technical Support Centre** to enable a technical specialist from the manufacturer to dial-in the equipment, at any time, via Ethernet connection to troubleshoot any fault encountered during operation of same.		
22. **CONTRAST MEDIA INJECTOR**		
a) Compatible dual-head microprocessor-controlled contrast injector should be supplied for use with disposable syringes.		
b) Bidder to specify:		
i. Make of injector		
ii. Model of injector		
c) Should have US FDA approval and European CE mark Certification. Original certificates of compliance to be submitted with manufacturer's name and model of equipment		
d) Should be ceiling mounted with telescopic arms.		
e) Should trigger automatic start of spiral scan.		
f) Should allow multiple boluses during examination.		
g) To be supplied with 500 syringes and tubings.		
23. **POST-PROCESSING WORKSTATION**		
a) Three workstations are required for reporting: one in console room and two in Radiologists's room. b) The computer system must be supplied with at least 16 GB RAM, 1 TB hard-drive or larger, network card, suitable graphics card and at least one 20 inch flat panel LCD clinical grade monitor (supporting 2560 x 1024 resolution).		
c) Bidder to specify:		
i. Make of workstation		
ii. Model of workstation		
d) Should have US FDAapproval.and/or European CE		
e) Should have the following processing tools: 3D reconstruction, surface and		

volume rendering capabilities, Multi Planar Reconstruction, Minimum and Maximum Intensity Projections.		
f) All post processing facilities and software application packages listed above must also be available at the workstation.		
g) DICOM 3.0 compliant.		
h) Should be supplied with one professional grade computer desk and one ergonomic chair.		
24. **COMPATIBLE DRY LASER PRINTER**		
a) Bidder to specify:		
i. Make of dry laser printer		
ii. Model of dry laser printer		
b) Should have US FDA approvalor European CE mark Certification. Original certificates of compliance to be submitted with manufacturer's name and model of equipment		
c) Selectable 50/100 micron printing on 35 x 43 cm film size		
d) Throughput of at least 100 films/hour is required for 35 x 43 films		
e) 14-bit pixel depth with at least 16000 levels of gray		
f) Floor-mounted and heavy duty type		
g) Film size: 35 x 43 cm		
h) Daylight loading film magazines to be used with at least 100 films per magazine		
i) Automated image quality control technology for image optimisation		
j) Built-in calibration tools		
k) DICOM 3.0 compliant with connectivity to CT scanner and post-processing workstation		
25. **TRAINING AND DOCUMENTATION**		
a) Three sessions of two weeks (six weeks in total) local application training for Imaging Technologists. i. Training to be conducted by a qualified factory trained application specialist with a minimum of 5 years' experience in CT training and familiar with the line of CT scanner proposed. ii. Training to be delivered in three major sessions: one prior to commissioning. The two remaining trainings to be delivered in two separate sessions – timing to be arranged with the user department.		
b) Three sessions of two weeks (six weeks in total) local application training for Radiologists. i. Training to be conducted by a qualified factory trained application specialist with a minimum of 10 years' experience in CT training and familiar with the line of CT scanner proposed. ii. Training to be delivered in three major sessions: one prior to signing of commissioning certificate. The two remaining trainings to be delivered in two separate sessions – timing to be arranged with the user department.		
c) One week technical training for Biomedical Engineers and Biomedical Engineering Technicians by a factory trained Service Engineer. The training should include the following: i. Description and functions of all sub-stations of the system. ii. Description and functions of each component of sub-stations. iii. Troubleshooting of all common faults that may occur and their solutions. iv. Should provide a troubleshooting guide/manual to each participant in		

the training sessions.		
d) Full sets of documentation – user manuals, technical and service manuals.		
26. **WARRANTY CONDITIONS**		
1. Two-year warranty on **whole equipment** – covering transport, labour, spare parts (including X-ray tube and detector), tool kit for calibration and image quality assurance, full set of tools to service the equipment, including tools required for tube change, and workmanship as from date of commissioning.		
a) The warranty must include scheduled preventive servicing/maintenance as per manufacturer's recommendations.		
b) Should supply **Permanent licenses**for all software licences– system, application, diagnostic and calibration. No temporary licenses for required software will be accepted.		
c) Free software upgrade for at least 2 years.		
d) Bidders should quote separately, with full details of scope of work, for a maintenance contract for eight consecutive years, renewable on a yearly basis, after warranty period **for labour only**.		
27. **GENERAL REQUIREMENTS**		
a) The bidder must have a locally**established service facility** at the time of the bid. This must include: i. A workshop equipped with diagnostic tools. ii. Local qualified and trained staff with at least one Biomedical Engineer and two Engineering Technicians. Proof of qualifications must be submitted. iii. One of the engineers/Technicians must have at least 3 years' experience on repair and maintenance of multi-slice CT scanners.Proof of factory training on multi-slice CT scanners to be submitted. iv. Availability of spare parts within 5 working days. v. Ability to supply spare parts and to maintain the equipment as and when required during the life expectancy of the equipment. vi. Prior to commissioning, successful bidder must send a service engineer/technician for overseas factory training on the awarded make/model of equipment. Training certificate must be submitted at time of commissioning.		
b) It is mandatory for the bidder to submit a letter of authorization, appropriately dated, from the manufacturer certifying that the equipment which they are proposing can be sold in Mauritius.		
c) Acceptance tests should include all required dosimetric measurements.		
d) Original certificates from manufacturer specifying date of manufacture, make, model, serial number, software version, place of manufacture or assembly, and acceptance test certificate. These documents should be submitted at time of commissioning.		
28. **SITE REQUIREMENTS:** The successful bidder shall bear the cost of all the works listed below including lead linings, rooms (control and examination) finishes, exterior corridors lining if damaged during installation, all electrical and lighting works in the rooms. The successful bidder should also be responsible to obtain all necessary permits, authorisations and papers required to enable the smooth installation of the equipment.		
a) It is the responsibility of every bidder to carry out a pre-bid survey at the		

site, where the equipment will be installed at New Flacq Hospital, and ensure that the whole system will fit in the room before submitting their bids.		
b) The bidder must propose a floor layout for the equipment with respect to the new room plan prior to installation for vetting by Radiology department.		
c) The potential contractor must make sure that the examination room's wall be properly lined with at least 3 mm of lead from the floor up to a minimum of 7 feet in order to meet the requirements of the Radiation Safety and Nuclear Security Authority.		
d) A lead glass of appropriate lead equivalent should be supplied and fitted in the existing opening between examination room and console room.		
e) All existing doors in the examination room must be replaced with new fully leaded 3 mm lead sheet doors.		
f) All doors joints and openings should be fitted with overlapped 3mm lead sheets to prevent radiation leakage.		
g) A plan of the lead lining of the CT examination room must be submitted to the Radiation Safety and Nuclear Security Authority for approval.		
h) All lead lining must be supplied and installed by the bidder.		
i) Appropriate floor and ceiling ducting required to accommodate cables for the new CT scanner shall be done by the supplier.		
j) Application of new antistatic flooring in the examination and console room.		
k) The potential contractor will be responsible for the lighting installations inside the examination and control rooms, ensure with the users if dimmers are required and subsequently make good.		
l) The potential contractor should carry out all making-goods related to the floor, ceiling, walls of the examination and console rooms.		
m) The potential contractor should provide cupboards inside the examination room for the storage of accessories, phantoms, calibration tools, etc. related to the C.T Scanners. Cupboard sizes and placement to be confirmed with the users during prebid visit.		
ELECTRICAL REQUIREMENTS		
29. **GENERAL**		
a) Successful bidder shall provide the following:		
i. Surge Suppressor		
ii. Isolating Transformer		
iii. Power Conditioner (spike suppressor, voltage stabilizer, UPS with back up)		
b) Air Conditioner and Ventilation System		
c) New earthing system shall be provided.		
d) Emergency items and other security/safety Items		
e) Lighting and communication cable		
f) Existing electrical cables and other cables shall be disconnected. All existing electrical items (electrical distribution board, surge suppressor, UPS) shall be disconnected and removed.		
g) The location of the Electrical/UPS Room shall be decided and finalised during the pre-bid survey/meeting.		
30. **ELECTRICAL POWER**		
a) Mains Power: 3-phase 400V ± 6%, 50Hz ± 1.5%.		
b) Before installation of the equipment, the bidder shall submit to ESD the		

schematic drawings of the electrical distribution board.		
c) The Electrical Room / UPS Room shall consist of the electrical distribution board, power conditioner, surge suppressor and all other electrical accessories.		
d) Apart from the main earthing, the successful bidder shall make provision for any other earthing installation required for the equipment to be installed.		
31. **DISTRIBUTION BOARDS WITH ALL CABLINGS**		
a) All distribution boards shall be to IP55 and polyester type. It shall be of suitable dimension to accommodate all switchgears and 30% spare capacity shall remain.		
b) All cabling should be neat with proper labelling and to IET regulations.		
c) All final circuits shall be protected by a residual circuit breaker rated at 30mA.		
d) Circuit breakers shall be of make Legrand or equivalent either 2 poles or 4 poles. One pole is not acceptable.		
32. **SURGE SUPRESSOR**		
a) It shall be of at least 40 kA, 3-phase with protection on all 3 phases and neutral. The earth connection shall be included in the scope of works.		
33. **ISOLATING TRANSFORMER FOR EQUIPMENT**		
a) The rated power shall be suitable for the whole CT equipment and starting of the UPS.		
b) It shall be 3-phase K-rated (>13) dual shielded isolating transformer to completely isolate the mains power supply and neutral.		
c) All earthing and associated electrical installation shall be included.		
d) It shall have double insulation and K rated at least 13 and air cooled.		
e) Common noise attenuation shall be at least 100dB.		
f) It shall be installed in the Electrical/UPS Room.		
34. **POWER CONDITIONER**		
To supply, install, test and commission a complete power conditioning equipment having the following main features:		
a) Spike suppression		
b) Voltage Stabilizer		
c) Uninterruptible Power Supply with Back-up		
The power conditioning equipment shall have the following specifications:		
d) It shall be a True Online Type (Double Conversion Topology) with efficiency of up to 95% and capacity of at least 130 kVA.		
e) Suitable for 400V ± 10% and 50Hz ± 8% power input.		
f) Input current Total Harmonic Distortion at input less than 3%.		
g) Input Power Factor 0.85.		
h) Output voltage 400V ± 3% or as per requirement of CT scanner.		
i) Output frequency 50Hz or as per requirement of CT scanner.		
j) Output Voltage regulation ±0.5%		
k) Output voltage total harmonic distortion on non-linear load less than 1%.		
l) Maximum load crest factor; 3:1.		
m) Backup time/Battery autonomy of at least 15 minutes at 70% of load.		
n) Guarantee of 2 years on power conditioner.		
o) It shall enable teleservice: remote monitoring via modem.		

p) To include installation of telephone line to PABX and testing and commissioning of remote monitoring.		
q) Complete with Bypass Switch.		
r) Normal and Common Noise Reduction.		
s) Load Regulation Response less than 1.5ms.		
t) Operating Temperature range up to 45°C.		
u) Suitable for relative humidity 95% non-condensing.		
v) CE conformity and to EN standards.		
w) In case of power failure in the CT examination Room and the CT scanner is working on the power conditioning unit, a remote alarm both visual and buzzer shall be installed in the console room.		
35. **AIR CONDITIONER AND VENTILATION EQUIPMENT**		
a) A complete air conditioning system shall be provided by the successful bidder to control the temperature and humidity of the		
i. CT Scan equipment room		
ii. Control Room		
iii. Electrical/UPS Room		
b) The air conditioning and ventilation system shall be able to maintain the optimum environmental conditions for the equipment to operate normally and maintain temperatures between 18°C and 23°C and maintain the relative humidity in above mentioned rooms at 20-50%.		
c) Compressors of the air conditioning systems shall be guaranteed for 3 years.		
36. **EMERGENCY STOPS**		
a) At least 3 Emergency Stops shall be installed.		
37. **EQUIPMENT LAYOUT, CONSOLE ROOM AND ELECTRICAL/UPS ROOM**		
a) Prior to the start of installation, the successful bidders shall submit the layout of the equipment, console room and technical room indicating the position of all electrical accessories to ESD Engineer for approval.		
38. **ELECTRICAL, LIGHTING AND DATA WIRING LAYOUT**		
a) The contractor shall carry out any lighting and data installation required for the proper working of the CT scanner. All lighting fixtures shall be European Standards. All sample of electrical accessories such as light fittings, sockets, circuit breakers, switches, distribution boards, trunking, emergency stops etc. shall be submitted to ESD for approval prior to order. Trunking shall be of the make Legrand or Tehalit or equivalent.		
b) To make provision for three indicator lamps in the Console Room to give the following information:		
i. GREEN coloured indicator lamp: CEB Power available		
ii. ORANGE coloured Indicator Lamp: Generator supply ON		
iii. RED coloured indicator Lamp: Equipment on UPS		
39. **EARTHING INSTALLATION**		
a) Successful bidder shall carry out all associated interior works including electrical floor ducting and openings required for the successful completion of the installation of all equipment.		

