DAWN

TODAY'S PAPER | MAY 22, 2024

DOW UNIVERSITY OF HEALTH SCIENCES

No. DUHS/DP/2024/275-CORR-1 **Dated: 21 May 2024**

CORRIGENDUM

Reference to the Invitation for Bid (IFB) No: DUHS/DP/2024/275/276 Dated 17 May 2024 for the Procurement of Radiology Equipment / Instruments (Ref. # DUHS/DP/2024/275) published in Daily Dawn, Daily Jang and Daily Kawish on 18th May 2024 and hoisted on Dow University of Health Sciences (DUHS) and Sindh Public Procurement Regulatory Authority (SPPRA) website at PPMS Sr. No: T00582-23-0023. The following updates/ amendments/ modifications have been carried out in the above-referred tender:

1. The technical specifications for Item No. 01, **"Advanced AI Driven Wide Bore 1.5 Tesla MR System"** (Section V of the Bidding Documents), have been modified/ amended. Interested bidders can access the updated specifications on the DUHS and SPPRA websites.
2. The dates for tender purchasing, bid delivery, and bid opening have been extended according to the following schedule:

Last Date for Tender Purchase	Deadline for submission of bids	Bids Opening Date & Time
06 June 2024	07 June 2024 up to 11:00 a.m.	07 June 2024 at 11:30 a.m.

NOTE:

- All the interested bidders are requested to furnish their bids as per the above corrections/ modifications.
- All other terms and conditions of the tender shall remain unchanged.

Director Procurement
Dow University of Health Sciences (Ojha Campus)
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بدھ 13 ذیقعدہ 1445ھ 22 مئی 2024ء

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پاکستان کی سب سے بڑی اشاعت ABC CERTIFIED بااعتماد تصدیق شدہ اشاعت

THE DAILY JANG KARACHI

روزنامہ جنگ کراچی

WEDNESDAY MAY 22, 2024

صفحہ 141 بدھ 13 ذیقعدہ 1445ھ 22 مئی 2024ء صفحہ 28

DOW UNIVERSITY OF HEALTH SCIENCES

نمبر:DUHS/DP/2024/275-CORR-1 تاریخ:21 مئی 2024

تصحیح

بحوالہ طبی نیڈر ٹونس کا اشتہار نمبر DUHS/DP/2024/275/276 بتاریخ 17 مئی 2024 جو ڈیلی ڈان ، روزنامہ جنگ اور روزنامہ کاوش میں مورخہ 18 مئی 2024 کو شائع ہوا اور ڈاؤ یونیورسٹی آف ہیلتھ سائنسز (ڈی یو ایچ ایس) اور سندھ پبلک پروکیورمنٹ ریگولیٹری اتھارٹی (ایس پی پی آر اے) کی ویب سائیٹس پر بمع پی پی ایم ایس سیریل نمبر T00582-23-0023 زیر عنوان "پروکیورمنٹ برائے ریڈیولوجی ایکوپمنٹ اسٹرومنٹس (ریفرنس نمبر DUHS/DP/2024/275)" کیلئے اپ لوڈ کیا گیا۔ مندرجہ بالا نیڈر میں درج ذیل تبدیلیاں/ترامیم/اصلاحات کی گئی ہیں:

۱۔ تکنیکی تصریحات برائے آئٹم نمبر 01 "ایڈوانسڈ ایجائل ڈرون وائیڈ بور 1.5 ٹیسلا ایم آر سسٹم" (بولی دہندگان کے سیکشن V میں) ترمیم/تبدیلی کی گئی ہے۔ دلچسپی رکھنے والے بولی دہندگان اپ ڈیٹ شدہ تصریحات ڈی یو ایچ ایس یا ایس پی پی آر اے ویب سائیٹس پر ملاحظہ کریں۔

۲۔ مندرجہ ذیل شیڈول کے مطابق نیڈر خریدنے، بیچانے اور کھلنے کی تاریخوں میں توسیع کی گئی ہے:

