No. IV-21011/19/2010-Prov-I
Government of India
Ministry of Home Affairs

26, Man Singh Road, Jaisalmer House,
New Delhi, 13.12.2010

To
The ADG (Medical), Central Paramilitary Force Medical Services,
ITBP, TIGRI,
PO Madangir,
New Delhi-110016

Subject:- Specifications for **(i) 27 equipments for Physiotherapy & Rehabilitation Equipments, and (ii) 15 equipments for Radio-diagnostic & Imaging Equipments** for CPMFs Hospitals- approval thereof.

Sir,

The Specifications for the **(i) 27 equipments for Physiotherapy & Rehabilitation Equipments, and (ii) 15 equipments for Radio-diagnostic & Imaging Equipments** for CPMFs Hospitals for CPMFs Hospitals have been approved by the Competent Authority in MHA and the same are enclosed for information and Record.

Yours faithfully,

(S.B.Nanda)
Under Secretary

Encl. as above

Annexure-(i)

TECHNICAL SPECIFICATION MOBILE X RAY MACHINE

MOBILE X-RAY MACHINE

High Frequency- 40 KHz
Rad KV -40 to 110 KV
Rad mA - upto 150 mA
Output power - 6 KW
mAS - 1 to 200 mAS

X RAY TUBE HEAD

Stationary Anode X ray tube having focal spot 2.8 mm2 H.V Transformer, Filament Transformer, HV rectifiers and capacitors to be provided One No manual collimator should be provided

Control panel should consist of

Total soft touch switches for various operations

Digital displays of KV and mAS
KV increase and decrease switches
mAS increase and decrease switches
Small and large focal spot selection switch
Machine on/off switch
Bucky selection switch
Collimator lamp ON switch
Stand by & exposure release switch
Self diagnostic program with indicators for:

Earth fault error
KV error
Filament error
Tube head thermal error

X ray on indicator
Incoming voltage indicator
The control panel should be equipped with a power pack to store the energy which enables the machine to be used on 15 Amps single phase wall socket at 230V AC 50Hz indicator for charging of capacitors mist be provided
A hand switch with dual action for exposure release with retractable cord should be provided for radiation protection to the operator

Tube stand

Spring balanced stand with lead lined cassette storage box large nylon wheels for easy mobility The stand should be designed for maximum maneuverability of the unit and should be able to achieve tube focus to floor distance of 75 inch and tube focus to tabletop distance of 46 inches. The equipment should occupy minimum floor area and should be capable to be taken through elevators with case.

Power supply

230V AC 50HZ 15 Amps with line regulation of 10% line resistance<0.4ohms

Standards, Safety and Training

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- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
- List of important spare parts and accessories with their part number and costing.
- Compliance Report to be submitted in a tabulated and point wise manner clearly mentioning the page/para number of original catalogue/data sheet. Any point, if not substantiated with authenticated catalogue, will not be considered.

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Annexure-(ii)

300 mA HI-FREQUENCY X RAY MACHINE

X RAY MACHINE	**350 mA-120 KVP (30 KW) high frequency X ray generator for Radiography and Fluoroscopy**
Radiographic Rating	40 to 120 KVP or more(Radiography)
mA Range	Rad: Up to 350 mA
mA Range	1 to 200 mAS or more
Control Panel	A very compact soft touch control panel having following functions and indications the panel can be supplied in floor or wall mount
	Machine ON/OFF switch
	Digital Display of KV & mAS
	KV and mAS increase and decrease switches
	Tube focal spot selection switch
	Ready and X ray on switch with indicator
	Bucky selection switch
	Self diagnostic program with indicators for earth fault error, KV error filament error & Tubes Thermal overload
	A dual action hand switch with retractable cord is provided for radiation protection of operator
X Ray Tube	Rotating Anode X ray tube of 21/43 KW rating and focal spot of 1 & 2mm2 anode heat storage capacity of at least 100 KJ
HV Transformer	Compact heavy duty transformer compressing HV silicon rectifiers HT Transformer filament transformer federal Busing all immersed in high dielectric strength transformer oil
Collimator	One manual
Power supply requirement	400-440V AC 50HZ 3 Phase-Max allowable line regulation+/-10%
HV Cable	1 pair of 8 meter High voltage cables
Stand	Floor to ceiling stand and with counter balanced tube head (rotatable=180 degree) 360 degree rotatable mounted on floor ceiling rails for convenient movements
Table	Motorized table with motorized bucky having grid ratio 8:1,85 Lines/ich and stainless steel cassette tray The table should move from trandlenburg position to vertical with automatic stop at Horizonatal vertical and trendlenburg position Provision should be given to manually move the table in case of power failure
	Semi automatic spot film device capable of doing all routine spot filming(4 on 1,2 on 1 1 on 1) for use with 8" x 10" x 12",14"x14" cassettes Grid with ratio 6:1 ,60 lines per inch stray radiation lead rubber flaps. KV/MA/Flurotimer display should be SFD.
	Table accessories like compression band handgrips footrest and footsteps should be provided
Other requirements	The company should be ISO 9001:2000,ISO 13485:2003 and CE certified
	System must be having a standard warranty of one year and next five years CMC charges to be given
II TV System	9" Tripple field image intensifier
	High resolution compact CCD camera with 752 (H) x 582 (v)

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picture elements
17" high resolution Monitor along with the trolley
32 frame digital memory last image hold recursive filter negative image reproduction etc.
40 to 120 KVP or more (Fluoroscopy) & fluro up to 3mA

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
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Annexure-(iii)

SPECIFICATIONS OF 500mA HIGH FREQUENCY X RAY MACHINE

X RAY GENERATOR	**High frequency X tray Generator for General Radiography and Fluoroscopy** KV range (rad) 40 to 120 KVP mA range (Rad) 10 to 550mA or more mAs range (Rad) 1 t0 200 mAs or more FLUORO KV Range:40 to 120 KV or more FLUORO KV Range:1 to 3mA or more FLUORO time : 5 minutes cumulative timer
Control	A very compat soft touch control panel having following functions and indication The panel can be supplied in floor or wall mount and has a spill proof design Following features are available on the control panel Fluoro/Rad mode selection switch Digital display of KV mA and mAs 5 steps film density control KV and mAs increase and decrease switches Tube focal spot selection switch Self diagnostic program with indicators for earth fault error KV filament error & Tubes thermal overload
X Ray Tube	Two Nos rotating anode dual focus thermally protected having focal spot of 0.6 & 1.5 mm anode heat storage capacity of the tube should be 200 KHU or more A very compact HV tank filled with high dielectric transformer oil Two pairs of 8 meter HV cable compatible with the X ray tube Two nos light beam diaphragm with knobs for adjustment of exposure area
Tube stand	Floor to ceiling stand and with counter balanced tube Head (rotatable=180 degree) 360 degree rotatable mounted on floor ceiling rails for convenient movements
Table	Motorized table with motorized bucky having grid ratio 8:1,85 lines/inch and stainless steel cassette tray The table should move from trendlenburg position to vertical with automatic stop at Horizontal vertical and trendlenburg position provision should be given to manually move the tablein case of poser failure Semi automatic spot film device capable of doing all routine spot filming(4 on 1,2 on 1,1 on 1) for use with 8" x 10",10"x 12",14"x1`4" cassettes Grid with ration6:1 60 lines per inch stray radiation lead rubber flaps. KV/MA/Flurotimer should be on SFD (Spot Film Device) Table accessories like compression band hand grips foot rest and foot step should be provided
Digital image processor Memory	Memory with facility to store 10,000 image having below mentioned main features should be provided: 2 monitors system for LIH,LIVE and stored images Permanent image storage capacity of approx 10,000 images 50 temporary image storage for quick review CD writer to store images on CD for giving it to patients

