TECHNICAL SPECIFICATION OF 32 SLICE CT SCANNER

Equipment: CT Scanner 32 Slice.

Operational Requirements

The spiral CT scanner system for high resolution whole body scanning. The instrument must be capable of acquiring minimum 16 slice per 360 degree rotation and reproducing 32 slices. The system must have FDA approved latest iterative reconstruction technique.

Technical Specifications

1.	**Scan Time**
a.	The scan time for one gantry rotation of complete 360 degree rotation should be 0.9 sec or less.
2.	**Scanning Capability**
a.	Paediatric and infant base protocols shall be available based on the infant weight.
b.	Real time contrast monitoring acquisition with auto scan initiation protocol and with auto injector trigger.
c.	High contrast Resolution should be at least 15 lp/cm for axial and spiral scan at 2% MTF.
d.	Low contrast resolution should be at least 3 mm at 3%.
3.	**Gantry**
a.	Aperture of 70 cm or more.
b.	Auto positioning Lights.
c.	Should have FOV of at least 50 cm or more.
d.	Physical / Digital Remote Gantry Tilt must be provided with Tilt +/- 30.
4.	**Detectors**
a.	Data acquisition system capable of acquiring 16 Slice or more per 360 degree rotation with 16 or more rows of detector. Total coverage of the detectors must be 10 mm or more.
5.	**Slice thickness**
a.	16 slice acquisition with minimum thickness of 0.80 mm or less.
6.	**Pitch Factor (Volume Pitch)**
a.	Should be variable between 0.6 – 1.5 or better and should be user selectable or automated. Specify all possible pitch selections.
7.	**Scan time and length in Spiral / Helical Technique**
a.	Should be at least 100 sec continuous. Must be able to tri-phasic abdomen studies of 400 mm or more within 60 seconds.

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8.	**X-Ray Generator**
a.	High Frequency type.
b.	Power output: 26 KW or higher Voltage Selection: 80 – 140 KV or wider.
c.	mA Range: 230 mA or more (with incremental steps of 1 mA).
9.	**X-Ray Tube**
a.	Anode Heat Storage Capacity – Minimum of 3.5 MHU or more.
b.	Anode Heat Dissipation: Specify the minimum value in K W.
10.	**Patient Table**
a.	Carbon Fibre Table Top with Load carrying capacity 150 Kg or more with 1mm positioning accuracy.
b.	Horizontal Table speed preferably 100 mm / sec.
c.	Metal free scan able range of 120 cm or more.
d.	Facility of positioning aid for horizontal Iso-centric positioning of the patient.
e.	Vertical up / down movement.
11.	**Image Reconstruction**
a.	Reconstruction Field of View Range: 5 – 50 cm Reconstruction Matrix: 1024 x 1024.
12.	**Image Display**
a.	Image Area Matrix Dimension: 1024 x 1024.
13.	**Image Reconstruction**
a.	Image reconstruction capability should be at least 10 image/sec with simultaneous reconstruction facility.
b.	Storage Capacity 2 TB or more.
c.	System should have latest iterative reconstruction technique in raw data space.
14.	**Operator Console**
a.	It should have 21" or more high resolution LCD monitor.
b.	The system should be user friendly with all functions menu driven. It should be modern user interface.
c.	All functions including scanning image reconstruction, film documentation, archiving transferring. MPR Angiography maximum intensity projection,3D volume rendering, 3D SSD, CT Angio, CT Urography, vessel analysis, should be possible on console MIP, CT Angio software with quantitative vessel analysis must be provided.
15.	**Computer System & Image Processor**
a.	64 Bit Bit main CPU with at least 8 GB RAM memory or better.
b.	High speed CPU with latest software should be provided.
c.	Hard Disc of 2 TB or more.
d.	Image storage in 512 x 512 matrix for storage of 7, 00, 000 image or more.
e.	DVD / CD archive capacity with Dicom viewer software default.

