TECHNICAL SPECIFICATIONS OF 800 mA X-RAY UNIT WITH DIGITAL FLAT PANEL DETECTOR FOR THE DEPARTMENT OF RADIODIAGNOSIS, KSCH, NEW DELHI

A high powered Direct Digital ceiling mounted X-Ray Unit for general radiography with digital flat panel technology. The system should be capable of both erect and supine radiological examinations. The system should be US FDA and European Certificate approved The X- ray unit and console should be completely integrated (**single console**). It should have following specifications.

1. **The unit should comprise of the following:**
   - 1.1 Flat Panel Detector – single.
   - 1.2 Generator.
   - 1.3 X-Ray Tube and Collimator.
   - 1.4 Ceiling suspended 3D Column Stand.
   - 1.5 X-Ray Table.
   - 1.6 System should have anti collision control system.

2. **One Flat Panel Detector:**
   - 2.1 Flat Panel Detector size of at least 43 x 43 cm or more.
   - 2.2 Detector panel should be made of amorphous silicon with CSI.
   - 2.3 Image matrix size at least 2800x2800 or more.
   - 2.4 Pixel size to be 150 microns or less.
   - 2.5 Spatial resolution 3lp/mm or more
   - 2.6 Digitalization of 12-14bits or more and 100% pixel fill in.
   - 2.7 Mention whether any cooling is required for detector. If yes specify.
   - 2.8 Tube assembly movement to be automatically synchronized with the detector movement.
   - 2.9 Preview time after exposure 5 sec or less.
   - 2.10 Image processing time should not be more than 9 sec.
   - 2.11 DQE at 0lp/mm should be at least 65% or more.
   - 2.12 The detector should not be using any batteries/ capacitors.

3. **Generator**
   - 3.1 Microprocessor controlled high frequency X-Ray Generator of latest technology with constant output with low ripple frequency.
   - 3.2 Output 80 kW or more.
   - 3.3 KVP range 40kV-150Kv or better.
   - 3.4 Output 800mA or more at 100 kV.
   - 3.5 Please specify minimum exposure time, should be 1ms or less.
   - 3.6 It should have automatic exposure control (AEC) device.
   - 3.7 It should have digital display of kVP & mAs.
   - 3.8 Anatomical programming radiography should be possible.
   - 3.9 It should have over loading protection.
   - 3.10 Monitoring of all the position data on monitor screen for system console (Kv, mAs, SID, tube angle, column angle).

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4. X-Ray Tube.

4.1 The X-Ray Tube ceiling suspended with motorized movements and should be of rotating anode type with high speed compatible with the generator and must have dual focus. Tube loading should be at least 30 KW for small and at least 80 KW for large focus.

4.2 Focal spots of the following sizes:

a. Large Focus: 1.2mm or less.
b. Small Focus: 0.6mm or less.

4.3 Please mention tube loading for small focus and large focus.
4.4 Tube with Anode heat storage capacity of 300 kHU or more .
4.5 Tube protection against overload.
4.6 Target angle should be at least 12 degree.
4.7 Please specify tube rotation at vertical axis and horizontal axis. Horizontal & vertical tube rotation should be +/-180.
4.8 Multileaf collimator having halogen lamp/bring light source and auto shut provision of the light.
4.9 Collimator must be mounted on x-ray tube and Collimator must have an integrated Dose Area Product (DAP) meter. Output of DAP meter should be visible in software console.

5. Ceiling suspension

5.1 Ceiling suspended 3D Column stand Movement in all direction should be easily possible.
5.2 Monitoring of all the position data on screen for SID, tube angle, column angle.
5.3 SID (Source to Image Distance) in vertical positions 100 cm or more, in horizontal position 150 cm or more.

6. X-Ray Table

6.1 Motor driven, adjustable height floating table top of carbon fibre or equivalent suitable material, scratch resistant surface.
6.2 Compact bucky table with digital flat panel detector Table top should be 4 way floating with transverse and longitudinal movements. Should be possible to do all general radiological imaging.
6.3 Mention range of vertical, horizontal and longitudinal movements of the table.
6.4 Foot switches for adjusting height, longitudinal/side to side movements, locking.
6.5 Anti collision control system.
6.6 Table should support patient weight of 180 kg or more.

7. Vertical Bucky stand (Wall Stand)

7.1 Motorized, counter balanced adjustable height vertical Bucky stand for digital flat panel detector.
7.2 The unit should have provision to do all upright X-Rays.
7.3 The vertical bucky should travel from at least 1.5 feet to 5 feet above floor level.
7.4 Bucky tilting should be -20 to $+90^0$ or more.
7.5 Removable grid for SID of 180cms for vertical bucky applications.
7.6 It should have provision to do chest radiography without grid .

8. Filter & Collimator

8.1 Inherent filtration of at least 1.00 mm Al.
8.2 Multi leaf collimator with halogen lamp and auto shut function.
8.3 Full field light localizer:
8.4 Rotation of +/- 45 deg or more.

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9. **Operating (Acquisition) Station**

9.1 Operating console software should be integrated with x-ray control and should have facility to show all X-ray parameters/ doses for examination done and for image processing and enhanced analysis of images.