	The Turnkey Scope of Work – CT		

1	The Supplier should inspect the proposed site offered by the ConsigneeInstitute in which the CT system has to be installed and they are required to submit the plan for the complete CT Scan Centre on a turnkey basis. The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Airconditioning and Fire fighting for the construction of CT Scan Centre.		
2	While preparing the plan, the following aspects have to be addressed.		
	a) Care should be taken to provide easy negotiation of the patient stretchers/ trolleys through corridors and doors.		
	b) Radiation shielding for doors, walls, windows etc.		
	c) Furniture like desk, chairs, shelves etc.		
	d) Patient stretcher and other furniture/ accessory to make the scan centre		
3	Civil works		
	a) Civil construction work including construction of brick wall if any, plastering, flooring as per the approved plan and equipment layout plan.		
	b) Concrete bed at CT equipment area.		
	c) Platform for unloading and shifting the CT should be provided if necessary.		
	d) Cable tray, trench & channel – necessary trenches, cable tray and channels at required location would be provided.		
	e) All the construction work to be done as per the final plan approved by the		
	f) Active and passive room shielding for magnetic, fringe field should be provided as per the requirement of the equipment.		
	i) Flooring		
	1. 600 x 600 mm vitrified tiles with 100mm tile skirting to match in console room		
	2. 50 mm thick cement concrete flooring with Vinyl flooring in CT equipment and		
	ii) Painting		
	1 Two coats Plastic Emulsion Paint over 2 coats of wall putty including primer in console room, UPS room,CT Gantry & Equipment room etc.		
	iii) False Ceiling		
	1. Acoustical tile for ceiling with light weight insulating material of high quality supported on grid or finished seamless with support above ceiling. Finished		
	supported on grid or finished seamless with support above ceiling. Finished with white paint or powder coated with white paint, if metallic. Ceiling height		
4	Plumbing work		
	1. 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.		
	2 . Hot water service to be provided if required.		
5	Electrical work		
	1 . The supplier shall be required to specify the total load requirements for the CT 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 CT 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.		
	2 . 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		
	b. Switches light and power points should be of modular type and ofstandard make as listed below		
	c. General lights – LED light fittings with 500 Lux Illumination		
6	AIR CONDITIONING		
	Ductable package air conditioners / 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		
	The outdoor units of AC should have grill coverings to prevent theft and		
	Ventilation is required in toilet.		
2	Environmental specifications		
	a) Relative Humidity range: To be maintained between 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment.		
	b) Temperature ranges: 22± 2° C in all areas except equipment roomwhich shall be as per requirement of the equipment.		
	c) Air conditioning load: The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the		
	Furniture		
	a) Revolving chairs height adjustable, medium-back with hand-restin the Control room, Radiologist room and viewing area. – 4 NO.S		
	b) Chairs for patient waiting area – Three seater (chrome plated). - 10 NO.S		
	c) Cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement. – 3 NO.S		
	d) Drug trolleys for patient preparation area -1 NO.S		
	e) Patient trolley with rubber foam mattress to be kept in the patient		
	f) Name boards for all rooms		
	g) Tables for Workstation and Radiologist - 2 NO.S		
	h) Changing rooms should have change lockers and dressing table- 1 SET		
	i) Dustbins: 10 no.s		
	j) Room Signage- as per requirement		
	k) Any other furniture item as per requirement.		
	All furniture items should be of standard make as mentioned in the table		
	1 Cabling of Network (LAN) connectivity for camera system, console system, workstation and computers etc as required.		
	2 Broadband connections: for REMOTE SERVICE of CT system.		
	3 Fire extinguisher Dry CO2 type as required for the building safety as required		

SUPPLY, INSTALLATION AND COMMISSIONING FOR DIGITAL MOBILE X-RAY FOR RADIOLOGY DEPARTMENT

INTENDED LOCATIONS: New Flacq Hospital		**Compliance of Specification**	**Deviation of non-compliance/Deviation**
Each of the following requirements must be shown and highlighted in the brochure/technical specifications by the bidder. In case the information required is not found in the brochure/technical specifications, authentic documentations, signed by the manufacturer, must be submitted by the bidder to provide evidence of compliance and/or details of non-compliance and degree of deviation from the specifications.			
TECHNICAL SPECIFICATIONS			
1.GENERAL DESCRIPTION			
1.1	Bidder to specify:		
1.1.1	Make of equipment		
1.1.2	Model of equipment		
1.1.3	Country of Manufacture		
1.2	Original Certificate from manufacturer specifying the release date of the model quoted to be specified.		
1.3	Original manufacturer certified brochure including full technical specifications to be submitted. The original brochures and technical specifications must bear the seal of the manufacturer. In case the catalogue is a copy of the original, the bidder must certify the copy by writing 'Certified to be a true copy of the original seen by me' on each page of the document, signing it, dating it, printing their name under the signature and adding their occupation.		
1.4	Equipment should conform to at least one of the following international regulatory standards for medical devices: US FDA, European CE, Japanese PMDA. Original valid as at date documents of compliance to be submitted. Submitted certificates should clearly indicate the make and model of equipment quoted.		
1.5	Original manufacturer certified brochure including full technical detailed specifications to be submitted. Same should be signed and stamped by manufacturer.		
1.6	Certified technical data sheet to be included for evaluation.		

1.7	Equipment should appear as acurrent product on manufacturer'swebsite. Bidder to submit 10 major health centres as reference sites in Europe and USA where the digital mobile X-ray machine proposed is used. An obsolete systemwill not be accepted.		
2.TECHNICAL SPECIFICATIONS			
2.1	The mobile x ray unit should be compact and easily transportable on fourwheels with brakes. The unit should be digital with a flat panel detector.		
2.2	The system should have a telescopic arm for maximum positioning flexibility in any patient position. Bidders offering collapsible and counter balanced arm will be considered.		
2.3	Tube positioning -maximum horizontal of at least 1200mm		
2.4	Focal point distance from floor at least 2000mm		
2.5	Lateral arm rotation of at least+180°/ -135°		
2.6	A hand switch should be available for preparation and exposure.		
2.7	The generator should be microprocessor controlled high frequency of at least 80 kHz.		
2.8	Maximum power output: at least 30 kW		
2.9	Maximum tube voltage: at least 125 kV		
2.10	Maximum tube current: at least 400 mA		
2.11	Tube current mAs range: at least0.3 -400 mAs		
2.12	The X-ray tube should have dual focus: small focus 0.8 mm or less and large focus 1.3 mm or less.		
2.13	Exposure parameters adjustment method mAs &Kv control.		
2.14	**COLLIMATOR**:		
2.14.1	Collimator lamp should be LED (at least 5 spare LED lamps to be provided)		
2.14.2	Adjustment mode: Manual		
2.14.3	Tape measure: SID Measurement		
2.14.4	Collimator Rotation should be +90 to -90 degrees		
2.14.5	Collimator should provide auto shut off lamp facility		
2.15	**FLAT PANEL DETECTOR**		
2.15.1	Detector type should be of Amorphous silicon with Csi		

2.15.2	Bidder to supply two panels of dimesions: Large.35x43 Small 24x30		
2.15.3	Image should be of high spatial resolution. Bidder to specify spatial resolution.		
2.15.4	Flat Panel detector should have an ingress protection class of at least IPX 4 water resistant.		
2.15.5	The X-ray unit should comprise of a detector storage compartment.		
2.15.6	Detector weight should not be more than 5 kg.		
2.17	**WORKFLOW**		
2.17.1	The unit should provide an integrated console for image display and post image processing.		
2.17.2	The integrated console should be LCD type with high contrast and brightness.		
2.17.3	Image storage up to 3000 images.		
2.17.4	The machine should be able to connect to any network and be able to transfer images and patient data from and to hospital network using LAN connectivityor wireless LAN.		
2.17.5	Should be able to connect to a dry laser printer.		
2.17.6	Temporary storage of patient data.		
2.17.7	Fast image preview of minimum 10 s.		
2.18	**POWER**		
2.18.1	Line connection 230 VAC		
2.18.2	Unit should have a built-in battery with a battery indicator level available to enable x-ray exposure in case of power cuts.		
2.18.3	Battery operation time: minimum 3 hours		
	WARRANTY		
5.1	Warranty: At least two years includinglabour and spare parts as from date of commissioning. (Including X-ray tube and flat panel detector)		
5.2	The warranty must include free of cost schedule preventive servicing/maintenance and applicable software upgrades as per manufacturer's recommendations		
5.3	Bidders should quote separately, with full details of scope of work, for a maintenance contract for five consecutive years, renewable on a yearly basis, after warranty period **for labour only**.		
6. TRAINING			
6.1	**Training schedule:** A Plan of Training programme shall be submitted at time of delivery of equipment		

	to the respective; Regional Health Director, Consultant-in-Charge and Biomedical Engineer.		
6.2	**Application training:** Comprehensive on-site application training regarding operation/functionalities of the equipment for a minimum period of 3 days to be given to end users by a certified application specialist.		
6.3	**Technical training:** At least two days' on-site technical training to be given to biomedical staff. Technical training should include: I. Theory and practical training by a factory trained technician/service engineer II. Technical materials (training handbook) to be submitted including troubleshooting procedures. III. Training should cover troubleshooting with respect to errors, messages and codes, repair and calibration procedures. IV. During technical training, supplier should be equipped with calibrated test tools or defibrillator analyzer to demonstrate performance and functional/output tests as recommended in technical manuals.		
7. ACCESSORIES TO BE SUPPLIED PER EQUIPMENT			
7.1	Standard accessories to make the equipment fully functional		
8. ADDITIONAL REQUIREMENTS			
8.1	Bidder to state life expectancy of equipment which should be at least ten years. Relevant documents from manufacturer should be submitted at time of bid as proof of equipment lifespan claimed		
9. AFTER SALES			
9.1	Ability to supply spare parts and to maintain the equipment as and when required throughout the life expectancy of the equipment. Successful bidder shall be responsible to make arrangements at their end to provide continuous technical support throughout the equipment lifespan even If they lose distributorship of the equipment.		

9.2	The bidder must have an **established service facility** at the time of the bid. This must include: i. A workshop equipped with diagnostic tools. ii. At least one Biomedical Engineer/service engineer with relevant experience on medical equipment and two service technicians. Proof of qualifications must be submitted. iii. Trained staff on the type of equipment proposed. Relevant proof of valid technical training certificate must be submitted. iv. Availability /ability to supply spare parts within agreed time by client i.e. within a week.		
9.3	Technical support should be on a 24/7 hour basis. Response time to attend to technical faults reported by end users/hospital administration/BME staff should be within 4 hours as from the time that the request for repair is made.		
9.4	In case that the local contractor's engineers/technician are unable to diagnose a fault locally, remote assistance from the manufacturer's Technical Support Centre should be sought urgently to repair the equipment in the shortest delay.		
9.5	During the warranty period, should the physical presence of an overseas engineer be required for troubleshooting and repair of the equipment, same should attend to the repairs of the equipment fully at the contractor's cost.		

10. MANUALS/DOCUMENTATIONS/SOFTWARE TOOLS	
10.1	All original installation software, software reload drivers and service diagnostic tools to reconfigure machine or to verify performance and functionality of equipment should be provided either on DVDS or pen drives at the time of commissioning
10.2	Full user manual to be provided (2 hard copies and 1 soft copy per equipment).
10.3	Fullservice manual with assembly diagrams, including spare parts list (2 hard copies and 1 soft copy per equipment). Errors and malfunction codes should be fully documented in the service manuals.
10.4	Original certificates from manufacturer specifying date of manufacture, make, model, serial number, software version, place of manufacture or assembly, and acceptance test/quality assurance certificate for every equipment should be submitted at time of commissioning.

