Summary File ONLY

PLEASE BE AWARE THAT
THIS PDF FILE
CANNOT BE PRINTED

IT IS BROWSABLE ON-SCREEN ONLY AND IS PROVIDED FOR YOUR INFORMATION TO DECIDE WHETHER TO BECOME A PROSPECTIVE TENDERER ONLY

Note: This file may contain a brief scope statement, or an extract from the RFT documents, or a full exhibited copy – depending on the specific circumstances.

To participate in this tender process you MUST first download or order a full copy of the Request for Tender (RFT) documents, including the respondable components, and any addenda issued to date.

To do this return to the RFT web page on this web site and copy the RFT documents to your own computer or network – the blue "DOWNLOAD A SOFT COPY" link at the bottom provides access to the page from which you can do this.

NSW Department of Commerce

State Procurement is a Business Unit of the NSW Department of Commerce

State Procurement invites this tender for and on behalf of the NSW Government State Contracts Control Board

Request for Tender 0701937

Standing Offer Agreement and Leasing for Nuclear Medicine Equipment 2008 to 2011

RFT Issue Date: 25 February 2008

Closing Date: 27 March 2008

Closing Time: 9:30 am (Sydney time)

Note: There is no charge for downloading an electronic copy from https://tenders.nsw.gov.au/commerce.

COPYRIGHT

This Request for Tender document ("RFT") has been prepared by the Electromedical Unit of Government Architect's Office in conjunction with the NSW Procurement for the State Contracts Control Board for and on behalf of the Crown in right of the State of New South Wales. This RFT is protected by Crown copyright.

For the purposes of this RFT, inquiries should be directed to the Contact Officer nominated in Part A of this RFT.

Other matters should be directed to:

Group General Manager
Contracting Services – NSW Procurement
NSW Department of Commerce
McKell Building
2-24 Rawson Place
Sydney NSW 2000
Tel: (02) 9372 7504
Fax: (02) 9372 7533

Contents

PART A
THE REQUIREMENT AND TENDER INFORMATION FOR TENDERERS

TABLE OF CONTENTS

PART A The Requirement And Tender Information

1. Outline Description Of The Requirement

1.1 This Request For Tender ("RFT") is made by Electromedical Unit of Government Architect's Office in conjunction with the State Contracts Control Board ("the Board") for the supply of the Deliverables to Customers outlined below and detailed in the Specification at Annexure 1 to Part B, on the conditions contained in Part D and Part E.

1.2 The Board is responsible for the conduct of the tender process, assisted by the Department of Commerce, State Procurement.
"Standing Offer Agreement and Leasing for Nuclear Medicine Equipment"

1.3 Additional items related to the Deliverables sought, may be tendered in the format required by cl.7.1.1 (Price Schedule) of Part B

2 Summary Information For Tenderers

2.1 Interpretation

2.1.1 Definitions of terms used in Parts A-C are contained in cl.4 of Part B.

2.2 Structure of Request for Tender

2.2.1 This RFT is made up of Parts A to E, which includes the Leasing tender documents '**Operating Lease Facility**' and **'Master Rental Agreement'** under Annexure 1 of Part B. If submitting a Tender, retain Parts A, B , D and E. Part C and schedules for Leasing, once completed is to be submitted in accordance with instructions contained in Part B. Once completed, Part C contains the following:

- Part C1 – Information supplied in response to Part B
- Part C2 – Statement of compliance with Specification
- Part C3 – Price Schedule
- (if requested) Part C4 – Selected Price Schedule
- Part C5 – Acknowledgment and confirmation of Tender
- Schedules for Leasing which is under document '**Operating Lease Facility**

2.3 Contact Officer

2.3.1 Refer requests for information or advice regarding this RFT to:
Name: Ulpiano Manlangit
Phone (02) 9372 8134
Fax: (02) 9372 8144
E-mail: ulpiano.manlangit@commerce.nsw.gov.au

2.3.2 Any information given to a tenderer to clarify any aspect of this RFT will also be given to all other tenderers if in the Board's opinion the information would unfairly favour the inquiring tenderer over other tenderers.

2.4 Nature and duration of contract

2.4.1 The Requirement is to be met by means of a Standing Offer Agreement between the Board and the successful tenderer(s) on the conditions contained in Part D and E.

2.4.2 The Standing Offer Agreement will be for a term of 48 months and may be extended for a further term of 12 months at the option of the Board.

2.5 Non-exclusive Standing Offer Agreement

2.5.1 The Board reserves the right to appoint more than one Contractor to supply the Requirement or a part of the Requirement.

2.6 Eligibility to tender

2.6.1 Tenders must be submitted by a legal entity or, if a joint Tender, by legal entities, with the capacity to contract. The Board will only consider tender offers from the relevant legal entity or entities.

2.6.2 Not Used.

2.6.3 The Board may ask a tenderer to provide evidence of its legal status or capacity to contract. If Tenders from entities proposing to contract in their capacity as trustees are not excluded under this clause, such evidence may include copies of the relevant trust deeds. Any evidence requested is to be provided within 3 working days of the request.

2.6.4 The Board reserves the right to reject any Tender if the Board judges the tenderer not to have appropriate financial assets or standing and may engage a consultant to assist it to make this judgement in accordance with clause

2.6.5 If the Board judges the tenderer's financial position to be marginal, the Board reserves the right to make acceptance of any Tender conditional upon the tenderer entering into a bank or parent company guarantee, or an unconditional performance bond.

2.7 Other Eligibility Requirements

2.7.1 The Board will not enter into an agreement with a company that does not have an Australian Business Number and is not registered for GST. Normally, Tenderers must be registered for GST and state their ABN in their Tender Response.

Tenders from Tenderers that do not have an ABN and/or are not registered for GST at the Closing Date and Time, such as Tenderers commencing business in Australia, may be considered at the Board's discretion if the Tenderer demonstrates that it will obtain an ABN and GST registration before entering into a Standing Offer Agreement with the Board. Such Tenderers must state how and when they intend to obtain an ABN and register for GST in their Tender Response.

3. Where to obtain this RFT

3.1 RFT copies

3.1.1 A tenderer may obtain either a hard copy or electronic copy of this RFT (if an electronic copy is available).

3.1.2 NSW Department of Commerce has adopted an electronic tendering system using the internet, which has the capacity for viewing, downloading, or ordering of RFT and for the lodgement of Tenders.

3.2 Hard copy – not used

3.3 Electronic copy

3.3.1 An electronic copy of the RFT and any Addenda that may be issued up to the Closing Date and Closing Time, will be displayed on the Commerce Tendering Web site. All tenderers must view, and where appropriate, download the contents of the website at **https://tenders.nsw.gov.au/commerce** before lodging their tender.

3.3.2 A tenderer is encouraged, although not required, to obtain the RFT and to lodge a Tender electronically through the NSW Department of Commerce Tendering website.

3.3.3 In order to download an electronic copy of the RFT, a tenderer must first register as a site user.

3.3.4 A tenderer should follow the instructions on the site to view and download the RFT.

3.4 RFT Purchase Price - Not used

3.5 Addenda to RFT

3.5.1 The Board, during the tender period may issue Addenda altering the RFT. In such cases, it is the obligation of the tenderer to verify if any addenda were issued prior to closing date, even if a tender has already been submitted. They must obtain a copy of all addenda as given in clause 3.5.2 or 3.5.3 as applicable.

3.5.2 Where a RFT has been acquired in a hard copy form, tenderers must contact the Contact Officer named under clause 2.3 of Part A or the Tenders Office (McKell Building 2-24 Rawson Place Sydney, contact number: 9372-8900, e-mail: Tenders@commerce.nsw.gov.au).

3.5.3 Where a RFT has been acquired in an electronic form, tenderers must check the web site address, https://tenders.nsw.gov.au/commerce and download the Addendum.

PART B -
THE TENDER PROCESS

PART B The Tender Process

4. Definitions Of Terms Used In Parts A-C

Unless the context indicates otherwise, the following terms, where used in Parts A-C of this RFT, shall have the meanings set out below. Note the defined terms below will not all necessarily appear in this RFT.

"ABN" means an Australian Business Number as provided in the GST law.

"Addendum" means an addendum or addition to this RFT made by the Board before the Closing Date and Time under cl. 5.4.

"Alternative Tender" means a Non-Conforming Tender that is intended to offer a different method of meeting the object and intent of the Requirement.

"Board" means the State Contracts Control Board established under the *Public Sector Management (Goods and Services) Regulation 2000* whose responsibilities include:

- Inviting and accepting tenders;
- Determining the conditions under which tenders are invited or accepted;
- Entering into contracts on behalf of the Crown in right of the State of New South Wales; and
- On-going contract administration and management,

and includes the duly authorised delegates of the Board, including officers of NSW Procurement.

"Breakpoint" means the number of Order Units at which nominated discounts take effect. There may be more than one Breakpoint nominated by the tenderer in the tender.

"Bulk Purchase Discount(s)" means the discount(s) (if any) applying to the Tender Price and specified in the Tender which are based on the aggregate volume of goods comprised in any single Order placed by a particular Customer.

"Catalogue number" means the tenderer's unique catalogue number required for the purposes of an Order.

"Closing Date and Time" means the Closing Date and Time for receipt of tenders, specified on the cover sheet to this RFT.

"Code" means the NSW Government Code of Practice for Procurement, as amended from time to time, together with any other codes of practice relating to procurement, including any amendments to such codes, that may be applicable to the particular RFT. The Code can be viewed and downloaded from: http://www.treasury.nsw.gov.au/

"Conforming Tender" means a Tender that:

(a) conforms to the Requirement;
(b) is in the prescribed form;
(c) conforms to the terms and conditions of Part D and Part E, and
(d) conforms to all of the other requirements of this RFT.

"Contractor" means a tenderer who has entered into a Standing Offer Agreement with the Board.

"Customer" means the entity that places an Order with the Contractor under the Standing Offer Agreement.

"Customer Contract" means the contract that is made between the Contractor and a Customer, on the terms and conditions stated in cl.2 of Part D, by means of the placing of an Order by the Customer with the Contractor.

"Deliverables" means the goods and services or goods or services sought under this RFT, as detailed in the Specification.

Discount(s) means the discount(s) (if any) specified in the Tender.

"GST" is a goods and services tax and has the same meaning as in the GST Law.

"GST Free Supplies" and **"Input Taxed Supplies"** have the same meaning as in the GST Law.

"GST Law" means any law imposing a GST and includes *A New Tax System (Goods & Services Tax) Act 1999* (C'th) or if that Act does not exist, means any Act imposing, or relating, to a GST and any regulation made under those Acts.

"Late Tender" means a Tender received after the Closing Date and Time for tenders and includes a Tender which is only partly received by the Closing Date and Time.

"Non-Conforming Tender" means any Tender which does not conform to the definition **Conforming Tender**.

"NSW Government Procurement Policy" means the policy package outlined in cl.6.1 of this RFT.

"OHS&R" means occupational health, safety and rehabilitation.

"Order" means a request by a Customer to the Contractor for the provision or supply of any or all of the Deliverables.

"Order Unit(s)" means the unit(s) used when ordering Deliverables from a Contractor. An Order Unit may be "each", "per box", "per carton" or some other unit.

"Price" includes a price expressed as a lump sum or a rate per unit of quantity, calculated in accordance with cl.7.3.

"Price Schedule" means the list of Deliverables offered by the tenderer, together with the corresponding pricing information. The Price Schedule forms, or is to be attached to, Part C3 of the RFT.

"Principal" means the State Contracts Control Board established under the Public Sector Employment and Management Act 2002 and includes the duly authorised delegates of the Principal, including officers of State Procurement.

"Product Code" means the tenderer's unique product code number that identifies each Deliverable and is required for the purposes of an Order.

"Requirement" means the requirement for goods and services or for goods or services to be met by the Tender, outlined in cl.1 of the RFT and detailed in the Specification.

"RFT" means the Request for Tender.

"Selected Price Schedule" means the list of selected Deliverables and corresponding pricing information that may form Part C4 to some RFTs.

"**Smartbuy®**" means an electronic market place, consisting of an internet web site and associated databases and applications, maintained on behalf of the NSW Government, located at **http://smartbuy.nsw.gov.au** and associated domains.

"Specification" means the detailed description of the required goods and services or goods or services contained in Annexure 1 to Part B.

"Standing Offer Agreement" means a contract under which there is a standing offer for the provision or disposal of goods or services over the period of the contract on the Order of any Customer for whom the Board has arranged the contract.

"State Procurement" means a business unit of the NSW Department of Commerce representing the Board and authorised to arrange and administer contracts on behalf of the Board.

"Tender" means the offer to supply the Deliverables submitted in response to the RFT.

"Tender Price" means, in respect of each Deliverable offered, the Price nominated in the Price Schedule for that Deliverable.

"Volume Discount(s)" means the discount(s) (if any) applying to the Tender Price and specified in the Tender which are based on the aggregate yearly volume of Deliverables purchased by a Customer in a specified period.

"**Works**" means the work to be carried out by the Contractor under the Standing Offer Agreement comprising the supply, delivery,construction, installation, commissioning and testing of the Deliverables, including freight, insurance and associated tuition of Customer staff. The works shall include demonstration of the performance of the Deliverables and compliance by the Deliverables with the specification set out in the RFT and to the requirements of the relevant regulatory authorities.

5 Preparation Of Tender – General

5.1 Conformity of Tenders

5.1.1 The Board seeks Conforming Tenders.

5.1.2 Non-Conforming Tenders that do not include a fully completed Part C, in particular those Tenders which do not contain sufficient information to permit a proper evaluation to be conducted, may be excluded from the tender process without further consideration, at the Board's discretion.

5.1.3 Tenderers may, if they choose, submit an Alternative Tender but only in conjunction with a Conforming Tender. Tenderers are encouraged to offer options or solutions that contribute to the Customer's ability to carry out its business in a more cost-effective manner.

5.1.4 The Board may assess an Alternative Tender against the evaluation criteria where submitted with a Conforming Tender.

5.1.5 An Alternative Tender must be clearly marked "Alternative Tender".

5.1.6 The Board expressly reserves the right to accept, in its discretion, either or both of the following:

(a) Any Alternative Tender or part of an Alternative Tender, where submitted with a Conforming Tender; and

(b) Any other Non-Conforming Tender or part of a Non-Conforming Tender (not, in either case, being an Alternative Tender or part of an Alternative Tender) that, in the Board's opinion, is substantially a Conforming Tender.

5.2 Prescribed form of Tender

5.2.1 The Tender, including any Alternative Tender, must comprise a completed Part C and any attachments to Part C, as may be necessary. Any attachments should be labelled to identify those clauses of the RFT to which they relate.

5.2.2 The Tender will be taken to be for the supply of the Requirement on the terms and conditions stated in Part D and Part E except to the extent that these are amended by the Tender.

5.3 General instructions for completion of Tenders

5.3.1 Prices, responses and other information provided in the Tender are to be in writing and in English.

5.3.2 Tenderers must initial and date any alterations to, and deletions from, a hard copy Tender.

5.3.3 Tenderers must complete ALL of Part C of this RFT, as directed and must not amend any of the questions provided.

5.3.4 Tenderers should notify the Contact Officer in writing on or before the Closing Date and Time if they find any discrepancy, error or omission in this RFT.

5.4 Addenda to this RFT before close of Tenders

5.4.1 A tenderer may ask the Contact Officer for clarification of anything in the RFT before the Closing Date and Time. The Board may issue any instruction resulting from such request in writing to all tenderers in the form of an Addendum.

5.4.2 If, for any other reason, the Board requires the RFT to be amended, an Addendum will be issued.

5.4.3 In each case, an Addendum becomes part of the RFT.

5.5 Not Used

5.6 Provision of catalogue information

5.6.1 State Procurement provides Customers with an electronic catalogue of up-to-date information on goods and services available under NSW Government Standing Offers. The catalogue is known as QICS™ (Quick Information Contract Search).

5.6.2 The database of goods and services on QICS™ is catalogued by State Procurement using NATO/Auslang standards. State Procurement is moving to adopt the internationally recognised Universal Standard Products and Services Classification (UNSPSC) coding system for classifying products and services.

5.6.3 In order to assist the entry of goods and services information from any selected Tender into QICS™ tenderers may be asked in Part C to provide details of their own Catalogue number (part number or Product number) for each of the Deliverables tendered.

EAN or HIBCC Barcoding

5.6.4 As part of the move towards more efficient management of information, including information in relation to product distribution, inventory control and data capture, the NSW Health Department has formally endorsed adoption of the European Article Number (EAN) Standard and the Health Industry Business Communications Council (HIBCC) Standard and has indicated that preference will be given to EAN or HIBCC compliant organisations.

5.6.5 The tenderer is required to state in Part C1 the extent of its use of EAN or HIBCC Barcoding for its products.

5.6.6 If Tenderers have EAN or HIBCC Barcoding in place, they shall indicate in the Pricing Schedule in Part C the EAN or HIBCC number for each of the products being offered.

5.6.7 Indication of compliance with this section warrants that Tenderers will provide to State Procurement details of all EAN and HIBCC Barcodes available, or which may become available for use, for any products accepted to be supplied under any resulting contract.

5.7 Tenderers to inform themselves

5.7.1 Before submitting its Tender, a tenderer must:

(a) Examine all information relevant to the risks and contingencies and other circumstances having an effect on its Tender; and

(b) Satisfy itself:

(i) that the Tender, including the Tender Price is correct; and

(ii) that it is financially and practically viable for it to enter into and perform as per the requirements of the Standing Offer Agreement.

6. Preparation Of Tender – Policy

6.1 Procurement Policy – Introduction

6.1.1 Tenderers should read the main policy documents listed below. Other relevant policies and particular policy objectives to be implemented through this procurement are drawn to tenderers' attention in this cl.6. Their requirements are reflected in the selection criteria listed in cl.9.2 and in the responses required from tenderers in Part C.

NSW Government Code of Practice for Procurement
http://www.treasury.nsw.gov.au/

6.2 Code of Practice for Procurement

6.2.1 Tenderers must comply with the Code for Procurement. The ability of a tenderer to comply with the Codes is an essential condition of all Tenders.

6.2.2 Lodgement of a tender will itself be an acknowledgement and representation by the tenderer that it is aware of the requirements of the Code, that the tenderer will comply with the Code and that the tenderer agrees to provide periodic evidence of compliance with the Code and access to all relevant information to demonstrate compliance for the duration of any contract that may be awarded.

6.2.3 If a tenderer has failed to comply with the Code, this failure will be taken into account by the Board when considering its tender or any subsequent tender and may result in this or any subsequent tender being passed over without prejudice to any other rights or action or remedies available to the Board.

6.3 to 6.15 Not Used

6.16 Occupational Health Safety & Rehabilitation

6.16.1 Tenderers must comply with the following OHS&R requirements in the performance of any Standing Offer Agreement awarded:

(a) The Occupational Health and Safety Act 2000 (NSW) and any regulation made under this Act, including the OHS Regulation 2001; and

(b) Codes of Practice, approved and issued pursuant to the above Act and or regulations made under the Act

6.16.2 Tenderers must ensure that the Tenderer's Sub-Contractors will comply with the OHS&R requirements listed in 6.16.1 in the performance of any Standing Offer agreement awarded.

6.16.3 Tenderers must indicate compliance with their OHS&R obligations in Part C, including any specific obligations in clause 6.7.2 (Occupational Health, Safety & Rehabilitation) of Part D.

6.17 Environmental Management

6.17.1 The NSW Government seeks to promote ecologically sustainable development through procurement. The Tenderer is required in Part C1 to highlight how the provision of the Deliverables would promote this object if its Tender was accepted.

6.18 Not Used

6.19 E-Commerce

6.19.1 The NSW Government is dedicated to maximising opportunities for the electronic and on-line delivery of goods and services including monitoring of and reporting on the supply of contracted goods and services. The use of electronic commerce in government procurement is therefore actively encouraged. It is the intention of the NSW Government to move purchasing progressively on-line to benefit NSW Government and its suppliers of goods and services.

6.19.2 Tenderers are required in Part C1 to outline their present capabilities and services (if any) or future strategies in relation to electronic commerce. Tenderers should also indicate their willingness to work together with the Board towards electronic commerce in the administration and operation of the Standing Offer Agreement.

6.19.3 Tenderers who require more information can view policy documents on the above at:
http://www.gcio.nsw.gov.au/
and
http://www.commerce.nsw.gov.au

6.19.4 The Board reserves the right to inspect a tenderer's e-commerce capabilities to verify any claims made and to examine the format and flexibility of the offered system.

6.20 Not Used

6.21 Compliance with relevant legislation and standards

6.21.1 In all cases the Deliverables tendered must comply with the relevant Act, codes and other regulations.

6.21.2 Certificate of compliance with relevant Standards

6.21.2.1 Tenderers are required to provide evidence of compliance with Standards requirements as laid down by State or Federal Authorities, where relevant.

6.21.2.2 In all cases where Australian Standards exist, tendered products should conform to such Standards. Tenderers are at liberty to offer such items that comply with other recognised international Standards. However, where any inconsistencies exist between other Standards offered and the Australian Standards specified, full details of the inconsistencies are to be stated in the tender response.

6.21.2.3 Tenderers are required in Part C to indicate whether certification from approved testing authories, which confirm that the tendered items meet the relevant Australian, overseas or International Standard, is attached to Part C5.

6.21.3 Compliance with Therapeutic Goods Act 1989

6.21.3.1 Therapeutic goods (both drugs and devices) offered must be contained on the Australian Register of Therapeutic Goods (ARTG) unless exempted, in accordance with the Therapeutic Goods Act 1989 (Cth). Products contained on the ARTG are required to meet standards in relation to quality, safety and efficacy (for registered goods) and quality and safety (for listed goods). Products not accepted onto the ARTG cannot be lawfully supplied in Australia, unless exempted. Tenderers must, in the space provided in the Price Schedule, state for each item offered the AUSTR number (for registered goods), the AUSTL number (for listed goods) or indicate whether the item offered is exempted.

6.21.3.2 Tenderers must provide copies of all relevant certification issued by the Therapeutic Goods Administration which will enable verification of any statements made in respect of the above.

6.21.3.3 Submission of a Tender will be taken as clear evidence that the tenderer will comply in all respects with "The Uniform Recall Procedure for Therapeutic Goods" as called for by the Therapeutic Goods Administration.

6.21.3.4 Labelling of products shall comply with the Therapeutic Goods Order 37, "General Requirements for Labels for Therapeutic Devices".

6.22 Other Board Requirements

6.22.1 Marketing

6.22.1.1 Tenderers are required to participate at their own cost in the promotion of the Standing Offer Agreement to all current and potential Customers. The Tenderer's involvement may include but not be limited to the provision of promotional material, direct marketing, product literature, brochures and other sales related activities. Tenderers are required in Part C1 to indicate their willingness to participate in the promotion of the Standing Offer Agreement.