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	Flicker free images on a flat screen 32 Bit image storage for Excellent resolution Image sharpening(Real time or stored images) Image rotation Image EMBOSS for three dimensional relief presentation Colorized images Dynamic contract control (Gray level stretch) Negative images(Gray level invert) Frames averaging for smoothing of images(Real time)256 frames 32 bit at 800 x 600 resolutions Digital subtraction of image QUAD view (4 images on monitor) Cine Loop of 500 frame (Multiplecine loops can be stored permanently) Variably frame rate of 2,5,10,15 and 27 frames per second for cine loop Image can be stored in folders of individual patients name Quick exploration of stored images ON screen Help mode On screen measurements –length (X &Y)& area Area of interest marker Contrast enhancement of area of interest Histogram of area of interest Facility for image printing Text annotations and provision of removal of all text from the image Automatic capture and storage of cine loop with cine foot switch Offset and gain adjustments for improved image quality Thumb nail use of complete study Frame by frame review Printing options in different formats(Frames of different loops can be printed on the same sheet, 1x1,1x2,1x4,1x8 formats) Frame rate selection LAN connectivity DICOM Compatible
Other requirements	The company should be ISO 9001:2000 & CE certified System must be having a standard warranty of one year and next five years CMC charges to be given
II TV SYSTEM	
Image intensifier	9" or more Triple field under couch
Camera	High resolution compact CCD Camera Half inch sixe with 752 (H) x 582 (v) picture elements
Monitor	17" or more High resolution Monitor along with the trolley

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Should be FDA or CE, UL or BIS approved product
- Comprehensive warranty for two years and next 5 years CMC charges after warranty.

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- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

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- Certificate of calibration and inspection and inspection
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Annexure-(iv)

1000 mA DIGITAL RADIOGRAPHY SYSTEM

Direct digital imaging system for general Radiography should be Robust and Manoeurable in order to undertake wide range of Examination required The desigh of the system should feature a wide range of movements and Incorporate ergonomic considerations A single active Matrix Flat panel Detector which can be move into different positions for all radiographic projections with the help of remote viz General radiography Chest Orthopedic Pediatric

GENERATOR	Microprocessor controlled high frequency generator of 100 KHZ Output 80 KW mAS up to 1000 mAS KVP range 40 KV to 150 KV Out put at 100 KV should be 800 mA & at80 KV should be 1000 mA Having automatic control with its senses
DETECTOR	Single flat panel digital detector system of following configuration Amorphous silicon technology Cesium Iodide scintillation X ray sensing surface (Detector size) 43cm x 43cm (17"x17") Image Matrix 3000 x 3000 Pixel Pixel size 143 micron Very high DQE 65%(digital Quantum efficiency) Spatial resolution 3.5 LP/mm Sensor infrared or blue tooth must be built in detector to stop collision of detector
CEILING SUSPENDED X RAY TUBE	Ceiling suspended X ray tube with its motorized movement & electromagnetic locks for all radiographic projection System is convenient for off detector imaging Digital display of its parameters Anode heat storage capacity 600 KHU more Large focus 01mm or less with 80 KW output Small focus 0.6mm or less with 40KW output Specify tuberotation vertical & horizontal Longitudinal and Transverse movement Variable SID High speed rotating Anode of 9000 Rpm
X RAY TABLE	Fixed table having floating tabletop having fourway movement with elevated base. Up and down movement should be motorized. Tabletop made of carbon fiber Anti scatter radiation grid removable focus grid 80 lines/cm & grid ration is 15:1 or more System must have transverse & longitudinal movement please specify
OPERATION STATION	System has filling flat high resolution monitor of minimum 21" size with minimum 1024x1024 display matrix with an anti reflector screen

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	Operating console should have facility for patient ID entry viewing processing and documentation of images Specify the time taken for an image 6 or less sec to appear on the screen after exposure The next exposure should be possible while processing is progress on the operating system Auto stitching software to unit at least four images means(able to join complete lower limn or whole spine)
IMAGE VIEWING REPORTING STATION & DOCUMENTATION	Should have high resolution minimum 21"monitor
	The digital work station should be based on the latest high speed processor It should be acquire the image from digital detector Minimum image acquisition matrix of 3k and 3k or more windo & level adjustment for image processing measurement Zoom pan copying of image image manipulation edge enhancement System having inbuilt CD/DVD writer Post acquisition image processing reprocessing hard copy documentation and onward transmission is possible Image storage capacity 10000 image Should be connected to Dry chemistry laser camera of latest technology The system should be Dicom3 version ready system will be able to send receive acknowledge, print and record CD/DVD It will be ready for connectivity for any network computer PC etc. Easy integration and networking should be possible with any other existing/future networking including other modalities HIS,RIS,PASC
ACCESSORIES TO BE SUPPLIED WITH	Lead glass 80 cm x 100 cm UPS with half an hour backup for computer Servo stabilizer for complete system Compression belt(Pediatrics & Adult) Patient handgrip Lead aprons 6 numbers which 0.5 mm equivalent
WARRANTY	The complete system is having guarantied for a period of two years and next five year CMC charges will be provided in the price bid All information in the tender document must suggested by argued product datasheets compliance statement must be in conformity with the original product datasheets and information provided in offer Application specialist will be available for on site training to all radiologist and technicians of all user department

Standards, Safety and Training

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Documentation

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Annexure-(v)

SPECIFICATIONS OF "HEAVY DUTY AUTOMATIC FILM PROCESSOR"

Automatic X Ray film processor for processing of all standard medical X Ray and imaging films It should have the following features

