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Attorneys for Appellant JMI Edison

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PROCUREMENT APPEALS
DATE: Feb 12, 2018
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FILE NO OPA-PA: 18-001

BEFORE THE OFFICE OF PUBLIC ACCOUNTABILITY
PROCUREMENT APPEAL

In the Appeal of JMI-Edison, Appellant.	Docket No. OPA-PA-18-001 **COMMENTS ON AGENCY STATEMENT**

I. INTRODUCTION

Pursuant to 2 GAR §§ 12104(c)(4) and 12108(a), Appellant JMI-Edison ("JMI/Appellant") submits its Comments on the Agency Statement submitted by the Guam Memorial Hospital Association ("GMHA") to the Office of Public Accountability on January 31, 2018. These comments are submitted to address the inadequacies and unavailing nature of that report regarding the procurement appeal of GMHA IFB 013-2017 (the "IFB").

II. COMMENTS TO AGENCY STATEMENT

GMHA continues to hold to a single ground justifying its denial of JMI's protest: that the CT machines offered by JMI were not responsive to the 64 slice and .625mm slice thickness requirements of the IFB. Agency Statement, 2. GMHA continues to be wrong.

A. GMHA impermissibly seizes upon a single page of the Appendix provided in JMI's submission, and ignores the required specific Bid Submission forms submitted pursuant the IFB's requirements.

GMHA asserts that it "rejected the bid from JMI-Edison because it was nonresponsive to technical specifications in its IFB for two CT scanners." Agency Statement, 3. To support this,

ORIGINAL

GMHA cites to "specifically, Appendix Tab 5.1 Data Sheet, labeled System Hardware," as the reason that GMHA believed that JMI was only offering machines with "32 acquired slices." Agency Statement, 4.

First, GMHA's reliance upon the appendix of JMI's submission in order to find grounds to reject its bid does not conform to the plain terms of the IFB. IFB §1-2 explains that "Each bid must be submitted on the prescribed Bid form contained within Appendix A[of the IFB] and shall be accompanied by all of the required forms and documents required in these Specifications." IFB §1-2, PR 744. None of the required forms include the additional brochures provided by JMI in its bid package Appendix.[1] Simply put, the IFB declared that an offeror like JMI should use the prescribed GMHA bid form and forms in the IFB appendix, and JMI's bid proposal encompassing those documents fully embraces the requirements of the IFB.

Nothing in JMI's bid proposal to GMHA on the mandated bid submission forms declares that JMI was offering "proposed item(s) that are not as specified in this solicitation." To the contrary, JMI's Bid Proposal— submitted on the exact bid proposal forms mandated by GMHA in the IFB— time and again declared an unequivocal intention to bid on CT machines as specified by GMHA. Those declarations of meeting the exact specifications of the IFB appearing in the actual Bid Proposal were ignored by GMHA, and are recounted here:[2]

Document	Description	Location
September 27,	JMI-Edison Sales Manager Jean Grape explains	JMI Bid Submission p.

[1] While §1-42 of the IFB does call for the submission of "Descriptive literature," that mandate only applies to the situation involving "proposed item(s) that are not as specified in this solicitation" so that GMHA can "establish, for the purposes of evaluation and award, details of the product(s) the bidder proposes to furnish...." IFB§1-42, PR 753. At the risk of sounding redundant, JMI never proposed items to GMHA that were not as specified in the solicitation.

[2] The Agency Procurement Record lodged in this matter on January 24, 2018, failed to include JMI's bid submission. JMI's bid was included in the Agency Report filed on January 31, 2018, though that report was not bate stamped. For ease of reference, the relevant pages of JMI's submission are either excerpted or attached to these Comments.

2017, JMI Bid Cover letter	without equivocation that "This proposal will comply with GMHA Procurement and Installation of New CT Scanners under GMHA IFB #:013-2017 requirement.	3; Attached as **Exhibit A** to these comments
Invitation for Bid Award	JMI-Edison President Eduardo R. Ilao signs the Invitation for Bid Award sheet agreeing to meet the IFB specifications "as per attached"	JMI Invitation For Bid Form; Attached as **Exhibit B** to these comments
Bid Proposal Form (IFB Form Appendix A)	JMI –Edison President Eduardo R. Ilao signs the GMHA official Bid Proposal Form and, without equivocation or deviation from the requirements of the IFB, "agrees to furnish all necessary labor, materials, equipment, tools, and services necessary for the purchase, installation, and training of new CT scanners, pursuant to Invitation for Bids No. GMHA IFB 013-2017 in accordance with the Specifications and other Contract Documents composing the Invitation for Bids for the sum of $1,224,040.00."	JMI Bid Submission, Tab 2, p.1, IFB Form Appendix A; Attached as **Exhibit C** to these comments
Price Bid Form (IFB Form Appendix B)	JMI-Edison submits a detailed price bid providing specific and unequivocal bid prices for a "CT 64 cardiac capable system" and a "CT 64 non cardiac capable system." The specific	JMI Bid Submission, Tab 3, IFB Form Appendix B; Attached as **Exhibit D** to these

	machines offered are from the GE Revolution EVO line of products.	comments

GMHA's conclusion that JMI failed to offer appropriate goods under the IFB also ignores the Bid Bond that JMI submitted along with its bid. As the Bond makes clear, JMI's surety has agreed to provide "sufficient surety for the faithful performance of [the] Contract...." JMI Bid Bond submission, Attached as **Exhibit E** to these comments. The contract, of course, is for providing 64 slice machines operating with .625mm accuracy to GMHA. GMHA somehow decided to conclude that JMI was not offering the machines required by the IFB, despite obtaining a bond to guaranty just that.[3]

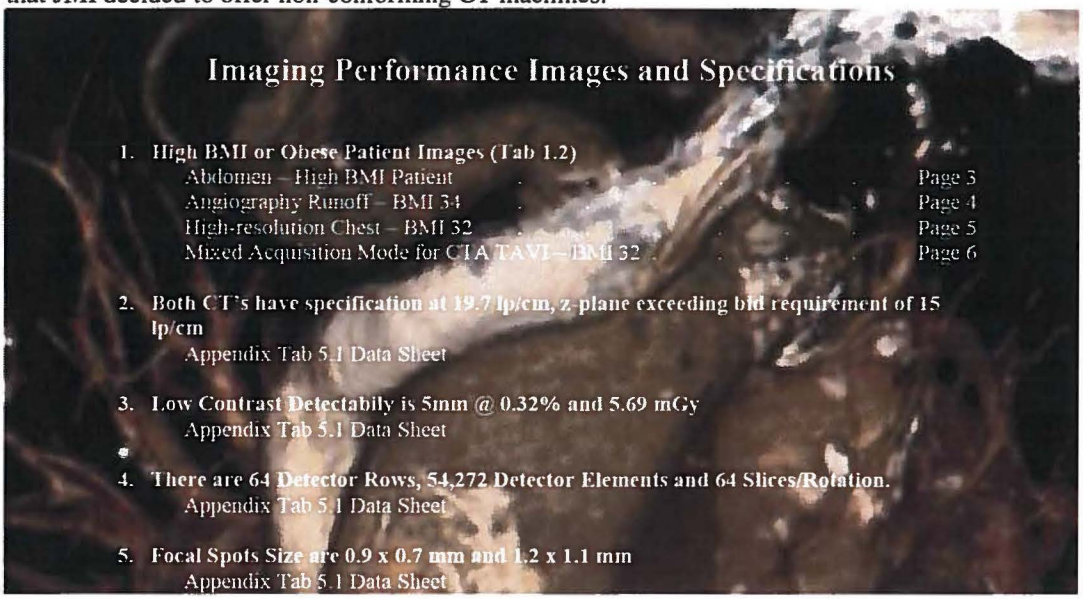
B. GMHA's flawed determination of JMI's responsiveness also ignores numerous performance images and specification included in JMI's submission.

Further cutting against GMHA's claim that JMI was offering non-conforming CT machines is the fact that JMI's proposal included an entire section of numerous Imaging performance images and Specifications that clearly showed CT machines operating at a full 64 detector rows and 64 slices per rotation.. *See* Imaging performance images and Specifications, Attached as **Exhibit F** to these comments.

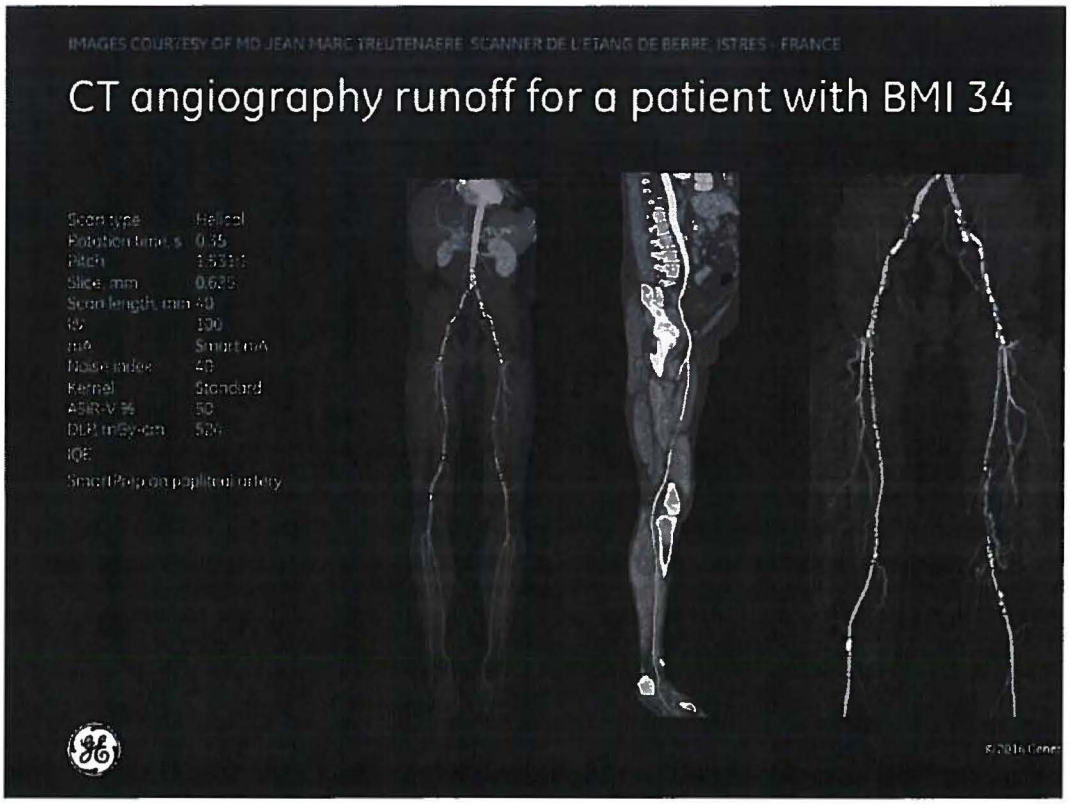
The very first page of the section, excerpted here below, explained that the offered machine would have the requisite "64 detector rows, 54,272 Detector Elements and 64 Slices/Rotation."