6.22.1.2 The Board will similarly promote the Standing Offer Agreement in publications where possible.

6.22.2 Financial Assessment

6.22.2.1 The Board may engage a consultant to financially assess tenderers during the tender stage and also during the term of Standing Offer Agreement, and by tendering for this Contract, the Tenderer agrees to cooperate and supply all the requested financial information.
Financial details of tenderers may be obtained by an external Financial Assessor for assessment. Financial Assessors have a contract with the Board to safeguard the financial details obtained. Financial Assessors must not disclose such details, either in whole or in part to any party other than NSW Government departments or agencies without the express written permission of the tenderer. The current Financial Assessor is: Kingsway Financial Assessments Pty Ltd.

6.22.3 Conformance with Department of Health policies

6.23.3.1 The contractor shall conform to the requirements and policies of the NSW Department of Health as amended from time to time, which can be viewed at www.health.nsw.gov.au
and this includes but not limited to criminal records check requirements for contractor employees and OH&S documentation including contractor site access notification requirements.

7. Preparation Of Tender – Price Schedule

7.1 Price Schedule

7.1.1 Tenderers must complete the Price Schedule that is contained in Part C3 to this RFT

7.1.2 The information listed below is to be provided in respect of each item offered, in the spaces provided in the Price Schedule. Items required which are not offered by the tenderer should be struck through in the space containing the item description.

7.1.3 The Price Schedule must contain all the information in respect of each Deliverable as required by the Price Schedule contained in Part C3 to this RFT.

7.2 Selected Price Schedule

7.2.1 The total cost of a Tender will be determined by reference to a selected list of the Deliverables that are expected to be most often ordered or represent the greatest value in turnover. The list is contained in a Selected Price Schedule, which forms Part C4.

7.2.2 Tenderers must complete the Selected Price Schedule and return it as part of their Tenders. The Selected Price Schedule is only for the purpose of calculating the total cost of a Tender. Tenderers may submit offers for as many of the required Deliverables as they choose in the Price Schedule at Part C3, and are not obliged to tender for all the items listed in the Selected Price Schedule.

7.2.3 Every Deliverable listed in the Selected Price Schedule will be used to evaluate the total cost of the Tender. If a tenderer fails to provide a price for any Deliverable listed in the Selected Price Schedule a notional price will be applied, equivalent to the highest price offered for that Deliverable by the other tenderers.

7.2.4 In completing the Selected Price Schedule tenderers must endeavour to offer items exactly as described in that Price Schedule, for example with the specified product or model name, if given. If another item is offered, which the tenderer warrants to be of equivalent quality to the specified product or model, a determination will be made as to whether that item is of equivalent quality. If it is determined that the alternative item is not of equivalent quality the Tender Price for that item may be adjusted to ensure equality of evaluation of all Tenders.

7.3 Calculating the Tender Price

7.3.1 General

7.3.1.1 The Tender Price must:

(a) be in Australian dollars or Foreign currency as appropriate.
(b) cover all costs of performing the Standing Offer Agreement;
(c) include all costs associated with delivery, installation and testing including materials consumed and services required to perform the installation and testing service.

(d) include all costs of packaging where necessary.

(d) include Goods and Services Tax as shown on the Schedule of Prices if it is payable and all other applicable taxes, duties and charges at the rates applicable at the Closing Date and Time for Tenders;

(e) include all costs associated with the preparation and submission of the Tender.

7.4 Price Adjustment

7.4.1 The Tender Price is a maximum (ceiling) price that cannot be exceeded during the term (including any extension of the term) of the Standing Offer Agreement unless –Price Revision is provided for in this RFT.

7.4.2 The Tenderer must comply with the clauses – **Prices for the Goods and/or services** and **Further Competitive Offers**, under Part D of the specification.

7.5 Discounts

Relevant Discounts are to be stated under the 'Schedule of Prices' in the Tender and shall be:

(a) applicable to the total of any Order, including optional items, unless they are specified to apply only to particular items; and

(b) applicable concurrently, unless the Contractor has identified them in groups, which are mutually exclusive. Total Discounts applicable shall be determined by adding the relevant percentages together.

Some of the discounts are explained below:

7.5.1 New Model Discount

- means a discount applicable when a new model for the State of NSW has been released and this model has been varied into, or the models the Contractor nominated in the Tender response to the Standing Offer Agreement, unless otherwise specified. Also, this discount shall be limited only to the first unit (of each new model) sold by the Contractor unless otherwise specified by the Contractor.

.

7.5.2 Reference Site Discount

- means discount applicable to a Customer site, subject to the concurrence of the Customer, wherein the Tenderer is allowed to bring their potential clients to the site for viewing of the Deliverables.

The Tenderer shall explicitly define the conditions under which this discount is applicable and unless stated otherwise it shall apply to all Customers willing to avail themselves this discount.

7.5.3 Luminary Discount

- means discount applicable to a Customer site where the Customer agrees in writing to a luminary presentation within a period of two years from the date of purchase of the Deliverables.

Luminary Presentations include:

- a conference attended by a wide cross section of the clinicians who may be interested in purchasing similar equipment to the Deliverables, **or**
- a presentation of paper in a journal, specifically read by a wide cross section of the clinicians who may be interested in purchasing similar equipment to the Deliverables.

The Tenderer shall define the conditions under which this discount is applicable and unless stated otherwise it shall apply to all Customers willing to avail themselves of this discount.

7.5.4 Demonstration Unit Discount

- means discount applicable when customer agrees to purchase a demonstration unit.

In general, the Tenderer shall upgrade any demonstration unit to the current version of software and hardware as at time of delivery, and it must be less than 12 months old, fully functional and be of similar performance to a new unit .

Tenderers shall in the Schedule of Prices state the total number of units for each model to be made available during the Standing Offer Agreement Period as demonstration units and the availability dates of each unit.

Also for any new models varied, the tenderer shall the state number of demonstration units to be made available during that Standing Offer Agreement period and their availability dates of each unit.

These availability dates and/or the number of demonstration units, can be changed by a price revision request as detailed under the clause 'Price Adjustment and changes to Discounts and Discount Conditions'.

If any of the demonstration units offered by the Contractor is not taken up by Customer's either in advance or within a week of the stated availability date (as set out in the Price Schedule), then the Contractor can sell those units elsewhere to any private customer.

Unless otherwise stated all other discounts in addition to demonstration unit discount shall be applicable.

7.5.5 Major Installation Site Discount

- means the discount applicable to an installation site which has been classified explicitly as a major installation site or can be classified as one, using the contractor's classification guidelines stated in their tender.

The tenderer shall define the classification guidelines in a detailed prescriptive manner under which this discount is applicable, and unless stated otherwise it shall apply to all Customers willing to avail themselves of this discount provided the Customer satisfies the prescriptive requirements. If there is an ambiguity using the Tenderer's classification, then the benefit of doubt will be resolved in favour of the Customer being entitled to the discount.

7.5.6 (A) Cross Modality Discount for Total Value of an Order

This discount is to be submitted as a percentage only. It shall be treated as additional to all other discounts available under this Standing Offer Agreement. All discounts as applicable shall first be applied as defined under the respective Period Contracts / Standing Offer Agreements to arrive at the value of a particular order and then the cross modality discount shall be applied to that value, which will denote the total value of that order. In the event that related cross modality discounts are not specifically stated, then this discount shall be applicable to all equipment purchased in conjunction with this Standing Offer Agreement. If circular references of this discount occur between the respective Period Contracts / Standing Offer Agreements, then the maximum discount as applicable shall be applied.

(B) Cross Modality Discount applicable to Goods and or Services in this Standing Offer Agreement, when other modalities are purchased in conjunction

This discount is to be submitted as a percentage only. This discount is applied only to the goods and or services which fall under this Standing Offer Agreement, and becomes applicable only when purchased in conjunction with the other cross modalities as defined by the Contract (vendor to clearly spell out the other cross modalities or else it shall be construed as applicable when purchased in conjunction with any modality).

7.5.7 Other Discounts

The Tenderer may define and put in other discounts as it considers suitable to their operations and market conditions, such as Prepayment Discounts, End of Quarter discount, End of Financial Year Discount. However, the Tenderer must specify in the Tender all the criteria's and details as to the duration and timeframe that apply in the definitions for end of quarter, end of financial year and other such discounts.

The Tenderer may also define and offer trade-ins provided they are clear and prescriptive in determining the amount offered for a particular trade-in model and the age.

7.6 GST Free or Input Taxed Supplies

7.7.1 Tenderers must identify and state the value of any GST Free or Input Taxed Supplies to be made under the Standing Offer Agreement.

7.7 Minimum Tender validity period

7.7.2 Tenders must remain open for acceptance for a period of at least 12 weeks from the Closing Date and Time for Tenders. Tenderers must state in Part C1 if their Tenders will remain open for any longer period.

8. Submission of Tenders

8.1 General instructions for submission of Tenders

8.1.1 A Tender must be received by the Closing Date and Closing Time.

8.1.2 A Tender may be submitted by any of the following methods:

(a) by delivery into one of the designated Tender Boxes:

by electronic lodgement through the NSW Department of Commerce *eTendering* website at:

https://tenders.nsw.gov.au/commerce

Locate the RFT web page for 0701937
As a registered user follow the on-screen instructions for lodgment

Alternatively:

Physical Tender Box
NSW Department of Commerce
Level 3, McKell Building
2-24 Rawson Place
Sydney. NSW 2000

If delivery personnel requires a signature as evidence of Delivery, the Tender must be delivered between 8:30 a.m. and 4.30 p.m, Mondays to Fridays (except public holidays) by prior arrangement – Ph: 02 9372 8900.

Facsimile Tender Box - (02) 9372 8974

8.1.3 If a tenderer intends to submit electronically through the NSW Department of Commerce *eTendering* website or by facsimile, the following must be considered:

(a) The facsimile machine and NSW Department of Commerce *eTendering* website are at peak use on the morning when Tenders close.

1) Due to the limitations of these means of communication it may take longer to lodge a Tender near Closing Date and Closing Time than at other times.

2) When lodging by facsimile or through the NSW Department of Commerce *eTendering* website, it is recommended that a Tender be lodged well in advance of the Closing Date and Closing Time.

3) A tenderer must determine whether lodgement of a Tender by facsimile or through the NSW Department of Commerce *eTendering* website is appropriate.

(b) The facsimile machine and the NSW Department of Commerce *eTendering* website may experience difficulties in accepting a large Tender. A tender lodged via the NSW Department of Commerce *eTendering* website should ideally be below 7 megabytes (MB) in total file size. Responses totalling more than 7MB may experience difficulties in lodgement. A tenderer is referred to cl. 8.2.4(b) for instructions as to compressing electronically submitted Tenders.

(1) In order to comply with cl. 8.1.3(b), an electronic Tender may be supported by documents in hard copy or on CD-ROM.

(2) Supporting documents, to be submitted in hard copy or on CD-ROM, may be designated throughout the RFT. Supporting documents may include, but are not limited to, statutory declarations, certificates, and company brochures.

(3) If submitting an electronic tender with supporting documents:

a) The complete Tender, including the supporting documents, must be submitted by Closing Date and Closing Time, and

b) Supporting documents should be clearly designated as "Supporting Documents to Contract No. 0701937"

8.1.4 A tenderer is not required to provide multiple copies of a Tender.

(a) If a tenderer provides multiple submissions, the tenderer should clearly state on the front page of the Tender whether it is:

(1) A "Copy." A copy must be identical to an earlier or simultaneous submission in every respect.

(2) A "Variation." A variation of an earlier tender will be deemed as superseding a prior submission.

(3) An "Alternative Tender" under cl. 5.1.

(b) In the event that a Tenderer fails to designate whether a submission is a Copy or a Variation, the latest Tender received in the NSW Department of Commerce Tender Box will be deemed as the definitive submission.

8.1.5 If required, a tenderer must provide a copy of the Price Schedule on a CD-ROM or an IBM compatible 1.44MB floppy disk in a file format that can be read, formatted, displayed, manipulated and printed by Microsoft Excel 97.

8.2 Electronic Tenders to the NSW Department of Commerce *eTendering* website

8.2.1 A tenderer is strongly encouraged, although not required, to lodge its Tender electronically through the NSW Department of Commerce *eTendering* website at https://tenders.nsw.gov.au/commerce. A tender submitted electronically will be treated in accordance with the *Electronic Transactions Act 2000* (NSW), and given no lesser level of confidentiality, probity and attention than Tenders lodged by other means.

8.2.2 A tenderer, by electronically lodging a Tender, is taken to have accepted conditions shown in the Conditions of Tendering and on the NSW Department of Commerce *eTendering* website.

8.2.3 A tenderer must follow the following directions:

(a) RFT for which electronic lodgement is available through the website can be identified by the blue "Lodge a Response" button on the web pages for the RFT.

(b) To lodge a Tender electronically, the files containing the Tender Response must be up-loaded through the website. Access to the up-loading process is through the blue "Lodge a Response" button, then follow the steps and instructions on the NSW Department of Commerce *eTendering* website and any instructions which may have been supplied with the RFT Summary and/or Respondable Copy.

8.2.4 A tenderer must observe the following format for submissions:

(a) An electronically lodged Tender must be lodged in a file format which can be read, formatted, displayed and printed by Microsoft Word 2000, or any format required by the RFT.

(b) If a tenderer compresses files, it must be possible to decompress them using WinZip. A tenderer must not submit self-extracting (*exe) zip files.

(c) A tenderer must not change pre-existing text in the RFT other than to insert the required information.

(d) Any CAD files submitted with an electronically lodged Tender must be in DWF, DWG or DXF format. A tenderer must ensure that any CAD files submitted will correctly display and print in Microstation Version 4.

8.2.5 Signatures are not required for a Tender submitted to the NSW Department of Commerce *Tendering* web site. A tenderer must ensure that a Tender is authorised by the person or persons who may do so on behalf of the Tenderer and appropriately identify the person and indicate the person's approval of the information communicated.

8.2.6 Electronically submitted Tenders may be made corrupt or incomplete, for example by computer viruses. The Board may decline to consider for acceptance a Tender that cannot be effectively evaluated because it is incomplete or corrupt. Note that:

(a) To reduce the likelihood of viruses, a tenderer must not include any macros, applets, or executable code or files in a Tender.

(b) A tenderer should ensure that electronically submitted files are free from viruses by checking the files with an up to date virus-checking program before submission.

8.2.7 If a tenderer experiences any persistent difficulty with the NSW Department of Commerce *Tendering* web site in submitting a Tender or otherwise, it is encouraged to advise the Contact Officer. A tenderer should note:

(a) There are usually alternative Tender lodgement methods described in the RFT. It is always the tenderer's responsibility to lodge the Tender by Closing Date and Closing Time.

(b) If there is a defect or failure of the NSW Department of Commerce *Tendering* web site and the Board is advised, the Tender Closing Date and Closing Time may be extended provided that, in the view of the Board, the tender process will not be compromised by such an extension.

8.3 Custody of Tenders after receipt

8.3.1 All hard copy tenders submitted (and any accompanying CD-ROMS or floppy disks) are kept in the NSW Department of Commerce Tender Box, which is a locked tender box, until after Closing Date and Closing Time.

8.3.2 Tenders lodged electronically to the NSW Department of Commerce Tenders website will be treated in accordance with the *Electronic Transactions Act 2000* (NSW) and given no lesser level of confidentiality, probity and attention than Tenders lodged by other means.

(a) On receipt of Tenders lodged electronically to the NSW Department of Commerce *Tendering* web site, Tenders are encrypted and stored in a secure "electronic tender box."

(b) For reasons of probity and security, NSW Department of Commerce is prevented from interrogating the electronic tender box to ascertain whether tenders have been received or for any reason, until after the Closing Date and Closing Time.

(c) The e-mail receipt that is sent to the Tenderer after successfully up-loading the Tender is the only evidence of Tender lodgement provided.

8.4 Late Tenders

8.4.1 In accordance with the requirements of the Code of Practice for Procurement Late Tenders will not be considered except when the Board is satisfied that the integrity and competitiveness of the tendering process will not be compromised.

8.5 Extension of the Closing Date and Time

8.5.1 The Board may, in its discretion, extend the Closing Date and Time.

9. Evaluation Of Tenders

9.1 General

9.1.1 Tenders will be assessed on the basis of value for money against the selection criteria listed below, which are not necessarily exhaustive, in order of significance or to be given equal weight. Tenderers are advised to respond clearly to all the selection criteria listed in this RFT.

9.1.2 Information supplied by the tenderer in Part C will contribute to the assessment of the Tender. The Offer must document / demonstrate compliance with the Specification and highlight any deviation from the specification under Part C in **Schedule of Non Compliance**. If the tender does not fully comply with the mandatory requirements of the Specification, it may result in the exclusion of the Tender (either exclusion of the non complying part(s) or the whole of Tender, dependant on the nature of non compliance), without further consideration.

9.1.3 For the purpose of evaluation of tenders, if the price is submitted in a foreign currency for an item, then the amount in foreign currency shall be converted to Australian currency by applying the spot selling rate for the purchase of the foreign currency at the Westpac Bank at the close of business on the day of closing of tenders.

9.2 Selection criteria

(a) Fitness for purpose of the offered Deliverables in accordance with the specification, however minor departures may be accepted.

(b) Product enhancement features which give value added performance to the equipment.

(c) Pricing including the cost of the Deliverables, other additional/ancillary costs, and cost of 5 year operational maintenance

(d) Company aspects and details including previous contract experience and standard of contract performance, the capability of its maintenance and local support services and business systems in place, including QA and Occupational Health and Safety.

9.3 Variation of Tenders

9.3.1 At any time before the Board accepts any Tender received in response to this RFT, a tenderer may, subject to cl.9.3.2, vary its Tender:

(a) by providing the Board with further information by way of explanation or clarification;

(b) by correcting a mistake or anomaly, or

(c) by documenting agreed changes to the Tender negotiated under cl.10.1 of this Part.

9.3.2 Such a variation may be made either:

(a) at the request of the Board, or

(b) with the consent of the Board at the request of the tenderer

but only if,

(c) in the case of variation requested by the tenderer under cl.9.3.1(a)-(b), it appears to the Board reasonable in the circumstances to allow the tenderer to provide the information or correct the mistake or anomaly, or

(d) in the case of variation under cl.9.3.1(c), the Board has confirmed that the draft documented changes reflect what has been agreed.

9.3.3 If a Tender is varied in accordance with cl. 9.3.1(a) or (b), the Board will provide all other tenderers whose Tenders have similar characteristics with the opportunity of varying their Tenders in a similar way.

9.3.4 A variation of a Tender under cl. 9.3.1 will not be permitted if in the Board's view:

(a) it would substantially alter the original Tender; or

(b) in the case of variation under cl.9.3.1(a) or (b), it would result in the revising or expanding of a Tender in a way which would give a tenderer an unfair advantage over other tenderers.

9.4 Not Used

9.5 Exchange of information between government agencies

9.5.1 Lodgement of a Tender will itself be an authorisation by the tenderer to the Board to make available, on request, to any NSW government agency information, including but not limited to, information dealing with the tenderer's performance for any contract that may be awarded. Such information may be used by the recipient NSW Government agency for assessment of suitability for pre-qualification, selective tender lists, expressions of interest or the award of a contract or termination of contract.

9.5.2 The provision of the information by the Board to any other NSW Government agency is agreed by the tenderer to be a communication falling within section 22(1) of the *Defamation Act 1974* (NSW), and the tenderer shall have no claim against the Board and the State of New South Wales in respect of any matter arising out of the provision or receipt of such information, including any claim for loss to the tenderer arising out of the communication.

9.5.3 In the evaluation of Tenders, the Board may take into account any information about the tenderer that the Board receives from any source.

9.5.4 To avoid doubt, information which may be collected, exchanged and used in accordance with this provision includes "personal information" about the tenderer for the purposes of the *Privacy and Personal Information Protection Act 1998*. Lodgement of a Tender will be an authorisation by the tenderer to the Board to collect such information from third parties, and to use and exchange such information in accordance with this cl. 9.5.

9.5.5 The tenderer's attention is drawn to the *Freedom of Information Act 1989* which may confer rights, subject to the terms of that Act, to access, and to require the correction of, information held by certain agencies.

9.5.6 During the course of the contract, the successful tenderer's performance will be monitored and assessed. Performance assessment reports, including substantiated reports of unsatisfactory performance, can be taken into account by NSW government agencies and may result in future opportunities for NSW government work being restricted or lost.

9.6 Corrupt or unethical conduct

9.6.1 If a tenderer, or any of its officers, employees, agents or sub-contractors is found to have:

(a) offered any inducement or reward to any public servant or employee, agent or subcontractor of the Board, Customer or the NSW Government in connection with this RFT or the submitted Tender;

(b) committed corrupt conduct in accordance with the provisions of the *Independent Commission Against Corruption Act 1988*, or

(c) a record or alleged record of unethical behaviour,

this may result in the Tender not receiving further consideration.

9.6.2 The Board is under no obligation to do so, by may, in its discretion, invite a relevant tenderer to provide written comments within a specified time before the Board excludes the tenderer on this basis.

10. Outcomes

10.1 Negotiations before determination of outcome

10.1.1 Before making any determination as to acceptance or rejection of Tenders the Board may, at its discretion, elect to conduct limited negotiation with preferred tenderers, including those who have submitted Alternative Tenders or who have submitted substantially Conforming Tenders, to mutually improve outcomes.

10.2 Acceptance or rejection of Tenders

10.2.1 The maximum number of Tenderer's that may be accepted into this Standing Offer Agreement are detailed under Annexure 1 to Part B in **Technical Particulars** and **Operating Lease Facility**

10.2.2 The Board may accept all or any part or parts of any Tender or Tenders, including, in accordance with cl. 5.1, any Alternative Tender or other Non-Conforming Tender.

10.2.3 The Board is not bound to accept the lowest or any Tender.

10.2.4 If the Board rejects all the Tenders received it may:

a) invite fresh Tenders based on the same or different criteria (specifications and details contained in Alternative Tenders will not be used as the basis for the calling of new Tenders), or

b) conduct post tender negotiations in accordance with cl. 10.6.

10.3 Discontinuance of the Tender process

10.3.1 In addition to its rights under cl. 10.2, the Board reserves the right to discontinue the tender process at any point, whether or not it has made a determination regarding acceptance or rejection of any Tender.

10.3.2 The Board will not be liable for any losses suffered by a tenderer as a result of discontinuance of the tender process, including costs of tendering.

10.4 Notification of outcome

10.4.1 Following the Board's decision, all tenderers will be notified in writing of the outcome of their Tenders.

10.5 Entry into Standing Offer Agreement

10.5.1 Acceptance of a Tender or part Tender will be subject to issue of Letter of Acceptance as per the terms of Part D and Part E.

