Biograph Vision Quadra

Release Information – Start Here!

PET*syngo* VR20A

SIEMENS Healthineers

Biograph Vision Quadra

Release Information – Start Here!

PET*syngo* VR20A

Legend

	Indicates a hint Is used to provide information on how to avoid operating errors or information emphasizing important details
	Indicates the solution of a problem Is used to provide troubleshooting information or answers to frequently asked questions
●	Indicates a list item
✓	Indicates a prerequisite Is used for a condition that has to be fulfilled before starting a particular operation
◆	Indicates a one-step operation
1 2 3	Indicates steps within operating sequences
Italic	Is used for references and for table or figure titles
→	Is used to identify a link to related information as well as previous or next steps
Bold	Is used to identify window titles, menu items, function names, buttons, and keys, for example, the Save button
Orange	Is used to emphasize **particularly** important sections of the text
Courier	Is used for on-screen output of the system including code-related elements or commands
Courier	Is used to identify inputs you need to provide
Menu > Menu Item	Is used for the navigation to a certain submenu entry
<variable>	Is used to identify variables or parameters, for example, within a string
⚠ CAUTION	CAUTION Used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or material damage. CAUTION consists of the following elements: • Information about the nature of a hazardous situation • Consequences of not avoiding a hazardous situation • Methods of avoiding a hazardous situation

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

WARNING consists of the following elements:

- Information about the nature of a hazardous situation
- Consequences of not avoiding a hazardous situation
- Methods of avoiding a hazardous situation

WARNING

Legend

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1 Legal Notice

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CAUTION

- Federal law of the United States of America restricts this device to sale by or on the order of a physician. (21 CFR 801.109(b)(1))

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The original language of this document is English.

1 Legal Notice

All rights reserved.

1.1 Trademarks

Biograph is a registered trademark owned by Siemens Healthcare GmbH.

syngo is a registered trademark owned by Siemens Healthcare GmbH.

Other trademarks are used for identification purposes only and are the property of their respective owners.

1.2 Availability of Products and Features

Due to international regulatory restrictions, some products and features described in this document are not commercially available in all countries. Features may be blocked or enabled by optional software licenses. Future availability of these features cannot be guaranteed. Some features may not be explicitly marked as optional. Please contact your local Siemens Healthineers representative for further details.

1.3 System and Software Representations

The photographs, graphics, figures, and medical images used in this documentation are examples only. Their actual display and design may be slightly different on your system.

1.4 Regulatory Information

1.4.1 Legal Manufacturer



Siemens Medical Solutions USA, Inc.
Molecular Imaging
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USA

1.4.2 EU Authorized Representative



Siemens Healthcare GmbH
Henkestr. 127
91052 Erlangen
Germany

1 Legal Notice

2 Welcome

Welcome to your Siemens Healthineers Biograph Vision Quadra PET·CT system! The PET*syngo* VR20A supports the Biograph Vision Quadra. This device is based on technology present in the Biograph Vision. It features a large axial field of view (greater than 1 meter).

Please read this document for helpful hints, known limitations, and an overview of the Biograph operating instructions included with your system. Familiarity with this content prepares you for a positive experience on your Biograph Vision Quadra system.

This document is applicable to the PET·CT system Biograph Vision Quadra family and supported accessories.

We appreciate your feedback regarding this new version of software. If you have any further suggestions or proposals for future improvements, please forward them to your Siemens Healthineers Service representative.

2.1 Operating Instructions Overview

In the instance you need to consult your product operating instructions, refer to the list below for an overview of these instructions and their respective manuals. Online versions of these manuals may be found at https://doclib.siemens-healthineers.com.

- Start Here!
  - This document provides helpful hints, known limitations, and other miscellaneous information you should know before operating the system.
- Operator Manual
  - This document provides introductory and procedural information necessary for the safe and proper operation of the system.

2 Welcome

- Online Help
  - The online help contains operating instructions which address the main functions and processes supported on the system. Press **F1** on your system keyboard, at any time, to access the online help.
- *syngo* MI - *syngo* TrueD Standard
  - This document provides operating instructions for the TrueD viewing software.
- *syngo* MI - *syngo* TrueD Lite
  - This document provides operating instructions for the TrueD viewing software.
- Security Guidelines
  - This document describes the security capabilities of the sytem as well as the roles and responsibilities of Siemens Healthineers and the user.
- Reference Information
  - This document provides technical information, dose and imaging performance data, and the standards and statutory regulations in which the system complies with.
- Self-Test Instructions
  - This document provides the instructions necessary to complete the self-tests for NEMA, radiation therapy, and system monitor constancy testing.
- Baby Mattress
  - This document provides information on the baby mattress accessory.