[3] GMHA's conduct to seek out a reason to declare JMI's bid non-responsive also directly contradicts the plain language of the IFB itself. The IFB explains that the submission of a bid is "prima facie evidence" that the bidder agrees to provide the goods exactly as required by GMHA. IFB, §1-4, Procurement Records ("PR") 745. Here, though GMHA's IFB declares that the submission of a bid is prima facie evidence that the bidder agrees to provide

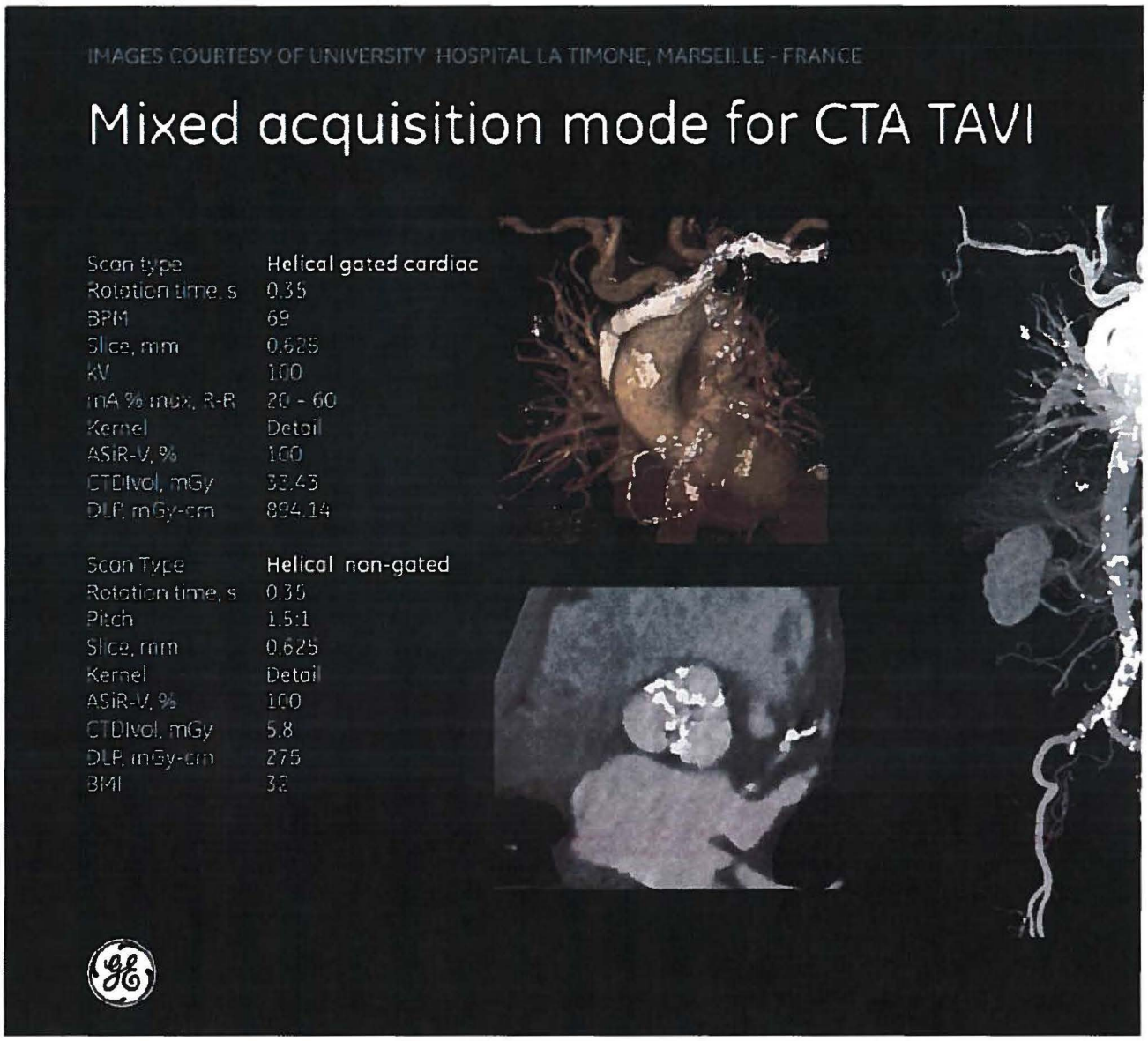
the CT machines as specified, GMHA nevertheless ignores the command of the IFB and instead concocts a theory that JMI decided to offer non-conforming CT machines.



More, JMI's submission of performance imaging and specifications made it clear that the appropriate image slice size would be provided to GMHA. A sample image of a CT angiography of a patient with a BMI of 34 shows the image to be "0.625" mm in thickness.



And again, a sample image of a "mixed acquisition mode" shows the same "0.625" of slice thickness.

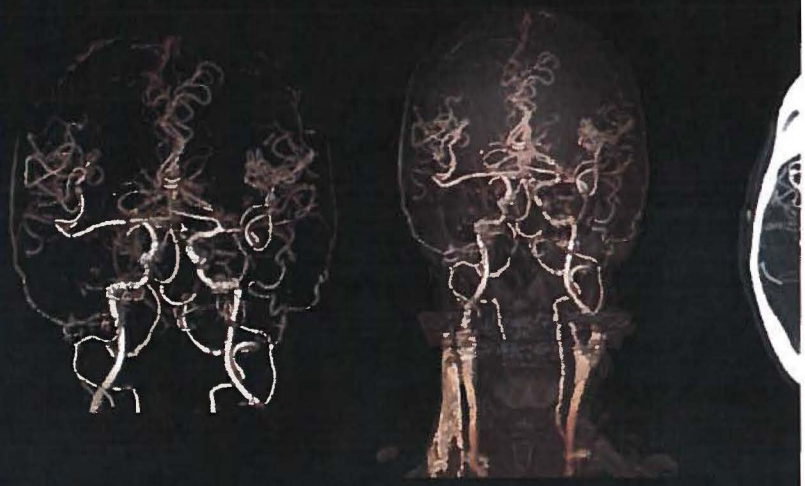


This is repeated time and again with sample images for "low-dose and high quality CT for Circle of Willis," "Coronary CTA at low dose," "Thoracic-abdominal aorta," "peripheral angiography," "Low-dose PE," and "Fast High Resolution Scanning." These images showing .625mm slice thickness are excerpted here, attached as **Exhibit F**, and were ignored by GMHA.

IMAGES COURTESY OF MÄLARSJUKHUSET HOSPITAL, ESKILSTUNA - SWEDEN

Low-dose and high-quality CT for Circle of Willis

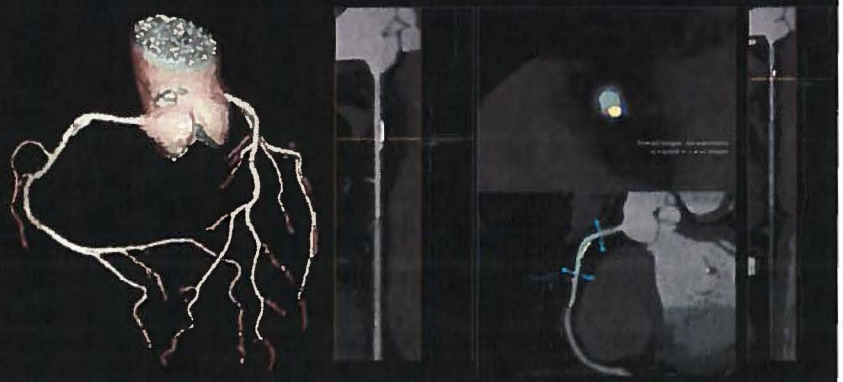
Scan type	Helical
Pitch	0.531:1
Rotation time, s	0.4
kV	100
mA	70
Slice, mm	0.625
Noise Index	15
ASiR-V %	40
Kernel	Standard
CTDIvol, mGy	75
DLP, mGy-cm	298



IMAGES COURTESY OF CLINIQUE PARLY II, VERSAILLES - FRANCE

Coronary CTA at low-dose with SnapShot Pulse

Scan type	Axial gated
Rotation time, s	0.35
Slice, mm	0.625
Scan length, mm	140
kV	100
mA	400
Kernel	Standard
ASiR-V %	50
CTDIvol, mGy	9.7
DLP, mGy-cm	136
Eff. dose, mSv[1]	1.9

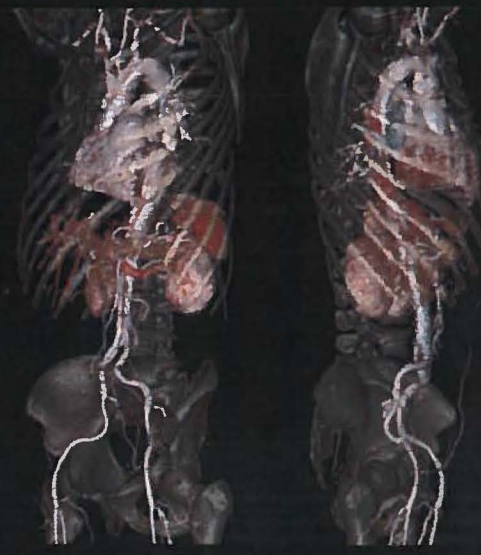


1. Obtained using a chest conversion factor of 0.014 *DLP

IMAGES COURTESY OF HUMANITAS RESEARCH HOSPITAL, MILANO - ITALIA

Thoracic-abdominal aorta

Scan type	Helical Gated Helical
Rotation time, s	0.35
Cardiac Segment	40-80
Pitch	1.531
Slice, mm	0.625
kV	100
Kernel	Standard
ASIR-V %	80
CM, ml	90
Saline fl. 4.0, ml	50
CTDIvol, mGy	8.5
DLP, mGy-cm	759
Eff. Dose, mSv	12.9
Total scan time, s	16
Noise Index	36



1. Estimated using a chest-abdomen-pelvis conversion factor of 0.017 DLP

IMAGES COURTESY OF DORSET COUNTY HOSPITAL, DORCHESTER - UNITED KINGDOM

Excellent IQ for peripheral angiography

Scan type	Helical
Rotation time, s	0.6
Pitch	0.516
Slice, mm	0.625
kV	100
mA	80
Noise index	20
Kernel	Standard
ASIR-V %	70
CTDIvol, mGy	5.0
DLP, mGy-cm	694

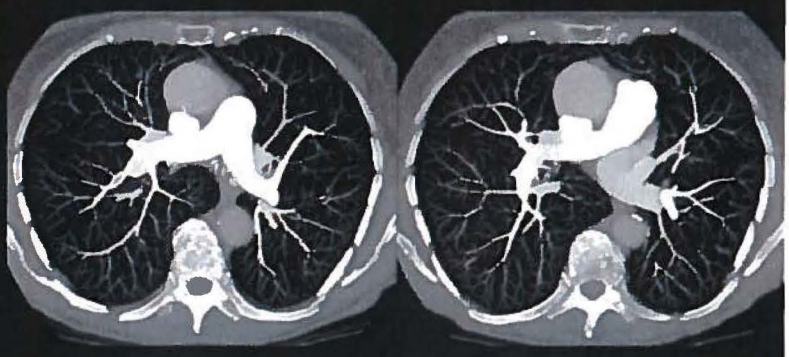
Volume Rendered

Volu

IMAGES COURTESY OF WHEATON FRANCISCAN - FRANKLIN, WI - REVOLUTION EVO

Low-dose PE in 2.67 seconds at full resolution

Scan type	Helical
Rotation time, s	0.5
Slice, mm	0.625
Scan time, s	2.67
kV	100
mA	150-280
Kernel	Standard
ASiR-V%	60
CTDIvol, mGy	3.4
DLP, mGy-cm	98
Eff. dose, mSv	1.4



Determined by EUR-16262 EN Chest factor of 0.0014 x DLP using a

IMAGES COURTESY OF WHEATON FRANCISCAN - FRANKLIN, WI - REVOLUTION EVO

Fast high-resolution scanning for trauma evaluation

Scan type	Helical
Rotation time, s	0.6
Slice, mm	0.625
Scan time, s	3.09
kV	120
mA	Auto mA
Kernel	Bone
CTDIvol, mGy	12.3
DLP, mGy-cm	418
Eff. dose, mSv	0.6

Determined by EUR-16262 EN trunk factor of 0.0015 x DLP using a 32 cm phanto

C. GMHA's claimed uncertainty regarding whether JMI was providing CT machines with manufacturer upgrades to 64 slices strains credulity.

GMHA acknowledges that "JMI-Edison's bid included information on certain machines which could be upgraded to the specifications required by the IFB..." Agency Statement, 4. GMHA, again reaching beyond the plain offer contained in JMI's Bid Proposal, says that JMI was non-responsive because "JMI'Edison's bid included information on certain machines which could be upgraded to the specifications required by the IFB, but was not clear that the upgrade was part of the bid and not the base model." Agency Statement, 4. This is wrong. JMI's submission made it clear that each of the machines offered to GMHA did indeed include the 64 slice upgrade.

JMI provided to GMHA a "System Detail Description" of its bid packet. That packet section explained the details of the particular GE Revolution EVO systems that would be provided, and that included the "64 channel detector upgrade." That inclusion is excerpted here:

B78B0CE
64 Channel Detector Upgrade

See JMI System Detail Description, Attached as **Exhibit G** to these comments.