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	B	C	D
1	**SPECIFICATIONS FOR SUPPLY, INSTALLATION AND COMMISSIONING OF DIGITAL PANORAMIC X-RAY SYSTEM** **Location: New Flacq Hospital**		
	Digital Panoramic Dental X-ray system designed for imaging the maxillofacial region using a rotating x-ray beam, which produces a single image of the dental arch as a fixed elliptical shape; and to obtain images of the complete skull (cephalometric radiography) or of a region of interest from various angles. Theunit to produce multilayered transverse images of the maxillary and mandibular jaws (cross-sectional tomography).		
1.	**General Description:**		
(a)	Bidder to specify:		
(i)	Make of equipment		
(ii)	Model of equipment		
(iii)	Country of Manufacture		
(b)	Original Certificate from manufacturer specifying the release date of the model quoted to be specified.		
(c)	Original manufacturer certified brochure including full technical specifications including release date of the model to be submitted. The original brochures and technical specifications must bear the seal of the manufacturer. In case the catalogue is a copy of the original, the bidder must certify the copy.		
(d)	Mandatory requirement: Should have US FDA approval and European CE mark (Notified body) Certification. Original VALID certificates of US FDA approval for marketability in the USA and CE certification, duly stamped, to be submitted. The manufacturer's name and model of equipment should be clearly mentioned on the certificates or accompanying documents. For US FDA, the 510(K) premarket approval (with the 510(K) number) should be submitted along with the US FDA Indications for use Statement.		
(e)	Equipment should appear as a current product on manufacturer's website. Bidder to submit website with the appropriate links.		
(f)	Bidder to submit **10 reference sites worldwide including Europe and USA** where the proposed equipment is used. An obsolete system will not be accepted.		
(g)	The equipment should provide for **Remote Diagnostic facility**to be connected to the manufacturer's **Technical Support Centre** to enable a technical specialist from the manufacturer to dial-in the equipment, at any time, via Ethernet connection to troubleshoot any		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	B	C	D
	fault encountered during operation of same on regular basis to retrieve information about the system and to correct any software problem.		
2	**TECHNICAL SPECIFICATION**		
2.1	X-Ray generator should be of microprocessor controlled high frequency type with latest technology having constant output with low ripple frequency		
2.2	It should be digital with Flat Panel Detector.		
2.3	Suitable for Adult and Pediatrics		
2.4	Minimum total filtration shall be 2.5 mm Al.		
2.5	Heat capacity shall be ≥20,000 HU.		
2.6	Focal spot size should be ≤ 0.6 mm.		
2.7	Constant potential: high-frequency generator required		
2.8	Automatic Exposure Control (AEC) is required which is used to control thelength of x-ray exposure		
2.9	The exposure timer controls the length of the xray exposure; typical exposure times are 0.1 to 5 seconds forcephalometric radiography and 5 to 20 seconds for panoramic radiography.		
2.10	Patient selection Switches (Thin, Normal and Obese)		
2.11	Feather touch keypad and length of exposure cable should be 5 to 6meters.		
2.12	Ease of operation as all the functions can be selected from the remotecontrol as well as timer.		
2.13	An excellent output of 60 kV to 80 kV, 0mAs to 15 mAs.		
2.14	Exposure time shall be ≤15 sec.		
2.15	Audible and Visual indication of "X-Ray On" (Radiation indications).		
2.16	Should provide compatible voltage stabilizer (Built in/External).		
2.17	Source to Image Distance(SID) 400-500 mm		
2.18	MAGNIFICATION: 1.2 to 1.5 times		
3	**Software Packages:**		
3.1	Standard: Basic panoramic programs Standard panoramic, Lateral TMJ (closed & open), PA TMJ (closed & open), PA sinus		
3.2	Standard:Child (Paediatric) mode for each standard and optional program to reduce the dose		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	B	C	D
3.3	Optional: Horizontal and vertical segmenting for panoramic program		
3.4	Optional:True Bitewing		
3.5	Optional: Advanced panoramic programs: Interproximal panoramic Orthogonal (perio) panoramic Lateral-PA TMJ Lateral multiangle TMJ PA multiangle TMJ PA linear sinus Lateral sinus		
4.	**Power requirements**		
4.1	230V, AC, 50 Hz, 15 Amps, Line resistance < 0.4 ohms		
5.	**Operator Console/Image Processing:**		
5.1	Host computer and Image processing computers should be of **industrial grade** – Non-industrial grade computers will be rejected.		
5.2	Make of host computer/imaging processing computers		
5.3	Model of host computer/imaging processing computers		
5.4	Hi-resolution TFT/LCD**/**medical grade monochrome monitor of at least 20" with resolution of 1 mega pixel or more.		
5.5	Resolution: 1600 x 1200 or better.		
5.6	A desk/tabletop to be supplied to accommodate the console keyboard and monitor.		
5.7	Patient data entry.		
5.8	Start and end exposure facility.		
5.9	Should store at least 100 last patients cases		
5.10	Operating console should have a facility for patient identity entry, Viewing, processing and filming capability		
5.11	Should be DICOM 3.0 compatible and should be PACS ready.		
5.12	The cumulative number of X-Ray exposures should be available on the system.		
5.13	System should have auto protocol select		
6	**Panoramic X-ray Room and Control Space:**		
a)	It is the responsibility of every bidder to carry out a pre-bid survey at the sites, where the equipment will be installed, and ensure that the whole system will fit in before submitting their bids. All bidders will be invited to carry out a site visit at the installation site. The time and		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	B	C	D
	date of the site visit will be communicated to the bidder before the closing of bids.		
b)	The bidder must propose an on-site layout for the equipment prior to installation for vetting by the Radiology department.		
c)	A plan of the lead lining of the X-ray examination room must be submitted to the Radiation Safety and Nuclear Security Authority for approval, and to amend accordingly to satisfy RSNSA requirements.		
d)	A lead glass shield of appropriate lead equivalence should be supplied in the examination room .		
e)	All existing doors in the examination room must be fully leaded with 3 mm lead sheet.		
f)	All doors joints and openings should be fitted with overlapped 3mm lead sheets to prevent radiation leakage.		
g)	All lead lining must be supplied and installed by the bidder.		
h)	Appropriate floor and ceiling ducting required to accommodate cables for the new digital radiography system shall be done by the supplier.		
i)	Application ofantistatic flooring in the digital radiography room and console room.		
7.	**Dry Laser Printer:**		
(a)	Bidder to specify:		
(i)	Make of equipment		
(ii)	Model of equipment		
(b)	Should have US FDA approval or European CE mark Certification. Original valid certificates duly stamped to be submitted. The manufacturer's name and model of equipment should be clearly mentioned on the certificates.		
(c)	Of heavy duty type and floor mounted.		
(d)	Loading of films to be carried out in daylight		
(e)	Gray scale resolution at least 12 bits.		
(f)	Fitted with automatic self-calibration mechanism		
(g)	A film density correction system must be provided.		
(h)	A high throughput of 100 or more sheets per hour.		
(i)	DICOM compatible.		
(j)	Should hold at least 3 film trays for film sizes		
(k)	Bidder to supply 5000 films of each of the three film sizes		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	B	C	D
8.	**Warranty:**		
(a)	Twoyears warranty on the entire system (whole equipment including X-ray tube, flat panel detector and dry laser imager and Software) including labour and spare parts as from date of commissioning.		
(b)	The warranty must include scheduled preventive service/maintenance as per manufacturer's recommendations.		
9.	**Training:**		
(a)	Training schedules for both application and technical trainings should be submitted together with the bidding documents with their proposed programmes.		
(b)	*Technical Training*: Three days technical training to be provided to biomedical engineering staff by a factory trained Service Engineer. The following shall be included/provided and should include: I. The training should comprise of one day classroom training and two day hands-on training II. Technical materials (handbook) including troubleshooting procedures. III. Training should cover troubleshooting with respect to **Errors messages and codes** for all sub-systems of the equipment offered. The bidder shall make necessary arrangements to accommodate at least 10 Biomedical Engineering staff for the technical training with proper training facilities.		
(c)	*Application Training*: 5 working days of local training for all of the Radiologists and Radiographers by an application specialist from the manufacturer.		
10.	**Maintenance after warranty period:**		
(a)	Bidders should specify a maintenance contract (labour only) on a yearly renewable basis for 10 consecutive years after warranty.		
(b)	Bidders are required to submit along with their bids a price list of spare parts for one year after warranty from which purchases of same will be made in case the spare parts will be needed.		
(c)	The successful bidder will thereafter be required to submit price list of spare parts every year, for the same purpose.		
11.	**General Requirements:**		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
(a)	The bidder must have the following **service facility** at the time of the bid:		
(i)	A workshop equipped with diagnostic tools. The Ministry reserves the right to carry-out a surprise visit to your workshop with only one day notice by fax.		
(ii)	Qualified and trained staff with at least one Biomedical Engineer and two Engineering Technicians. Proof of qualifications must be submitted.		
(iii)	At least one of the Service Biomedical Engineer/Technicians should have followed a Factory Service Training on the make(s) and model(s) proposed, prior to the commissioning processes. Proof of factory training should then be submitted at time of commissioning. If factory training has been attended before submission of bids, Proof of factory training on the proposed make(s) and model(s) of digital Panoramic system must be submitted. Bidder to state if the factory training will be submitted at the time of commissioning. In addition to the above, one of the Service Engineers/Technicians must have at least 3 years' experience on repair and maintenance on x-ray imaging machines.		
(iv)	Availability of spare parts should be within 5 working days. It is mandatory for the bidders to undertake the responsibility to order spare part(s) on "Test Purposes" basis within 24 hours (during working days) with a view to get the machine repaired within one week as from the declaration of the needs for spare part(s). Evidences of ordering of spare part(s) together with the Airway Bill number should be submitted by the maintenance contractor to the Biomedical Engineer the earliest possible for follow up. Only the replacement of the confirmed faulty spare part(s) will be charged by the maintenance contractor.		
(v)	Ability to supply spare parts and to maintain the equipment as and when required during the lifetime expectancy of the equipment.		
(b)	Bidder to state life expectancy of equipment which should be at least 10 years or better.		
(c)	To supply spare parts and to maintain the equipment as and when required during the life expectancy.		
(d)	All Installation, software reload and service diagnostic discs to verify performance and functionality of equipment to be provided.		
(e)	All licences to be included.		
(f)	System should come with the latest software and free software upgrade for a minimum of two years.		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
(h)	Full user manual (2 hard copies and 1 soft copy).		
(i)	Full service manual with assembly diagrams, including spare parts list (2 hard copies and 1 soft copy). Errors and malfunction codes should be fully documented in the service manuals.		
(j)	After sales service: Technical support from bidder, should be on a 24/7 hour basis during warranty period and during maintenance contract. Their response time should be within 4 hours as from time of request for repair is launched.		
(k)	In case of the local contractor's engineers/technician are unable to diagnose a fault and require assistance from the manufacturer's Technical Support Centre, they should be able to contact a foreign engineer by phone/whatsapp or other medias/email or any communication platform for on-line technical guidance on site.		
(l)	Throughout the duration of the maintenance contract, should the physical presence of an overseas engineer be required for a repair on the equipment installed, same should attend to the repairs of the equipment on the contractor's own account.		
(m)	Original certificates from manufacturer specifying date of manufacture, make, model, serial number, software version, place of manufacture or assembly, and acceptance test certificate. These documents should be submitted at time of commissioning.		
(n)	Commissioning will be effected only after all acceptance tests are completed and the image quality and the functionality of the equipment are deemed acceptable by the Consultant Radiologist, the Biomedical Engineer and the ESD Engineer.		
15.	**Accessories:**		
(a)	Radiation protection Apron of 0.35 mm lead equivalence, two lead aprons with protective neck collar to be supplied including wall hanger.		
(b)	Lead goggles 2 units.		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)	
1	**SPECIFICATIONS FOR SUPPLY, INSTALLATION AND COMMISSIONING OF DIRECT DIGITAL REMOTE-CONTROLLED RADIOGRAPHY WITH FLUOROSCOPY (R/F) SYSTEM FOR NEW FLACQ HOSPITAL**			
	Each of the following requirements must be shown and highlighted in the brochure/technical specifications by the bidder. In case the information required is not found in the brochure/technical specifications, authentic documentations, signed by the manufacturer, must be submitted by the bidder to provide evidence of compliance and/or details of non-compliance and degree of deviation from the specifications.			
1.	**General Description:**			
(a)	Bidder to specify:			
(i)	Make of equipment			
(ii)	Model of equipment			
(iii)	Country of Manufacture			
(b)	Original Certificate from manufacturer specifying the release date of the model quoted to be specified.			
(c)	Original manufacturer certified brochure including full technical specifications including release date of the model to be submitted. The original brochures and technical specifications must bear the seal of the manufacturer. In case the catalogue is a copy of the original, the bidder must certify the copy.			
(d)	Should have US FDA approval and European CE mark Certification. Original VALID certificates of US FDA approval for marketability in the USA and CE certification, duly stamped, to be submitted (mandatory requirement). The manufacturer's name and model of equipment should be clearly mentioned on the certificates or accompanying documents.			
(e)	Equipment should appear as a current product on manufacturer's website. Bidder to submit website with the appropriate links.			
(f)	Bidder to submit **10 reference sites worldwide including Europe and USA** where the digital R/F system proposed is used. An obsolete system will not be accepted.			
(g)	A digital R/F system with flat detector technology, designed for universal applications of a general hospital, i.e.:			
(i)	For **Radiography**: Skull, Thorax, Chest, Abdomen, Spine, Pelvis, Upper and Lower extremities.			
(ii)	For **Fluoroscopy**: Gastro-intestinal Examinations, Venography, Lymphography, Myelography, Paediatrics, Non-vascular as well as Vascular Interventional procedures requiring fluoroscopic guidance.			
(h)	The system must include the X-ray generator, the general purpose R/F table with its integrated X-ray tube and collimator, the digital flat panel			

	detector, the control panel and a dry laser printer.			
(i)	The system should befloor mounted.			
(j)	Should be fully DICOM 3 Compliant (DICOM send, receive, query, retrieve, print, work list) and should be PACS ready.			
(k)	Shall be fitted with DICOM CD and DVD recorder. The DICOM CD/DVD must be readable on any PC without and special software.			
(l)	Image storage capacity on hard disk: 10,000 images or more (1024 x 1024).			
(m)	The equipment should provide for **Remote Diagnostic facility** to be connected to the manufacturer's **Technical Support Centre** to enable a technical specialist from the manufacturer to dial-in the equipment, at any time, via Ethernet connection to troubleshoot any fault encountered during operation of same.			
(n)	Shall perform pulsed digital fluoroscopy up to 10 pulse/sec or better.			
(o)	Shall perform digital serial radiography up to 6 frames/sec or better.			
(p)	All the movements including the X-Ray tube and detector, X-Ray table should be motorized.			
(q)	**Electrical requirements**: (i)Three Phase + N; Line to Line 400 VAC± 6 %, 50 Hz ± 1.5 % (ii) Control panel for the power distribution to the machine (iii) Emergency switches (iv) On-line professional grade UPS with at least 15 minutes power autonomy for the computer system. Bidder to submit technical data sheet of proposed UPS.			
r	The device consists of three main components: X-ray tube, X-ray generator and flat panel detector of which two main components should be of the same make. Details and technical datasheets of these three components should be submitted at the time of bid.			
2.	**X-ray Generator:**			
(a)	High frequency generator – frequency at least 80KHz.			
(b)	Automatic Exposure Control (AEC) with at least 3 measuring chambers.			
(c)	Power at least 80 kW.			
(d)	Operating Modes: kV/AEC, kV/mAs, kV/mA/time.			
(e)	Tube voltage: 40 - 150 kV or better.			
(f)	X-Ray Tube current at least 800mA at 100kV.			
(g)	mAs: 0.5 - 400 mAs or better.			
(h)	Pulsed Fluoroscopy with a fluoroscopy kV ranging from 40 to 100 kV or better.			
(i)	Automatic X-ray tube calibration.			
3.	**X-ray Tube:**			

