

# PETQuant Imaging Parameters

Prior to using PETQuant, both NeuroQuant (v 1.4) and LesionQuant scanner settings need to be configured on your scanner(s).

PET scanner should have an up to date calibration and normalization on the date of each imaging session.

## FDG Scans:

- ▶ Standardization of the environment during the 20-30 minutes following tracer administration is essential.
- ▶ During the uptake phase, subjects should be asked to remain still and keep awake with eyes open looking straight ahead (not into lights).
- ▶ Lights should be dimmed to a level similar to twilight. The subject's position (e.g., sitting or lying), their visual environment, and the room's ambient light should be the same throughout the longitudinal study.
- ▶ The patient should be monitored periodically to be certain of compliance and to ensure that the eyes do not close and the patient remains awake.

## Florbetapir Scans:

- ▶ Contrary to FDG-PET imaging, standardization of the environment during the 50 minute uptake period following Florbetapir administration is not essential.
- ▶ A 370 MBq (10 mCi +/- 10%) bolus injection of Florbetapir will be administered and 20-minute continuous brain PET imaging will begin approximately 50-minutes post-injection.
- ▶ The images will be reconstructed immediately after the 20-minute scan, and if motion artifact is detected, another 20-minute continuous scan will be acquired.

## Source:

PET Technical Procedures Manual AV-45 & FDG:

[http://adni.loni.usc.edu/wp-content/uploads/2010/05/ADNIGO\\_PET\\_Tech\\_Manual\\_01142011.pdf](http://adni.loni.usc.edu/wp-content/uploads/2010/05/ADNIGO_PET_Tech_Manual_01142011.pdf)

# PETQuant™ - GE Scanners

## GE Discovery STE and VCT – 47 Slice PET/CT

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
SCAN	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames
RANDOMS CORRECTION	Singles (not real time subtraction)	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
PRIMARY RECONSTRUCTION METHOD	Iterative (fully 3D Iter; not 3D FORE IR)
ITERATIONS	4
SUBSETS	20
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	3.27 mm
SMOOTHING FILTER	None or 0.0 (for loop filter, post-filter and z-axis filter)
ALL CORRECTIONS	On

## GE Discovery ST and RX (LYSO) – 47 Slice PET/CT

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
SCAN	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames
RANDOMS CORRECTION	Singles (not real time subtraction)	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
PRIMARY RECONSTRUCTION METHOD	Iterative, if available (fully 3D Iter; not 3D FORE IR) [*Only if fully iterative is not available, as in some older systems, it is ok to use 3D FORE IR]
ITERATIONS	4
SUBSETS	21
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	3.27 mm
SMOOTHING FILTER	None or 0.0 (for loop filter, post-filter and z-axis filter)
ALL CORRECTIONS	On

\*For Discovery ST-47 Slice PET/CT scanner only.

## GE Discovery LS – 35 Slice PET/CT

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
SCAN	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames
RANDOMS CORRECTION	Singles (not real time subtraction, unless singles correction not available)	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
PRIMARY RECONSTRUCTION METHOD	FORE Iterative
ITERATIONS	4
SUBSETS	21
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	4.25 mm
SMOOTHING FILTER	None or 0.0 (for loop filter, post-filter and z-axis filter)
ALL CORRECTIONS	On

## GE Advance – 35 Slice PET

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Five or six min 2D scan acquired immediately post-emission scan; process with segmentation	
SCAN	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames
RANDOMS CORRECTION	Singles (not real time subtraction, unless singles correction not available)	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
PRIMARY RECONSTRUCTION METHOD	FORE Iterative
ITERATIONS	4
SUBSETS	21
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	4.25 mm
SMOOTHING FILTER	None or 0.0 (for loop filter, post-filter and z-axis filter)
ALL CORRECTIONS	On

# PETQuant™ - Philips Scanners

## Philips Gemini TF – 90 Slice PET/CT

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
ACQUISITION PROTOCOL	Brain Protocol	
SCANS	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	LOR 3D Ramla* (If only older software versions are available, 3D Ramla reconstruction is acceptable)
* LOR 3D RAMLA ATTENUATION	CTAC-SG
* LOR 3D RAMLA SCATTER	SS-Simul
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	2.0 mm
SMOOTHING	Sharp
OTHER PARAMETERS	Defaults for Brain Protocol
ALL CORRECTIONS	On