3 New and Enhanced Features

The PET*syngo* VR20A software is based on the primary features of the PET*syngo* VR10X software for Biograph Vision Quadra systems. In addition, VR20A provides the following new functionality:

- * **Deviceless PET Respiratory Gating** is a non-contact, equipment-free respiratory gating method that utilizes a derived waveform from acquired PET data for the use of a respiratory signal and motion correction.
- * **FAST PET Planning** uses ALPHA (Anatomic Landmarking and Parsing of Human Anatomy) technology to automatically populate, predefined PET scan ranges based on an acquired topogram.
- * **Patlak** examinations allow you to model the time-varying nature of PET to quantitatively estimate physiological processes.
- * **OncoFreeze** automatically selects optimal respiratory gating points to eliminate variations due to changing respiration rates, coughing, etc., and utilizes elastic motion correction to reduce motion artifacts while maintaining image statistics.
- The **WB Relative** and **WB Absolute** scatter correction options apply additional scatter correction to reconstructed images that contain halo artifacts.

* Some features require optional licensing and/or hardware for implementation. Please contact your local Siemens Healthineers Service representative for information on obtaining additional licenses.

3 New and Enhanced Features

4 Known Limitations

4.1 Parametric PET

- In a Patlak reconstruction, if you update the blood glucose level within the **Radiopharmaceutical Dose Dialog** after submitting the reconstruction, you must duplicate and resubmit the reconstruction to properly recalculate the MRfdg (slope) values.
- If you load more than one intercept or slope image into TrueD at once, the statistics shown on the screen will overlap and make it hard to distinguish which statistics go with which image. To avoid this, ensure to only load one intercept or slope image into **TrueD** at a time.
- Ensure you close the patient within the **Examination** task card before loading the SUV, slope, and intercept images into TrueD. If you do not close the patient, only the CT images will load into **TrueD**.
- Ensure you are in the transverse viewing mode before loading the auto VOIs. If you are not in transverse mode (for example, viewing mode set to sagittal or coronal), the VOIs will not copy across the PET timeslices.
- When exporting Parametric PET data to an external PACS system, please ensure that the Parametric raw data has been backed up using the PET·CT Export tool.
- Do not use **MM Oncology** to create a Time Activity Curve (TAC) from Wholebody Dynamic acquisitions, including acquisitions for Patlak Parametric studies. The timing data in the generated CSV file is not adjusted for multiple bed positions or CBM acquisition.

4.2 Quality Control

- Full Setup is required before performing and/or scheduling QualityGuard. Do not perform only a partial setup prior to QualityGuard, as it will cause intermittent failures. After a full setup is performed, QualityGuard must be run within 24 hours in order to determine the correct ratio between the LSO energy peaks and the 511kV energy peaks.
- If the QC is aborted during a critical operation, such as Partial Setup, Full Setup, and/or Time Alignment, please rerun QC and ensure it is successful before scanning a patient.
- Performing PET Quality Control with phantoms other than the Siemens Healthineers solid Germanium-68 phantom may cause a variation in the quantification of the attenuation corrected PET images.

  To correct for biased PET quantification you should perform the scanner cross calibration procedure after the PET Quality Control completes. The cross calibration procedure calibrates the PET scanner to the dose calibrator and accounts for the mu-value of a liquid or third-party solid Germanium-68 Quality phantom. For complete instructions on the Cross Calibration procedure, please refer to the Biograph Operator Manual.
- Using a non-Siemens Healthineers supplied source on this system may result in the failure of system quality control and is not recommended
  - The Vision Quadra system quality control (DailyQC, system setup, etc.) is calibrated to use a 21 x 30 cm Ge-68 source with up to 3.0 mCi.
- If the PET Quality Control fails, restart the system and repeat the PET Quality Control with a Full Setup. If problems persist, contact your Siemens Healthineers Service representative.

4.3 Acquisition

- You may experience reconstruction failures if you create a custom reconstruction range with WB Scatter selected. If this happens, please adjust the reconstruction range slightly on the Exam UI so that the end no longer corresponds with the end of the scan range. Then resubmit the reconstruction.
- If the user interface becomes unresponsive after you end an exam, select **Setup** > **Continue** from the main menu. This should clear the error state and allow the system to operate normally, in most cases.
- Before loading a respiratory scan, please check the respiratory waveform signal and use the offset and amplitude adjustments in the **Trigger** subtask card to ensure the signal resides in the middle of the amplitude, this could reduce the risk of occurrence of respiratory waveform clipping.
- To execute a successful Molecular Topogram protocol, you must utilize the Set Table Begin/End buttons on the gantry to plan the scan range. When the system prompts you to move the bed, you must also move the bed using the gantry Move In or Move Out buttons. Failure to use the buttons on the gantry to plan the scan range and move the bed results in the inability to use the Molecular Topogram to plan the CT scan range.
- Using the **Patient Browser** on the *syngo* Acquisition Workplace, it is possible to delete the PET raw data from a current, active study in the **Examination** task card. If an acquisition is in progress, the acquisition fails and an error message appears stating that the "PET scan aborted due to acquisition error". You should not delete PET raw data during an acquisition as this action causes the PET acquisition to fail.
- You should not attempt to copy a normalization file from another study into an active acquisition even though this is an option.
- The Automatic Patient Instruction (API) language displayed on the **Patient Model Dialog** may differ depending on the protocol selected. Before loading a protocol, verify that the language selected on the Patient Model Dialog **API Language** pulldown menu is the correct language for the patient.

