SPECIFICATIONS FOR DIGITAL RADIOGRAPHY SYSTEM WITH HIGH-FREQUENCY X-RAY MACHINE (500 MA)

A fully integrated single console controlled Digital Radiography System with high frequency X-Ray generator for general Radiography with a dual flat panel detector along with table bucky and vertical bucky capable of taking the complete range of radiographic examinations with the following Specifications and configuration.

The Unit should be completely integrated system (integrated X-Ray generator and image and image acquisition control console) along with auto features in quality control and performance automatic exposure control (AEC), anatomical programming radiography (APR), position of detector for supine and vertical studies.

I. High Frequency Generator

50KW generator should be latest technology with high frequency offering 50KHz or more.
Constant power output of 40KW or more Generator should offer 3 point technique and user should have following parameters selection range.

1. KV range should be 40 to 125
2. mA output: 500mA at 100 KVP
3. mAs range should be 1 to 500mAs
4. Exposure time should be 1ms to 4 secs or better.

II. X-ray Tube

1. A Dual focus rotating anode X-ray tube with small focus 0.6 mm or less and large focus 1.2 mm or less
2. Anode heat storage capacity of the tube should be 300KHU or more.
3. Tube rotation speed 9000 RPM or more.
4. Collimator having halogen lamp/ bright light source and auto shut provision of the light
5. HV cable: 1 pair of H.V. Cable of suitable length.

III. Tube stand

1. Floor to ceiling tube stand with counter balanced tube head
2. It should have movements to make all radiographic position (erect and supine studies) possible.
3. The horizontal movement for the tube stand should be minimum 200cm.
4. Tube should have minimum vertical travel of 150cm with minimum floor to focus distance of 35cm
5. Tube should have angulations of minimum +/-135 degree with detents at 0 degree, +/-90 degree with angulation meter.
6. Tube head should have source image distance (SID) measuring tape and should have collimation light source.

IV. Table

1. The table material should be scratch resistant (carbon fibre).
2. Top should be made of low radiation absorption and water proof material
3. Horizontal 6 way table with floating table top should be provided.
4. Table should be provided with inbuilt FPD (flat panel detector) minimum 43cm x 43cm size or more, beneath the table top
5. Transverse movements (18cm or more) and longitudinal movements (45cm or more) of the table top and should be locked by electromagnetic locks.
6. Table should consists of motorized reciprocating bucky with grid ratio 10:1.
7. The table should cover entire length of the table and should be locked at any desired position by electromagnetic lock.

8. Table should be 210cm x 70cm or more.

9. Minimum and maximum adjustable heights 55-85 cm.

10. Load bearing capacity of table in kg :200 kg or more.

11. Table accessories like stainless steel cassette tray, compression band should be provided.

12. Bucky tray should be equipped with cassette type wired or wireless flat panel detector.

V. VERTICAL BUCKY

1. The stand should be floor mounted motorized type.
2. Wall stand should have minimum of 3 field AEC
3. Vertical bucky stand with oscillating grid ratio of 10:1 to be provided
4. The bucky should move up and down and should be equipped with up to 43cm x 43cm (17 x17") size cassette type wired or wireless detachable flat panel detector.

VI. Flat Panel Detector (FPD with TFT technology)

1. The Digital Detectors should be latest wired or wireless Flat Panel Detector (FPD)

2. One 17" x 17" size detector for table and one 17" x 17" size detector for vertical bucky should be provided.

3. The detector Scintillator material should be made up of Cesium Iodide (Csi) and sensor with Thin Film Transistor (TFT) and Amorphos Silicon technology.

4. The detector should be water resistant.

5. Wireless detector if provided should be free from any integration with x ray machine. The same should be able to use with any mobile x-ray machine so that Detector can be used portably. The detector should be capable of doing out of bucky radiography in wireless mode and also lateral supine radiography must be possible.

6. The detector should have DQE of 65% at 0 lp/mm.

7. The detectors should have a minimum spatial resolution of 3.5 lp/mm or more.

8. Detector array size/ Active Image Matrix should be a minimum of 3.0K x 3.0K pixels.

9. Pixel Pitch: 140 microns or less

10. Image depth should be 14 bit or more.

11. The detector offered should be light in weight and less than 4 Kgs

12. Images pre-viewing should be available in about less than 3 sec after exposure and the cycle time should be less than 7 sec.