(a)	Dual focus X-ray tube with anode heat storage capacity ≥ 300 kHU.			
(b)	High speed rotating anode.			
(c)	Focal spot sizes:			
(i)	Large focus: 1.2 mm or less			
(ii)	Small focus: 0.6 mm or less			
(d)	Should be air/oil cooled.			
(e)	Rated kV peak ~ 150 kVp.			
(f)	Power at least 80 kW.			
(g)	Bidder to submit tube specifications and characteristics.			
(h)	Date of manufacture should be within last 6 months.			
4.	**Table and Patient Tabletop:**			
(a)	Shall allow patient approach from almost entire perimeter.			
(b)	System to be both remote controlled from operator's console and locally controlled from table side.			
(c)	Shall have large imaging area from head to feet to minimize patient movements during examinations (radiolucent area must be at least 190 x 50 cm or larger).			
(d)	Shall have motorised elevation function to allow the adjustment of the table top height from a minimum of 60 cm or less.			
(e)	If floating table is offered the following should apply; 1) Longitudinal travel range: 80 cm or more at both foot and head ends, motorised. 2) Transversal travel: 15 cm or more to the R and L, motorised.			
(g)	If fixed table top is offered, the tube should be able to travel along the whole table length covering the abovespecifiedlongitudinal and transversal movements.			
(h)	Table tilt of +90°/-90°.			
(i)	A footswitch for R/F in the examination room must be provided in addition to the one at the operating console.			
(j)	A tableside control panel must be available.			
(k)	Table to support patients of at least 200 Kg.			
(l)	Accessories to be included: foot rest, head clamp, hand/shoulder grips, complete set accessories to allow gynaecological and urological examinations.			
5.	**X-ray Tube Stand:**			
(a)	Source to image distance (SID) of 115 up to 180 cm or better with motorised adjustment.			
(b)	The X-Ray tube should be able to cover the whole table length.			
(c)	Tube rotation: Motorised from +90° to -90° or better.			
(d)	Wide range of exposure incidence angles (up to ±40^{o} or better)			
6.	**Collimator:**			
(a)	Should be locally and remotely controlled with automatic shut off of the light beam source.			
(b)	Bidder to supply 5 spare lamps.			

7.	**Digital Flat Panel Detector:**			
(a)	Bidder to specify:			
(i)	Make of detector:			
(ii)	Model of detector:			
(c)	Certified technical datasheet from manufacturer to be included for evaluation.			
(d)	Should be of Amorphous Silicon with CsI.			
(e)	Detector size: 43 x 43 cm.			
(f)	Pixel size: About 200 µm or smaller.			
(g)	Fitted with grid for scattered radiation.			
8.	**Operating Console and Displays:**			
(a)	Host computer and Image processing computers should be of **medicalgrade**with high speed processing capacity, high resolution graphic display card and monitors.			
(i)	Make of host computer/imaging processing computers			
(ii)	Model of host computer/imaging processing computers			
(b)	Two 20" or more, flicker-free TFT/LCD **medical grade** monitors for live image displays in the examination room and operating console. The monitor in the examination room must be fitted on a mobile trolley. A desk must be supplied to accommodate the operating console and display.			
(c)	Resolution: 1600 x 1200 or better.			
(d)	Contrast ratio ~ 600:1.			
(e)	Should be DICOM compatible and should be PACS ready.			
9.	**X-ray examination, technical and Control Rooms Space: (These requirements are machine specific and same need to be determined by the bidder)**			
(a)	It is the responsibility of every bidder to carry out a pre-bid survey at the sites, where the equipment will be installed, and ensure that the whole system will fit in the existing room space. All bidders will be invited to carry out a site visit at each installation site. The time and date of the site visit will be communicated to the bidder before the closing of bids.			
(b)	The successful bidder should submit a proposed floor layout plans of the control, technical and examination rooms to the Ministry prior to installation, for approvalby the Ministry's technical team.			
(d)	A plan of the lead lining of the X-ray examination room must be submitted to the Radiation Safety and Nuclear Security Authority for approval, and to amend accordingly to satisfy RSNSA requirements.			
(e)	A lead glass of appropriate lead equivalence should be supplied and fitted in the existing opening between examination room and console room.			
(f)	All existing doors in the examination room must be replaced with new fully leaded 3 mm lead sheet doors.			
(g)	All doors joints and openings should be fitted with overlapped 3mm lead sheets to prevent radiation leakage.			
(h)	All lead lining must be supplied and installed by the bidder.			

(i)	Appropriate floor and ceiling ducting required to accommodate cables for the new digital R/F system shall be done by the supplier.			
(j)	Application of new antistatic flooring in the digital radiography and fluoroscopy system room and console room.			
10.	**Dry Compatible Laser Printer**			
(a)	Bidder to specify:			
(i)	Make of equipment			
(ii)	Model of equipment			
(b)	Should have US FDA approval or European CE mark Certification. Original valid certificates of FDA and CE approvals to be submitted. The manufacturer's name and model of equipment should be clearly mentioned on the certificates.			
(c)	Of heavy duty type and floor mounted.			
(d)	All operations from film loading to processing are to be carried out in daylight room conditions.			
(e)	Gray scale resolution at least 14 bits.			
(f)	A high throughput of 100 or more 35x43 cm sheets per hour.			
(g)	Fitted with an automatic self-calibration mechanism.			
(h)	A film density correction system must be provided.			
(i)	DICOM compatible.			
(j)	Fitted with at least three film trays of 24x30, 30x40 and 35x43 cm.			
(k)	To be supplied with 1000 films for each of the above mentioned sizes.			
(l)	Should enable multi-modality printing.			
11.	**Warranty:**			
(a)	Two-year warranty on the entire system (whole equipment including X-ray tube, flat panel detector and dry laser imager) including labour and spare parts as from date of commissioning.			
(b)	The warranty must include scheduled preventive service/maintenance as per manufacturer's recommendations			
(c)	Bidders should quote separately, with full details of scope of work, for a maintenance contract for eight consecutive years, renewable on a yearly basis, after warranty period **for labouronly**.			
12.	**Training (per equipment):**			
(a)	**Training:** A Plan of Training programme shall be submitted at time of delivery to the respective; Regional Health Director, Consultant-in-Charge and Biomedical Engineer.			
(b)	Three days technical training to be provided to biomedical engineering staffby a factory trained Service Engineer. The following shall be included/provided and should include: I. The training should comprise of one day classroom training and two day hands-on training II. Technical materials (handbook) including troubleshooting procedures. III. Training should cover troubleshooting with respect to			

	Errors messages and codes for all sub-systems of the equipment offered. The bidder shall make necessary arrangements to accommodate at least 10 Biomedical Engineering staff for the technical training with proper training facilities.			
(c)	5 working days of local and onsite application training for all of the Medical Image Technologists/Radiographers by a qualified application specialist with a minimum of 5 years' experience in X-ray training and familiar with the line of digital R/F system proposed.			
(d)	5 working days of local and onsite advanced training for all of the Radiologists by a Radiologist with a minimum of 10 years' experience in X-ray training and familiar with the line of digital R/F system proposed.			
13.	**Maintenance after warranty period:**			
(a)	Bidders should enter into a maintenance contract (labour only) on a yearly renewable basis for 8 consecutive years after warranty.			
14.	**General Requirements:**			
(a)	The bidder must have the following local**after-sale service facility** at the time of the bid:			
(i)	A workshop equipped with diagnostic tools. The Ministry reserves the right to carry-out a surprise visit to your workshop with only one day notice by fax.			
(ii)	Qualified and trained staff with at least one Biomedical Engineer and two Engineering Technicians. Proof of academic and professional qualifications must be submitted.			
(iii)	At least one of the Service Biomedical Engineer/Technicians should have followed a Factory Service Training on the make(s) and model(s) proposed, prior to the commissioning processes. Proof of factory training should then be submitted at time of commissioning. If factory training has been attended before submission of bids, Proof of factory training on the proposed make(s) and model(s) of digital R/F system must be submitted. In addition to the above, one of the Service Engineers/Technicians must have at least 3 years' experience on repair and maintenance on x-ray imaging machines.			
(iv)	Availability of spare parts should be within 5 working days. It is mandatory for the bidders to undertake the responsibility to order spare part(s) on "Test Purposes" basis within 24 hours (during working days) with a view to get the machine repaired within one week as from the declaration of the needs for spare part(s). Evidences of ordering of spare part(s) together with the Airway Bill number should be submitted by the maintenance contractor to the Biomedical Engineer the earliest possible for follow up. Only the replacement of the confirmed faulty spare part(s) will be charged by the maintenance contractor.			
(v)	Ability to supply spare parts and to maintain the equipment as and when required during the life expectancy of the equipment.			
(vi)	Failure to submit evidence for the above-mentioned service facility will result in an automatic rejection of the bidder.			
(b)	Bidder to state life expectancy of equipment which should be at least 10			

	years or better.		
(c)	To supply spare parts and to maintain the equipment as and when required during the lifetime of the equipment installed.		
(d)	All original system (including OS) softwaresnamely: (i) service software (including system software Installation instructions), (ii) diagnostic software for troubleshooting, performance and functionality check of sub-systems, (iii) Permanent software licenses should be supplied on DVDs or/and other media, to the respective Biomedical Engineer/technician of each hospital, prior to commissioning procedures.		
(e)	All licenses should be permanent and service password of the equipment to be handed over to the Biomedical staff signing the commissioning certificate.		
(f)	System should come with the latest software and free software upgrade for a minimum of two years.		
(g)	A tool kit for calibration and image quality assurance including phantom(s)per each hospital.		
(h)	After sales service: Technical support from bidder should be on a 24/7 hour basis during warranty period and during maintenance contract. For equipment under maintenance contract, the response time expected from the contractor should be within 4 hours as from time of request (either by written request or by phone from the user or the respective hospital Biomedical staff) for repair is launched.		
(i)	In case of the local contractor's engineers/technician are unable to diagnose a fault and require assistance from the manufacturer's Technical Support Centre, they should be able to contact a foreign engineer by phone/whatsapp or other medias/email or any communication platform for on-linetechnical guidance on site.		
(j)	Throughout the duration of the maintenance contract, if the contractor requires the physical presence of its overseas engineer to attend a repair on the equipment installed, same should attend for the repair at the contractor's cost.		
(j)	Original certificates from manufacturer specifying date of manufacture, make, model, serial number, software version, place of manufacture or assembly, and acceptance test certificate. These documents should be submitted at time of commissioning.		
(k)	Commissioning will be effected only after all acceptance tests are completed and the image quality and the functionality of the equipment are deemed acceptable by the Consultant Radiologist, the Biomedical Engineer and the ESD Engineer.		
15.	**Accessories:**		
(a)	Five lead aprons and five protective neck collar to be supplied, including wall hangerper hospital.		
Turnkey	**Complete turnkey project: The cost of alteration and preparation in a specified built in area on turnkey basis which will include civil, electrical and air conditioning is to be borne by the firm.**		

SPECIFICATION FOR FULL FIELD DIGITAL MOBILE MAMMOGRAPHY UNIT FOR NEW FLACQ HOSPITAL

Mammography unit:

1. Purpose

The Ministry of Health and Wellness intends to invite interested bidders to participate in the competitive bidding for "Supply, Installation, Implementation and Commissioning of Full Field Digital Mobile Mammography Unit (FFDMM) " as per the technical specifications mentioned in this document, to be used for the breast cancerinvestigation at the New Cancer Hospital.

2. General

2.1 Bidder should ensure that the quoted items are not declared "End of Support/Maintenance" for the next ten years from the date of submission of the bid. If in any case, any of the quoted item/s is/are not available in the market, the bidder will have to supply higher version/replacement of that Item in the quoted cost in the same time duration.
2.2 CE marked
2.3 US FDA approved
2.4 Upgradable to Tomosynthesis
2.5 Optional Upright Biopsy Unit available, both Stereotactic & Tomosynthesis
2.6 Optional Contrast Enhanced Digital Mammography

3. *Functional & performance requirements*

These specifications call for a full field digital mammography system that employs flat panel detectors.

The FFDM system shall include:

3.1 Should have US FDA approval
3.2 Tube head and detector assemble
3.3 Compression system
3.4 X-ray Generator and tube
3.5 Flat panel detector
3.6 Acquisition cum Review workstation
3.7 Accessories and consumables
3.8 ***Tube head and detector assembly:***

3.8.1 Should have iso-centric rotation for every positioning.

3.8.2 The iso-centric movements should be motorized and the patient compression device should have automated variable multispeed options.

3.8.3 Vertical travel of C-arm assembly should be 70-140 cm.

3.8.4 Angular range of C arm assembly should be 180° -100°.

3.8.5 Movement of C-arm angulations and vertical movement should be motorized.

3.8.6 Should support wheel chair access.

3.8.7 Mention the line per cm of grid and grid should be supplied if required along with the system, preferably removable type. Technology should be explained if the grid is not supplied.

3.9 ***Compression system***

3.9.1. Compression devices which are capable of sensing the breast density and adjusting the compression forces accordingly.

3.9.2. Should have automated variable multispeed capabilities.

3.9.3. Magnification of 1.5 times or more should be provided.

3.9.4. Range of movement of sliding compression plate to be provided in relation to breast support platform should be 30 mm for both left and right. (Bidders to mention the sizes of paddle they are offering).

