

## تنويه

م/ تمديد غلق المناقصة المرقمة 66/2023/125  
تجهيز اجهزة MRI

تحية طيبة..

نود اعلامكم انه تم تعديل المواصفات الفنية المذكورة ادناه لأجهزة MRI 1.5 T و MRI 3T وتمديد غلق المناقصة انفا ليكون الغلق (2024/1/8) بدلا من (2023/12/24) شاكرين لكم تعاونكم معنا.  
...مع الاحترام

## Notice

Subj/Inv No : 66/ 2023/125

### Dear Sirs:

We would like to inform you that hereunder technical specifications for MRI 1.5T & MRI 3T has been amended & closing date has been extended to (8/1/2024) instead of (24/12/2023) Thanks for your cooperation.

TKS & B.RQPS

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DEVICE NAME: Scanning Systems, Magnetic Resonance Imaging 3T

CLINICAL APPLICATION	High performance, whole body, general application
<p>MAGNET</p> <ul style="list-style-type: none"> <li>• Strength</li> <li>• Dimensions of maximum useful FOV and homogeneity, (x, y, z), cm</li> <li>• Guaranteed homogeneity, ppm, within 30 cm DSV</li> <li>• Guaranteed homogeneity, ppm, within 45 cm DSV or 40 cm</li> <li>• Cryogen refill frequency</li> <li>• Shimming</li> </ul>	<p>3 T</p> <p><math>\geq (50 \times 50 \times 45)</math> cm (higher is preferred)</p> <p><math>\leq 0.3</math></p> <p><math>\leq 1.5</math></p> <p>Zero boil-off or <math>\leq 7</math> liter helium</p> <p>Active &amp;/ or passive &amp;/ or( Advanced High order ) (High order shim is preferred)</p>
<p>GANTRY</p> <ul style="list-style-type: none"> <li>• Bore diameter at isocenter, cm</li> <li>• Total bore length with covers, cm</li> </ul>	<p><math>\geq 70</math> cm</p> <p><math>\leq 210</math> cm</p>
TABLE	

<ul style="list-style-type: none"> <li>• Maximum patient weight (including vertical and horizontal movements , kg</li> </ul>	$\geq 200$ kg
Elevating <ul style="list-style-type: none"> <li>• Minimum table height from floor cm</li> <li>• Detachable table</li> </ul>	YES $\leq 73$  Yes
ACOUSTIC NOISE <ul style="list-style-type: none"> <li>• Maximum sound pressure level (SPL) at peak gradient amplitude and slew rate, dB(A)</li> <li>• Acoustic noise reduction</li> </ul>	Lower preferred  Higher preferred
GRADIENT SYSTEM <ul style="list-style-type: none"> <li>• Standard strength, z-axis, mT/m</li> <li>• Standard slew rate, z-axis, T/m/sec</li> <li>• Spin echo pulse sequences, minimum TR , msec</li> <li>• Gradient echo pulse sequences, minimum TR in 2-D and 3-D,msec</li> </ul>	$\geq 45$ (Along each axis simultaneously ) $\geq 200$ (Along each axis simultaneously )  $\leq 9$ (lower is preferred)  $\leq 1.1$
RF TRANSMIT AND RECEIVE <ul style="list-style-type: none"> <li>• Integration all RF receive component ( including ADC)</li> <li>• Power output, kW</li> </ul>	( should be specified )  $\geq (30)$ kW or $\geq (2*15)$ kW

<ul style="list-style-type: none"> <li>No. of independent receiver channels that can be used simultaneously in one single scan at one FOV each generating an independent partial image</li> <li>Parallel imaging</li> </ul>	<p>≥ 32 or independent</p> <p>Yes ( Acceleration technique 2D &amp; 3D) or its equivalent</p>
<b>COILS</b>	Should be specified the Weight for each coil
<p>Dedicated surface or adaptable multi-element matrix coils</p> <p>Automatic or manual element selection</p>	<p>Yes</p> <p>Yes ( Automatic preferred )</p>
<p><b>Head / neck ( Higher Channels are preferred )</b></p>	<p>Should be Required with at least 20 Channels light weight comfortable</p>
<p><b>Spine ( Higher Channels are preferred )</b></p>	<p>Should be Required with at least 32 Channels light weight comfortable</p>
<p><b>Torso (AA)( Higher Channels are preferred )</b></p>	<p>Should be Required with at least 16 Channels light weight comfortable</p>
<p><b>Breast ( Higher Channels are preferred )</b></p>	<p>Should be Required with at least 8 Channels light weight comfortable</p>
<p><b>Rigid Dedicated Knee(Tx &amp; Rx )( Higher Channels are preferred )</b></p>	<p>Should be Required with at least 8 Channels light weight comfortable</p>

