APPENDIX 3C

LOT 3 SPECIFICATION
NUCLEAR MEDICINE IMAGING AND ASSOCIATED OPTIONS AND RELATED SERVICES

1. Introduction

1.1. This Lot is for the supply of nuclear medicine imaging systems including Positron Emission Tomography (PET), Computed Tomography (CT), Single Photon Emission Computed Tomography (SPECT), Magnetic Resonance Imaging (MRI), Gamma camera systems and Gamma Probes.

1.2. The core product lines within this Lot are as follows:

Line Number	
1	PET CT
2	PET MRI System
3	SPECT with integrated CT
4	SPECT Gamma Camera
5	Dedicated Cardiac SPECT System with Solid State Detectors
6	Gamma Probes

1.3. All product line(s) must be supplied with a minimum 7 year expected lifecycle under proper use and maintenance.

2. Line 1 – PET CT

2.1. This is the core technical specification for the supply, delivery, installation and commissioning of a PET CT system for full body combined PET and CT imaging. The device will be predominantly used for both oncology and cardiac PET CT applications.

2.2. The core components of a PET CT system:
- 2.2.1. Combined coaxial full body PET with CT system.
- 2.2.2. Patient table.
- 2.2.3. Room mounted reference lasers if required.
- 2.2.4. Image reconstruction computer.
- 2.2.5. User control terminal.
- 2.2.6. Contrast injector interface if required.
- 2.2.7. Image quality control phantoms (PET and CT).
- 2.2.8. Ancillary cooling equipment as required.

2.3. Combined coaxial full body PET slice CT system:
- 2.3.1. The gantry opening for both PET and CT must be at least 70 cm wide.

2.3.2. Patient table and gantry movement controls must be located on both sides of the gantry opening.
2.3.3. The PET detector must be optimised for the detection of positron annihilation photon.
2.3.4. Attenuation correction must be provided by CT.
2.3.5. The PET must have 3D PET acquisition capability.
2.3.6. The PET axial field of view must be at least 150mm.
2.3.7. The PET trans axial field of view must be at least 50cm.
2.3.8. The PET performance must be reported in conformance with the NEMA NU2-2018 standard.
2.3.9. The PET sensitivity must be at least 4.3 counts per second per kBq (kilo Becquerel).
2.3.10. The scatter fraction (3D mode) must be no more than 41%.
2.3.11. The peak noise equivalent count rate must be at least 35 kilo counts per second (kcps).
2.3.12. The energy resolution must be less than 15%.
2.3.13. The trans axial resolution (full width half maximum (FWHM) @ 1cm radius) must be no greater than 5mm.
2.3.14. The trans axial resolution (FWHM @ 10cm radius) must be no greater than 6mm.
2.3.15. The axial resolution (FWHM @ 1cm radius) must be no greater than 5mm.
2.3.16. The axial resolution (FWHM @ 10cm radius) must be no greater than 6mm.
2.3.17. The system must be capable of time of flight acquisition.
2.3.18. Respiratory gating for PET / CT must be provided if required by the user.
2.3.19. Cardiac gating for PET / CT must be provided if required by the user.
2.3.20. It must be possible to generate multiple PET reconstructed images from a single examination to allow for optimisation and development of protocols.
2.3.21. It must be possible to produce images with iterative reconstruction and there must be an option of incorporating resolution modelling in the reconstruction.
2.3.22. It must be possible to create PET images with and without attenuation and scatter corrections.
2.3.23. It must be possible to acquire PET data in listmode.
2.3.24. It must be possible to export raw PET data, which can later be re-imported and reconstructed for review.
2.3.25. The PET QC phantom must be available with appropriate shielding if required.
2.3.26. It must be possible to create ECG-gated PET images from an external input with the ECG trace displayed either on the gantry or acquisition computer.
2.3.27. The CT system must be designed to acquire diagnostic quality CT images.
2.3.28. It must be possible to acquire CT images independently of the PET sub-system.
2.3.29. The X-Ray generator (CT) must be at least 53kW.
2.3.30. The detector must have at least 16 rows of detectors.