9.2 Should have a high resolution TFT / LCD Monitor, medical grade of minimum 19 inch size or more fully flat with minimum 1024 x 1024 or more display matrix and anti reflective front screen.

9.3 Please specify image matrix size.

9.4 Operating console should have a facility for patient identity entry, viewing and processing images, documentation etc.

9.5 Preview image should be ready in minimum time. The next exposure should be possible while processing is in progress on the operating system.

9.6 System should have auto protocol select.

9.7 Image processing functions like rotate, mirroring, zoom ,move ,windowing ,filter and printing etc should be available.

9.8 Image stitching software.

10. **Image storage and Transmission**

10.1 Hard disk storage capacity should be for 3000 images or more images of 1024 x 1024 matrix.

10.2 The system should support storage of images on compact discs/DVD.

10.3 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 computed/PG-etc in DICOM format.

10.4 Easy integration and networking should be possible with any other existing future networking including other modalities HIS, RIS & PACS at no extra cost.

11. **Accessories:**

11.1 Lead Glass viewing window 100 cm x 120 cm.

11.2 Two sets of Patient fixing belts and compression device (for performing excretory urography).

11.3 Dry Chemistry, camera Multiport, multiple films (14"x17", 11"Xx14" and 8"x10", 10x12") with resolution of 500 DPI or more, DICOM ready and online. At least three size film trays . should be active. 100 film of size 10"x 8", 10"x12" each and 50 films of 11"x14" each to be supplied with camera.

11.4 100 kVA or more voltage stabilizer to be quoted along with the system. Suitable UPS with 30 minutes of backup to be provided for digital section of machine and essential lighting.

11.5 Fire extinguisher system to be connected to central system by vendor.

11.6 Necessary furniture like tables with operating console, and two chairs on wheels, one Cupboard for storage of accessories examination stool, foot step, stand for Lead aprons and gonad shields.

12. **Optional Items:** The price of following optional items along with the prices for 5 years CMC after five year of warranty to be quoted separately.

(A) Fixed Vertical Detector: The final decision to purchase these items will be taken at the time of placing orders either item in point 7 or in point 12.

a. Detector specifications to be the same as in point 2.

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13. Approvals--.

The bidder should provide AERB, US FDA and European CE approval certificate for the machine. Registration of equipment with AERB and regular quality assurance test during the life time of equipment will be the responsibility of the vendor. Hospital will provide necessary documentary support. Please enclose any other certificate required for installation of the machine. The bidders of Indian Models to enclose BIS certificate.. The model should be original DR system, analogue X-ray system retrofitted with Digital flat panels are not accepted.

Approval of site plan and registration of the installation from AERB shall be responsibility of the successful bidder. However necessary documentation required shall be provided by the purchaser/consignee.

The equipment must have type approval of the model quoted on the date of opening of the tender.

14. Warranty and Post Warranty CMC

14.1 Five year comprehensive on site warranty of entire system (Spares and labour) including X-ray tube, flat panel detector, required civil, electrical and air conditioning works and all accessories (including dry chemistry camera, CD burner, fire fighting system, UPS including batteries etc.). This will be followed by 5 years comprehensive AMC. The bidder to quote 5 years , year wise CMC Charges after completion of warranty period. The CMC charges should include for all the items as in warranty period.

14.2 98% uptime guarantee should be given during warranty and post warranty CMC. In case down time exceeds 2%, penalty in the form of extended warranty , by double the number of days for which the equipment goes out of service, will be applied during warranty and subsequent CMC period.

15. Training

Minimum of 3 week of onsite training at the Hospital should be provided to radiographers and as and when required.

16. Installation.

The finished room will be provided to the bidder. The bidder has to do all necessary civil, electrical and mechanical work for installation of machine. The bidder should visit the site of installation (Room No. 12 OPD Block New Building, Radiology Department) before hand.

Firm should attach installation list in India of the model quoted preferably in the Govt. hospital or Govt. Medical Institute.

The participating firm must be dealing with the quoted /similar equipment for last 3 years. Submit satisfactory certificate from the users.

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17 **Upgrading requirement and Spares**:
A free comprehensive software upgrade (compatible with the existing platform) during the period of warranty and CMC. Manufacturer/principal to give undertaking to provide spares for next 10 years of their quoted model.

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

19. The supplier must ensure the availability of expertise service and maintenance at New Delhi. The company should provide local office address, telephone and fax number of Trained personnel.

20. **Product Data Sheet**
All the information in the tender document must be supported by original product data sheets, without which the bid will not be considered. Photocopies of these documents or printouts of the email/web pages will not be accepted. The bidders to provide detailed compliance sheet and mark the serial number of items in product data sheet / brochure against each item.. All information asked must be provided under heading given above. Incomplete and haphazard information will not be accepted.

21. Buy Back of existing x-ray machine installed in Room no. 12 OPD Block, New Building of X-ray . . department.

22. The equipment quoted should be the main equipment of the principal manufacturer. The quoting vendor should be either original manufacturer or 100% subsidiary. The Detector supplied should be OEM of the principal vendor and should be FDA approved. The x-ray machine and its main components should find a place in the manufacturer's website and the copy of the webpage showing the same should be enclosed in the tender document . The bidder to mention its principal manufacturer's website address.

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