## Philips Gemini and Gemini GXL – 90 Slice PET/CT

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
ACQUISITION PROTOCOL	Brain Protocol	
SCANS	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	LOR 3D Ramla* (If only older software versions are available, 3D Ramla** reconstruction is acceptable)
* LOR 3D RAMLA ATTENUATION	CT-SEG
* LOR 3D RAMLA SCATTER	SS-Simul
** 3D RAMLA SCATTER & ATTENUATION	NonUni-BGSub
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	2.0 mm
SMOOTHING	Sharp
OTHER PARAMETERS	Defaults for Brain Protocol
ALL CORRECTIONS	On

## Philips Allegro – 90 Slice PET

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
TRANSMISSION SCAN	Five or six min 2D scan acquired immediately post-emission scan; process with segmentation	
ACQUISITION PROTOCOL	Brain Protocol	
SCAN	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	LOR 3D Ramla* (If only older software versions are available, 3D Ramla** reconstruction is acceptable)
* LOR 3D RAMLA ATTENUATION	CT-SEG
* LOR 3D RAMLA SCATTER	SS-Simul
** 3D RAMLA SCATTER & ATTENUATION	NonUni-BGSub
GRID	128 x 128
FOV	256 mm (results in voxel size of 2.0 mm)
SLICE THICKNESS	2.0 mm
SMOOTHING	Sharp
OTHER PARAMETERS	Defaults for Brain Protocol
ALL CORRECTIONS	On

## Philips Allegro

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
TRANSMISSION SCAN	Five min 2D post-emission scan; process with segmentation and re-projection	
SCAN	30 min	20 min
SCAN DURATION	Six x 5-min frames	Four x 5-min frames

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	3D Ramla standard brain recon parameters except lambda = 0.016
3D RAMLA SCATTER & ATTENUATION	NonUni-BGSub
GRID	128 x 128 (2 mm voxels is fine)

# PETQuant™ - Siemens Scanners

## Siemens ECAT Exact HR+ (BGO) 63-slice

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
ACQUISITION MODE	3D	
SCAN DURATION	30 min	20 min
FRAMING	Six x 5-min frames	Four x 5-min frames
TRANSMISSION SCAN	Five or six min 2D scan acquired immediately post-emission scan; process with segmentation	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (FORE / OSEM-2D)
ITERATIONS	4
SUBSETS	16
GRID	128 x 128
BRAIN MODE	On
ZOOM	2.0
SMOOTHING FILTER	None (software version 7.2 says "All Pass (Ramp)")
AXIAL FILTERING	None (software version 7.2 says "Off")
ALL CORRECTIONS	On

## Siemens HRRT 207-slice

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
ACQUISITION MODE	3D	
SCAN DURATION	30 min	20 min
FRAMING	Six x 5-min frames	Four x 5-min frames
TRANSMISSION SCAN	Five or six min scan acquired immediately post-emission scan	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (OSEM-3D)
ITERATIONS	6
SUBSETS	16
GRID	256 x 256 x 207
VOXEL SIZE	1.219 mm <sup>3</sup>
SMOOTHING FILTER	2 mm Gaussian
ALL CORRECTIONS	On

## Siemens BioGraph mCT – 81 or 109 (TrueV) Slice PET/CT

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
LIST MODE SCAN	30 min	20 min
LIST MODE SCAN DURATION	Six x 5-min frames	Four x 5-min frames
*NON - LIST MODE SCAN	2 scans	2 scans
*NON - LIST MODE SCAN DURATION	15-min each	10-min each

\*Note: Use only if LIST-MODE is not available. To reduce motion artifacts, two separate emissions scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (Florbetapir) min. Do not repeat CT scan.

