

Final Technical Bid Document after pre bid meeting held on 18-2-2012

Radiology

Direct Digital Radiography System is splitted in to 2 (two) separate specification i.e. A & B to remove confusion amongst the vendors participated in the pre bid meeting held on 18-2-2012.

1) Direct Digital Radiography System with Flat-Panel Detector

A) Ceiling mounted with dual detector:

Original	Modifications
1. Generator	
-800 mA or more, with microprocessor controlled high frequency X-Ray generator with power output of 80 KW	
-Specify KV and mA range	
-Specify exposure time range	
For trauma patients the generator should have minimum exposure time.	
There should be provision for automatic exposure control.	
Unit must be AERB type approved	
	- International – FDA/CE Certification is essential.
2. X-Ray Tube	
Ceiling suspended with dual detector.	Only Ceiling Suspended
Dual focus tube	and tube heating capacity: 400 KHU or more
Mention size of each focus	
Tube loading should be at least 30 KW for small and at least 80 KW for large focus	
Motorized movement of ceiling suspended tubes	
Mention range of tube movements in vertical, longitudinal and horizontal planes	
Electromagnetic locks collision protection sensor	
Field size programming should be possible	
3. Horizontal Bucky Table	
Adjustable height floating top compact bucky table with digital flat panel detector.	
Mention range of vertical, horizontal and longitudinal movements of the table.	
Foot switches for – adjusting height, longitudinal/side to side movements, locking, light adjustment.	
Removable grid.	
Automatic exposure control should be available.	
4. Vertical Bucky	
Counter balanced adjustable height vertical Bucky with digital flat panel detector.	
Detector movement should be synchronized with	

movement of the X-ray tube.	
Vertical detector system should be tilt table (-150 to + 900) and should travel from 1' to 6 ½' above floor level.	tilt table (-15 degree to + 90 degree).
Automatic exposure control.	
Patient display.	
5. Detector System	
Digital flat panel detector system.	Digital flat panel non tiled detector.
- Detector type – Amorphous Selenium	- Detector type – Amorphous Silicon with Cesium Iodide.
-Minimum size of detector must be 14"x17"	14"x17" or more.
- Image matrix size 3k X 3k pixels	2k X 2k pixels or more
- Pixels size to be mentioned	Pixels size 160 micron or less
- Image resolution should be 3 lines pair/mm or more	2.5 lines pair/mm or more
- Specify picture elements	
- Tube assembly movement to be automatically synchronized with the detector movement.	
- Should allow centered/de-centered collimation	
- Specify refresh cycle (time for second exposure)	
6. Operating Station	
- Should have a high resolution monitor minimum 19" size (TFT) with minimum 1024x1024 or more display matrix and antireflective front screen.	
- Operating console should have facility for patient identity entry, viewing and processing images, documentation	
- Specify time for the image to appear on screen after exposure	
- Next exposure should be possible while processing is in progress on the operating station	
7. Image Viewing and Reporting Station and Documentation	
-Should have high resolution, minimum 19"size (TFT) monitor.	
-Image acquisition matrix should be minimum of 3K x 3K.	
-Image display matrix should be of high resolution, minimum of 1.5 K x 1.5 K.	
-High luminescence display for diagnostic image viewing.	
-Post acquisition image processing, viewing, reprocessing, hard copy documentation and onward transmission should be possible.	
-Should be connected to a Dry chemistry Laser Camera of at least 500 DPI / PPI for documentation. The camera should accept all size films up to 14"x17" size.	Dry Chemistry Camera with multiple online trays with buffer will be preferred.
-Long term storage facility.	
8. Image storage and Transmission	
-Hard disc storage capacity should be minimum of 10,000 images	3,000 images or more.
-The systems should support storage of images on compact discs/DVD	
-The system should be DICOM 3.0 (or higher version)	

