Discovery MI Gen2

Digital PET/CT Scanner

Overview

Discovery MI Gen2 is the new generation of Discovery MI PET/CT system, a system that incorporates over 30 years of advanced developments in positron emission tomography. The powerful combination of digital detection, scalable and upgradable design, intelligent motion management, and full convergence reconstruction creates a performance category of its own, that continuously evolves.

Discovery MI Gen2 was built with clinically relevant capabilities aimed to improve the clinical performance of molecular imaging and to open doors to new and advanced possibilities.

Digital LightBurst Detector

New silicon photomultiplier (SiPM)-based PET detector, designed for optimal efficiency and clinical versatility, optimized to perform with any PET tracer currently available for improved PET/CT imaging thus potentially allowing faster acquisition time and/or lower injected PET dose.

Accurate Quantitation

Quantitation helped establish PET/CT as a valuable clinical tool. It provided an important starting point to find and follow disease throughout the course of treatment, but it was limited by the technologies used to produce it. Now, consistent, accurate SUV measurements are possible with Q.SUV. The 'Q' signifies the SUV measurement was produced exclusively from our innovative PET image reconstruction technology, Q.Clear, which delivers not only up to a 2x improvement in PET quantitation accuracy (SUVmean), but also up to a 2x improvement in image quality (SNR). For this reason, Q.Clear is a critical component of Discovery MI Gen2.

QSUV is more than a starting point for clinical decisions. Because it is more accurate and consistent than conventional methods, it becomes more than a number, it becomes a tool for communication. As a result, it sharpens communication among imaging specialists, oncologists and patients. Be sure your SUV starts with a 'Q'.

Intelligent Motion Management

Respiratory motion is a major limiting factor of image quality and accurate quantitation. A critical and large area of the body is impacted by respiratory motion: chest, abdomen, and pelvis.

Disease types in which respiratory motion may have a significant impact, if uncorrected, include: lung cancer, liver cancer, colorectal cancer, lymphoma, cancers that have metastasized to the liver, cancers in the thorax, and heart disease.

GE offers MotionFree; the first software-only solution for motion correction without an external device, minimally disruptive to the workflow, and as result can be used with every patient. MotionFree enables you to improve your quantitative accuracy (SUVmean) by up to 46% and volumetric accuracy of lesion size by up to 68%[2].

1. 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.
2. 46% compared to non-processed (static, no-motion corrected) OSEM reconstructed data.

Premium CT

Discovery MI Gen2 includes diagnostic CT innovations from our Revolution EVO platform.Its 40 mm High Definition (0.625mm channel) coverage combined with pitch booster technology and ASiR-V provide you excellent image quality, low dose capability and speed1. Discovery MI Gen2 brings TrueFidelity™ Images generated by GE Healthcare's Deep Learning Image Reconstruction (DLIR). DLIR neural networks give an image appearance similar to traditional FBP images while maintaining the performance of ASiR-V. With Smart MAR virtually eliminating streaks and shadows from metal artifacts, you'll save valuable time previously spent correcting images.

Discovery MI Gen2 offers, TrueFidelity™, the new era of CT-image reconstruction to address the challenges of filtered-back-projection and iterative reconstruction. TrueFidelity™ images are generated by GE Healthcare's Deep Learning Image Reconstruction (DLIR). which gives an image appearance similar to traditional FBP images while maintaining the performance of ASiR-V.

Available in Three Configurations

Discovery MI Gen2 can be configured with 3, 4 and 5 LightBurst detector rings:

- **Discovery MI Gen2 15**, with 7.5 cps/kBq NEMA sensitivity and 15 cm Axial FOV (3 rings)
- **Discovery MI Gen2 20**, with 13.5 cps/kBq NEMA sensitivity and 20 cm Axial FOV (4 rings)
- **Discovery MI Gen2 25**, with 21 cps/kBq NEMA sensitivity and 25 cm Axial FOV (5 rings)
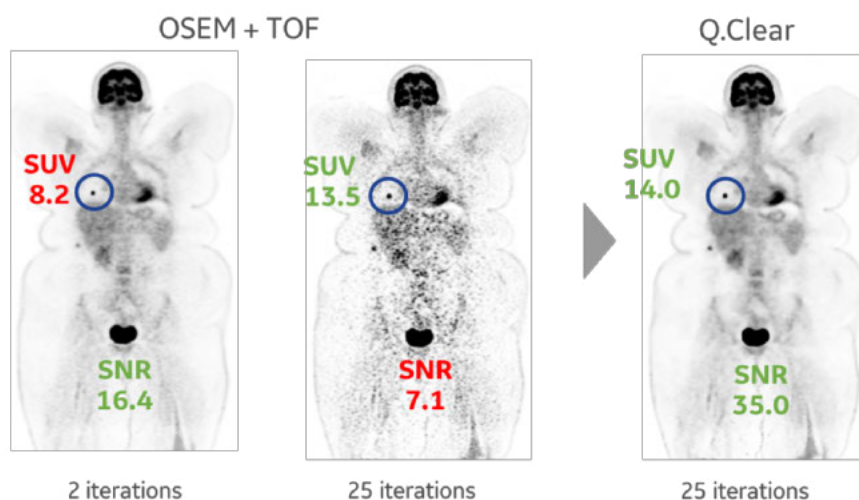
Discovery MI Gen2 detectors are designed for scalability from 15 cm FOV up to 30 cm FOV