10.6 Post Tender negotiations in the event all Tenders are rejected

10.6.1 If the Board rejects all Tenders on the basis that all Tenders are Non-Conforming, but considers that conformity with the requirements of this RFT is achievable, it may enter into negotiations with the least non-conforming tenderer with a view to achieving a Conforming Tender and entering into a Standing Offer Agreement. If such negotiations are unsuccessful the Board may then enter negotiations with the next most acceptable tenderer. This process

may be repeated with each of the rejected Tenders in order of potential acceptability. However, the Board is not obliged to enter into negotiations with any tenderer.

10.6.2 The purpose of the negotiations will be advised by the Board and made clear to the participants before the commencement of negotiation. Negotiations will not seek to play off tenderers' prices against other tenderers' prices.

10.7 Complaints

10.7.1 It is the NSW Government's objective to ensure that industry is given every opportunity to win Government contracts. Should any entity feel that it has been unfairly excluded from tendering or unfairly disadvantaged by the Conditions in Part D and Part E of the Requirement, it is invited to write to:

Chairman,
State Contracts Control Board
Level 23, McKell Building
2-24 Rawson Place
SYDNEY NSW 2000

10.8 Disclosure of information concerning successful and unsuccessful Tenders

10.8.1 In accordance with NSW Government Policy to publicly disclose details of its contracts, the Board may publish the following information about a Standing Offer Agreement awarded under this RFT:

(a) Details of the Standing Offer Agreement (description of project to be completed or goods/services to be provided or property to be transferred; commencement date of the Standing Offer Agreement; the term of the Standing Offer Agreement);
(b) The full identity of the successful tenderer including details of cross ownership of relevant companies;
(c) The price payable by the agency and the basis for future changes in this price;
(d) The significant selection criteria used in Tender assessment and their weightings;
(e) Provisions for re-negotiation (where applicable).

10.8.2 The Board will not disclose the following information about any Standing Offer Agreement awarded under this RFT unless the tenderer agrees, or release is determined under the *Freedom of Information Act 1989* or is otherwise legally required:

(a) The Contractor's financing arrangements;
(b) The Contractor's cost structure or profit margins;
(c) Items of the Contractor having an intellectual property characteristic (eg. non-tangible property that is the result of creativity, such as patentable ideas or inventions, trademarks, copyrights, etc.);
(d) Any other matters where disclosure would, in the Board's view, place the Contractor at a substantial commercial disadvantage with its competitors both at the time of entering into the Standing Offer Agreement and at any later date when there would be an effect on future competitive arrangements.

10.8.3 A tenderer may request that the Board not disclose particular information included in its Tender but must give the reasons for requesting this. The Board will advise a tenderer in contention for a Standing Offer Agreement what information it agrees not to disclose (unless legally required to do so). If the Board and a tenderer cannot agree about what should be disclosed, the Board will seek the advice of the Chair of the Board. The Board's decision is however final and is at the Board's absolute discretion. Neither a decision by the Board, nor a recommendation by the Chair of the Board under this paragraph is a decision that falls within any dispute resolution procedures specified in Part D.

10.8.4 The Board may publish the identities of all tenderers, but will not disclose other information included in an unsuccessful Tender unless the tenderer agrees, or release is determined under the Freedom of Information Act 1989 or is otherwise legally required.

10.8.5 For Standing Offer Agreements valued over $100,000, the Board will normally publish the names of tenderers when Tenders close, and the other information about the Standing Offer Agreement specified in cl. 10.8.1 on the internet, within 90 days after award of the Standing Offer Agreement. For other Standing Offer Agreements valued less than $100,000 the Board will disclose the specified information in cl. 10.8.1 on request.

10.9 Ownership of Tenders

10.9.1 All Tenders become the property of the Board on submission.

10.9.2 The Board may make copies of the Tenders for any purpose related to this RFT.

10.10 Monitoring of Contractor Performance

10.10.1 During the course of the Standing Offer agreement the Contractor's performance will be monitored and assessed. For details refer to the NSW Government Procurement Guidelines on Contractor performance management which is available on request from the Contact Officer, the NSW Department of Commerce or can be viewed and downloaded from **www.ogp.commerce.nsw.gov.au/NR/rdonlyres/ebwssn7k5yfsxvbbwly7mhpwmqec6elk2wb3hbuptrlypeir7otlr7ud7noad4jv6m5fdai5wy2566kasjlyfmwnoab/Service+Provider+Performance+Management.pdf**

10.10.2 The terms and conditions of the proposed deed of agreement, set out in Part D and Part E, detail the performance criteria to be applied in the monitoring of Contractor performance.

ANNEXURE 1 TO PART B – Specification Of The Requirement

Section 1	**Electromedical Specific**	**EM1 to EM17**
Section 2	**Technical Particulars**	**T1 to T75**
Section 3	**Operating Lease Facility**	**L1-L9**
Section 4	**Master Rental Agreement (and Schedules)**	**L10-L41**

TECHNICAL - PARTICULARS

NUCLEAR MEDICINE EQUIPMENT

T100 GENERAL

This part of the tender document outlines particular technical requirements for supply, installation, testing and acceptance of the NUCLEAR MEDICINE EQUIPMENT of various categories.

The offers submitted will provide basis for selection of suppliers of the above mentioned equipment / systems to form a 48 months Standing Offer arrangement, facilitating purchase of such items by various hospitals. Specifics of the Standing Offer Agreement are detailed under Part D of the Specification

In addition, this tender also requests for submission of the offers for an Operating Lease of the offered equipment. For details refer to the Operating Lease facility in Annexure 1 Part B of this document

The reliability of the NUCLEAR MEDICINE EQUIPMENT the quality of the images, the ability to handle trauma and injured patients quickly and easily, the degree of user friendliness in operation are the factors of the utmost importance.

The tendered equipment shall be of known and proven reliability and durability under high workload conditions experienced in major teaching hospitals.

T101 EQUIPMENT TO BE SUPPLIED AND WORK TO BE CARRIED OUT

The work to be carried out shall comply of the supply, delivery, installation and testing, including freight, insurance and tuition of staff associated with the following equipment:

Gamma Camera	**Clause T100, T101, T102 to T114**
SPECT/CT Scanner	**Clause T100, T101, T102, T120 to T120.4**
PET Scanner	**Clause T100, T101, T102, T200 to T217**
PET/CT Scanner	**Clause T100, T101, T102, T300 to T318**
Bone densitometer	**Clause T100, T101, T102, T400 to T418**
Cyclotron	**Clause T500.to T505**

The offers shall comply with all the particular requirements and detailed technical specification for the individual items as outlined in the subsequent clauses of this specification. Any non-compliance shall be clearly stated as required under Part C2 “Statement of Compliance with Specification”.

Tenderers shall complete a separate response for each model of equipment offered.

Tenderer must give a full response to all points of the specification, sufficiently clarifying all aspects and issues addressed in this document. The response shall also include:

- clear answers or compliance statement to all clauses of this specification
- complete “Tenderer Response” column in the tables incorporated in the individual clauses to indicate actual specification parameters of the offered item
- copy of the current certificate registration of the company’s implemented QA system
- information on service facilities
- TGA & other certificates

Tenderers shall also address aspects of “Alternative Offers and Product Enhancement Features” as detailed under Annexure 1 to Part B, Section 1 -Electromedical Specific. The above requirement is mandatory and forms part of the evaluation process. Failure to supply details of enhancement/features (over and above the specification requirements) for all product models offered may result in the tender not being considered for acceptance.

T102 NUMBER OF TENDERERS TO BE ACCEPTED

Gamma Camera	**up to 5 for each category**
SPECT/ CT Scanner	**up to 5**
PET Scanner	**up to 5**
PET/CT Scanner	**up to 5**
Cyclotron	**up to 4**
Bone densitometer	**up to 4**

T103 GENERAL REQUIREMENTS: - GAMMA CAMERAS

The equipment tendered under this specification shall be selected to form a period contract agreement. Tenderers attention is directed to Clause T104 outlining specific conditions of such an arrangement.

The tendered equipment shall be of known and proven reliability and durability, under high patient load conditions as normally found in major public hospitals. If Tenderers do not fully meet the technical aspects of this specification but conclusively prove that the offer meets the performance aspects of the Specification then the offer may be considered.

The equipment shall be designed to produce medical diagnostic images of radio-isotope distribution IN-VIVO. It shall enable the distribution to be viewed continuously and simultaneously to produce a permanent digital record of static, dynamic, tomography and gated studies of radio-isotope distribution.

The offered equipment must comply with NEMA standards as applicable for gamma cameras. The offered equipment must be able to perform data transfers in the current ACR/NEMA (Dicom 3) format, (as applicable at the time of placement of order, for the equipment to be supplied), so as to communicate with other equipment having ACR/NEMA (Dicom 3) transfer capability.

The submitted tender shall include a compliance statement of all the clauses and subclauses.

T104 THE EQUIPMENT SPECIFICATIONS:

i) Equipment to be Supplied. The equipment to be supplied by the contractor shall be in the quantities specified, and described herein and as listed in Schedule of Prices. Items not included or specified in detail but required for proper functioning of the equipment shall be listed in Schedule No 2, Schedule of prices, Table 7, under option items and be of type and quality generally accepted as standard in Nuclear Medicine work.

Equipment to be supplied shall consist of:

1.	Single head large field Gamma Camera
2.	Dual head (Fixed head) Gamma Camera
3	Dual head (Variable angle) Gamma Camera
4	Dedicated Cardiac Dual head Gamma Camera
5	Multi head variable angle coincidence Gamma Camera
	Optional Items
1.	Multi format Unit as in Optional Items
2.	ECG Gate
3.	Collimators
4.	Laser Imager Dry type
5.	Thermal Colour Printer or Laser Colour Printer
6.	Reporting Workstation Station
7.	Optical Disk Drive
8.	Network system
9.	Spect Phantom
10.	One Co 57 Flood source

T105 GAMMA CAMERA PERFORMANCE

The Tenderers are advised that each Gamma Camera shall be type tested to the NEMA standard for performance measurement of scintillation cameras as set out in the standard publication No. NU1-1986 for single crystal scintillation cameras (1.8).

Tenderers are to note that all performance and NEMA Specification requirements shall be met prior to equipment handover.

A. NEMA TESTING

Each of the Camera shall meet the following NEMA Specifications:

	Parameters	**Camera 1**	**Camera 2**
1.	Number of Heads	1	2
2.	Intrinsic Spatial Resolution FWHM CFOV (mm)	4	4
3.	Intrinsic Energy Resolution FWHM UFOV (%)	10	10
4.	Intrinsic Flood Uniformity:		
	Integral uniformity UFOV (%)	5	5
	Differential uniformity UFOV (%)	3	3
5.	Intrinsic Differential Spatial Linearity UFOV (mm)	0.3	0.3
6.	Observed Count rate for 20% loss TC 99 m Source (Kcps)	> 150	> 150
7.	System Sensitivity (LEHR, using 100 mm dia. 3 mm deep source Tc 99m cpm/uCi)	> 200	> 200
8.	System Spatial Resolution with scatter LEHR Collim, FWHM, 10 cm dist. (mm)	8.5	8.7
9.	Reconstructed System Spatial Resolution LEHR, Collim., FWHM, average radial (mm)	10.5	11.4
10.	Multiple window spatial registration x and y directions max. (mm)	2	2
11.	Number of energy windows	3	3

B. GAMMA CAMERA TECHNICAL SPECIFICATION

Clause No.	**Specification**	**Single Head**	**Dual Head**
T105.1	**BASIC CAMERA CAPABILITY**		
	The Gamma Camera with an integrated computer shall comprise detector heads, stand, processor and console, and shall be supplied complete with all electronic processing circuitry, monitors, together with all auxiliary equipment required for the proper operation of the unit.	√	√
	Dual head Gamma Cameras shall include the feature of automatic on-line body contoured scanning.	√	√
	The Gamma Camera shall produce diagnostic and tomographic images of radio-isotope distribution in glands, organs and whole bodies where required. It shall enable the distribution to be viewed continuously and simultaneously collect image data in computer memory. It shall be suitable for both static and dynamic studies of the radio-isotope distribution.	√	√

Clause No.	Specification	Single Head	Dual Head
	All the measurement and control equipment shall be fitted into the ganrty and acquisition computer or a self-contained control console, housing all the interconnecting cabling behind.	√	√
T105.2	**CAMERA HEAD**		
	DETECTOR - PARAMETER		
	Crystal thickness (mm)	> 8.5	> 9
	Detector dimensions axial in mm transaxial in mm	 > 350 > 500	 > 350 > 500
	PMT Number	48	55
	Energy range, minimum keV	50 to 400	50 to 400
	Each head shall contain the detector crystal, photomultiplier tubes and associated electronics. The head shall be capable of accommodating a number of different types of collimators (specified under collimators) stored on special collimator stands.	√ √	√ √
	The useable Crystal size shall enable images of the head, heart, liver, and lower spine. The photomultiplier tubes, crystal and associated electronics shall be encased in steel and radiation shielding to protect these internal components from mechanical damage and from background radiation up to at least 400 keV. The detector crystal shall be made of thallium doped sodium iodide and shall be well protected against mechanical and thermal shocks. Tenderers shall supply full information on crystal thicknesses available, including costing and NEMA details. Correction for the following parameters shall be micro-processors controlled. (a) Adjustment of the photomultiplier gain. (b) Energy and spatial distortion correction. (c) Resolution and uniformity parameter adjustment The system shall be capable of storing separate energy and spatial correction maps for each radionuclide used, if required to maintain performance of each radionuclide. It is preferable that one energy and one spatial correction map is applicable to all radionuclide used.	√ √ √ √ √ √ √ √	√ √ √ √ √ √ √ √
T105.3	**MEASURING SYSTEM**	√	√
	A separate measuring system shall be provided for each of the camera heads. The energy range shall be at least 50 keV to 400 keV. The pulse height analysers shall provide a minimum of three (3) separate measuring systems to enable an image from three separate photo peaks to be displayed or to enable images from two different isotopes to be collected simultaneously. Each peak shall have separate range adjustments (windows) provided. Digital displays or displays on the acquisition computer screen are to be provided to indicate the elapsed time and the number of scintillations counted. The cables connecting the console or acquisition computer and head shall be flexible of at least 12 metres long from the exit of the stand to the entry of the console or computer. Where more than one cable is supplied they shall be secured together in an	√ √	√ √

Clause No.	Specification	Single Head	Dual Head
	approved method.	√	√
T105.4	**GAMMA CAMERA STAND**	√	√
	The camera heads are to be mounted on a rigid stand such that the heads can be rotated around a patient positioned on the scanning bed. The camera heads shall be capable of both synchronised and individual radial movements from the centre of rotation. Where it is necessary for the heads to move to a specific point for collimator exchange, this shall be either reprogrammed, or else an incorporated interlock shall indicate when this position is reached.	√ √	√ √
	Diameter range of scan sections in mm The rotational movement of the heads shall be quoted in the tender documents. A fast acquisition mode or alternative method of enabling scans on patients who have a tendency to move is highly desirable. The possibility of acquisition and display of whole body SPECT scans is highly preferable.	250 to 550 √	250 to 550 √
	The camera head shall be capable of vertical movement and (two plane rotations applicable for only single head Gamma camera). All movements are to be motor driven and controlled by a rugged non breakable hand held, on gantry mounted control unit. The control unit, being a low voltage, is to be designed to prevent accidental operation of the drive motors if left on a flat surface face down. It shall be permanently and clearly labelled. Counter poise systems will also be considered and full details are to be provided for all locking systems, pivot connection and collimators counterbalancing facilities. All motor controlled movements shall be protected by limit switches to prevent damage to the head or stand assembly. All connecting cables shall be secured to the stand and control unit by mechanical means to prevent damage to the connecting plugs, sockets and cables also and an Anti Head cable twist system shall be incorporated on the stand assembly.	√ √ √ √	√ √ √ √
T105.5	**PATIENT TABLE**	√	√
	Patient table motorised vertical motion - nominal range in mm	500-1000	500-1000
	All motor controlled movements shall be protected by limit switches to prevent damaged to the head or stand assembly. The table motions shall be micro processor-controlled. Full details shall be supplied with the tender submission.	√ √	√ √
	Table nominal length, mm Table nominal width, mm Table load capacity in kg., minimum Table top shall be of low attenuating material The table must be complete with a head rest (to enable close proximity of the detectors for brain tomography), a head restraining device, armrests and mattress.	2000 350 150 √ √	2000 350 150 √ √
T105.6	**CONTROL CONSOLE ACQUISITION/ANALYSIS COMPUTER SYSTEM AND DISPLAY MONITOR**	√	√
	A computer system shall be fully integrated with the Gamma		

Clause No.	Specification	Single Head	Dual Head
	Camera and shall enable simultaneous data acquisition, processing, networking and process Nuclear Medicine patient studies in digital form. The system must be able to acquire and process tomography simultaneously with no restrictions. It must also be able to: (1) acquire whole body and process tomography, (2) acquire tomography and process tomography with no compromises.	√	√
	Simultaneous Emission/Transmission attenuation correction - optional - describe in detail the method used. It's preferable that the source used does not require replacement for the life of the camera.	√	optional
	The system shall consist of:		
	i) System, acquisition and display software	√	√
	ii) CPU, clock speed in Mhz	32 bit, 200	32 bit, 200
	iii) RAM, MB	32	32
	iv) Hard Disk Capacity, GB	2	2
	Floppy disk, MB	1.4	1.4
	v) Colour monitor display system	√	√
	vi) Variable persistence patient video monitor	√	√
	vii) Alphanumerical keyboard and text monitor	√	√
	viii) Rolling Ball, mouse or joystick	√	√
	ix) Archival storage of patient data	√	√
(a)	**Data Acquisition**	√	√
	The acquisition functions must be able to collect images in the following acquisition matrix size and acquisition modes:	√	√
	Dynamic and Static Studies:		
	Matrix for H.R. is highly preferable	1024x1024	1024x1024
	Matrix for static collection mode only, 8 bit	512x512	512x512
	Minimum frame rate (frames/sec) for 64 x 64 x 16 matrix shall be provided for dynamic acquisitions.	30	30
	Whole Body Studies	optional	optional
	Matrix, minimum	256x1024	256x1024
	Whole Body Contour Software	optional	√
	Automatic Whole Body Contour Software is preferable	optional	√
	Indicate if available on 3 head system or if not when	optional	√
	Whole body SPECT software is preferable	optional	√
	Dual Isotope Studies	√	√
	Matrix, minimum for 8 bit	256 x 256	256 x 256
	Multi Gated Acquisition	√	√
	The system must be capable of performing cardiac gate synchronised acquisition with at least the following matrix sizes and number of frames per cardiac cycle.		
	Matrix at 16 bit to 32 frames per cycle.	64 x 64	64 x 64
	Matrix at 8 bit with up to 32 frames per cycle	128 x 128	128 x 128
	Matrix at 16 bit with up to 16 frames per cycle	128 x 128	128 x 128
	The system must be capable of rejecting data from cardiac cycles whose length falls outside a specified tolerance and also data from cardiac cycles which follow such irregular cycles.	√	√
	The distribution of the R-R interval as a histogram must be stored with the patient data.	√	√
	Pan and Zoom Facilities	√	√
	Continuous range of pan off centre with image magnification up to at least x 2.	√	√
	Tomographic Acquisition	√	√
	Tomographic software shall be provided and shall include a full		

Clause No.	Specification	Single Head	Dual Head
	quality control package to enable testing of alignment and position of the tomographic attachment.	√	√
	The acquisition software shall provide the following minimum requirements, allowing simultaneous acquisition from all detectors or any combination of detectors:	√	√
	• both circular and or elliptical orbits	√	√
	• automatic and manual body contour definition	√	√
	• dual energy acquisition	√	√
	• multigated acquisition	√	√
	• acquisition matrices	64x64 and 128x128	64x64 and 128x128
	acquisitions with any specified starting angle	$120^o/180^o$ & 360^o	$120^o/180^o$ & 360^o
	view acquisitions	64 and 128	64 and 128
(b)	**Colour Monitor Display System**	√	√
	A colour monitor display unit providing at least 256 levels of colours selectable from a range of colours and 256 levels of grey shall be provided. Flat panel shall be offered as option.	√	√
	Outputs shall be provided to connect to a hardcopy imager.	√	√
	Minimum screen diagonal dimension in mm.	350	350
(c)	**Variable Persistence patient Video Monitor**	√	√
	The variable persistence monitor shall display each Gamma Camera event as a slowly decaying pixel of light on the computer's monitor and/or a 230mm monitor mounted on the gamma camera gantry stand. The monitor shall operate during positioning and during the study and acquisition, and a screen clearing device shall also be provided on the control console.	√	√
T105.7	**COLLIMATORS**	√	√
	The collimators supplied shall be of robust construction complete with protective face plates or both sides of the collimators. It shall be equipped with totally captive holding devices and provided with a suitable alignment device to the Gamma Camera head.	√	√
	Individual prices for each collimator are required to be listed separately:	√	√
	a) Low Energy all purpose	√	√
	b) Low energy high resolution	√	√
	c) Low Energy high sensitivity	√	√
	d) Medium Energy	√	√
	e) High Energy all purpose	√	√
	f) Low energy special purpose Cardiac if available	√	√
	g) High Energy pinhole	√	√
	h) Ultra High Energy	√	√
	Tenderers are to provide full technical data including guaranteed engineering tolerances, system resolution and sensitivity measured at 5, 10 and 20 cms for all collimators available for the tendered Gamma Camera.	√	√
	THE DATA ON EACH COLLIMATOR SHALL INCLUDE:	√	√
	• maximum useful energy,		
	• hole length and hole diameter,		
	• septal thickness,		

Clause No.	Specification	Single Head	Dual Head
	• system resolution and sensitivity at 0 mm, 50 mm, 100 mm and 200 mm, • focusing distance • integral sensitivity. The collimators shall be supplied with all necessary accessories to facilitate changeover with a minimum of effort, and risk of injury. Collimators are to be housed in cassettes and stored on a collimator storage table. A collimator transport cart is to transport the collimators between the storage table and gantry.	√ √	√ √
T105.8	**TOMOGRAPHIC SYSTEM**	√	√
	The tomographic system(s) shall be equipped with locks to prevent movement unless the operator deactivates the control or is under external computer control. The gantry shall be fitted with an anti-cable twist system. The Tenderer shall specify the distance between the physical edge of the detector head and the edge of the imaging surface of the collimated detector which will limit the field of view of the brain when detectors rotate so as to avoid the shoulders (brain reach). Emergency stop switches shall be provided to disable the unit from the console and the bed positions. Table shall be capable of computer control in two directions for elliptical studies. Alternatively, the camera heads may move towards the patient under computer control during the acquisition to provide the elliptical orbits.	√ √ √ √ √	√ √ √ √ √
T105.9	**COMPUTER PROCESSING OF PLANNER IMAGES** The system shall provide at least the following functions.	√	√
	1. Image Processing i) Smoothing ii) Normalisation	√ √ √	√ √ √
	iii) Interpolation iv) Background subtraction v) Magnification vi) Frame arithmetic vii) Contrast enhancement - linear and non-linear viii) Image labeling ix) Image statistics x) Image profile curve generation for any angle xi) Image windowing/thresholding xii) User selectable colour scale xiii) Spatial & temporal filtering xiv) Image mirroring & rotation xv) Simultaneous cine display of at least four (4) 128 x 128 data sets each containing 32 frames	√ √ √ √ √ √ √ √ √ √ √ √ √	√ √ √ √ √ √ √ √ √ √ √ √ √
	2. Regions of Interest i) Regular and irregular minimum 12 ROIS ii) ROI statistics, max, min, total, mean and standard deviation for each ROI. iii) Duplication, rotation, mirroring, translation, editing iv) Save ROI's to disk v) Curve generation from ROI's **3. Curve Processing**	√ √ √ √ √	√ √ √ √ √