2.3.31. The z-axis coverage of the detector must be at least 20mm.
2.3.32. The minimum image thickness must be <= 0.625mm.
2.3.33. The minimum rotation time must be less than 1.0 second.
2.3.34. The CT system must include an automatic dose control system.
2.3.35. The gantry must include patient positioning lasers in both the PA and lateral planes.
2.3.36. The coincidence of the laser beam and scan plane must be <= 2mm.
2.3.37. The kVp range must be at least 80 to 130kVp.
2.3.38. The X-Ray tube must have a heat capacity of at least 3MHU.
2.3.39. The X-Ray tube must have a maximum cooling rate of at least 800 kHU/min.
2.3.40. The X-Ray tube must contain at least two automatically selectable focal spots.
2.3.41. The maximum field of view must be at least 50cm.
2.3.42. The CT system must be able to acquire 2D projection radiographic images for scan planning in PA, AP and lateral projections.
2.3.43. Planning radiographs must be acquired up to the maximum scan length of the CT system.
2.3.44. The system must have a CT number accuracy within 5 HU (Hounsfield Unit).
2.3.45. The uniformity of CT numbers must be at least 5 HU across the entire extended field of view.
2.3.46. The range of HU numbers must be at least -1000 to 3000 HU.
2.3.47. Metal artefact reduction and correction features must be provided if required by the user for both PET and CT.
2.3.48. Limiting high contrast spatial resolution, scan plane (lp/cm @10% MTF) must be at least 13lp/cm.
2.3.49. Limiting high contrast spatial resolution, scan plane (lp/cm @0% MTF) must be at least 15lp/cm.
2.3.50. Deviation of the image thickness from nominal value in sequential and helical scanning must be less than 0.1mm for nominal thickness < 1mm.
2.3.51. Deviation of the image thickness from nominal value in sequential and helical scanning must be less than 10% for nominal thickness > 1mm.
2.3.52. Low contrast resolution must be at least 5mm diameter @ 0.3% contrast in Catphan for maximum 25mGy surface dose (32cm diameter computed tomography dose index (CTDI) phantom).
2.3.53. The system must be supplied with phantoms to enable testing of position and CT number accuracy.

2.4. Patient table:
2.4.1. The patient table must maintain positioning accuracy for both PET and CT imaging.
2.4.2. The patient table must have a flat top insert available, with indexing that matches standard radiation therapy treatment systems if required.
2.4.3. Radiation therapy patient positioning aids must be available as an option to purchase.

2.4.4. The total scanned range must be at least 1.5 metres.
2.4.5. The maximum patient weight at specified table positioning accuracy must be at least 195kg.
2.4.6. The patient table positioning accuracy must be at least +/- 0.25mm.
2.4.7. The patient table must have at least two positioning speeds.
2.4.8. The patient table must lower to within 67cm of the floor.
2.4.9. It must be possible to manually retract in the patient table in emergency situations.

2.5. Room Mounted Reference Lasers:
2.5.1. Sagittal plane ceiling mounted lasers must be available to purchase, positioning accuracy must be at least 2mm at isocentre.
2.5.2. Coronal plane wall mounted lasers must be available to purchase, positioning accuracy must be at least 2mm at isocentre.
2.5.3. Axial plane vertical wall mounted lasers must be available to purchase, positioning accuracy must be at least 2mm at isocentre.

2.6. Image Reconstruction Computer:
2.6.1. The CT image reconstruction rate must be at least 10 images per second (512 x 512 matrix).
2.6.2. Image storage capacity must be at least 150GB.

2.7. User Control Terminal:
2.7.1. The user control terminal must include a graphic user interface.
2.7.2. PET CT image fusion tools must be supplied.
2.7.3. The image manipulation tools must include DRR and MPR reconstruction.
2.7.4. The user control terminal must meet the minimum PACS requirements.
2.7.5. The user control terminal must meet the DICOM RT conformance standards.
2.7.6. The user control terminal must display the expected dose and actual dose (CTDI and DLP (dose length product)) for every series.
2.7.7. The user control terminal must display the total dose (CTDI and DLP) delivered during a patient study.
2.7.8. The user control terminal must enable the automation of routine workflow steps.
2.7.9. The user control terminal must include a flat panel monitor with a minimum 19" screen size (measured diagonally corner to corner).
2.7.10. The user control terminal must include pre-recorded patient instructions in English.
2.7.11. The system must include a 2-way patient to staff intercom.
2.7.12. Access to configuration settings, including scanning protocols must be based on user login rights.
2.7.13. The user control terminal for the system must enable import of DICOM image data.
2.7.14. The user control terminal for the system must be compatible with DICOM 3.0 for data export.