نیڈر خریدنے کی آخری تاریخ	نیڈر بیچانے کی آخری تاریخ اور وقت	نیڈر کھلنے کی آخری تاریخ اور وقت
06 جون 2024	07 جون 2024 صبح 11:00 بجے تک	07 جون 2024 صبح 11:30 بجے

نوٹ:

تمام بولی دہندگان سے درخواست ہے کہ اپنی بولیاں درج بالا ترامیم/تبدیلیوں کے مطابق جمع کروائیں۔

نیڈر کی تمام دیگر شرائط و ضوابط میں مزید کوئی تبدیلی نہیں کی جائیگی۔

ڈائریکٹر پروکیورمنٹ

ڈاؤ یونیورسٹی آف ہیلتھ سائنسز (او جی ایچ)

پروکیورمنٹ ڈائریکٹوریٹ لائبریری بلاک، سپارکو روڈ،

آف مین یونیورسٹی روڈ، گلزار ہجری، اسکیم نمبر 33، کراچی۔

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هڪ ئي وقت ڪراچي، حيدرآباد ۽ سکر مان شايع ٿيندڙ پهرين سنڌي اخبار
روزانه ڪاوش
Daily Kawish Hyderabad
Wednesday, 22 May, 2024
(جلد 34) اربع 22 مئي 2024ع بمطابق 13 ذوالقعد 1445ھ (شمارو 291) قيمت 40 ريا

DOW UNIVERSITY OF HEALTH SCIENCES

نمبر. DUHS/DP/2024/275-CORR-1 تاريخ: 21 مئي، 2024

تصحيح

بحوالو ٽلبي نوٽيس جو اشتهار نمبر. DUHS/DP/2024/275/276 تاريخ 17 مئي، 2024 جيڪو ڊيلي ڊان، روزاني جنگ ۽ روزاني ڪاوش ۾ تاريخ 18 مئي، 2024 تي شايع ٿيو ۽ ڊائو يونيورسٽي آف هيلٿ سائنسز (ڊي يو ايڇ ايس) ۽ سنڌ پبلڪ پروڪيورمينٽ ريگيوليٽري اٿارٽي (ايس پي پي آر اي) جي ويب سائٽس تي گڏ پي پي ايم ايس سيريل نمبر. T00582-23-0023 زير عنوان "پروڪيورمينٽ براءِ ريڊيولاجي ايڪيوپمينٽ/ انسٽرومينٽس (ريفرنس نمبر. DUHS/DP/2024/275)" لاءِ اپ لوڊ ڪيو ويو. مٿي ڄاڻايل ٽينڊر ۾ هيٺ ڏنل تبديليون/ترميمون/ اصلاحون ڪيون ويون آهن:

1. ٽيڪنيڪي تصريحات براءِ آئٽم نمبر.01 "ايڊوانسڊ اي آءِ ڊرون وائيڊ بور 1.5 ٽيسلا ايم آر سسٽم" (واڪ دستاويزن جي سيڪشن V ۾) ترميم/تبديلي ڪئي وئي آهي. دلچسپي رکندڙ واڪ ڏيندڙ اپ ڊيٽ ٿيل تصريحات ڊي يو ايڇ ايس يا ايس پي پي آر اي ويب سائٽس تي ڏسن.
2. هيٺ ڏنل شيڊيول مطابق ٽينڊر خريد ڪرڻ، پهچائڻ ۽ ڪلڻ جي تاريخن ۾ توسيع ڪئي وئي آهي.

ٽينڊر خريد ڪرڻ جي آخري تاريخ	ٽينڊر پهچائڻ جي آخري تاريخ ۽ وقت	ٽينڊر ڪلڻ جي آخري تاريخ ۽ وقت
6 جون، 2024	7 جون 2024 صبح 11:00 وڳي	7 جون 2024 صبح 11:30 وڳي

نوٽ:

سمورن واڪ ڏيندڙن کي درخواست آهي ته پنهنجا واڪ مٿي ڄاڻايل ترميمن/تبديلي مطابق جمع ڪرائين.

ٽينڊر جي ٻين سمورن شرطن ۽ ضابطن ۾ وڌيڪ ڪا تبديلي نه ڪئي ويندي.