- **Processor should be able to take the maximum film width and in feed width shall be 45 cm and minimum of 10 cm x10 cm**
- **High capacity through put of more than 220 films /hours of size 14" x 17"**
- **Transport speed adjustable between at least 1.0 minute to 5.0 minutes 9in the steps of ranging between 5-8 second for perfect quality control)**
- **The developing and fixing tanks should be minimum of 12 liters capacity for proper developing and washing Washing tank should be of higher capacity**
- **Replenishment should have the individual programmers manual and automatic with tank capacity of 25 ltrs**
- **The roller transport system should have squeeze rollers and the main drive should stop automatically when not in use**
- **The container assembly should be monoshell and made of material which is non corrosive and of latest technology**
- **Theremostatic controlled temperature of developer and it should have range between 28oC to 40oC**
- **Multiple program memory should be there preferred for different application at least five program memory must be there**
- **Replenishment rate should be adjustable and the adjustment range must 200-20000 ml per sq.m**
- **Dryer temperature range must be up to 70oC for better drying**
- **Water consumption during use should not exceed 2 Lit per minute Lower consumption shall be preferred**
- **It should have anti-oxidation programme option in between adjustable range 10-90 minute intervals**
- **Film output should be possible through the wall(wall mounted(The processor should be complete with the following operational electrical data 230 volts,50Hz 10 Amperes with appropriate voltage stabilizer Details about availability of spares & service should be given**
- **The model quoted should be from reputed foreign manufacturer with international quality certifications for the model quoted**
- **The firm must have an installed base of the quoted model at Delhi/New Delhi provide list of installations**

Standards, Safety and Training

- **Should be FDA or CE, UL or BIS approved product**
- **Manufacturer should have ISO certification for quality standards.**
- **Comprehensive warranty for two years and next 5 years CMC charges after warranty**
- **Comprehensive training for technical staff and support services till familiarity with the system**

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.

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- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
- List of important spare parts and accessories with their part number and costing.
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Annexure-(vi)

SPECIFICATIONS FOR MAMMOGRAPHY UNIT

State of art latest Mammography unit for Diagnostic examinations screening Ability to perform survey spot compression and magnification for detailed diagnosis and base system should be stereotaxy ready The systems have following features

GERERATOR	High frequency X ray generator of 3.2 KW or more with optimum image quality at lowest possible dose by automatic selection of best combination of anode filter density and KV combination
	KV range 20 KV-39 KV or more in 1 KV increments
	mAS range 3mAS-500mAS or more
	Minimum exposure time is 0.01 to 10 second
	AEC facility with solid state detector(5position)
	Exposure lock facility to prevent double exposure and exposure without cassette insertion
X RAY TUBE	Single/dual metal rotating anode of Molybdenum with fine focal spot
	Focal spot of 0.1 mm (small) & 0.3 mm (Large)
	Maximum tube current 150mA
	Anode Heat storage capacity 200KHU or more
	Dual filter X Ray tube with combination of MO & RH
	Anode rotating speed is 9600 rpm
	Five user selectable film combination
MAMMOGRAPHY STAND	Motorized vertical movement
	Lateral projection with motorized and Isocentric rotation
	Height adjustment 71 to 140 cm or more
	Automatic collimation of film formats
	Cassette holder with bucky of size 18 x 24cm & 24 x 30 cm
	Automatic selection of small and large focus of x ray tube
	Magnification factor 1.8 x or 1.5x
	Motorized and manual compression force
	Digital display of breast thickness and compression forces
	Movement range of U ram angulations + 195—150 degree or more
	Automatic compression device for optimum compression force with user selectable preset compression force.
	Automatic decompression after exposure
	Manual release of compression incase of power failure
	Facility of full dual manual and spot compression
	SID-65 cm
BUCKY	High transmission cellular Grid ration5:1,31 Lines
	18X24CM 01 No
	24X30CM 01 No
Accessories	LEAD Glass & two light weight lead aprons
	UPS with 30 mins back up
	Relevant furniture
	2 Analog Cassettes of each size

27/6/12

Application training on site of installation

SYSTEM MUST HAVE A FACILITY FOR FUTURE UPGRADATION IN DGITAL SPOT MAMMOGRAPHY STEREOTACTIC BIOPSY AND EVALUTION UNITS PLEASE MENTION THE PRICE SEPERATELY IF INSTITUTE WANTS TO UPGRADE THE SYSTEM IN FUTURE WITH FOLLOWING CONFIGURATION:-

Microprocessor controlled stereo tactic biopsy system have ability to perform fine needle, core Biopsy and fine needle wire localization
Stereco tactic biopsies with integrated object table
Sterilize double needle guide pin able and separately adjustable in all axis in steps 0.1 mm
Number of targets 8-10 or more
Removable needle holder and compression plate for sterilizations
Biopsy field size 5.0 cm x 5.3 cm or more
Spatial resolution 10 lines /mm or more

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
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Annexure-(vii)

SPECIFICATION FOR BONE MINERAL DENSITOMETER

SCANNING METHOD	Narrow angle fan beam/Fan beam utilizing motorized table
X RAY GENERATOR AND TUBE	➢ SWITCHED PULSE Deal energy /constant potential source
	➢ X ray tune voltage 100 Kv
	➢ X ray tube must be oil cooled high capacity
DETECTOR	➢ Multi element high resolution/Direct digital detector-solid state with fast pulse counting technology Minimum numbers of detector 40
ACQUISITION TIME	➢ Spine, Hip & forearm 30 sec or less
PRECISION	➢ Less than 1.0%
CALIBRATION	➢ System should have a automatic calibration technique for programming & quality control
	➢ System should have anthromorphic spine phantom
	➢ System should have whole body quality assurance (QA) phantom
	➢ System must be a FDA Certified
PARAMETER TO BE MEASURED	➢ Bone Mineral Density (BMD)
	➢ Bone Mineral content (BMC)
	➢ T Score and Z score
	➢ Whole Body – BMD & BMC for Multisite
	➢ Body composition Analysis
STANDARD APPLICATION/SOFT WARE	➢ AP LUMBER SPINE
	➢ LATERAL SPINE
	➢ SCLIOTIC SPINE ANALYSIS
	➢ PROXIMAL FEMUR (WITH FIVE REGION ANALYSIS)
	➢ COMARISION TO PREVIOUS SCAN
	➢ HIGH DEFIANTION IVA WITH HIGH RESOLUTION IMAGE QUALITY
	➢ FOREARM
	➢ DUAL HIP
	➢ MULTI ROI ANALYSIS
	➢ PROSTHETIC HIP
	➢ WHOLE BODY WITH BODY COMPOSITION
	➢ PEDIATRICS SPINE HIP WHOLE BODY WITH SUBREGION
	➢ SMALL NIMAL
	➢ INFANT WHOLE BODY
	➢ GENERAL REGION OF INTREST TO SET UPTO SEVEN USER DEFINE ANALYSIS REGION WITH BMD,BMC FOR MULTISITES
	➢ PATIENT WEIGHT 150 KG OR MORE
OTHER	WORK TABLE WITH MOST ADVANCED