Finally, JMI, as part of its submission regarding eventual Equipment Delivery to GMHA, explained how it would be providing training on "work safety in the 64 slice CTs environment."

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GE CT SCANNER TECHNICAL TRAINING:

COURSE COMPETENCIES:

Upon successfully completing this course, the student should be able to:

- **Perform all work according to safety regulations and standards on a CT system**
- **Perform basic system setup, scan and image/data manipulation and storage on a CT system**
- **Identify common problems on CT Systems**
- **Identify required tools and documentation for system service**
- **Work safely in the 64 slice CTs environment**

See System Detail Description, Attached as **Exhibit H** to these comments.

D. GMHA's conclusion that JMI would not be providing 64 slice CT machines to GMHA contradicts JMI's existing history of providing 64 slice CT machines to GMHA and other Guam Health providers.

GMHA's conclusion that JMI would be non-responsive to the instant IFB is especially troubling given JMI's established history of provided 64 slice, .625mm CT machines to various medical providers, including GMHA in 2006 and the United States Naval Hospital, Guam, in 2014. JMI provided a detailed Statement of Qualification as part of its bid submission, and that work history— history ignored by GMHA for this procurement— is attached to these comments as **Exhibit I**, and excerpted below.

Radiology-Related Projects on Guam

JMI-Edison **has extensive experience, expertise and specialized technical knowledge in radiology & medical equipment. Specifically, we have numerous projects that we have successfully secured and implemented from the Government of Guam and GMHA. For Bid Invitation No.: GMHA IFB 013-2017, we have selected projects that have the most relevance to this scope of work. Please refer to the highlighted list below: (*a full portfolio may be submitted upon request*)**

Year	Customer	Description	Deliverables

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2006	**GMHA**	**2006 Radiology Equipment Upgrade Project & Site-related Preparations, Equipment Installations, Applications Support, and Acceptance Testing Support**	**Supply and Installation of all 2006 Radiology Equipment to include: GE Lightspeed VCT 64-slice CT, GE Precision 500D Fluoroscopy unit, GE Innova 3100 Angiography unit and Logiq 7 Ultrasound machine.**

2014	**US Naval Hospital**	**Equipment Installation**	**Successfully installed Radiology Equipment in the new Navy Hospital to include: GE Optima CT660 64-slice CT Scanner, GE Precision 500D Fluoroscopy, GE Senographe Essential Mammography systems, GE Discovery 670 Nuclear/CT Imaging camera, GE XR650 Digital Radiography Systems, GE XR220 Mobile Digital Radiography System & GE Discovery 750W 3.0T MRI System.**

E. GMHA clearly did not review all of the Appendix submitted by JMI in its submission, as the Appendix shows conformance to the IFB's specifications.

JMI, in an effort to provide the maximum amount of information to GMHA about the GE Revolution EVO line of CT machines, provided GMHA with additional information and manufacturer brochures about those products in an "Appendix" to JMI's bid proposal. This appendix has been used by GMHA to support the claim that JMI sought to deviate from the specifications of the IFB and instead offer 32 slice detector machines that could not take .625mm thick slice images. Again, GMHA's use of the Appendix to determine responsiveness was unnecessary as JMI had, in the actual Bid Proposal documents mandated by GMHA, agreed to provide the CT machines as specified by GMHA. Nevertheless, GMHA clearly neglected to review the entire appendix, as JMI's appendix made it plain that the machines offered were indeed machines that would be equipped with the necessary 64 slice detectors, and that those

detectors provided .625mm slice thickness. Pages from JMI's appendix that were ignored by GMHA are excerpted here, and attached to these comments as **Exhibit J.**

System Configuration

Standard system hardware
40 mm Clarity detector with 2D collimator to reduce scatter noise
Up to 0.28 mm spatial resolution
64 slices (see page 5 for details)
Performix™ 40 Plus x-ray tube with liquid metal bearing

System Hardware

Detector and data acquisition system	
HiLight Clarity detector	Inherited directly from our breakthrough Revolution CT system, the Clarity detector is the heart of Revolution EVO. With its high-resolution imaging capabilities, you can see details as small as 0.28 mm. The Clarity detector delivers improved dose efficiency and signal-to-noise ratio as well, plus large coverage with z-axis uniformity.
Integrated Clarity data acquisition system	Thanks to its revolutionary, patented design, the data acquisition system is integrated directly onto the photo diode. This reduces the size of the data acquisition system by 75%, reduces electronic noise by 44%, and lowers power consumption by 90% compared to previous-generation systems.
HiLight™ scintillator	GE proprietary, patented scintillator was designed specifically for CT imaging and provides key performance properties that make it ideal for the task including high primary speed (affects spatial resolution at fast rotation speeds), low afterglow (affects artifacts) and high x-ray stopping power (affects image quality per dose).
Clarity 2D collimator	Designed to reduce scatter and improve image quality.
Maximum number of slices per rotation	32 (acquired slices), up to 64 (axial reconstructed slices)
Number of detector rows	64
Number of detector electronic channels	32
Number of detector elements	54,272
Number of views per rotation	861-1,968
Axial acquisition modes	32 x 0.625 mm 32 x 1.25 mm, 16 x 0.625 mm, 8 x 0.625 mm, 4 x 0.625 mm, 2 x 0.625 mm

System Hardware

Helical acquisition modes	Slice thicknesses	Table speed
0.516:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	20 mm/rotation
0.984:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	39 mm/rotation
1.375:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	55 mm/rotation
1.531:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	61 mm/rotation

Optional Cardiac Package

Advanced software for cardiac imaging	
Calcium scoring acquisition	
SmartScore™ Pro	Provides hardware and software for acquiring calcium scoring exams, including ECG monitor..
Helical cardiac acquisition (includes all of the above plus)	
Helical Cardiac™	Revolution EVO has the ability to cover the heart in as little as 5 beats.
SnapShot imaging	Retrospective helical ECG-gated reconstruction with three modes: • SnapShot Segment single-sector protocol • SnapShot Burst multi-sector protocol using up to two sectors • SnapShot Burst Plus multi-sector protocol using up to 4 sectors
Image thickness	0.625, 1.25 and 2.5 mm
Rotation speeds	0.35, 0.375, 0.4, 0.425, 0.45, 0.475 and 0.5 s
Temporal resolution	0.175 msec with 0.35 s rotation and SnapShot imaging
ECG mA modulation	Prospective ECG mA modulation automatically adjusts the mA to minimize the patient's exposure to x-rays – reducing mA during systolic phases of the cardiac cycle. This provides clear images and allows users to reduce mA primarily in the systolic phases of the cardiac cycle.
ECG waveform on the Xtream Display	Waveform displayed on the front of the gantry allowing the user to be confident of electrode placement prior to leaving the scan room.
ECG waveform on the console	ECG clearly displayed on the operator console during the scan.
Cardiac image filters	Allows the user to reconstruct filtered images using three steps of noise (pixel noise standard deviation) reduction for helical and axial cardiac imaging, which may allow a reduction of mA while maintaining an acceptable level of image performance.
5 Beat Low Dose Cardiac acquisition (includes all of the above plus) (All 5 Beat cardiac options require 64 channel acquisition)	

F. GMHA continues to incorrectly ignore the clarifications provided to them by JMI when GMHA claimed to be confused about the CT machines offered.

GMHA also finds fault with the information responses provided by JMI to GMHA's information requests. GMHA contends that "Each time, JMI Edison directed GMHA's attention to certain pages in its bid which did not clearly support JMI's assertion that the machines were responsive for both 64 acquired and 64 reconstructed." Agency Statement, 2. GMHA's feigned confusion over the nature of the bid strains credulity, and also ignores the very direct responses provided by JMI helping GMHA identify the 64 slice nature of the offered CT machines. *See* JMI Response to GMHA inquiries, attached to these comments as **Exhibit L;** *See also* PR 871-877.

III. CONCLUSION

Based on the foregoing, JMI requests that its protest be sustained, and, as the lowest responsive bidder, the Agency be ordered to award it GMHA IFB 013-2017.

Submitted this 12th day of February, 2018.

CIVILLE & TANG, PLLC

By: _____
JOSHUA D. WALSH
Attorneys for Appellant JMI Edison

EXHIBIT A

JMI-EDISON
A Division of Johndel International, Inc
125 North Marine Drive, P.O. Box 6577, Tamuning, Guam 96931
*Tel: (671) 646-6400 * Fax: (671) 649-5685 * E-mail: sales@jmiguam.com*

September 27, 2017

MR. PETER JOHN CAMACHO
HOSPITAL ADMINISTRATOR / CEO, Interim
GUAM MEMORIAL HOSPITAL AUTHORITY
850 Gov. Carlos G. Camacho Road,
Oka Tamuning, Guam 96913

RE: GMHA IFB #: 013-2017
- **PURCHASE, INSTALLATION & TRAINING OF NEW CT SCANNERS**

Dear Mr. Camacho,

JMI-Edison is pleased to submit this offer for the above referenced project. This proposal will comply with GMHA Procurement and Installation of New CT Scanners under GMHA IFB #: 013-2017 requirement.

JMI-Edison is uniquely qualified to optimally fulfill and provide equipment procurement and professional services for the emergency repairs and preventive maintenance services on the Hospital's Radiology equipments. JMI-Edison has in its employ, an on-island team of local professionals composed of experts in the field of medical equipment procurement, installation, maintenance and repair. This multi-modality team is well suited to serve GMHA in regards to the above-mentioned project.

JMI-Edison has been awarded numerous projects from GMHA, US military facilities, the island's private and public clinics, Dental facilities and other off-island medical providers. Attached is an outline of our company's background. We would be delighted to supply any additional information upon request.

Thank you very much for this opportunity. Again, should you have any questions regarding any of the documents presented, please do not hesitate to call me directly at 929-7600 or at our office at 649-5240/649-5444.

Very Truly Yours,

JEAN O. GRAPE
Sales Manager
JMI-EDISON
125 North Marine Corps Drive,
Tamuning, Guam 96913
Tel: (671) 649-1256 / 649-5444
Fax: (671) 649-5685
Email: jeangrape@jmiguam.com

EXHIBIT B

INVITATION FOR BID AWARD

PETERJOHN D. CAMACHO, MPH
HOSPITAL ADMINISTRATOR / CEO

ISSUING OFFICE:

GUAM MEMORIAL HOSPITAL AUTHORITY
MATERIALS MANAGEMENT DEPARTMENT
850 Gov. Carlos G Camacho Road,
Oka Tamuning, Guam 96913

DATE ISSUED: July 19, 2017

GMHA IFB 013-2017

BIDDERS INSTRUCTION: This BID shall be submitted in one (1) original and one (1) duplicate copy and sealed to the issuing office above no later than, 08:30 a.m., August 02, 2017 and will be publicly opened at, 9:00am, August 02, 2017 in the Materials Management Conference Room. Bid submitted after time and date specified above shall be rejected. See attached Solicitation Instructions and General Terms and Conditions for details

BID FOR: PURCHASE, INSTALLATION, and TRAINING of NEW CT SCANNERS

SPECIFICATIONS: As per attached.

QUESTIONS ON BIDS: See Paragraph 3, Sealed Bid Solicitation Instructions

DESTINATION: Guam Memorial Hospital Authority

REQUIRED DELIVERY DATE: See General Terms & Conditions/Special Provisions

NOTE TO BIDDERS: This bid is subject to the attached General Terms and Conditions. The undersigned offers and agrees to furnish within the time specified, the articles and services at the price stated opposite the respective items listed on the schedule provided, unless otherwise specified by the bidder. In consideration of the expense of the Government in opening, tabulating, and evaluating this and other bids, and other considerations, the undersigned agrees that this bid remain firm and irrevocable within 120 calendar days from the date opening to supply any or all of the items which prices are quoted. This bid is governed by the laws of the Territory of Guam, emphasis on the 5 GCA Government Operations - Chapter 5, the Guam Procurement Law and 26 GAR Public Health and Social Services, Division 2, Guam Memorial Hospital.