Clause No.	Specification	Single Head	Dual Head
	i) Smoothing	√	√
	ii) Background curve subtraction	√	√
	iii) Area normalisation	√	√
	iv) Curve & curve arithmetic	√	√
	v) Curve fitting to equation	√	√
	vi) Deconvolution and convolution	√	√
	vii) Curve statistics	√	√
	viii) Modification of curve points	√	√
	ix) Save curves to disk	√	√
T105.10	**SOFTWARE REQUIREMENTS**	√	√
	Offered Gamma Camera shall be supplied with all necessary software packages as normally required for proper operation of the units.	√	√
	The following is to be provided as a minimum requirement:		
	• G.H.P.S.	√	√
	i) A total and regional ejection fractions		
	ii) Peak emptying and filling rates		
	iii) Time to peak emptying and filling rate		
	iv) Cardiac Shunt quantification		
	• Thallium Circumferential Profile	√	√
	• Renal differential and G.F.R.	√	√
	• Software to provide control of data acquisition, data analysis and control of displayed images and graphs.	√	√
	Complete listing of all nuclear medicine data analysis programs offered shall be provided with the tender documents.	√	√
	The tenderer is to state in the tender documents the current software and developed software versions, not yet available for current use.	√	√
	All software upgrades released within a period of one year after Practical Completion shall be provided free of charge to the hospital.	√	√
	The following Diagnostic Protocol shall be provided:	√	√
	i) Cardiac Studies:	√	√
	Semi-automatic and manual gated cardiac analysis, including wall motion, phase analysis, regional EF list mode and first pass acquisition.	√	√
	Shunt quantisation.	√	√
	Quantitative planar myocardial analysis; quantitative SPECT myocardial data base for Thallium and Technicium studies.	√	√
	ii) Renal Studies:	√	√
	Perfusion Indices.	√	√
	Differential function and transit time using deconvolution method.	√	√
	GFR and ERPF.	√	√
	MAG-3.	√	√
	Diuretic renal curve analysis - half clearance time.	√	√
	iii) Gastric Emptying Program	√	√
	iv) Lung Ventilation and Perfusion.	√	√
	v) Hepatobillary programme for hepatic extraction fraction (deconvolution analysis) and half clearance times.	√	√
	vi) Tenderer shall include/indicate whether simultaneous transmission and emission software is available for SPECT.	√	√

Clause No.	Specification	Single Head	Dual Head
	vii) Computer hardware/software preferably to include: • A high level language compiler. • Graphic package including histogram printouts. • Image enhancement including: • (a) Image interpolation • (b) Nine point smoothing • (c) Contrast enhancement • Dynamic and static image playback including single or a group of names stored on disc to be displayed at a variable rate. • Isocount Display to provide variable upper and lower count thresholds and display images outside the threshold range: • Hardware Diagnostics programs for the system. • Whole body images in a matrix of at least 256 x 1024 suitable for a patient up to 1900 mm tall. viii) Tomographic Software The system reconstruction time shall not exceed one (1) second per slice for a 360°, 128 view, 64 x 64 matrix studies.	√ √ √ √ √ √ √ √ √ √ √	√ √ √ √ √ √ √ √ √ √ √
	ix) Gated acquisition; analysis and display. Tenderers shall list all programs offered, distinguishing between corporate programs and programs available through a users program. All programs shall operate under a disc operating system. Tenderers shall provide a memory map of the Random Access Memory and shall describe which areas are used by the system's monitor, disc operation system and peripherals. The software supplied shall enable the user to develop their own procedures using macros or protocols consisting of linked analysis commands. A compiler for a higher-level language (eg: C) shall be provided together with appropriate subroutines to enable programs to be integrated into the macros or protocols.	√ √ √ √	√ √ √ √
T105.11	**HARD COPY DEVICES**	√	√
	i) Colour Printer	√	√
	The printer shall be suitable for use with the tendered Gamma Camera unit. All necessary interfaces and connecting cables shall be supplied, to reproduce the image on hard copy without degradation of the resolution, uniformity or image geometry of the main study. A printer with printing on plain paper is the preferred option over printers using expensive recording media. Sufficient materials for producing 100 copies of images for test and evaluation. It is preferable that this hard copying device be able to provide printing facilities to all Gamma Camera units via a local network if required. Where the equipment is capable of producing output in different formats such as overhead transparencies or 35mm slides, the cost of these options shall be provided.	√ √ √	√ √ √
	ii) Multi-format Video Imager (Optional)		
	The imager shall be suitable for use with the tendered Gamma Camera Unit. All necessary interfaces and connecting cables		

Clause No.	Specification	Single Head	Dual Head
	shall be included. Requirements: a) Data can be represented on a standard 20.3 x 25.4 cm film in multiple formats. b) Dual input design preferred. c) Manual and automatic frame advance. d) Separate brightness and contrast controls. e) System to provide preferably hand copy transparencies of video and digital images. **iii) Laser Imager (Optional)** In addition to image hard copying functions available via IMS/PACS the facility for direct access to a laser **imager shall also be provided**.	√ √ √	√ √ √

Required = √

T106 REPORTING WORKSTATION (OPTIONAL)

The offer for Gamma Cameras shall include two (2) stand alone Workstations for access and display of image data separately from the camera operator's console.

One workstation shall provide full capability for viewing, reprocessing with application of analytical software to the image data, while the other workstation shall only provide viewing functions.

The units shall have direct access to the images stored on disks of the associated Gamma Cameras.

The following specification shall be required as minimum performance for the offered Workstation:

a) Memory capacity of at least 128 MB, HD storage capacity of 20 Gbyte

b) Display matrix 1024 x 1024 with possibility of 256 x 1024 for viewing of the whole body image.

c) High resolution, 50cm diagonally colour monitor with 16 patellae display.

d) Output port for optical storage system.

e) Computer unit based on either a single or multiple CPU of at least 32 bit, speed of 500mhz and capable of:

- reading 64 images, each of 64 x 64 word, from disc into memory and display all the images within 5 seconds.
- displaying a cine of 32 frames of 128 x 128 matrix size at a minimum rate of 30 frames/second.
- generating 6 time-activity curbs, from 6 ROI's each of 100 pixels from a dynamic study comprising 128 frames of 64 x 64 images in 15 seconds.
- reconstructing a tomographic study, comprising > 60 view of 128 x 128 matrixes, including filtering, for 64 transaxial, sagittal and coronal view in 2 minutes.

f) all clinical software packages as applicable on the main processing computer of the Gamma Camera.

g) full size keyboard with function keys.

The Tender shall state the maximum number of frames of 64 x 64 and 128 x 128 matrix size that can be displayed together in cine mode.

T107 LOCAL ARCHIVING DEVICE

For local saving and storage of specific, selected studies a rewritable Optical Disk Device or CD of 650MB shall be provided and interfaced with the Analysis/processing Workstation..

The unit shall have at least 20 GB storage capacity.

Three (3) spare disks cartridges shall be included in the price.

T108 NETWORK FACILITY

All equipment (Gamma Cameras, Workstations) preferably to have the facility to be interconnected via a local computer network for direct communication, access to the diagnostic information, manipulation and transfer of data between the particular units as well as communication with a hospital Image Management System (IMS/PACS).

The network shall consist of:

- A stand alone computer unit to drive and control network operations (file server).
- Full operating and processing software.
- A data entry facility (keyboard).
- VDU (monitor).
- All necessary interfacing modules, reticulating wiring, etc.

T108.1 NETWORK SYSTEM OPERATION

The system shall be capable of retrieving and transferring data between the cameras and it must be able to communicate in any direction of combination of camera/workstation/network. The speed of transfer should be at least IMB Baud rate without affecting data input to the network during this operation.

There should be a common database for all the systems on the network to enable a patient study search from any of the terminal on the network.

The tender shall state the limitation of the system offered and give examples of typical inputs and outputs of the system being offered in block diagrams, indicating main components and direction of communications.

The tenderer shall provide layout details including the size of interface boxes for this installation and the computer network along with power and air conditioning requirement.

T109 ACCESSORIES

The following accessories are to be listed in the schedule of prices.

A. Any phantom, software and calibration sources required to met the factory manufacturers' QC/QA procedures and testing are to be supplied. Any special tools required for the maintenance and/or calibration shall be supplied. Also other phantoms recommended for system performance assessment shall be quoted as optional items.

B. Cardiac Gate Units (Optional)

The Cardiac Gate supplied shall be suitable for use in a cardiac procedural area and comply with relevant Australian standards. The Cardiac Gate is to provide an ECG display and an adjustable trigger pulse to initiate the date collection. The ECG signal shall be suitably conditioned such that the triggering point on the R-wave (when set) shall not drift.

ECG Amplifier

i) Three lead monitoring (Lead I, II and III) selectable via push-bottom or rotary switch.

ii) Patient circuit shall be cardiac protected and will be tested in accordance with AS 3200.

iii) Main frequency rejection of at least 30 dB.

iv) Common mode rejection ratio of at least 100 dB over the operating frequencies with all leads driven with respect to earth.

v) Operating frequency - 0.1 Hz to 100 Hz.

vi) Ability to reject pacemaker pulse.

vii) Defibrillator proof.

Display:

The ECG trace shall be displayed on a screen of nominal dimension 80 mm x 100 mm, the ECG trace, the actual triggered point shall be indicated. There shall be a manual or automatic trace brightness control of sufficient range to fully compensate for ambient light variations.

Recorder:

The built-in recorder shall be capable of faithfully reproducing the ECG wave form through the entire cardiac study, the strip chart shall also indicate the actual triggering point on the ECG trace.

Accessories to be included:

- Three (3) lead patient cable
- Twenty-five (25) pre-jelled electrodes
- One (1) consumable item compartment (to be incorporated into the main equipment)
- Ten (10) rolls of chart paper.

T110 ACCESSORIES (OPTIONAL)

A. Spect Phantom for high resolution imaging having hot and cold areas of different diameters in a clear cylinder, these hot and cold regions shall be in even steps from at least 45mm to 10mm.

B. One Co 57 Flood Source to suite the FOV of the cameras offered.

C. NEMA test phantoms

T111 DUAL HEAD (VARIABLE ANGLE) GAMMA CAMERA

The Dual Head (Variable Angle) Gamma Camera shall comply with Clause T103 to T108 where applicable with the following exceptions:

- That both heads are capable of moving from the horizontal position to vertical
- One head can be set and moved to 90^{o} position for SPECT imaging and 180^{o} for body imaging.
- The two detector heads should be capable of moving relative to each other from the position where they are 180 ^{o} to each other to a configuration of 90 ^{o} or less between the two detectors.

T112 DEDICATED CARDIAC DUAL HEAD GAMMA CAMERA

The Dedicated Cardiac Dual Head Gamma Camera shall comply with clause T103 to T108 where applicable with the following exceptions:

- Shall comprise two high performance heads
- Integrated stand
- Acquisition/analysis computer system complying with current NEMA performance criteria
- Camera heads are fixed nominally at 90^{o}
- NEMA TEST

	Parameter	Camera
1.	Intrinsic Saptial Resolution FWHM, mm	≤ 3.9
2.	Energy range, keV	50 to 150
3.	Crystal thickness, mm	9.5
4.	Detector dimension, nominal in mm	300 x 150

T113 MULTI-HEAD COINCIDENCE FIXED OR VARIABLE HEAD GAMMA CAMERAS

The Multi-Head Coincidence Gamma Camera shall comply with Clause T102 to T107 where applicable with the following exceptions:

- Coincidence Detection Cameras

This multi head camera shall be suitable to detect and process single photon events as well as positron coincidence events.

1. Fixed
2. Variable Head.

Nominal Specifications:-

1. Energy range to at least 511keV.

Item No	**Parameter**	**Camera**
1.	Intrinsic Spatial Resolution FWHM	≤ 5.5mm
2.	Intrinsic Energy Resolution FWHM	11%
3.	Intrinsic Differential Spatial Linearity UFOV	≤ 0.3mm
4.	Maximum Count Rate	> 200 Kps
5.	Multiple Window Spatial Registration X and Y Directions	≤ 2.0mm
6.	Tenderers to advice effective field size in mm	
7.	Tenderers to advise crystal size in mm	

Further technical requirement for the following shall be submitted with the tender:

- Maximum singles count rate available per detector.
- Maximum NEC count rate according to NEMA NU 2-2001 (70 cm phantom)
- Crystal size of unit offered.
- List of reference sites for system evaluation.
- A list of clinical software and where it has been trialed.
- Special shielding or other facility requirements for the system offered.

T114 NUCLEAR MEDICINE SYSTEM SERVICE FACILITIES

The tenderer shall state the availability of servicing facilities for the system tendered and the availability and type of spare parts carried in stock for the tendered model of Gamma Camera and computer system in their Sydney office.

The tenderer is also to state the number of personnel in Sydney who are factory-trained to maintain the equipment offered and the after hours service availability for breakdowns.

The tenderer is to state the software support service in Sydney for the system being offered including the number of factory trained personnel.

The tender shall also include the following information:

1. Service facilities available from the Tenderer, including details of training programs to be undertaken by staff.
2. Details of spare parts in stock and or arrangements in hand for the replacement of defective components with a minimum of delay. A guarantee from the supplier that spare parts and service of the equipment supplied will be available for a minimum period of 10 years.

3. Experience of the staff who will be on site during the installation period, supervising the installation of the equipment, and who will be carrying out service works after the installations are complete.
4. Preference will be given to those Tenderers who have an established maintenance service in Sydney for similar equipment in operation or who will establish as a result of this tender such a service.

T115 INSTALLATION OF GAMMA CAMERAS

All works associated with the installation of the offered equipment shall be carried out by the equipment contractor.

This shall include:

a) Extension of power supply circuits from the isolating switch as provided.

b) All wiring associated with the equipment.

c) Supply and installation of cable enclosures, ducts, cable trays including all necessary penetrations through walls, floor etc.

d) Earthing of the equipment of comply with established patient protection area (Cardiac or Body) within the room.

e) Connection of radiation warning lights as necessary.

Facilities such as:

- Power supply (30A, 240V, 50Hz single phase) terminated in the isolating switch
- Air conditioning
- Lighting, power and communication outlets
- General finishes

are to be provided by others.

T116 OTHER GAMMA CAMERAS

T116.1 GANTRYLESS TYPE GAMMA CAMERAS

Other type and model of Gamma Cameras may be offered in the Schedule of Prices e.g. Gantryless or Ceiling Mounted Gamma Cameras including the detailed technical specification and installation requirements. The offered unit shall comply with the NEMA standards for a Dual Head Gamma Cameras.

T116.2 HYBRID GAMMA CAMERAS SYSTEM

Hybrid Gamma Cameras may be offered in the Schedule of Prices e.g. Gamma Cameras system with CT capabilities including the detailed technical specification and installation requirements. The offered unit shall comply with the NEMA standards for a Dual Head Gamma Cameras.

SPECT/ CT SCANNER

T120 SPECT /CT SCANNER

T120.1 GENERAL REQUIREMENTS

The whole body SPECT/ CT Scanner is a combined-modality imaging required for use in clinical and research SPECT applications. The supplied system shall permit routine 2D/ 3D clinical studies and other research application. The SPECT/CT system shall be applicable for imaging all SPECT tracers to provide quality images and high throughput and shall include the following tools and functions:

- Patient scheduling and data entry
- View, analyse and QC of integrated SPECT/ CT data
- Archive and networking control
- Modality worklist
- SPECT and CT daily QA/QC
- Performance manager for SPECT and CT
- Image fusion of SPECT/ CT

T120.2 EQUIPMENT TO BE SUPPLIED

The equipment to be supplied and the work to be carried out shall be in the quantities specified and as described herein and as listed in the Schedule of Prices.

The SPECT/ CT Scanner shall comprise at least the following:

* Integrated gantry containing slip-ring design CT X-ray tube, HT tank and muti-slice detector, Dual Head Variable Angle Gamma Camera
* Patient couch & accessories
* Acquisition system/ electronics
* Operator integrated console/workstation with multitasking capabilities, HD storage, archive storage and Ethernet network connections
* Computer hardware and software necessary for data management acquisition, reconstruction, review, analysis and software development
* Standard collimators for the Dual Head Camera
* Collimator transport device
* Complete set of standard NEMA NU2 test phantoms;
* Associated equipment:(Optional)
  - (a) ECG gating device for acquisition of ECG gated studies
  - (b) Optical disk drive (MOD)
  - (c) Laser filming, colour hardcopy and optical disc storage
  - (d) Dry Laser Imager
  - * Dicom 3 standard (to be priced separately under table of options))
  - * SPECT DICOM connectivity (Query, Retrieve, Send, Receive)
  - * Integrated DICOM connectivity for MR and CT
  - * DICOM Print
  - * DICOM Modality Worklist
  - * DICOM Secondary Capture
  - * HIS/RIS interface

All charges relating to optional items shall be included in the price of the options listed in the Schedule of Prices. The price of optional items <u>should</u> <u>not</u> be included in the Lump Sum Tender Price.

T120.3 CT COMPONENT

The CT component of the SPECT/ CT Scanner shall comply with the specification requirements of Clause T100 to

T104.37 of the CT Scanner Period Contract No. 0701527 for the 3 levels of CT scanner except for the following:

- CT scanner and data acquisition/processing is to be integrated with the SPECT scanner
- The operators console shall meet the requirements for acquiring and processing SPECT/ CT studies
- Only software required for the performance of the full range of SPECT/ CT scans is required to be included. Other specialized CT software available shall be quoted as an option. (Note: Some SPECT/ CT scans may involve administration of CT contrast media. CT software and protocols which facilitate contrast media imaging and standard SPECT/ CT software shall be included).

The CT Scanner System may be offered under three levels:

- Low end SPECT/ CT system with a CT Scanner meeting the Level R specifications (T100 to T104.37)
- Mid range SPECT/ CT system with a CT Scanner meeting the Level P specifications (T100 to T104.37)
- High end SPECT/ CT system with a CT Scanner meeting the Level M specifications (T100 to T104.37)

T120.4 SPECT COMPONENT

The SPECT component of the SPECT/ CT Scanner shall comply with the general requirements for SPECT Dual Head Variable Angle Gamma Camera specified in T103-T111 and with the NEMA specification requirements of Clause T103 Table A with the following exceptions:

- Positioning lasers (Clause T204.5) – triple axis lasers shall be supplied which indicate the slice location of the CT. Lasers delimiting the axial FOV of the patient are desirable, but not essential. It shall be possible to define the scan range for SPECT on the topogram (scout) view of the CT.
- Computer system for SPECT/ CT scanners, shall include the following requirements:
    - Speed, memory, hard disk capacity and archive capacity shall be commensurate with the large data volumes associated with SPECT/CT studies. The number of whole body patient studies (covering 100 cm) which can be stored on the system shall be indicated.
    - Display monitor: 21" CRT high resolution or 18" LCD.
    - If multiple computers are used for SPECT/ CT acquisition and reconstruction, specifications for each system shall be provided.
    - Multiple computer systems shall interoperate seamlessly. Method of controlling CT and SPECT acquisition and reconstruction shall be specified (eg from a single monitor/key board, multiple monitors key/board etc).
    - Any limitation on commencing SPECT acquisition before CT reconstruction is completed shall be stated.
- The CT shall be able to be used for attenuation correction of all SPECT studies performed on the scanners. Any limitations on using CT data for attenuation correction shall be stated.
- Accurate alignment between CT and SPECT field of view is required for fusion of SPECT/ CT images . Accuracy of alignment and any deviations due to patient table flexing for heavy patients shall be stated.
- Positioning aids shall be provided to minimize patient motion between the CT and SPECT parts of the study.
- Complete SPECT/ CT whole body study times for a scan covering 100 cm and for patients weighing 70kg to 120 kg shall be stated based on the recommended protocol for the scanner.

PET SCANNER

T200 DEPARTMENTAL STANDARDS

The equipment, where applicable shall be in accordance with the relevant SAA codes. (At least the following; AS3003, AS3200, AS1894, AS2064, refer also to clause PJ-01). The equipment shall be suitable for use in (BODY PROTECTED AREA) procedures.

Items not included or specified in detail in this Specification but required for the proper functioning of the equipment, shall be included, (listed and priced separately but the amounts included in the lump sum tender price),

and shall be of type and quality generally accepted as standard in high level organ imaging work for the procedures indicated below under T102.

The equipment shall be essentially from the same manufacturer and be of known and proven reliability and durability under high workload conditions experienced in major teaching hospitals.

In order that the Principal may assess alternate offers, the Tenderer is requested to complete for each alternate offer and return with his tender all REQUIRED INFORMATION as specified in the schedules.

> NB: In providing this information the Tenderer's attention is drawn to the listed test conditions, which are required to allow meaningful inter-comparison. Should alternative conditions of measurement be recommended for routine use, a second set of data may be supplied for the different conditions. Preferably data should be confirmed by measurement on a system installed at a hospital site (with no commercial link to the Tenderer), but must at least be confirmed on a working (prototype) unit.

Tenderers shall also address aspects of "Alternative Offers and Product Enhancement Features" as detailed under Annexure 1 to Part B, Section 1 -Electromedical Specific.

T201 EQUIPMENT TO BE SUPPLIED

This part of the work shall be for supply, installation, testing and maintenance of a whole body, dedicated Positron Emission Tomographic (PET) Camera which shall be able to be upgradable to take advantage of new software/hardware innovations.

The reliability of the PET Camera, the quality of the images, the ability to handle very sick and injured patients quickly and easily, the degree of user friendliness in operation, as well as the availability of flexible protocols are factors that are regarded as of the utmost importance.

The supplier shall be well established in Australia, with a credible service organisation having a proven record of satisfactory maintenance of their installed base, with High Tech medical equipment: eg. CT/MRI Scanners, PET Cameras or other complex radiological equipment.

Documentation supporting the nature of the service organisation is to be supplied by the tenderer and will be taken into consideration when tenders are evaluated.