<p><b>Shoulder( Higher Channels are preferred )</b></p> <p><b>Flex( Higher Channels are preferred )</b></p>	<p>Should be Required with at least 12 Channels light weight comfortable</p> <p>Should be Required with at least 16 Channels light weight comfortable</p> <p>2 different size should be required with at least 4 Channels light weight comfortable</p>
<p>Other Standard Coils</p>	<p>According to manufacturer (properties should be specified in details)</p>
<p>MRI stretcher computable</p>	<p>YES</p>
<p><b>SCANNING TECHNIQUES</b></p> <p><b>Standard pulse sequences</b></p> <ul style="list-style-type: none"> <li>• Spin echo (SE)</li> <li>• Turbo Spin echo, Fast spin echo</li> <li>• Fast Gradient Echo with preparation pulse or turbo.</li> <li>• Multi- echo with identical phase - encoding for the whole echo train and automatic combination of the echoes , to minimize flow artifacts and chemical shift artifacts</li> </ul>	<p>All should be clarified in details</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>

- Dual - echo acquisition , Double Echo Steady State
- Constructive Interference in Steady State
- Diffusion imaging
- Echo Planar Imaging (EPI)
- Single – shot TSE

Yes

Yes

Yes

Yes

Yes

**Image acquisition**

- Automated real - time prospective motion detection and correction shall be included, 1D motion detection and correction , 2D motion detection and correction
- Isotropic 3-D T1
- Isotropic 3-D fast spin echoT2
- Water contrast
- Fat contrast
- Phase contrast
- MARS(metal artifact reduction sequence)

Yes

Yes

Yes

Yes

Yes

Yes

Yes

**Gradient echo**

- Spoiled techniques
- Rewound techniques

Yes

Yes

<ul style="list-style-type: none"> <li>• Steady state free precession</li> <li>• Inversion recovery</li> <li>• Magnetic transfer contrast</li> <li>• Magnetic susceptibility imaging</li> <li>• Whole body diffusion</li> <li>• Diffusion image</li> <li>• Diffusion tensor imaging</li> <li>• Perfusion imaging</li> <li>• Spectroscopy ( single &amp; multi voxel )</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes ( Advanced post processing )</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes ( Advanced post processing )</p>
<ul style="list-style-type: none"> <li>• ECG gated</li> <li>• Cardiac imaging</li> <li>• Respiratory gating</li> <li>• Contrast-enhanced imaging</li> <li>• Extremity contrast-enhanced imaging</li> <li>• Other Standards</li> </ul>	<p>Yes</p> <p>Yes ( should be specified )</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
<p><b>Non-contrast angiographic imaging</b></p> <p>Time of flight</p> <p>Phase contrast</p> <p>SSFP or PSIF</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p>
<p><b>Application</b></p>	
<p>The following application shall be included</p>	<p>MR Angiography, Cardiac imaging</p>

<ul style="list-style-type: none"> <li>• PSIR (phase sensitive inversion recovery)</li> <li>• Advanced neuro</li> <li>• Artificial Intelligence with advanced features</li> <li>• Other application</li> </ul>	<p>Yes</p> <p>Yes ( should be specified )</p> <p>Yes ( should be specified )</p> <p>Yes (according to manufacture)</p>
<p><b>IMAGE PROCESSOR</b></p> <p><b>Reconstruction</b></p>	<p>The possibility of automatically displaying images immediately after reconstruction shall be included</p> <p>Yes (should be specified)</p>
<p><b>Workstation Quantitative image analysis tools</b></p> <ul style="list-style-type: none"> <li>• Cardiac imaging</li> <li>• Advanced neuro imaging</li> </ul> <p>• 3-D image reconstruction</p> <p>• Other standards</p>	<p>Should contain all the clinical application that mentioned above</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>According to manufacturer (should be specified in details)</p>
<p><b>CONTROL CONSOLE</b></p> <ul style="list-style-type: none"> <li>• Graphic user interface</li> <li>• Workflow efficiency features</li> <li>• Remote access</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p>



