

ANNEX 01

1. Technical specifications of "OT C-Arm".

Mobile C-arm image intensifier with the following specifications:

X-Ray Generator	<ul style="list-style-type: none"> • Frequency: 40 KHz or better • Power output: 2 KW or more • KV range: 40-110 KV or better • mA in radiography: 20mA or more • mA in fluoroscopy: 0.1 to 3 mA or more in normal fluoroscopy and 7 mA or more in High Level Fluro • Should have facility for continuous fluoroscopy and Pulse fluoroscopy (Pulse rate up to 8 pulse per second) • Should have Digital Spot for high quality single image, 16 mA or more • Housing heat capacity of minimum 700 KHU and cooling rate of more than 12,000 HU/min
X-Ray tube Head	<ul style="list-style-type: none"> • Must have anode heat capacity of min 50,000 HU or more & cooling rate of min 30,000 or more HU/Min • Should have dual focal spots • Collimation: motorized iris and motorized rotating blades • Tube assembly filtration of 3.0 mm Al or higher
C-Arm mechanism and control panel (digital work station)	<ul style="list-style-type: none"> • Locks for stabilization at desired position • It should have the following range of movements: • Motorized vertical movements more than 400mm • Horizontal travel: 200mm or more • Orbital movement: (-) 30 deg. To (+) 90 deg. 120Deg. Or more) • Swing / panning movement: +/- 12 degrees or more • Source image distance: 950 mm or more • Depth of c-arm: 600 mm or more

<p>Control panel (Digital work station)</p>	<ul style="list-style-type: none"> • It should have the following facilities: • System should have capability of Pulse Fluoroscopy option to reduce to radiation exposure with 1,2,4,8 pulse per second, which should be easily user selectable • Fluoroscopy and Radiography exposure on switching. • Image rotation from control panel. • Image intensification, mode selection (normal and zoom). • Automatic brightness stabilizer. • Auto dose rate control. • Collimation for radiography.
<p>Integrated image processing, recording and memory system</p>	<ul style="list-style-type: none"> • Image intensifier tube. • Input diameter 9" with Triple field (9/6/4). • Minimum central resolution (At monitor): 2.0 lp/mm or better at 9" FOV. • CCD camera. • CCD camera with 1kx1k resolution for high resolution image acquisition. • The system should have Integrated image processing, memory and recording. • Medical Grade Monitor 2 qty of 18 inches each or 1 qty with split screen of 27 inches or better • Min 18 inch or more/ 27 inches or more, flicker free, high resolution (1280x1024 pixels or better), medical grade flat screen, automatic and manual control of brightness and contrast, mounted on mobile trolley with locking device. • Cable free rare side and 180° rotatable monitors. • Vertically and horizontally adjustable monitors for specific needs. • The system should be capable of doing high end Vascular Applications and offer optional price for DSA • Must be fully digital continuous imaging chain of at least 1 Kx1 K for acquisition, processing, storage, archiving and documentation.
<p>Digital image processor</p>	<ul style="list-style-type: none"> • Provision to record multiple images on CD, DVD & USB with embedded DICOM viewer. • Image processing at 1K * 1K Matrix or better.

	<ul style="list-style-type: none"> • Contrast enhancement, edge enhancement, zoom facility. • Recursive filter for detecting motion. • Last image hold. • Image rotation, vertical and horizontal reversal. • Image storage of minimum 10,000 images in a 1 Kx1 K matrix. • DICOM option.
<p>Regulatory / Safety Requirement</p>	<ul style="list-style-type: none"> • Equipment should have Certificate for radiation safety standard. • Equipment should have CE/US FDA certification.
<p>Optional Accessories:</p>	<ul style="list-style-type: none"> • Lead aprons (0.5mm lead ultralight equivalent). • Thyroid shields. • Gonadal shields. • Lead goggles. • Thin LCD view box 2x1 films. • Lead Screen on wheel.