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f.	Image Processor: Operating system shall be windows / Linux based.
g.	The image reconstruction time should be at least 10 image / sec or better for all types of acquisition modes including Cone Beam Correction, Neuro Imaging studies.
16.	**Software**
a.	Should have DICOM 3.0 compatibility.
b.	Volume rendering technique with axial cross reference imaging along with measurement tools on volume rendered image 3D, 3D small volume measurement package MIP slab viewer.
17.	**Patient Communication System**
a.	An integrated intercom and Automated Patient Instruction System (API) should be provided.
18.	**Others**
a.	System should have PACS interface ready without any new hardware or software.
b.	Fully DICOM 3.0 complaint including.
19.	**Dose saving protocols.**
a.	Latest dose saving protocols must be available.
20.	**Accessories**
a.	Lead Glass of size 100 x 120 cm
b.	Single Head Pressure Injector (300psi) with 100 syringes.
c.	Patient Trolley.
d.	The equipment should be new and unused. The manufacturing date should not be more than 180 days when it would reach the consignee address.
e.	All patient positioning accessories including head rest.
21.	**Standard and Safety**
a.	Should be of CE ("Conformite Europeene"), USFDA and AERB approved .Please submit the documents for the same.
22.	**Viewing Work Station: 2 nos of LCD monitors with 18" or more**
a.	Standard multimodality independent work station.
b.	2 TB Hard disc & 8 GB RAM.
c.	Should be capable of simultaneous viewing all post processing functions and filming independently without the help of main console. Two way data transfer between the operative console and the satellite workstation should be standard.
23.	50 KVA or more UPS for the entire system including CT scanner, console, additional work station with sufficient rating for 15 minutes back up. Rate to be quoted separately which will be taken for evaluation.

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24.	**Dry imager**
a.	Resolution: 16 bits / 500 dpi or more with minimum three trays.
b.	Support Multiple Film Sizes: one of which must be 17" x 14"
c.	DICOM Compatible.
25.	**Laser printer of latest configuration should be provided.**
26.	**View boxes – LED type of 14" x 17" 3 films type.**
27.	**Light weight vinyl Lead Aprons of 0.5 mm lead equivalence.**

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TECHNICAL SPECIFICATION OF 800 mA OR MORE DIGITAL RADIOGRAPHY WITH DUAL DETECTOR

A high powered X-Ray unit for general radiography with digital flat panel detector technology to perform whole body radiographs. The system should be capable of both erect and supine radiological examinations. A unit should be completely integrated ceiling suspended digital X-Ray system. The system should have two detectors; one wireless in the patient table and one fixed in the Bucky wall stand integrated with control console.

	The unit should comprise of the following:
i.	Dual Flat Panel Detectors.
ii.	80 KW X-Ray Generator.
iii.	Ceiling Mount Tube Support System.
iv.	X-Ray Tube and Automatic Collimator.
v.	Height Adjustable Table.
vi.	Motorized Height Adjustable & Tiltable Wall Bucky Stand.
1.	**Fixed Flate Panel Detector**(one on wall stand and other on table: The detectors should be able to do all routine Radiography examinations. It should have following features.
i.	The flat panel detector should be of proven technology with amorphous silicon photodiode and Csl scintillator.It should receive the X-ray beam and convert it to Photons.
ii.	Flat Panel Detector size for both detectors should be 14" x 17" for table bucky and 17" x 17" for stand bucky.
iii.	The detector should have non tiled Csl scintillator on the tube side and amorphous silicon photo diode array behind it.
iv.	Iamge matrix size at least6 2.8.K x 2.8 K or more.
v.	Minimum pixel size to be mentioned, should be 150 micron or less.
vi.	Grey scale of 16 bit or better.
vii.	Preview time after exposure 5 sec or less.
viii.	DQE 65% or more at 0lp per mm.
ix.	Ingress protection should be Ip x 6 or better.
x.	Weight should be less than or equal to 4 kilograms.
2.	**Generator:**
i.	Microprocessor controlled high frequency X-Ray Generator should be of latest technology with constant output with low ripple frequency.
ii.	Output 80 KV or more.
iii.	KVP range 40 KV – 150 KV.