PET Technologies

Advanced Quantitative Reconstructions

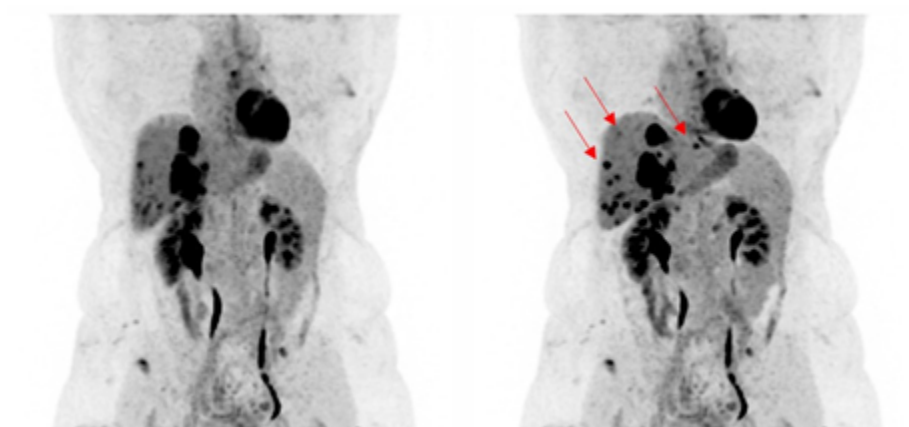|		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
VUE Point HD	VUE Point HD utilizes a full 3D Iterative Reconstruction technique with all corrections within the loop.It offers: enhanced resolution detector geometry modeling; model-based 3D scatter correction; scatter estimation outside the FOV; exclusive randoms corrections based on singles; dead time correction with pileup estimates.	●	●	●
VUE Point FX	VUE Point FX, time-of-flight image reconstruction, leverages the innovative VUE Point HD iterative process by adding timing information to each step within the iterative loop and improving signal-to-noise ratio.	●	●	●
QAC	Our Q.AC algorithm helps to ensure that the attenuation coefficients used in image reconstruction are accurate in ultra-low-dose, non-diagnostic CT protocols.	O	O	O
SharpIR	Point Spread Function modeling enhances visual contrast and resolution in both whole-body and brain PET images. SharpIR provides uniform High Definition resolution over a 70 cm PET FOV.	●	●	●
Q.Clear	Full convergence iterative reconstruction technology providing up to 2 times improvement in PET quantitation accuracy (SUVmean) and up to 2 times improvement in image quality (SNR) for small lesion detection, fast and efficient reading and a more confident diagnosis.	O	O	O

● Included   O Optional

OSEM + TOF

SUV 8.2
SNR 16.4
2 iterations

SUV 13.5
SNR 7.1
25 iterations

Q.Clear

SUV 14.0
SNR 35.0
25 iterations

PET Technologies

Intelligent Motion Management

|		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
MotionFree	MotionFree is a software-only solution to derive a respiratory signal from the acquired PET data as an alternative to existing device-based respiratory gating options. It generates a respiratory signal which can be used to automate motion correction of PET images with respiratory motion. MotionFree is designed to be minimally disruptive to the standard workflow, and therefore to be used in every scan. MotionFree enables you to improve your quantitative accuracy (SUVmean) by up to 46% and volumetric accuracy of lesion size by up to 68%[2].	O	O	O
Q.Static	Represents a starting point for adding motion correction techniques to your facility and the opportunity to build towards a full 4D phase-matched workflow. Without disrupting your standard whole-body workflow, QStatic automatically isolates data when organs are in a low-motion state, thereby correcting for motion across the entire chest or torso. The result is a single image series with reduced blurring from organ motion and therefore more consistent quantitation compared to a static image.	O	O	O
Q.Freeze	Q.Freeze is designed to combine the quantitative benefits of 4D phase-matched PET/CT imaging into a single static image. By collecting CT and PET data at each phase of the breathing cycle, then matching the data for attenuation correction purposes, Q.Freeze is designed to facilitate quantitative consistency. None of the acquisition data is wasted, as 100% of the counts collected are combined to create a single static image. The goal – a resulting image that has the dual benefit of frozen patient motion and reduced image noise. Combine with Q.AC to create 4D cine data for attenuation correction of PET images at low dose levels.	O	O	O

● Included   O Optional

Conventional   MotionFree

PET Technologies

Workflow Optimized for Quantitation Accuracy

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Auto-In	This feature allows the user to landmark and position the patient remotely at a desired table location from the operator console. This may minimize the radiation dose to technologist & improves workflow by reducing the time spent to position the patient.	●	●	●
DQA	The new Daily Quality Assurance (DQA) procedure helps to minimize radiation exposure and optimize efficiency. The newly developed ^{68}Ge phantom, which lasts for at least 24 months, is only 25% the weight of a conventional 30 cm flood phantom. The procedure takes less than 10 minutes[3].	●	●	●
Q.Temp	Real Time Temperature Compensation technology that uses the sensors to measure the temperature of each detector unit and individually adjusts the gain in real time to ensure that temperature fluctuations in the scan room do not impact system performance and, therefore, quantitative measurements.	●	●	●
Q.Check	User configurable data integrity check that can help ensure parameters important for quantitative imaging are saved in the patient DICOM data prior to network. It includes blood glucose level, date of last therapy, and ability to note if patient is diabetic.	●	●	●
Q.Prep	Q.Prep is designed to facilitate the patient exam preparation. QPrep offers the following functions: • Ability to view parameters of prior exams • Compare prior parameters to current exams • Ability to pre-enter study information	O	O	O