ڊائريڪٽر پروڪيورمينٽ

ڊائو يونيورسٽي آف هيلٿ سائنسز (اوجها ڪيمپس)

پروڪيورمينٽ ڊائريڪٽوريٽ لائبريري بلاڪ، سپارڪو روڊ،

آف مين يونيورسٽي روڊ، گلزار هجري، اسڪيم نمبر.33، ڪراچي

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اي ميل: director.procurement@duhs.edu.pk

Revised / Amended Technical Specifications

Item No.	Name of Goods, Technical Description, Specifications and Standards	Required Quantity
01.	**Advanced AI Driven Wide Bore 1.5 Tesla MR System**	01 Unit

ITEMS WITH * ARE MANDATORY SPECIFICATIONS.

1. GENERAL

*1.1 **Technical advancement requirements:**
The vendor should guarantee that the system supplied is not refurbished and the MR system quoted is the latest available model in the segment. Please mention that year of launch of the quoted model.

*1.2 **Certification requirement:**
The offered model should be CE and FDA-approved (authentic and legible certificate for the same to be annexed).

2. MAGNET SYSTEM

2.1 **Field strength:** 1.5T

2.2 **Type of magnet:** Superconducting

2.3 **RF shielding:** Should support RF shielding

2.4 **Field stability:** < 0.1 ppm/h

2.5 **Homogeneity of magnet:** 40 cm DSV ≤ 1 PPM

2.6 **Shimming system:** Should be equipped with shimming system
2.6.1 **Shimming:** Should have both active and passive shimming
2.6.2 **High order shimming:** Should have at least 1 channels high order shimming

2.7 **Weight of magnet (incl. helium):** ≤ 6000kg

*2.8 **Length of magnet:** ≤ 180cm

*2.9 **Patient bore size:** ≥ 70cm

2.10 **Liquid helium boil-off rate:** Zero Helium Boil-off

2.11 **Helium volume:** Should mention Total volume of Helium required for operation

2.12 **Type of cold head:** 4K cold head

3. GRADIENT SYSTEM

3.1 **Gradient control technique:** Should have digital and real-time control techniques

3.2 **Cooling type:** Water cooling or Air cooled

*3.3 **Maximum gradient strength in each axis:** ≥ 44 mT/m

*3.4 **Maximum gradient slew rate in each axis:** ≥ 200 T/m/s

3.5 **Minimum rise time:** ≤ 0.25 ms

3.6 **Simultaneously achieve max. gradient strength and max. gradient slew rate:** Yes

3.7 **Duty cycle of full FOV:** 100%

3.8 **Shielding:** Should have active shielding in X/Y/Z planes

3.9 **Noise reduction technology:** Should have noise reduction technology

4. RF SYSTEM

*4.1 **Power of RFPA:** ≥ 16 kW

4.2 **Type of RFPA:** Should be water or air cooled and digital interface

4.3 **Transmit coil:** Should be tuning free

4.4 **Independent receive channels:** ≥ 64

4.5 **RF Coils:**
*4.5.2 **Head and neck coil:** ≥ 24 channels / Acceptable with combination Channels.
4.5.3 **Body array coil:** ≥ 12 channels
*4.5.4 **Spine coil:** ≥ 32 channels
*4.5.5 **Large flex coil:** ≥ 16 channels
*4.5.6 **Small flex coil:** ≥ 8 channels
4.5.7 **Dedicated Breast coil:** ≥ 8 channels
*4.5.8 **Dedicated Knee coil:** ≥ 12 channels
(Flex coil used for MSK will not be acceptable)
*4.5.9 **Dedicated Shoulder coil:** ≥ 6 channels
(Flex coil used for MSK will not be acceptable)
4.5.10 **Dedicated Wrist coil:** ≥ 6 channels
(Flex coil used for MSK will not be acceptable)
*4.5.11 **Dedicated Lower extremity coil:** ≥ 24 channels / Acceptable with combination Channels.
*4.5.14 **Dedicated Foot & ankle coil:** ≥ 8 channels
(Flex coil used for MSK will not be acceptable)
*4.5.15 **Dedicated Cardiac coil:** ≥ 24 channels
(Body Array Coil to perform Cardiac Scanning will not be acceptable)
4.5.17 **Number of coil interface:** ≥ 6
*4.5.18 **Combined imaging technology:** Should have combined imaging technology for multi-body parts