- If motion stops during bed movement and the bed does not respond to either the gantry buttons or the console control box, this indicates that a hardware circuit has tripped. Verify that the gantry buttons are lit and there are no errors or message windows on the console screen. To reset the circuit, press the **Stop** button on the gantry or control box, then click **Continue** on the dialog that appears on the console.
- After you select a radiopharmaceutical from the **Isotope** pulldown menu, located within the PET **Routine** subtask card, it is possible to inadvertently select a different radiopharmaceutical by scrolling with the mouse. Before starting the scan, always verify that the correct radiopharmaceutical displays in the **Isotope** field.

4.4 Reconstruction

- When configuring a PET·CT reconstruction job, an otherwise eligible CT AC series may not appear in the drop-down list of available CT scans. For example, a CT AC series may have been created using the **merge CT** feature and may not appear in the list. In these cases, it is possible to force the reconstruction job to use an appropriate CT AC series by dragging it from the **Patient Browser** window into the **Recon** subtask card.
- When planning the PET·CT examination please note that changes to either the PET scan range or the CT scan range may affect scan range alignment, necessitating adjustment of the PET recon range using the custom reconstruction feature. For example, change of the scan direction between the PET and CT scans may trigger the need to apply a custom PET reconstruction range to ensure the PET acquisition data is constrained to the CT scan range.
- Using the **Edit** > **Correct** tool while the patient is open within the **Examination** task card, will cause reconstruction failure. To prevent failure, always close the patient in the **Examination** task card before using the **Edit** > **Correct** tool.

- If you receive an error message while reconstructing data from a Prompt Gamma Isotope (PGC), which includes Rubidium-82, Gallium-68, and Iodine-124, please use one of the following workarounds to successfully reconstruct.
  - Ensure **Absolute** scatter correction is being used.
  - Increase the frame delay to coincide with the onset of activity visible in the head curve on the **Scan** subtask card. This delay will likely be greater than 30 seconds.
- The system will not submit an online WB reconstruction until the scan has completed.
- Due to variability in the reconstruction order of image data, images may display out of order within the Tomo segment. If this occurs, use the **PET Cine display** to view the data in order after reconstruction is complete, or close and reopen the examination once reconstruction completes.
- Prompt Gamma Correction (PGC) automatically applies to Rubidium-82, Gallium-68, and Iodine-124 studies. You should be aware that PGC applications with isotopes other than Rb-82, Ga-68, and I-124 are not validated.
- PET image quality degrades beyond the 50 cm CT FOV due to less accurate attenuation correction values outside that range.
- As part of the system time alignment procedure, the time alignment process compensates for a slight mis-positioning of the phantom to ensure proper system time alignment for UltraHD reconstruction. Additionally, to detect time alignment changes over time, when DailyQC is run, the system will compare the newly measured time alignment values with the current time alignment of the system and if there is a difference greater than threshold shown in the report, DailyQC will fail and ask you to run system time alignment again.
- Occasionally a PET image reconstruction may stall and not complete. To recover, reload the study into the **Examination** subtask card and verify that the hour glass icon for the reconstruction appears. Next, press the **Hold** button and then press the **Recon** button to restart it. The reconstruction job should complete successfully.

- If there is a PET·CT study loaded into the **Examination** task card, you must close the study prior to a restart of the system. If the study remains open while the system restarts, the PET data can no longer be post-processed.
- When using the CT Image Mirroring option, you should note that PET images do not display in the same orientation as CT images.
- The recommended scatter correction is **Relative**. **Absolute** scatter correction should only be used by advanced users familiar with the effects and potential impact of absolute scatter correction such as changes in quantification as well as image quality changes.

4.5 TrueD

- When using the VOI Freeform tool, in the TrueD **Quantification** subtask card, be sure to close the VOI. If you do not close the VOI, TrueD becomes unresponsive. In this event, close TrueD and relaunch.
- When the system submits multiple PET reconstructions via the **Auto recon** and **Auto display** options found in the PET **Auto Tasking** subtask card, TrueD may freeze after viewing multiple studies in the TrueD queue. When this occurs, it is necessary to close and reopen TrueD.
- When loading data sets that are compressed with a lossy algorithm, a pop-up message displays that warns you about possible loss of image quality. See the *TrueD Operator Manual* for more information.
- There is no display refresh when applying a deformable registration color map before enlarging the MIP segment.
- After loading the **Presentation State** series back to TrueD, the Rotating MIP may not display.
- In the **VOI Analysis** dialog, adding a trending table to a report or saving a graph as an DICOM SC may fail for an image series that loads back in to TrueD from the presentation state.