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SOFTWARE/HARDWARE CONFIGURATION

- HARD DIST MINIMU 160 GB RAM 1 GB MIN
- REPRTING SOFTWARE FOR BMD,BMC FOR MULTISITES SUBREGION &WHLEBODY
- FRACTURE RISK ASSESMENT FOR TEN YEARS
- CAD fx COMPUTER AIDED FRACTURE ASSESMENT TOOL
- NHANES REFERENCE DATA
- DICOM READY
- ISCD COMPLAINT REPORTING SOFTWARE
- SERIAL EXAMINATION TRENDING
- QUANTITIVE MORPHOMETERY
- LASER COLOUR PRINTER
- 17" LCD MONITOR OR MORE
- CD ROM(R.W) NETWORK READY
- ONLINE UPS WITH HALF AN HOUR BACKUP
- EXTERNAL SHIELDING NOT REQUIRED

STANDARD INFORMATION REQUIRED FROM VENDOR

- Pre installation requirements
- Numbers of installation in India

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

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MULTILOADER COMPUTED RADIOGRAPHY SYSTEM (CR SYSTEM)

Specification for the multi loader computed radiography system for high resolution digital radiography the computed radiography system (CR SYSTEM) should be made of:-

- Imaging plates and cassettes
- Image reader system
- Preview station/CR console
- Patient /cassettes identification
- CR work station
- Laser Imager

The CR Image reader (CR System)/Digitizer and Dry Laser Camera should be of same manufacturer

1.(a) Imaging plates (IPs) and cassette

CR System compatible imaging plate of following size are required

35 cm x 43 cm - ..... 6.... Nos
35cm x 35cm- .....6. Nos
24cm x 30cm- .....6.... Nos
18cm x 24cm- .....6.... Nos

1 b) Image reader (multi loader Image reader) The model quoted should be of latest version

- Multi loader image reader which can stack 4 or more cassetters and have 4 or more input slots with following features:-
- It should be able to process all standard size cassette=s and imaging plates from 8 x10 inch to 14 x 17 inch
- It should be able to process mammography cassettes and imaging plates with > 15 pixels/mm resolution
- Processing capacity should be of 90 or more IPs PER HOUR OF size 35cm x 43 cm
- Image preview time should be less than 50 sec
- It should have various image processing protocols for respective regions of the body(anatomical presets)
- It should have capability for accepting exposed imaging plates with out patient demographics for causality/trauma workflow requirement
- Dept acquisition resolution should be 12 bits or more
- Reading sampling resolution should be 5-10 pixel /mm or more for 14" x 17 " size)
- It should have ability to route the images to multiple destinations like work stations laser camera etc.
- It should have storage capacity of at least 2000 images locally without recourse to a workstation and have capability of retrieving at least last 10

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scanned images as part of contingency plan

1(c) Preview station/CR Console

- It should have preview station/console with 17 inch or more good resolution ang= tiglare flicker free TFT/LCD color monitor having standard features /software
- It should have customizable graphic user interface (GUI) preferably touch screen
- It should have software which enables to see in the preview terminal the deviation from normal exposures Should have indication of over exposure & under exposure on the preview station
- It should have the facility of auto-routing images to pre defined DICOM destinations and also possible to directly print the images without going to CR WORK STATION
- It should have preferably the facility of pan zooming rotation window level adjustment cropping the image edge enhancement noise reduction latitude reduction etc.

1d) Patient /cassettes identification

- Should have bar code reader or any other patient/cassettes identification system

1 e) DEDICATED ADVANCED WORK STATIONS OTHER THAN CONSOLE

- Should have 19 inch or more antiglare flicker free medical grade TFT/LCD flat monitor with at least one mega pizel resolution of standard made like BARCO
- Should have 320 GB or more storage capacity (hard disk) with 4 GB or more RAM latest high speed core 2 duro or any other processor of 3.0 GHz or more speed and have CD & DVD burner
- Should have latest windows based original software
- It should accept images from, CR reader without loss of any data
- It should have build in routine for using predefined image processing parameters for image quality enhancement
- It should have mechanism for storing the patient image based on name data exam etc
- It should have capability of storing user defined image processing parameters capability of overwriting predefined image parameter with user-defined parameters & storing these two image separately
- It should be able to process the raw image data of CR reader and have capability of windo level adjustment flipping rotating zooming collimating annotating latitude reduction image noise reduction grey scale saturation feedback electronic shuttering

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grey scale reversal etc.

- It should have provision for customized printing foprmats in different layouts
- It should have auto routing incoming image to predefined DICOM store or print destination
- It should have mechanisum for printing multiple images in one film with possibility of slide and true size printing
- It should be able to connect with other DICOM System such as MR work station CT work station etc.

1 f) Dry laser imager

- A dry laser chemistry imager capable of printing images in high quality
- Printing resolution should be 500 DPI or more for all the films size
- Processing capacity should be 180 sheets per hour more of 14 inch x 17 inch
- Pixel depth architecture/gray scale resolution should be 14 bits or more
- Image resolution /pixel size should be 100 microns or less
- Time required to first print should be less than 100 sec for 14 inch x 17 inch
- Film loading system should be daylight film loading and there should be no use of chemicals
- It should be able to support at least four standard films size
- It should have at least three film sizes on line
- It should have automatic quality /density control system to maintain the quality of image printing
- It should have high speed DICOM print server
- It should have compatibility of networking & connectivity there should be the provision of direct connectivity to any DICOM MODALITY & on installation there should be available essential provision of connection to at least 6 DICOM modalities for high volume centralized USG,CT,MRI,NM,CR,DR,C Arm printing applications
- It should ne capable of printing in different layouts formats on single films Customized layouts & formats should be independent of films sizes
- Image memory should be 512 MB

SOFTWARE

- The system should include the following software application as standard

i) Full leg/full supine image processing
ii) Quality control software
iii) Software masking of the collimation areas
iv) Special attention should be placed on pediatric and mammography applications

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v) Software for printing on any DICOM printer and to print user defined formats and layouts (multiple images on film, true size printing etc)
vi) Software for storing images on any DICOM 3 (OR NEWER VERSIONS) compliant stations
vii) Annotation software advanced annotation features like customizable text arrows & other markers and measurement tools should allow free text to be applied to the image without interfering with the image
viii) Black border/black surround or similar masking software
ix) It should have provision of processing for expanded visualization for optimal viewing of structures with vastly different densities like DRC EVP or similar
x) Grid detection & grid pattern removal software
xi) Should have built in image processing software

3

- The CR system should have compatibility of upgradeability of PACS
- The CR system should have a separate online UPS compatible with the unit to take care of power failure for at least 30 minutes back up for the whole system
- The CR system should have software security features like user names & password to prevent unauthorized operation
- The company should provide demonstration of the quoted equipment and final technical approval will be based on satisfactory demonstration.