2. Technical Specifications for Fixed DR System

<p>Description of Function</p>	<ul style="list-style-type: none"> • A fully digital radiography system capable of detector exposure in vertical, horizontal and oblique positions to perform general radiography. The unit should be completely integrated (integrated Generator and Image Acquisition)
<p>Operational Requirements:</p>	<ul style="list-style-type: none"> • Fully Digital Radiography with image processing unit. • An integrated Flat panel Detector • A separate workstation for image positioning and patient demographic data is required • The workstation should be able to send, receive and print according to DICOM (Digital Imaging and Communications in Medicine) standards. • The workstation should also be able to obtain DICOM modality, work list from connected information system and send information about performed procedure to the connected information system Read and Write in CD/DVD for data Storage and review.
<p>Technical specifications:</p>	<p>Radiography: High Frequency X ray generator</p> <ul style="list-style-type: none"> • KV: 40 – 125 Precision 1 KV increment • Super high frequency Generator with automatic exposure control • mA: 600 mA or more • mAs maximum: 1 to 600 mAs or more • Exposure time should be 1ms to 5 secs or better. • Power 60KW approximately • Exposure mode Manual/AEC (Automatic Exposure Control) <p>HV Tank:</p> <p>A very compact H.V. Tank filled with high dielectric transformer oil should be provided. The H.V. Tank should contain H.V. transformer, Filament Transformers, H.V. Rectifiers & H.V. Cable receptacles</p> <p>Tube:</p> <ul style="list-style-type: none"> • Dual focus Rotating anode X-ray tube with Small Focus .6 mm & Large focus 1.2mm

	<ul style="list-style-type: none"> •Heat Storage: 300 KHU or More •Cooling rate: 750W or more (63.360 KHU/Min or more) <p>Protection devices:</p> <ul style="list-style-type: none"> •Overload •Broken filament •Abnormal rotor •High voltage arcing <p>Tube Stand:</p> <ul style="list-style-type: none"> •Floor to ceiling tube stand with counter balanced tube head •It should have movements to make all radiographic positions (erect & supine studies) possible •The horizontal movement for the tube stand should be minimum 200 cm •Tube should have minimum vertical Travel of 150cm with minimum floor to focus distance of 35cm. •Tube should have angulations of minimum $\pm 135^\circ$ with detents at 0°, $\pm 90^\circ$ •Tube Head should have SID measuring tape and should have collimation light source. <p>Vertical Bucky Stand:</p> <ul style="list-style-type: none"> •Oscillating grid rate with balanced at counter weight •The unit should be provided with vertical bucky having tilting facility •It should have built in flat detector system of at least 40x40 cm size •It should have automatic exposure control. <p>Radiographic table:</p> <ul style="list-style-type: none"> •Balanced at counter weight •Table movement: 4 ways with elevation •Easily installable and good assembly •Transverse and longitudinal movements of the tabletop should be locked by electromagnetic locks. •Table should consist of Motorized reciprocating bucky with grid of Ratio 10:1
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	<ul style="list-style-type: none"> •The bucky should cover the entire length of the table & should be locked at any desired position by an electromagnetic Lock. •The table top should be made of low radiation absorption, water proof material. •Table should be wide with minimum 200cm x 90cm (LXW). •Bucky tray should be equipped with cassette type wired cum wireless Flat panel detector of minimum 35cm x 43cm size or more. <p>Detector System:</p> <ul style="list-style-type: none"> •The detector should be solid state flat detector of latest technology. •The size of the detector should be 40 cm x 40 cm or more. •The detector should be water resistance. •The detector should be capable of doing out of bucky radiography in wireless mode and also Lateral supine Radiography must be possible. •The detector offered should be light in weight with less than 4 kgs, enabling ease of use for operations and easy positioning at the time of out of bucky exposures. •The detector must be capable of working on both wired as well as wireless mode and switch over must be less than 2 sec. <ul style="list-style-type: none"> • Detector offered should be capable of handling 150 or more exposures or 8 hours of operation in single full charge. • The detector should be able to work at normal room temperature and humidity. <p>The detector system should not require frequent calibrations on daily start-up</p> <ul style="list-style-type: none"> • Offered detector should have load bearing capacity of 150 kgs or more.
<p>Fully Integrated CONSOLE System:</p>	<ul style="list-style-type: none"> • Single integrated console system shall have following functions & indications should be provided. Following features should be available on the console. • Digital Display for display of X-ray parameters of KV & mAs. There should be option of selecting mA station. • mA, KV & mAs increase and decrease switches. • Tube focal spot selection Switch. • Ready and X-Ray on switch with Indicators • Bucky Selection Switch. • Self-diagnostic Program with Indicators for Earth fault error, KV error, filament