5. COMPUTER SYSTEM
5.1 Host
5.1.1 **CPU:** ≥ 3.0GHz
5.1.2 **Memory capacity:** ≥ 24GB
5.1.3 **Hard drive capacity:** ≥ 1000GB
5.1.4 **Image storage (512x512):** ≥ 600000
5.1.5 **Monitor resolution:** ≥ 1920 x 1200
5.1.6 **Monitor size:** ≥ 24 inch

5.2 High-speed MR reconstruction
5.2.1 **CPU:** Core number ≥ 44, frequency ≥ 2.0GHz
5.2.2 **Memory capacity:** ≥ 64GB
5.2.3 **Hard drive capacity:** ≥ 1000GB
5.2.4 **image reconstruction speed (256x256):** ≥ 60,000 frame/second
5.2.5 **Maximum MR acquisition matrix:** 1024 × 1024
5.2.6 **Maximum MR reconstruction matrix:** 1024 × 1024

6. INTERFACES
6.1 **Parallel scanning and storage:** Should provide parallel scanning and storage
6.2 **DICOM 3.0 interface and PACS connection:** Should provide DICOM 3.0 interface and PACS connection.
6.3 **Network connection with PACS:** Support printing, transmission, receiving, query, worklist, etc.

7. SCANNING PARAMETERS

7.1 **Maximum FOV in X axis:** ≥ 500mm

7.2 **Maximum FOV in Y axis:** ≥ 500mm

*7.3 **Maximum FOV in Z axis:** ≥ 500mm

7.4 **Minimum FOV:** ≤ 5mm

7.5 **Minimum 2D slice thickness:** ≤ 0.1mm

7.6 **Minimum 3D slice thickness:** ≤ 0.05mm

7.7 **Maximum b value of diffusion weighted imaging:** ≥ 10000

8. SCANNING TECHNIQUES

8.1 Spin echo (SE)

8.1.1 **2D/3D spin echo:** Should provide 2D/3D SE

8.1.2 **2D/3D fast spin echo:** Should provide 2D/3D FSE

8.1.3 **Tissue relaxation time measurement:** Should provide relaxation time measurement technique

8.1.4 **Variable angle SE sequence:** Should provide variable angle SE sequence

8.1.5 **Single shot fast spin echo (SSFSE):** Should provide single shot fast spine echo sequence

8.2 Gradient echo (GRE) / Field Echo or equivalent

8.2.1 **Spoiled gradient echo / FASE and FASE2D mEcho:** Should provide gradient echo with RF spoiled technology

8.2.2 **3D fast spoiled gradient echo / FFE3D:** Should provide 3D fast spoiled gradient echo that utilizes fast fat-saturated pulse, acquiring multiple encoding lines in k-space continuously after each fat-saturated pulse, to reduce acquisition time.

8.2.3 **Steady state free precession:** Should provide the steady state free precession sequence

8.2.4 **Balanced steady state free procession:** Should provide balanced steady state free procession to ensure steady-state by spatial, phase and frequency-encodings and finish fast imaging with high SNR

8.2.5 **Contrast enhanced MRA sequence:** Should provide sequence to conduct contrast enhanced MRA

8.2.6 **Time of flight (TOF):** Should provide TOF sequence that enhances signal intensity relative to static tissue by using inflow blood

8.2.7 **Phase contrast (PC):** Should provide PC sequence that utilizes phase changes of inflow blood to suppress background tissue but highlight inflow blood

8.2.8 **Multi echo combined gradient sequence:** Should provide sequence that utilizes shifts of readout gradient after each small-angle RF excitation to acquire multiple gradient echoes