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty including UPS
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
- List of important spare parts and accessories with their part number and costing.
- Compliance Report to be submitted in a tabulated and point wise manner clearly mentioning the page/para number of original catalogue/data sheet. Any point, if not substantiated with

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authenticated catalogue, will not be considered.

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ADG (Medical), CPMFs

Annexure-(ix)

HIGH END C-ARM SYSTEM AND ORTHOPAEDIC OT TABLE

- The unit should be based on digital technology for un paralleled reliability and ease of use
- The movements should be smooth having very simple positioning

X RAY GENERATOR AND X RAY TUBE

High Frequency 40 KHz, 6 KW or more X ray generator
Rotating Anode X Ray Tube of focal spot 0.3 mm & 0.6 mm with output power of 5/17 KW resp.
Maximum KV output-120 Kv or more
Motorized Iris Collimator should be provided

IMAGE INTENSIFIER TV SYSTEM

- 9 inches triple Field
- CCD Camera with a progressive scan sensor of 2/3" or 1K x 1K or more Medical Grade with auto IRIS & ND Filter Integrated optical
- The acquisition is made at 14 bits or better
- Resolution to use the full dynamic range of CCD Camera
- MEMORY SYSTEM
- PC based memory system with the following features should be provided
- Image processing software with real time image capturing storage and display in 1 k x 1k format
- Boosted fluoroscopy (CINE) up to 12.5 FP With real time recording on Hard disk drive
- More than 1000 image storage capacity in 1kx1k format
- Dicom 3.0 compatible
- Dicom CD/DVD
- Connectivity with PACS and HIS
- Length and angle Measurements with Annotation
- Pre programming for image setting for different operating modes
- Image flipping and image rotation
- WW.WL level adjustments for optimum image quality
- Recursive filters for image smoothening
- Programmable motion detection facility
- Gamma curve adjustments for optimum image quality
- Image Zoom with pan
- Image Inversion

MONITORS

- 02 Nos Medical grade high brightness , high contrast B/W 19" LCD Monitors

CONTROL PANNEL

- Modes: continues and pulsed fluoroscopy up to 12.5 FPS
- Radiographic mode (cassette exposure)up to 120 KV & 100mA
- KV range -40 to 120 (user selectable)
- Digital display : KV fluoro time , Fluoro mA
- Timer (Radiographic): Radiographic timer to select Radiographic mAs.
- Timer (fluoroscopic): radiographic timer to select radiographic mAs
- X ray tube head temperature sensor for thermal safety cut off
- X Ray ON Indicator
- SWITCH
  - Mode selector Switch

- **I.I mode selection switches**
- **Exposure initiation switches for fluro/radiography**
- **Collimator control switches**

STAND

- **Motorized Up/down-430 mm**
- **Horizontal movement-220mm**
- **Are Orbital-90o +25(115)**
- **Wig wag = 12.5o(25o)**
- **Rotation = 180o**
- **Free space-800mm**
- **Focus screen distance-900 mm**
- **Arc Depth-65cm**
- **Locks-Locks for all the movements**

POWER SUPPLY REQUIREMENT

Single Phase 230 volts AC 15 Amps,50 Hz = 10% regulation Independent earthling required on the wall socket in the room

OPTIONAL	5 KVA servo stabilizer The unit can be upgradeable to digital subtraction angiography for vascular applications with Roadmap, Pixel shift and peak pacification Re masking Iso-centric motorized "C": DAP(Dose Area Product) Meter
Other Requirements	The company should be ISO 9001:2000,ISO 13485:2003 and CE certified System must be having a standard warranty of one year and next five years CMC charges to be given separately in price bid.

ORTHOPAEDIC O.T TABLE

- **Electro Hydraulic operated eight function remote controlled Operating table with five section eccentrically positioned RADIO-TRANSLUCENT table top suitable for C Arm Image Intensifier**
- **Operating positions i.e Table Top Height, Trendelenburg reverse Trendelenburg Lateral Tilt and back section are precisely and smoothly controlled by Hand held remote control**
- **Mounted on 57 mm or more dia polyurethane castors with manual floor locking**
- **Detachable divided Leg section with manual up down and side wise movements**
- **Head and Foot sections are detachable and interchangeable to facilitate enhanced C Arm, application These should be manually operated by means of robust ratchet system**
- **Column size of 180 mm x 280 mm or better**
- **Detachable Rexine covered high density foam mattress**
- **Provision for floor mounted Orthopedic Leg Traction system**
- **Table can be operated Manually as well by pressing foot pedal and selecting position through remote control**

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- **Chair position**
- **Non-corrosive stainless steel covered base and cylinder covers for easy cleaning and hygiene**
- **Complete with stainless steel side-rails clamps standard accessories**

Minimum Height 30

Mayfeild sugita head rest adaptable Table Top

STANDARD ACCESSPROES	High density foam mattress 50mm thick covered with foam rexine	One set
	Anesthetic screen L shaped	One
	Padded shoulder support	One pair
	Radio-Translucent Arm Board with cushion	Two Pcs
	Padded side supports	One Pair
	Wristlets for hand wrapping	One pair
	Goepel type special Lithotomy crutches	One pair
Orthopedic Accessories	Floor mounted stainless steel Orthopedic Leg Traction Attachment with screw controlled foot traction apparatus foot plates perineal post and sacral rest fitted with castors for easy maneuverability	

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
- List of important spare parts and accessories with their part number and costing.
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ADG (Medical), CPMFs

Annexure-(x)

SPECIFICATION FOR WHOLE BODY MULTI SLICE SPIRAL CT SCANNER

The equipment must be multi slice. Spiral CT scanner. The system should conform to the following specification :-

Multislice		**Minimum six slice or more per rotation. The system must have the facility to upgrade higher slices (example 10,12 or 16 slice).**
Scan time		The minimum scan time should be 0.8 second for full scan (360 degree)
Continuous scanning	**Spiral**	125 scans or ore at 0.8 second scan time or 100 scan in 1 second scan time.
Slice thickness		Minimum slice thickness should be 0.65 nn.
F.O.V.		42 CM or more variable in steps.
Detectors		Must be ceramic solid state type of 18000 elements or more
X-Ray Tube		Tube must have heat capacity of 3.5 MHU or more
Gantary		The gantary aperture should be 70 cm or more and tilt should be minimum + / -25 Degree
X-Ray Generator		High frequency type of minimum 40 KW capacity with out put KV range variable between 100 to 130 KV or more and mA range of 25 or 350 or better.
Patient Table		The patient table must have a minimum height of 45 cm. The topogram length should be 1300 mm or better. The load bearing capacity should be 130 kg or more.
Computer System		The computer system should be a multi CPU workstation type with complete multi tasking capability.
Recon. Time		0.2 second per image or less.
Recon. Matrix		512x512 or more
Image Storage		The magnetic disk unit should be 500 GB or more for image storage separate magnetic disk to be provided for RAW data storage which should 250 GB or more. The system also provided with the re-writable DVA ROM/MOD of capacity of 9 GB or more per disk as standard component of the system.
Image Display		The display matrix should be 1280x1024 or ore and the monitor should be high resolution type of 19 inch colour or more.
Software		Volume rendering & Surface rendering 3D, MIP, Minimum intensity projection & Volume rendering angiography, & 3D, Virtual Endoscopy, Contrast tracking, Real Time MPR, Adaptive mA, Cine display, Artifact