ready (like send, receive, print, record on CD/DVD, acknowledge etc.) for connectivity to any network, computer/PC etc. in DICOM format.	
- Easy integration and networking should be possible with any other existing/future networking including other modalities, HIS and RIS and PACS	
-A stand alone independent workstation connected with Digital X-ray .It should be capable of performing 2D post processing for all digital X-ray .	
-Optional requirement in workstation :	
Capability of performing 2D/3D post processing for digital X-ray, CT, MRI,PET and DSA images along with image fusion and comparison of multimodality images .The basic application should be available for Digital X-ray reporting, automatic image/study sorting,3D VRT,ROI and MPR.	Please consider these requirements as standard items and not optional one.
9. Accessories	
- Voltage stabilizer for complete system	
- UPS for the computer with 15 minutes backup	
- Dry chemistry laser camera with at least 500 DPI / PPI resolutions to take all size of films up to 14”x17” size	
- Image viewing and reporting station	
- Minimum necessary furniture and fire extinguisher system.	
-Flicker free Ultra-thin(LCD/TFT) viewing panel : 56 inchX17 inch	
-Lead glass window (1no)-100cmX120cm	
-Required Lead lining for Entrance Door (two nos)	
-Lead apron-3 nos (.5mm lead equivalent double breast type)	
9. a. - Image composition accessory should be available to allow acquisition of whole spine & extremity images.	
9. b. - Any other accessory useful for trauma work should be mentioned.	
10. Installation	
- The cost of alteration and preparation in a specified built in area on turn key basis which will include civil, electrical and air conditioning and maintenance of air conditioning during the warranty period is to be borne by the firm.	
- This work should be done in consultation with the Department of Radiology of Concerned Medical College.	
- Power supply to be clarified.	

Warranty : Warranty 5 (Five) Years . AMC/CMC 5 (Five) Years.

**1) Direct Digital Radiography System with Flat-Panel Detector
B) Floor mounted U-arm with single detector:**

Original	Modifications
1. Generator	

-800 mA or more, with microprocessor controlled high frequency X-Ray generator with power output of 80 KW	
-Specify KV and mA range	
-Specify exposure time range	
For trauma patients the generator should have minimum exposure time.	
There should be provision for automatic exposure control.	
Unit must be AERB type approved	
	- International – FDA/CE Certification is essential.
2. X-Ray Tube	
Floor mounted U-arm with single detector.	Floor mounted column stand fitted with single detector with U-Arm
Dual focus tube	
Mention size of each focus	
Tube loading should be at least 30 KW for small and at least 80 KW for large focus	
Motorized movement of ceiling suspended tubes	
Mention range of tube movements in vertical, longitudinal and horizontal planes	
Electromagnetic locks collision protection sensor	
Field size programming should be possible	
3. Horizontal Bucky Table	
Adjustable height floating top compact bucky table with digital flat panel detector.	Table should be movable with effective full proof breaking system.
Mention range of vertical, horizontal and longitudinal movements of the table.	To do all general Radiological Imaging in Supine and Erect, Sitting position, and Cross Lateral imaging of chest.
Foot switches for – adjusting height, longitudinal/side to side movements, locking, light adjustment.	
Removable grid.	
Automatic exposure control should be available.	
4. Vertical Bucky	To be ignored.
Counter balanced adjustable height vertical Bucky with digital flat panel detector.	
Detector movement should be synchronized with movement of the X-ray tube.	
Vertical detector system should be tilt table (-150 to + 900) and should travel from 1' to 6 ½' above floor level.	
Automatic exposure control.	
Patient display.	
5. Detector System	
Digital flat panel detector system.	
- Detector type – Amorphous Selenium	- Detector type – Amorphous Silicon with Cesium Iodide.
-Minimum size of detector must be 14"x17"	14"x17" or more.
- Image matrix size 3k X 3k pixels	2k X 2k pixels or more
- Pixels size to be mentioned	Pixels size 160 micron or less
- Image resolution should be 3lines pair/mm or more	2.5 lines pair/mm or more