It should be possible for a representative of the Department to review a site with the equipment offered, preferably working in a clinical setting.

A list of all the PET Cameras supplied and installed by the tenderer together with the name and address of the operator of each Camera, to whom a Department representative may refer for information shall be provided.

The tenderer shall provide a commitment for the upgrading of the PET Camera, both in software and hardware for a five years period after the PET Camera has been installed and its warranty (DLP) period expired. Upgrades shall be implemented within 3 months of the upgrades being released for international use. This will be undertaken from resources within the Contractors own organisation, and not by any subcontracting arrangement.

T202 PERFORMANCE OF EQUIPMENT

The whole body PET Camera System shall be suitable for carrying out at least the following investigations on both adults and children, which may include intensive care patients.

- Whole body studies
- Brain studies
- Cardiac studies

T203 PET CAMERA - GENERAL

The equipment to be supplied and the work to be carried out shall be in the quantities specified and as described herein and as listed in the Schedule of Prices.

All charges relating to optional items shall be included in the price of the options listed in the Schedule of Prices.

The price of optional items should not be included in the Lump Sum Tender Price.

The PET Camera shall comprise at least the following:

* Gantry containing detector rings of BGO or LSO or GSO crystals or NAI(Tl)
* Patient couch & accessories
* High Speed acquisition electronics
* Computer hardware and software necessary for data management acquisition, reconstruction, review, analysis and software development
* Operator workstation with multitasking capabilities, HD storage, archive storage and Ethernet network connections
* Complete set of standard NEMA NU2 test phantoms shall be priced separately under optional items.
* Associated equipment:(Optional)
  - (a) ECG gating device for acquisition of ECG gated studies
  - (e) Optical disk drive (MOD)
  - (f) Laser filming, colour hardcopy and optical disc storage
* Dicom 3 standard (to be priced separately under table of options))
  - * PET DICOM connectivity (Query, Retrieve, Send, Receive)
  - * Integrated DICOM connectivity for MR and CT
  - * DICOM Print & other DICOM standards for PET Scanner

T204 PET SYSTEM

T204.1 GENERAL REQUIREMENTS

A whole body PET camera is required for use in "neurological", cardiac and "whole body" applications. The supplied system shall permit routine 3D clinical studies and other research application. The PET Camera system shall be applicable for imaging most PET tracers (details to be provided) to provide quality image and high throughput.

T204.2 DETECTOR/ GANTRY

A safety interlocks shall be fitted between the ganrty and couch movement. Any specific cooling requirements for the gantry system shall be included.

The gantry patient aperture shall be at least 56 cm (with any transmission source retraction/rotation system fitted). Attenuation correction should be supplied with the system.

T204.3 DETECTOR/ PHOTOMULTIPLIER ASSEMBLY

Details of the detector/ photomultiplier design shall be provided. Data shall be supplied to illustrate the spatial discrimination capability of the particular detector/pm (photomultiplier) configuration.

T204.4 PATIENT COUCH

A patient couch shall be provided suitable for both "whole body" and "head" studies. The couch shall be motor controlled such that patient access is easy and safe (i.e. safe loading height) and shall permit accurate (0.5 mm) and reproducible (0.5 mm) patient positioning. The couch shall be capable of being manually withdrawn from the detector ring easily and within a few seconds in case of emergency and in the event of a power failure. The couch shall be comfortable and include armrests and a head fixation device. The Tenderer shall supply drawings of the couch showing details of the armrest and head fixation device.

T204.5 POSITIONING LASERS

Positioning triple-axis lasers shall be provided to facilitate accurate (± 0.5 min) repositioning of the patient within the gantry aperture in all three directions, i.e. distance into aperture and also patient position in horizontal and vertical direction. In addition, lasers shall be supplied which delimit the axial field of view. Prices for radiotherapy posioning lasers may be offered as option.

T204.6 CONTROLS LOCATED AT OR NEAR THE CAMERA GANTRY

Controls shall be provided at a practical position for operator access to permit couch and gantry positioning with accurate monitoring of position. Buttons shall be provided for emergency stop.

T204.7 TRANSMISSION SOURCE

The camera shall be equipped with the means of performing a transmission scan with minimum radiation dose to staff and minimal background radiation when the source is retracted/removed. Transmission measurements must be able to be performed for post emission tracer injection. Methods should be implemented to limit and correct for the contamination of the transmission counts from the emission activity in the patient. The source shall be retracted into the appropriate shielding position when not in use for transmission measurement. Acceptable transmission methods include:

(a) **Single based transmission measurment**

Transmission is measured with a single photon emission source such as ^{137}Cs. Methods must be provided to accurately correct the transmission data for the difference in the energies of the transmission source and the 511 keV annihilation photons. The overhead for extending/retracting transmission source and emission contamination scan should be specified.

(b) **Coinicidence Based Transmission Measurement**

Transmission is measured with a positron emiiting source such as ^{68}Ge/^{68}Ga. Preferred configuration is rotating pin or rod sources, but other configuration may also be considered. It should be specified whether transmission scan can be performed in 3D or requires septa in place (2D). In the latter case, the overhead associated with extending/retracting septa for transmission measurement in 3D whole body studies should be specified as well as the overhead for extending/retracting transmission sources.

An estimate of dose rate to the patient and member of the staff (at 1 metre on axis of gantry) during a transmission scan shall be provided.

The Tenderer shall guarantee to supply and install a replacement of radioactive sources for transmission, normalisation and cross-calibration, which require at least yearly replacement, to be priced separately.

T205 PERFORMANCE REQUIREMENTS FOR PET CAMERA

The system provided shall adhere to the following minimum performance.

Note that the tenderer shall specify all measurement parameter including the energy threshold for 2D and 3D and coincidence window. A summary table of the performance requirements is included.

Refer to Schedule of prices for details of procedures to be adhered to.

T205.1 Resolution (In Air)

Transverse reconstructed resolution shall be no greater than 6.5mm at 1cm from the centre of the field of view and shall be no greater than 8.0mm at 10 cm radius. Axial resolution should match the transverse resolution (6.5 mm – 8.0mm) over the complete field of view (0-10 cm radius). The resolution requirements shall be met for all planes defined for normal operation.

T205.2 Sensitivity

The 3D system sensitivity (NEMA 1994) shall exceed 400 kcps/ μCi/cc for category I scanners and 700 kcps/μCi/cc for category II scanners.. An estimate of the scatter present in these measurements shall be included in the above information.

T205.3 Countrate

Countrate data shall be supplied for concentrations of 0.1, 1.0, 3.0 and 10.0 μCi/cc in a 20 cm test phantom. The corrected trues countrate shall be linear from 0 up to activity concentration at peak noise equivalent count rate (NEC) with a maximum deviation from linearity of < 10%, for 3D studies acquired with 20 cm phantom and the NEMA NU2 2001 70 cm phantom. The method of correction shall be provided in detail. The dead time correction factor, random/true ratio and the activity within the system field of view shall be specified by the Tenderer at all concentrations. An estimate of the concentration at which the random/true ratio is one shall be provided for NU2 2001 70 cm phantom.

The peak NEC measured in 3D mode according to NEMA NU2 2001 shall be >10,000 cps for category I scanners and >20,000 cps for category II scanners.

A graph of trues, randoms, scatter and NEC count rates shall be supplied. Details of any anticipated improvements in countrate performance shall be provided together with a guarantee that any improvements resulting from circuit modifications shall be implemented at no additional cost.

T205.4 Reconstructed Uniformity

The standard deviation of reconstructed pixel counts shall be less than 15 per cent for all planes as measured for a high count study (30 million counts) using the 20 cm phantom with measured attenuation correction.

T205.5 Scatter

An estimate of scatter shall be provided, measured according to NEMA NU2 2001 standard for 3D mode, and if available on scanner, for 2D mode.

T205.6 Detection system

The energy resolution of the complete system shall be less than 25 percent. (Note that this does not refer to single block energy resolution.) This requirement will be used to evaluate the system's electronic alignment. The energy resolution for a single detector module shall also be provided.

The coincidence timing window should be ≤ 12 ns.

The system efficiency shall be stable without the need for frequent recalibration. The variation in efficiency shall be supplied and shall be less than 2 per cent over a three month period.

The Tenderer shall specify the recommended frequency of calibration/normalization and provide details of the procedures involved. The Tenderer shall also specify the number of such interactions over a three month period and the effect on calibration stability.

T205.7 Image Quality

In order to assess overall system performance the system the Tenderer is requested to supply a series of sample images each with acquisition, reconstruction and display parameters strictly controlled. These shall include images of a standard NEMA phantom and FDG images for all sections in a normal study. The following protocols shall be strictly adhered to:

NEMA NU 2-2001 Image Quality Analysis phantom

Supply sample images with the corresponding parameters used as below:
Calibrated activity

Acquisition Counts
Energy threshold
Scatter correction :
Attenuation correction :
Reconstruction

Display

Installation and Siting Requirements (refer also to Clause T 216):

	Parameter	**Tenderers' Response**
1.	Minimum room size Examination room Control console room Equipment/ computer room Chilled water room (if applicable)	
2.	Operating temperature range, ºC	
3.	Humidity %	
4.	Cooling BTU/hr	
5.	Power requirements	
6	Patient couch: H x W x D, cm Weight , kg	
7.	Gantry: H x W x D, cm Weight ,kg Patient port diameter, cm Transmission source Laser alignment (patient positioning) Additional features	
8.	PET host computer: H x W x D, cm Weight ,kg	
9	Power distribution unit: H x W x D, cm Weight ,kg	

T205.8 PET Performance Requirements Summary - NEMA Testing standard

Clause No.	SPECIFICATION		Parameters (minimum requirements)	Tender Response (Yes/No or specify)
1	**Energy threshold**		350 to 550keV	
2	**Energy resolution**		<25%	
3	**Spatial Resolution** (Clause T205.1)			
	Spatial Resolution, mm: 3D Nema NU2 2001			
	Transverse FWHM	at 1.0 cm	6.5	
	Transverse FWHM	at 10 cm radius	8	
	Axial FWHM	at 1.0 cm	6.5	
	Axial FWHM	at 10 cm radius	8	
4	**Sensitivity** (Clause T205.2)			
	System sensitivity 3D, kcps/µCi/cc s		>700k	
5	**Countrate** (Clause T205.3)			
	Peak NEC 3D Nema NU2 2001 kcps		>20k	
6	**Uniformity** (Clause T205.4)			
	Image reconstructed uniformity		<10%	
7	**Scatter fraction** (Clause T205.5)			
	Nema NU2 2001 3D		<50%	
8	**Specify coincidence timing window** (Clause T205.6)		≤12 ns	
9	**Calibration stability** (Clause T205.6)		<2% over 3 months	

T206 NEMA STANDARD TEST PHANTOMS AND ACCESSORIES

Tenderer shall demonstrate QA and QC testing to meet the NEMA NU2-2001 standard during the commissioning of the PET Scanner. Any phantom, software and calibration sources required to met the factory manufacturers' QC/QA procedures and testing are to be supplied. Any special tools required for the maintenance and/or calibration shall be supplied. Also other phantoms recommended for system performance assessment shall be quoted as optional items.

Cost associated with on-site NEMA NU2-2001 testing shall be specified separately.
Supply of factory NEMA data for the particular scanner may be considered as an alternative providing tests are performed that confirm that the scanner is performing according to specifications and factory NEMA testing reflects the performance of the scanner post installation.

T206.1 TEST PHANTOMS AND ACCESSORIES

Mandatory phantoms to be supplied with the scanner:

Phantoms and sources (other than ^{18}F) required for calibrating the scanner to provide absolute activity concentration calibration for standard uptake values (SUV) shall be supplied.

Optional phantoms to be supplied with scanner and priced separately:

A complete set of test equipment shall be provided as option. This test equipment shall be used for acceptance testing and routine calibration as well as long term quality assurance when required by the hospital and shall include the following equipment:

1. Standard 20cm cylindrical phantom with 5cm cylindrical insert and with fixing attachments for line and point sources. The phantom shall have an internal diameter of 20cm and be 20cm in length. A second cylinder 5cm external diameter and at least 15cm long shall also be supplied together with suitable attachments to secure this cylinder inside the 20cm cylinder. Both cylinders shall be easily filled with liquid via two inlets and when secured no leakage shall be detectable (by "Smear" test).

2. NEMA NU2-2001 Image Quality phantom or EC whole body phantom with accesories

3. NEMA PET phantoms: A set of inserts shall be provided for the 20cm cylinder so that the phantom can be used. If inserts are not available separate phantoms shall be supplied. The inserts shall include a set of cold rods (solid perspex), cold spheres (solid perspex), hot rods (fillable) and hot spheres. An array of hot rods shall also be supplied with rod size and spacing provided. The rod size should be chosen such that one sector is only marginally visible under normal operating conditions of the camera.

4. Hoffman PET brain phantom: A three dimensional phantom representing the structures of the brain shall be supplied. This phantom shall be easily filled with activity using a single filling hole. The phantom's dimensions shall provide realistic simulation of scatter conditions in the head.

T207 COMPUTER SYSTEMS

T207.1 General Requirements

The PET camera shall be supplied with a computer system(s) which satisfy the following general requirements. (The tenderer shall provide a block diagram of the layout of the computer system(s) offered).
The following definition will apply:

"The System" refers collectively to all computers necessary to perform data acquisition, reconstruction, display, general PET data processing and any other computer functions specifically referred to herein.

The workstation and computer system shall perform:

* acquisition of data from the PET camera
* reconstruction display and processing of PET data
* on-line access to current PET data
* "archival" and retrieval of data and system software
* hard copy of PET image data (Dicom 3 compatible)
* support for ethernet and modem communications
* import image data from other modalities
    * performance measurement and quality control
    * and allows for the development of user programs (Optional)

The system as a whole shall meet the following general requirements:

Hardware

* The system shall include a computer system which will control data acquisition, per form reconstruction, and provide centralised disk storage of patient data and software.

* All computers (nodes) comprising the system shall be interfaced to each other by ethernet and appropriate networking software

* All data, with the exception of archived data, shall be immediately and transparently accessible at any node, regardless of where it is physically stored

* The number of workstations shall be expandable. The maximum number of additional workstations which can be added to the system is to be stated and shall be at least 8.

* All computers comprising the system shall be based on well recognised, and preferably industry-standard, hardware and software architectures for which a large variety of software is available

* Where the system offered incorporates a host computer it shall have a main memory of at least 512MB.

* All computers included in the offers shall be from manufacturer's catalogues current at the time of the offer.

* The Tenderer shall supply a list of all computers included in the offer. For each computer, at least the following information shall be provided:-

  MAKE/MODEL
  Country of manufacture
  Memory size
  Performance of CPU
  Physical dimensions
  Operating system and version
  Display characteristics (number of bits, pixels etc)

  For each computer offered, the Tenderer shall provide a list of all peripheral devices e.g. disks, tapes, etc) and hardware options (array processor or equivalent, ethernet interface etc). The Tenderer shall provide full specifications for each peripheral device and hardware option listed.

Software

* The Contractor shall provide system, networking, clinical, utility, quality control, and hardware diagnostic software as set out below.

* The tenderer shall provide documentation to show that all software supplied has been satisfactorily **validated** (certificate or evidence that it have been validated).

* The Tenderer shall supply a detailed list of all software offered, specifying for each item:

  a) the type and amount (number of pages) of documentation provided

  b) availability of on-line help.

  c) the type of support available in Australia. For this, possible categories include (i) unsupported, (ii) limited, tenderer to state what limitations apply, (iii) full support, i.e. a guarantee to work on bugs as they arise, and provide a response within an agreed time interval.

  d) How is the software driven (eg: command, batch, interactive menu, mouse and pulldown menus?).

  e) the distribution media/format available.

  f) which supplied computer(s) the software runs on.

Note: that Full Support shall be provided as part of the warranty and maintenance contract for at least software system, networking, diagnostics, acquisition, display and analysis, with the support of the manufacturer (e.g. Direct modem connection). The tenderer shall supply, free of charge, upgrades to all supplied core software packages as they become available, for the duration of the operational maintenance agreement. Any hardware necessary for the software upgrade shall be priced separately.

T207.2 System and Networking Software

* The Tenderer shall provide all operating system and networking software necessary to make the hardware functional. Two complete documentation sets for this software, as published by the software manufacturer, shall be provided in hardcopy or softcopy format. The software supplied shall be identical to that normally supplied by the software manufacturer.

* The Contractor shall guarantee to maintain compatibility of all software products he offers with future releases of the operating system. Where necessary he shall provide updates of software packages free of charge during the operational maintenance contract period to ensure continued compatibility.

T207.3 Clinical Software

* The Tenderer shall list all clinical software available.

* Software for calculating standard uptake values (SUV) must be provided

* The documentation for each clinical package offered shall include a description of the method, and references to any related publications.

T207.4 Utility Software

The Tenderer shall supply a utility software to allow saving of screen displays and cines in standard formats (eg jpeg, avi etc). It should be possible to print screen capture either to a Dicom 3 or Postscript printer.

T207.5 Calibration and Correction Software

The Tenderer shall provide software and documentation for the implementation of the following functions:

*system normalisation and/or calibration
*decay correction
*dead time correction
*randoms correction
*attenuation correction (calculated and measured)
*scatter correction

In addition software shall be provided for to allow the manufacturer recommended routine quality control checks and calibrations to be carried out.

T207.6 Servicing Diagnostic Software

The Tenderer shall provide diagnostic programs and documentation for the analysis of hardware problems affecting the PET Camera, electronics and computer systems. Instructions for running the diagnostics and a full description of each program shall also be provided.

T208 FUNCTIONAL REQUIREMENTS

T208.1 Acquisition of Data from the PET Camera

The Tenderer shall provide full details and specifications of the acquisition system proposed, and any optional configurations, specifically including matters affecting the flexibility and performance of the system.

The Contractor shall provide full and sufficient details of acquisition system operation to enable user-modification of acquisition protocols.

The acquisition system shall incorporate a flexible and friendly user interface for specifying acquisition parameters prior to performing a study. It shall be possible to store multiple sets of acquisition parameters for later use as pre-defined acquisition protocols. Modification of existing pre-defined acquisition protocols shall be a simple operator procedure.

The acquisition user-interface shall permit control of individual camera components such as bed position, transmission source position and (if applicable) rotation speed, prior to and during acquisition.

Dual energy acquisition shall be possible. Energy windows must be selectable under computer control.

T208.2 Control of Bed Position

It shall be possible to control bed movement during acquisition to the extent that:

a) two or more contiguous volumes of the patient can be imaged to produce single whole studies.

T208.3 Control of Transmission Source Rotation Speed

If the PET camera incorporates a rotating pin or road source for transmission measurements, the time of acquisition shall be controllable through the acquisition user interface, so that an appropriate speed can be selected to avoid synchrony between source position and physiological movement such as respiratory or cardiac motion.

T208.4 Performance

The acquisition system shall permit collection of dynamic studies over the complete axial field of view (FOV) at

rates of at least one frame per second. (A frame is defined as one complete data set, typically sinograms for all slices in the FOV). Any limitation on the number of successive frames which can be acquired at this frame rate, and at 10s and 15s per frame, shall be listed, see schedule of technical information. Acquisition memory required to achieve the specifications shall be detailed.

It shall be possible to acquire dynamic studies which consist of multiple (at least three) frame groups, each group having a different frame rate.

It shall be possible to set up and commence a new study immediately after the completion of a previous study. This shall **not** be limited by time taken for transfer or reconstruction of previously acquired data. Where this requirement can not be fully met, the Tenderer shall provide full details of the limitations involved.

It shall be possible to automatically commence reconstruction immediately after all frames of the study are acquired, and preferably as soon as the first frame has been acquired. Such automated reconstructions shall allow the use of the same pre-defined reconstruction parameter sets as non-automated reconstructions.

Through put for whole body studies shall be specified as follows:

- Time taken including all overheads in exteneding/retracting transmission sources/speta for performing a whole body study with measured attenuation correction covering a length of 100 cm and the using recommended clinical protocol. Recommended changes in scan time in line with patient weight should also be specified. Where applicable times for 2D and 3D studies should be specified.

T209 RECONSTRUCTION, DISPLAY AND PROCESSING OF PET DATA

The Tenderer shall provide detailed specifications and the recommended configuration of hardware to perform the tasks of reconstruction, display and processing of static, whole body and dynamic PET data, specifically including matters affecting the flexibility and performance of the system. The Tenderer shall also specify relevant hardware options available (e.g. additional memory, larger disks, graphic accelerators etc) and their costs.

T209.1 General Requirements

Two workstations shall be provided for reconstruction, display and processing of PET data.

Each workstation shall have at least 12 integer, which shall have a CPU and display of at least 512Mb of memory and 40Gb hard disk. All other workstations shall have at least 256Mb of memory and at least 40Gb of hard disk capacity.

Control Room: 1 Acquisition & Processing workstation

One workstation shall be installed in the control room to permit a full range of PET display and analysis functions to be carried out by personnel in this room. Its primary function will be to allow checking of reconstructed transmission and emission slices immediately following data acquisition. However it will also be used for preliminary evaluation of patient studies by clinical staff. It should be indicated whether a separate system is recommendied for routine processing, generating soft and hard copies of the studies for sending to referrers etc.

Reporting Room: 1 Review workstation (Optional)

One workstation shall be installed in the data analysis room. The vast majority of PET data analysis will be performed on these machines. They will be shared by both hospital and external clinical, research, physics and software development personnel.

T209.2 Reconstruction

A suitable software shall be provided for full data reconstruction including accelerated iterative reconstruction.

Full documentation and development tools shall also be provided. For whole body studies, reconstruction should commence as soon as complete data set for first bed position has been acquired and reconstruction of the complete study should be finished no later than 5 min post end of whole body study collection.

Once initiated from a workstation and while in progress, the reconstruction of data shall not interfere with the use of that workstation for any other purpose. If this requirement cannot be met, full details of the non-compliance shall be provided by the Tenderer. (Listed in the Schedule of Non-Compliance).

It shall be possible to reconstruct a sub-region of the transverse Field of View (i.e. zoomed reconstruction)

The reconstruction software shall permit the following corrections: detector normalization, radioactive decay, randoms, dead time, scatter, and attenuation.

The Tenderer shall specify the method used (and quote relevant publications where they exist) for each of the following corrections:

* attenuation
* detector normalisation
* radioactive decay
* "randoms"
* dead time
* scatter
* absolute count normalisation

The reconstruction method options available and options for rebinning 3D data shall be specified.

T209.3 Display

The workstations shall adhere to the following minimum requirements:

The workstations shall be capable of high quality colour and black and white display of at least sixteen (16) 256 x 256 images simultaneously using at least ten bit depth (i.e. 256 colours/grey shades). The time taken to fetch (over the ethernet) and display 16 256x256 images shall be stated and shall not exceed 10 seconds.