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iv.	Output at 100 KV should be 800 mA or more.
v.	Exposure time should be 1 ms or less.
vi.	The generator must be completely integrated with console work station and it should be possible to control all exposure parameters from the shoftware console.
vii.	Anatomical programmable radiography should be possible (800 or more).
viii.	It should have over loading protection.
ix.	Automatic exposure control should be available with 3 field AEC sensors on table and wall stand.
3.	**Ceiling Mount Tube Support System:** Ceiling suspended tube support with auto tracking should be provided. Movements should be automated / motorized (preferably in 5 – azes). It should allow three – dimensional movements of the tube covering a huge area. A 10 inch or more LCD touch screen display should be available on X-ray tube for control and display of multiple functions like tube angle, SID, etc.
i.	Telescopic are should have following movement: a. vertical Direction – 1500 mm or more. b. Longitudinal Direction – 3000 mm or more. c. Lateral / Transverse – 2000 mm or more.
ii.	The tube rotation at vertical and horizontal axis should be +/- 180 degree.
iii.	The x-ray tube – collimator assembly should have touch screen panel to display X-Ray conditions, SID, angle, etc. It should be possible to change exposure parameters from the touch screen panel on the coliimator.
iv.	One hand operation of the tube system should be possible.
v.	Electromagnetic locks should be available for safety.
4.	**X-Ray Tube and Collimator:**
i.	The X-Ray Tube should be rotating anode high speed, compatible with the generator and must have dual focus.
ii.	Focal spots should be of the following sizes: Large Focus : 1.2 mm or less. Small Focus : 0.6 mm or less
iii.	Tube with Anode heat storage capacity of 400 KHU or more. X-ray tube should be guaranteed for immediate supply in case failure of the same within one weeks.
iv.	Tube protection against overload should be available.
v.	A high speed rotor accelerator (starter).
vi.	It should have fully automatic / motorized collimator.
vii.	Inherent filtration of at least 1.00 mm. Al, also auto filtration with organprogamming.

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viii.	Square collimation: manual and motorized, should be controllable by organ programming.
ix.	Full field LED light localizer with high illumination.
x.	Rotation of + /- 45 degree or more.
xi.	Display of collimation field size, filter.
5.	**Height Adjustable X-Ray Table:**
i.	Height adjustable fixed four way floating table top with wireless 41 x 41 cm or more sized FPD and Foot switch for controlling the table height, floating movements etc.
II.	It should have a carbon fiber table top of equivalent.
iii.	Table should support patient weight up to 250 kg or more.
iv.	It should be possible to synchronize detector movement with movement of X-Ray Tube.
v.	The table top dimensions should be as mentioned (Minor Deviation without compromising the functionality will be accepted) Width of the patient table : 80 cm or better Length of the patient table: 220 cm. Table height: 55 cm to 85 cm (adjustable motor)
VI.	The table top movement should be Longitudinal movement: +/- 50 cm, Transverse movement: +/- 10 cm at least.
vii.	The table should have removable grid of 10:1 ratio with focus distance of 100 mm.
6.	**Vertical Bucky Stand (Wall Stand)**
i.	Motorized, counter balanced, height adjustable vertical Bucky with 43 x 43 or more wired digital flat panel detector.
ii.	Bucky should have a removable grid ratio 10:1 or more and focus distance of 150 cm or more.
iii.	It should have motorized tilting facility of minus 20 to plus 90 degree or better.
iv.	The vertical travel range of the detector should be 1400 mm (400 up to 1800 mm above floor measured center to center) +/-10%
v.	Automatic tracking of tube and detector all the movements of the vertical Bucky stand and table bucky should be electromagnetic lockable.
vi.	It should have the facility of Auto Stitching of long bone (Full leg / Full Spine) with necessary hardware and software.
7.	**Operating (Acquisition) Station:**
i.	PC based workstation for management of Image / Studies.
ii.	The Image Acquiring Software and Flat Panel Detector should be from the same manufacture for better synchronization and image output.