- Specify picture elements	
- Tube assembly movement to be automatically synchronized with the detector movement.	
- Should allow centered/de-centered collimation	
- Specify refresh cycle (time for second exposure)	
6. Operating Station	
- Should have a high resolution monitor minimum 19” size (TFT) with minimum 1024x1024 or more display matrix and antireflective front screen.	
- Operating console should have facility for patient identity entry, viewing and processing images, documentation	
- Specify time for the image to appear on screen after exposure	
- Next exposure should be possible while processing is in progress on the operating station	
7. Image Viewing and Reporting Station and Documentation	
-Should have high resolution, minimum 19”size (TFT) monitor.	
-Image acquisition matrix should be minimum of 3K x 3K.	
-Image display matrix should be of high resolution, minimum of 1.5 K x 1.5 K.	
-High luminescence display for diagnostic image viewing.	
-Post acquisition image processing, viewing, reprocessing, hard copy documentation and onward transmission should be possible.	
-Should be connected to a Dry chemistry Laser Camera of at least 500 DPI / PPI for documentation. The camera should accept all size films up to 14”x17” size.	
-Long term storage facility.	
8. Image storage and Transmission	
-Hard disc storage capacity should be minimum of 10,000 images	3,000 images or more.
-The systems should support storage of images on compact discs/DVD	
-The system should be DICOM 3.0 (or higher version) ready (like send, receive, print, record on CD/DVD, acknowledge etc.) for connectivity to any network, computer/PC etc. in DICOM format.	
- Easy integration and networking should be possible with any other existing/future networking including other modalities, HIS and RIS and PACS	
-A stand alone independent workstation connected with Digital X-ray .It should be capable of performing 2D post processing for all digital X-ray .	
-Optional requirement in workstation :	
Capability of performing 2D/3D post processing for digital X-ray, CT, MRI,PET and DSA images along with image fusion and comparison of multimodality images .The basic application should be available for Digital X-	Please consider these requirements as standard items and not optional one.

ray reporting, automatic image/study sorting,3D VRT,ROI and MPR.	
9. Accessories	
- Voltage stabilizer for complete system	
- UPS for the computer with 15 minutes backup	
- Dry chemistry laser camera with at least 500 DPI / PPI resolutions to take all size of films up to 14"x17" size	
- Image viewing and reporting station	
- Minimum necessary furniture and fire extinguisher system.	
-Flicker free Ultra-thin(LCD/TFT) viewing panel :56inchX17 inch	
-Lead glass window(1no)-100cmX120cm	
-Required Lead lining for Entrance Door(two nos)	
-Lead apron-3 nos (.5mm lead equivalent double breast type)	
9. a. - Image composition accessory should be available to allow acquisition of whole spine & extremity images.	
9. b. - Any other accessory useful for trauma work should be mentioned.	
10. Installation	
- The cost of alteration and preparation in a specified built in area on turn key basis which will include civil, electrical and air conditioning and maintenance of air conditioning during the warranty period is to be borne by the firm.	
- This work should be done in consultation with the Department of Radiology of Concerned Medical College.	
- Power supply to be clarified.	

Warranty : Warranty 5 (Five) Years . AMC/CMC 5 (Five) Years.

2) High Speed, Heavy Duty Computed Radiography System (CR System) including imaging Plates & High Speed, High Resolution Dry Laser Printer

Digitizer, System should have the ability to 100 or more numbers of
Imaging Plate process 60 or more numbers of cassettes / imaging plates per
and related cassettes / imaging plates per hour for hour.
the largest size (14 X 17'')

Software and the largest size (14 X 17'')

Hardware System should be efficient to get the first image transfer on the monitor within 55 sec or less.

Pan Zoom facility of the image directly should be possible while checking the quality of the image and detect patient motion etc.

Image storing /archiving facility for at least 10000 images locally without resources to workstation to allow quick view and quality check. Should have at least 320 GB Hard Disk.

System should have touch screen graphical user interface to allow easy use and minimal operator training

For easy selection different preset should be provided for various anatomies

System should have the mechanism to accept exposed cassettes with patient Demographic mode

Should be capable of writing CDs universally and should have all processing facilities like rotate, crop, zoom, annotations etc.

System should provide TRUE Printing facility for direct measurement for orthopaedics work

System should have software security like user names and password to prevent unauthorized operation

System should provide free text to be applied to the image for easy documentation

Supplier should have their service centre inside the State concerned for prompt service, provide details of service center(s) address (es) along with Service Engineer's details. List of Installations of equivalent models/systems in the State concerned.

Screen size of the console should be at least 17" size of LCD, Medical Grade Monitor

Should have broad range of application like General Radiography, Mammography, Orthopedic and Dental

Automatic Cassette identification through barcode reader

The equipment should have IP Cassettes of size 8" X 10", 10" X 12" and 14" X 17".

The No. of cassettes required will depend on institutional demand. **The price is of each size cassette to be quoted separately in the price –bid, including prices of Mammography Cassette .**

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Mammography as optional with specific software.

Mammography Cassette as optional.

System should have International FDA / CE Certification.