8.3 Echo planar imaging (EPI)

8.3.1 **Single shot EPI:** Should provide single shot EPI sequence

8.3.2 **SE-EPI:** Should provide SE-based EPI sequence

8.3.3 **GRE-EPI:** Should provide GRE-based EPI sequence

8.3.4 **EPI IR:** Should provide combined EPI and IR technique

8.4 Fat saturation technique:

8.4.1 **Fat Saturation:** Should provide technique that uses chemical shift differences in water/fat molecules to complete selective saturation of fat peak for excellent fat suppression

8.4.2 **Spectral attenuated inversion recovery:** Should provide technique that uses fat saturated and adiabatic pulses to suppress the maximum fat signals with automatic calculations of inverse time

8.4.3 **Spectral excitation:** Should provide technique that uses frequency and spatial selected binomial pulses, to combine multiple pulses with various flip angles in different directions

8.4.4 **STIR:** Should provide STIR technique that is insensitive to inhomogeneous magnetic field/RF filed and provides remarkable fat suppression on large FOV and off-center scanning

8.4.5 **EPI-IR:** Should provide EPI-IR technique that combines EPI and IR sequence to suppress fat signals and completes EPI acquisitions

***8.5 Diffusion imaging**

8.5.1 **ADC acquisition:** Should be able to perform ADC acquisition

8.5.2 **Isotropic acquisition:** Should be able to perform isotropic acquisition

8.5.3 **Anisotropic acquisition:** Should be able to perform anisotropic acquisition
8.5.4 **ADC measurement:** Should be able to perform ADC measurement
8.5.5 **ADC mapping:** Should be able to perform ADC mapping

***8.6 Angiography:**
8.6.1 **2D/3D time of flight (TOF):** Should provide TOF technique to utilize enhanced effect of inflow blood and saturation of background tissue to generate excellent blood-tissue contrast
8.6.2 **2D/3D phase contrast (PC):** Should provide PC technique to utilize phase changes and flow velocity encoding to suppress background tissue but highlight angiographic signals
8.6.3 **Magnetization transfer contrast (MTC):** Should provide MTC technique to improve contrast of MR angiography
8.6.4 **Maximal intensity projection (MIP):** S Should provide MIP technique
8.6.5 **Multi planar reconstruction (MPR):** Should provide MPR technique
8.6.6 **Curved planar reconstruction (CPR):** Should provide CPR technique

***8.7 Artifacts reduction technology**
8.7.1 **Flow compensation:** Should provide flow compensation technique to reduce the phase error and motion artifacts
8.7.2 **Respiratory trigger:** Should provide respiratory trigger technique to reduce respiratory motion artifacts
8.7.3 **Multi-breath hold scan:** Should provide multi-breath hold technique to reduce respiratory motion artifacts
8.7.4 **Average mode:** Should provide technique to average acquired data for improving SNR and suppressing motion artifacts.
8.7.5 **Motion artifact reduction acquisition:** Should provide the motion insensitive technology to do radial k-space filling and reduce motion artifacts. Specify the technology name.
8.7.6 **Image filtering:** Should provide image filtering to improve image quality
8.7.7 **Radial acquisition:** Should provide the radial acquisition technology to reduce motion artifact caused by pulsation, breathing or swallowing

***8.8 Fast acquisition technique**
8.8.1 **Half Fourier:** Should provide Partial Fourier that fills out k-space with acquired phase-encoding lines based on its conjugate-symmetric theory
8.8.2 **Partial read out:** Should provide partial read out that utilizes sequences without echo-train and reduces TE to decrease acquisition time or increase acquisition slice numbers
8.8.3 **Rectangular FOV:** Should provide rectangular FOV technique that could save scanning time
8.8.4 **Parallel imaging:** Should provide parallel imaging technique to accelerates routine clinical scanning to improve patient throughput and optimizes temporal/spatial resolution within same acquisition time
8.8.5 **Elliptical acquisition:** Should provide elliptical acquisition technique that can partial fill k-space with central information by elliptical acquisition technology