3.9.5. Spot magnification paddle {mention size and shape} to be provided as standard.

3.9.6. Compression paddle of two different sizes: (i) 24 (+/-4) width and 30 (+/-4) in depth to be provided as standard and (ii) small size: 18 x 30 cm

3.9.7. Special compression paddles capable of conforming to the natural contour of the breast, providing for greater comfort to the patient and more even compression across the entire breast if available to be quoted as optional. Bidders should mention the type and size of paddle .

3.9.8. Digital display of compression -force and thickness should be available on either side of gantry.

3.9.9. Operator selectable compression modes and manual compression option

3.9.10. Compression controls manual and foot switch / pedal options should be available

3.9.11. Emergency release option for compression in case of power failure.

3.9.12. Emergency stop button should be available.

3.9.13. The compression should be extremely smooth and there should be automatic decompression at the end of each exposure.

3.10 ***X-ray Generator and tube***

X-ray generator should be high frequency with the following parameters:

3.10.1. At least 25-35 kV in steps of 1 kV

3.10.2. mAs range: 4-500 or more

3.10.3. Power output should be above 4 Kw

3.10.4. Exposures per hour ≥ 60.

3.10.5. Anode heat storage capacity should be at least 150 KHU

The X-ray tube unit should comply with the following parameters:

3.10.6. Dual / Single Rotation Anode Tube Dual / Single Rotation Anode Tube

3.10.7. Anode material should be of molybdenum or tungsten(Preferred).

3.10.8. Single /dual focal spot size of 0.3 mm or better

3.10.9. Total inherent filtration of x-ray tube should not be more than I mm of Beryllium

3.10.10. The filter material used in the system as, for single focus single filter will be used

3.10.11. Filter/ collimation selection: automatic / manual.

3.11 *Flat Panel detector*

3.11.1. Detector area 24 (± 4) cm width and 30(± 4) cm depth .

3.11.2. Automatic exposure (AEC) control is mandatory.

3.11.3. Pixel Size should be ≤ 100 microns in 2D imaging mode

3.11.4. Image acquisition - display time < 30 seconds.

3.11.5. Minimum Ghosting or lag effect should be present in case of direct x-ray conversion technology based detector and zero in case of indirect x-ray conversion technology based detector; image depth should be at least more than 12 bits.

3.12 *Acquisition console cum Reporting workstation*

3.12.1. System should come with DICOM compatible Breast density software capable of volumetric computation i.e., displaying individual breast volumes in cc, volumes of fibro glandular density in cc, and percentage density score.

3.12.2. High performance quad core processor with CPU clock speed minimum 3GHz or more and compatible operating system.

3.12.3. Minimum 6 GB high speed RAM.

3.12.4. Min. 1 TB HDD/10000 images for local storage.

3.12.5. MP medical grade gray scale monitor for acquisition and review

3.12.6. On board video resolution of minimum 1024 grey levels {12 bit}

3.12.7. Ethernet port – for connecting to Telemedicine computer

3.12.8. Latest DICOM version {DICOM 3 standard} or newer versions compatible with DICOM viewer.

3.12.9. CD, DVD copying should be possible

3.12.10. Capability to post process, store, print, retrieve, schedule workflow should be possible.

3.12.11. Wireless keyboard and mouse etc.

3.12.13. Provision for Export/Import

The following imaging processing should be possible on the workstation:

3.12.14. Measurements

3.12.15. Zoom, roam, magnification

3.12.16. Brightness and contrast

3.12.17. Image inversion

3.12.18. Contrast enhancement processing

3.12.19. Flip rotate inward

3.12.20. Annotations, measurements

3.12.21. Image evaluationlikecontrastenhancement histogram display,length measurements before and after comparison etc.,

3.12.22. There should be single 5MP gray scale monitor .

3.12.23. The power requirement for the equipment should be less than 15 KVA, including peak power.

3.13 Accessories and Consumables

3.13.1. Dual function footswitch

3.13.2. Stool with backrest

3.13.3. System should come with vehicle mounting brackets, radiation Shield kit and accessories required as standard.

3.13.6. Should be installed on a telemedicine vehicle, provide supporting vehicle fitment tools

3.14 General services

The successful bidder has to provide all of the needed equipment, software, consultation, installation, support and training for the system presented in this bid.

3.15 Service & Maintenance

The Bidder must have knowledgeable and capable man power (fully comprehensive Curriculum Vitae to be produced) for servicing and maintaining the equipment and software proposed. The installation, service, maintenance, and support must include support from the successful bidder and from the equipment manufacturer. Further, the Ministry expects the costs for requested support to be included for all hardware and software proposed. The support shall cover;

- Replacement of hardware components
- Email/Telephonic support for hardware and software from authorised bidder and OEMs
- Maintenance of the equipment

3.16 Training

Successful Bidder shall provide certified man power to provide hands-on training for 10 working days to a team of medical staff and engineers.

3.17 Documentation

Full documentation of the project is to be included in the deliverables by the successful bidder. Documentation should include fully annotated diagrams and associated detail of equipment utilized in compliance to the scope of this bid. It shall include:

3.17.1. Original user and installation manuals of all proposed system and software.
3.17.2. Installation/ layout plan and connectivity Diagram.
3.17.3. Course material for the training.
3.17.4 Full sets of documentation technical and service manuals to be provided.

3.18 Testing

3.18.1 Testing of functionality and all other aspect required to ensure the completeness of the solution as per the requirements in the bid.

3.18.2 Bidder has to prepare Test Plan and procedure in this regard and get it approved by the Ministry

3.19 **Warranty and Post warranty maintenance**

3.19.1 Two-year warranty on **whole equipment** – covering transport, labour, spare parts (including X-ray tube and detector).

3.19.2 Bidders should quote separately, with full details of scope of work, for a maintenance contract for eight consecutive years, renewable on a yearly basis, after warranty period **for labour only**.

The Site Modification Work - Scope of Work – MAMMOGRAPHY

1. The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Air-conditioning and Fire fighting for the construction of Mammography Centre

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

a. Care should be taken to provide easy negotiation of the patient stretchers/ trolleys through corridors and doors.

b. Radiation shielding for doors, walls, windows etc.

c. Furniture like desk, chairs, shelves etc.

d. Patient stretcher and other furniture/ accessory to make the Mammography centre functional.

3. The cost of Site Modification Work for the area of 600sq.ft and Air-conditioning of Tonnage 6 TR will be considered for Ranking / Evaluation purpose

4. Moreover Bidders will have to quote the Unit Rates of the following components of site modification work work.

a) Civil works

b) Electrical work

c) Air Conditioning (HVAC)

d) Interior Furnishing & Furniture

e) Miscellaneous

Scope of work for Site Modification Mammography system:

The Mammography CENTRE shall consist of the following rooms:

a) Mammography Room

b) Console room

c) Patient preparation room

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

Civil work

i. Civil construction work including construction of brick wall if any, plastering, flooring as per the approved plan and equipment layout plan.

ii. Concrete bed at Mammography equipment area.

iii. Platform for unloading and shifting the Mammography should be provided if necessary.

iv. Cable tray, trench & channel – necessary trenches, cable tray and channels at required location would be provided.

v. All the construction work to be done as per the final plan approved by the Consignee.

a. Flooring

600 x 600 mm vitrified tiles with 100mm tile skirting.

b. Painting

Two coats Plastic Emulsion Paint over 2 coats of wall putty including primer in patient preparation area, Lobby area, console room, Mammographyroom .

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.

Plumbing work

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.

Electrical work

a. The supplier shall be required to specify the total load requirements for the Mammography centre including the load of air conditioning , room lighting and for the accessories if any.

b. The supply line will be provided by the Institute up to one point within the Mammographycentre . The distribution panel shall be provided by the vendor. Few lights in each room shall be connected to the UPS to provide emergency lighting.

c. The electrical work shall include the following:

i. 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.

ii. Switches light and power points should be of modular type and of standard make as listed below.
iii. General lights – LED light with 500 Lux Illumination

AIR CONDITIONING:

a. Package air conditioners units/Split AC units may be used according to room requirement and suitability. Humidity control should be effective to eliminate moisture condensation on equipment surface.

b. The outdoor units of AC should have grill coverings to prevent theft and damage.

Environment specifications:

Humidity range: Relative humidity 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment.

Temperature ranges: 22 ± 2° C in all areas except equipment room which shall be as per requirement of the equipment.
Air conditioning load: The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the bidder.

Furniture:

a. Revolving chairs height adjustable, medium-back with hand-rest in the Control room, Radiologist room and viewing area. – 4 NO.S

b. Cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement. – 2 NO.S

c. Drug trolleys for patient preparation area. – 1 No.

d. Name boards for all rooms

e. Tables for Workstation - 1 NO.

f. Changing rooms should have change lockers and dressing table.

g. Dustbins – 4 No's.

All furniture items should be of standard make as mentioned in the table below.

Miscellaneous:

a. Cabling of Network (LAN) connectivity for camera system, console system, workstation and computers etc.

b. Fire extinguisher Dry CO2 ABC type as required for the building safety. - 2 nos

LIST OF ITEMS AND SUGGESTED MANUFACTURERS

ITEMS	**PREFERRED MAKES**
FLOORING VITRIFIED TILES	- Somany, Kajaria , H&R Johnson, RAK india
PAINT	- Dulux, Asian Paints ,Nerolac
PLUMBING	- Kohler, Jaguar , Grohe , Roca
SANITARY ITEMS	- CERA, Hindware, Parryware
ELECTRICAL CABLES	- Finolex, Havells ,V-Guard
SWITCHES	- Legrand, L&T, Crabtree , Roma
DISTRIBUTION BOX , MCB	- Legrand, L&T, Siemens, Havels
LIGHT FITTINGS	- Philips / Crompton / Wipro/Syska
AIR CONDINTIONING	- Daikin, Hitachi, Blue Star, Voltas,
FURNITURE	- HermenMiller, Godrej, Featherlite,Geeken

BOQ

Item Description

Digital mammography system with stereotactic biopsy-1 Nos.

Dual foot pedals-2 Nos.

Radiation shield-1 Nos.

Face shield-1 Nos.

Large paddle- 24x31cm (+/-2cm) - 1 Nos

19x23 cm +/- 2 cm sliding paddle - 1 Nos

Spot compression paddle - 1 Nos

Remote service modem-1 Nos.

LED X-ray Film viewer-3 Nos.

UPS for power supply & backup of 30 minutes for the entire system-1 Nos.

Dry view camera: 600 DPI or more, with 300 films each (size 18 X 24cm and 24X30cm) qty 1

Quality control toolkit-1 Nos.

Site Modification Work as per specification

Civil works

Electrical work

Public health (plumbing and sanitary fittings).

Air Conditioning

SPECIFICATIONS FOR SUPPLY, INSTALLATION AND COMMISSIONING OF DIGITAL RADIOGRAPHY SYSTEM

	`Location: New Flacq Hospital.
	Each of the following requirements must be shown and highlighted in the brochure/technical specifications by the bidder. In case the information required is not found in the brochure/technical specifications, authentic documentations, signed by the manufacturer, must be submitted by the bidder to provide evidence of compliance and/or details of non-compliance and degree of deviation from the specifications.
1	**General Description:**
(a)	Bidder to specify:
(i)	Make of equipment
(ii)	Model of equipment
(iii)	Country of Manufacture
(b)	Original Certificate from manufacturer specifying the release date of the model quoted to be specified.
(c)	Original manufacturer certified brochure including full technical specifications including release date of the model to be submitted. The original brochures and technical specifications must bear the seal of the manufacturer. In case the catalogue is a copy of the original, the bidder must certify the copy.
(d)	Should have US FDA approval and European CE mark Certification. Original certificates of compliance to be submitted with manufacturer's name and model of equipment. For US FDA, the 510(K) premarket approval (with the 510(K) number) should be submitted along with the US FDA Indications for use Statement.
(e)	Equipment should appear as a current product on manufacturer's website. Bidder to submit website with the appropriate links.
(f)	Bidder to submit **10 reference sites worldwide including Europe and USA** where the digital Radiography system proposed is used. An obsolete system will not be accepted.
(g)	An X-Ray digital system with flat panel detector technology, designated for universal application in general hospital, i.e.:
	For **Radiography**: of Skull, Thorax, Chest, Abdomen, Spine, Pelvis, Upper &Lower extremities.
(h)	The system must include the X-ray generator, the radio translucent table with X-Ray tube and collimator, two digital flat panel detectors – one for bucky table and one for erect stand, the control panel and a dry laser printer.
(i)	Floor Mounted.
(j)	The machine should be designed for heavy workload of 300-400 X-ray exposures daily. Should be DICOM
	3.0 compliant (DICOM send, receive, query, retrieve, print, work list) and PACS ready.
(k)	Should have motorized movement for examination table, floating table top and detector arms.
(l)	Should allow for manual positioning of the detector and automatic positioning of detectors and X-Ray tube
(m)	Machine should enable automatic synchronization of x-ray tube and detector
(n)	**Electrical requirements**: (i)Three Phase + N; Line to Line 400 VAC± 6 %, 50 Hz ± 1.5 % (ii) Control panel for the power distribution to the machine (iii) Emergency switches (iv) On-line professional grade UPS with at least 15 minutes power autonomy for the computer system. Bidder to submit technical data sheet of proposed UPS.
2	**X-ray Generator:**
(a)	High frequency generator frequency: at least 50 KHz.
(b)	Power: at least 50kW.