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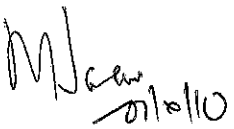
	removal algorithm, CT perfusion and CT dental.
Standard Accessories	• Dry Laser Camera • Lead Glass • Voltage Stablizer & UPS for complete system • Un-interrupted power supply for the image processing unit. • Pressure injector.
Warranty	The system having a standard warranty of one year and next Five years CMC price will be given in price bid. X-ray tube to be warranted for 80,000 rotations.
Turnkey Project Specification for Multi Slice CT Scanner	The proposed site inspected by the supplier after inspecting the site and getting the approved from medical college. The scope work will include planning, designing and execution of work pertaining to all civil work, electrical and air conditioning. Total Area Covered shall be provided 1500 Sq. Feet for installation of CT Scanner, complete with reception waiting area, patient preparation and doctors room.
Civil Work	Complete civil work including construction and plastering of partition walls, 2 feet x 2 feet x 8.5mm vitrified of reputed make, flooring with 10mm skirting. Aluminum panel fall ceiling for entire area except toilets, which should have gypsum board fall ceiling. Two toilets (One each for patient and staff) complete with ISI marked fittings. All internal painting on walls to used plastic emulsion paints except toilets which should have glazed tiles upto door height and oil hound distemper on the rest of the wall.
Doors	All doors to be of anodized aluminum with 5mm thick glass, door closers, except gantry room door which should be of wood fitted lead lining. Doors of the toilets should be of commercial board with ISI mark fittings
Electrical	Power distribution panel complete with ON/OFF switch and MCBs. Internal wiring to be of copper, with socket, power points as per system requirement. Adequate light fitting in each room of reputed make to be provided. Installation of DG set with sound proofing for back up power of adequate capacity, of standard make, with auto switchover in case power failure. Class one ear thing for CT scanner exclusively and for lighting for separately.
Furniture	Reception desk in board construction with granite top, chair, storage cupboard at reception. PVC mounded chairs on common steel stand in group-12



	seats, Corner table-2no.s. In Control Room-1 no.s of View Box)6 films) and Low back swinging chairs on casers with armrests chairs-3 no.s, patient preparation room with Patient couch, Drug trolley and Examination Stool. In CT Gantry Room Drug trolley on casters and lead Aprons (light weight)- 4 no.s.
A/C System	Necessary duct able package type air-conditioning for C.T. Systems & Console. A/C with wireless remote control in doctor's room and waiting area. Distribution panel for A/c also to be provided.
Fire Safety	Reputed make fire alarm system comprising of smoke detectors, hooter, control panel and fire extinguisher to be provided.
Miscellaneous	Wall mounted 32 inch LCD Flat TV and water cooler of reputed make to be provided at reception.

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
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Annexure-(xi)

Open Type Magnet MRI System

X-ray Generator		
	Magnet System	Vertical Magnetic Field Permanent Magnet
	Magnet Poles	Non Conducting Type, Eddy Current Type
	Static Magnet Field Intensity	0.3 Tesla or more (Resonant Frequency 12.7 MHz or more)
	Aperture Height	36 cm or more
		Maximum Open Type
	Gantry Weight	15000 kgs or less
	Guass Line	2.0 x 1.5 m or less
	Homogeneity	3.5 ppm or less
	Shimming	Auto Shimming in 3 Axis
	Gantry Opening	200 degrees or better in front
		60 degrees or better in rear
	Table	Manually or Fully motorized with Left/right & up/down movements
Imaging System		
	Scan region	Whole body
	Image Reconstruction	2D Fourier Transformation, 3D Fourier Transformation Method
	Applicable Nucleus	Hydrogen nucleus (Proton)
	Image Type	a. Spin Echo image (SE)
		b. Inversion recovery Image (IR)
		c. Gradient Echo Image (GE)
	Fast SE	2-256 Echo train length
	Fast IR	1 or 2 Echo time
	Slice Thickness	1~100mm
	Slice Plane	a. Transverse
		b. Sagittal
		c. Coronal
		d. Double oblique
		e. Multi Angle
	Scan matrix	512 X 512 or more preferable
	Spatial Resolution	Minimum 0.2 MM
	Multislice	256 Maximum
	Multi Echo	4 Echoes maximum
	FOV	320 mm or more with

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		choice of selection
Gradient Magnetic Field System		
	Gradient magnetic field intensity	20 mT/M or more
	Slew Rate	50 T/m/sec or more
	Rise Time	0.5 ms or less
RF Transmitter/Receiver System		
	Type	Digital
	Transmitter Coil	QD 2 channel or more preferred
	Pre Amplifier Noise	0.3 dB or less
	OUTPUT	4KW or more
SEQUENCES	Spin Echo	2D and 3D TR.35-900 ms or more In 1 ms step FA change 70-110 degree TE 11-240 ms or more In 0.1 ms Step
	Gradient Echo	GE (2D AND 3D) GR (2D AND 3D) SARGE(2D AND 3D) RF SARGE TE6~45msor more In 0.1 ms Step TR 20~9000 ms or more In 1 ms Step
	INVERSION RECOVERY	STIR, FLAIR, FIR T1 15-7500 MS IN 1 MS Step
	FAST SPIN ECHO	2D AND ECHO TR:15 MS ~ 9 SECOND OR MORE PREFERRED ETL RANGE 2-256 SSFSE
	ANGIOGRAPHY	1. 3D time of flight 2D and 3D 2. 3D WITH SSP, MOTSA AND MTC 3. Phase Contrast 2D AND 3D 4. Contrast Enhanced
	FLOW COMPENSATION	
	MTC PULSE	