INDICATE WHETHER: ( ) INDIVIDUAL ( ) PARTNERSHIP (x) CORPORATION

INCORPORATED IN: **GUAM**

NAME AND ADDRESS OF BIDDER:

JMI-Edison
125 North Marine Corps Drive
Tamuning, Guam, 96913 USA

SIGNATURE AND TITLE OF PERSON AUTHORIZED TO SIGN THIS BID

EDUARDO R. ILAO
PRESIDENT

AWARDED TO:

CONTRACT NO.: AMOUNT: $ DATE:

ITEMS AWARDED BY NUMBERS:

CONTRACTING OFFICER:

PETERJOHN D. CAMACHO, MPH
HOSPITAL ADMINISTRATOR /CEO

NAME AND ADDRESS OF CONTRACTOR:

SIGNATURE AND TITLE OF PERSON AUTHORIZED TO SIGN THIS CONTRACT:

EXHIBIT C

APPENDIX A

BID PROPOSAL FORM

DATE:

TO: Hospital Administrator
Guam Memorial Hospital Authority
850 Governor Carlos G. Camacho Rd.
Tamuning, GU 96913

Dear Sir:

The undersigned ("Bidder"), a JMI EDISON (Corporation or partnership or individual), organized and/or licensed to do business under the laws of GUAM, hereby proposes and agrees to furnish all necessary labor, materials, equipment, tools and services necessary for the **PURCHASE, INSTALLATION, AND TRAINING OF NEW CT SCANNERS**, pursuant to Invitation for Bids No. **GMHA IFB 013-2017** in accordance with the Specifications and other Contract Documents composing the Invitation for Bids for the sum of:

(Bid Amount) $1,224,040.00 - One Million Two Hundred Twenty Four Thousand Forty Dollars;

plus any and all sums to be added and/or deducted resulted from all extra and/or omitted work under a change order or Contract amendment under the unit and/or lump sum prices stated in the itemized proposal form attached hereto.

The undersigned has examined the location of the proposed Work, Specifications and other Contract Documents and is familiar with the local conditions at the place where the work is to be performed, agrees to perform all work within the time set forth; herein and the price stated in their bid.

The Bid Guaranty attached hereto without endorsement, in the sum of not less than fifteen percent (15%) of the highest amount the total aggregate bid, is furnished to the Guam Memorial Hospital Authority ("GMHA") as a guarantee that the Agreement will be executed and a Performance and Payment Bond and proof of insurance and other requirements set forth in the bid, in forms acceptable to GMHA, shall be furnished within twenty (20) days after notification that the undersigned is the lowest responsible and responsive bidder. In the event that this Bid is accepted, and the undersigned bidder shall fail to: (1) provide any and all documents requested by GMHA and (2) execute the Contract on terms and conditions acceptable to GMHA, the equivalent amount of the Proposed Guaranty shall be forfeited, as liquidated damages for the delay and additional work and costs caused thereby in obtaining another bidder, said amount being beforehand determined as being reasonable and containing no penalties.

If written notice that the bidder is the lowest responsible and responsive bidder, and such notice is mailed, telegraphed or delivered to the undersigned within one hundred and twenty (120) days after the opening thereof, the undersigned agrees to execute a Contract on terms and conditions acceptable to GMHA, and to furnish a Performance and Payment Bond in an amount equal to one hundred percent (100%) of the Contract Amount, within twenty (20) days after receipt of such notice.

The undersigned hereby acknowledges receipt of the following Amendments:

Amendment No.	Dated:
See attached acknowledged amendments	

If awarded the Contract, the undersigned agrees to complete the work within sixteen months following the execution of the Contract by all parties thereto and the issuance of the Notice to Proceed from GMHA.

Attached hereto are the following: (1) an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this proposal or any other proposal or the submitting of proposals for the Contract for which this bid is submitted; (2) proof of licensure on Guam to conduct the services specified in the bid; (3) Certification of Non-Employment of Convicted Sex Offenders; and (4) any other document requested under per the Bid Specifications.

The undersigned understands that the GMHA reserves the right to reject any or all Proposals or to waive any informality or technicality in any Proposal in the interest of GMHA.

RESPECTFULLY SUBMITTED BY: JMI EDISON

(CONTRACTOR)

EDUARDO R. ILAO

(BY)

PRESIDENT

(TITLE)

125 North Marine Drive Tamuning Guam 96913 USA

(BUSINESS ADDRESS)

EXHIBIT D

APPENDIX B

PRICE BID FORM

Description	Unit Price
1. CT 64 cardiac capable system	$ 597,000.00 - Five Hundred Ninety Seven Thousand Dollars
2. CT 64 non cardiac capable system	$ 410,200.00 - Four Hundred Ten Thousand Two Hundred Dollars
3. Workstation for cardiac and perfusion post evaluation RAM of 8GB or higher ($ 62,000.00 each x 2) Capacity to do all 2D and 3D post processing	$ 124,000.00 - One Hundred Twenty Four Thousand Dollars
4. Two Color Laser Printers ($ 320.00 each x2)	$ 640.00 - Six Hundred Forty Dollars
5. Two UPS with appropriate KVA($ 19,000.00 each x2) with at least 10 minutes back up capable of running the entire system	$ 38,000.00 - Thirty Eight Thousand Doll
6. Accessories ECG cables ECG monitor on the gantry for cardiac scanner Software for remote application support for both scanners	$ 10,000.00 - Ten Thousand Dollars
7. Maintenance/Service–Minimum 18 month warranty period. (Warranty pricing shall include maintenance inclusive of a 24-hour guaranteed response to a request for emergency onsite help as well as unlimited telephone support for applications service (Monday through Friday excluding holidays), one Preventive Maintenance Inspections performed each quarter during each twelve-month period.) ($ 22,100.00 each x 2)	$ 44,200.00 - Forty Four Thousand Two Hundred Dollars

Warranty:
FULL 18 MONTHS WARRANTY ON ALL GE SYSTEMS, ACCESSORIES, NON-GE SYSTEMS AND PARTS.
ALL GE PARTS UNDER WARRANTY WILL BE PROVIDED UNDER AN EXCHANGE BASIS.
TUBE NON-PRORATA WARRANTY FOR 18 MONTHS.

Offering:
1. GE REVOLUTION EVO WITH CARDIAC
~~**2. GE REVOLOTION EVO**~~
3. GE ADVANTAGE WINDOWS SERVER WITH 2 PC WORKSTATIONS
4. HP COLOR LASER JET PRO
5. GE UPS E4502KY
6. GE ACCESSORIES
~~**7. 18 MONTHS FULL WARRANTY**~~

TOTAL BID AMOUNT: $ 1,224,040.00 (One Million Two Hundred Twenty Four Thousand Forty Dollars)

EXHIBIT E

BID BOND NO. KIC-14467-B

APPENDIX C

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that

JMI EDISON

(Name of Contractor)

as Principal, herein after called the Principal and DONGBU INSURANCE CO., LTD.

(Name of Surety)

as a corporation duly licensed under the laws of Guam, as Surety, hereafter called the Surety, are held and firmly bound unto the Guam Memorial Hospital Authority ("GMHA") for the sum

of 15% OF TOTAL BID AMOUNT Dollars

($15% OF TOTAL BID AMOUNT) for payment of which sum will and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents:

WHEREAS, the Principal has submitted a bid for:

GMHA IFB 013-2017 PURCHASE, INSTALLATION AND TRAINING OF NEW CT SCANNERS

NOW, THEREFORE, if the GMHA shall accept the bid of the Principal and the Principal shall not withdraw said bid within one hundred twenty (120) calendar days after the opening of bids, and shall within twenty (20) calendar days after the prescribed forms are presented to him for signature, enter into a Contract with the GMHA in accordance with the terms of such bid and give such bond or bonds as may be the specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or in the event of the failure of the Principal to enter into such Contract and give such bond or bonds, if the Principals shall pay to the GMHA the difference not to exceed the penalty hereof between the amounts specified in said bid and such larger amount for which the GMHA may in good faith Contract with another party to perform work covered by said bid or an appropriate liquidated damage amount as specified in the Invitation for Bids then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 12TH day of SEPTEMBER, 2017.

JMI EDISON

(PRINCIPAL) (SEAL)

EXHIBIT F

Imaging Performance Images and Specifications

1. **High BMI or Obese Patient Images (Tab 1.2)**

2. **Both CT's have specification [illegible] lp/cm, z-plane exceeding bid requirement of 15 lp/cm**
   Appendix Tab 5.1 Data Sheet

3. **Low Contrast Detectabily is 5mm @ 0.32% and 5.69 mGy**
   Appendix Tab 5.1 Data Sheet

4. **There are 64 Detector Rows, 54,272 Detector Elements and 64 Slices/Rotation.**
   Appendix Tab 5.1 Data Sheet

5. **Focal Spots Size are 0.9 x 0.7 mm and 1.2 x 1.1 mm**
   Appendix Tab 5.1 Data Sheet

6. **Non-Cardiac CT has a range of 10-560 mA**
   Cardiac CT has a range of 10-600 mA
   Appendix Tab 5.1 Data Sheet

7. **Both CT's have voltage range of 80, 100, 120, 140 kV**
   Appendix Tab 5.1 Data Sheet

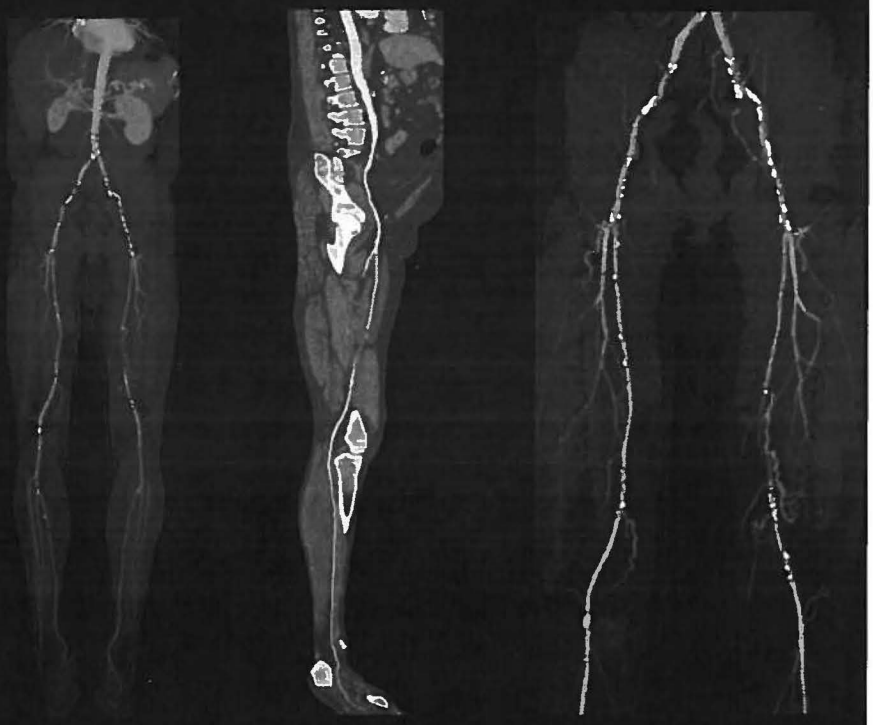
IMAGES COURTESY OF MD JEAN MARC TREUTENAERE SCANNER DE L'ETANG DE BERRE, ISTRES - FRANCE

CT angiography runoff for a patient with BMI 34

Scan type	Helical
Rotation time, s	0.35
Pitch	1.531:1
Slice, mm	0.625
Scan length, mm	40
kV	100
mA	Smart mA
Noise index	40
Kernel	Standard
ASIR-V %	50
DLP, mGy-cm	524