(c)	Tube voltage: 40 - 125kV or better.
(d)	X-ray Tube current at least 500mA at 100kV.
(e)	mAs: 0.5 - 400 mAs or better.
(f)	Operating Mode: adjustable kV and mAs in manual mode, and Automatic mode (AEC mode).
4	**Flat Panel Digital Detector (Quantity: 2 units – for X-ray table and vertical stand):**
(a)	Bidder to specify:
(i)	Make of detector
(ii)	Model of detector
(b)	Should have US FDAor European CE approval. Original certificates of compliance to be submitted with manufacturer's name and model of equipment.
(c)	Certified technical datasheet from manufacturer to be included for evaluation.
(d)	Fixed type and powered internally – battery only powered detector will not be accepted.
(e)	Detector size at least 35 x 43 cm.
(f)	Should be of Amorphous Silicon with Csi.
(g)	Image Matrix: 1900x2000 or better with pixel size
	160-200um
(h)	Grey scale: 12-bit minimum
(i)	Tube Assembly movement to be automatically synchronised with the detector
5	**X-ray Table:**
(a)	Free floating radio translucent table-top controlled with foot pedal.
(b)	Both longitudinal and lateral movement for table-top.
(c)	Table to support patients of at least 200 Kg.
(d)	All table movement locked by electro-magnetic brakes.
(e)	Bucky fitted with grid.
(f)	Fitted with one digital flat panel detector as per specification above powered from table.
(g)	Shall have motorised elevation function to allow the adjustment of the table top height from a minimum of 60 cm or less.
6	**Column and Cross-Arm:**
(a)	Comprise of one X-Ray tube stand with fully counter balance cross arm.
(b)	Column translation along the length of the examination table and up to 90cm beyond the edge of the table.
(c)	Column to move along a floor rail
(d)	All movements locked by electromagnetic brakes.
(e)	Variable SID with tube head assembly repositioning.
7	**Vertical Detector Stand:**
(a)	Vertical Bucky to be fitted with one digital flat panel as per specification above.
(b)	Bucky properly counter balanced and adjustable height.
(c)	Bucky to have a grid with grid ratio suitable for SID in the range of 150-180 cm.

8	**Operator Console/Image Processing:**
(a)	Host computer and Image processing computers should be of **industrial grade** – Non-industrial grade computers will be rejected.
(i)	Make of host computer/imaging processing computers
(ii)	Model of host computer/imaging processing computers
(b)	Hi-resolution TFT/LCD medical **grade** monitor minimum 20 inch.
(c)	Resolution: 1600 x 1200 or better.
(d)	A desk/table top to be supplied to accommodate the console keyboard and monitor.
(e)	Patient data entry.
(f)	Start and end exposure facility.
(g)	Should store at least 100 last patients cases
(h)	Viewing, processing and filming capability
(i)	Should be DICOM compatible and should be PACS ready.
(j)	The cumulative number of X-Ray exposures should be available on the system.
9	**X-ray Room and Control Space:**
(a)	It is the responsibility of every bidder to carry out a pre-bid survey at the sites, where the equipment will be installed, and ensure that the whole system will fit in before submitting their bids.
(b)	The bidder must propose an on-site layout for the equipment prior to installation for vetting by the Radiology department.
(c)	Lead lining in the X-ray examination room must be supplied and installed by the bidder in accordance with the requirements of the Radiation Safety and Nuclear Security Authority.
(d)	A plan of the lead lining of the X-ray examination room must be submitted to the Radiation Safety and Nuclear Security Authority for approval, and to amend accordingly to satisfy RSNSA requirements.
(e)	A lead glass of appropriate lead equivalence should be supplied and fitted in the opening between examination room and console room.
(f)	All doors in the examination room must be fitted withfully leaded 3 mm lead sheet doors.
(g)	All doors joints and openings should be fitted with overlapped 3mm lead sheets to prevent radiation leakage.
(h)	All lead lining must be supplied and installed by the bidder.
(i)	Appropriate floor and ceiling ducting required to accommodate cables for the new digital radiography system shall be done by the supplier.
10	**Dry Laser Printer:**
(a)	Bidder to specify:
(i)	Make of equipment

(ii)	Model of equipment
(b)	Should have US FDA or European CE approval. Original certificates of compliance to be submitted with manufacturer's name and model of equipment.
(c)	Of heavy duty type and floor mounted.
(d)	Loading of films to be carried out in daylight
(e)	Gray scale resolution at least 12 bits.
(f)	Fitted with automatic self-calibration mechanism
(g)	A film density correction system must be provided.
(h)	A high throughput of 100 or more 35 x 43 cm sheets per hour.
(i)	DICOM compatible.
(j)	Should hold at least 3 film trays for film sizes 24 x 30, 30 x 40 and 35 x 43 cm.
(k)	Bidder to supply 5000 films of each sizes mentioned above.
11	**Warranty:**
(a)	Two-year warranty on the entire system (whole equipment including X-ray tube, flat panel detector and dry laser imager) including labour and spare parts as from date of commissioning.
(b)	The warranty must include scheduled preventive service/maintenance as per manufacturer's recommendations.
12	**Training:**
(a)	5 working days of local and onsite application training for all of the Medical Imaging Technologists/Radiologists by a qualified factory trained application specialist with a minimum of 5 years' experience inX-ray training and familiar with the line of digital radiography system proposed.
(b)	3 full day local and on-site training for the Biomedical Engineering Staff by a factory trained Service Engineer.
13	**Maintenance after warranty period:**
(a)	Bidders should specify a maintenance contract(labour only) on a yearly renewable basis for 8 consecutive years after warranty.
(b)	Bidders are required to submit along with their bids a price list of spare parts for one year after warranty from which purchases of same will be made in case the spare parts will be needed.
(c)	The successful bidder will thereafter be required to submit price list of spare parts every year, for the same purpose.
14	**General Requirements:**

(a)	The bidder must have an **established service facility** at the time of the bid. This must include:
(i)	A workshop equipped with diagnostic tools.
(ii)	Qualified and trained staff with at least one Biomedical Engineer and two Engineering Technicians. Proof of qualifications must be submitted.
(iii)	One of the Engineers/Technicians must have at least 3 years' experience on repair and maintenance of X-ray machines. Proof of factory training on the proposed make of digital radiography system must be submitted.
(iv)	Availability of spare parts within 5 working days.
(v)	Ability to supply spare parts and to maintain the equipment as and when required during the life expectancy of the equipment.
	Failure to submit evidence for this established service facility will result in an automatic rejection of the bidder.
(b)	Bidder to state life expectancy of equipment which should be at least 10 years or better.
(d)	All Installation, software reload and service diagnostic discs to verify performance and functionality of equipment to be provided.
(e)	All licences to be included.
(f)	System should come with the latest software and free software upgrade for a minimum of two years.
(g)	A tool kit for calibration and image quality assurance including a phantom.
(h)	Service laptop complete with laptop bag with latest operating system, Microsoft office, firmware, microprocessor INTEL core i7 preloaded with technical manuals, calibration guidelines and remote assistance software shall be provided to the biomedical technical team.
(i)	Full user manual (2 hard copies and 1 soft copy).
(j)	Full service manual with assembly diagrams, including spare parts list (2 hard copies and 1 soft copy). Errors and malfunction codes should be fully documented in the service manuals.
(k)	Original certificates from manufacturer specifying date of manufacture, make, model, serial number, software version, place of manufacture or assembly, and acceptance test certificate. These documents should be submitted at time of commissioning.
(l)	Commissioning will be effected only after all acceptance tests are completed and the image quality and the functionality of the equipment are deemed acceptable by the Consultant Radiologist, the Biomedical Engineer and the ESD Engineer.
Turnkey	Complete turnkey project: The cost of alteration and preparation in a specified built in area on turnkey basis which will include civil, electrical and air conditioning is to be borne by the firm.

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
1.	**Specifications for 3D/4D High-End(Premium) Echography Machine for Radiology Department**		
	To specify:		
	• **Make:**		
	• **Model:**		
	• **Country of manufacture/origin:**		
1.0	**General Requirement**		
1.1	Machine to be used by Radiologists and should include the following applications: General abdomen; OB/GYN; Cardiology; Small parts; Urology; Vascular; Pediatrics; Nerve; Emergency and Critical; others.		
1.2	Equipment should be FDA approved and CE marked with respective certificates to be submitted.		
1.3	Bidder to submit at least 10 major Radiologycenters as reference sites where the equipment proposed is being used.		
1.4	On-line professional grade UPS with at least 30 minutes power autonomy for the whole equipment. Bidder to submit technical data sheet of proposed UPS.		
1.5	Should be heavy duty machine designed for a daily workload of 40-50 patients.		
1.6	At commissioning, bidder to verify the measurements accuracyand specifications such as resolutionusing a recommended ultrasound phantom.		
1.7	All bidders should provide evidence that at least one of its engineers or technicians has already had a **Fully Comprehensive Factory Training**on the proposedequipment with samemake and model.Their training certificates should still be valid for one year after the commissioning date.		
1.8	The machine should include **Remote Diagnotics Facilities** to enable engineers from manufacturer's Support Centre to dial-in for troubleshooting in case of breakdown.		
2.0	**General Features:**		
2.1	Ergonomic design of control panel for Operator comfort in standing and sitting positions		
2.2	Supplied on mobile trolley with four swivel lockable wheels		
2.3	TFT colour LCD monitor with 18" or above diagonal & wide screen format		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
2.4	Touch display with following facilities: 2.4.1 Anti-glare colour touch screen of 10 inches or better, high sensitivity, resolution 1920 × 1080. 2.4.2 Support multi-touch gesture operations, measurements, zoom in/out, rotate or erase on projected 3D/4D image, freeze, print and save. 2.4.3 Support handwriting with and without gloves.		
2.5	Intuitive control panel keyboard with back light and user-friendly interface to minimize repetitive hand motions .		
2.6	Capable of connecting at least 4 probes simultaneously with minimum 4 probe holders		
2.7	Dynamic Gain greater than 300dB		
2.8	Date and Time to be set or adjusted only in service mode		
2.9	Should have Digital Beamforming facilities to provide higher image quality, dynamic focusing, dynamic aperture and weighting, etc.		
3.0	**2D Imaging**		
3.1	Frame rate:at least 3000 frames/sec		
3.2	Depth selection Range: up to at least 40 cm (Transducer dependent).		
3.3	Tissue Harmonic Imaging or equivalent image processing technique to be possible on all probes		
3.4	Scan type: linear sector, trapezoid scan		
3.5	2D Colour Doppler and ability to split the image in B/W and colour, in order to compare both images at the same time		
3.6	High definition pan and zoom on live and freeze modes.		
3.7	Spectral Doppler–High PRF Pulsed Wave, Continuous Wave & Tissue Spectral Doppler, Color duplex and triplex imaging with B-mode.		
3.8	Tissue Synchronisation Imaging mode or equivalent technology with calculations.		
3.9	Ability in 2D to rotate the image without moving the transducer.		
3.10	Ability to adjust sector width and position during live imaging.		
3.11	Ability to do angle correction.		
4.0	**Live 3D/4D Imaging**		
4.1	3D/4D Imaging with high frame rates at least 30 vol/s		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
4.2	Volume Imaging Modes:		
4.3	Full Volume B Mode		
4.4	Live 3D Colour Doppler		
4.5	Thin Volume B-Mode		
4.6	Combined Modes, e.g.B Volume + Colour Doppler Volume		
4.7	Multiple Frequency Imaging settings (B-Mode, Colour Doppler and Spectral Doppler frequencies can be selected independently)		
4.8	Customizable image and exam presets for image optimization		
4.9	Live 3D pan and Zoom		
5.0	**Quantification and Measurements:**		
5.1	Imaging Mode: B, THI, Anatomic M, Colour Doppler, POWER Doppler, PW, CW, TDI, Smart 3D/4D, Panoramic,LVO, Zoom, TDI, Contrast QA		
5.2	**Spectral Doppler;**		
5.2.1	**PW/CW Real-time Calculation:** To configure calculations of items, including Heart Rate, PS, PPG		
5.2.2	**Image Processing:** Display format, duplex/triplex and more.		
5.2.3	**Post Processing:** PW: Base line, wall filter, angle correction and more		
5.3	**Colour Power Doppler;**		
5.3.1	**Image Processing:** Dual live,B/C Align, Invert, smooth		
5.3.2	**Post Processing:** Gain, invert, base line, colour map.		
5.4	**Tissue Doppler;**		
5.4.1	**Imaging Mode:**TEI, TVI, TVD, TVM		
5.4.2	**Image Processing:**Dual live, B/C Align, Invert, smooth, Tissue state		
6.0	**Storage and archiving**		
6.1	Hard Drive capacity on-board(1 Terabyte minimum), DVD/CD-RW		
6.2	Professional patient reports with images on customizable letterheads.		
6.3	Supports the following DICOM 3.0 services : Work list management, storage, Query, Print/Send		
6.4	Ability to export whole studies with images and reports to portable media CD/DVD or USB pen-drives - DICOM 3.0 compliant and PC compatible file(AVI, JPEG) for images and video clips		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
7.0	**Post processing and Data Management**		
7.1	In mixed mode (volume imaging mode 3D, 2D/M, 2D/D, 2D/CD, 3D/CD, 3D/D); individual modes can be played back independently		
7.2	Should have inbuilt Image Management facility for direct storage of images and loops in the hard disk drive and to review and edit the images,		
7.3	All real-time post-processing functions are available.		
7.4	Automatic disk management with auto delete		
7.5	**Special Imaging features:**		
7.5.1	Ability of one-key optimization for B, PW/CW images		
7.5.2	Ability to display visualization of3D images of tiny and crossing vessels.		
8.0	**Standard Transducers required**		
8.1	Curved array probe: 2.0 – 6.0 MHz or better		
8.2	Linear array probe: 4.0 – 12.0 MHz or better with mountable biopsy kit		
8.3	Curved Volume probe: 2.0 – 6.0 MHz or better 3D/4D		
8.4	Phased-array probe for neonatal cranial imaging: 7.0 – 10.0 MHz or better		
8.5	Endocavitary (vaginal and/or rectal) probe: 3.5 – 9.0 MHz or better with mountable biopsy kit		
9.0	**Accessories and Peripherals:**		
9.1	Hi-Res Thermal printer		
9.2	Hi-ResColour Laser printer		
9.3	Supply of 5 litres of ultrasound gel		
9.4	Supply of Ultrasound Phantom equivalent to the Fluke 84-317 complete with the Instruction Manual		
10.0	**Training Requirements:**		
10.1	**1 week** (at least 5 working days) applications training by overseas application specialist to end Users including an Application Training Video and a Workbook for each trainee.		
10.2	**Three** days technical training to be provided to biomedical engineering staff. The following shall be included/provided and should include: I. The training should comprise of one day classroom		