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	MRCP	
	MR MYELOGRAPHY	
	. EPI Based Diffussion Weighted Imaging, single shot and multi shot	
	. Fat/Water separation	
	. Min. Slice Thickness 2D	less than 2.2 or less
	. Maximum number of Slices in 3D	Less than 1 mm
	. Maximum number of Slices in 2D	256 Or more
	. Maximum Number of slices in 3D	`256 Or more
	. Multiple Slab 3D	
SCAN FEATURES		
	RECON MATRIX	UPTO 1024^2
	GATED IMAGING	CARDIAC, RESPIRATORY AND PULSE
	BANDWIDTH OPTIMIZATION	
	HIGH RESOLUTION SCAN	
	DUAL SLIZE	
	CINE IMAGING	
	JOINT MOTION STUDIES	
	OFF CENTRE IMAGING	
	MIP DISPLAY	
IMAGE PRROCESSING		
	SHARP	
	SMOOTH	
	MUTI IMAGE AND SEGMENTED	
	PREREGISTERING OF PATIENT	
	DIGITAL PROCESSING	
	DISTANT AREA	
	MANNUAL AUTO ROI	
	MAGNIFICATION	
	HISTOGRAM	
	AUTOMATIC COIL IDENTIFICATION	
COMPUTER		
	TYPE	WORKSTATION TYPE Dual 64-bit CPU preferred
	MONITOR	18" COLOUR
	IMAGE	0.1 Ms OR LESS

	RECONSTRUCTIION TIME	
	MEMORY OF I.P	512 mb
PATIENT TABLE		
	TABLE	MANUAL/MOTORISED/ELECTRONIC CONTROLLED
	LENGTH	MORE THAN 2200 MM
	LONGITUDINAL TRAVEL	FAST: MORE THAN 50 mm/s SLOW ; MORE THAN 15mm/s
	VERTICCAL MOVEMENT	400~700 mm
	LATERAL MOVEMENT	+/- 45 mm min
	WEIGHT BEARING CAPACITY	120-180 KGS
	ENVIRONMENT CONDITIONS	
	TEMPERATURE	
	SCAN ROOM	20-28 DEGREES CENTIGRADE
	OPEARTION ROOM	20-28 DEGREES CENTIGRADE
	HUMIDITY	40-80% RH
	ELECTRIC FIELD SCAN ROOM	0.5~30 MHz : 0 Db μV/M OR More
	MAGNETIC FIELD FLUCTUATION	DC MAGNETIC FIELD 1×10^{-7} TESLA(1 Mg) or less AC MAGNETIC FIELD 1×10^{-7} (1 Mg) or less
POWER		
	POWER REQUIREMENT	SINGLE PHASE 10 KVA OR LESS
	POWER CONSUMPTION	4 KW OR LESS
	GROUNDING FACILITY	GROUNDING RESISTANCE LESS THAN 50 OHMS
ACCESSORIES:	Laser Camera, trolley, Boyles apparatus, MR air-conditioning, UPS for complete system	
Warranty:	System having a standard warranty of one year and next five year CMC charges must be given	
Installation	On Turnkey Basis	

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product

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- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty including UPS
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist.
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1.5T Superconductive MRI System

The whole- body 1.5 Tesla Magnetic Resonance (MR) imaging system for diagnostic purposes is required with the following performance.

Magnet System	Magnet system should be short, compact and have high homogeneity to obtain sufficient images.
Operating Field Strength	1.5 Tesla
Field Stability	0.1 ppm/h
Homogeneity	0.2 ppm (50cm DSV)
Active Shimming	1st and 2nd order shimming standard
Helium Capacity	Approx. 1400 liters
Helium refill interval	6years at least
Magnet Weight	Less than 5.2t
Magnet bore diameter	61 cm or more
Magnet length	160 cm or less
Magnet width	210cm or less
Magnet height	220 cm or less
Fringe field	2.5x4.0m or less
Gradient System	Gradient system should have not only the high amplitude but also high stew rate to achieve fast imaging and to get high quality images
Max. amplitude	33m T/m
Max. slew rate	150T/m/s or more
Min. FOW	0.5 cm
Max. FOW	50 cm
Min Slice Thickness	0.05 mm
Imaging matrix	1024x1024
RF System	RE receiving system should be 8 channel at minimum and scalable.
No. of RF channels	Minimum8
Frequency control	32 bits
Patient Table	Patient table should be designed based on patient comfort and safety and the operationality of users
Table Stroke	280 cm or more
Table height (min)	50 cm or less
Table height (max)	86 cm or less
Load capacity	180kg or more
(full movement	
Computer System	Computer system should have high performance for fast image processing and big storage capacity.
Image capacity (256x256)	400,000 or more
Archive Media	DVD-RAM
Media capacity	9.4 GB or more
Media capacity (256x256	60,000 or more
Display monitor	24 inch or more
Display matrix sixe	1920x1200or more
Bit depth	24bit
Receiving Coils	Dedicated high-sensitivity coils for each region

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	Head Coil (16 elements) Spine Coil (16 elements) Body/Torso Coil (16 elements) Shoulder Coil (5 elements) Knee Coil (16 elements) Multipurpose Coils Transmission/Receiver Coil
Imaging Sequences	Standard imaging sequences and functions to cover wide range of clinical applications in all anatomical regions such as; diffusion weighted imaging, balanced SARGE, CE-MRA imaging, parallel imaging, water excitation, fat suppression, angiography imaging (PC/TOF), hybrid-type radial acquisition imaging, regional shimming, volume rendering, perfusion imaging and so on
Accessories to be supplied	RF Shield room Oxygen Sensor CCTV UPS for complete system Pressure Injector Roter Inverter chiller Dry lazar imager Stainless steel trolley Patient wheel chair Operator table & chair Operator table & chair Hi-fi system Oxygen tank Generator for complete system backup MRI compatible Monitor and stretcher both
Quality standard	Valid FDA & CE certificate of the offered model must be submitted with the offer.
Installation	On turnkey basis

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection

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- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
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Annexure-XIII

SPECIFICAION OF BLACK AND WHITE ULTRASOUND SCANNER SYSTEM

Transducers:-

A. The system should have a full field digital scan converter capable of supporting 2 or more probes with facility to switch between the transducers. Fast selection of the transducers should be possible with a single key stroke. Multi frequency selection of the probe should be available. Broadband frequency transducer with THI (Tissue Harmonic imaging) should also be available

B. The unit should have following broadband multi frequency transducers.
3.5 MHz convex transducer.
7.5 MHz Linear transducer.
6.5 MHz Endo- Vaginal Transducer.

System operating & display modes.

The system should include B-mode, M-mode. Single or mixed modes like B+M (Horizontal/vertical, 4B should also be available.

Keyboard

Full alpha numeric keyboard having backlit control panel with:

A. Black / White conversion.
B. Right/ Left conversion.
C. Pre & Post processing functions.
D. Adjustment dynamic range of over 100 dB.
E. Zoom.
F Scan depth 24 cm or more and cine loop should also be available
G. Multiple duplex image formats.
H. Focusing – number and position user selectable.

Display monitor

35 cm or larger high resolution monitor.
Swivel and tilt facilities.