● Included   O Optional

Patient	Uptake Room	Scanner	Reading Room
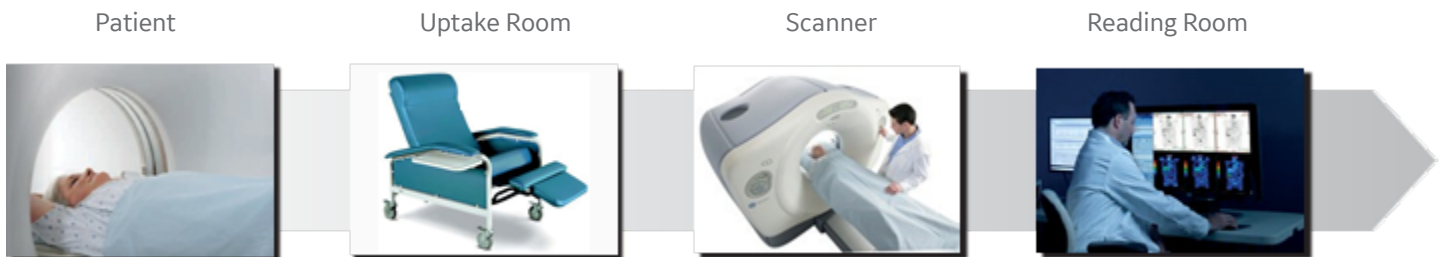
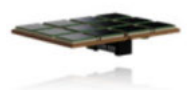3. Represents typical system performance.

PET Performance Specifications

Light Shield

Scintillator (LBS) crystal array with light guides and Enhanced Spectral Reflectors (ESR)

Silicon Photomultiplier (SiPM) with electronics (ASICS) designed for Digital Compton Recovery

Future Upgradability to 30cm now available with Gen2 detectors

LightBurst LBS Detector		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Scintillator material		LBS-Lutetium based scintillator		
Scintillator dimensions		3.95 mm x 5.3 mm x 25 mm		
Number of detector rings		27	36	45
Number of crystals		14,688	19,584	24,480
SiPM Channels		7,344 (1,224 Hex-Anode SiPMs)	9,792 (1,632 Hex-Anode SiPMs)	12,240 (2,040 Hex-Anode SiPMs)
Number of detectors		408 blocks	544 blocks	680 blocks
Axial field of view		15 cm	20 cm	25 cm
Transaxial field of view		70 cm	70 cm	70 cm
Slice overlap		User defined 1-26	User defined 1-35	User defined 1-44
Sensitivity[4]		7.5 cps/kBq	13.5 cps/kBq	21 cps/kBq
Effective Sensitivity[5]		53 cps/kBq	95 cps/kBq	150 cps/kBq
Timing Resolution	@ 0kBq/ml	385psec (typical)	385psec (typical)	385psec (typical)
	@ 5.3kBq/ml[6]	405psec (typical)	405psec (typical)	405psec (typical)
Sensitivity/mm[4]		0.05 cps/kBq*mm	0.068 cps/kBq*mm	0.084 cps/kBq*mm
Scatter fraction[4]		41%	41%	41%
Clinical NECR[4]		33kcps @ 2.4kBq/ml	58kcps @ 2.4kBq/ml	90kcps @ 2.4kBq/ml
Peak NECR[4]		110kcps @ 20kBq/ml	200kcps @ 20kBq/ml	315kcps @ 20kBq/ml
Coincidence window		4.9 ns	4.9 ns	5.25 ns
Energy threshold		425 KeV	425 KeV	425 KeV

4.The following specifications represent typical system performance, measured according to NEMA Standards Publication NU2-2018 for Discovery MI Gen2. Sensitivity represents the average of measurements at 0 and 10 cm.

5. Effective Sensitivity – the measurement considers the signal-to-noise ratio improvements provided by time of flight and Bayesian penalized likelihood reconstruction.
6. The following specifications represent typical system performance, measured according to NEMA Standards Publication NU2-2018 for Discovery MI Gen2.

Spatial Resolution	Discovery MI Gen2 15		Discovery MI Gen2 20		Discovery MI Gen2 25	
	VUE Point[7]	Q.Clear[8]	VUE Point[7]	Q.Clear[8]	VUE Point[7]	Q.Clear[8]
Axial @ 1 cm	4.4 mm	3.4 mm	4.4 mm	3.4 mm	4.4 mm	3.4 mm
Axial @ 10 cm	4.7 mm	3.5 mm	4.7 mm	3.5 mm	4.7 mm	3.5 mm
Transaxial @ 1 cm	3.9 mm	2.1 mm	3.9 mm	2.1 mm	3.9 mm	2.1 mm
Transaxial @ 10 cm	4.4 mm	2.1 mm	4.4 mm	2.1 mm	4.4 mm	2.1 mm

7. VUE Point HD - Data measured for typical system with 4 iterations and 34 subsets. Typical system performance measurements represent the mean performance of tested systems.

8. Q.Clear - Data measured with Bayesian penalized likelihood reconstruction with β20 and time of flight. Typical system performance measurements represent the mean performance of tested systems.