***8.9 Other standard techniques**
8.9.1 **Sequential and interleaved slice acquisition:** Should provide sequential and interleaved slice acquisition method
8.9.2 **Variable bandwidth:** Should provide method that is open for users to adjust sequence bandwidth
8.9.3 **Adjustable receiving gain:** Receiving gains should be adjustable for acquired signals.
8.9.4 **Frequency offset:** Scanning frequency offset can be adjusted automatically and manually
8.9.5 **Graphical and interactive slice planning:** Should provide Graphical and interactive slice planning technique
8.9.6 **Variable-rate selective excitation:** Should provide variable-rate selective excitation to optimize RF energy
8.9.7 **Automatic coil selection:** Should provide automatic coil selection technique

***8.10 Comprehensive application package**
8.10.1 **Neuro examination:** Should provide dedicatedly designed sequences, protocols and workflow for neuro imaging
8.10.2 **Body examination:** Should provide dedicatedly designed sequences, protocols and workflow for body imaging
8.10.3 **Orthopedics examination:** Should provide dedicatedly designed sequences, protocols and workflow for orthopedics imaging
8.10.4 **Oncology examination:** Should provide dedicatedly designed sequences, protocols and workflow for oncology imaging
8.10.5 **Breast examination:** Should provide dedicatedly designed sequences, protocols and workflow for breast imaging

8.10.6 **Vessel examination:** Should provide dedicatedly designed sequences, protocols and workflow for vessel imaging

8.10.7 **Cardiac examination:** Should provide dedicatedly designed sequences, protocols and workflow for cardiac imaging

8.10.8 **Pediatric examination:** Should provide dedicatedly designed sequences, protocols and workflow for pediatric imaging

9. ADVANCED APPLICATION

*9.1 **Compressed Speeder / Compressed sensing or compressed sensing-based acceleration technology:** Should support compressed sensing technique, and it cannot be replaced by other technologies such as parallel imaging technology.

*9.1.1 **Compressed sensing for dynamic imaging:** Specify the highest temporal resolution achievable for the quoted MR system

*9.1.2 **Compressed sensing for static imaging:** Should support compressed sensing technique for 2D and 3D static imaging

*9.1.3 **High speed reconstruction machine for compressed sensing:** Should provide high speed reconstruction machine for compressed sensing imaging data

*9.2 **Susceptibility weighted imaging:** Support amplitude map, phase map, and MinIP reconstruction

*9.3 **Susceptibility weighted imaging with blood signal suppression:** Should support blood signal suppression in susceptibility weighted imaging

*9.4 **Susceptibility weighted imaging in abdomen:** Support fast acquisition for a single layer to obtain a comparison of tissue susceptibility

*9.5 **Magnet resonance spectroscopy:** Support single voxel and multi voxel acquisition for 2D and 3D

*9.6 **Diffusion tensor imaging (DTI):** Should support ≥128 directions diffusion tensor imaging

*9.7 **Brain perfusion:** Should support brain perfusion to show high temporal resolution imaging of brain tissue

*9.8 **Functional MRI with BOLD technology:** Should support BOLD to analyze brain function, such as motion and cognitive positioning, and data of activated brain region with respect to susceptibility changes

*9.9 **Fat quantification technology:** Should support fat quantification technique, specify the technology name

*9.10 **Computed DWI technology:** Should support computed DWI technology that produces computed b value DWI images

*9.11 **Small FOV DWI / RDC DWI** or equivalent**:** Should support DWI in small FOV, specify the technology name

9.12 **Mapping technology:** Should provide sequences for tissue T1, T2* mapping

*9.13 **Smart examination:** Should support automatic “one-button-to-push” anatomical orientation for examination process

*9.13.1 **Head smart examination:** Should support smart examination for head

*9.13.2 **Spine smart examination:** Should support smart examination for spine

*9.13.3 **knee smart examination:** Should support smart examination for knee

*9.13.4 **Cardiac smart examination:** Should support smart examination for cardiac

9.14 **Multiple protocols manipulation:** Should support manipulation of multiple protocols within a single user interface