Dry Laser Imager/Printer

Camera/Printer should have inbuilt quality control like densitometer to ensure consistency in print. It should be able to print at least 5 sizes films

Dry Chemistry Camera with Multi slot and buffer.

8X10 inch, 10X12 inch, 11X14 inch, 14X14 inch, 14X 17 inch and should have at least 3 trays online and any size film can be loaded in any drawer for uninterrupted printing of all sizes. Pixel Size should 100 microns or less.

Camera/Printer should be capable of loading at least 300 films or more at a time. High density camera for quality output - quote density.

It should have minimum resolution 500 ppi/dpi or more.

Camera should be DICOM ready
Bit depth of the printer should be at least 14 bits.

2. SOFTWARE

The system should include the following software application as standard:

Full leg / full spine image processing with 2 (two) Nos. Cassette

- i. Full leg / full spine image processing
- ii. Quality control software
- iii. Software for printing on any DICOM printer and to print user defined formats and layouts. (multiple images on film, true size printing etc)
- iv. Software for storing images on any DICOM 3 (or newer versions) compliant stations.
- v. Should have built in image processing software

Optional:

- i. Software masking of the collimation areas
- ii. Special attention should be placed on pediatric and mammography applications.

3. The CR system should have compatibility of upgradeability of PACS.

4. The CR system should have a separate online UPS compatible with the unit, to take care of power failure, for at least 15 minutes back up for the whole system.

5. The C.R. system should have software security features like user names and password to prevent unauthorized operation.

The company should provide demonstration of the quoted equipment and final technical approval will be based on satisfactory demonstration.

Warranty : Warranty 3 (Three) Years . AMC/CMC 5 (Five) Years.

3) 800 mA High Frequency X-Ray Machine with IITV

Technical Specification:

The high power R/F system should have a High Frequency inverter type generator & remote controlled	
diagnostic table. The Unit should be over table tube system compact and occupy minimum space. The unit must be AERB type Approved.	
System Configuration:	
1. 80 kW Generator, Remote controlled R/F Table	
2. 12" Image Intensifier, Multi Leaf collimator with auto collimation.	
3. High capacity X Ray tube	
A. X-ray High Voltage Generator	
- 80kW High voltage generator with inverter frequency of not less than 50	
kHz. Maximum output: 80kW(800ma @100kv)	
- Radiographic kV range: 40 - 150kV at 1kV step	
- Radiographic mA range: 10 - 800 mA at 12.5% steps	
- Radiographic mAs range: 0.5 - 800 mAs at 12.5% steps	
- Anatomical program memory-user programmable	
- LED readout for exposure parameter display.	
- Microprocessor controlled with automatic exposure control.	
Automatic setting of optimal digital radiography parameters from fluoroscopy parameters (kV, mAs)	
B. R/F Table	
- Remote controlled operation of table movement	
- Table tilt: + 90 deg ~ - 25 deg	Table tilt: + 90 deg ~ - 15 deg.
- Lateral movement of table top: Not less than 22 cm	
- Table should be Motorized Elevating type for easy patient access	
- Longitudinal movement: Not less than 800 mm. Movement of imaging unit is preferred for patient safety.	
- Oblique tilt Motorized and remote operated +/- 30deg With 1.5 FFD	Para should be omitted.
Extension	
- Cassette / Film size: 8 x 10 inch ~ 14 x 17 inch.	
- Exposure programs: Up to 4 on 1 should be possible on Cassette Spot	
Film L 3 on 1 for 14 X 17 and 12 X 10 should be possible.	
Rapid spot filming should be possible. Multi Cassette Size Spot Film	
Device, X Ray Grid: 12:1, 60 lines/cm	
- Remote console with integrated Table Control and Monitor mount	
- Table side controls for controlling the table movements	
C. Image Intensifier & Camera	
- Input field:12" ,Resolution: Not less than 45 lp/cm	
- Contrast ratio: Not less than 30:1	
- CCD camera 400K or better with Last Image Hold	
- Desk combined with console,	
- 15" or more Monochrome LCD Medical Grade	
D. X Ray Tube High Speed Rotating anode tube of 9000 rpm	

or better	
- Anode heat capacity – not less than 400 kHU	
- Focal spot size – Small focus - not more than 0.6mm	
Large focus - not more than 1.2 mm	
- Short term rating - 36 kW / 80 kW or better	
HT cable pair 18 mtrs or more	
E. Accessories: - For Local Operation Use - LCD Colour monitor 15", with	
Monitor cart & Foot switch for examination room.	
- Sub-divisional (up-down) spot (SFD), G.I. Examination kit (Compression	
cone (flat & triangle) & Barium cup holder), Compression band,	
Auxiliary tabletop,	
Interphone: Bedside: Microphone, Remote console: Microphone,	
Partition wall with lead window Glass - 1000 x 800 mm ,	
F. The System should be upgradeable to Digital and DSA in future.	DSA to be omitted.