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iii.	The Server must provide display of acquired image with a greater details of demographics, like patient / study listing for easy access.
iv.	This server must be provided with a High Quality Monitor of minimum 2 MP (21 inch) resolutions with touch screen.
v.	The Console PC must be of reputed brand and must have RAID 1 configuration to protect data. It should have 1 TB HDD and minimum 4 GB RAM.
Vi.	The server must provide full amount of post processing features like Geometric Corrections, Widow / Level, Alogarithms, Annotations such as markers, predefined texts, drawing lines and geometrical shapes, measuring distances nd angles, Shuttering, histograms, Zoom, Grey Scale Reversal, Indicate Grey Scale Saturation Level.
vii.	Scoliosis measurement, leg length difference measurement tools must be provided. The console should also have the functionality / tool to correct radiographic magnification on the image.p
viii.	System should have auto tracking facility in both horizontal and vertical panel.
ix.	The console should have automatic program to indicate over / under exposure visually in the pre view screen.
x.	The terminal must provide a full fledge DICOM printing. Should be able to print multiple formats (minimum 4) of a patient study on a film. It must be able to print a True Size image.
xi.	Should be able to send DICOM images to a DICOM viewing station I PACS and should be able to connect to HLS / RIS for DMWL (vendor neutral.
xii.	Should be equipped with DICOM CD writer for allowing examination of a patient to be written onto a CD in DICOM format for referral purposes with inbuilt DICOM Viewer to allow viewing on any PC.
xiii.	Special attention should be given to Paediatric and neonatal imaging. It should have possibility of reducing radiation dose to paediatric and neonatal exam
xiv.	Whole system is a Turnkey project.
8.	**Image Viewing, Post – Processing and Reporting Station:**
i.	2 MP or better dual head medical grade monitor of reputed make need to be supplied.
ii.	Workstation computing hardware should be of latest generators with at least 16 GB RAM, Intel 17 Processor, 1 TB HDD and 2 MP medical display.
iii.	Image processing functions like, mirroring, zoom, move, and widowing filter should be possible.
iv.	There should be facility for measurements.
v.	Multi-format printing should be possible with user selectable opinions.
vi.	It should be possible to create alphabetical date wise and exam based work list.
vii.	Work list should be auto refreshing.

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9.	**Accessories:**
i.	**Dry Printer** a. The system mst be A Dry Image, without need of any wet Chemistry. b. The System must be DICOM 3.0 Print Service Class Provider, allowing minimum of 10 associations at a time. c. The system must be able to process up to 50 films / hour (minimum) depending on the size. d. The system must have a spatial resolution of 300 PPI /DPI (minimum) or more for all sizes printed. e. The system must have contrast resolution of 12 bits / pixel or more. f. The system must have at least two online film sizes, and should be capable to print on any of the 8" x 10", 10" x 12", 11" x 14", 14" x 17" sizes. g. System should be provided 2 computer system one for DICOM work station / viewing station.
ii.	Compression Band.
iii.	Patient hand grips.
10.	**Regulatory Approval: The Digital Radiography System offered should have the following.**
i.	AERB Type approval for installing the unit in India.
ii.	Certification – the unit should be US FDA & European CE approved with AERB type approval
iii.	UPS : Suitable UPS for console workstation and printer with 1 hour backup.
iv.	Suitable voltage stabilizer for whole system must be provided.
v.	Warranty: 5 years including Tube, detector, generator, and all components.
vi.	All the specifications, features offered must be supported by original data sheets and published literatures from manufacturer and / or regulatory authorities.
vii.	The Bidder and manufacturer should not be blacklisted/ debarred from any central or state government, in past 3 years.
11.	**Turn Key Specification:**
i.	Minimum AERB specified space turnkey for DR.
ii.	A space for UPS, console for technical staff with lead glass measuring 3 feet x 2 feet with 1 table three chair, three lead apron with steel hanger.
iii.	Workstation room (10 feet x 10 feet) with one scretariate table, Godrej, with desktop computer, printer for typing report with UPS.
iv.	Three (3) numbers of AC's of 1.5 Ton each - 2 for DR room and 1 for workstation. Flooring with vitrified tiles upto false ceiling.

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