	<p>error & Tube’s Thermal Overload.</p> <ul style="list-style-type: none"> • Anatomical Programming radiography (i.e., APR) should be provided in which KV & MAS are automatically selected depending upon the physique of the patient and part of the body to be X-rayed. • All anatomical Programming should be available • A dual action hand switch with retractable cord should be provided. • The DR Console should be offered with latest high end image processing capability console software and high-speed processor with 1 mega pixel 20” Medical Grade Monitor. The DR work station should be based on latest high-speed processor of at least 32bit also have image storage disc 500GB or more. • Selection of Patient demography. • Selection of the Anatomical parts to be X-rayed • Windows and Level Adjustments • Annotations must be possible • Previews of images should be available in about 3 Sec or less • Zooming, ROI, Image Cropping and Masking, automatic grid removal function • Soft tissue processing must be possible • Should offer capability of local image storage • Should be capable of connecting minimum of 2 Flat panels simultaneously. • Should be capable of connecting directly to the dry laser printer. • Full range of basic Image Processing tools such as Zoom, Pan, Window, Annotation. • The workstation should be capable of configuring Multi Format images for DICOM Printers • The console should have provision for remote diagnostic capability. • It should have the possibility of acquiring the image directly from the detector system. • Dicom compliant system. • Easy integration & network capability with the existing /future networking including other modalities RIS/HIS/PACS • Post processing facility must be possible like addition of anatomical marker,
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	image annotation, magnification etc. please specify all the functions.
Power Requirement:	<ul style="list-style-type: none"> The unit should be operable on 3 Phase, 380/400/480Volts AC 50Hz with line resist less than 0.4 Ohms. Line Regulation +10%. The power requirement should be furnished by the vendor during bid submission
Mandatory Requirements:	<ul style="list-style-type: none"> The company should be ISO certified company. The whole systems should have USFDA and CE approval 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. All specifications to be provided with original product data sheet.
Accessories:	<ul style="list-style-type: none"> 60 KVA Online UPS for whole X ray DR system Mandatory. Lead Apron 0.5mm Pb equivalent – 2 No

3. Technical Specifications for Portable DR System

<p>Description of Function</p>	<ul style="list-style-type: none"> • Mobile Digitalized Radiography (DR) System • 30-50KW Battery Powered (Generator Type) • Kv Range: 40-125kv, 1.0kv increment (Precision) • mA Range: 20-500mA, variable • mAs Range: 0.5-500mAs, • Console & Display: • kV & mA & mAs/sec digital display • Prep. & Exposure LED/Indication • Collimator lamp Switch • Anatomical Programming radiography (i.e., APR) should be provided in which KV & MAS are automatically selected depending upon the physique of the patient and part of the body to be X-rayed.
<p>X-ray Tube:</p>	<ul style="list-style-type: none"> • Type: Rotating anode • Focal spot 0.6 to 1.25 mm • Heat Storage: 225 kJ (300 KHU) • Cooling rate: 750W (60KHU/Min) • Inherent Filtration: 0.7mm Al
<p>Collimator</p>	<ul style="list-style-type: none"> • Suitable halogen lamp built-in timer: 30sec. • Collimation Field 48 x 48 cm @ SID=1 m • Al eq contribution to total filtering 2 mm Al eq
<p>Safety devices</p>	<ul style="list-style-type: none"> • Protection and automatic control of filament current. • Protection from over current and over voltage (kV, mA). • Protection from maximum load of X-Ray tube. • Operator error or malfunctioning indication
<p>Detector</p>	<ul style="list-style-type: none"> • Portable, Wireless Flat Panel Detector • Size: - 35X43 cm • Detector Battery Indicator Yes. Into the GUI • Maximum load capacity on detector 150kg