2.8. Contrast Injector Interface:

2.8.1. It must be possible to connect (for handshaking) a contrast injector interface for any CT contrast media injector.

3. Line 2 – PET MRI System

3.1. This is the core technical specification for the supply, delivery, installation and commissioning of a PET/MRI system for molecular imaging studies. The whole-body MRI and PET systems must be fully integrated and be able to provide accurate morphology, function, and metabolism information. These systems are highly configurable and other molecular imaging studies may require additional elements/configurations beyond those listed in the core components as described in paragraph 3.3 below.

3.2. The system must be provided as a complete solution of the customer's needs with full implementation and support, regardless of the sub-contractors required to be employed to provide the system.

3.3. The core components of a PET MRI system:

3.3.1. Combined coaxial whole-body PET and MRI system.
3.3.2. Patient table.
3.3.3. Radiofrequency transmission and receiving sub-systems.
3.3.4. User control terminal and image reconstruction computer.

3.4. Combined coaxial whole-body PET and MRI system:

3.4.1. The system must be able to acquire the PET and MRI images both simultaneously and independently.
3.4.2. The gantry opening for both PET and MR must be at least 60 cm wide.
3.4.3. Patient table and gantry controls must be located on both sides of the gantry opening.
3.4.4. PET attenuation correction must be provided by MR images.
3.4.5. The PET axial field of view must be at least 20cm.
3.4.6. The PET trans axial field of view must be at least 50cm.
3.4.7. The PET sensitivity must be at least 10 counts per second per kBq.
3.4.8. The PET scatter fraction must be no more than 44%.
3.4.9. The PET peak noise equivalent count rate must be at least 100kcps.
3.4.10. The PET energy resolution must be less than 15%.
3.4.11. The PET trans axial resolution (FWHM @ 1cm radius) must be no greater than 5mm.
3.4.12. The PET trans axial resolution (FWHM @ 10cm radius) must be no greater than 6mm.
3.4.13. The PET axial resolution (FWHM @ 1cm radius) must be no greater than 6mm.
3.4.14. The PET axial resolution (FWHM @ 10cm radius) must be no greater than 7mm.

3.4.15. The MR primary magnetic field strength must be 3.0T.
3.4.16. The SAR limit over any study period must not exceed 20W/kg for head and trunk and 40W/kg for extremities.
3.4.17. The MR magnet length (including covers) must be no more than 2.0 metres.
3.4.18. The MR magnetic field must not change more than 0.1ppm per hour.
3.4.19. The MR useful field of view (UFOV) must be at least 45cm x 45cm x 45cm.
3.4.20. The MR guaranteed field homogeneity must be less than 1.0ppm within a 45cm diameter spherical volume.
3.4.21. The MR magnetic field must be actively shielded.
3.4.22. All the MR patient specific shimming and tuning must be automatic.
3.4.23. The MR fringe magnetic field must be less than 0.5mT at a distance of 3 metres radially and 5 metres axially from the isocentre.
3.4.24. The MR maximum gradient strength must be at least 44mT/m.
3.4.25. The MR maximum gradient slew rate must be at least 200T/m/s.
3.4.26. The MR cryogen boil off rate must be zero under normal operating conditions.
3.4.27. The system must have both ECG and respiratory gating capability. It is preferred but not mandatory that both can be used simultaneously.
3.4.28. The system must have MR gradients acoustic noise reduction features.