Software

A. Grey shades – 256 in M-Mode.
B. User programmable pictogram, annotations in various presets.
C. TGC control : enabling multi –step transmit focusing.
D. Magnification in real time & frozen mode, Factor to be specified.
E. Scrolling facility should be possible after magnification.
F. Facility to magnify specific region of image.
G. Standard measurements and calculations.
H. Trackball / mouse with calipers for measurements.
I. 2D Circumference / area by ellipse, continuous trace or trace by points.
J. M-mode distance (depth/time/slope).
K. Heart Rate.
L. Thyroid Volume.
M. 2D volume and ratio.
N. Standard examination specific calculation and report packages for obstetrics, gynecology, urology, small part, cardiology, orthopedics etc.

6. Integrated mobile trolley with foot switch.

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7. Documentation (Built in):

A. Image archiving on floppy or on pen drive or CD

B 80 GB or more hard disk should be available for storage of data

C. Thermal printer.

D. Accessories

On line UPS with 30 minutes back up with in built Battery of appropriate capacity.

ISO 9001: 2000 certification mandatory.

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years incl probes and next 5 years CMC charges after warranty including UPS

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
- List of important spare parts and accessories with their part number and costing.
- Compliance Report to be submitted in a tabulated and point wise manner clearly mentioning the page/para number of original catalogue/data sheet. Any point, if not substantiated with authenticated catalogue, will not be considered.

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SPECIFICATIONS FOR COLOUR DOPPLER ULTRASOUND UNIT

The system should be state of the art with full digital technology and should be for the whole body applications which would include abdominal, peripheral vascular, small parts imaging such as thyroid, intracavity application etc.

Essential features

- The equipment should have 8000 channels or more
- The system should have 256 grey scale or more
- The system should have a dynamic range of 180 DB or more
- The system should be able to support at least 3 transducers with universal ports allowing any transducer to be connected to any port
- All transducers should have a broad bandwidth technology for extreme high resolution 2 D imaging
- The system should have a very high frame rate of at least 400 frames per second
- The system should have a high-resolution non interlaced monitor of 17 inches with tilt and swivel display

General Requirements

1. The system should incorporate facility for high resolution 2D, M-mode, PW, CW, colour flow imaging, Elastography, power doppler imaging modes.
2. The system should employ state of the art real time imaging technology with multiple lines of sight to obtain the image at real time frame rates for improved visualization and better image quality in the abdominal and vascular imaging and to virtually clean up the image artifacts.
3. The system shall have harmonic imaging for tissues for hard to image patients. The system should be able to work in combined mode of harmonic imaging and Real time imaging to get excellent imaging quality.
4. The system should have a alphanumeric keyboard or System will work through the touch screen without any key board.
5. The system should have cine loop review facility in individual and mixed modes cine loop greater than 300/2D color frames and greater than 30 seconds of spectral Doppler and M mode strip data. System memory minimum 50,000 still images and 2000 or more image clips of Doppler/M-Mode Cine.
6. The system should have the facility of digital storage and retrieval of B/W and colour image data (both frozen and cine loop) on built-in or removable media (Compact Disc or pen drive).
7. The system should have automated real time qualification of real time parameters like velocity, frequency, time heart rate slope, flow volume, pulsatility index, peak velocity, average value, point value, area and diameter, flow volume etc.
8. Power Doppler Angio for perfusion studies should be available for visualization of flow in small vessels
9. Should have trapezoidal imaging and steerable imaging for 2D, Colour and Doppler with linear probe.
10. The system should have advanced 4D imaging package
11. The system should have extensive calculation software package for generic measurements, Ob/Gynae, Vascular etc.
12. Equipment with above mentioned features to be offered with following broad bandwidth probes.
    a. Broad band convex array transducer with frequency range 2-5 MHz

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b. Broad band linear array probe with frequency range 5-14 MHz
c. 4 D volume mechanical probe with frequency range 3-7 MHz
d. Broad band transvaginal / transrectal probe with frequency range 5-9 MHz.
e. Biopsy attachment for convex, linear and TV/TR probes should be available
f. Phased array sector probe for neonatal application with frequency range 4-9 MHz.
g. All probes should have tissue harmonic imaging.

13. The system should have following documentation devices and accessories
    a. B & W thermal printer to be provided
    b. UPS for complete unit with 30 min. backup.
14 All information must be supported by original product data sheet.

Standards, Safety and Training*

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.
- Comprehensive warranty for two years and next 5 years CMC charges after warranty including UPS
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
- Certificate of calibration and inspection and inspection
- Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
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DIGITAL PANORAMIC & CEPHALOMETRIC X-RAY IMAGING UNIT

Fully Digital panoramic & Cephalometric Dental Radiography System

BASIC UNIT

- Should have motorized control for height, forehead & temple support movements to allow easy patient posting.
- Should have three-point patient fixation with 2 laser light markers to align mid-sagittal & Frankfurt horizontal plane for eliminating any possibility of motion blurring
- Should have dedicated programs for following:
  - Panoramic radiograph with Orthoradial projection.
  - Panoramic program using constant magnification (1:1:25) for ease in measurement during implant planning.
  - Standard panoramic radiograph with half side left or right exposure.
  - Panoramic radiograph with Frontal Dentition for orthodontic evaluation..
  - True paediatric program with reduced radiation field in width & height
  - Bitewing X-ray program
  - TMJ with open & closed occlusion.
  - Sinus program
  - Transverse multi-slice posterior teeth for implantology.
  - Ceph program
    - Ceph asymmetrical
    - Ceph asymmetrical posterior- anterior
    - Ceph symmetrical abterior- posterior
  - Frankfurt horizontal positioning in Ceph with laser beam
  - All the programs must have spinal column compensation via automatic kV control

X-RAY UNIT

Generator	Multi-pulse (120 Khz or more)
Tube Voltage	60-90 kV
Tube Current	3-16 mA
Effective Exposure Time	15 secs. or less full panoramic view 10 secs. Or less for Ceph (effective exposure time should be less than 300 ms)

ACQUISITION UNIT:-

- System should have a Direct Digital CCD or CDTE Sensor for Panoramic and Ceph acquisition, which should be interchangeable
- Suitable computer with flat monitor
- Unit should have option for operation via centralized or remote control.
- Should be with upgradable imaging software.

ESSENTIAL ACCESSORIES:-

- Suitable Medical Laser printer for OPG and Ceph with transparency film size A4 for printing of 6'x 12"and 8"x 10"

Standards, Safety and Training

- Should be FDA or CE, UL or BIS approved product
- Manufacturer should have ISO certification for quality standards.

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- Comprehensive warranty for two years and next 5 years CMC charges after warranty
- Comprehensive training for technical staff and support services till familiarity with the system

Documentation

- User./Technical/maintenance manuals to be supplied in English
- List of equipments available for providing calibration and routine Preventive maintenance Support, as per manufacturer documentation in service/technical manual.
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