Warranty : Warranty 3 (Three) Years . AMC/CMC 5 (Five) Years.

4) 100 mA Mobile X-Ray Machine

Out put Rating	8KW as per ISI:7620 (Part 1)
(Radiography)	100 mA at 45 to 100 KVP 50 mA at 45 to 100 KVP 25 mA at 45 to 100 KVP
KVP Range	45 to 100 -120 KVP in Steps of 5 KVP/Step
Timer	Solid State Electronic Timer with timing range from 0.04 to 8 Sec. in 24 steps
Control Panel	Attractively and Ergonomically designed control panel having Digital display of mAs, KVP and Radiographic mA. Independent Voltmeter to indicate line voltage. mA meter, Voltage compensator- and Fine to coarse to compensate provided. Booster transformer is provided in control panel for stabilization of filament voltage. Tech. Selector for selection of Rad mA, KVP Selector from 45 to 100 KVP, Bucky selector switch to be provided.
Safety Features	Automatic trip off overload circuit breaker Electronic overload protection with simultaneous protection from high input voltage /KVP/mA/Time provided. Fuses for all circuits provided in the machine
Tube Head	Self contained Tube Head containing Stationary Anode X-Ray Tube.

Compact Heavy Duty Full Wave Rectified H.T. Transformer, Filament transformer and High Voltage Silicon Rectifiers etc. All Oil emerged and hermetically sealed. Tube Head can be tilted 360 degree with full flexibility for use in operation theatres and in ward for bedside Radiography.

Tube Stands Mobile stand with 4 wheel design, which ensures easy Mobility Counter Balance (MCB) and steering. Counter Balanced articulated tube carriage allowing smooth movements of the tube head in vertical and horizontal plane. Lead lined cassette storage box. Double steel Rope for counter balancing gives additional safety as per ISI-7620. Large castor nylon wheels for easy mobility stand is designed for maximum maneuverability of the unit.

Power Supply 10 KVA, 230-440 Volts AC 3 Phase supply, maximum allowable line regulation $\pm 10\%$ with Line Resistance of 0.4 Ohms as per IS: 7620(1).

Note AERB type approval of the tube is must
Local/ Technical backup system within the step
Good Performance Report.

Warranty : Warranty 2 (Two) Years . AMC/CMC 3 (Three) Years.

5) Portable Ultrasound B & W

Original	Modification
Portable ultrasound machine with digital beam former.	
· Scanning mode: convex	
· Display mode: b mode, m mode ,b+b and b+m	
· Monitor screen should be 12"X 15" high resolution non interlace flicker free monitor latest technology	Monitor screen should be 10 inch or more
· Display depth: 25 cm max	
· Magnification: 8 steps	
· Facility for image zoom, image reverse, image freeze and image magnification, reduction	
· Alphanumeric keyboard for character entry and character display	
· Gynecology measurement facility for uterus, cervix, special probe for gynecology to be provided	
. All Obstetrical measurement facility.	
. 3/ 3.5 MHz convex probe.	
. 5-6 MHz Multi frequency Endo Cavitory probe.	
. Black and white thermal printer with at least 10 no. Rolls, mobile stand.	
. 2 probe connector USB port with 128 frame cineloop facility.	1 probe connector or more.