CT Technologies

Imaging Performance

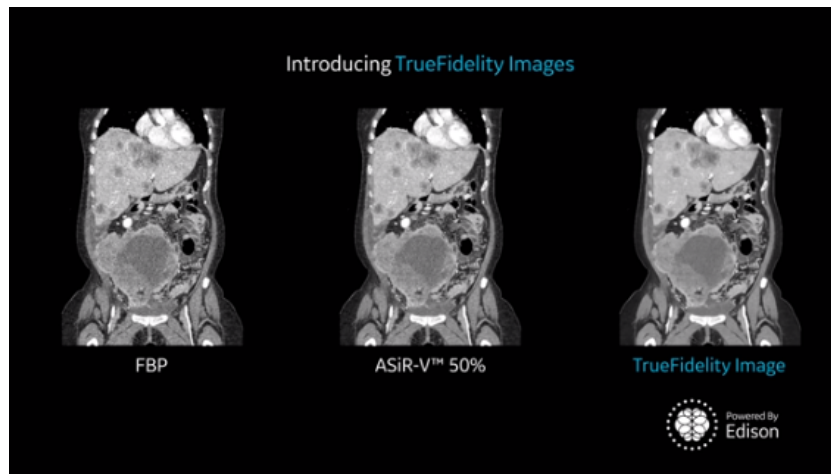|		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Clarity Detector and Data Acquisition System (DAS)	Designed as analog cable free between ASIC and Diode, and has a capability to reduce electric noise. Designed for less heat generation, up to 90% compared with previous GE technology and all in one DAS / Detector. Designed for less floor-noise, up to 44% compared with previous GE technology and it has capability to reduce electric noise.	●	●	●
Performix™ 40 Plus X-ray Tube	A liquid bearing tube that has a capability of less-wear of Tube bearing and is enabled up to 0.35sec rotation speed with a routine scan. Revolution EVO allows users to utilize helical pitches up to 1.531 and 0.35sec rotation speed that meets GE's image quality specifications for lower pitch acquisitions. This high pitch and 0.35sec rotation speed enables faster scan times which may allow for shorter breadth holds, and may help to avoid sedation, simultaneously (or "as well as") reducing motion artifacts from patient and organ movement.	●	●	●
ASiR™	An advanced Statistical Iterative 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 Revolution EVO 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[9].	●	●	●

● Included   O Optional
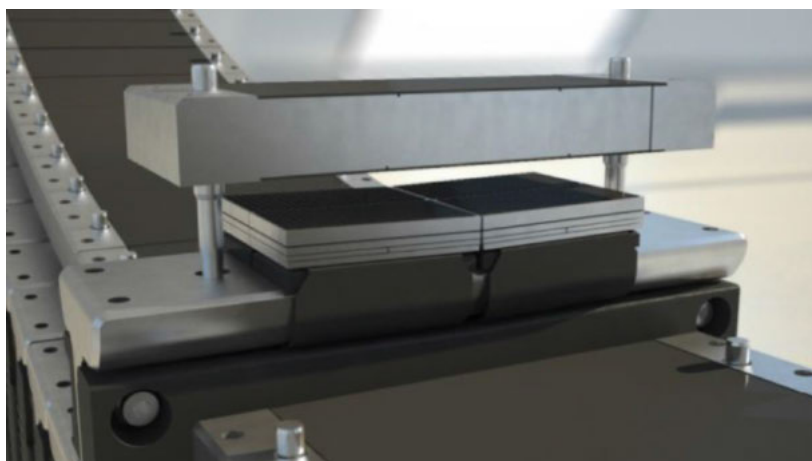
9. In clinical practice, the use of ASiR may reduce CT patient dose and improve low contrast detectability depending on the clinical task, patient size, anatomical location and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.

CT Technologies

TrueFidelity

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
TrueFidelity™	TrueFidelity™ deep learning image reconstruction is the next generation image reconstruction technology that uses a dedicated Deep Neural Network (DNN) to generate TrueFidelity CT Images. Compared to current iterative reconstruction technology, TrueFidelity CT Images can elevate every image to a powerful first impression with distinguished image quality Performance[10], and preferred image sharpness[11] and noise texture[12], at the same dose. TrueFidelity Images have the potential to improve the reading confidence in a wide range of clinical applications such as head, whole body and cardiovascular, for patients of all ages. The user can select three strengths of TrueFidelity deep learning image reconstruction: Low, Medium or High. The strength selection will vary based on user preference in specific clinical applications. Natively running on Recon Server Xtream, the TrueFidelity deep learning image reconstruction engine is incredibly powerful to achieve fast reconstruction for routine CT use, even in acute care settings. TrueFidelity is available on GEHCs Edison platform.	O	O	O

● Included   O Optional

Introducing TrueFidelity Images

FBP   ASiR-V™ 50%   TrueFidelity Image

Powered By Edison

10. Image quality comparisons between DLIR and ASiR-V, were evaluated by phantom tests of MTF, SSP, axial NPS, standard deviation of image noise, CT Number accuracy, CNR, and artefact analysis. Additionally, LCD was demonstrated in phantom testing using a model observer with the head and body MITA CT IQ Phantoms (CT191, CT189 The Phantom Laboratory). DLIR and ASiR-V reconstructions were performed using the same raw data.
11. As demonstrated in a clinical evaluation consisting of 60 cases and 9 physicians, where each case was reconstructed with both DLIR and ASiR-V and evaluated by 3 of the physicians. In 100% of the reads, DLIR's image sharpness was rated the same as or better than ASiR-V's. This rating was based on each individual reader's preference.
12. As demonstrated in a clinical evaluation consisting of 60 cases and 9 physicians, where each case was reconstructed with both DLIR and ASiR-V and evaluated by 3 of the physicians. In 91% of the reads, DLIR's noise texture was rated better than ASiR-V's. This rating was based on each individual reader's preference.