13. The battery must be latest Lithium ion type. 5 Nos batteries along with battery charger should be provided in case of wireless detector being offered. Fully charged battery should last for at least 5 hours in operating mode and 8 hours in energy saving mode.

    Company should replace batteries free of cost for next five years. The battery offered should be replaced irrespective of charge cycle limitations. In case of inbuilt battery detector manufacturer should either replace battery or detector, in case of any breakdown of battery. Kindly specify battery type and life of offered model.

14. Detector offered should be capable of integrating with any x-ray system or mobile x-ray and should be readily switchable within multiple x- ray machine, in case there is breakdown in the x-ray system.

15. The detector should be able to work at normal room temperature and humidity. The detector system should not require frequent calibrations on daily start up.

16. Offered detector should have load bearing capacity of 200 Kgs or more.

VII. Fully integrated X-ray/ Image control console system with following features

1. Digital display for display of X-ray parameters of KV and mAs. There should be option of selecting mA station

2. MA, KV and mAs increase and decrease switches.

3. Tubal focal spot selection switch.

4. Ready and X-ray ON switch with indicators.

5. Bucky selection switch.

6. Self-diagnostic programme with indicators for earth fault error, KV error, filament error and tube's thermal overload.

7. An inbuilt overload protection device

8. APR Programs: More than 200 programs. (Expandable as per user's requirement) such that any number of organ programming combinations are possible, and user can define his own organ parameters and can edit the existing parameters to his satisfaction and comfort level.

9. A dual action hand switch with retractable cord should be provided

10. The DR console should be offered with latest high end image processing capability console software and with i7 processor with 16GB RAM and 2 TB HDD with 01 No. minimum 21 inch LCD medical display Monitor.

VIII. Image acquisition software

1. Software provides complete control of all image capture functions within the examination room It enhances the entire workflow by delivering diagnostic image instantly. It also allows user to transfer X ray images electronically to remote workstations, image archives, and printers, also has an excellence

2. performance on image quality control such as:-

3. Digital image processing technology.

4. Preview image in less than 3 seconds

5. Exam specific Algorithms image processing for consistent image quality of all body parts

6. Present image processing tools for different anatomy.

7. Image zooming, ROI, image cropping and masking, automatic grid removal function

8. Image mirror, rotate.

9. Image annotation.

10. Soft tissue processing must be possible.

11. Should offer capability of local image storage.

12. Should be capable of connecting directly to the dry laser printer.

13. Should be capable of connecting minimum of 2 flat panels.

14. A separate workstation should be provided which must be of latest generation, of a reputed brand with windows 11 pro or latest operating system, at least 16GB RAM, Intel i7 processor or better with high processing speed, 2TB HDD and 01 No. 2MP LCD medical display monitor of size minimum 21 inches with storage capacity of minimum 10000 images with ability to review and report X-Rays independent of main console.

15. Image stitching along with hardware and software.

16. The workstation should be capable of configuring multi format images for DICOM printers

17. Add image accept/ reject comments.

18. Rejected images archival with provision of converting them to accepting images.

19. True size for printing

20. Inbuilt CD/DVD writer facility.

21. Easy and quick offset and gain calibration with bad pixel removal algorithm.

22. DICOM 3.0 compliant system All features mentioned below should be quoted as-

a) DICOM work list management

b) DICOM print

c) DICOM query/retrieve

d) DICOM CD creation/ DVD creation with embedded viewer.

e) DICOM storage

f) Support DICOM MPPS

23. Easy integration and network capability with the existing /future networking including other modalities and RIS/HIS/PACS facility.

24. There should be facility for complete range of post processing features like measurements. annotations, window levelling, window width etc.

25. DR console should be connected to a compatible dry laser printer with resolution 500 DPI or more.

26. The printer should accept all size films up to 14" x 17" size (three film size trays should be active). The system must have at least two online film sizes. Day light loading should be possible.