Item No.	Technical Specification Required	Compliance of Specification Offered	Details of Non-Compliance/ Deviation (if applicable)
A	**B**	**C**	**D**
	training and two day hands-on training II. Technical materials (handbook) including troubleshooting procedures. III. Training should cover troubleshooting with respect to **Errors messages and codes** for all sub-systems of the equipment offered. The bidder shall make necessary arrangements to accommodate at least 10 Biomedical Engineering staff for the technical training with proper training facilities.		
10.3	Bidder to quote separately for a comprehensive factory training for one Biomedical Engineer/Technician and to submit the detailed content of the training (Factory training to be effected before the date of commissioning of the equipment). The training should include classroom training and hand-on troubleshooting on a functional demo unit.		
11.0	**Maintenance:**		
11.1	Fully comprehensive Technical documentation including full user and service manuals, parts list and circuit diagrams to be submitted. All manuals should be in original (not copy) and refer to the actual equipment both in terms of hardware and software. All system software, service and diagnostic software, software service packs and patches, all software licenses should be delivered on ***ORIGINAL*** DVDs and on pen drives, at commissioning time.		
11.2	Two years full warranty labour and spare-parts on the whole equipment including all probes.		
11.3	Bidder to quote for 5 years post-warranty annual maintenance,for labour only, services.		
11.4	System should come with the latest software and all future post-commissioning mandatory software upgrade and updates should be free of cost during the lifetime of the equipment.		
11.5	Bidder to submit signed test certificates of equipment and all ultrasound probes supplied with mention of Manufacturing dates from the Manufacturer.		
11.6	Certificate of manufacture and software version to be submitted at time of commissioning.		

SPECIFICATION FOR DIGITAL 1.5 T MAGNETIC RESONANCE IMAGING (MRI) FOR NEW FLACQ HOSPITAL

	GENERAL DESCRIPTION:
1.	A **Digital** Magnetic Resonance Imaging System for whole body diagnostic purposes.
2.	Bidder to specify Make, Model, Software Version of MRI
3.	The Year of introduction of the proposed MRI on the market should be mentioned.
4.	Bidder to state lifetime of the equipment to be 10 years minimum.
5.	Shall be US FDA and CE approved. Certificates of compliance to be submitted.
6.	MRI should appear on the manufacturer's Website as a current product
7.	Shall have superconductive magnet with active shielding
8.	Should be at least 1.5T Magnet.
9.	The new MRI scanner system should fit in the existing MRI facilities, i.e, the existing control room, the technical room and the scan room.
10.	Full DICOM 3.0 compliant (DICOM send/receive, query/retrieve, print, work list (HIS/RIS), storage commitment, body part examined) and PACS ready.
11.	With intercom between patient and console room and automatic voice commands programmable by the user.
12.	System shall be equipped with properly rated UPS with Surge Protection to supply the whole MRI system with autonomy of at least 15 mins.
13.	Supply and installation of an appropriate chiller for the system.
14.	Shall include the following applications:
	• Neuro Imaging
	• MR Angiography
	• Cardiac Imaging
	• Body Imaging
	• Breast Imaging
	• Orthopedics/Musculo-Skeletal Imaging
	• Oncological Imaging
	• Pediatric Imaging
15.	*System shall include:*
	• MRI Compatible Physiological monitor (ECG, SpO2, NIBP) with remote monitor. FDA approved
	• MRI Compatible Contrast Media Injector, and MRI compatible anesthetic machine, FDA approved
16.	*Magnet System:*
	• Magnet type: Latest Superconducting magnet with very high homogeneity. Magnet type to be specified with theoretical description of the technology adopted.
	• Operating Field Strength: At least 1.5T
	• Active Shielding
	• Installation Shim: Active and Passive
	• Magnetic bore of at least 60 cm diameter, with ventilation and illumination and speakers for patient entertainment.
	• Large field of view imaging of up to 50 x 50 x 50 cm
	• Zero Helium boil-off, no loss technology
	• Bidders shall specify the amount of helium (in Litres) required to attain a helium level of 100%.
	• The Vessel Helium pressure should be specified.
	• The helium level should be at least 95% full at the time of commissioning of the equipment.
	• Main Field homogeneity of not more than 0.5 PPM for a 40 cm diameter of spherical volume (DSV), Fat Sat, EPI and MR Spectroscopy should always be possible.
	• Should have long term magnet stability.
	• Bidder to specify magnetic field drift and homogeneity drift.
16.	***Cooling System for Helium Compressor***

	• Two Chiller systems shall be installed. Both Chillers will be working alternately and each chiller will serve as a back-up for the other chiller with a view to keep the MRI system running in case of the breakdown of one chiller.
17	***Gradient System***
	• Minimum Strength: 30mT/m per axis
	• Minimum Slew rate: 100T/m/s per axis
	• For gradient systems with several operational modes, the specifications for each gradient mode have to be provided.
	• Duty Cycle: 100%
	• Gradient coils shall use closed loop water cooling system.
	• Gradient coil shall have active shielding system
	• High Noise Reduction Technology
18	***RF System***
	• Minimum 8 number of Channels in Receiver system.
	• Number of RF Amplifier and output should be stated.
	• The system shall describe the latest technology or techniques used by the manufacturer in regards to data transmission from RF receivers to RF amplifierswith a view to minimisenoises during RF signal processing.
19	***Imaging Techniques***
	• Spin Echo (SE)
	• SE for T1, T2, and proton density (PD) contrast.
	• Dual-echo SE for PD and T2 contrast in one scan.
	• Fast Spin Echo (TSE, FSE)
	• TSE with "flip-back" RF pulse
	• Ultra-Fast (Single Shot) Spin Echo
	• Single shot fast spin echo for MRCP
	• Inversion Recovery (IR)
	• Turbo Inversion Recovery
	• Short TI inversion recovery (STIR),Fast STIR, Fat Sat and other variants
	• Fluid attenuation inversion recovery with long inversion times (FLAIR, DARK Fluid).
	• Dark Blood Technique
	• True IR for High T1 contrast.
	• Gradient Echo (GRE)
	• Spoiled Gradient Echo (FLASH, Spoiled GRASS, T1-FEE)
	• Gradient Echo with partial transverse rephasing (GRASS, FISP, FEE)
	• Gradient Echo with RF-rephasing (CE-FAST, PSIF, T2-FEE)
	• Fast Gradient Echo with preparation pulses (Turbo FLASH, MPRAGE, MPGRASS,TFE)
	• Multi-echo-Fat-water in-phase and out-of-phase imaging and Combined Echo Imaging
	• Fast 3D GRE with quick fat saturation
	• Steady State GRE
	• Contrast enhanced steady state GRE
	• Balanced GRE (True FISP)
	• Arterial Spin Labeling (ASL) 3D GRASE
	• Echo Planar Imaging (EPI),
	• SE-Echo Planar, GRE-Echo Planar,
	• Gradient and Spin Echo (GRASE)
	• Fast Cardiac Imaging Sequence
	• Time of flight Magnetic Resonance Angiography (MRA), MR-DSA, Phase Contrast MRA in 2D and 3D, Contrast Enhanced MRA

SPECIFICATION FOR DIGITAL 1.5 T MAGNETIC RESONANCE IMAGING (MRI) FOR NEW FLACQ HOSPITAL

	• DWI/ADC/DTI- diffusion technique
	• Parametric testing with T1, T2 and T2*(to allow measurement of iron levels in the heart and liver)
20	***Resolution parameter:***
	• Maximum Matrix Size :1024x1024
	• Minimum field of view: 1 cm or less
	• Maximum field of view: 50 cms or more
	• Minimum slice thickness 3D: 0.2 mm or less
21	***Imaging options***
	The following imaging options must be possible;
	• Respiratory compensation
	• Respiratory gating
	• Cardiac and peripheral pulse gating
	• Fat Suppression (Fat Sat) and water suppression
	• Volume Imaging
	• Slice location
22	***Safety Provisions***
	• Emergency switches to power off equipment in Emergency situation
	• Oxygen Monitor with alarm for the MRI scanning room
	• SAR display for each protocol
	• Device to rundown magnet in Emergency situation
	• Cryogen exhaust
	• Patient alert system to alert Operator at the console.
	• Site plan of the MRI showing clearly the safe area
	• Warning and Cautionary safety signs
23	***Host Computer***
	• Host Computer should be of Professional Grade and the latest Make and Model used by the manufacturer. Statement from manufacturer stating the same should be submitted.
	• CPU Type, speed, OS, Hard Disk Capacity for images, Software and database of patients
	• With 19-22 in LED/LCD flat screen color monitor and resolution 1280x1024
	• With ergonomic keyboard and mouse.
	• DVD/CD-R disk drive for loading software and archiving
	• Hard Disc with minimum storage capacity of about 200 patient studies
24	***Image visualization***
	Shall be equipped with latest viewing, analysis and elaboration tools (multiple image display, zoom, measurements, cross examination review, annotate, cine)
	2D Post Processing:
	• Image subtraction
	• Time-Intensity Curves
	• T1 and T2 calculations
	3D Post Processing:
	• Multi Planar reconstructions
	• Maximum Intensity Projection (MIP)
	• Surface Shaded Display (SSD)
	• Cine Mode
	• A package for Regions of Interest (ROI) analysis shall be included.
	• Auto calibrating reconstruction.

SPECIFICATION FOR DIGITAL 1.5 T MAGNETIC RESONANCE IMAGING (MRI) FOR NEW FLACQ HOSPITAL

25	***Radiologist Workstation***
	• Three workstations (one in console room and two in Radiologists' room) of latest make and model to allow radiologists to process images independently of the Host Computer:
	• High performance Professional Grade computer multi-core CPU computer /graphic card
	• Hard Drive Capacity at least 2 TB, RAM of at least 20GB.
	• Ergonomic Keyboard and mouse
	• Monitor size of at least 19-22 inches TFT LCD color flat screen
	• Resolution, pixels: 1280 x 1024
	• Gray scale steps: 256
	• Display matrix up to1024 x 1024
	• All post processing functions from the console /host computer should be available on the workstation.
	• Configured for automatic transfer of raw data from Host Computer following completion of a scan.
	• DVD/CD-R disk drive for loading software and archiving
	• Archiving on external hard drive (an at least 5 TB hard disk to be supplied – 1 unit)
26	***Patient Table***
	• Maximum patient weight: 150kg including vertical movement.
	• Longitudinal travel: 150cm minimum.
	• Horizontal speed: 10 cm/s minimum.
	• Shall allow manual movement in case of emergency.
	• Shall have digital display of table position.
	• Should allow both Head first and Feet first scan.
	• MRI compatible patient trolley to be supplied if Patient Couch is not undockable.
	• Operation of table from both sides of the magnet gantry.
27	***Image Reconstruction System***
	• Image Processor shall be of Professional Grade for performance and reliability
	• Offer shall state: CPU type and quantity, CPU Clock rate, Operating system, RAM Capacity, Hard disk capacity.
	• Image reconstruction Speed : Minimum1000 Reconstructions per second (for 512x512 image matrix, full FOV)
28	***Console***
	• Patient browser and patient entry.
	• Should allow to plan, start, pause and stop scan.
	• Integrated Intercom for patient monitoring and communication.
	• Display of Specific Absorption Rate (SAR) value for each examination protocol.
	• All functions shall be integrated on a single screen (image, text, scan control, data).
	• Should support simultaneous scanning, reconstruction, viewing, reviewing, archiving and filming.
	• Viewing images in a Cine-loop
	• Reformatting 3D Volume Images
	• Post-processing functionality in 2D and 3D
	• Display of centre frequency.
	• Display of Helium Vessel Pressure and Level.
	• Display of Chiller water temperature and flow.
29	***Coils (a brief technical description of each coil is required)***