CT Technologies

Imaging Performance

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
ASiR-V™	ASiR-V is the newest technology in GE's family of industry-leading iterative reconstruction techniques. ASiR-V combines the speed of ASiR with additional capabilities from Veo, GE's full model-based iterative reconstruction technology. ASiR-V allows healthcare providers to lower dose by 50 to 82% as compared to standard filtered back-projection (FBP) reconstruction at the same image quality[8,12,13]. 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. ASiR-V Benefits: • Reduces dose by 50% to 82% relative to FBP at the same image quality[14]. • Improves low contrast detectability by 59% to 135% at the same dose[13]. • Reduces image noise up to 91% at the same dose[12]. • Improves spatial resolution up to 2.07X (107%) at same image noise[12]. • Has the capability to reduce low signal artifact such as streak artifact compared to FBP[12].	O	O	●

● Included   O Optional
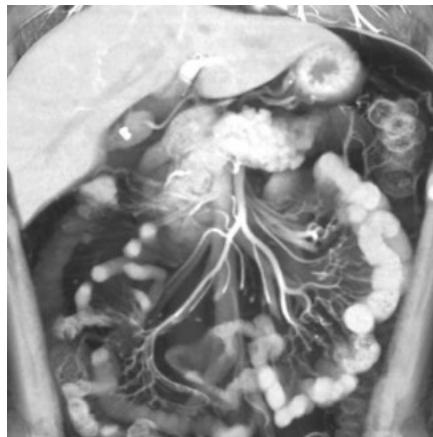
13. In clinical practice, the use of ASiR-V may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the 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.
14. Image quality as defined by low contrast detectability.

CT Technologies

Imaging Performance

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
IQ Enhance	IQ Enhance (IQE) reconstruction reduces helical Artifact Index in thin slice helical scanning. This reduction in artifacts makes it possible to scan at faster helical pitches.	●	●	●
Advanced Artifact Reduction	Advanced Artifact Reduction (AAR) Filter significantly reduces streaking artifacts when highly absorbent objects are in the field of view – i.e. large shoulder.	●	●	●
Two Path Dual-Energy Acquisition	GE's protocol management is improved with the addition of a workflow improvement feature, which allows easy configuration of back to back Axial or helical scans of the same anatomy at two different X-ray energies (kVps). To further improve registration accuracy, patient immobilization may be utilized. The additionally acquired dual energy data can be post-processed on console or AW workstation using Add/Sub function to gain additional clinical information.	●	●	●
Conjugate CB Back Projection	For 64ch based system, Conjugate Cone-Beam Back Projection utilizes two sets of counter-opposed projections to provide 128 distinct projection measurements per rotation for axial and a helical acquisition mode to significantly improve Z-resolution. For 32ch based system, Conjugate Cone-Beam Back Projection utilizes two sets of counter-opposed projections to provide 64 distinct projection measurements per rotation for axial and a helical acquisition mode to significantly improve Z-resolution.	●	●	●
Ultra Kernel	Adaptive Enhance Level Adjustment (AELA) may improve visual spatial resolution while maintaining pixel noise standard deviation and without introducing new artifacts.	●	●	●
SmartMAR	Smart MAR* helps reducing photon starvation, beam hardening and streak artifacts caused by metal in the body, such as hip implants.	O	O	O
Overlapped Recon	For 64ch based system the overlapped reconstruction feature enables up to 128 slices per rotation in axial scanning modes and delivers improved Z-axis visualization performance relative to non-overlapped reconstruction. For 32ch based system, the overlapped reconstruction feature enables 64 slices per rotation in axial scanning modes and delivers improved Z-axis visualization performance relative to non-overlapped reconstruction.	O	O	●

● Included   O Optional

Conventional   SmartMAR

CT Technologies

Dose Management

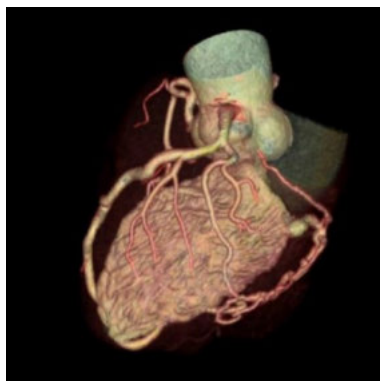|		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
OptiDose™	ECG mA Modulation for cardiac applications; CT 4Kids pediatric protocols based upon a child's size, age, and weight; Color Coding Kids provides pediatric scan protocols based on the Broselow-Luten Pediatric System®; SmartTrack, which keeps the beam focused only on the active detector cells; and SmartBeam, the continuous variable beam thickness, filtered and shaped to optimize dose and image performance.	●	●	●
Dose Reporting	DICOM Structured Dose Report generates a CT Dose Report, which can enable tracking of dose (CTDIvol and DLP) for the patient by the hospital radiation tracking system/RIS/HIS.	●	●	●
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).	●	●	●
Dose Display	CTDIvol (Volume CTDIw), DLP (Dose Length Product) and Dose Efficiency are displayed during scan prescription and provide dose information to the operator.	●	●	●
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).	●	●	●
3D mA 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 dose 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[15].	●	●	●

● Included   O Optional
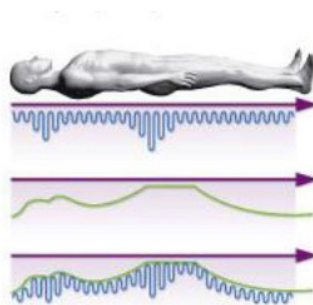
3D mA Modulation

15. mA modulation is designed to optimize the dose for user prescribed noise index. It's effect on dose depends on the patient body habitus, and prescribed noise setting.