Warranty : Warranty 2 (Two) Years . AMC/CMC 3 (Three) Years

6) Specification of Digital Color Doppler Ultrasound System

Original	Modification
1. System shall provide all-digital broadband	

technology using all digital time delay circuits, implemented using ASICs. There shall be no analog delay line components employed in the construction of beam former.	
2. System should have minimum 1024 digitally processed channels for simultaneous formation, acquisition and delay processing of multiple ultrasound beams.	
3. The system must use a Frequency (Fusion Compounding) Compounding Technique whereby a broad bandwidth of digital signals are broken down into multiple sub-bands and processed in parallel before being "fused" into a single image to reduce speckle noise and optimize tissue contrast, while retaining spatial and contrast resolution.	
4. System should have 2D, M-Mode, Color Flow, PW, CW, Steerable CW and Directional Color Power Angio Facility, one button optimization for 2D and Doppler modes, Auto Doppler Calculation taking the entire sample acquired.	
5. System should have minimum 230 frames per second.	400 or more frames per second.
6. The system should be capable of supporting the Extreme Resolution adaptive image processing technique that performs analysis at the pixel level.	
7. The system should support broadband Phased Array, Linear Array and Convex Array transducer technologies.	
8. Slide pot TGC & gain optimization in the lateral walls(LGC) with pre-defined curves.	
9. Triplex Imaging.	
10. 17" High Resolution non-interlaced LCD monitor with articulating arm & tilt & swivel facility.	15" High Resolution or more.
11. System should have maximum scanning depth of 30 cm.	
12. System should at least 230 dB full times input dynamic range.	
13. System should have cine loop image review up to 1000 frames and should have dual loop facility for simultaneous full screen left & right display.	cine loop image review at least 1500 frames
14. System should provide a technique that automatically maintains optimal angle to flow and assists in delivering accurate and consistent Doppler velocity measurements.	
15. System should be a new generation ergonomically designed to curb minimum injury to the sonographer /physician with keyboard platform moveable (up/down).	
16. Simultaneous real time display Angio/Color	

Doppler and Gray scale images side by side.	
17. System should support Tissue Harmonic Imaging facility in Phased Array, Convex Array, Linear Array.	
18. Linear Array should have extended field of view on side of the linear array.	
19. System should have minimum 3 active transducer connectors	
20. Online Help function and system manual accessible via dedicated "Help" key on the control panel.	
21. System should have more than 200-gigabyte hard drive.	
22. On-board Image Management - should have facility to (A) direct digital storage of single B/W and Color image to internal hard disk and compact disk (B) direct digital storage of B/W and Color loops to internal hard disk and compact disk and (C) print patient reports & images directly on plain paper printer thru USB connector.	
23. Full functional measurement facility and calculation should be possible.	
24. Suitable UPS & Colour Inkjet Printer for direct printing to be quoted along with the system.	

N.B. 1. International – FDA/CE Certification is essential

Following Transducer to be quoted as standard:

2-5 MHz Broadband Curved Array Transducer with Tissue Harmonic Imaging for General Abdominal, Obstetrics & Gynaecology imaging.	
4-8 MHz Broadband Curved Array Transducer with Tissue Harmonic Imaging for Trans-vaginal & Trans-rectal imaging.	
	Linear Transducer : 4-12 M.Hz. to be included.

Warranty : Warranty 5 (Five) Years . AMC/CMC 5 (Five) Years

7) Specifications for Premium High End Colour Doppler System :

The system should be latest and state of the art with fully digital technology equipment to incorporate the facility of 2D, M-Mode, CDI, PW, CW- Doppler, Power Doppler, directional power angio, (Contrast Imaging), Real time 3-D(4-D), Imaging for abdomen, obstetrics & Gynae, Cerebro-vascular, peripheral vascular, adult trans-cranial & superficial parts imaging like breast, scrotum, thyroid, musculoskeletal exam etc. and Cardiac (optional)

