

SUPPLEMENTAL TABLE 1. PET scanner specifications for the mCT and mMR.

Parameter	Biograph mCT	Biograph mMR
Detector material	LSO	LSO
Detector element dimension (mm ³)	4×4×20	4×4×20
Detector elements per block	13×13	8×8
Total number of detector elements	32,448	28,672
Signal readout	PMTs (2×2 per block)	APDs (3×3 per block)
Axial FOV (cm)	21.8	25.8
Transaxial FOV (cm)	70	60
Plane spacing (mm)	2	2
Image planes	109	127
Coincidence time window (ns)	4.1	5.9
Energy window (keV)	435–650	430–610
Energy resolution (%)	11	14
System time resolution	540 ps	–
NEMA sensitivity (kcps/MBq)	9.7	15

SUPPLEMENTAL TABLE 2. Contrast recovery results for the mCT.

400×400, 2 mm*			
¹⁸ F			
Sphere size	OSEM	PSF	PSF+TOF
10	37.1	47.5	49.9
13	52.4	58.0	62.9
17	64.0	68.2	68.9
22	75.2	78.1	76.8
28	70.9	70.3	76.4
37	73.6	74.2	79.2
¹¹ C			
Sphere size	OSEM	PSF	PSF+TOF
10	36.7	42.4	40.1
13	52.6	57.6	61.7
17	57.2	61.3	64.8
22	73.7	76.1	74.1
28	71.7	71.1	76.4
37	75.0	74.9	78.2
⁸⁹ Zr			
Sphere size	OSEM	PSF	PSF+TOF
10	31.6	32.1	37.5
13	41.5	45.3	46.2
17	48.5	53.2	52.5
22	58.4	61.5	61.6
28	64.6	65.5	71.0
37	73.4	73.3	76.8
¹²⁴ I			
Sphere size	OSEM	PSF	PSF+TOF
10	27.0	27.6	29.0
13	35.6	43.9	46.6
17	51.3	57.9	57.8
22	63.0	66.6	66.2
28	60.3	60.9	73.0
37	69.5	67.4	77.8
⁶⁸ Ga			
Sphere size	OSEM	PSF	PSF+TOF
10	32.3	34.0	36.0
13	46.8	54.2	55.6
17	60.9	64.2	64.9
22	67.7	71.9	71.5
28	68.9	69.3	75.7
37	73.9	73.6	79.0
⁹⁰ Y			
Sphere size	OSEM	PSF	PSF+TOF
10	-	21.4	30.8
13	-	38.6	40.3
17	33.5	38.8	46.1
22	46.9	48.5	60.3
28	40.1	33.2	53.2
37	61.8	58.0	58.5

*Iteration number and subsets are defined in Table 1.

SUPPLEMENTAL TABLE 3. Contrast recovery results for the mMR.

344×344, 2 mm*		
¹⁸F		
Sphere size	OSEM	PSF
10	49.0	45.4
13	51.5	53.1
17	66.9	69.3
22	76.5	78.5
28	63.2	63.7
37	67.3	67.6
¹¹C		
Sphere size	OSEM	PSF
10	41.8	37.5
13	55.4	61.0
17	66.8	70.5
22	75.4	77.4
28	65.4	65.5
37	70.8	70.6
⁸⁹Zr		
Sphere size	OSEM	PSF
10	38.3	37.7
13	50.6	52.1
17	53.6	55.1
22	58.9	60.3
28	58.4	59.2
37	61.6	62.3
¹²⁴I		
Sphere size	OSEM	PSF
10	39.2	36.1
13	38.8	41.5
17	60.1	66.5
22	71.5	74.3
28	61.8	62.8
37	69.3	69.5
⁶⁸Ga		
Sphere size	OSEM	PSF
10	30.2	32.8
13	43.2	47.3
17	60.4	63.3
22	72.7	74.6
28	64.6	64.7
37	71.3	70.9
⁹⁰Y		
Sphere size	OSEM	PSF
10	-	17.4
13	38.9	44.6
17	40.7	45.8
22	55.0	56.2
28	51.0	52.5
37	52.6	55.0

*Iteration number and subsets are defined in Table 1.