T209.4 Processing

The system shall incorporate a systematic naming system for patient-related data files, including raw data, reconstructed images, curves, regions of interest, and blood files. The patient data-base shall enable any patient data to be located easily. It shall provide a list of matches to a user-specified patient name string, from which the user can select the desired data file.

Patient data file names up to at least 12 characters in length shall be permitted.

The system shall allow sorting of patient studies of different types to be kept in separate directories.

The user shall have flexible interactive control over image selection, and full independent control over the display parameters for each displayed image, including position, size, colour maps, size and position of text legends, region of interest overlay, smoothing, interpolation, and pixel thresholding.

The workstation software shall include tools for three-dimensional (3D) manipulation of reconstructed volumes. In particular it shall be possible to produce from already reconstructed data, slices in any desired plane, and planes orthogonal to that plane.

The workstation user shall be able to easily define circular, elliptical, rectangular and irregular regions of interest (ROI's) using a graphical input device: mouse or digitised drawing table. It shall be possible to define regions of interest on saggital and coronal slices, as well as transverse slices. It shall be possible to define as one region of interest up to six non-adjacent irregular areas within the same slice.

Regions of interest shall be able to be stored in disk files, permanently associated or identified with the

corresponding image data. Any limitations applying to the definition of ROIs shall be detailed by the Tenderer in Schedule of Technical Information.

The workstation user shall be able to display statistical summaries of ROIs. Examples are voxel volume, total activity, mean activity per voxel and per cubic centimetre, standard deviation etc.

Immediately following definition of ROIs, a workstation user shall be able to generate and display time-activity curve(s) for all ROIs simultaneously. The software shall incorporate an option to store the time-activity curves in one or more ascii files for export to and further processing by other software packages.

The workstation software shall permit synchronized display of at least four cines simultaneously. The user shall have full control over the playback rate, whether colour or monochrome, and thresholding during playback. It shall be possible to store cines in disk files for later re-display.

The workstation software shall include the capability to display 3D recostructed images in transverse, saggittal and coronal slices simultaneously, together with reference images and markers showing the anatomical position of the slices displayed. Selection of slices shall be interactive.

The PET shall be capable of providing SUV (Standard UptakeValue) analysis and allow the displayed images and colour bar to be calibrated in SUV values.

The Tenderer shall provide full details of the patient data base, and patient file naming conventions.

T210 ON-LINE ACCESS TO CURRENT PET DATA

The Tenderer shall provide full details and specifications of the hard disk storage subsystem proposed and any optional configurations, specifically including matters affecting the flexibility and performance of the system.

T210.1 General Requirements

The system shall be equipped with centralized on-line hard disk storage totalling approximately one 36 gigabyte for the storage and shared access to the system and application software and recent patient data. All software and data shall be easily, transparently and directly accessible (i.e. without the need to transfer it first) at any workstation regardless of where it is physically stored on the system.

T210.2 Performance

The hard disk storage subsystem(s) shall have an average seek time not greater than 30 ms and a peak transfer rate of not less than two Mbytes/second.

T211 ARCHIVAL AND RETRIEVAL OF DATA AND SYSTEM SOFTWARE

A distinction is drawn between the archival of system and patient data. The optimal hardware for each may differ. System backups require a copy of the entire system, that is **all** files, to be made as quickly, and with as much security, as possible. In the event of disk failure, the priority will be to restore the current system backup as quickly as possible. In most cases the entire backup will be required, rather than selective access to individual file(s). However, access to individual files is also a requirement. A magnetic tape drive based on helical scan video technology is an example of an acceptable system archival device.

Archival of patient data, and retrieval of previously archived patient data, will be performed frequently as a matter of routine. Priorities include reliability of the backup media, shelf life, and speed of access to desired archived patient data sets. A direct access device, such as an erasable optical disk drive, is an example of an acceptable device for patient data archival.

Archival operations shall not interfere with the utilization of the system. For example, it shall be possible for the system to remain completely operational while backup/restore operations are in progress. In particular, an archival operation instituted from a workstation shall not, while it is in progress, interfere with the utilization of that or any other workstation for other tasks.

T211.1 PERFORMANCE OF SYSTEM ARCHIVAL DEVICE

The system archival device shall use media with a formatted capacity of at least 1.5 GB.

The Tenderer shall supply details of the time required to backup (and, if different, restore) the hard disk subsystem in the Tenderer's recommended configuration, assuming its capacity is 15 GB.

T211.2 Patient Data Archival Device

The device for archival of patient data shall use storage media with a capacity of at least 1.5Gbytes. The storage media should be reusable and have a guaranteed shelf-life of at least ten years.

Data shall be directly accessible. The device shall have a transfer rate of at least one megabyte per second.

T212 HARDCOPY DEVICES (Dicom3 print compatible) and Postscript Printer)

T212.1 PET Image/textual/graphical data

It shall be possible to obtain a hard copy of any information displayed on the workstation screens:

a) in monochrome on 8 x 10 inch X-Ray film
b) in colour on thermal paper or plain paper

T212.2 Computer Printouts

The system shall be equipped with a Laser printer and shall be a postscript-compatible and **to be priced separately.** This printer shall be quiet in operation (60 dB).

The Tenderer shall provide full specifications of the printer offered.

T213 SUPPORT FOR ETHERNET AND MODEM COMMUNICATIONS (Optional)

Ethernet

The PET host computer shall be equipped with all hardware and software necessary to enable it to be connected via 100 Based T ethernet to existing hospital network in a WAN, VPN or VLAN environment.

The hardware to be supplied shall include:

* Patch leads PET host computer departmental network outlets or hub specified below.

* An ethernet interface for the PET host computer.

* 10/100 BaseT hubs or switches to with sufficient ports to allow interconnection of all computers supplied with this tender

Standard Modem

The system shall be equipped with an asynchronous Telecom permitted modem to allow dial-up access to external computer systems for electronic mail, telex and general computing services. The modem shall be capable of operating over normal Australian Telecom telephone lines at 19200, 2400, 1200 and 300 bits per second.

The Tenderer shall provide full specifications of all ethernet and modem hardware offered.

T214 ADDITIONAL OPTIONAL ITEMS

T214.1 Additional Workstations

The Tenderer shall specify the unit cost per additional workstation which shall include the hardware and software necessary to interface this workstation to existing hospital network.

T214.2 Advanced Display Hardware & Software

The Tenderer shall specify the unit cost per additional high performance hardware/ software suitable for use in conjunction with the offered workstations.

T214.3 Additional Patient Data Archival Device

The Tenderer shall provide as an option the cost of an additional identical patient data archival device to permit simultaneous retrieval and archival of patient data(eg: dual drive).

T214.4 Additional Memory

The Tenderer shall provide the costs of optional additional memory increments for the host computer acquisition system(s) and workstations up to the maximum memory permitted.

T215 INSTALLATION OF EQUIPMENT

T215.1 Generally

The co-ordination of the installation, the supervision of the installation and the testing of the completed installation shall be carried out by the Contractor under the supervision of the Principal or his representative.

The Contractor shall at the direction of the GAO Supervising Officer supply any information requested for the design and construction of the building within 10 working days of such a request.

The Contractor shall prepare a detailed schedule of installation which shall be approved by the Principal prior to the commencement of work on site.

All costs incurred in the delivery and installation of the PET camera and associated equipment shall be included in the tender price.

The Contractor shall make good all work disturbed.

Any signs or placards pertaining to the safe operation of the equipment shall also be provided by the Contractor.

The Imaging and operational performance of the system as installed shall be the sole responsibility of the Contractor. The responsibility for quality control in planning and preparation which may effect the imaging and operational performance remains under all circumstances that of the Contractor.

The Contractor is to provide approved floor covering to protect the floor surfaces from damage during installation of the equipment.

T215.2 Access to Camera Room

The Tenderer shall state the proposed means of access for installation. The Tenderer shall determine the extent of the disruption of the existing services caused by the new works. The disruption of the normal operations of the occupier shall be kept to a minimum.

T215.3 Electrical Work to be included

The Tenderer shall allow in the installation cost for the following electrical work to be carried out:

(1) The PET Camera Room is classified as Body Protected Area as defined in Australian Standard AS3003-1985. All equipment installed in this area shall meet the requirements of the above standard for that type of area.

(2) The PET Camera room(s) shall have a separate temperature alarm if required with separate thresholds for alarm and power trip. The power trip switch shall switch off all power to the CPU, electronic cabinets, fast array processors, disc drive, etc., if the temperature in these devices exceeds the normal allowable operating limits.

(3) Supply and installation of all cable enclosures or cable trays as necessary.

T215.4 Testing

The testing shall be in accordance with the Department's testing procedures, together with the recommended testing procedures of the equipment manufacturer. Tenderers are to indicate separately what their standard test procedures are.

The successful tenderer shall supply and provide all necessary instruments/equipment and phantoms required or specified for the tests as required. The instruments shall have recently been calibrated (certificate required) and the contractor shall supply all incidental labour as may be required to assist the Department in the testing procedures.

The phantoms required for the continued calibration and evaluation of the equipment are to be left on site with the equipment and included in the tender price.

T215.5 Supply of Consumables

The contractor shall provide an initial supply of consumable items for printers, hardcopy devices, disks and tapes, sufficient to make the system operational: testing, commissioning, initial backup, etc. The contractor shall also provide sufficient details of suppliers/ manufacturers and their Australian distributors of these items to enable additional supplies to be ordered by the Hospital(s).

T216 INSTALLATION, BUILDING AND OTHER SERVICES

All necessary site works in regards to the preparation of the available areas to accept the new equipment shall be carried out by others.

All structural supports for equipments, the provision of electrical supply to an isolating switch and air conditioning system will be provided by others. Cable ducting should be utilised where possible, otherwise the Contractor shall provide all other ducting, cable trays and conduits required.

The room layout, available space and restrains on capacity of the air conditioning facilities can affect the installation of some models of the equipment.

The Tenderer shall submit with the tender documents a proposed layout of the equipment offered and all the information in regard to:

- electrical power requirements (loading, line resistance, location of outlets)

- air conditioning (heat loading of all individual items of the equipment.

- recommended cable ducting routes.
- Any other specialised services required.

The successful tenderer shall fully co-operate with other contractors and sub-contractors during the installation of the equipment.

T217 TRAINING AND TUITION

Tenderers are to indicate what training they are prepared to give operating staff. This shall include at least an initial (1) week period of operator training and at least two days follow-up of full time attendance by an application specialist with a program of training to make sure that the operators know how to achieve the best results with the equipment.

Tenderers shall submit detailed proposals of the training programme, which must at least cater for the following personnel:

(i) One (1) nominated technologist
(ii) One (1) nominated physicist.
(iii) One (1) technical support engineer.

T217.1 Factory Training (Optional)

The tenderer shall further submit a seperable price (to include all travel, accommodation and other associated costs) for the training of the personnel listed below at the manufacturers factory/ training centre, to allow them to do first-line evaluation of faults, to allow the flexibility of modifying/changing progams/protocols,etc. The tenderer is to give a detailed outline and their aims of the courses available, the time taken to complete them, and the timing/availability of these courses.

(i) One (1) person for software & system development training
(ii) One (1) person for instrumentation training
(iii) One (1) person for technical support

PET/CT SCANNER

T300 DEPARTMENTAL STANDARDS

The equipment, where applicable shall be in accordance with the relevant SAA codes. (At least the following; AS3003, AS3200, AS1894, AS2064, refer also to clause PJ-01). The equipment shall be suitable for use in (BODY PROTECTED AREA) procedures.

Items not included or specified in detail in this Specification but required for the proper functioning of the equipment, shall be included, (listed and priced separately but the amounts included in the lump sum tender price), and shall be of type and quality generally accepted as standard in high level organ imaging work for the procedures indicated below under T102.

The equipment shall be essentially from the same manufacturer and be of known and proven reliability and durability under high workload conditions experienced in major teaching hospitals.

In order that the Principal may assess alternate offers, the Tenderer is requested to complete for each alternate offer and return with his tender all REQUIRED INFORMATION as specified in the schedules.

> NB: In providing this information the Tenderer's attention is drawn to the listed test conditions, which are required to allow meaningful inter-comparison. Should alternative conditions of measurement be recommended for routine use, a second set of data may be supplied for the different conditions. Preferably data should be confirmed by measurement on a system installed at a hospital site (with no commercial link to the Tenderer), but must at least be confirmed on a working (prototype) unit.

The tenderer must give a full response to all points of the specification, sufficiently clarifying all aspects and issues addressed in this document including the **cost benefit analysis (enhancement features)** in Clause E117

T301 EQUIPMENT TO BE SUPPLIED

This part of the work shall be for supply, installation, testing and maintenance of a whole body, high performance, integrated Positron Emission Tomographic and CT Scanner (PET/CT) which shall be able to be upgradable to take advantage of new software/hardware innovations.

The reliability of the PET/CT Scanner, the quality of the images, the ability to handle very sick and injured patients quickly and easily, the degree of user friendliness in operation, as well as the availability of flexible protocols are factors that are regarded as of the utmost importance.

The supplier shall be well established in Australia, with a credible service organisation having a proven record of satisfactory maintenance of their installed base, with High Tech medical equipment: eg. CT/MRI Scanners, PET/CT Scanners or other complex radiological equipment.

Documentation supporting the nature of the service organisation is to be supplied by the tenderer and will be taken into consideration when tenders are evaluated.

It should be possible for a representative of the Department to review a site with the equipment offered, preferably working in a clinical setting.

A list of all the PET/CT Scanners supplied and installed by the tenderer together with the name and address of the operator of each Scanner, to whom a Department representative may refer for information shall be provided.

The tenderer shall provide a commitment for the upgrading of the PET/CT Scanner, both in software and hardware for a five years period after the PET/CT Scanner has been installed and its warranty (DLP) period expired. Upgrades shall be implemented within 3 months of the upgrades being released for international use. This will be undertaken from resources within the Contractors own organisation, and not by any subcontracting arrangement.

T302 PERFORMANCE OF EQUIPMENT

The whole body PET/CT Scanner shall be suitable for carrying out routine 3D clinical investigations on both adults and children, research application and all other hospital's PET/ CT scanning needs, which may include the following:

- Scanning intensive care patients
- Whole body studies for oncology patient and radiation thereapy studies
- Brain studies for tumours, dementia and epilepsy
- Cardiac viability studies

T303 PET/CT SCANNER - GENERAL

The equipment to be supplied and the work to be carried out shall be in the quantities specified and as described herein and as listed in the Schedule of Prices.

All charges relating to optional items shall be included in the price of the options listed in the Schedule of Prices.

The price of optional items should not be included in the Lump Sum Tender Price.

The PET/CT Scanner shall comprise at least the following:

* Integrated gantry containing slip-ring design CT X-ray tube, HT tank and muti-slice detector, PETdetector rings of BGO or LSO crystals or GSO
* Patient couch & accessories
* High Speed acquisition electronics
* Computer hardware and software necessary for data management acquisition, reconstruction, review, analysis and software development
* Operator integrated console/workstation with multitasking capabilities, HD storage, archive storage and Ethernet network connections
* Complete set of standard NEMA NU2 test phantoms;

* Associated equipment:(Optional)
  - (a) ECG gating device for acquisition of ECG gated studies
  - (g) Optical disk drive (MOD)
  - (h) Laser filming, colour hardcopy and optical disc storage
  - (i) Dry Laser Imager
  - * Dicom 3 standard (to be priced separately under table of options))
  - * PET DICOM connectivity (Query, Retrieve, Send, Receive)
  - * Integrated DICOM connectivity for MR and CT
  - * DICOM Print
  - * DICOM Modality Worklist
  - * DICOM Secondary Capture
  - * HIS/RIS interface

T304 PET/CT SCANNER

T304.1 GENERAL REQUIREMENTS

The whole body PET/CT Scanner is a combined-modality imaging required for use in clinical and research PET applications. The supplied system shall permit routine 3D clinical studies and other research application. The PET/CT system shall be applicable for imaging all PET tracers to provide quality images and high throughput and shall include the following tools and functions:

- Patient scheduling and data entry
- View, analyse and QC of integrated PET/CT data

- Archive and networking control
- Modality worklist
- PET and CT daily QA/QC
- Performance manager for PET and CT
- Image fusion of PET/CT

Systems may be offered under three levels, based on the CT capabilities of the system:

- Low end PET/CT system with a CT Scanner meeting the Level R specifications (T100 to T104.37)
- Mid range PET/CT system with a CT Scanner meeting the Level P specifications (T100 to T104.37)
- High end PET/CT system with a CT Scanner meeting the Level M specifications (T100 to T104.37)

The PET component of the PET/CT Scanner shall comply with the general requirements for PET scanner specified in T200-T217 and with the NEMA specification requirements of Clause T304.2 with the following exceptions:

- Positioning lasers (T204.5) – triple axis lasers shall be supplied which indicate the slice location of the CT. Lasers delimiting the axial FOV of the patient are desirable, but not essential. It shall be possible to define the scan range for PET on the topogram (scout) view of the CT.
- Transmission Source (T204.7) – separate transmission sources are not required, provided attenuation correction for all studies can be accomplished using the CT data.
- T208.3 does not apply.

- In addition to the general requirements for computer system of PET scanners, the following requirements shall be met:
    - Speed, memory, hard disk capacity and archive capacity shall be commensurate with the large data volumes associated with PET/CT studies. The number of whole body patient studies (covering 100 cm) which can be stored on the system shall be indicated.
    - Display monitor: 21" CRT high resolution or 18" LCD.
    - If multiple computers are used for PET/CT acquisition and reconstruction, specifications for each system shall be provided.
    - Multiple computer systems shall interoperate seamlessly. Method of controlling CT and PET acquisition and reconstruction shall be specified (eg from a single monitor/key board, multiple monitors key/board etc).
    - Any limitation on commencing PET acquisition before CT reconstruction is completed shall be stated.

- The CT shall be able to be used for attenuation correction of all PET studies performed on the scanners. Any limitations on using CT data for attenuation correction shall be stated.
- Accurate alignment between CT and PET field of view is required for fusion of PET/CT. Accuracy of alignment and any deviations due to patient table flexing for heavy patients shall be stated.
- Positioning aids shall be provided to minimize patient motion between the CT and PET parts of the study.
- Complete PET/CT whole body study times for a scan covering 100 cm and for patients weighing 70kg and 120 kg shall be stated based on the recommended protocol for the scanner.

The CT component of the PET/CT Scanner shall comply with the specification requirements of Clause T100 to T104.37 of the CT Scanner Period Contract No. 0701527 for the 3 levels of CT scanner except for the following:

- CT scanner and data acquisition/processing is to be integrated with the PET scanner
- The operators console shall meet the requirements for acquiring and processing PET/CT studies
- Only software required for the performance of the full range of PET/CT scans is required to be included. Other specialized CT software available shall be quoted as an option. (Note: Some PET/CT scans may involve administration of CT contrast media. CT software and protocols which facilitate contrast media imaging and standard PET/CT software shall be included).

T304.2 PET/CT Performance Requirements Summary - NEMA Testing standard

The PET performance shall comply with the requirements of Table T205.8

BONE DENSITOMETER

T400 GENERALLY

This part of the specification outlines detail requirements for the supply, installation and acceptance testing of a Bone Densitometer Unit.

The equipment shall preferably be designed on a modular pattern (internally) which will enable the whole unit to be free-standing, compact and self-contained. The unit shall be constructed in a manner, which allows it to be upgraded at a future date, to take advantage of improvements in technology and or to add additional facilities to those currently specified or specified as options.

All equipment shall be suitable for use in Class BF procedures.

Patient isolation shall be such that with all sensing electrodes and or transducers attached to the patient, the patient is adequately protected against electric shock under normal environmental conditions. Tenders shall state how patient isolation is achieved and they are to indicate the amount of isolation under normal conditions. All equipment shall conform with the current AS3200 series in all respects, plus any other relevant Australian Standard Code. Testing to demonstrate compliance with these standards shall be carried out and reference may be made to AS 3551.

The equipment shall be essentially of the same manufacture and be of known and proven reliability and durability under high workload conditions experienced in major Australian hospitals (or equivalent).

Items normally provided with separate plug (such as computers etc. **)** shall plug internally into a receptacle which in turn uses a single mains cord of minimum length 3 metres to the General Purpose Outlet. (Attention is drawn to the earth resistance requirement from the GPO to the unit). All mains supply flexible cords shall be fitted with transparent plugs to facilitate inspection of the earthing connection.

T401 COMPLIANCE

Equipment chosen for purchase must have been Type Tested to Australian Standards.

All medical equipment purchased by the Hospital must comply with AS3200. 1-1990 and associated Part Two Standards. To confirm compliance, all equipment purchased must be supported by appropriate documentation.

The documentation should take the form of:

1. A Type Test Report from an Australian NATA certified Test Laboratory indicating compliance.
   or
2. A Certificate of Compliance from Quality Assurance Services of Standards Australia licensing the use of the Type Test label for A53200. 1-1990 and associated Part Two Standards where applicable.

Compliance may also be recognised with a Certificate of Compliance with 1EC60 1.1-1988 and its Part Two Standards where applicable from a Recognised Test House provided the equipment is also tested against the additional requirements of AS 3200.1-1990 (“Appendix Z”) by an Australian NATA certified Test Laboratory or a Recognised Biomedical Engineering Department. Tests shall have been carried out with a supply voltage of 240 volt *+1*- 10% and 50 Hz.

Where "Hazard Alerts", both Australian and International, have been raised, copies of these alerts shall be provided with the tender documents. The action taken to remedy any such Hazard Alert shall also be included with the tender documents.

Where the equipment (or any part or accessory) has been subject to regulatory action or ban by any authority in any country details shall be provided with the tender documents.

T402 PERFORMANCE OF EQUIPMENT

This tender includes the supply, delivery, installation and commissioning of the following equipment:

Automatic Whole Body Fan Beam Bone Densitometer complete with computer analyser system.

Automatic Pencil Beam Bone Densitometer complete with computer analyser system.

The equipment provided shall be complete with accessories as required for the proper operation of the equipment as specified in this document. It shall be suitable for use in the Nuclear Medicine Department of various hospitals.

The machine shall be capable of scanning sections of the spine (both AP and lateral), femur, areas of interest over the whole body region.

The Tenderer shall supply details on the following:

manual selection of regions for analysis.
method used to compensate for various patient thickness.

T403 EQUIPMENT TO BE SUPPLIED

The equipment to be supplied and the work to be carried out shall be in the quantities specified and as described herein and listed in the Schedule of Prices.

Items not included or specified in detail shall be of a type and quality generally accepted as standard in Nuclear Medicine Departments particularly of major NSW hospitals.

The first type of Bone Densitometer shall use a fan beam and an array of detectors that moves linearly over the patient and at varying distances from the x-ray source.