IQE

SmartPrep on popliteal artery

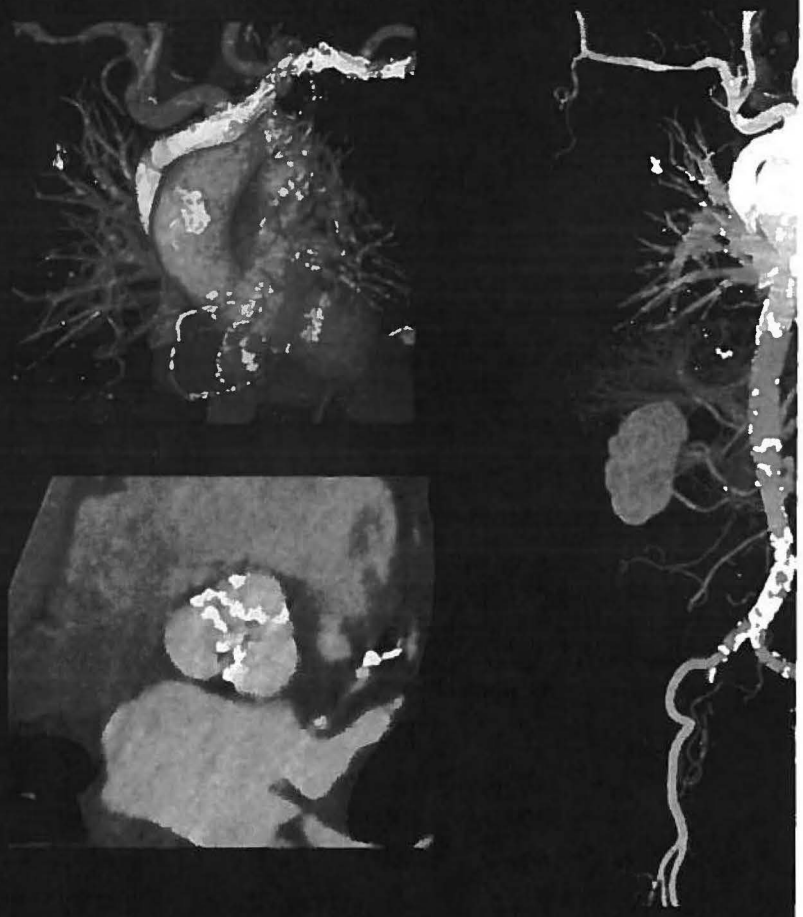


IMAGES COURTESY OF UNIVERSITY HOSPITAL LA TIMONE, MARSEILLE - FRANCE

Mixed acquisition mode for CTA TAVI

Scan type	**Helical gated cardiac**
Rotation time, s	0.35
BPM	69
Slice, mm	0.625
kV	100
mA % max, R-R	20 - 60
Kernel	Detail
ASiR-V, %	100
CTDIvol, mGy	33.43
DLP, mGy-cm	894.14

Scan Type	**Helical non-gated**
Rotation time, s	0.35
Pitch	1.5:1
Slice, mm	0.625
Kernel	Detail
ASiR-V, %	100
CTDIvol, mGy	5.8
DLP, mGy-cm	275
BMI	32



IMAGES COURTESY OF MÄLARSJUKHUSET HOSPITAL, ESKILSTUNA - SWEDEN

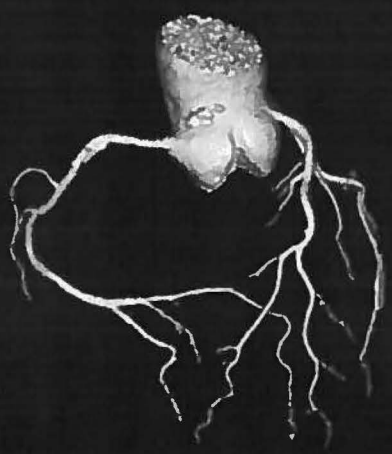
Low-dose and high-quality CT for Circle of Willis

Scan type	Helicol
Pitch	0.531:1
Rotation time, s	0.4
kV	100
mA	79
Slice mm	0.625
Noise Index	15
ASIR-V %	40
Kernel	Standard
CTDIvol, mGy	7.5
DLP, mGy-cm	298

IMAGES COURTESY OF CLINIQUE PARLY II, VERSAILLES - FRANCE

Coronary CTA at low-dose with SnapShot Pulse

Scan type	Axial gated
Rotation time, s	0.35
Slice, mm	0.625
Scan length, mm	140
kV	100
mA	400
Kernel	Standard
ASiR-V %	50
CTDIvol, mGy	9.7
DLP, mGy-cm	136
Eff. dose, mSv[1]	1.9



1. Obtained using a chest conversion factor of 0.014*DLP

IMAGES COURTESY OF HUMANITAS RESEARCH HOSPITAL, MILANO - ITALIA

Thoracic-abdominal aorta

Scan type	Helical Gated Helical
Rotation time, s	0.35
Cardiac Segment	40-80
Pitch	1.531
Slice, mm	0.625
kV	100
Kernel	Standard
ASiR-V %	60
CM, ml	90
Saline fl. 4.0, ml	50
CTDIvol, mGy	5.5
DLP, mGy-cm	759
Eff. Dose, mSv[1]	12.9
Total scan time, s	18
Noise Index	36

1. Obtained using a chest-abdomen-pelvis conversion factor of 0.017*DLP

IMAGES COURTESY OF DORSET COUNTY HOSPITAL, DORCHESTER – UNITED KINGDOM

Excellent IQ for peripheral angiography

Scan type	Helical
Rotation time, s	0.6
Pitch	0.516
Slice, mm	0.625
kV	100
mA	80
Noise index	70
Kernel	Standard
ASiR-V %	70
CTDIvol, mGy	5.0
DLP, mGy-cm	694

Volume Rendered

Volun

IMAGES COURTESY OF WHEATON FRANCISCAN - FRANKLIN, WI - REVOLUTION EVO

Low-dose PE in 2.67 seconds at full resolution

Scan type	Helical
Rotation time, s	0.5
Slice, mm	0.625
Scan time, s	2.67
kV	100
mA	150-280
Kernel	Standard
ASiR-V%	60
CTDIvol, mGy	3.4
DLP, mGy-cm	98
Eff. dose, mSv	1.4

Obtained by EUR-16262 EN Chest factor of 0.014x DLP using

IMAGES COURTESY OF WHEATON FRANCISCAN - FRANKLIN, WI - REVOLUTION EVO

Fast high-resolution scanning for trauma evaluation

Scan type	Helical
Rotation time, s	0.6
Slice, mm	0.625
Scan time, s	3.06
kV	120
mA	Auto mA
Kernel	Bone
CTDIvol, mGy	12.5
DLP, mGy-cm	418
Eff. dose, mSv[1]	0.6

[1] Obtained by EUR-16262 EN trunk factor of 0.0015 x DLP using a 32 cm phanto

EXHIBIT G

B77392FJ

AWE Connection

The AW Server client on the CT console is a software that allows accessing to all applications hosted on an AW Server, from the CT Console. It offers customers the use of applications on the CT console for improved workflow and productivity.

B7880CH

72kW Option

The 72kW power option upgrades the maximum allowable mA selection of the on-board high frequency generator by 40% from 400 mA max to 560 mA, or 600mA with cardiac options. More mA can be used to image large patient or at faster rotation times you can maintain the mAs prescribed.

B78B0CJ

0.4 Sec Rotation Option

Provides the capability of a 360-degree rotation in 0.4 seconds. This additional rotation time will enhance the user's ability reduce exam times and potentially lower patient breath-holds. Enabling up to 153 mm/sec acquisition speeds

B78B0CE

64 Channel Detector Upgrade

B78552CA

CT Operator Console Desk

The Freedom workspace is an ergonomic working environment specifically designed for use with the GE Healthcare imaging systems. The sleek table design enables the efficient use of space while enhancing clinical workflow and technologist comfort.

The Freedom workspace provides a minimalist footprint to improve patient visibility and giving the user easier access to patients in the imaging suite.

It offers sit/stand and horizontal/vertical monitor flexibility. It can also help reduce noise and heat with remote location options of the console. The non-adjustable Freedom workspace version is 1300mm long x 895mm wide x 850mm height and weighs 55.8kg.

B7660B

Chair

Chair for CT scanner

B77292CA

CT Service Cabinet

Service cabinet for system accessories storage

E8016AN

CT Table Slicker with Cushion - 2000 Systems (2 Piece Set)

FEATURES/BENEFITS

- Two-piece, sealed slicker cushion set has comfort pads enclosed inside the slicker cover and extender cover
- Durable, clear PVC plastic cover facilitates faster, more thorough cleanup of blood and fluids
- Increase system uptime by protecting table from spills and particulate contaminants

EXHIBIT H

4. EQUIPMENT DELIVERY

4.1. Equipment Delivery

Delivery: 120 Calendar days from the effective date of the Notice to Proceed

DE-INSTALLATION: 3-5 days (per unit)

INSTALLATION AND COMMISSIONING: 7-15 days (per unit)

4.2. Clinical & Technical Training

GE CT SCANNER CLINICAL APPLICATION TRAINING:

- This training explains the relationship of pitch to scan coverage speed, relationships of scan coverage speed to helical artifacts, effect of IQ Enhance on helical artifacts, IQE scan parameter requirements and the benefit
- Explain current and advanced CT Scanner technologies
- Perform System Basic function and set-up
- Describe system physics and instrumentation
- Perform Protocol set-up and procedures
- Develop modality specific Scan Assistant programs
- Perform Post Reconstruction in various clinical specialty areas
- Explain the temporal resolution required for Neuro perfusion
- Explain the reconstruction parameters for prospective images, retrospective images
- List the High Definition scan mode choices and algorithms
- Explain the difference in number of views collected
- Describe when to Rx Hi-Resolution scanning in clinical practice

GE CT SCANNER TECHNICAL TRAINING:

COURSE COMPETENCIES:

Upon successfully completing this course, the student should be able to:

- Perform all work according to safety regulations and standards on a CT system
- Perform basic system setup, scan and image/data manipulation and storage on a CT system
- Identify common problems on CT Systems
- Identify required tools and documentation for system service
- Work safely in the 64 slice CTs environment
- Identify FRU part numbers, and replace common FRUs
- Identify the installation steps -Perform system quality assurance checks and performance verification
- Identify the difference point of VCT, CT660 and CT750 Lab activities will include: -Calibrations -Characterizations
- Subsystem diagnostics
- Detector Module change -Subsystem and system troubleshooting
- Complete preventative maintenance according to service schedule, including all necessary documentation

EXHIBIT I

JMI-Edison is confident in its ability to fill all scope of works delineated within the solicitation **GMHA IFB 013-2017**:

- One (1) 64 slice state of the art Computed Tomography (CT) system
- One (1) 64 slice fully cardiac configured state of the art CT system
- Resources, services, labor, materials, and supplies necessary to deliver, install, commission, train personnel and set into place the new equipment in the hospital Radiology Department
- Provide on-going local technical and application support and service for the equipment
- Local support on-site for emergency maintenance calls

JMI-Edison ensures that all equipment is of highest quality and material. We provide a guarantee, within 14 days upon equipment received, that if any equipment is damaged, inoperable, or non-compatible after inspection by GMHA, that *JMI-Edison* shall return the equipment (at our expense), and replace the equipment or issue GMHA a full refund or credit. *JMI-Edison* believes in quality delivery and even-increasing value to our customers and clients.