CT Technologies

Cardiac Applications

|		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
ECG Viewer/Editor	provides users the capability 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.	O	O	O
Snapshot Pulse	SnapShot Pulse mode is for low dose imaging of the coronary arteries. SnapShot Pulse can also be used to image structures that are near to the heart and may be affected by heart motion such as thoracic aorta's or pulmonary arteries. Prospective Gating based SnapShot Pulse achieves significant dose reduction compared to CG gated helical acquisition mode.	O	O	O
SnapShot Freeze	SnapShot Freeze is designed to reduce blurring artifacts due to motion in coronary vessels that cannot be addressed by gantry speed alone. Providing up to a 6X improvement, while maintaining high spatial resolution, the reduction in motion artifacts is equivalent to a 0.058s Equivalent Gantry Rotation Speed with Effective Temporal Resolution of 29msec[16].	O	O	O
Snapshot Assist	Helps users optimize ECG-gated CT acquisitions based on patient heart rate characteristics. Uses the patient's recorded heart rate information to display scan parameters (including scan mode, cardiac phases, padding and pitch) that could be used during the cardiac CT scan.	O	O	O
SmartScore Pro	Acquires prospective ECG gating measurements, which provides information that is valuable for scan timing. Using the measurements, the system synchronizes the collection of data with the cardiac cycle.	O	O	O

● Included   O Optional

16. As demonstrated in cardiac phantom testing.

CT Technologies

RT, Interventional and Increased-coverage Applications

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Biopsy Mode	Biopsy Mode improves the efficiency of setting up and acquiring slices during a biopsy. All biopsy scan parameters are available on a single screen from which you can launch the biopsy scan.	●	●	●
SmartStep	SmartStep is an interventional mode providing step-and-shoot imaging with in-room viewing and manual X-ray control. The three interventional viewports automatically update each time an exposure is made with the foot pedal.	O	O	O
Volume Shuttle	Revolution EVO provides a single-injection 80mm (2x wider coverage, 128 slice-width) Volume Shuttle acquisition scan. Volume Shuttle is a repetitive axial scan mode where the table shuttles back and forth between two consecutive imaging locations (X-ray is off during table movement). Each location covers 40 mm in the Z-direction for a total of 80 mm of Z-coverage. The shuttle action repeats over a defined duration to enable evaluation of tissue changes over time.	O	O	O
Volume Helical Shuttle	Volume Helical Shuttle is a continuous scan technique that is a bi-directional scan mode, covers up to 312.5mm or 500 slices (0.625mm x 500 slice) for 4D imaging. Volume Helical Shuttle provides data to support up to 140 mm of coverage repeatability within 3.2sec. Dynamic Pitch Reconstruction extends Z-coverage and improves temporal sampling by utilizing acquired scan data during table acceleration and deacceleration.	O	O	O
TG-66 Kit	Enables accurate patient positioning in the trans-axial plane that may help improve the accuracy of radiotherapy planning. The kit consists of mechanical elements that are permanently installed on the cradle by means of a dedicated calibration tool. Once installed, GE-supported flat table tops can be easily mounted and removed based on the clinical protocol.	O	O	O

● Included   O Optional
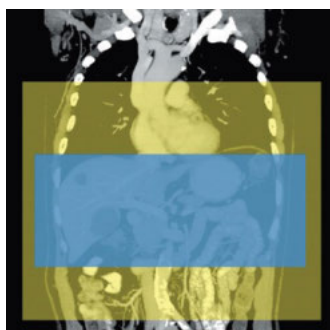
CT Performance Specifications

X-Ray Tube	
Performix 40 Plus X-ray Tube	Liquid-bearing tube that has a capability of less-wear of Tube bearing and is enabled up to 0.35 second rotation speed with a routine scan
Thermal ratings	The maximum anode heat capacity: 5.0 MJ (7.0MHU)
Distance of focal spot to detector	95 cm
Small focal spot	0.9 x 0.7 per IEC 60336/2005
Large focal spot	1.2 x 1.1 per IEC 60336/2005
Maximum power	72kW (100 kVA)
mA	10 to 600 mA, 5 mA increments

CT Performance	
Display field of view	70 cm with WideView
Scan field of view	50 cm diagnostic
Minimum slice thickness	0.625 mm
Scan modes	• Axial: axial slices acquired simultaneously with each 360° rotation, with the time between scans set by the user-selected interscan delay (ISD) or intergroup delay (IGD). • Helical: continuous 360° scanning with table incrementation and no interscan delay. • Cine: contiguous axial slices acquired simultaneously with each 360° rotation. Half-scan imaging and segmented reconstruction is supported with acquisitions times of 0 .65 times that of the scan speed. • 128 slices per Rotation[‡] - The overlapped reconstruction feature enables 128 slices per rotation in Axial scanning modes and delivers improved Z-axis visualization performance relative to non-overlapped reconstruction.
Pitch	Helical Pitch (nominal): 0.516 to 1.531 Cardiac Pitch: 0.16 to 0.35
Rotational speeds (360°)	Axial: 0.35[‡], 0.4[‡], 0.5[‡], 0.6[‡], 0.7, 0.8, 0.9, 1.0, and 2.0 seconds Helical: 0.35[‡], 0.4[‡], 0.5[‡], 0.6[‡], 0.7, 0.8, 0.9 and 1.0 seconds Cardiac application[‡]: 0.35, 0.375, 0.40, 0.425, 0.45, 0.475, and 0.50[‡] seconds
HU scale	-31,743 to 31,743
Reconstruction matrix	512 x 512
Display matrix	1024 x 1024