SUPPLEMENTAL TABLE 4. Mean and standard deviation (in parentheses) mCT spatial resolution.

		1 cm Offset		10 cm Offset		
		Transverse	Axial	Transverse Radial	Transverse Tangential	Axial
¹⁸ F	FWHM (mm)	4.3 (0.02)	4.7 (0.04)	5.1 (0.02)	5.0 (0.03)	5.7 (0.001)
	FWTM (mm)	8.5 (0.1)	9.2 (0.1)	9.4 (0.02)	9.9 (0.1)	10.6 (0.03)
¹¹ C	FWHM (mm)	4.4 (–)	4.6 (–)	5.1 (–)	5.0 (–)	5.8 (–)
	FWTM (mm)	8.7 (–)	9.1 (–)	9.3 (–)	10.1 (–)	11.0 (–)
⁸⁹ Zr	FWHM (mm)	4.4 (0.1)	4.7 (0.04)	5.1 (0.02)	5.0 (0.03)	5.9 (0.1)
	FWTM (mm)	8.9 (0.1)	9.3 (0.1)	9.4 (0.1)	9.9 (0.2)	10.9 (0.2)
¹²⁴ I	FWHM (mm)	4.4 (0.05)	4.4 (0.1)	5.1 (0.005)	5.0 (0.02)	5.5 (0.04)
	FWTM (mm)	8.7 (0.1)	8.8 (0.2)	9.4 (0.1)	9.9 (0.03)	10.4 (0.1)
⁶⁸ Ga	FWHM (mm)	4.4 (0.05)	4.7 (0.02)	5.1 (0.03)	5.0 (0.04)	5.8 (0.1)
	FWTM (mm)	8.9 (0.1)	9.4 (0.03)	9.3 (0.1)	9.9 (0.1)	11.0 (0.2)
⁹⁰ Y	FWHM (mm)	4.7 (–)	5.1 (–)	5.0 (–)	5.1 (–)	5.8 (–)
	FWTM (mm)	10.2 (–)	9.9 (–)	9.4 (–)	10.9 (–)	11.4 (–)

SUPPLEMENTAL TABLE 5. Mean and standard deviation (in parentheses) mMR spatial resolution.

		1 cm Offset		10 cm Offset		
		Transverse	Axial	Transverse Radial	Transverse Tangential	Axial
¹⁸ F	FWHM (mm)	4.1 (0.2)	4.7 (0.04)	5.2 (0.03)	4.7 (0.05)	6.6 (0.1)
	FWTM (mm)	8.0 (0.2)	9.2 (0.2)	9.5 (0.04)	11.8 (0.2)	12.4 (0.4)
¹¹ C	FWHM (mm)	4.1 (–)	4.6 (–)	5.2 (–)	4.7 (–)	6.8 (–)
	FWTM (mm)	8.1 (–)	9.7 (–)	9.6 (–)	11.7 (–)	12.9 (–)
⁸⁹ Zr	FWHM (mm)	4.1 (0.1)	4.9 (0.1)	5.2 (0.04)	4.8 (0.1)	6.7 (0.1)
	FWTM (mm)	8.1 (0.1)	9.7 (0.1)	9.5 (0.2)	11.6 (0.2)	12.7 (0.1)
¹²⁴ I	FWHM (mm)	4.2 (0.1)	5.7 (0.1)	5.2 (0.02)	4.8 (0.1)	7.7 (0.1)
	FWTM (mm)	8.1 (0.1)	14.1 (0.1)	9.6 (0.03)	11.9 (0.2)	17.0 (0.2)
⁶⁸ Ga	FWHM (mm)	4.2 (0.1)	5.8 (0.03)	5.3 (0.03)	4.8 (0.03)	7.8 (0.1)
	FWTM (mm)	8.0 (0.1)	14.4 (0.3)	9.8 (0.1)	11.9 (0.01)	17.2 (0.4)
⁹⁰ Y	FWHM (mm)	4.2 (–)	4.9 (–)	5.2 (–)	4.8 (–)	6.8 (–)
	FWTM (mm)	8.1 (–)	9.4 (–)	9.9 (–)	12.1 (–)	13.5 (–)