



## TECHNICAL SPECIFICATIONS FOR CT SIMULATOR UNIT (at least 16 MULTISLICE)

### Scope

This includes the supply, delivery, installation and commissioning of CT Simulator.

### Application/Use

Radiotherapy patient simulation and treatment planning.

### Standard Composition

- Scanner Gantry
- X-ray Generator and Tube
- Detection System
- Couch
- Operator Console
- Image Display Device
- Scan Parameters
- Image Collection and Processing
- Data/Image Storage, Management and Connectivity
- Accessories
- External positioning lasers
- CT Simulation software
- Power Requirements
- Other Requirements
- Other Terms and Conditions

### Technical Specifications

<b>Scanner Gantry</b>	Scanner aperture	80 cm or bigger
	Tilt	-30° to +30° or greater
	Laser positioning lights – planes	Transaxial, sagittal, coronal with position accuracy of ± 1mm or better
	Controls	Located on either or both sides of the gantry
	Digital read-out	Couch and gantry positions/settings
<b>X-ray generator and tube</b>	Generator type	High frequency
	Anode heat capacity	2 MHU or higher <input type="checkbox"/> If higher, please specify _____ MHU
	Maximum tube voltage	130 kV or higher
	Maximum tube current	<input type="checkbox"/> 200 mA <input type="checkbox"/> If higher, please specify _____ mA With AEC system
	Focal spot	Dual (high speed rotating anode)
<b>Detection system</b>	Detector type	Solid state array
<b>Couch</b>	Material	Carbon fiber
	Dimension	Minimum of 235 cm by 40 cm
	Couch top movement System	Motor driven and manual
	Horizontal travel	Range: 170 cm or longer Speed: Variable with maximum speed of at least 10 mm/s

		Scannable range: At least 150 cm or more
		Reproducibility of movement: Better than $\pm 0.25$ mm
	Vertical travel	Range: 55-95 cm when outside the gantry Moving range within the gantry: 20 cm Minimum height outside the gantry: 52 cm $\pm 1$ cm
	Maximum weight allowed on couch	180 kg or heavier
	Table top	Flat with patient positioning index
	Location of table top controls	Table side, control console and hand pendant
<b>Operator Console</b>	Input devices	Keyboard with integrated function keys and mouse
	Operating panel / Control desk	<ul style="list-style-type: none"> <li>- Remote control of couch movement and gantry tilt</li> <li>- Displays all scan parameters and CTDI and DLP values for each procedure</li> <li>- With programmable adult and pediatric scan protocols</li> <li>- Allows selection of scan parameters</li> <li>- Allows window width and window level adjustments</li> <li>- With image processing/evaluation functions</li> </ul>
	Recorded instruction system options	User customizable recording
	Operator-patient communication system	Two-way communication system <ul style="list-style-type: none"> <li>- Microphone and speakers</li> </ul>
<b>Image display device</b>	Acquisition workstation	At least 1 unit medical grade LCD/LED-type monitors Diagonal dimension of image screen, 21" or bigger
	Review workstation (Optional)	At least 3 megapixel LCD/LED-type monitors Diagonal dimension of image screen, 21" or bigger
<b>Scan parameters</b>	Image reconstruction time	Less than 1.5 s for any mode
	Scan region	Whole body, including head
	Scan fields of view	At least 50 cm or more
	Extended field of view	Minimum of 70 cm
	Scan modes	Axial, spiral/helical, dynamic, volumetric, and other scanning modes (please specify) _____
	Minimum rotation time in spiral/helical mode	$\leq 0.5$ s
	Slice thickness	User selectable, starting with 1mm or less
<b>Image Collection and Processing</b>	Reconstruction matrix	$\geq 512 \times 512$
	Image display	Display matrix: 1024 x 1024
		Window width: continuously variable
		Window level: continuously variable
		Multiple image display
		Three-dimensional (3D) display of images
		Image retrieval: Display images can be changed from patient to patient or from one image to another image for the same patient using the keyboard or on-screen menus
	Image processing	Scanned projection radiography processing: <ul style="list-style-type: none"> <li>• Anatomical scale</li> <li>• Slice position setting</li> <li>• Slice position display</li> <li>• Zoom out / zoom in</li> </ul>
		CT image analysis: <ul style="list-style-type: none"> <li>• ROI setting and processing</li> <li>• Measurement of distance and angle between two positions</li> <li>• Histogram</li> <li>• CT number display</li> <li>• Volume calculation</li> <li>• Profile</li> </ul>