3.5. Patient table:
3.5.1. The patient table must maintain positioning accuracy for both PET and MR imaging.
3.5.2. The total scanned range must be at least 1.5 metres.
3.5.3. The maximum patient weight at specified table positioning accuracy must be at least 200kg.
3.5.4. The table positioning accuracy must be at least +/- 2.5mm.
3.5.5. The patient table must be detachable or include an MR safe radiolucent patient transfer trolley.
3.5.6. The MR coil connection sockets must be included at both ends of the patient table.
3.5.7. Padding for patient safety must be provided.
3.5.8. The patient table for the system must include a 2-way patient to radiographer intercom.
3.5.9. The patient table for the system must include a patient panic button.
3.5.10. The patient table for the system must include adjustable bore ventilation and lighting.
3.5.11. Patient table must be able to be extracted from the scanner manually in case of emergency.

3.6. Radiofrequency transmission and receiving sub-systems:
3.6.1. The system must enable the user to position coils for full coverage before the study.
3.6.2. The MR must have at least 16 independent receiving RF channels.
3.6.3. The MR RF channel must have a maximum bandwidth of at least 1MHz.

3.6.4. The MR coils must be easy and quick to position. The system must have automatic coil position detection and selection of coils.
3.6.5. The MR coils must be designed specifically for use in a PET/MR system to minimise attenuation of the PET signals.
3.6.6. The MR must be capable of parallel imaging techniques with a maximum acceleration factor of at least 3.
3.6.7. A head coil with at least 8 channels must be included.
3.6.8. A spine coil with at least 16 channels and 90cm superior to inferior coverage must be included.
3.6.9. A torso coil with at least 6 channels and 50cm superior to inferior coverage must be included.

3.7. User control terminal and image reconstruction computer:
3.7.1. PET MR image fusion tools must be supplied.
3.7.2. MR imaging protocols that complement PET imaging must be supplied.
3.7.3. The system must have dynamic imaging protocols for PET and MR.
3.7.4. The user control must enable the automation of routine workflow steps.
3.7.5. The user control must include automatic cardiac and respiratory triggering.
3.7.6. The system must be supplied and supported to allow integration with the workflow and image management system run by the Healthcare Enterprise to store/retrieve the digital images and manage the workflow using work lists from PACS/RIS.
3.7.7. The system must enable import of DICOM image data.
3.7.8. The system must provide graphical visualisation of coils and their current position within the user interface.
3.7.9. Image analysis tools must be provided including region of interest measurements.
3.7.10. It must be possible to reconstruct at least 5000 MR images per second (256 x 256 matrix).
3.7.11. The system must be capable of performing parallel scan and reconstruction.

4. Line 3 – SPECT with integrated CT

4.1. This is the core technical specification for a SPECT system with an integrated CT suitable for general nuclear medicine imaging. The CT system must be suitable for attenuation correction and fusion imaging for localisation.

4.2. The core components of a dual head SPECT with CT system:
4.2.1. Gamma camera and CT.
4.2.2. Patient table.
4.2.3. Image reconstruction computer.
4.2.4. User control terminal.

4.3. Gamma camera and CT.
4.3.1. The gamma camera system must have at least 2 detectors.

4.3.2. The gamma camera detectors must rotate around the patient.
4.3.3. The gamma camera detectors must have variable angle geometry suitable for various clinical applications including cardiac imaging
4.3.4. A wide range of detector positions is essential to easily accommodate imaging patients in a bed or sitting in a chair.
4.3.5. The Scintillation crystal must be at least 9.5mm thick if present.
4.3.6. The gamma camera performance must be reported in conformance with the NEMA NU1-2018 standard.
4.3.7. The UFOV must be at least 38cm x 53cm.
4.3.8. The maximum count rate must be at least 310,000cps.
4.3.9. The intrinsic spatial resolution (FWHM, CFOV) must be no greater than 3.8mm.
4.3.10. The intrinsic spatial resolution (FWHM, UFOV) must be no greater than 3.9mm.
4.3.11. The intrinsic spatial resolution (FWTM, CFOV) must be no greater than 7.5mm.
4.3.12. The intrinsic spatial resolution (FWTM, UFOV) must be no greater than 7.7mm.
4.3.13. The intrinsic energy resolution must be no greater than 10% at 140 keV.
4.3.14. The intrinsic uniformity (integral, CFOV) must be no greater 3%.
4.3.15. The intrinsic uniformity (integral, UFOV) must be no greater 4.5%.
4.3.16. NEMA performance data for the gamma camera must be supplied if requested by the user.
4.3.17. The systems must be supplied with either LEGP or LEHR collimators (or equivalent).
4.3.18. MEGP, HEGP and pinhole (or equivalent) collimators must be available if required by the user.
4.3.19. A collimator storage trolley and exchange mechanism must be supplied.
4.3.20. The rotation radius must be variable.
4.3.21. The maximum rotation radius must be at least 30cm.
4.3.22. The minimum rotation radius must be no more than 15cm.
4.3.23. The system must include body contouring for SPECT and whole-body acquisition.
4.3.24. The system must have a continuous body scan feature.
4.3.25. It must be possible to acquire CT images independently of the SPECT sub-system.
4.3.26. The X-Ray generator (CT) must be at least 40kW.
4.3.27. The detector must have at least 2 rows of detectors.
4.3.28. The z-axis coverage of the detector must be at least 10mm.
4.3.29. The minimum image thickness must be <= 1.0mm.
4.3.30. The minimum rotation time must be less than 1.0 second.
4.3.31. The gantry must include patient positioning lasers in both the PA and lateral planes.
4.3.32. The coincidence of the laser beam and scan plane must be <= 2mm.
4.3.33. The X-Ray tube must have a heat capacity of at least 3MHU.