- If the **Mediastinum** algorithm fails for a baseline study in a multi-timepoint load session, the application may prompt you to invoke the algorithm again while toggling the Mediastinum buttons to the OFF state. In this case, select the **No** option.
- When auto-loading of a dataset is about to start, invoking TrueD manually may interrupt loading of the dataset into TrueD.
- When there are multiple series in the same study, TrueD applies the last saved registration matrix even if a different series of the same study is loaded.
- Range images do not retain private DICOM tag values in the creation of parallel range series.
- The rotating MIP display available in TrueD is intended only as a visual reference. Rotating MIPs may mask out areas of interest near the edge of the FOV. As a result, it is recommended that you always review actual image data.
- For the best image resolution, the recommendation is to use a 2x2 layout when creating fused parallel ranges within TrueD.

4.6 NEMA

- You should note that the **NEMA Test Tool** times out after 20 minutes of inactivity and displays a **Page Not Found** message once you try to resume activity.

4.7 Applications

- Do not use **MM Oncology** to create a Time Activity Curve (TAC) from Wholebody Dynamic acquisitions.
- The ICS workstations do not support installation of the *syngo*.via client.
- For exams that use the Varian RGSC respiratory monitoring system, ensure that the camera does not collide with the gantry when the bed enters the patient tunnel. You must install the camera in the fully retracted mounting position while the vertical bed height shown on the gantry display must fall in the range of 253 mm - 170 mm from the vertical center of the patient tunnel.

4.8 Exporting and Importing Data

- If you transfer a 3D application series to syngo.via, the series format is modified upon import. Once this has occurred, the 3D application series cannot be used to create a new reconstruction if reimported to the system.
- If you are performing a list mode scan, export jobs in the **Examination Job Status** will suspend. Once the list mode scan completes, the export job will resume.
- When using the **Presentation state** during the export of datasets, private attributes within DICOM can be lost. The recommendation is to disable **Presentation state**.
- You receive an incorrect error message when you export PET raw data to a DVD. The error message says “the export has failed” while the system simultaneously ejects the DVD from the drive. However, the export was successful despite the error message; as such, it is not necessary for you to attempt to export the PET raw data to different media.
- When exporting images to a PACS viewing system configured for GSPS (Grayscale Softcopy Presentation State), do not use JPEG format.

- Images exported to a PACS viewing system configured for GSPS (Grayscale Softcopy Presentation State) will not retain Zoom or Pan manipulations.
- When exporting an entire PET Study to some USB devices, the PET raw data may fail to export. To avoid the failure, export the PET raw data first followed by the study data. This issue does not occur with all USB devices.
- When exporting data and creating a new DVD, you must complete finalization if this is the desired state. If finalization is not complete in the initial creation of the disk, the DVD will stay in a non-finalized state forever.
- You cannot use the **Edit** > **Correct** feature on PET patient data once it is exported. Otherwise, the system will not allow reconstruction of the PET data.
- To avoid error when exporting patient data to DVD, you should use the **Export To** tool by accessing **Transfer** > **Export To** menu option in the **Patient Browser**.
- When you generate PET scan statistics, be aware that the system saves the .csv file to the following location: **H:\SiteData\PETScanStatistics**.
- If the file share system has been restarted or has lost connection, you must reestablish connection by clicking **Connect As** within the PET/CT Export or Import Data Tool dialog box before importing or exporting data to the file share again.

4.9 Miscellaneous

- Please note when the PET Acquistion Monitor (PAM) displays a “low voltage” (yellow light), the cause may be that the detectors are idle and not currently acquiring. In this case, this is expected behavior.
- Ensure you always use a USB to import protocols on to the system via Scan Protocol Assistant. Using a CD ROM, for example, will cause the import to fail.

4 Known Limitations

- If a USB drive does not mount properly on the Navigator (ICS) tower, you should ensure it is plugged in to one of the black 2.0 USB ports.
- It is possible to inadvertently scan a patient under the wrong name. For patients scheduled via HIS/RIS, you may not be able to edit and/or correct the patient data via the **Patient Browser**, dependent on the configurations of your HIS/RIS system. In the event that you are unable to edit and/or correct this data using the edit / correct utility in the **Patient Browser**, please contact your local HIS/RIS administrator for assistance in correction of the data.
- The **Patient Browser** shows all studies as open. When you register a new patient for examination, the *syngo* software creates a study that contains an instance of a MPPS (Modality Performed Procedure Step) object with the step status as IN PROGRESS. This happens regardless of whether the system is configured for HIS/RIS. This also happens regardless of whether the patient is retrieved from the HIS/RIS or the patient is registered locally.