	<ul style="list-style-type: none"> • X-ray generator synchronization X-ray push button – Auto triggering mode • Standard component with One detector 3 batteries & One 3-slot battery charger
IMAGE DISPLAY SYSTEM	<ul style="list-style-type: none"> • Type LCD touch screen with capacitor technology Size 19” or more
ENVIRONMENTAL CONDITIONS	<ul style="list-style-type: none"> • OPERATING Temperature +10°C to +40°C • Humidity 20% ÷ 80% • User-friendly operation and smooth movement • One-unit package with in-built battery/generator system • Durable with operational implication for different position and parts of the body. • Dicom compliant system. • All standard accessories for standardization and configuration of the system must be • provided along with the system.
Charge input:	<ul style="list-style-type: none"> • 220V – 240 VAC, 50/60Hz fitted with UK plug.
Standards and safety:	<ul style="list-style-type: none"> • Should be approved product by standard or control • Safety aspects of radiation dosage leakage should be spelt out • Certificate for calibration should be provided. • The whole systems should have USFDA and CE approval. • The company should be ISO certified company.

4. Technical Specifications for upgrading the OPG machine to CBCT

Description of Existing Device (KAVO)	<ul style="list-style-type: none"> • ORTHOPANTOMOGRAPH OP 3D PRO • Type – OP300 – 1 • SN: - IE 1908371 • Manufactured – November 2019
FOV	<ul style="list-style-type: none"> • FOV should be 13x15 at least
Software	<ul style="list-style-type: none"> • INVICO Software / Firmware upgradation needed
	<ul style="list-style-type: none"> • 13x15 UPGR KIT FOR OP 3D PRO • 3D CALIBRATION TOOLS • 3D SENSOR MOTOR ASSY • 3D SOFTWARE
Image Detector	<ul style="list-style-type: none"> • CMOS
Image Voxel Size	<ul style="list-style-type: none"> • 85 μm-420 μm
Scan Time	<ul style="list-style-type: none"> • 11-42 s
Exposure Time	<ul style="list-style-type: none"> • 1.2-8.7 s
Image Volume Sizes	<ul style="list-style-type: none"> • 50x50, 61 x78, 78x78, 78x150, 130x150 mm (HxW)
DICOM* Support	<ul style="list-style-type: none"> • Yes

5. Technical Specifications for Dental Digital X-ray PSP scanner

<p>Description</p>	<ul style="list-style-type: none"> • PSP Plate Reader • PSP Plates • Suitable Display/Monitor for viewing and editing images
<p>Software</p>	<ul style="list-style-type: none"> • Suitable software for proper functioning. • Should support various image adjustment functions: Invert, Rotation, Zoom In/out, Annotation (line, angle, magnifying glass) etc. • Dicom compliant.
<p>Technical specifications</p>	<ul style="list-style-type: none"> • Display : 2.4" or more (Plate reader) • Plate sizes : S0 Pedo (22x35mm) - 2 Nos S2 Adult(31x41mm) – 4 Nos Optional: S3 occlusal • Theoretical resolution LP/mm (dpi) :40 (2,000) • Effective resolution LP/mm (dpi) :22 (1,100) • Greyscale (bit) :16 (65,536) • Weight (kg) : Not more than 5 kg. • Standby function : Yes • Interfaces : LAN