4.3.34. The X-Ray tube must have a maximum cooling rate of at least 800kHU/min.
4.3.35. The maximum field of view must be at least 50cm.
4.3.36. The CT system must be able to acquire 2D projection radiographic images for scan planning.
4.3.37. Planning radiographs must be acquired up to the maximum scan length of the system.
4.3.38. Limiting high contrast spatial resolution, scan plane (lp/cm @10% MTF) must be at least 13.0 lp/cm.
4.3.39. Limiting high contrast spatial resolution, scan plane (lp/cm @0% MTF) must be at least 15.4 lp/cm.
4.3.40. Deviation of the image thickness from nominal value in sequential and helical scanning must be less than 0.1mm for nominal thickness < 1mm.
4.3.41. Deviation of the image thickness from nominal value in sequential and helical scanning must be less than 10% for nominal thickness > 1mm.
4.3.42. Low contrast resolution must be at least 5mm diameter @ 0.3% contrast in Catphan for maximum 25mGy surface dose (20cm diameter CTDI phantom).
4.3.43. The uniformity of CT numbers must be at least 4 HU across a 25cm diameter water filled phantom.
4.3.44. The system must be supplied with phantoms to enable testing of position and CT number accuracy.

4.4. Patient table:
4.4.1. The patient table must enable whole-body imaging.
4.4.2. It must be possible to withdraw the patient table so that patients can be scanned with SPECT on a stretcher or wheelchair.
4.4.3. The patient table must lower to at least 60cm from the floor.
4.4.4. The scanning range for planar whole body must be at least 200cm.
4.4.5. The scanning range for multiple FOV SPECT CT must be at least 186cm.
4.4.6. The maximum load capacity must be at least 180kg.
4.4.7. Patient table must be controlled with a hand pendant.
4.4.8. Patient table must be able to be extracted from the scanner manually in case of emergency.
4.4.9. Suitable means of minimising vertical deflection of the couch

4.5. Image reconstruction computer:
4.5.1. The CT image reconstruction rate must be at least 10 images per second (512 x 512 matrix).
4.5.2. Image storage capacity must be at least 250GB.

4.6. User control terminal:
4.6.1. The user control terminal must include a graphic user interface.
4.6.2. The system must support a DICOM worklist.
4.6.3. The terminal must have the acquisition and option of processing functions necessary for image review.