  This behavior is configurable. If you enable **AutoComplete MPPS**, the MPPS status appears as DONE.
- For CT-only exams, you can perform the MPPS in the **Patient Browser** by selecting **Patient** > **Complete MPPS**. However, for PET·CT exams, it is necessary to select **Patient** > **Show MPPS**, choose **Apply to All**, then click **Completed**.
- During system checkup, an error message may appear stating that the checkup failed and the system needs to restart due to a critical error or “over temp”. If this occurs, power the system down completely, wait 15-20 minutes, and then power the system on. If the error occurs again, contact your Siemens Healthineers Service representative.
- If you restart the system without first closing the patient, the reconstruction status does not update. Though the reconstruction status does not update, the system saves the raw data and images.

- When you select **Auto Transfer** in the **Auto Tasking** subtask card, queued PET reconstruction jobs will not transfer if the target node becomes unavailable. As the queue becomes full, database performance slows. To avoid this situation, delete failed transfer jobs from the **Transfer** > **Network Job Status** drop-down menu. When the nodes become available, resubmit the failed transfer jobs. If you receive an error message "`Clipboard full. Close any print jobs`," discontinue scanning and contact your Siemens Healthineers Service representative.
- Using the **Patient** > **Examination Job Status** function to simultaneously select and change the job status of multiple unrelated jobs can lead to unexpected PET data processing results. Though the **Examination Job Status** allows simultaneous selection of multiple unrelated jobs, you should only select jobs from the same examination for simultaneous status changes.
- Entering dose information with the **Edit dose parameters** button on the **Routine** subtask card causes the **E-log Book** to display **Assayed Dose** information rather than **Effective Dose**. The Effective Dose is used in SUV calculations and is stored in the image header.
- You should not use special characters in text fields as doing so can result in the appearance of unexpected text.
- The rotating MIP display in the **3D** task card may occasionally break in to segments which may possibly obscure menu items and buttons. If this occurs, click on another task card and then return to the **3D** task card.
  - The rotating MIP display available in the **3D** Task Card is intended only as a visual reference. Rotating MIPs may mask out areas of interest near the edge of the FOV. As a result, it is recommended that you always review actual image data.
- On rare occasions, when you perform a restart of the system (**System** > **End Restart System**), the PRS may fail to reboot. The PRS icon on the task card status bar displays red when this failure occurs. In this situation, it is necessary to reboot the MARS (which houses the PRS) manually. Contact your Siemens Healthineers Service representative if this situation persists.

- When a virus definition update is available for installation, a flashing yellow exclamation mark appears in the upper corner of the monitor. Do not click this icon while performing QC scans or scanning patients. Instead, perform the update after restarting the system and prior to performing Daily QC. Refer to your user documentation for instructions on updating virus definitions.
- If the system has Daylight Savings Time (DST) enabled, do not conduct scans during the DST switch to prevent the potential loss of patient data.

4.10 *syngo* Media Viewer

- PET statistics images are not viewable in the *syngo* Media Viewer.

5 Reference Information

5.1 PET Dose Report

The PET Dose report supports the following PET Radiopharmaceuticals:

- Acetate
- Ammonia
- Carfentanil
- Fluorethyltyrosine
- Fluorodeoxyglucose
- Fluoro-L-dopa
- Methionine
- Oxygen-water
- Raclopride
- Rubidium chloride
- Sodium
- Thymidine

5.2 Standard Uptake Values

Please take care when interpreting and comparing standard uptake values (SUVs). As documented in Keyes, "SUV: Standard Uptake or Silly Useless Value?" *J Nucl Med*, 1995; 36:1836-1839, many factors can influence the quantitative values recovered from a PET image, including:

Continual improvements in reconstruction may produce small changes in SUV. In general, if images are quantitatively compared, please ensure they are reconstructed using identical software versions, techniques, parameters, and that care is taken to accommodate the limitations of SUV precision as outlined above.

Some viewing applications may not accurately compute the decay correction of the injected radioisotope when the injection date is prior to the actual scan date. If you inject a patient on a separate calendar date than the acquisition date, use the residual dose dialog to compute an effective injection dose that is decay corrected to the acquisition start date. This will ensure proper computation of SUV values within the viewing applications. **Note:** This limitation does not apply to either the **TrueD** or **3D** viewing applications.

5.3 PET and CT Volume Matching

To ensure that the PET and CT volumes match in the reconstruction of quantitative PET images, select the **Scan Range** - **Match CT Range** radiobox in the PET **Routine** subtask card.