[‡] Optional

CT Performance Specifications

Clarity Detector	
Number of elements	54,272
Number of rows	64 rows of 0.625 mm thickness at isocenter 32, 64‡, and 128‡ slices per rotation‡
Detector coverage	up to 40 mm in axial mode up to 61 mm/rotation using IQE (1.531:1 pitch)
Perfusion coverage	120 mm with Volume Helical Shuttle‡
Absorption efficiency	98%
Special Resolution	0.28 mm
Data Acquisition System	Volara XT Digital DAS

Image Quality	
Low-contrast detectability On 8 in (20 cm) Catphan phantom, helical scan	Reconstruction mode: Standard Algorithm with ASiR Object Size: 5 mm % Contrast: 0.32% Dose Level (mGy TDIvol) 10 mm slice: 5.69 mGy
CTDI expressed in mGy/100 mA on CTDI head and body dose reference phantoms	Axial head: 16.7 mGy/100 mAs Axial body: 8.7 mGy/100 mAs Helical head: 17.0 mGy/100 mAs Helical body: 8.8 mGy/100 mAs
Noise	Axial: 0.43% at 11.0 mGy CTDIvol with ASiR Reconstruction Algorithm Helical: 0.43% at 11.1 mGy CTDIvol with ASiR Reconstruction Algorithm

‡ Optional

Workspace and Protocols

Discovery MI Gen2 Workspace

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Q.Flow	Ease of use and automation: common PET and CT user interface, up to 3 PET prospective reconstructions, up to 8 list mode record/replay Enhanced Graphic Rx: edit scan parameters on scout view, one-click hybrid protocol set-up from CT, auto direct multi-planar reformats, PET copy PMR to copy reconstruction parameters Flexibility: variable acquisition time per bed, multi-bed gated PET, cardiac and respiratory PET gating, integrated PET gating Networking and compatibility: DICOM HIS/RIS, DICOM PET RAW, auto-store and auto-networking.	●	●	●
ViP Replay	Volume Interface Protocol (ViP) is an intuitive and comprehensive PET list mode prospective reconstruction solution. Provides integrated list mode processing for generating a variety of scan types (static, dynamic, gated) from a single acquisition.	●	●	●
RadRx	Create your own PET/CT protocol from any CT protocol. Automated CTAC creation from CT acquisitions, including contrast enhanced, perfusion and gated CTs. Integrated Average Cine CT protocol for improved attenuation correction.	●	●	●
PET/CT pediatric protocols	Default protocols specifically designed for FDG oncology pediatric exams based on Broselow-Luten Pediatric System®, which is designed to minimize CT radiation exposure in PET/CT attenuation correction to meet ALARA guidelines.	●	●	●
Remote table retract	Increase technologist shielding from the patient by allowing the use of operator console-based controls for bed retraction and lowering out of the gantry at the end of the exam.	O	O	O

● Included   O Optional

Workspace and Protocols

Discovery MI Gen2 Workspace

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Clinical Protocols	Oncology: • Whole-body PET/CT (Static) • Q.Static PET/CT • 2 meter scan whole-body PET/CT Cardiology • 82Rb/ Ammonia stress/rest protocol • FDG Gated PET/CT Neurology • Amyloid PET imaging • Brain PET All protocols can work with ASiR, ASiR-V, and Q.AC	●	●	●
Direct MPR with Auto-Batch	Automatic real-time direct reconstruction and transfer of fully-corrected multiplanar images, in any plane. Up to 10 fps transfer speed in real-time during acquisition to up to four different destinations.	●	●	●
Exam Split	Allows multi-anatomic exams to be read in separate anatomic sections. This allows specialists to review only those images needed for a given requisition.	●	●	●
SmartPrep	Enables intermittent monitoring of IV contrast enhancement in an area of interest.	●	●	●
AWE Connection	Allows access to applications hosted on an AW Server, right from the CT console for improved workflow and productivity.	●	●	●
PET Data Storage	2 .4 TB List Data Storage, 1 .2 TB Sinogram Data Storage and Network Storage Capability. Storage space is amplified by utilizing GE's patented sinogram and list compression technology.	●	●	●
PET Exam Report	Highlights key aspects from the PET scan including injected dose, uptake time, patient demographics and other important information that is intended to be passed along to reading physicians and streamline their workflow.	●	●	●
Xtream Injector	A powerful integrated injection option that starts the injection process in synchronization with "Start Scan" to simplify the enhancement exam workflow.	O	O	O