The second type of Bone Densitometer shall use a well collimated pencil beam and a single detector which moves in a rectilinear motion over the patient.

The Tenderer shall provide full details of the construction and mode of operation of all of all densitometers offered.

Dual detector system may be offered and full details of the technical specification shall be provided.

The Bone-Mineral Densitometer shall produce images of the bone structure of the whole skeleton and of the lumbar spine and proximal femur of patients. It shall enable the density for sub-regions of the whole skeleton, for individual vertebrae and for the femoral neck and Ward's Triangle regions of the proximal femur.

T404 BONE DENSITOMETER

The Bone Densitometer to be supplied under this Contract shall be a robust, stable, high quality machine, and shall have a dual energy x-ray source by using a filtering system. The output shall be detected and connected to a computer based processing system.

The Bone Densitometer supplied shall be capable of scanning the total patient body and or a predetermined section of the body such as the spine/femur and other regions of interest at varying distances from the x-ray source.

The Bone-Mineral Densitometer shall meet the following specifications:

Scanning Times

The times given below shall be the maximum scanning times for the acquisition of high resolution scans giving the precision listed below:

T404.1 Beam	**Fan**	**Pencil**
Lumbar spine BMD in the AP projection	1 minute	2 minutes
Proximal femur BMD	1 minute	*5* minutes
Total body BMD	*5* minutes	6 minutes

T404.2 In-Vivo Precision

In this tender, precision of BMD measurements shall mean the coefficient of variation of repeated measurements on a group of individuals, expressed as a percentage; precision of vertebral morphometry measurements shall mean the standard deviation of repeated measurements on a group of individuals, expressed in millimetres. The Tenderer shall state the number of individual studied to estimate the precision, together with the range of BMD values of these individuals.

The precision values given below shall be the minimum precision in-vivo using the scanning times listed above (ie. the tendered system shall not exceed these values).

Lumbar spine BMD in the AP projection	*1.0%*
Lumbar spine BMD in the lateral projection	*1.5%*
Proximal femur BMD	1.0%
Total body BMD	*0.5%*

T404.3 Energy Minimum Requirements

High Level:	70 keV
Low Level:	38 keV

The tenderer shall state the type of filter used and the sampling rate. The system must incorporate an X-ray generator, the tenderer shall state the X-ray tube mA of the system offered, where switched, both levels shall be supplied. Variable scan speed modes must be utilised. Tenderer to supply details.

T404.4 Detection System

Dual detection system complete with photo multiplier tubes or solid state detectors shall be fully described in the technical data with tender documents.

T404.5 Computer System

The acquisition/analysis system shall be fully integrated with the bone densitometer and shall enable data acquisition, processing and archiving of patient studies.

The Tender shall provide full details of the acquisition/analysis system. This system shall at least include the following:

T404.6 Processor	Pentium based with minimum 256 Mbyte of memory as required to provide the necessary system performance
Operating System	Windows based
Hard Disc Capacity	40Gbyte
Tape Backup	600 Mbyte Minimum (optional)
Keyboard	Standard alphanumeric keyboard complete with special function keys
Archival	MOD data archival system (windows compatible, to be network hospitals' archival system)
Display	High resolution colour display Minimum image size 15" LCD The shall be free of astigmatism and flicker

The colour monitor shall be able to display simultaneous images and alphanumeric data. It shall be able to display all acquired images as contiguous images together with the results of the data analysis.

T404.7 Report Generation and Printing

Easy report generation of the results. Simple interface with patient demographic data.

T404.8 Software

The analysis software shall enable the density of the bones to be computed and displayed for sub-regions of the whole skeleton, for individual vertebrae and for the femoral neck and Ward's Triangle regions of the proximal femur. The software shall utilise automatic bone-edge detection to minimise operator variability in the analysis. The results shall be displayed numerically as bone mineral content (g) and as bone mineral density (g/cm²). The results shall be compared to an age-dependent normal population and expressed as a Z-score (number of standard deviations away from the mean of the normal population). A graphical representation of the BMD value as compared to the normal variation shall be available.

The Tenderer shall provide software to analyse the morphometry of the lumbar vertebrae from a lateral scan of the spine. The results shall include the anterior and posterior heights of each individual vertebrae, and vertebral wedge parameters and shall be compared to similar results in a normal population.

The Tenderer shall state whether age-dependent normal ranges are available for both sexes for all scan modes supported, and shall state the number of individuals in each age range for these normal ranges. The Tenderer shall state whether the normal data was obtained from measurements on the Australian population, and, if not, shall state the countries and racial groups included in the normal population.

Software to be supplied shall enable the following studies to be carried out:

1. Whole Body
2. Spine
3. Neck of Femur (including "Wards Triangle" and "total femur")
4. Calculation for body composition including total body lean and fat mass

5. Comparison with normal age patients
6. Patient sequential data measurements relating to time
7. Graphical results of acquired data.
8. Orthopaedic software
9. Paediatric software
10. Small animal software
11. Lateral spine including BMD & morphometry
12. Research Software

Tenderer is to state precision and accuracy for each scanning mode. A graphical display of results compared with age to match normal data should be available.

The Tenderer shall state the database language used for the database of patients and scan results, database query software shall be provided with the system.

T404.9 Additional Software

The unit shall come complete with built-in diagnostic fault finding software aids. DICOM 3 compliance shall be a standard requirement.

T404.10 Scanning Speed

The system shall have a variable speed selection from at least 0 to 50 mm/s.

T404.11 Drift and Reliability

The Tenderer shall include details regarding the drift with time of the absolute bone-mineral density as measured by the densitometer and the method used to check the densitometer in the field for drift.

It is required that the BMD values obtained with the test phantom shall not drift outside manufacturer's specification within a period of 3 months after an initial alignment.

If a Tenderer' s bone-mineral densitometer is not able to meet this requirement then the Tenderer is to state the period for which the densitometer will remain within specification.

T404.12 Scan Area

The scan area shall be at least 1800 mm by 600 mm.
The system reconstruction time shall not exceed 30 seconds using a matrix size of
256x 256 and a scan speed of 400mm/sec for a scan.
The system shall incorporate a laser positioning system with automatic centering.

T404.13 Patient Support System

The Tenderer shall state the dimensions of the patient couch, and shall state the maximum height of a patient that can be successfully scanned in the whole-body mode. The tendered couch shall be designed for not less than a 130 kg patient.

The Tenderer shall describe all additional patient support or positioning devices provided for the specified scan modes.

T404.14 Patient Data

The tenderer shall supply full data and the method used for patient archival and retrieval for the system being offered.

Minimum requirements: -

(a) Patient name
(b) Patient Hospital ID Number

The system should be able to display chronological results of sequential measurements carried out on the same patient.

System must incorporate a patient management system. Full details to be supplied.

T404.15 Long Term (Archival) Data Storage

A patient archiving system, comprising a Magneto Optical Drive (MOD) with a minimum capacity of 600 MBytes, **a** simple archiving/retrieval protocol and a non-proprietary database.

The tenderer shall supply the MOD archival system for long term patient data storage, full technical data shall be supplied with the tender documents.
Additional information as to the average speed of retrieval for this device is required and the projected life of the storage medium used is to be stated.

T404.16 Quality Control

The system offered shall be equipped with quality control software. The tenderer shall provide data on the system used in the tender documents.

T404.17 Radiation dosimetry

Full radiation dosimetry details to be supplied for both patient and operator.
Preference shall be given to a low dose system.

T405 HARD COPY FACILITY

The tendered system shall provide hard-copy output, which includes the patient identification, an image of the acquired scan, a graphical representation of the BMD value as compared to the normal population and the numerical values of the BMD and Z-score.

The Tenderer shall state the typical print time using the supplied printer and shall state whether further acquisition or analysis can be performed during printing of the report. The Tenderer shall provide examples of the hard-copy output, using the tendered printer, for each of the supported scan modes.

The tenderer shall supply and interface the unit to a laser printer (600 DPI) and shall detail connections to the following optional devices (Dicom print capability is required):

1. Video Printer
2. Colour Printer (inkjet or similar)
2. Film printer for lateral views

T406 TEST PHANTOM

The Tenderer shall supply a test phantom which gives BMD values similar to those found in an AP projection of the lumbar spine. The Tenderer shall provide a calibration certificate for the test phantom, stating the BMD values of the supplied test phantom, obtained at the time of manufacture. The BMD values obtained with the test phantom at the time of installation shall differ from the values given on the calibration certificate by no more than *0.5%.* The coefficient of variation calculated from repeated measurements of the bone-mineral density of the test phantom shall not exceed 0.5%.

The tenderer shall supply full technical data and cost covering delivery etc. of all available test phantoms with the tender offer.

T407 ADDITIONAL PACKAGE

The tenderer shall provide with the tender documents a radiation survey of the unit offer.
Data supplied shall include the following:

(1) The model and type of phantom used.
(2) A scatter pattern of the radiation output and maximum output at 1000 mm from source.
(3) The model and type of test instrument.
(4) Compliance to what international radiation standards.
(5) A system isodose curve may be supplied
(6) The tenderer shall state that radiation shielding is required.
(7) Internet ready and encryption data shall be provided

The Tenderer shall list any additional scan modes (eg. forearm) that would be supplied with the bone-mineral densitometer, and shall further list any additional scan modes that may be optionally purchased.

T408 FURTHER ACCESSORIES AND CONSUMABLE SUPPLIES

The Tenderer shall submit a list (including description and price) of accessories and consumable supplies required for day to day operation of the equipment and recommended for stock holding by the hospital.

T409 SPARE PARTS

The tenderer shall detail the service capability of the company for these units, the number of local and overseas trained service personnel on the system being offered. Details regarding spare parts held in the tenderers Sydney Office must also be provided with the tender, specifically the detector, X-ray tubes and printed circuit boards.
The Tenderer shall submit a list (including description and price) of spare parts recommended for stock holding by the hospital for maintenance of the equipment by the Biomedical Engineering Department.

The Tenderer shall-

Indicate the usual location of spare parts,
Provide an indication of Australian inventory of spare parts,
State any encumbrances upon spare parts.
Indicate the cost of service contracts for all units offered. (Refer Schedule of Operational Maintenance).

T410 SPECIAL TOOLS

Where tools not readily available or devices such as simulators or extender boards and cables, are required for calibration or maintenance, these shall be listed on a separate page and included as accessories in the tender price.

T411 ONGOING TECHNICAL SUPPORT

The Tenderer shall provide a technical information service to the Hospital's Biomedical Engineering Department throughout the life of the equipment. This service shall supply full technical information in writing concerning upgrades, faults or hazards for the hardware and software offered as soon as they are known to the Tenderer. This service shall be provided irrespective of the 5 year OPM being taken up or not. The charge for this service (if any) shall be stated.

The Tenderer shall note the requirements of this tender regarding the supply of hardware and software upgrades.

T412 TRAINING

The contractor shall provide in-service training, sufficient to ensure staff on all shifts are fully conversant with the operation of the hardware and software.

The Contractor shall provide technical training for the staff of the Biomedical Engineering department during installation and commissioning and during the Defects Liability Period sufficient to ensure that the department can provide full technical support at the end of the Defects Liability Period.

T413 REPAIR FACILITIES

The Tenderer shall indicate the location of repair and calibration facilities for the equipment offered. (Sydney is the preferred location).

T414 EXAMINATION OF EQUIPMENT

Refer to Clause B111.

T415 SOFTWARE UPGRADES

Software upgrades for features and options included in this contract shall be provided (at no extra charge) as they are released in Australia for the full duration of the DLP.

They shall also be included as part of the comprehensive 5 year OPM

The Tenderer should state the design features of the unit which relate to the desired benefits of upgradability and extension of the top-quality performance of the unit as this quality is preferred.

The Tenderer shall demonstrate a history of hardware and software upgrades to protect against future obsolescence.

T416 INSTALLATION OF EQUIPMENT

The Tenderer shall allow for:

- all cabling and wiring from the provided power isolating switch to the unit and all interconnections between its subcomponents
- final conection of x-ray warning lights to operate when x-ray radiation is produced

All interconnecting cables shall be installed in skirting ducts or vertical risers. Tenderers are requested to check further details of the facilities on sites

The Tenderer should nominate the steady state heat output, the operating temperature and relative humidity limits. Should this information or the Tenderers recommendation as to the suitability of the environment involve further costs, these costs shall be considered when evaluating the tenders. The attention of the Tenderer is drawn to evaluating the existing environmental conditions provided and requesting any modifications, before confirming the

Tender price.

One copy of the factory calibration results obtained with the test phantom plus acceptance, final test results shall be handed to the Hospital's representative on completion of the installation.

T417 EQUIPMENT INFORMATION

The Tenderer shall supply sufficient technical data to enable a full evaluation of the equipment to take place. The Tenderer should address each clause number in turn responding to requests for information. The Tenderer should show the clause numbers in the response documentation and in the Schedule of Non-Compliance.

The information requested by clause T308 of all available accessories, disposable and other options (including those for the equipment tendered) should be listed and priced on a separate page. Sufficient information shall be supplied to enable the simple inclusion and deletion of these items without vitiating the tender offer.

T418 COPIES OF TENDER

Two copies of the tender documents (including schedules, letters, comments and brochures etc. **)** shall be provided. One copy should be labelled "Original

CYCLOTRON

T500 GENERAL

This part of the tender document outlines the technical requirements for the medical cyclotron equipment as used for PET isotopes production.

The equipment offered through this tender would be selected to form a Period Contract arrangement to facilitate purchase of such units by various hospitals.

The offers submitted will provide basis for selection of suppliers of the above mentioned equipment / systems to form a 48 months Standing Offer arrangement, facilitating purchase of such items by various hospitals. Specifics of the Standing Offer Agreement are detailed under Part D of the Specification

In addition, this tender also requests for submission of the offers for an Operating Lease of the offered equipment. For details refer to the Operating Lease facility in Annexure 1 Part B of this document

Items required: **Shielded Cyclotron**
Unshielded Cyclotron

The equipment to be supplied and the work to be carried out shall be in the quantities as described herein and as listed in the Schedule of Prices of this tender document. All optional items shall be listed and priced separately in table of Options in the Schedule of Prices.

The offered equipment is to be of a type and quality generally accepted as standard in a modern Nuclear Medicine department. Its design and type shall be of proven reliability and durability under high workload conditions.

T501 CYCLOTRON - GENERAL

The Cyclotron operation shall be based on compact negative ion principle, which features a vertical mid-plane and accelerate protons and deuterons, producing radiation output in the megavoltage energy range.

The Cyclotron shall be a low-cost facility dedicated to the production of PET tracers, and therefore tenderers should limit their proposals to a small cyclotron capable of accelerating protons to an energy in the range 9.6 MeV to 17 MeV and deuterons to an energy in the range 5 MeV to 8.5MeV. Beam current should be at least 50μA. The cyclotron shall include a target auto changer to handle at least six targets (appropriate target assemblies for the production of positron-emitting tracers) and a number of automated chemical syntheses for labelled compounds.

The PET isotopes production by the cyclotron shall include: fluorine-18, oxygen-15, nitrogen-13 and carbon-11. These isotopes are automatically transferred to the radiochemistry processing systems for conversion into finished radiotracers.

Equipment design concept shall be such that radiation exposures to operating personnel from leakage or from induced radioactivity (if any) in system components and accessories are minimised and under no circumstances exceed the relevant dose equivalent limits outlined by International Commission of Radiological Protection, and as accepted under the Radiation Control Act (NSW).

The Radionuclide Production Facility should include at least the following equipment:
- Cyclotron core system and shielding
- Cyclotron target assemblies with auto-changer system
- Automated Radiochemistry systems for the synthesis of specified tracers
- Computer control system
- Target Assemblies & Autochanger
- Accessories:
    - 4 lead- shielded hot cells

- Standard radiopharmaceutical equipment for quality control
- Radiation Monitoring equipment
- Quality Control equipment
- Lab Fit-out

The submitted Lump Sum Tender Price must include all of the above. Additional radiopharmaceutical systems and target assemblies may be proposed as optional extras. However, the equipment supplied shall be capable of providing at least the four most commonly used positron-emitting isotopes as those listed in Clause T501 in sufficient quantities to meet the requirements of the PET/ CT services.

T501.2 RELIABILITY

The reliable supply of radiopharmaceuticals is very essential to the hospital PET services, the tenderers therefore must be in a position to demonstrate, in practice both the reliability of the system and the ability to intervene rapidly in the event of malfunction or breakdowns. For this, the tenderer must have a solid service organisation within Australia capable of responding to such demands. Documentary evidence of this organisation will be required and will be taken into consideration when evaluating tenders.

T501.3 CYCLOTRON CORE SYSTEM and SHIELDING

The cyclotron should comprise the following equipment:

- Magnet
- RF System
- Ion source
- Vacuum system
- Beam extraction & beam diagnostics
- Control system
- Shielding

The cyclotron should be of fixed energy, chosen to optimise the production of PET radionuclides using inexpensive target materials. The Tenderer proposing the use of enriched target materials rather than a dual particle machine must detail in their tender the implication of the additional operating costs (over a ten year period).

T501.3.1 Magnet

The magnet should be a superconducting magnet with simple robust operation and water-cooled. Each conductor layer shall be equipped with a thermo-switch for over heat protection and hardware interlocks to monitor the flow of cooling water. Chilled water system shall be supplied with the Cyclotron unit.

T501.3.2 RF System

The RF system must be reliable and automated. The Tenderer should state the number of Dees used for particle acceleration. If the cyclotron is required to accelerate more than one particle type (i.e. protons and deuterons), the Tenderer must demonstrate that the changeover procedure is rapid, straightforward and requires minimal intervention from the operator. If re-tuning of the beam is necessary, the Tenderer will be expected to demonstrate the procedure.

T501.3.3 Ion Source

The Tenderer must explain the choice of either a positive or negative ion machine by stressing the advantages and disadvantages of the unit offered. Since a negative ion cyclotron offers a simple, high efficiency beam extraction procedure and low residual activity in the cyclotron components, the Tenderer
proposing an alternative positive ion machine must explain in detail the advantages of such a choice. Furthermore, since the potential to accelerate both protons and deuterons offers greater flexibility in the choice of production reactions, the Tenderer offering a single particle machine must detail in their tender
the reasons for the limitation. The procedure to change beam particle must be simple, reliable and performed remotely from the control computer. The type of ion source (cold or hot) and the insertion mode(vertical or

horizontal) should be described. The Tenderer should give the expected lifetime of the filament under normal cyclotron operating conditions, and describe the replacement procedure.

T501.3.4 Vacuum system

The vacuum system must be highly reliable and simple to maintain. All O-ring seals should be accessible and easy to change with minimal radiation dose to the technologist. The time required to establish the vacuum must not exceed five to ten minutes for a positive ion machine. The time to establish the higher vacuum required by a negative ion machine must be stated and demonstrated by the manufacturer. In addition, with a negative ion machine, the Tenderer must provide convincing evidence that the oil diffusion pump is able to establish and maintain the required vacuum, i.e. that the pump is not operating at the limit of its range and that down-time resulting from vacuum problems is small.

T501.3.5 Beam extraction

The beam extraction efficiency must be as close to 100% as possible. For a positive ion machine, the Tenderer must demonstrate stable beam extraction on a regular basis, with low residual activity generated in the cyclotron components. The beam extraction components such as the harmonic coils, deflector and steering magnets must be under computer control, with good diagnostic information supplied to the operator of the total beam current being extracted. Since the target performance is considerably influenced by the spatial intensity distribution of the beam, the Tenderer must give the specifications of the beam spot at the target entrance (e.g. size and homogeneity). The expected life-time of the deflector must be stated, and the cost and difficulty of the replacement procedure given. For negative ion machines, the carbon foil lifetime must be stated (should exceed 100 hours) and the changing procedure (e.g. a carousel) must be rapid, straightforward and clearly documented. The Tenderer will be expected to provide a supply of such foils, together with an estimate of the cost of replacements. The Tenderer must demonstrate reliable beam extraction on a regular basis.

T501.3.6 Computer Control system

The operation cyclotron must be automated under computer control and the control system must be user friendly and easy to use. The software interface should be menu-driven, preferably through a pointing device (e.g. a mouse) with a minimal requirement for keyboard entry. All displays should be clear and easy to follow, with all commands and error messages self-explanatory. Diagnostics of machine malfunction conditions must be explained, with clear indications of the action needed. Good quality documentation on machine operation is essential and the Tenderer will be required to provide evidence of this.

The Tenderer will also be required to demonstrate, from the computer terminal:

- cyclotron initialisation from cold to standby
- selection of a circulating beam, available target, time of irradiation
- the interlock system preventing accidental irradiation of a different target
- the setting-up of an integrated current value to be delivered to the target
- cyclotron shutdown
- the on-line maintenance procedure

Superfluous information should not be displayed during trouble- free operation, although in the event of a problem, the operator should have access to all relevant parameters of the machine. The possibility to incorporate user-defined macro files for standard operating procedures will be an advantage. A hard-copy log of cyclotron operations would also be an advantage.

T501.3.7 Shielding

All shielding requirements must be described in full detail at the time of tender. Preferences is for a cyclotron which is self-shielded without compromising easy machine access. However, the Tenderer must provide measurements of residual radioactivity levels around the cyclotron when operational in order to show that the self-shielding meets the radiation level norms of the Hospital. Should the self-shielding appear to be inadequate, any additional shielding must be specified, and a design proposed and costed prior to acceptance of tender.

If the cyclotron is not self-shielded, the extent and type of shielding must be specified and examined in conjunction with the proposed cyclotron placement. An accurate estimate of the shielding cost must be arrived at in collaboration with the Hospital. Radiation safety is a primary concern of a cyclotron installation within the Hospital environment and, as for the self-shielded design, radiation level measurements as a function of distance from the cyclotron will be required in order to ensure that the Hospital radiation protection norms are satisfied. The Tenderer will be expected to supply the necessary equipment to monitor the environmental radiation levels. The Tenderer must detail the extent and how the shielding removal would be effected in order to gain access to the cyclotron for repairs.

T502 TARGET ASSEMBLIES AND AUTOCHANGER SYSTEM

T502.1 General requirements

The targets supplied must be able to provide, under normal and reproducible operating conditions, the PET radioisotopes ^{11}C, ^{13}N, ^{15}O and ^{18}F. The target technology must be well-integrated with the cyclotron configuration and performance. The Tenderer must provide optimised target assemblies for each of the PET tracers, with detailed technical drawings of the designs (including the construction material where appropriate) for the target body, target foil and the cooling system. Special attention must be paid to the beam entrance window with specification of maximum pressure and beam current allowed, and an estimate of the expected window lifetime. Evidence of reliability and ease of maintenance will be expected. Removal and installation of target assemblies must be quick and simple. The insertion of an energy degrader in front of the irradiated target should be possible. Other target facilities such as heating and vacuum pumping must be listed with separable prices.