5.4 ECF Values

5.4.1 Why is the ECF Value Important?

The PET Calibration Factor, or ECF, is a numeric value used to convert non-quantitative PET images (counts/pixel/sec) to quantitative images (Bq/ml). A correct ECF is a necessary condition to generate quantitative regions of interest and Standard Uptake Values (SUVs) using various viewing applications (e.soft, 3D, TrueD, Fast Review MultiSeries Viewer, etc.)

During Normalization one can obtain an ECF value by scanning a radioactive source, usually the Ge-68 solid phantom provided with the Biograph, which contains a known assay date, assay time, assayed activity, and volume.

5.4.2 Changes to ECF

Continuing improvements to scanner hardware and reconstruction software may lead to changes in quantification. Most generally, the ECF is intended to compensate for such changes to maintain stable quantification from version to version. Therefore some variation in ECF is expected with scanner improvements.

The following section documents the baseline ECF with the most recently released scanner and software version.

5.4.3 ECF Values for Your Biograph

Typical ECF values are as follows:

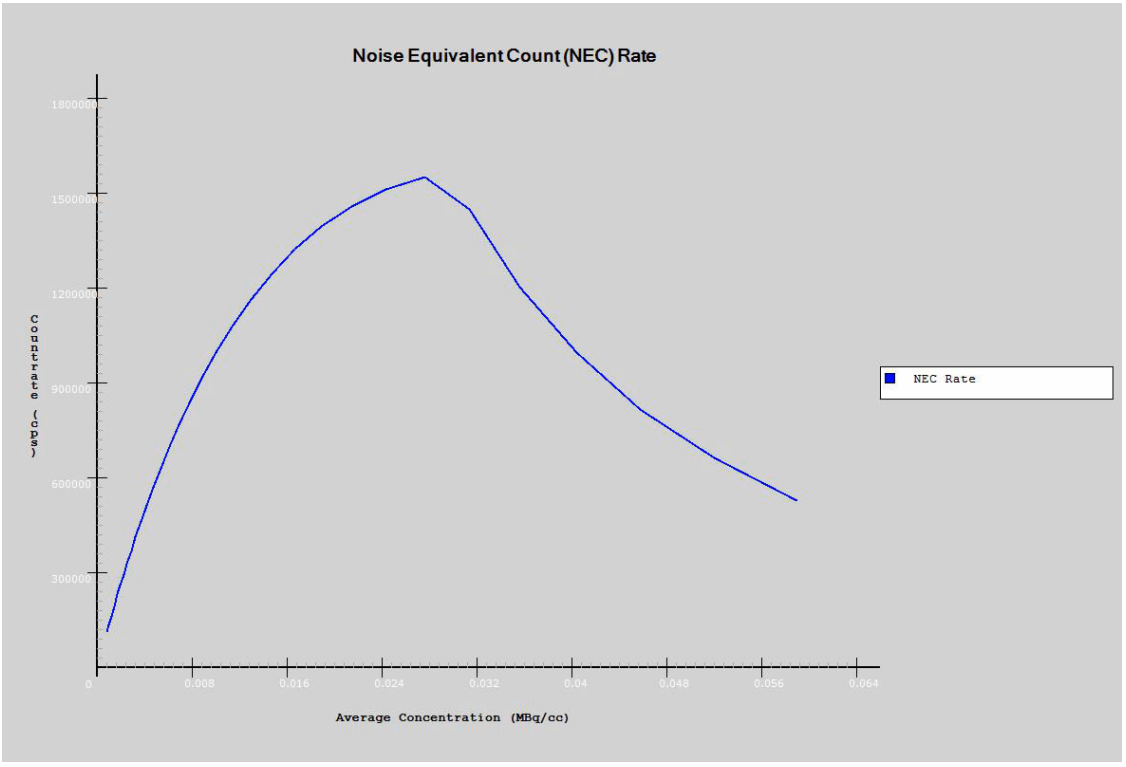
Biograph Raptor	Bq/ml
Minimum ECF Value	6.30×10^7
Maximum ECF Value	1.17×10^8

- If the ECF value is incorrect, the quantification of patient data (SUV values) is affected. If any questions regarding your Biograph's ECF value arise, please contact the local service representative.