<ul style="list-style-type: none"> <li>• Remote control</li> <li>• Protocol-sharing tools</li> <li>• Parameter adjustment aides</li> <li>• Respiratory gating</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
SYSTEM INTEGRATION DICOM	Yes
PATIENT POSITIONING AIDES	Yes
cushions for stable and comfortable positioning of the patient during the examination	Yes
MR-compatible wheel chair for transporting a patient into the examination room	Yes
PATIENT MONITORING Respiratory ECG ECG Triggering	<p>Yes</p> <p>Yes</p> <p>Yes</p>
Site preparation	Yes (should be specified)
Cooling System	According to manufacturer (should be suitable to work in Iraq climate ( temperature& humidity)
CONTRAST INJECTION SYSTEM	Yes should be specified with (Starting kit of disposable syringe sets for $\geq 100$ patients)
Dry Radiographic Film Printer	Yes stander specification should be specified (Starting kit of $\geq 1000$ film is supplier responsibility)

<p>Traning</p>	<p>Local traing : (1 week)  1 Radiologist  1 eng (from hospital)  1 Technical Radiographer or Radiographer ( from hospital )</p> <p>Abroad training: (1 week)  1 Radiologist  1 eng.(from hospital for 1 week)  1 eng. (from medical equipment management dep.)  1 Technical Radiographer or Radiographer ( from hospital )  1 eng. (from kimadia).</p>
<p>*Power supply  Line voltage</p>	<p>- Medical Approved power supply board  - 380 VAC ,50/ 60 Hz</p>
<p>Smart UPS for all system including chiller</p>	<p>-160 KVA continues power supplying technique</p>

DEVICE NAME: Scanning Systems, Magnetic Resonance Imaging ( MRI )1.5T, Full-Body closed system

CLINICAL APPLICATION	High performance, whole body, general application
<b>MAGNET</b> Strength Guaranteed homogeneity, ppm, within 30 cm DSV Guaranteed homogeneity, ppm, within 45 cm or 40 cm DSV Dimensions of maximum useful FOV and homogeneity, (x, y, z), cm Shielding Cryogen refill frequency	1.5 T $\leq 0.42$ $\leq 1.2$ $\geq 50 \times 50 \times 45$ cm Active Zero boil-off or $\leq 7$ liter helium
<b>GANTRY</b> Bore diameter at isocenter, cm Total bore length with covers, cm	$\geq 70$ $\leq 185$
<b>TABLE</b>	

Maximum patient weight (including vertical and horizontal movements , kg	$\geq 200$ kg
Elevating Minimum table height from floor cm	Yes $\leq 70$
<b>ACOUSTIC NOISE</b> Maximum sound pressure level (SPL) at peak gradient amplitude and slew rate, dB(A) Acoustic noise reduction	Lower prefer Higher prefer
<b>GRADIENT SYSTEM</b>  <ul style="list-style-type: none"> <li>• Standard strength, z-axis, mT/m</li> <li>• Standard slew rate, z-axis, T/m/sec</li> <li>• Gradient echo pulse sequences, minimum TR in 2-D &amp; 3-D, msec</li> <li>• Minimum slice thickness 2-D</li> <li>• Minimum slice thickness 3-D, mm</li> </ul>	$\geq 33$ $\geq 120$ $\leq 1$ $\leq 0.5$ $\leq 0.1$
<b>RF TRANSMIT AND RECEIVE</b>  <ul style="list-style-type: none"> <li>• Power output, kW</li> <li>• No. of independent receiver channels that can be used simultaneously in one single scan at one FOV each generating an independent partial image</li> <li>• Parallel imaging</li> </ul>	$\geq 15$ kW $\geq 32$ or independent  Yes
<b>COILS</b>	

<p>Dedicated surface or adaptable multi-element matrix coils Coil selection</p> <p><b>Head/neck</b> ( <b>Higher channels are preferred</b> )</p> <p>Patient mirror(s)</p> <p><b>Spin ( Higher channels are preferred )</b></p> <p><b>Torso (AA)/ Body ( Higher channels are preferred )</b></p> <p><b>Breast ( Higher channels are preferred )</b></p> <p><b>Rigid Dedicated Knee ( Higher channels are preferred )</b></p> <p><b>Shoulder ( Higher channels are preferred )</b></p>	<p>YES</p> <p>( Automatic selection or manual )</p> <p>Should be Required with at least 20 Channels light weight comfortable</p> <p>Yes</p> <p>Should be Required with at least 24 channels light weight comfortable</p> <p>Should be Required with at least 12 channels light weight comfortable</p> <p>Should be Required with at least 7 channels light weight comfortable</p> <p>Should be Required with at least 12 channels light weight comfortable</p>
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Diffusion imaging ( advanced )	Yes
Head	
body	Yes
Echo Planar Imaging (EPI)	Yes
Turbo Inversion Recovery	Yes
Single - shot TSE	Yes
	Yes
	Yes