● Included   O Optional

Workspace and Protocols

Discovery MI Gen2 Workspace

		Discovery MI Gen2 15	Discovery MI Gen2 20	Discovery MI Gen2 25
Data Export	Ensures that the relevant images and reports can be visualized by the referrals in a PC friendly format (MPEG, AVI, etc.)	●	●	●
Compatible peripherals	DVD-R: Creation of interchange media of PET and CT image data with viewer option. USB 2 .0 external hard drive: ViP data offline storage.	●	●	●
Direct Connect	AW VolumeShare 7 supports a direct connection between the scanner and AW workstations. Post processing can be done on image residing on Direct Connect linked systems by launching applications without having to DICOM transfer the exam to the AW.	●	●	●
Acquisitions	Static, gated, dynamic Multi-static, multi-gated, multi-dynamic Real time list mode coincidence data acquisition for clinical and research applications that provides the opportunity for principal component analysis of the PET raw data (i.e. sinogram) and therefore facilitates user development of advanced motion corrections that eliminate the need of an external respiratory device.	●	●	●
Image matrix sizes	128 x 128, 192 x 192, 256 x 256, 384 x 384	●	●	●
SPARC	Standalone PET Reconstruction Console for DMI and DMI-DR PET/CT scanners. SPARC increases department productivity by allowing offline protocol management and sharing across scanners and retrospective reconstruction, analyses and visualization of data to maintain patient throughput on the acquisition console. SPARC also allows reconstruction from a selection of other GE PET/CT scanners[17].	O	O	O

● Included   O Optional

Siting Requirements

System	Height	Width	Depth	Weight
Gantry	193 cm / 76"	224 cm / 88"	156 cm / 62"	3612 kg / 6971 lb.
Table	107 cm / 42"	66 cm / 26"	345 cm / 136"	1049 kg / 2312 lb.

Patient Table	
Maximum load	500 lb. (226 kg)
Maximum horizontal scannable range	Standard 170 cm with up to full 200 cm (optional)
Vertical scannable range	8 to 205 mm below isocenter
Maximum horizontal speed	100 mm/sec

Patient Table Compatible Options
IV Pole integrated at the foot-end of the table prevents IV lines from becoming crossed and tangled and ensures that the lines stay securely in place on the patient
2 m table extender: Carbon fiber table extender to enable full 2 m scan range for complete head to toe studies.
Radiation treatment planning flat table overlay securely lock into the PET/CT.
GE integration kit for Varian respiratory patient monitor composed of a table-mounting bracket with connector to support the RPM device; allows respiratory gating with and without radiation treatment planning flat table overlay.

Scan Room	
Minimum room size	3462 mm x 7009 mm / 136" x 276"
Room temperature range	18° C (64° F) – 26° C (79° F)
Room cooling requirements	Air cooled, recommended 55,414 BTU/hr with heavy CT utilization

Control Room	
Minimum room size	2743 mm x 3912 mm / 108" x 154"
Room temperature range	18° C (64° F) – 26° C (79° F)
Room cooling requirements	Air cooled. Recommended 3625 BTU/HR
Power Requirements	100 kVA maximum, 30 kVA average (150 kVA maximum in China and Russia)
Equipment Room	Not required. Heat and noise output for Power Distribution Unit and computer hardware are low enough to allow inclusion in the patient scanning suite with the table and gantry.

Standards and Regulatory Compliance

DICOM Conformance Standards

PET sinogram data can be saved as a DICOM file

DICOM storage service class

Service Class User (SCU) for image send

Service Class Provider (SCP) for image receive

DICOM query/retrieve service class

DICOM storage commitment class push

DICOM modality work list

DICOM modality performed procedure step

DICOM Print

Filming Protocol

3M-952 standard

Supported film and hardcopy devices:
- A DICOM print interface is standard on the system
- DICOM basic grayscale and color print via ethernet
- Sterling/AGFA Helios via ethernet
- Post script level 2 printer via TCP/IP ethernet

HIPAA

Password protected user login and authentication.
Image anonymization tool.
Product network filters restricts access to scanner system by IP address, services type (IE ftp, telnet) and DICOM port number.
User configurable.

Standard, Selectable Items

Language selectable keyboard ConnectPro HIS/RIS interface with performed procedure step

DICOM storage service class

Regulatory Compliance

This product is designed to comply with applicable standards under the Radiation Control for Health and Safety Act of 1968. Laser alignment devices contained within this product are appropriately labeled according to the requirements of the Center for Devices and Radiological Health.

CAUTION
Laser Radiation
Do not stare into beam
635, 670nm Laser Product
1 Milliwatt Maximum Output
Class II Laser Product

This product complies with laser standard IEC 60825-1:2007-03. Rear PET laser is an IEC Class 1M laser product. Laser Radiation - Do not view directly with optical instruments. Do not expose users of telescope optics. Max power: 0 .39 mW. Wavelength: 635 nm.

Discovery MI Gen2 has been designed to follow PET/CT international standards: ACR, ACRIN, EARL, QIBA

Discovery MI Gen2 system meets MITA XR-29-2013 Smart Dose standards.

OptiDose, ASiR and Performix are trademarks of General Electric Company or one of its subsidiaries.
Broselow-Luten System and Color Coding Kids are trademarks of Carefusion, Inc.

Imagination at work

GE Healthcare is a leading provider of medical imaging, monitoring, biomanufacturing, and cell and gene therapy technologies. GE Healthcare enables precision health in diagnostics, therapeutics and monitoring through intelligent devices, data analytics, applications and services. With over 100 years of experience and leadership in the healthcare industry and more than 50,000 employees globally, GE Healthcare helps healthcare providers, researchers and life sciences companies in their mission to improve outcomes for patients around the world. Follow us on Facebook, LinkedIn, Twitter and The Pulse for latest news, or visit our website www.gehealthcare.com for more information.

DOC2440914 Rev1