Radiology-Related Projects on Guam

JMI-Edison has extensive experience, expertise and specialized technical knowledge in radiology & medical equipment. Specifically, we have numerous projects that we have successfully secured and implemented from the Government of Guam and GMHA. For Bid Invitation No.: **GMHA IFB 013-2017**, we have selected projects that have the most relevance to this scope of work. Please refer to the highlighted list below: (*a full portfolio may be submitted upon request*)

Year	Customer	Description	Deliverables
Current More than 10 years	GMHA	**Radiology Service and Maintenance Contract**	**Provide constant parts, maintenance, and troubleshooting for all equipment including: GE Radiology equipment, GE Marquette, GE OEC, and other OEM equipment.**
2014	GMHA	**Equipment Installation**	**Transferred and installed GE equipment from Naval Hospital to GMHA Radiology Department: GE Lightspeed 16 CT-Scanner, GE Precision 500D Fluoroscopic unit, and GE Infinia Gamma Camera.**
2006	GMHA	**2006 Radiology Equipment Upgrade Project & Site-related Preparations, Equipment Installations, Applications Support, and Acceptance Testing Support**	Supply and Installation of all 2006 Radiology Equipment to include: GE Lightspeed VCT 64-slice CT, GE Precision 500D Fluoroscopy unit, GE Innova 3100 Angiography unit and Logiq 7 Ultrasound machine.
2006 3 Ground-breaking days	GMHA	**De-installation and Re-installation**	**Successfully and efficiently de-installed and re-installed the old GE Prospeed CT to another room within three days.**

1998	GMHA	Supply, Installation, and Financing	GE CT Scanner valued at $630,000.00
1996	MR Imaging Group	Constructed MRI Facility & Installation of Second New High Field Strength MRI Facility	Successfully constructed the MRI Facility, which led to the installation of a Second New High Field Strength MRI Facility
2014	US Naval Hospital	Equipment Installation	Successfully installed Radiology Equipment in the new Navy Hospital to include: GE Optima CT660 64-slice CT Scanner, GE Precision 500D Fluoroscopy, GE Senographe Essential Mammography systems, GE Discovery 670 Nuclear/CT Imaging camera, GE XR650 Digital Radiography Systems, GE XR220 Mobile Digital Radiography System & GE Discovery 750W 3.0T MRI System.
2006	US Naval Hospital	De-installation of old Picker CT and Installation of new GE Lightspeed 16-slice equipment	Successfully installed the rest of Radiology Equipment to include: GE Lightspeed 16-slice CT Scanner, GE Proteus X-ray, GE Precision 500D Fluoroscopy, GE Diamond Mammography, GE Infinia Nuclear Imaging camera and GE AMX4+ Mobile X-ray units.
2016	FHP Health Center	Equipment Installation	Successfully installed the rest of Radiology Equipment to include: GE Brivo DR-F & GE Proteus Digital Rad Systems
2013	FHP Health Center	Equipment Installation	Successfully installed GE Senographe Essential Mammography systems and GE Discovery 750W 3.0T MRI System.
2008	FHP Health Center	Equipment Installation	Successfully installed GE Lightspeed Ultra 8-slice CT Scanner
2017	SDA Clinic	Equipment Installation	Installation of GE Brivo DR-F Digital Rad System

Company Technical Experience

JMI-Edison's Service Technicians and Field Engineers have intricate knowledge of electrical, electronic, mechanical, pneumatic and hydraulic systems. Furthermore, *JMI-Edison* cross-trains our engineers and technicians to be able to specify, install, service, and maintain sophisticated medical and radiology equipment. The advanced training includes the use of cutting-edge technology and computer hardware and software, as well as, the latest in electronic technology, IT technology, and miniaturized electro-mechanical systems that utilize state-of-the-art pneumatic and/or hydraulic system technology.

CURRENT CUSTOMERS

Currently, our group of companies represent the following clients:

- → GE Medical System
- → Ethicon
- → Sechrist Ventilators
- → Ansell/Perry
- → B/Braun Medical
- → Agilent Technologies – Chemical Analysis
- → AS&E Advanced X-ray Inspection Systems
- → Honeywell
- → Jacuzzi Pumps
- → Goulds Pumps
- → ABS Pumps
- → GE Lighting
- → GE Industrial Systems
- → Katolight Generators
- → And More…

CT-SCANNER System-Specific Experience

JMI-Edison has extensive experience and expertise in supplying, installing, and maintaining all Healthcare equipment, especially CT equipment as showcased below.

GMHA:

1. GE Lightspeed HP60 16-slice CT (2014)
2. GE Lightspeed VCT 64-slice CT (2006)
3. GE Prospeed Single Slice CT (1997)

US Naval Hospital

1. GE Optima CT660 64-slice CT (2014)
2. GE Brightspeed 16-slice NMCT (2014)
3. GE Lightspeed HP60 16-slice CT (2006)

FHP Health Center:

1. GE Lightspeed Ultra 8-slice CT (2008)

Active Contracts

JMI-Edison has supplied and installed, and currently provides maintenance and repair services to the Health Care facilities named below. Descriptive information and details of our current contracts are available upon request.

- → **Guam Memorial Hospital**
  - o Radiology Equipment Maintenance Service
- → **US Naval Hospital**
  - o Radiology Equipment Maintenance Service
- → **FHP Health Center**
  - o Radiology Equipment Maintenance Service
- → **SDA Clinic**
  - o Radiology, Dental, & Diagnostic Equipment Maintenance Service

Based on our history, experience, and expertise, *JMI-Edison* is extremely confident that we can provide GMHA with the highest quality services and healthcare equipment. We are ready to serve.

EXHIBIT J

GE Healthcare

Revolution EVO ES

Technical Data

More than just high tech. Higher purpose.

Today's healthcare environment is about creating new solutions to pressing needs. It's about understanding how one CT exam can improve patient outcomes while lowering the cost of providing care.

Simple and fast, CT is arguably the most valuable diagnostic imaging tool. Yet its capacity to improve the health of the world is far from tapped.

Advancing the role of CT is no longer just about technology. It's about design. That's the promise of Revolution™. Understanding your needs. And designing the best solution to meet those needs.

All revolutions start somewhere. Our revolution began with the Revolution CT system—designed from the ground up for pioneering the future of CT.

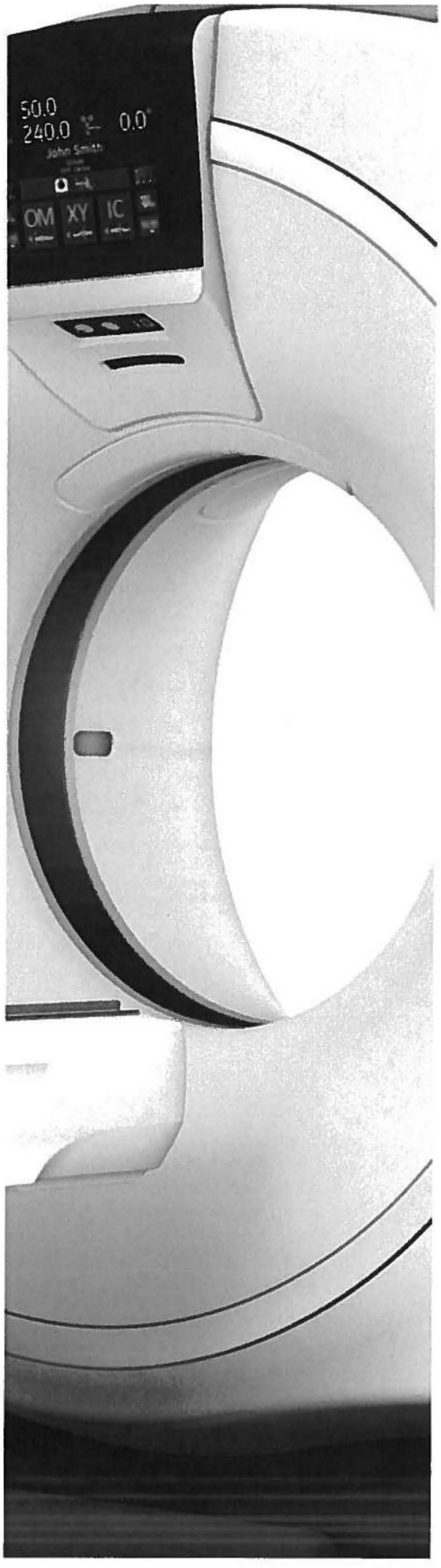
Now comes Revolution EVO.

Revolution EVO is designed with the purpose of operating in the reality of now, while anticipating the challenges of tomorrow.

It's designed to support the widest variety of patients and applications, from complex trauma or cardiac cases to large patient backlogs in busy emergency departments that strain workflows and resources.

The design of Revolution EVO is made for institutions that are unable to sacrifice advanced capabilities such as high resolution for daily productivity. It is well suited for those who need to provide the lowest dose possible. And it provides options to expand your referral physician base and the services you provide to your community.

Revolution EVO is designed for you.



System Configuration

Standard system hardware
40 mm Clarity detector with 2D collimator to reduce scatter noise
Up to 0.28 mm spatial resolution
64 slices (see page 5 for details)
Performix™ 40 Plus x-ray tube with liquid metal bearing
400 mA max, 72 kW high-performance generator (560 mA option)
Up to 0.7 second rotation speed (0.4, 0.5, 0.6 second option)
Revolution EVO Xtream interface for personalized patient care
Xtream operator console with 2 19" high resolution LCD's
Power distribution unit
VT1700v table with 500 lb (227 kg) weight limit

Optional tables
VT2000 table with 500 lb (227 kg) weight limit
VT2000x table with 675 lb (306 kg) weight limit

Standard Smart Dose technologies
ASiR iterative reconstruction (ASiR-V optional)
XR 25 and XR 29 compliant
Organ dose modulation
3D mA modulation with SmartmA and AutomA
ECG dose modulation with optional cardiac acquisition
Dynamic z-axis tracking
Dose Check based on XR 25 standards
DICOM Radiation Dose Structured Report
SmartBeam™
CT 4Kids and Color Coding for Kids™

Standard Smart Flow technologies
Xtream Gantry user interface for improved productivity
One-stop scanning – set up exams at the patients side
Default patient positioning
SmartPrep with dynamic transition
Real-time Image Check for up to 55 fps reconstruction
Up to 35 fps reconstruction for 512 x 512 images
10 prospective multiple reconstructions
In room start
Up to 87.5 mm per second coverage with IQE pitch-boosting technology
Direct MPR (multi-planar reformatting)

Additional capabilities (Standard unless indicated as option)
Smart MAR metal artifact reduction - option
High Helical Pitch: up to 1.531 for 87.5 mm/sec acquisitions
Ultra Kernel may visual spatial resolution for IAC type of exams
OLR with Cone-Beam back projections for 64 distinct projection measurements per rotation
Xtream injector interface - option

Dynamic coverage options
Volume Shuttle for 80 mm of dynamic axial coverage

Applications on the operator console options
Neuro Perfusion Package includes Volume Shuttle and Neuro perfusion analysis for the operator console
Angio Analysis Package includes AVA Xpress with AutoBone™
SmartStep fluoroscopy
SmartView real-time fluoroscopy
CT Perfusion 4D: Neuro or Multi-organ (multi-organ requires EX or EL configuration)
Advantage CTC Pro3D EC (CT colonoscopy)
CardIQ Xpress 2.0 Reveal
CardEP
DentaScan

Smart Cardiac technology options
5 Beat cardiac acquisition – Retrospective and prospective
SnapShot™ Pulse for low dose cardiac acquisition
SnapShot™ Freeze for 29 msec effective temporal resolution
SmartScore Pro for cardiac scoring acquisitions
SnapShot Assist cardiac acquisition assistant
ECG editor
ECG waveform on Xtream gantry user interface
ECG mA modulation

System Hardware

Gantry	
Aperture	70 cm
Maximum scan field-of-view	50 cm
Rotation time	0.7, 0.8, 0.9, 1 and 2 second (0.35, 0.4, 0.5, 0.6 sec. option)
Tilt	±30°
Focus-to-detector	95 cm
Focus-to-iso-center	54 cm
Laser alignment lights	Three-axes markers shows the location of the scan plane
Gantry left and right, front and rear control panels	For convenient and efficient patient positioning Select protocol and start scan from scan room (e.g. in emergency situations)
X-ray tube	
Tube	Performix 40 Plus
Tube current range	10–400 mA in 5 mA increments (560 mA option)
Tube voltage range	80, 100, 120, 140 kV
Tube anode heat storage capacity	7.0 MHU | 39 MHU equivalent with ASiR-V[1] (ASiR-V optional)
Tube cooling rate	1.1 MHU/min
Focal spot size according to IEC 60336 (1993)	0.7 x 0.36 mm 0.9 x 0.9 mm
Focal spot size according to IEC 60336 (2005)	0.9 x 0.7 mm 1.2 x 1.1 mm
Bearing	Liquid metal for extended operational life
Generator	
Maximum power	72 kW | 400 kW equivalent with ASiR-V[2] (ASiR-V optional)
Additional system hardware	
X-ray filtration for dose optimization	GE exclusive SmartBeam collimator contains three bowtie filters to shape the beam to optimize dose and image performance
SmartBeam	Collimator uses two independently controlled tungsten cams that are rotated to provide automatic and continuous correction of the x-ray beam shape to block unused x-ray at the beginning and end of a helical scan to reduce unnecessary radiation.