4.6.4. The camera interface must be at least 12bit resolution.
4.6.5. The system must as a minimum have modes for acquiring and, option of processing studies involving cardiac, pulmonary, renal, dynamic, tomographic, whole-body, and body contouring applications.
4.6.6. The system must have the ability to add cardiac gating and a cardiac trigger monitor available if required.
4.6.7. Any required 3rd Party software must be available for inclusion with the system.
4.6.8. Multi-modality image registration software must be available.
4.6.9. The user control panel must display the expected dose and actual dose (CTDI and DLP) for every series.
4.6.10. The user control panel must display the total dose (CTDI and DLP) delivered during a patient study.
4.6.11. The user control terminal must enable the automation of routine workflow steps.
4.6.12. The user control terminal must include automatic contrast triggering, if required.
4.6.13. The user control terminal must include a flat panel monitor with a minimum 19" screen size (measured diagonally corner to corner).
4.6.14. The user control terminal must include pre-recorded patient instructions in English.
4.6.15. The system must include a 2-way patient to staff intercom.
4.6.16. Access to configuration settings, including scanning protocols must be based on user login rights.
4.6.17. The system must be compatible with DICOM 3.0 for data export.

5. Line 4 – SPECT with Gamma Camera

5.1. This is the core technical specification for a gamma camera system suitable for general nuclear medicine imaging, including SPECT imaging.

5.2. The core components of the gamma camera system:
5.2.1. Single or multiple head gamma camera system.
5.2.2. Patient table.
5.2.3. User control terminal.

5.3. Gamma camera system:
5.3.1. The detection crystal must be at least 9.5mm thick.
5.3.2. The gamma camera detector(s) must rotate around the patient.
5.3.3. The gamma camera detectors must have variable angle geometry suitable for various clinical applications including cardiac imaging.
5.3.4. A wide range of detector positions is essential to easily accommodate imaging patients in a bed or sitting in a chair
5.3.5. The gamma camera performance must be reported in conformance with the NEMA NU1-2018 standard.
5.3.6. The UFOV must be at least 38cm x 53cm.

5.3.7. The maximum count rate must be at least 310,000cps.
5.3.8. The intrinsic spatial resolution (FWHM, CFOV) must be no greater than 3.8mm.
5.3.9. The intrinsic spatial resolution (FWHM, UFOV) must be no greater than 3.9mm.
5.3.10. The intrinsic spatial resolution (FWTM, CFOV) must be no greater than 7.5mm.
5.3.11. The intrinsic spatial resolution (FWTM, UFOV) must be no greater than 7.7mm.
5.3.12. The intrinsic energy resolution must be no greater than 10% at 140 keV.
5.3.13. The Intrinsic uniformity (integral, CFOV) must be no greater 3%.
5.3.14. The Intrinsic uniformity (integral, UFOV) must be no greater 4.5%.
5.3.15. NEMA performance data for the gamma camera must be supplied if requested by the user.
5.3.16. The systems must be supplied with either LEGP or LEHR collimators (or equivalent).
5.3.17. MEGP, HEGP and pinhole (or equivalent) collimators must be available if required by the user.
5.3.18. A collimator storage trolley and exchange mechanism must be supplied.
5.3.19. The rotation radius must be variable.
5.3.20. The maximum rotation radius must be at least 30cm.
5.3.21. The minimum rotation radius must be no more than 15cm.
5.3.22. The system must include body contouring for SPECT and whole-body acquisition.
5.3.23. The system must have a continuous body scan feature.

5.4. Patient table:
5.4.1. The patient table must enable whole-body imaging.
5.4.2. It must be possible to swing the patient table away so that patients can be scanned on a stretcher or wheelchair.
5.4.3. The patient table must lower to at least 60cm from the floor.
5.4.4. The scanning range for planar whole-body must be at least 200cm.
5.4.5. The maximum load capacity must be at least 180kg.
5.4.6. Patient table must be controlled with a hand pendant.
5.4.7. Patient table must be able to be extracted from the scanner manually in case of emergency.

5.5. User control terminal:
5.5.1. The user control terminal must include a graphic user interface.
5.5.2. The system must support a DICOM worklist.
5.5.3. The terminal must have the option for acquisition and processing functions necessary for image review.
5.5.4. The camera interface must be at least 12bit resolution.
5.5.5. The system must have modes for acquiring and, option of, processing studies involving cardiac, pulmonary, renal, dynamic, tomographic, whole-body, and body contouring applications.

5.5.6. The system must have the ability to add cardiac gating and a cardiac trigger monitor must be provided.
5.5.7. Any required 3rd Party software must be available for inclusion with the system.
5.5.8. Multi-modality image registration software must be available.
5.5.9. The system must be compatible with DICOM 3.0 for data export.