27. Multi format printing should be possible with the user selectable options.

28. It should be possible to create alphabetical, date wise and exam based, work list. Work list should be auto refreshing.

29. It should have the ability to print hospital name with patient details. It should have the provision of adding patient photo in film or data

IX. Power Requirement

1. The unit should be operable on Three Phase AC (380-440 V,50/60 Hz)
2. The power requirement should be furnished by the vendor during the bid submission

X. Accessories

1. Reputed brand online UPS(3KVA) for the whole system including computer/digital components and printer with 30 minutes backup.
2. Suitable Servo Voltage stabilizer for entire DR system including console, workstation, printer etc.
3. Lead glass of size 100 x 150 cm or more for console room as per AERB rules.
4. Two light weight 'zero lead" aprons (0.5mm Pb).
5. Gonadal shields for male and female one set each.
6. Thyroid shields 02 No.s
7. Lead gloves 02 pairs and lead goggles 02 Nos
8. Stand for lead aprons and gonad shields.
9. Table - as required for console/ workstation.
10. Four high swivel chairs.
11. Examination stool – one
12. Footstep for patients – one

13. Foot switches for adjusting longitudinal/side to side movements, locking and light adjustments.

14. Patient fixing belts.

15. DAP meter

16. Two LED based view boxes with adjustable illumination to view 3 films of 14x17 in each view box.

XI. Mandatory Requirements

1. The company should be ISO certified company.

2. The whole systems should have BIS or USFDA or CE approval and the entire system and model should have AERB type approval.

3. Company should have ISO 9001:2015 and ICMED 13485 certificate. Also have MD 9 License for Medical Devices from CDSCO for quoted model.

4. License from AERB for supplying Diagnostic X-Ray units in India.

5. QA Analysis and report shall be the part of the installation process. Regular QA and QC as per AERB norms would be the responsibility of the vendor.

6. Site modification as per AERB guidelines for radiation shielding of doors/walls/windows to be done by successful bidder.

7. Minimum two components out of three major components (flat panel detector, X-ray generator and X-ray tube) must be from the same manufacturer and bidder.

8. Bidder should have proven track record in Central/State government/PSU and should have installed at least three same/similar DR system during the last three years with satisfactory performance report from the HOD of the User department of Institution.

9. The bidder and the principal company should have a good reputation and never been black - listed or debarred in any state and central government organization.

10. If the bidder is not the manufacturer of detectors warranty support documents should be made available in the form of undertaking from detector manufacture.

11. Spares:

a) Manufacturer/principal to give undertaking to provide spares/reagents/consumables/ accessories etc for next 10 years of their quoted model.

b) Principal manufacturer to give undertaking that they will maintain and service the equipment in case Indian agent/supplier fails to provide the service.

12. Training: Minimum of 1 week of onsite training at the Hospital should be provided to radiographers and radiologists.

13. Product Data Sheet:

a) All specification to be provided with the original product data sheet.

b) All technical specification should be supported with original data sheet highlighting the page number in the compliance sheet.

c) The equipment quoted should be the main equipment of the principal manufacturer.

d) The X- ray machine and its main components should find a place in the manufacturer website and the copy of the webpage showing the same should be enclosed in the tender document.

e) The bidder to mention its principal manufacturer's website address.

14. Availability of Toll-free facility for technical support maintained by OEM or Authorized Agency.

15. Address of local service centre to be provided.

16. Offered system should have 5 year warranty from date of installation and 5 year CMC to be quoted separately.

17. Demonstration of the equipment should be a part of Technical qualification.

18. OEM/Authorized seller certificate to be submitted.

General Points: -

- The equipment should be software and platform protected for the entire life time of the equipment.
- All software upgrades should be done free of cost by the OEM/bidder within one month of issue of new upgrade from Principal OEM.
- Even during the warranty period, the desired uptime of 98% of 365 days will be ensured. In case the downtime exceed the 2% limit, extension of the warranty period will be twice the Excess downtime period.
- Bid/Tender should include a clause that availability of Spares/Reagents/ consumables/accessories etc shall be ensured by the bidder for complete lifespan of the equipment or 10 years (whichever is more). Buy Back: Buyback option where applicable may be duly evaluated.