*9.15 **Cardiac imaging package:** Should provide cardiac imaging package

*9.16 **Advanced image post-processing workstation:** Should provide the latest version of image post-

processing workstation

9.16.1 **BOLD analysis:** Should provide post-processing software for evaluation of functional MRI data

9.16.2 **MRS analysis:** Should provide post-processing software for evaluation of MRS data, including single voxel and multiple voxel data

9.16.3 **Brain perfusion analysis:** Should provide post-processing software for evaluation of MR brain perfusion data

9.16.4 **Tractography:** Should provide post-processing software for DTI and Tractography, estimation of ADC, FA, fiber tracking, fiber statistics and display of fiber tracts on anatomical images

9.16.5 **Breast evaluation and analysis:** Should provide post-processing software for evaluation of MR breast imaging data

9.16.6 **Maps analysis:** Should provide post-processing software for the calculation of T1, T2*, R2* and ADC

9.16.7 **Image fusion:** Should provide post-processing software for images fusions of different MRI contrasts

9.16.8 **Vessel analysis:** Should provide post-processing software for angiography analysis, with the accurate extraction of blood vessels and fast automatic measurement including:

a. Phase Contrast
b. TOF MRA
c. Dynamic Contrast-enhanced MR Angiography
d. 3D ASL
e. SNAP
f. Non-contrast MRA

9.16.9 **Cardiac analysis:**

Should provide post-processing software for cardiac function analysis including:

a. Morphology
b. Cardiac Function
c. Cardiac Perfusion
d. Cardiac Viability
e. Mapping
f. Coronary Imaging
g. Flow Quantification 2D

***10. AI SOLUTIONS AND ADVANCED SOFTWARE**

*10.1 **Deep Learning Image Reconstruction:** Deep learning network should intelligently recognize and remove noise to optimize image detail and improve image quality. It should support all body parts examination.

*10.2 **AI Based Compressed Sensing / Compress Speeder:** AI based compressed sensing should integrate AI based compressed sensing, parallel acquisition and half-Fourier acceleration technologies and perform deep learning on prior knowledge through AI.

*10.3 **Quiet Imaging:** System should have the feature to reduce overall gradient noise during scanning. Standard Electronic and/or acoustic sound dampening will not be acceptable. Quiet imaging should be applicable for all sequences.

*10.4 **Wireless Respiratory Gating Acquisition:** System should have the capability in hardware and software for wireless respiratory gated acquisition without the need for a respiratory belt.

11. EXAMINATION ENVIRONMENT

11.1 **Communication system:** Should provide two-way intercom to communicate with patient for scan instruction and patient's anxiety elimination

11.2 **MR compatible headphone:** Should provide MR compatible headphone to play music or to communicate with patient

11.3 **Adjustable patient comfort setting in tunnel:** Should provide adjustable patient comfort setting of ventilation and in-bore lightness

11.4 **Control panels:** Should provide dual-side control panels with touching screen

11.5 **Vital signal monitor:** Should provide wireless vital signal monitor to display patients ECG, signal of pulse and respiration

11.6 **Bed-side patient information system:** Should provide bed-side system to display patient's personal and examination information

11.7 **Emergency alarm device:** Should provide emergency alarm device for patient during examination

*11.8 **Maximum weight of patient table:** ≥220kg

11.9 **Maximum horizontal moving speed of patient table:** ≥20cm/s

11.10 **Length of patient table:** ≥ 200cm

11.11 **Scanning range:** ≥ 180cm

11.12 **Automatic table movement for multi-station scan:** Should provide automatic table movement for multi-station scan

11.13 **Emergency stop button:** Should have emergency stop button on each side of patient table

11.14 **MR compatible drip stand:** Should provide MR compatible drip stand

11.15 **MR compatible paper roll stand:** Should provide MR compatible paper roll stand

11.16 **Coil cabinet:** Should provide coil cabinet for coils storage

12 THIRD PARTY ACCESSORIES

*12.1 **Imported RF Cage with complete interior finishes:** Complete details of RF Cage recommended by the manufacturer should be provided

*12.2 **Imported Chiller (2Nos):** Should provide compatible chillers as per manufacturers recommendations

12.3 **MRI Compatible Wheelchair**

12.4 **MRI Compatible Stretcher**

12.5 **MRI Compatible Power Injector:** Should provide details of MRI compatible power injector with at least 100 syringes.