6. Line 5 - Dedicated SPECT Systems with Solid State Detectors

6.1. This is the core technical specification for a dedicated SPECT system with solid state detectors.

6.2. The core components of a dedicated SPECT system with solid state detectors:
6.2.1. Solid state SPECT camera.
6.2.2. Patient couch.
6.2.3. User control terminal.

6.3. Solid state SPECT camera:
6.3.1. The SPECT system must be solid state gamma detectors.
6.3.2. The system must be optimised for acquiring SPECT images.
6.3.3. It must be possible to position the gamma detectors to perform optimised cardiac imaging.
6.3.4. Reports on gamma camera performance must be in conformance with the NEMA NU1-2018 standard.
6.3.5. The field of view must have an active area of at least 15cm x 20cm.
6.3.6. The detector must as a minimum be sensitive to all photons in the range 50keV to 170keV.
6.3.7. The energy resolution must be 10% or better at 140keV.
6.3.8. The sensitivity must be at least 400cps/MBq.
6.3.9. The count rate must be linear up to 500,000cps.
6.3.10. The extrinsic spatial resolution (FWHM) must be no greater than 10mm.
6.3.11. The Intrinsic uniformity (integral, CFOV) must be no greater 2.2%.
6.3.12. The Intrinsic uniformity (integral, UFOV) must be no greater 3%.
6.3.13. NEMA performance data for the gamma camera must be supplied if requested by the user.

6.4. Patient couch:
6.4.1. A patient couch must be provided that enables the patient to be positioned comfortably for imaging.
6.4.2. The maximum load capacity must be at least 180kg.
6.4.3. It must be possible to manually retract the patient couch in emergency situations
6.4.4. The patient couch must maintain positioning accuracy for both SPECT and CT (if supplied) imaging.
6.4.5. The patient couch must lower to at least 60cm from the floor.

6.5. User control terminal:

6.5.1. The user control terminal must include a graphic user interface.

6.5.2. The system must support a DICOM worklist.

6.5.3. The terminal must have the acquisition and processing functions necessary for image review.

6.5.4. The camera interface must be at least 12bit resolution.

6.5.5. The system must allow cardiac gating and include a cardiac trigger monitor.

6.5.6. Any required 3rd Party software must be available for inclusion with the system.

6.5.7. The system must enable import of DICOM image data.

6.5.8. The system must include a 2-way patient to staff intercom.

6.5.9. The user control terminal must meet the minimum PACS requirements.

6.5.10. The user control terminal must enable the automation of routine workflow steps.

6.5.11. The user control terminal must include a flat panel monitor with a minimum 19" screen size (measured diagonally corner to corner).

6.5.12. Access to configuration settings, including scanning protocols must be based on user login rights.

6.5.13. The user control terminal for the system must enable import of DICOM image data.

6.5.14. The user control terminal for the system must be compatible with DICOM 3.0 for data export.

7. Line 6 – Gamma Probes

7.1. This is the core technical specification for the supply, delivery and installation of a gamma probe for location of sentinel lymph nodes.

7.2. Core components of a Gamma Probe:

7.2.1. Base unit.

7.2.2. Wired or wireless probe(s).

7.2.3. Footswitch if required.

7.3. Gamma probe system:

7.3.1. Must include energy window setting for 99mTc.

7.3.2. Must include energy window setting – for other radionuclides to be used clinically.

7.3.3. Side shielding must be greater than 99% at 140keV.

7.3.4. Probe must have suitable collimation. Changeable collimation to adjust spatial resolution if required.

7.3.5. Must have ability to set time period for counting.

7.3.6. Must have ability to display count rate either visibly, audibly or graphically.

7.3.7. Must include display of events detected.

7.3.8. Must have foot switch available for convenient operation in theatre if required.
7.3.9. System must provide audible tone reflective of count rate.

7.4. Probe must be suitable for application in the following areas:
7.4.1. Breast Cancer.
7.4.2. Head and Neck Cancer.
7.4.3. Melanoma.
7.4.4. Vulva/penile.
7.4.5. Laparoscopic.
7.4.6. Parathyroid.