	All requested coils must be dedicated ones and **multi-purpose coils will not be accepted**.
	Coils can be combined to increase the SNR.
	All coils should be at least 8 channels type.
	Coils can also be flexible and embedded in the table.
	The required coils for the following applications shall be included in the system:
	• Head -(dedicated)
	• Neck (Soft Tissue) -(dedicated)
	• Head-Neck coils (coils 1 and 2 can be combined) for Neuro Vascular
	• Cervical Spine
	• Thoracic Spine
	• Lumbar Spine (coils 4,5 and 6 can be one combined CTL coil)
	• Whole Spine (a CTL coil can be offered if it can cover a whole spine scan)
	• Chest, Heart -(dedicated)
	• Whole Abdomen -(dedicated)
	• Pelvis -(dedicated)
	• Whole Torso -(dedicated)
	• Hip -(dedicated)
	• Knee -(dedicated)
	• Ankle & Foot (dedicated)
	• Shoulder…large : diameter / size 15cm. -(dedicated)
	• Elbow -(dedicated)
	• Wrist -(dedicated)
	• Temporo Mandibular Joint -(dedicated)
	• Peripheral MR Angiography -(dedicated)
	• Breast -(dedicated)
	• Prostate, Colon, Cervix -(dedicated)
	• Pediatric Imaging -(dedicated)
	• A minimum of 18 distinct coils should be supplied.
30	***Dry Laser Printer: one unit to be supplied***
	• Of heavy duty type and floor mounted.
	• All operations from film loading to processing are carried out in daylight room conditions.
	• Gray scale resolution: at least 14 bits.
	• Pixel size: both 100 and 50 microns for standard and high resolution printing respectively and for all film sizes.
	• A high throughput of at least 100 films (size 35 x 43cm) per hour.
	• Fitted with an automatic self-calibration mechanism.
	• A film density correction system must be provided.
	• DICOM 3 Compliant with connectivity to MR and Radiologist Workstation
	• Fitted with a film tray of 18x24, 24x30 and 35x43 cms.
	• Should be supplied with 50 boxes of 35x 43 films each box containing 100 films.
31	***TRAINING:***
	Local:
	• 3 full day's technical local training for Biomedical Engineers/Technicians by an Overseas Factory Trained Engineer on the proposed MRI.
	• 12 weeks of local training given in 6 sessions of 2 weeks. The first session to be dedicated for general imaging. The remaining five sessions to be dedicated for

	abdominal, breast and cardiac imaging: Arrangement to be made with the consultant in charge for the planning of these training sessions.
	Overseas:
	• Two weeks overseas training in a recognized centre for 5 radiologists and 5 officers from the medical imaging cadre, all working at New FlacqHospital. To be given prior to the installation of the equipment.
	• Overseas Factory Service Training for one Biomedical Engineer and one Biomedical Technician on the same model of machine as quoted in the bids. Schedule of training should include the following :
	• MRI equipment basics including MRI safety
	• Routine Servicing and follow-up maintenance work
	• Front line troubleshooting and reporting of faults
32	***Warranty:***
	• Two years warranty on the whole system as from date of commissioning. Warranty should include labour, all spare parts and helium refill if required.
	• The warranty must include schedule preventive servicing/maintenance as per manufacturer recommendation.
	• Computers and software updates/upgrades shall be free of charge during the whole lifetime of the equipment.
	• A schedule of maintenance should be submitted at time of commissioning
	• Cold Head, Compressor and Helium Lines to be replaced or serviced at the end of their rated life-time as recommended in the service manual
33	***Maintenance after warranty period:***
	• Bidders should quote separately ,with full details of scope of work, for a Maintenance Contract on a yearly renewable basis for 10 consecutive years after warranty period for:
	Labour only basis. The cost should include, any special tools or Engineers from overseas (if required) to maintain the MRI Machine
	• Bidder to submit a comprehensive **Price List**of spare parts for the whole MRI system including all of the major Electronic Modules, cold head and replacement of Coils,Helium compressor,for two years post-warranty period. The price list shall be updated on a yearly basis during the 12 years expected life time of the machine. *NOTE: The price list shall be binding and will be considered during evaluation*.
	• Bidder to supply spare parts within 5 days during the lifetime of the equipment following a purchase order from the New Flacq Hospital/ Ministry of Health and Wellness.
	• Any spare parts requiredto correct a fault that may result in loss of Helium, should be ordered on test purposes and dispatched within 48 hours after the fault diagnosis.
34	***SITING REQUIREMENT:***
	• Magnetic Shielding to be provided as required. New RF cage to be installed as per manufacturer's recommendations.
	• All pre-installation work to be performed as per instructions from the Site Preparation manual from manufacturer
	• After installation of the MRI the contractor should carry out all making goods related the floor, ceiling, walls of the examination, technical and console rooms.
	• The bidder should cater for the installation of gases outlets (oxygen, nitrous oxide, vacuum and compressed air) in the scan Chillers for cooling the MRI cold head to be supplied as per manufacturer recommendation
35	***GENERAL REQUIREMENTS:***
	• Bidders to carry out a pre-bid survey at proposed location siteto ensure that the model of equipment will fit in the MRI room.

	• Every supplier must have a locally "**Established Service Facility**" at the time of their bid. This must include:
	a) A workshop equipped with diagnostic tools.
	b) Qualified and trained staff with at least one Biomedical Engineer and two Engineering Technicians. Proof of qualifications must be submitted. At least one of the Service Biomedical Engineer/Technicians should have followed a Factory Service Training on the make(s) and model(s) proposed, prior to the commissioning processes. Proof of factory training should then be submitted at time of commissioning. If factory training has been attended before submission of bids, Proof of factory training on the proposed make(s) and model(s) of MRI must be submitted. Bidder to state if the factory training will be submitted at the time of commissioning. In addition to the above, one of the Service Engineers/Technicians must have at least 3 years' experience on repair and maintenance onMRI equipment.
	• Every supplier must submit evidence of a list of at least ten Established Centers where their equipment have been installed specifying their addresses.
	• It is mandatory for all bidders to submit a letter of authorization from their manufacturers certifying that the equipment that they are proposing can be sold in Mauritius.
	• A tool kit for calibration and image quality assurance including all phantom(s) to be supplied.
	• A full set of non-magnetic (MRI compatible)tools including spanners and screwdrivers to service the proposed MRI to be supplied.
	• All tools and accessories to refill the Compressor and the Magnet to be kept on site.
	• At time of commissioning, supplier must submit an original certificate from manufacturer specifying: (1) the date of manufacture, (2) make & model, (3) serial number, (4) software version, (5) place of manufacture or assembly of all the devices.
	• Full sets of Documentation (2 sets)-user manuals, technical and service manuals. All relevant software CDs for all the devices should be available at time of commissioning.
	• Should include all System, application, Diagnostic and Calibration softwares. All licenses should be included at no extra costs and valid during life-cycle of the MRI
	• Acceptance tests and Quality Assurance tests to be completed and a full report to be submitted at commissioning.
18	**SITE MODIFICATION WORK- 1.5 T MRI**
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.
	The Scope of Work - Site Modification Work - MRI The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Air-conditioning and Fire fighting for the construction of 1.5 T MRI .
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 Site Modification Work for the area of 1500sq.ft and Air- conditioning of Tonnage 20 TR will be considered for Ranking / Evaluation purpose.
	Moreover Bidders will have to quote the Unit Rates of the following components of Site Modification 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 Site Modification 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.
a.	MRI Room
b.	Console room
c.	Equipment room
d.	Patient preparation room (two components, - one for the induction of patients undergoing MRI under anaesthesia
g.	**Radiologist room**
	The actual area of Site Modification works done will be considered for payment, based on the unit rates and site measurements
	Civil work Any ab initio new construction or demolition of existing structure/walls etc and reconstruction is unambiguously included in the Site Modification 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 Added Para: Anti static Vinyl flooring within the Magnet room 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
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
d)	**Plumbing work**
	Copper pipes to be used for plumbing the Chiller to the MRI
	Note:
1	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
2	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
e)	**Electric 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
b.	Switches light and power points should be of modular type and of standard make as listed below.
c.	General lights – LED light fittings with 500 Lux Illumination

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 20 TR.(incl. standby airconditioning). However, if the installed system requires more capacity, it will be the responsibility of the supplier
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 designated with the standby provision to function 24 hours a day
iii.	The outdoor units of AC should have grill coverings to prevent theft and damage
iv.	Ventilation is required in toilet.
g)	**Environment specifications:**
	Relative Humidity range: To be maintained between 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment.
ii.	Temperature ranges: 22 ± 2° 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 . – 6 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 (approx size of 6'X3') and records
iv.	Drug trolleys for patient preparation area.- 1 NO.
v.	Patient trolley with rubber foam mattress to be kept in the patient preparation
vi.	Tables for Workstation nodes- 2 NO.S
vii.	Changing room with 6 lockers and one dressing table to be supplied
viii.	Dustbins (plastic with lid) : 10 no.s.
ix.	All the rooms in the complex will be signposted. Sun film & ventilation blinds
a.	All furniture items should be of standard make as mentioned in the table
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	4 Dry chemical power type MRI compatible 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
S L	**ITEMS** **PREFERRED MAKES**
A	FLOORING VITRIFIED TILES -Somany, Kajaria, H&RJohnson, RAK india
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/syska
F	AIR CONDINTIONING - Daikin, Hitachi, Blue Star, Voltas,
g	FURNITURE - Hermen Miller , Godrej , Featherlite,Geeken
	BILL OF QUANTITY
S.N	**ITEM**
1	Whole body 1.5 Tesla Magnetic Resonance Imaging system - 32 channels RF system; as per specified Qty 1 no
2	System Body Coil - Quadrature - Qty 1no
3	Neuro-vascular Coil with 16 or more channels OR Head / Neck neuro-vascular
4	Spine Array/Matrix Coils with atleast 32 channels Qty -1no
5	Body Array/Matrix coil with 18 – 32 channels Qty- 1no
6	Dedicated 32 channel Peripheral Angio Coil or 32 channel whole body coil with coverage of minimum 80 cm with max combination of 2 coils - qty 1 no
7	16 channels. OR Two Bilateral Breast
8	Multi channel (minimum 4 channel) flex loop Large FOV qty-1no
9	Multi channel (minimum 4 channel) flex loop SMALL FOV qty-1no
10	Shoulder coil: Dedicated Rigid Shoulder coil – Multi channel qty-1 no
11	Dedicated Knee Coil with atleast 15 channels. qty-1 no.
12	High resolution foot / ankle coil – minimum 8 channel qty-1 no.
13	Coil Storage Cart qty-1 no.
14	Server : Thin-client server as per specification qty 1no
15	Licenses: Concurrent licenses for Server. Qty-2 nos.
16	Node Hardware: CPU and Medical grade monitor (18 inch or more; 2 megapixels or more resolution). Qty-2nos.

17	Antivirus software of reputed make for two licenses software (perpetual type or license to be renewed by the supplier) as per specification Qty-1
18	Cardiac Package - License qty-2 nos.
19	Cartilage Assesment software to be included . Qty -1no.
20	Voice recognition software qty 2 nos.
	ACCESSORIES
1	Storage box for all coils qty 1 no
2	Dual Syringe Pressure injector qty-1 no.
3	syringes (50 ml) -Dual Syringe Pressure injector qty -100
4	connector -Dual Syringe Pressure injector syringe qty -100
5	MRI Compatible ECG electrodes (disposable) - qty-100
6	MRI Compatible Anaesthesia Machine with integrated Ventilator, 2 vaporiser, circle absorber qty-1no.
7	MRI compatible Multiparmeter Vital Signs Patient Monitor of 5000 Gauss/1.5m from isocentre Compliance and One
8	1.5 T MRI compatible syringe pump qty- 1no.
9	1.5 T MRI Compatible sets of Laryngoscope : 4 sizes blades- Neonatal,
10	1.5 T MRI compatible Magill forceps : Adult size- qty2 nos.
11	1.5 T MRI compatible Magill forceps : Paediatric size- qty 2 nos.
12	Stylet for endotracheal tube : Adult size qty 3. nos.
13	Stylet for endotracheal tube : Paediatric size qty 3nos.
14	1.5 T MRI compatible Clamps : Either towel clip or artery forceps qty - 2 nos.
15	1.5 T MRI Compatible IV stands qty 2 No
16	1.5 T MRI compatible suction apparatus qty 2 no.
17	Non-magnetic patient transfer trolleys qty 2 no.
18	Metal detectors : Handheld qty 2 nos.
19	Metal detector: Walk-through qty 1 no.
20	Phantoms to be provided for regular QA studies. Qty 1
21	Walk through Metal detector with multiple sensor and multiple location LED
22	a Dry Chemistry laser camera as specified qty -1 no b. films (14 x 17)inch , (11x 14) inch , (10 x 8)inch- 500 Nos each size
23	Anaesthesia bed/trolley for recovery room -qty -2 nos.
	Components of Site Modification Work: 1500 sqft
1	Civil works
2	Electrical work
3	Public health (plumbing and sanitary fittings).
4	Air Conditioning -20 Tr
	Furniture:
1	Revolving chairs height adjustable, medium-back with hand-rest - qty 6 nos.
2	Chairs for patient waiting area – Three seater (chrome plated). Qty 10 Nos.

3	Cupboard with laminate door shutters for storage of spare parts and accessories (approx size of 6'X3') and records
4	Drug trolleys for patient preparation area. Qty- 1 Nos.
5	Patient trolley with rubber foam mattress qty- 2 nos.
6	Tables for Workstation nodes. Qty -2 nos.
7	Changing room with 6 lockers and one dressing table to be supplied qty 1 set
8	Dustbins (plastic with lid) to be provided as required. Qty- 10nos.
9	Room Signage 1 LS
10	Venetian Blinds 1 LS
	Miscellaneous:
1	LED X-ray Film viewer with adjustable brightness; capable of holding 3 films of 14"x17" size. Qty 2 nos.
2	Cabling of Network (LAN) connectivity for camera system, console system, workstation and computers etc
3	Dry chemical powder type fire extinguisher of 5kgs capacity as per specification 3 Nos
4	Broad band Connection : for remote service of MRI System qty -1 nos
5	UPS qty 1 no.
6	MRI Room oxygen deficiency level monitor - 1 no
7	MRI compatible WHEEL CHAIR - 2 NOS