[1] Equivalent heat storage is based on the image noise ratio between ASiR-V and filtered back projection (FBP) reconstruction. The ratio calculation between image noise and dose corresponding mAs is defined as [(standard deviation with FPB) / (standard deviation with ASiR-V) x tube rating]

[2] Equivalent power is based on the image noise ratio between ASiR-V and filtered back projection (FBP) reconstruction. The ratio calculation between image noise and dose corresponding mAs is defined as [(standard deviation with FPB) / (standard deviation with ASiR-V) x generator power]

System Hardware

Detector and data acquisition system	
HiLight Clarity detector	Inherited directly from our breakthrough Revolution CT system, the Clarity detector is the heart of Revolution EVO. With its high-resolution imaging capabilities, you can see details as small as 0.28 mm. The Clarity detector delivers improved dose efficiency and signal-to-noise ratio as well, plus large coverage with z-axis uniformity.
Integrated Clarity data acquisition system	Thanks to its revolutionary, patented design, the data acquisition system is integrated directly onto the photo diode. This reduces the size of the data acquisition system by 75%, reduces electronic noise by 44%, and lowers power consumption by 90% compared to previous-generation systems.
HiLight™ scintillator	GE proprietary, patented scintillator was designed specifically for CT imaging and provides key performance properties that make it ideal for the task including high primary speed (affects spatial resolution at fast rotation speeds), low afterglow (affects artifacts) and high x-ray stopping power (affects image quality per dose).
Clarity 2D collimator	Designed to reduce scatter and improve image quality.
Maximum number of slices per rotation	32 (acquired slices), up to 64 (axial reconstructed slices)
Number of detector rows	64
Number of detector electronic channels	32
Number of detector elements	54,272
Number of views per rotation	861-1,968
Axial acquisition modes	32 x 0.625 mm 32 x 1.25 mm, 16 x 0.625 mm, 8 x 0.625 mm, 4 x 0.625 mm, 2 x 0.625 mm

Axial & cine acquisition modes	Reconstructed slice thickness
32 x 1.25mm	32i – 1.25 mm 16i – 2.5 mm 8i – 5 mm 4i – 10 mm
32 x 0.625 mm	32i – 0.625 mm 16i – 1.25 mm 8i – 2.5 mm 4i – 5 mm 2i – 10 mm
16 x 0.625 mm	16i – 0.625 mm 8i – 1.25 mm 4i – 2.5 mm 2i – 5 mm 1i – 10 mm
8 x 0.625 mm	4i – 1.25 mm 2i – 2.5 mm 1i – 5 mm
4 x 0.625 mm	2i – 1.25 mm 1i – 2.5 mm
2 x 0.625 mm	1i – 1.25 mm

System Hardware

Helical acquisition modes	Slice thicknesses	Table speed
0.516:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	20 mm/rotation
0.984:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	39 mm/rotation
1.375:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	55 mm/rotation
1.531:1 pitch	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm	61 mm/rotation
VT1700V patient table		
Maximum table load	227 kg / 500 lbs	
Horizontal speed	1-175 mm/s	
Scanable range	1,730 mm	
Scout scanable range	1,600 mm	
Vertical range	43-99 cm	
Elevation speed	12.5-25.5 mm/s	
Optional VT2000 patient table		
Maximum table load	227 kg / 500 lbs	
Horizontal speed	1-175 mm/s	
Scanable range	2,045 mm	
Scout scanable range	2,000 mm	
Vertical range	43-99 cm	
Elevation speed	12.5-25.5 mm/s	
Optional VT2000x patient table		
Maximum table load	306 kg / 675 lbs	
Horizontal speed	1-175 mm/s	
Scanable range	2,045 mm	
Scout scanable range	2,000 mm	
Vertical range	42.5-99 cm	
Elevation speed	12.3-23.2 mm/s	

Desktops

Virtual desktops

All clinical operations are managed through two "virtual desktops" or applications managers: Exam Rx and ImageWorks. Operators can effortlessly move back and forth among these environments simply by clicking on an icon. High-definition technology enhances the multi-tasking architecture and simultaneously maintains all processes so that no work will be lost or disrupted as desktops are switched.

Exam Rx acquisition desktop

The Exam Rx desktop environment provides the clinical tools necessary for comfortable, efficient control of patient studies. These tools include patient scheduling and data entry, exam protocol selection, protocol viewing and editing, scan data acquisition, image reconstruction, image display and routine analysis, AutoFilm or manual filming, AutoStore and AutoTransfer.

ImageWorks desktop

The ImageWorks desktop provides CT image management and networking functions including archiving, networking and manual filming control. ImageWorks also provides image processing such as multi-planar reformatting (MPR), multi-projection volume rendering (MPVR), and MR image display. ImageWorks also supports optional advanced image analysis applications.

Helical image reconstruction	
Real-time display	Image Check provides 340 x 340 matrix images at up to 55 images per second to allow real-time tracking of coverage up to 1,800 mm in length with less than 1 second delay
Axial slice thickness	0.625, 1.25, 2.5, 5, 10 mm
Helical slice thickness	0.625, 1.25, 2.5, 3.75, 5, 7.5, 10 mm
Reconstruction field-of-view	5-50 cm
Reconstruction matrix	512 x 512
10 MPR	Up to 10 sets of reconstructions can be pre-programmed as part of the scan protocol prior to acquisition. The operator can select different start/end location, slice thickness, interval, reconstruction algorithms and display fields of view for each reconstruction.
CT number scale	± 31,743 HU
Scan control unit	
High-performance computer	Dual Intel® Xeon® E5-2640 dual 2.5GHz six-core processors
Operating system	64-bit
RAM	32 GB DDR-1,333 MHz or equivalent
Graphics acceleration	NVIDIA® Quadro® 2000 PCI Express® 16x or equivalent
Image storage	2 x 300 GB (up to 460,000 512 x 512 images)
Raw data storage	5 x 300 GB (up to 3,520 scan rotations at 64 slice mode or upt to 1,5000 scan data files or up to 300 exams)
Dual display monitors	19-inch 1,280 x 1,024 resolution 1,024 x 1,024 image display matrix
Additional storage	DVD-RAM (scan data) 9.4 GB total (4.7 GB per side) DVD-R/CD-R (DICOM interchange) 4.7 GB capacity approximately 7,000 images

Iterative Reconstruction and Dose Reduction

ASiR[2] iterative reconstruction[1]

ASiR dose reduction technology: A reconstruction technology that may enable reduction in pixel noise standard deviation. The ASiR reconstruction algorithm may allow for reduced mA in the acquisition of diagnostic images, thereby reducing the dose required. ASiR dose reduction technology: A reconstruction technology that may enable improvement in low contrast detectability. When imaging the same object, the Optima CT660 system with ASiR may deliver pixel noise standard deviation equivalent to a higher mA acquisition such as that delivered by a higher power generator. The use of ASiR may allow for scanning at lower mA and less anode heat input, thereby reducing the likelihood of encountering tube-cooling delays.

Other standard software

Organ dose modulation	ODM provides reduction of radiation dose via X-ray tube current modulation for superficial organs and tissues, such as breasts while maintaining diagnostic quality without decreasing productivity (as the result of not using externally applied shields
XR 29	Compliant with XR 29. Includes Adult and Pediatric reference protocols, AEC, and DICOM SDR
3D dose modulation	Having this kind of volumetric knowledge before you scan allows you to personalize protocols and optimize dose for every patient – large and small. During the scan, real-time, 3D mA modulation helps deliver consistent image quality because it automatically accounts for the changing dimensions of your patient's anatomy. 3D mA modulation acquisitions may reduce dose compared with fixed mA acquisitions.
Dynamic Z-axis tracking	Dynamic Z-axis tracking provides automatic and continuous correction of the x-ray beam shape to block unused x-ray at the beginning and end of a helical scan to reduce unnecessary radiation..
Dose Check	Dose Check provides users with tools to help them manage CT dose in clinical practice and is based on the standard XR-25-2010 published by The Association of Electrical and Medical Imaging Equipment Manufacturers (NEMA).
Pediatric protocols	CT 4Kids : The pediatric protocols are based upon a child's size, age, and weight and tailor the dose or treatment to the size of the patient. The Head and Orbit categories are age based. The rest of the categories are height and weight based protocols. Color Coding Kids™ provides pediatric scan protocols based on the Broselow-Luten™ Pediatric System. This Color Coding system is incorporated into the protocol selection on the operator's console and is designed to potentially reduce medical errors.
Dose display	$CTDI_{vol}$ and DLP (Dose Length Product), and Dose Efficiency are displayed during scan prescription and provide dose information to the operator.
DICOM Structured Dose Reporting	DICOM Structured Dose Report generates a CT Dose Report, which can enable tracking of dose ($CTDI_{vol}$ and DLP) for the patient by the hospital radiation tracking system/RIS/HIS.

OPTIONAL ASiR-V[2] iterative reconstruction

The newest technology in GE's family of industry-leading iterative reconstruction techniques, ASiR-V allows users to lower dose by 50 to 82% as compared to standard filtered back-projection (FBP) reconstruction at the same image quality[1].. ASiR-V combines the speed of ASiR™ with additional capabilities from Veo™, GE's full model-based iterative reconstruction technology. By applying more advanced modeling and optimization technologies in projection- and image-space as part of the iterative reconstruction process, ASiR-V provides dose reduction well beyond that of ASiR, while maintaining low-contrast detectability, like Veo.

Dose reduction	Up to 82%
Low contrast detectability improvement	Up to 135%
Image noise reduction	Up to 91% at the same dose
Spatial resolution enhancement	Up to 2.07x at the same image noise
Artifact reduction	Reduction in low-signal artifacts such as streaking

1 In clinical practice, the use of ASiR may reduce CT patient dose and improve low contrast detectability depending on the clinical task, patient size, anatomical location and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.
2 In clinical practice, the use of ASiR-V may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. Low Contrast Detectability (LCD), Image Noise, Spatial Resolution and Artifact were assessed using reference factory protocols comparing ASiR- V and FBP. The LCD measured in 0.625 mm slices and tested for both head and body modes using the MITA CT IQ Phantom (CCT183, The Phantom Laboratory), using model observer method.

System Software

Smart Flow
Xtream gantry user interface is a multi-purpose touch LCD that allows you to personalize patient care and improve patient throughput. It will display basic patient information, the user can confirm this patient information while at the patient side, improve workflow with preset positioning (Default Patient positioning). Xtream display has a video function to assist the user in explaining the CT examination to patients. Movie change provides the ability to upload user created images and videos

One Stop Scanning Mode	Revolution EVO's exceptional one stop scanning mode provides a streamlined workflow on the Xtream Display such as "Patient selection", "Protocol selection" and "Confirm". Pre-scanning can be accomplished in as few as five touches.
Default patient positioning	Default Patient Positioning provides user friendly positioning. After patient is positioned on the table, the operator touches the target reference point button on the Xtream Display. The table is transferred to the target reference point, once the foot pedal has been pressed.
Instructional and distraction videos	Xtream gantry user interface has a video function to assist the user in explaining the CT examination to patients. This helpful when the patient and technologist speak different language. Distraction videos are available for pediatric patient. Movie change provides the ability to upload user created images and videos
ECG Waveform on Xtream gantry	ECG trace provides users the capability to display the heart rate and ECG waveform based on the data from the ECG equipment on the Xtream Display. Pre-requisite is cardiac option

Standard features	
Direct MPR	Allows users to move from routine 2D to 3D image review of axial, sagittal, coronal, and oblique planes. Allows automated, protocol-driven batch reformatting and networking.
SmartPrep with Dynamic transition	Enables the user to monitor contrast enhancement in an area-of-interest using low-dose scans and initiate target scans when enhancement reaches the desired level. Dynamic Transition allows automatic triggering of target scans once a user-defined HU threshold is reached.
Graphic retro reconstruction	Allows graphical prescription of retrospective reconstructions using an existing axial image as a reference.
10 PMR's	Up to 10 sets of reconstructions can be pre-programmed as part of the scan protocol prior to acquisition. The operator can select different start/end location, slice thickness, interval, reconstruction algorithms and display fields of view for each reconstruction.
Copy PMR and series	Automatically copy the parameters of an existing series to reduce the need to re-enter often-used settings.
Biopsy mode	Improves the efficiency of setting up and acquiring slices during a biopsy.
AutoVoice	Three pre-recorded voices are available in 12 languages (Brazilian Portuguese, Chinese, English, French, German, Italian, Japanese, Korean, Mexican Spanish, Portuguese, Russian, and Spanish). The user can record an additional 17 voice instructions.
Patient information	Patient information is loaded onto the CT from HIS/RIS using a DICOM connection. At scan time, select from the patient from the work list, or use the optional bar code reader to call up patient information. Or, preprogram patient information prior to patient arrival.
Exam protocols	Anatomical programmers (adult, pediatric) allow quick access to 6,840 user-programed protocols (total), each with 10 anatomical regions with 90 protocols per region.
Volume Viewer 5	Provides tools for 3D processing, analysis, segmentation, measurements, annotation, filming and exporting of clinically relevant images.