- 1 **Digital technology:** It should be fully digital Processor must be of 64 bits.
technology with digital beam former and should
have more than 20,000 digitally processed channels.
Technical data sheet should be enclosed in technical
bid to support the number of digitally processed
channels on the system.
- 2 **Monitor** should be at least 19 inch flat LCD display 17 inch flat LCD or more
colour monitor.
- 3 **Probe Ports:** System should have at-least three
universal active probe ports with electronic
switching facility from the keyboard without probe
adapter.
- 4 **Operating Modes** B-Modes B-mode, M-Mode, B/M
Mode, Doppler Mode, Colour Flow, Power Doppler,
DCA/DPA, Contrast imaging, B/Colour flow, PW,
CW Doppler, Real-time 3D (4D imaging),
Elastography Imaging. All should be available as
standard.
- 5 **Transducer:** Electronic Broad band transducers:
i) Convex Probe 2 - 5 MHz
ii) Linear probe 5-12 MHz
iii) Endo- Cavitory 4 - 8 Mhz. Volume 4-D endo-cavitory
probe with biopsy guide attachment is to be
provided.
iv) Transducer 2-6 MHz for 4D applications
v) Broadband Linear Array transducer 5-12 MHz for
Cardiac & Musculoskeletal Application.
- 6 **Frequency range:** System should support broad
band probes spanning a frequency of 2-12 MHz
- 7 **B mode & B colour** simultaneous should be
available side by side real time display of B-Mode &
Colour flow. Digital zoom facility for region of
interest in real time and frozen images.
- 8 **Grey Sheds:** System should have 256 gray shades.
- 9 **Image storage facility** on in build hard disk or
MOD/CD/DVD-RW/USB facility should be
available. In built hard disk should have the capacity
of 200 GB or more. System should have extensive
image management capability including thumb nail
review, cineloop editing etc.
- 10 **Cine loop as well as cine scroll facility** in B
Mode with storage of 800 or more images should be
available. Cineloop frames should also be available
for abdominal contrast applications
- 11 **Auto trace & automatic Doppler calculations**
should be available in live or frozen images. System
should have high precision beam steered spatial
image compounding for acquisition of more tissue
image information and reduction of angle generated
artifacts. it should have up to 9 beam-steered lines of
sight. This should be demonstrated in convex, linear
and endocavity probes.
- 12 **Advanced measurements & calculation
package** for abdominal, obst./gynae, urology &
vascular, cardiac applications should be available.
- 13 **Scanning Depth:** Should be capable of Scanning in
a standard depth.

- 14 **Frame Rate:** System should have an acquisition frame rate in 2D of 500 frames/second. Acquisition frame rate should be clearly mentioned in the technical quote. 1000 frames/second
- 15 **Dynamic Range:** System should have a very high dynamic range of at least 170 dB to pick up subtle echoes.
- 16 **THI:** System should have THI & should be able to work in combined mode of harmonic imaging and real time compound imaging to get excellent image quality. The system shall offer Tissue Harmonic Imaging in Power Doppler imaging mode for improved sensitivity and specificity in differentiating blood/against from tissue
- 17 **Contrast Harmonic Imaging:** System should have contrast Harmonic Imaging and should have optimization settings to detect the Contrast Agents. Please Specify other advanced technologies to perform better contrast harmonic imaging.
- 18 **Harmonic imaging for Tissues:** The System should have Harmonic Imaging for Tissues for hard to Image patients. The System shall support Tissue Harmonic Imaging capability on Phased, Linear, 3D and curved array transducers. Tissue Harmonic Imaging should be available in colour flow imaging, M-Mode, and 3D rendering Modes.
- 19 **Noise and Artifact reduction:** The system should have adaptive Image Processing for noise and artifacts reduction that improves tissue conspicuity and artifact reduction. Technologies like Xres, SRI (Speckle Reduction Imaging) can be offered.
- 20 **Selectable Field of View** from 20-90 degrees for sector probe. PW/ Colour Tissue Doppler Imaging Should be standard on the System. PW/CW Doppler facility in all imaging Phased Array Sector Transducers.
- 21 **Independently Selectable Gain Control** in both Axial & Lateral Plane with control keys.
- 22 **Automatic Real time & frozen tracing** of instantaneous peak velocity & instantaneous mean velocity (or frequency) should be available. Triplex imaging should be standard on the system.
- 23 **PW Velocity range** up to 12.5 KHz & more than 15 KHz with HPRF option at 0 degree cursor angle preferably. Should provided capability to change 2D functions like overall gain, Dynamic range and Colour functions like Gain, Baseline, Colour Map, and invert or a reviewed Image.
- 24 **Control Panel:** Angle correction in real time & frozen mode should be available. Should have single button control for automatic optimization and adjustment of TGC and receiver gain to achieve optimal uniformity of image quality and faster scans. The automatic optimization should be offered in colour imaging too. Control panel should be capable of being raised, lowered and rotated.
- 25 **System should also have incorporated the following features:**