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (OSEM-3D)
ITERATIONS	4
SUBSETS	12
GRID	400 x 400
ZOOM	2.0 (results in voxel size of ~1.018 mm)
SMOOTHING FILTER	None (or "0.0")
MATCH CT	Off or No (results in PET slice thickness of ~2.027 mm)
ALL CORRECTIONS	On

## Siemens ECAT Exact (BGO) and Accel (LSO) 47-Slice

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
ACQUISITION MODE	3D	
SCAN DURATION	30 min	20 min
FRAMING	Six x 5-min frames	Four x 5-min frames
TRANSMISSION SCAN	Five or six min 2D scan acquired immediately post-emission scan; process with segmentation	

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (FORE / OSEM-2D)
ITERATIONS	6
SUBSETS	16
GRID	128 x 128
BRAIN MODE	On
ZOOM	2.0
SMOOTHING FILTER	None (software version 7.2 says "All Pass (Ramp)")
AXIAL FILTERING	None (software version 7.2 says "Off")
ALL CORRECTIONS	On

## Siemens BioGraph HiRes – 81 Slice PET/CT (Model 1080)

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
LIST MODE SCAN	30 min	20 min
LIST MODE SCAN DURATION	Six x 5-min frames	Four x 5-min frames
*NON- LIST MODE SCAN	2 scans	2 scans
*NON - LIST MODE SCAN DURATION	15-min each	10-min each

\*Note: Use only if LIST-MODE is not available. To reduce motion artifacts, two separate emissions scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (Florbetapir) min. Do not repeat CT scan.

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (FORE / OSEM 2D)
ITERATIONS	4
SUBSETS	14 (or 16, if 14 is not an option)
GRID	168 x 168
TRIM	On
ZOOM	2.0 (results in voxel size of ~2.031 mm)
SMOOTHING FILTER	None (or "0.0")
MATCH CT SLICE LOCATION	Off or No (results in PET slice thickness of ~2.000 mm)
ALL CORRECTIONS	On

## Siemens BioGraph (LSO) – 47 Slice PET/CT (also sold as CTI Reveal)

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
*SCAN	2 scans	2 scans
*SCAN DURATION	15-min each	10-min each

\*Note: To reduce motion artifacts, two separate emissions scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (Florbetapir) min. Do not repeat CT scan.

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (FORE / OSEM 2D)
ITERATIONS	6
SUBSETS	16 (or 14, if 16 is not an option)
GRID	128 x 128
TRIM	On
ZOOM	2.0
SMOOTHING FILTER	None (or "0.0")
ALL CORRECTIONS	On



# Siemens BioGraph TruePoint – 81 or 109 Slice PET/CT (Model 1093)

ACQUISITION PARAMETERS	FDG	FLORBETAPIR
RADIOTRACER	4.5-5.5 mCi	8.0-10.0 mCi
SCAN START TIME POST-INJECTION	30 min	50 min
CT SCAN	Low mAs scan acquired shortly before emission. Leave enough time to start emission acquisition promptly at 30 (FDG) or 50 (Florbetapir) min	
LIST MODE SCAN	30 min	20 min
LIST MODE SCAN DURATION	Six x 5-min frames	Four x 5-min frames
*NON- LIST MODE SCAN	2 scans	2 scans
*NON - LIST MODE SCAN DURATION	15-min each	10-min each

\*Note: Use only if LIST-MODE is not available. To reduce motion artifacts, two separate emissions scans will be acquired as closely together as possible. The first is to be started at 30 (FDG) or 50 (Florbetapir) min. Do not repeat CT scan.

RECONSTRUCTION PARAMETERS	FDG AND FLORBETAPIR
RECONSTRUCTION METHOD	Iterative (FORE / OSEM 2D)
ITERATIONS	4
SUBSETS	14 (or 16, if 14 is not an option)
GRID	336 x 336 ( <b>168 x 168 with TRIM ON</b> )
TRIM	<b>On (if possible)</b>
ZOOM	2.0 (results in voxel size of ~1.015 mm or ~2.03 mm for 168 x168 grid)
SMOOTHING FILTER	None (or "0.0")
MATCH CT	Off or No (results in PET slice thickness of ~2.027 mm)
ALL CORRECTIONS	On