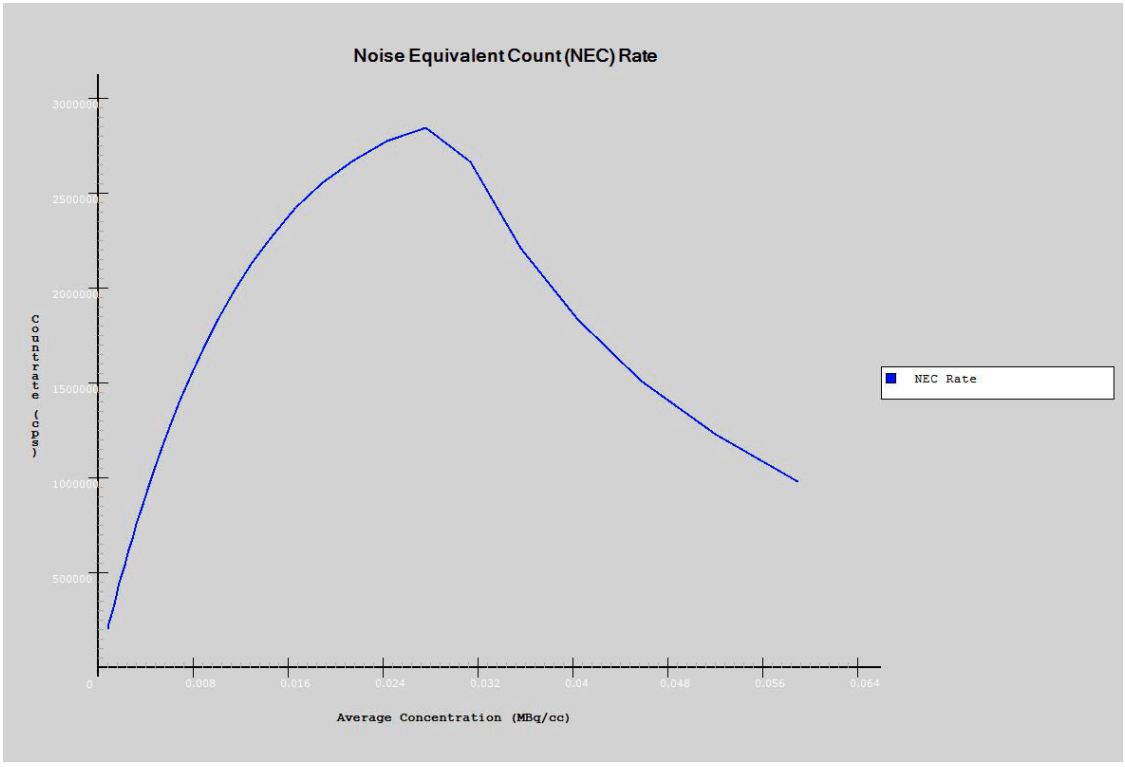
5.5 NECR

The NEMA Noise Equivalent Count Rate Curves of the Biograph Vision Quadra are below. Please refer to the NEMA Standards Publication NU 2 for more information.

5 Reference Information



High Sensitivity



Ultra High Sensitivity

5.6 LSO-based Scintillators

There is small amount of naturally-occurring radioactive material present in the scintillator material that makes up your PET detectors. Today, all commercial Time-Of-Flight tomographs use lutetium oxyorthosilicate (LSO) based scintillators as their scintillation medium. In its natural composition, LSO crystal matrix contains less than 3% Lutetium-176, a naturally-occurring radioactive isotope of Lutetium. The presence of this small amount of radioactive material does not increase exposure risk. The detector crystal itself is completely encapsulated. The radioactivity is uniformly distributed over the entire crystal volume and is mostly self-shielded by the crystal matrix and system components. Therefore, external radiation exposure to patients, clinical staff, and the public is a small fraction of the regulatory limits.

Despite the very low health risk, the presence of this small amount of Lu-176 may require specific licensing by your State Competent Authority. In February 2014, the Council of the European Union updated *Council Directive 2013/59/Euratom*. This Directive sets basic safety standards for radiation protection, including exemption/clearance levels for many radioactive isotopes. Transposition of the Directive was required in Member States by February 2018. The Directive does not specifically list Lu-176 in Annex VII; however, some Member States have introduced limits. We recommend that you review your country regulations regarding licensing of Lu-176.

If you have further questions regarding the exposure of our PET and PET/CT systems, please contact Siemens Medical Solutions USA, Inc., Molecular Imaging, 2501 North Barrington Road, Hoffman Estates, IL 60192, USA, Phone: +1 (847) 304-7700, siemens-healthineers.com/mi

Product	Activity Lu-176* (MBq)
Biograph Vision Quadra	1.53E+01

***Specific activity for Lu-176 of 41.5 Bq/g LSO**

6 Hints

6.1 PET Quality Check

You should perform a partial detector setup procedure weekly to ensure the best system performance. If, after seven days, partial setup is not performed the system automatically performs partial setup.

6.2 PET Scanner Cross Calibration

Using a Dose Cross-Calibration Factor (CCCF) other than 1.0 when performing the **Scanner Cross Calibration** procedure results in an incorrect CCCF value. If you choose to repeat the CCCF procedure at any point in the future, always reset the **Dose Cross Calibration Factor** in the PET·CT Quality Check to 1.0 and then acquire a new PET·CT Quality Check.

6.3 Accessing Files on the *syngo* Acquisition Workplace

You must access files such as AVIs, logs, and reports saved on the console in `H:\SiteData` via the **File Browser** as these files are not accessible via Windows Explorer. To access these files, open the File Browser from the main menu (**Options** > **File Browser**).