12.6 **MRI Compatible Anesthesia Machine:** Should provide details of MRI Compatible Anesthesia Machine

12.7 **Compatible Online UPS for MRI Suite:** UPS Must include backup of at least 10 minutes for the system and the chillers

13 ANY TWO OF THE FOLLOWING CERTIFICATIONS/STANDARDS:

13.1 510(k) USA- Food & Drug Administration (USA-FDA)
13.2 European MDD (CE) 93/42/EEC (Medical Device Directive)
13.3 Japan Industrial Standard (JIS) / Japan Quality Assurance Organization (JQAO) / Certificate issued by Ministry of Health, Labour and Welfare (MHLW) Govt. of Japan

14 UPGRADES

*14.1 Must separately quote cost of Future Software Upgrades (for Console licenses and Advanced Post-processing (workstation) licenses.

*14.2 Quote model must be equipped with ALL available options. Must quote separately all available software not mentioned in the tender

15 INSTALLATION AND COMMISSIONING

*15.1 The contracting firm will install the complete system within 4 months starting from the date of establishing L/C.

Confirmation for this timeline must be mentioned on the Company Letterhead and the vendor will be bound to adhere to the timeline. If a bidder does not confirm to agree to this, the tender bid may be rejected.

15.2 If a vendor fails to meet the timeline the hospital will impose penalties.

16 WARRANTY & POST WARRANTY

*16.1 **Five years Comprehensive Warranty:**
Five five-year comprehensive warranty period for the complete package shall start from the date of full functional commissioning including all RF Coils, Cold head, Helium and all parts.

*16.2 Comprehensive annual maintenance cost of 8% will be applicable after warranty up to 10th year

16.3 Maintenance of the machine/equipment during the whole period of warranty shall be the responsibility of the vendor failing which, the vendor will have to pay down downtime penalty as indicated in terms and conditions.

17 DOWNTIME CONDITIONS

17.1 **An annual optimal uptime of 95% is considered as an acceptable level of performance:**
Uptime should be defined as time available to user for data acquisition and processing on all working days throughout the year.
If the uptime percentage for the measurement period shall fall short of 95% annually, the following formula will be applied to determine additional days in the warranty / service contract period.
• 100 – 96% No penalty
• 95 – 90% the warranty period will be extended by 1.5 times the number of days as extra downtime.
• 89 – 80% the warranty period will be extended by 2 times the number of days as extra downtime.
• Below 80% the warranty period will be extended by 4 times the number of days as extra downtime.

The 8 hours non-functioning of the equipment or any part there of (all features as per specifications in contract/proposal) will be considered as one day down time. The equipment shall be fully functional as part of uptime and if it is partly functional i.e. some patients/procedures are not done, it should be considered as down time accordingly. If in this case, equipment is 70% functional i.e. 70% patients can be done on the machine, downtime will be 30% and warranty compensation will be made accordingly in terms of warranty extension as mentioned above.

Downtime is defined as the failure in the equipment operation to acquire or process the data, resulting in inability to carry out the required procedure properly.

Downtime will start as the end users notifies the designated service / facility verbally or in writing.

Downtime will end when satisfactory repairs have been affected and the system is again fully functional with all parameters available for clinical use.

The scheduled preventive maintenance shall not be considered as down time and shall not be more than two days.

17.2 Manufacturer / supplier will be responsible for preventive maintenance of the system as per manufacturer recommendation, should keep a check on electrical, magnetic, temperature and humidity conditions. Such a check should be made every four weeks and record should be provided to radiology department.

17.3 Manufacturer / supplier will guarantee the availability of spare parts and accessories for the system for at least 10 years.

17.4 Manufacturer / supplier should also confirm that in event of the services costs falling or reducing in line with the manufacturer policy worldwide due to technical innovations or other reviews, they will reduce the maintenance cost accordingly.