**Image acquisition**

Patient movement compensated, head	Yes
Patient movement compensated, body	Yes
Automated real - time prospective motion detection and correction shall be included,	Yes
1D motion detection and correction , 2D	
motion detection and correction	
Isotropic 3-D T1	Yes
Isotropic 3-D fast spin echo T2	Yes
Water contrast	Yes
Fat contrast	Yes
Phase contrast	Yes
MARS(metal artifact reduction sequence)	Yes
Fat-suppressed single breath-hold body imaging	Yes

**Gradient echo**

• Spoiled techniques	Yes
• Rewound techniques	Yes
• Steady state free precession	Yes
• Inversion recovery	Yes
• Magnetic transfer contrast	Yes

<ul style="list-style-type: none"> <li>• Magnetic susceptibility imaging</li> <li>• Breast imaging with fat suppression</li> <li>• Ecg gated</li> <li>• Respiratory gating</li> <li>• Contrast-enhanced imaging</li> <li>• Extremity contrast-enhanced imaging</li> <li>• Diffusion imaging</li> <li>• Diffusion tensor imaging</li> <li>• Perfusion imaging, head</li> <li>• Perfusion imaging, body</li> <li>• Spectroscopy (single voxel , multi voxel )</li> <li>• Functional imaging, neurological</li>   <li>• Other Standards</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Optional</p> <p>Yes</p>
<p><b>Non-contrast angiographic imaging</b></p> <p>Time of flight</p> <p>Phase contrast</p> <p>SSFP or PSIF</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p>
<p><b>Application</b></p>	
<p>The following application shall be included</p> <p>Real - Time display</p>	<p>Neuro imaging, MR Angiography, Cardiac imaging , Body imaging ,whole body imaging ,Breast imaging , Orthopedic imaging , Oncological imaging , Pediatric imaging.</p> <p>The possibility of automatically displaying images immediately after reconstruction shall be included</p>



Workstation Quantitative image analysis tools	All standards by the manufacturer (should be clarified in details )
Perfusion imaging	Yes
Diffusion imaging	Yes
Body imaging	Yes
3-D image reconstruction	Yes
Cardiac imaging	Yes
Other standards	According to manufacturer (should be specified in details)
<b>CONTROL CONSOLE</b>	
Graphic user interface	Yes
Workflow efficiency features	Yes
Remote access	Yes
Remote control	Yes
Protocol-sharing tools	Yes
Parameter adjustment aides	Yes
Respiratory gating	Yes
Advanced planning software to guide the operator to perform complex exams	Yes
<b>SYSTEM INTEGRATION</b>	
DICOM	Yes
<b>PATIENT POSITIONING AIDES</b>	Yes
cushions for stable and comfortable positioning of the patient during the examination	Yes
MRI stretcher computable	Yes

MR-compatible wheel chair and truly for transporting a patient into the examination room	Yes
<b>PATIENT MONITORING</b> Respiratory ECG ECG Triggering	Yes Yes Yes
Site preparation	Yes (should be specified) Suitable RF cage
Cooling System	According to manufacturer (should be suitable to work in Iraq climate ( temperature& humidity)
<b>CONTRAST INJECTION SYSTEM</b>	Yes should be specified with (Starting kit of disposable syringe sets for $\geq 100$ patients)
Dry Radiographic Film Printer	Yes stander specification should be specified (Starting kit of $\geq 1000$ film is supplier responsibility)
<b>Training</b>	<p>Local traing : (1 week)</p> <p>1 physician 1 eng (from hospital) 1 Operator ( from hospital )</p> <p>Abroad training: (1 week)</p> <p>1 physician 1 eng.(from hospital for 1 week) 1 eng. (from medical equipment management dep.) 1 Operator ( from hospital ) 1 eng. (from kimadia).</p>
*Power supply Line voltage	- Medical Approved power supply board - 380 VAC ,50/ 60 Hz

Smart UPS for all system including chiller

160 KVA continues power supplying technique

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