6.4 Patient Registration

For PET·CT patient studies the recommended method of patient registration is via the **Patient** menu. The use of the emergency registration keyboard shortcut method produces an advisory message that there is missing information since patient weight is mandatory for PET scanning. Please do not register PET·CT patients via this keyboard shortcut.

6.5 Editing the Patient Weight

To change the patient weight in one study, do the following:

- Select the *study* in the **Patient Browser**.
- Select **Edit** > **Correct**.
- Select the **Patient** tab and modify the weight.

To change the patient weight in all studies under one patient, do the following:

- Select the *patient* in the **Patient Browser**.
- Select **Edit** > **Correct**.
- Select the **Patient** tab and modify the weight.

6.6 Editing Patient Orientation

If patient orientation was configured incorrectly, after the scan is done acquiring, ensure you perform all necessary reconstructions before updating the patient orientation. Once all reconstructions have completed, correct patient orientation via **Edit** > **Correct**.

Note: Once patient orientation has been edited, additional PET reconstructions are no longer possible.

6.7 Editing Radiopharmaceutical Information

If it is necessary to edit radiopharmaceutical data, the data is only editable in the **Examination** task card on the *syngo* Acquisition Workplace (where it was entered initially). You can perform edits by clicking on the **Radiopharmaceutical Dose** button. Be aware that fields in the **Radiopharmaceutical Dose** dialog are not editable on the *syngo* MI Workplace.

6.8 Appending Additional Scan Entries

If a pre-existing entry has been scanned and an additional entry is appended, the injection time and date parameters will reset within the protocol. To avoid this issue, please enter the injection dose parameters *after* appending the wanted scan entry to the current protocol or save and use a new protocol containing the desired scan entries.

6.9 Patient Table Motion

The table motion controls on the gantry panels and *syngo* Acquisition Workplace console enable you to align the patient table before and in between the topogram, CT, and PET scans but are disabled during scans to prevent interference with the scan process. However, use of the bed handle switches to physically move the patient table during a scan will cause the scan to abort.

6.10 Image Labeling in the Viewing Task Card

Images are labeled according to the viewing orientation, not the scan orientation. For example, an image created in a caudocranial scan will have a “CR” label in the **Viewing** task card when viewed in the craniocaudal orientation.

6.11 Gantry Panel Display

The gantry display panel shows time left per bed and per study in seconds only.

The gantry display panel shows PET statistics in kilocounts only. This is not a configurable option at this time.

6.12 Cardiac Gating

After you connect the ECG leads to the patient and the Universal Physiological Measurement Module (UPMM), data displays on the ECG Display Panel. If it does not, recheck the connections.

Following the close of each patient examination, the ECG lead selection reverts to the default configuration of Mode II. If you prefer, or need, Mode I or III for a new examination, you must explicitly switch from Mode II to the desired mode. The system maintains a mode selection change made before or during the examination up until the close of the examination.

6.13 Respiratory Gating with the Varian RPM

For a CT respiratory gating study that uses the Varian RPM Respiratory Gating System, you must manually start and stop the Varian waveform acquisition for each CT acquisition where respiratory gating is desired. Start the waveform acquisition just prior to the imaging acquisition, and stop the waveform acquisition after imaging acquisition completes.

6.14 Reconstruction

When you perform a Twin Beam Dual Energy (TBDE) CT protocol for PET·CT Attenuation, the recommended series for use in the PET Attenuation Correction is **L_Au120 kV**. However, you may use either the **H_Sn120 kV** or the **C_AuSn120 kV** series by selecting it in the browser.

6.15 Viewing and Evaluating Images with TrueD

The recommended method of viewing and evaluating images is with the *syngo* TrueD application.

In the **Options** > **Configuration** > **TrueD General** tab it is recommended that the **Enable Automatic Registration in Single Mode** remain unselected for PET·CT studies.

6.16 Fast Review MultiSeries Viewer

PET data acquired on the Biograph Vision Quadra must be volume scaled to load into the Fast Review MultiSeries Viewer and certain PACS systems. See the *Biograph Vision Quadra Operator Manual* for more information on volume scaling.

6.17 PET*syngo* Online Help

To access PET*syngo* Online Help, press **F1** within the active PET protocol step on the right (primary) monitor.

6.18 Manually Setting the Scan Range

When manually setting the **End** point of a protocol that does not contain a CT Topogram component, the **Move** button may continue to blink after you press the **End** button. Because the system automatically rounds up to the next integral bed if necessary, press the **Move** button until it stops blinking, and then proceed with the scan. (It is not necessary to press the **End** button again.) Alternately, if you press the **End** button and the **Move** button still blinks, press **Cancel** and proceed with the scan; the bed automatically moves to the correct position.

6 Hints

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