- i) Real time 3D in grey scale, fusion mode (colour/power & B/W). STIC capability for fetal Echocardiography.
- ii) Real time 3D colour image package with volume 4D convex probe for real time 3D imaging with frequency range of 3-5 MHz
- iii) Volume 4D endo-cavitary probe with biopsy guide attachment is to be provided
- iv) Panaromic imaging and extended field of view imaging.
- v) Intima- media thickness (IMT) measurement and report should be available for calculation of maximum IMT & mean IMT.
- vi) Multislice/ i-slice/TUI imaging should be there.
- vii) Elastography Imaging To be omitted .
- viii) Advanced cardiac calculation packages To be quoted as optional item.
- 26 **Frame rate:** The system should offer a very high frame rate up to 500 frames per second. The system shall be able to perform mechanical 4D acquisitions at 30 volumes per second and electronic live volume imaging up to 90 volumes per second. Please specify in details in this regards. 1000 frames per second
- 27 **Operation of Machine:** Machine should operate on single phase 220 V, 50Hz. Abdominal Contrast imaging should be standard on the system. Abdominal probe should be capable of contrast imaging and please confirm this on the technical bid. Should have Low Mechanical Index (MI) and flesh Modes and start / stop timer.
- 28 **Computer:** One PC with suitable configuration (with hard disk capacity 200 GB or more) is to be supplied for image transfer and DICOM ready.
- 29 **One Online UPS of** suitable KVA with in-built battery for the whole system with at least 15 minutes back-up.
- 30 **Black and White thermal** printer of latest model and of standard make.
- 31 **Biopsy guide** compatible with linear probe and convex probe. At least 10 biopsy needle sets to be supplied.
- 32 **Elastography:** System should be quoted along with Elastography Imaging as standard. Elastography: Stands deleted
- 33 **Transducers support:** The System should support Convex, Linear, Sector, Volume, Matrix Array and static transducers. It should support volume imaging by freehand, mechanical, and electronic methods. The system should support the real time acquisition and display of two image planes. The system shall allow for a reference plane and second plane that can be laterally tilted, elevation tilted or rotated with respect to the reference plane. Matrix Array stands deleted.
- 34 **DICOM ready:** The system should be DICOM ready System and should have capability of HIS and RIS connectivity and should also be connected to the dry chemistry printer available in the department (CR/DR system /CT/MRI/Mammography). It should provide advanced DICOM connectivity to an enterprise data management system or PACS with advanced DICOM features: DICOM Store, Modality work list, Performed Procedure Step and Structured

Reporting. Please specify the advance DICOM features available on the quoted system.

- 35 **Key Board:** System should have a full Alfa numeric key board with illuminated key and status display System should have Fully Articulating Control Panel including Height, swivel & slide adjustments.
- 36 **Display:** The system shall support simultaneous display of volume and multi planer reconstructed (MPR) views. The system should have the in-built software tool for imaging MPR, Thick Slice, and slice plane views. The system shall support full screen display of all 3D views including individual X,Y,Z MPR views and simultaneous display of thumbnail views on the same system display monitor. Full Trim capability must be supported: Oblique and Linear trimming in the MPRs; Freehand trimming of the volume.
- 37 **Training :** Onsite training of the radiologist for the equipment for at least 7days by application specialist and also to provide short term training to the radiologist in a well recognized centre in contrast imaging, US guided interventions and imaging of women and pregnancy.

Optional Items : Advance Cardiac calculation package with trans thoracic and Trans Esophageal Cardiac Probes is made optional.

N.B. 1. Preferably Touch Screen Monitor for Premium High End Color Doppler Ultrasound System.

2. International – FDA/CE Certification is essential

Warranty : Warranty 5 (Five) Years . AMC/CMC 5 (Five) Years

The following instructions are same for all above items as required-

Instruction to the supplier :

- The tender should be in **two bids**. Technical and price bid should be provided in separate sealed covers.
- All the information in the tender document must be supported by product data sheets (original copy). All information asked must be provided under heading with proper indexing. **All information are to be provided as per columns and para specified in the tender documents. Incomplete and haphazard information will not be accepted and bid is liable to be cancelled.**
- **Vendor must produce certification in original from the manufacturer that all parts of the machine are new and genuine and not refurbished.**
- The supplier must ensure the availability of expertise service and maintenance at the Place of Installation of machine. Uninterrupted availability of spare parts and repair of next ten years must be assured. List of spares with price to be provided.
- Original product data sheets must be provided.
- Training should be provided for two technicians in an established centre.
- **Mention the number (with addresses and phone numbers) of installations of quoted unit in India.**
- All the information to be submitted along with a CD/DVD or Pen Drive softcopy.

Director of Medical Education, Assam