Optional Cardiac Package

Advanced software for cardiac imaging	
Calcium scoring acquisition	
SmartScore™ Pro	Provides hardware and software for acquiring calcium scoring exams, including ECG monitor..
Helical cardiac acquisition (includes all of the above plus)	
Helical Cardiac™	Revolution EVO has the ability to cover the heart in as little as 5 beats.
SnapShot imaging	Retrospective helical ECG-gated reconstruction with three modes: • SnapShot Segment single-sector protocol • SnapShot Burst multi-sector protocol using up to two sectors • SnapShot Burst Plus multi-sector protocol using up to 4 sectors
Image thickness	0.625, 1.25 and 2.5 mm
Rotation speeds	0.35, 0.375, 0.4, 0.425, 0.45, 0.475 and 0.5 s
Temporal resolution	0.175 msec with 0.35 s rotation and SnapShot imaging
ECG mA modulation	Prospective ECG mA modulation automatically adjusts the mA to minimize the patient's exposure to x-rays – reducing mA during systolic phases of the cardiac cycle. This provides clear images and allows users to reduce mA primarily in the systolic phases of the cardiac cycle.
ECG waveform on the Xtream Display	Waveform displayed on the front of the gantry allowing the user to be confident of electrode placement prior to leaving the scan room.
ECG waveform on the console	ECG clearly displayed on the operator console during the scan.
Cardiac image filters	Allows the user to reconstruct filtered images using three steps of noise (pixel noise standard deviation) reduction for helical and axial cardiac imaging, which may allow a reduction of mA while maintaining an acceptable level of image performance.
5 Beat Low Dose Cardiac acquisition (includes all of the above plus) (All 5 Beat cardiac options require 64 channel acquisition)	
SnapShot Pulse	Prospectively gated acquisition mode for low-dose imaging of the coronary arteries. Lowers dose by up to 83% compared to retrospective acquisition.
SnapShot Assist	Helps users optimize ECG-gated CT acquisitions based on patient heart rate characteristics. SnapShot Assist generates a cardiac scan parameter recommendation using the patient's ECG analysis and user-defined protocol selection algorithm. It uses the patient's recorded heart rate information to predict the heart rate behavior during a CCTA scan to assist the user with optimization of the parameters on a per-patient basis. Acquisition parameters displayed include scan mode (Cine SnapShot Pulse, Helical SnapShot Segment, etc.), cardiac phases, padding, and pitch.
ECG viewer / editor	Allows users to view and retrospectively modify intervals and adjust location of triggers for cardiac cycles based on the ECG waveform displayed on the console. This capability may improve successful cardiovascular acquisition rate in cases with suboptimal triggers or irregular heartbeats such as PVCs, PACs and arrhythmias.
5 Beat Low Dose Cardiac with SnapShot Freeze (includes all of the above plus) Requires AW or AW Server and CardIQ Express Reveal	
SnapShot Freeze	Provides 29 msec effective temporal resolution. An intelligent motion correction algorithm, which is designed to reduce blurring of coronary arteries due to motion artifacts. Utilization of SnapShot Freeze in clinical practice may assist the physician's diagnostic interpretability of coronary CTA by reducing the burden of non-diagnostic segments. Using a mechanical heart phantom it was shown that SnapShot Freeze reduces motion artifacts up to 6X, equivalent to a 0.058s equivalent gantry rotation speed with effective temporal resolution of 29ms

Optional System Software

Advanced image analysis applications for the operator console	
Smart MAR (Metal artifact reduction)	Smart MAR* helps reducing photon starvation, beam hardening and streak artifacts caused by metal in the body, such as hip implants, surgical clips, and dental implants
AVA Xpress with Autobone	Automated vessel tracking, analysis and measurements for vascular anatomy and pathology. Automated segmentation of bony structures and calcifications for CT angiographic exams
CT Perfusion 4D – Neuro	Neuro perfusion analysis package.
CT Perfusion 4D – Multi-organ	Perfusion analysis package for liver and other organs.
Advantage CTC Pro3D EC	Efficient reading workflow solution for helping detect colonic lesions CT, including electronic cleansing.
Advantage Dentascan	Real-time reformatting of dental images.
CardEP	Streamlined post-processing for improved electrophysiology procedures.
CardIQ Xpress Reveal	Cardiovascular image analys
SmartStep interventional application	
SmartStep	SmartStep is an interventional mode providing step-and-shoot imaging with in-room viewing and manual X-ray control. Three interventional viewports automatically update each time an exposure is made with the foot pedal.
Real-time performance	Single-viewport display @ 12 fps Three viewport display @ 24 fps
Nominal image lag time	0.2 s
Slice thickness, single viewport	2.5, 5, 10 mm
Slice thickness, three viewports	1.25, 2.5, 5 mm
Rotation speed	0.5, 0.8, 1 s
Tilt	±±30°
SmartView™ real time interventional application (includes all of the above SmartStep capability plus)	
SmartView	Provides continuous, real-time CT fluoroscopy at 24 fps (3 view ports at 8 fps each) with in-room viewing and manual x-ray control. The intuitive user interface provides six user-selectable display layouts, in-room image review and window-width and window-level control. Features ceiling-mounted in-room LCD monitor and full-featured handheld, cradle-mounted controller.
Optional extended dynamic coverage	
Volume Shuttle	Allows users to acquire a single-injection, 80 mm coverage scan via a repetitive axial scan mode where the table shuttles back and forth between two imaging locations. Each location covers 40 mm in the patient's long-axis 80 mm. The shuttle action repeats over a user-defined duration to enable evaluation of tissue changes over time.
Volume Helical Shuttle (Requires EX or EL configuration)	Continuous, bi-directional scan allows to 312.5 mm or 500 slices (0.625mm x 500 slice) coverage for 4D imaging. Data to support up to 140 mm of coverage repeatability within 3.2 s. Dynamic Pitch recon extends Z-coverage and improves temporal sampling by utilizing acquired scan data during table acceleration and de- acceleration.

Siting Requirements

Dimensions	Width (mm/inch)	Depth (mm/inch)	Weight (kg/lbs)
Gantry	2,050 / 81	1,039 / 41	1,820 / 4,012
VT1700V table	650 / 25.6	2,360 / 93.3	672 / 1,481
VT2000 table	650 / 25.6	2,910 / 114.5	732 / 1,613
VT2000x table	650 / 25.6	2,910 / 114.5	815 / 1,797
Power distribution unit	711 / 28	559 / 22	370 / 816
Operator console	470 / 19	736 / 29	80 / 176
Monitor (each)	420 / 16.5	247 / 9.7	9 / 20
Standard desk	1,300 / 51.2	895 / 35.2	57 / 126

Rating	
The system operates on three-phase power that meets the following specifications	
Voltage	200-240 VAC, 380-480 VAC
Capacity	100 kVA
Frequency	50 or 60 Hz ±3 Hz
Maximum power demand	100 kVA @ 0.85 PF at a selected technique of 140 kV and 515 mA
Average (continuous) power demand at maximum duty cycle	20 kVA
Idle power demand (without rotation and x-rays)	5.0 kVa

Imaging Performance Specifications

Low-contrast detectability

Low-contrast detectability is the ability to see a small object with a certain percentage contrast difference from it's background on a specific phantom at a state x-ray exposure level.

Helical	
Phantom	Catphan® (20 cm)
Object size	5 mm
Contrast difference	0.32%
CTDIvol	5.69 mGy
Slice thickness	10 mm
Kernel	Standard with ASiR

Axial	
Phantom	Catphan® (20 cm)
Object size	5 mm
Contrast difference	0.32%
CTDIvol	6.09 mGy
Slice thickness	10 mm
Kernel	Standard with ASiR

Noise

Noise is measured at a percentage of background at a specified x-ray exposure

Helical	
Phantom	AAPM water phantom or GE quality assurance phantom
Noise	0.43%
CTDIvol	11.1 mGy
Slice thickness	5 mm
Kernel	Standard with ASiR

Axial	
Phantom	AAPM water phantom or GE quality assurance phantom
Noise	0.43%
CTDIvol	11.0 mGy
Slice thickness	5 mm
Kernel	Standard with ASiR

High-contrast spatial resolution (MTF)

Typical MTF is demonstrated on a 0.05 mm tungsten wire and a 1.0 x 0.025 mm gold foil phantom for in-plane and z-plane, respectively

x/y-plane	0% MTF >18.3	lp/cm
	4% MTF 18.3	lp/cm
	10% MTF 16.0	lp/cm
	50% MTF 12.1	lp/cm
z-plane (helical mode)	0% MTF 19.7	lp/cm
	4% MTF 14.2	lp/cm
	10% MTF 12.2	lp/cm
	50% MTF 7.3	lp/cm

Helical high resolution

0.28 mm

Dose, CTDIw in mGy/100 mAs

Measured on CTDI head and body dose reference phantoms

Helical, head	17.0 mGy/100 mAs
Helical, body	8.8 mGy/100 mAs
Axial, head	16.7 mGy/100 mAs
Axial, body	8.7 mGy/100 mAs

License/Warranty/Regulatory Compliance

License

ASiR-V, Volume Helical Shuttle and Cardiac scan are licensed for use with a GE x-ray tube. Use of a third-party x-ray tube will require an additional license fee for these features.

Warranty

The published Company warranty in effect on the date of shipment shall apply. The Company reserves the right to make changes.

General Electric Company reserves the right to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation.

Regulatory compliance

Laser alignment devices contained within this product are appropriately labeled according to the requirements of the Center for Devices and Radiological Health.

This product complies with NEMA Standard XR 29-2013

EXHIBIT K

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Follow up response to Questions 3, 4 and 11:

3) Are both machines 32 acquired and 64 reconstructed slices?

Both CT systems are 64 acquired and 64 reconstructed.

GMHA: can you provide the page? The specs state 32 acquired.

JMI: Please refer to:

Imaging Performance Images and Specs TAB Cover Page 1, Item No. 4 "There are 64 Detector Rows, 54,272 Detector Elements and 64 Slices/Rotation.

It can also be found in:

System Detail Description TAB 1, Page 9, Catalog No. B78B0CE is the 64 Channel Detector that is included in the configuration for the Cardiac CT offer

System Detail Description TAB 2, Page 7, Catalog No. B78B0CE is the 64 Channel Detector that is included in the configuration for the non-Cardiac CT offer

4) Is the power output for both 48 KW with the 72 KW optional?

No, both systems are configured to be 72 kW systems.

GMHA: can you provide the page number? The IFB states 72KW Option.

Please refer to:

System Detail Description TAB 1, Page 9, Catalog No. B7880CH is the 72kW power that is included in the configuration for the Cardiac CT offer

System Detail Description TAB 2, Page 7, Catalog No. B7880CH is the 72kW power that is included in the configuration for the non-Cardiac CT offer

11) Clarify why a 64 Channel detector upgrade will be needed?

It allows the Cardiac system to be a 64 acquired, 64 reconstructed system for Cardiac imaging.

GMHA: If it is 64 acquired, why would we need the upgrade?

The Base System starts at 32 detectors so that is why the B78B0CE 64 Channel Detector Upgrade is configured for both CT Systems.