		<p>CT image processing:</p> <ul style="list-style-type: none"> <li>• Continuously selectable image magnification</li> <li>• Multi-frame display</li> <li>• Addition/Subtraction of images</li> <li>• Comment and annotation insertion</li> <li>• Top/bottom, right/left, black/white reversal of image</li> <li>• Image reconstruction algorithms/filtering</li> <li>• Multiplanar reconstruction/reformatting</li> <li>• Image stacking</li> <li>• Image annotation and labeling</li> <li>• Images are DICOM format ready for storage, retrieval, and compatible for teleradiology and networking system</li> </ul>
<b>Data/Image Storage, Management and Connectivity</b>	Storage media	<input type="checkbox"/> Film <input type="checkbox"/> CD/DVD <input type="checkbox"/> Others, please specify: _____
	Back-up storage media	<input type="checkbox"/> CD/DVD <input type="checkbox"/> Hard drive with storage capacity of 3 TB
<b>Accessories</b>	<ul style="list-style-type: none"> <li>• QC phantom(s) to test low contrast, high contrast, CT number calibration, Uniformity, Slice thickness, and Scan localization accuracy</li> <li>• Electron density phantom</li> <li>• Couch and laser alignment test tool</li> <li>• Immobilization and positioning devices             <ul style="list-style-type: none"> <li>- Headrests</li> <li>- Positioning pads and cushions</li> <li>- Straps (head, body, shoulders, knees, and legs)</li> <li>- Support (head, shoulders, knees, and legs)</li> <li>- Boards (Belly, Wing, Breast, etc.) (Optional)</li> </ul> </li> <li>• Couch top extension/Cradle extender (Optional)</li> <li>• Automatic injector for contrast media (Optional)</li> <li>• 2 lead rubber apron of at least 0.25 mm Pb equivalence</li> <li>• at least 100 cm x 60 cm (39" x 24") lead glass of 1.5 mm Pb equivalence</li> <li>• Hard copy imaging device (for film and paper storage media) (Optional)</li> <li>• External laser (advantageous if supplied/installed with the CT scan unit to ensure compatibility)</li> <li>• Simulation software (advantageous if supplied and installed by the authorized CT scan and TPS unit supplier to ensure compatibility)</li> </ul>	
<b>Power Requirements</b>	3 phase, 220 VAC/380-460 VAC, 60 Hz as applicable to the power supply of the end-user	
	Supplier to provide appropriate transformer when applicable	
<b>Other Requirements</b>	Air-conditioning units	At least 2 units split type, 2 hp, 220 VAC, 60 Hz for the CT scan room and 1 unit split type, 1 hp, 220 VAC, 60 Hz for the control room
	Automatic voltage regulator	1 unit, appropriate with the power rating of the CT scanner and with a voltage regulation range of 150-300 V
	Grounding system	dedicated grounding system for the machine shall be provided by the bidder
	Dehumidifier	1 unit, 60 Hz, 220 VAC
	UPS	1 unit for electrical ancillary equipment, with a battery run-time of ≥ 20 min
	Emergency light	2 units for CT room and 1 unit for the control room
	Documents	<p>Two sets of the following:</p> <ul style="list-style-type: none"> <li>• operation and instruction manuals</li> <li>• service and installation manuals</li> <li>• wiring and schematic diagrams</li> <li>• x-ray tube data specifications</li> <li>• parts list</li> </ul>

**Additional specification/requirement for upgrading diagnostic CT scanner to CT simulator:**

<b>CT simulator external laser</b>	1 set	
<b>Table top</b>	-Flat with patient positioning index - Material: carbon fiber - Dimension: Minimum of 235 cm by 40 cm	
<b>CT Simulation software</b>	Must be compatible with the CT Scan and Treatment Planning System	
<b>Immobilization and positioning device</b>	-Boards (Belly, Wing, Breast, etc.)	
<b>QC phantom(s)</b>	- to test low contrast, high contrast, CT number calibration, Uniformity, Slice thickness, and Scan localization accuracy (If not yet available)	
<b>Electron density phantom</b>		

**Other Terms and Conditions**

- Three (3) years warranty for parts and service after passing the acceptance testing of the Center for Device Regulation, Radiation Health, and Research (CDRRHR) of the Food and Drug Administration (FDA) – Department of Health (DOH) as provided in the DOH AO No. 21, s. 1996 dated 4 June 1996.
- Must comply with the applicable requirements under the DOH Administrative Order (A.O.) No. 35, s. 1994.
- The transportation expenses and per diem of the CDRRHR-FDA Medical Physics Team shall be shouldered by the bidder.
- Bid offer is in Philippine peso to include taxes and duties; transportation to site, delivery, installation and testing expenses on site (hospital) by the bidder.
- Certification from the manufacturer
  - that the bidder has the capability for corrective and preventive maintenance of the unit.
  - that the bidder/supplier has the engineer/s trained and capable for corrective and preventive maintenance for the model bid. Service engineer should be presently employed by the bidder/supplier or authorized by the manufacturer.
  - guaranteeing delivery of equipment and all accessories within the time period set by the Bids and Awards Committee (BAC).
  - guaranteeing the availability of all spare parts for the next ten (10) years duly authenticated by the Philippine Embassy in the country of origin.
  - that the equipment is a brand new unit and not a discontinued model.
  - that the terms and conditions stated in the contract shall be honored by the manufacturer in the event that a change of exclusive distributorship will occur during the duration of the said contract.
- Supplier's engineer shall perform preventive maintenance on the machine during the warranty period of at least quarterly.
- The bidder must provide certification type of training on the applications/operations, and basic maintenance for users and maintenance personnel of the hospital.
- Certificate of exclusive distributorship from the unit manufacturer mentioning the name of the Philippine representative.
- Certification from the bidder of 95% uptime guarantee for the equipment offered within the warranty period. Accumulated downtime in excess of 5% shall be added to the warranty period.
- The bidder must submit the original brochure with technical specifications in English language.
- The machine should conform to the International Electrotechnical Commission (IEC) standard or its equivalent national standard. The bidder must provide Certificate of Declaration of Conformity.
- Inventory of spare parts for the unit/model offered duly signed by the manufacturer.
- Certification from the Foreign Ministry of Health that the company can sell the product/model in that country of origin.
- The bidder shall specify post warranty comprehensive preventive maintenance costs including list and price of major spare parts for the next three years after warranty.

Note: This technical specifications replaces the previous technical specifications for CT Simulator unit. This constitutes revisions done by CDRRHR technical working group which was approved on September 29, 2014.