The target system must include the equipment required to fill, release and flush the target and transport the radioisotope produced to the radiochemistry synthesis area for further processing. The Lump Sum Price must include the costs of the extraction, transportation and remote control equipment.

In order to offer the greatest flexibility for isotope production, the possibility to irradiate two targets simultaneously will be regarded as a significant advantage. Apart from the immediate benefits of concurrent production of either two different PET tracers, or double quantities of the same tracer, dual target irradiation makes provision for future expansion to supply two PET scanners. This is important, given the expected (> ten year) lifetime of the cyclotron. In addition, irradiation of dual targets facilitates PET protocols which require the sequential administration of two tracers.

T502.2 Target assemblies

In order to ensure flexibility and reliability of the radioisotope processing and delivery, a dedicated target assembly should be provided for the production of each of the required tracers. The Tenderers must therefore provide the following six target assemblies:

Target assembly No.	**Radioisotope dispensed**	**Precursor or compound to be synthetised**
1	$^{15}O_2$	$^{15}O_2$, $C^{15}O$, $H_2{}^{15}O$
2	$C^{15}O_2$	$C^{15}O_2$
3	$^{11}CO_2$	$^{11}CO_2$, $^{11}CH_3I$
4	$^{13}NO_x$	$^{13}N_2$, $^{13}NH_3$
5	^{18}F	^{18}F-DG
6	$^{18}F_2$	^{18}F-Dopa

The Tenderer should give full details, for each isotope produced, of the beam current required, the nuclear reaction used, and the yield achieved at saturation. If an enriched water target is to be used (e.g. with ^{18}O for ^{18}F production) the volume of water required should be stated. If recovery of the target material is to be performed on a regular basis, full details of the procedure must be provided. If a deuteron beam is not available, the use of enriched target materials (e.g. ^{15}N for ^{15}O and ^{13}C for ^{13}N production) must be discussed and costed per mCi of activity produced. Preference will be given to a cyclotron producing high activity levels at low cost, on a regular and reliable basis.

T502.3 Target auto-changer

Automatic target changing should be provided either by remote-controlled system that moves the appropriate target assembly into the beam line, or by selecting the beam port position of one of the fixed internal targets. The target auto-changer must offer the possibility to accommodate up to six separate target assemblies at the cyclotron output beam, although eight would be regarded as an advantage. Target selection and operation of the entrance window cooling system must be initiated from the control console, with clear diagnostics in the event of failure. A display of the selected set-up parameters and indication of operation completed must be provided.

If a mechanical target changer is used rather than separate beam ports, evidence of trouble-free operation must be presented.

The Tenderer must supply technical information about the beam line exit window, and the efficiency of the automatic valve which comes into operation in the event of target foil rupture so as to prevent loss of cyclotron vacuum.

In the case of a fixed internal target system, the Tenderer must describe the time required and the extent of the procedure to remove and replace a target assembly. Detailed drawings must be provided showing the space available for the installation of targets manufactured in-house.

T502.4 Production yield

Under normal and reproducible cyclotron conditions, the radioisotopes recovered from the target assemblies must achieve at least the following activity levels:

Radioisotope dispense	**Irradiation time(mins)**	**Recovered activity at EOB (mCi)**	**Specific activity (Ci/µmol)**
^{15}O	2	>400.	
$C^{15}O_2$	2	>400	
^{11}C	20	>1000	~ 4
^{13}N	10	>400	~ 10
^{18}F	110	>800	~ 10
$^{18}F_2$	110	>400	~ .005

The Tenderer is expected to discuss the specific activity of the radioisotopes recovered from each target assembly.

T503 AUTOMATED RADIOCHEMISTRY PRODUCTION

T503.1 General requirements

In addition to the basic radioisotopes delivered directly from the targets, the Tenderer will be required to make provision for the supply of automated chemistry systems comprising:

* online production of ^{15}O-labelled water
* production of ^{11}C-methyl iodide
* production of ^{13}N-ammonia
* synthesis of [^{18}F]-FDG
* remote radioactive gas purifier and analyser (optional)

The Tenderer must clearly describe, for each automated system, the chemistry procedure selected, all chemical reagents involved, and any other component required by the synthesis.

All automated chemistry systems must be physically and chemically compatible with the radioisotope supply from the target. All connectors required must be provided, or clearly specified. The progress of the synthesis must be monitored from the cyclotron console, with display of the current step, and a safety interlock to control the activity dispensed. Any other automated chemistry syntheses currently available from the Tenderer should be proposed as optional extras, e.g. ^{11}C-fatty acid, ^{18}F-dopa, ^{13}N- amino acid, etc.

All chemistry systems must be included in the regular maintenance schedule, with the same conditions applying as for the cyclotron. They must be supplied with a complete and detailed set of documentation.

T503.2 Inorganic radioactive gas purifier (Optional)

This equipment should be able to provide at least the four purified gases:

- $^{15}O_2$

- $C^{15}O$

- $C^{15}O_2$

- $^{13}N_2$

$C^{15}O_2$ should be produced directly from a separate target, and not from a chemical process starting with $^{15}O_2$ production. Since the gas purifying equipment will supply gas directly to the scanner for human studies, the Tenderer must guarantee the reliability of the system.

The gas processing system should be housed in an appropriate shielded area and the system should include:

- Pressure reducing valves
- Flow meters
- Any catalysts or absorbers
- Furnaces
- Servo valves
- Dispensing gas taps
- Remote monitoring of activity
- Waste product supply

Shielded, stainless steel tubes must be provided to transport the gas from the purifying system to the scanner according to the local installation configuration and safety specification. Provision should be allowed for transportation up to 100m from the purifier to the scanner, or, if this is not possible, the Tenderer must state the maximum distance over which gas can be dispensed. The Tenderer must detail any requirements concerning the removal of waste products.

The entire radioactive gas supply system, including the facility for filling, releasing and purging, must be controllable from the cyclotron console display. The quality control available before delivery to the patient must be specified, and the Tenderer should propose a radioactive gas analysis system including a gas chromatographic, multi-channel analyser and radioisotope calibrator.

T503.3 ^{15}O-Labelled water production

The Tenderer should propose a continuous, on-line, ^{15}O-water production system for dynamic, in vivo infusion. Labelled water should be obtained from $^{15}O_2$ production through catalytic conversion. The synthesis equipment should be housed in an appropriate shielded enclosure close to the PET scanner. The shielded enclosure must contain the cell for dissolving $H_2{}^{15}O$ in saline solution, the set-up for controlling the dispensing rate, and the storage of unused radioactivity. The Tenderer should also specify the quality control performed prior to administration.

T503.4 ^{11}C-methyl iodide production

This precursor is important for the labelling of various drugs. The synthesis must provide the precursor in adequate amounts, and very high specific activity. A clear description of the connection between the synthesis system and the radioisotope production must be provided, including the remote transfer of the activity from the target.

T503.5 ^{13}N-ammonia production

This will be used as a flow tracer and as a precursor for amino acid labelling. The synthesis must provide very high specific activity and chemical purity of the ^{13}N-ammonia. The Tenderer should pay particular attention to the distillation from Devarda's alloy in order to minimise contamination with sodium hydroxide.

T503.6 ^{18}F (fluoro-deoxy-glucose) synthesis

The synthetised product will be used for routine applications in the determination of glucose consumption, particularly in epilepsy. The automatic system should therefore be highly reliable and easily operated. The Tenderer should specify the degree of purification achieved at the end of the synthesis involving both a Sep Pak and HPLC procedure.

T503.7 Expected yield

In each case, since the automated radio-synthesis should be based on the latest developments in radiochemistry, it is expected that the yield from the automated chemistry system should be close to that currently appearing in published literature. The Tenderer will be expected to discuss the yield of each synthesis as a function of the starting activity available from the Tenderer's target. It must be clear whether the yield is expressed in terms of the crude or purified product (i.e. Sep Pak and HPLC procedure). The time required for the quality control analyses must also be given. The Tenderer must ensure the following guaranteed activities of gases, precursors and radiopharmaceuticals:

Radioactive product dispensed	**Minimum guaranteed activity level at time of delivery**
$^{15}O_2$, $C^{15}O$, $C^{15}O_2$ or $^{13}N_2$ (ready for inhalation at 500 ml/min)	0.2 mCi/ml
$H_2{}^{15}O$ ready for infusion (in saline solution, ~4 ml/min)	20 mCi/ml
$^{11}CH_3I$ precursor	1000 mCi
$^{13}NH_3$ precursor	200 mCi
^{18}FDG (ready for injection)	20 mCi

T504 INSTALLATION AND MAINTENANCE

The Tenderer should include in the tender the following items:

T504.1 Cyclotron dimensions

The cyclotron should be as compact as possible and the dimensions and weight of all equipment, including shielding shall be specified. In particular, the weight and size of the largest single part of the cyclotron must be given. The Tenderer must specify whether or not the Cyclotron can be dismantled (after factory testing) for shipment and installation.

The Tenderer must provide a full survey of the proposed locality and the installation procedure. The dimensions of the cyclotron and shielding should not exceed 5 m x 5 m, with a height of 2 m. The weight of the cyclotron with shielding should not exceed 20 tons. The weight distribution (floor loading) must be specified.

T504.2 Auxiliary equipment

The Tenderer must specify all the auxiliary equipment required to operate the cyclotron, and list the facilities (e.g. power, water, waste extraction, etc.) that must be provided by the Hospital. In addition, all piping and connections to be provided by the Hospital must be itemised. Any additional equipment, such as a chilled water system, that is not included in the total cost of the tender, must be clearly stated. It is the responsibility of the Tenderer to ensure that the Hospital is aware of all such requirements, and to have them costed, at the time of the submission of tender. The Tenderer must supply all the data necessary in order to fully specify these requirements. The floor area required for the auxiliary equipment (including cyclotron electronics) must not exceed 28.5m²

T504.3 Total floor area

The total floor area of the installation must be specified, including the shielding and auxiliary equipment. Adequate space must be allowed for access to the targets when necessary, and for machine access in the event of breakdown. If mobile shielding is required, the total floor area for the cyclotron with the shielding retracted should not exceed approximately 7 m x 7 m, including the gas processing equipment. The recommended total floor area for the radioisotope production facility shall be specified:

cyclotron:	m²
auxiliary equipment:	m²
hot lab:	m²

T504.4 Power consumption

The total power consumption with the beam on target should not exceed 150 kW. The Tenderer should specify both the maximum and standby power consumption. In order to minimise daily operational costs, preference will be given to a machine with a low power consumption.

T504.5 Safety considerations

The Tenderer must provide complete documentation on the safety features of the machine. In particular, the cyclotron must include interlocks to prevent accidental irradiation of the environment. The procedure for storage and removal of active liquid and gaseous waste must be described.

The Tenderer will be expected to provide the equipment necessary to monitor the ambient radiation level around the cyclotron installation. The system must provide suitable warnings should an abnormal situation arise.

T504.6 Maintenance and spare parts

It is essential to the PET program that the cyclotron produces a regular supply of radioisotopes when required. Therefore, reliable machine operation and good maintenance facilities are of the utmost importance. It is expected that the successful Tenderer will have a solid base established within Australia from which to service and repair the cyclotron. The Tenderer will be expected to keep a full stock of spare parts available and to offer a guaranteed maximum intervention time and except in the case of serious breakdown, to carry outt immediate repairs. Alternately, the Tenderer may prefer to provide in-depth training for a locally based maintenance engineer. A remote diagnostic facility (i.e. a link to the company) would obviously be an advantage.

The Tenderer will be expected to provide details of their maintenance record and facilities at a clinical site located outside the country of manufacture of the cyclotron. A proven record of reliability will be considered an important advantage.

The Tenderer should describe the requirements for regular preventive maintenance, including:
- a full schedule of the work involved
- the time during which the cyclotron will be unavailable for isotope production.
- the frequency of the work (e.g.once every two months, etc.)
- the conditions of a maintenance contract

This contract is in addition to that covering interventions due to machine malfunction.

The Tenderer must supply a full list of all consumable spare parts delivered with the machine.

T504.8 Factory tests and cyclotron acceptance

The Tenderer must give a complete description of the equipment tests that will be carried out at the factory prior to shipment to Australia. It is assumed that a representative of the Hospital will be present for the completion of these tests. All costs associated for the hospital's representative to witness these factory tests are to be included, but listed separately in the pricing schedule.

T504.9 Training (Optional)

Tenderers shall submit detailed proposals of the training program, which shall at least cater for two hospital personnel to be trained in the factory/training centre.

The cost shall be detailed seperately, but shall include all costs associated: travel, accommodation and other associated costs.

T505 Optional Equipment and Accessories

Remote radioactive gas purifier and analyser
Radiochemistry Equipment
Quality Control Equipment
Radiation Monitoring
Dose calibrators
Shielded Hot cells
Laboratory Fit Out

CT SCANNER SPECIFICATION
(Taken from CT Period Contract No. 0701527)

T100 GENERAL

This part of the tender document outlines particular technical requirements for supply, installation, testing and acceptance of the Computerised Tomography Scanner equipment (C.T. Scanner).

The offers submitted will provide basis for selection of suppliers of the above mentioned equipment / systems to form a 36 months Standing Offer arrangement, facilitating purchase of such items by various hospitals. Specifics of the Standing Offer Agreement are detailed under Part D of the Specification

In addition, this tender also requests for submission of the offers for an Operating Lease of the offered equipment. For details refer to the Operating Lease facility in Annexure 1 Part B of this document

The reliability of the C.T. Scanner equipment, the quality of the images, the ability to handle trauma and injured patients quickly and easily, the degree of user friendliness in operation are the factors of the utmost importance.

The tendered equipment shall be of known and proven reliability and durability under high workload conditions experienced in major teaching hospitals.

T101 EQUIPMENT TO BE SUPPLIED AND WORK TO BE CARRIED OUT

The equipment to be supplied and the work to be carried out shall be in the quantities specified and described herein and as listed in the Schedule of Prices. The work to be carried out shall comprise of the supply, delivery, installation and testing, including freight, insurance and tuition of staff.

Items not listed or not specified in detail but required for the proper functioning of the equipment must be included in the offer; their type and quality shall be of a generally accepted industry standard in hospital environment.

This Standing Offer Agreement comprises of three (3) levels of the CT scanners:

- **Level M – High Range Multislice helical CT with 64 slices or greater**
- **Level P – Mid Range Multislice helical CT ≥ 16 slices but less than 64 slices**
- **Level R – Low Range ≥ 1 slice or < 16 slice helical CT**

The offers shall comply with all the particular requirements and detailed technical specification for the individual items as outlined in the subsequent clauses of this specification. Any non-compliance shall be clearly stated as required under Part C2 "Statement of Compliance with Specification".

Tenderers shall complete a separate response for each model of equipment offered.

Tenderer must give a full response to all points of the specification, sufficiently clarifying all aspects and issues addressed in this document. The response shall also include:

- clear answers or compliance statement to all clauses of this specification
- complete "Tenderer Response" column in the tables incorporated in the individual clauses to indicate actual specification parameters of the offered item
- copy of the current certificate registration of the company's implemented QA system
- information on service facilities
- TGA & other certificates

Tenderers shall also address aspects of "Alternative Offers and Product Enhancement Features" as detailed under Annexure 1 to Part B, Section 1 -Electromedical Specific. The above requirement is mandatory and forms part of the evaluation process. Failure to supply details of enhancement/features (over and above the specification requirements) for all product models offered may result in the tender not being considered for acceptance.

T101.1 General System Configuration

The C.T. Scanner shall be a high performance, heavy duty model able to be upgraded to take advantage of new software/hardware developments.

The reliability of the scanner, the quality of the images, its ability to handle very sick and injured patients with minimal efforts, the degree of user friendliness and the clarity of the scanning protocols are factors of the utmost importance.

The C.T. Scanner shall be suitable for carrying out the following procedures:
i) axial scanning
ii) helical volume scanning
iii) radiographic plane projection (scanogram)
iv) all head investigations
v) all body investigations
vi) dynamic scanning
vii) image archiving
viii) image hard copying

Basic System

The basic system shall consist at least of:
1) One (1) whole body C.T. Scanner, including: gantry, patient couch, operator's console, and computer system
2) Standard software package
3) One (1) image archiving device
4) Closed circuit TV
5) DICOM 3 conformance for the following functionality:
   a) Storage class
   b) Storage commit
   c) Print class
   d) Modality worklist
   e) MPPS
   f) Query/ retrieve

System Options

The CT Scanner may have the following features and functionality that can be added to the Basic System as options:

	Level M	**Level P**	**Level R**
3D Reconstruction & Display	√	√	√
CT Fluoro	√	√	√
CT Angio	√	√	
Virtual Endoscopy	√	√	
Dental Package	√	√	
Paediatric Package	√	√	
ECG Gating	√	√	

Cardiac Analysis	√	√	
Bone Mineral Study	√	√	
CT Simulation (Radiotherapy Package)	√	√	√
CT Workstation	√	√	√
Upgrade to higher multislice level	√	√	√
Contrast Injector	√	√	√
Contrast Optimisation Package	√	√	√
Laser Imager	√	√	√
Additional Dicom 3 conformance	√	√	√

Additional Requirements

As detailed in clause -Defects Liability Period /Operational Maintenance under Annexure 1 to Part B –in Section 1 -Electromedical Specific:

(1) Pricing of the equipment must include all routine and break down services during Defects Liability Period.

(2) The tenderer shall allow for a sufficient number of x-ray tubes to be included in the tender to withstand full operation during the 12-month Defect Liability Period at the same level

(3) Tenderers are to note that the assessment criteria specified in Part B will play a significant role in the assessment process, and therefore the tenderers are required to submit any additional information relevant to substantiate their claim of these considerations.

T 102 NOT USED

T103 CLAUSE NUMBER NOT USED

T104 PARTICULAR REQUIREMENTS

In general, all parameters indicated in the table below refer to nominal specification values.

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
Clause No.	**Specification**	**Level M**		**Level P**		**Level R**	
T104.01	**CT Technology** The scanner shall be utilising a rotating beam system with either rotating or stationary set of detectors. Scanning system technique. Number of slices per rotation.	√ helical with multislice ≥ 64 slices slices		√ helical with multislice ≥ 16 or < 64 slices		√ helical single or multi slice ≥ 1 or <16 slices	
T104.02	**Helical Scanning** Minimum requirements: • continuous scan time. • coverage • multi directional scanning • variable pitch/couch speed • allowing sequences breaks with periods for breaths • indication to the patient of the breath or the scan phase. Gantry Angulation in helical scanning mode.	 100 sec 1200 mm √ √ √ √ √		 100 sec 1200 mm √ √ √ √ √		 80 sec 1000 mm √ √ √ √	
T104.03	**Scan Time** Fastest scan time (on 360-degree rotation). Scan time (on partial rotation)	 0.4 sec 0.33 sec		 0.5 sec 0.4sec		 0.75 sec Vendor specify	
T104.04	**Image Reconstruction** Reconstruction matrix. Image reconstruction time. Helical real time image reconstruction.	 512 x 512 0.2 sec/image 16 fps		 512 x 512 0.5 sec/image 6 fps		 512 x 512 1 sec/image 3 fps	
T104.05	**Scanned Field (Field of View - F.O.V.)** Scanning field diameter.	 500 mm		 500 mm		 500 mm	
T104.06	**Slice Thickness**						

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	Slice thicknesses range. Selection of thicknesses (minimum available)	0.625 to 10 mm 4		0.75 to 10 mm 4		1 to 10 mm 4	
T104.07	**<u>Dynamic Scanning</u>** Number of scans programmable for dynamic scan. Protocols for series of scans performed with or without interscan delays. Protocols for series of scans performed with or without couch incrementation. Dynamic scan rate for rapid volume scanning with 10 mm couch incrementation. Dynamic scan rate for survey of a selected anatomical region over a single slice area without couch movement The above shall be performed on 500 mm F.O.V. and with exposure factors at:	100 √ √ 40 scans/min 50 scans/min 120 kVp, 250 mA, 1 sec scan		80 √ √ 30 scans/min 40 scans/min 120 kVp, 200 mA, 1 sec scan		60 √ √ 15 scans/min 25 scans/min 120 kVp, 200 mA. 3 sec scan	
T104.08	**<u>Radiographic Plane Projection - Scanogram</u>** Scanogram available in at least 2 scanning views: frontal and lateral The scanogram range. Table translation speed. Image display.	√ 1200 mm 35 mm/sec real time		√ 1200 mm 35 mm/sec real time		√ 1000 mm 35 mm/sec <2 sec	
T104.9	**<u>System Resolution Performance</u>** <u>Standard Spatial Resolution</u>: **0% MTF: l/cm** **10 % MTF: l/cm** **50 % MTF: l/cm** <u>High Contract Resolution</u>: - on 1 sec scan, 1 or 2 mm slice, 512x512 matrix, exposure at 120 kVp, 250 mA. - on 2 sec scan, 2 mm slice, 512x 512matrix, exposure at 120 kVp, 200 mA. <u>Low Contrast Resolution</u>:	 20 15 10 0.35 mm		 20 15 10 0.40 mm		 20 15 10 0.45 mm	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	- at 0.3% contrast (3 Hounsfield Units), on 20 cm phantom and the dose not exceeding 35 mGy	3 mm		3 mm		4 mm	
T104.10	**Image Noise**: Image noise (as an indicative parameter of the image quality) measured with a 20 cm water equivalent phantom at 120 kVp, 400 mAs on 10 mm slice.	<0.35%		<0.35%		<0.4%	
T104. 11	**X-Ray System** X-ray generator. KVp range. X-ray tube heat capacity. X-ray tube cooling rate. Automatic prevention of exposure in case of excessive tube heat build-up. Prevention of commencement of any planned sequences if the calculated heat load exceeds the allowable limits.	 60 kW 80- 120 kVp 7 MHU 1,000 kHU/min √ √		 35 kW 80- 120 kVp 5 MHU 700 kHU/min √ √		 25 kW 80- 120 kVp 3.5 MHU 500 kHU/min √ √	
T104.12	**Image Data Storage** Acquired data shall be store on a computer hard disk. Disk capacity shall allow for: - hard drive - reconstructed images store (512 x 512	 √ 200 GB 75,000 image		 √ 146 GB 40,000 image		 √ 73 GB 40,000 images	
T104.13	**Image Archiving** The scanner to include an on-board image archiving device as indicated in T104.24. Archiving performed in background mode.	 √ √		 √ √		 √ √	
T104.14	**Gantry Assembly** Gantry aperture minimum size. Gantry tilt. Detector array. Detector type. Safety interlocks between the gantry and couch movement. Positioning lights incorporated/integrated with the gantry. In-built intercom for operator-patient voice communication.	 700 mm ±25° √ solid state √ √ √		 700 mm ±20° √ solid state √ √ √		 700 mm ±20° √ Xenon gas √ √ √	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	Pre-recorded set of voice instructions to the patient.	√		√		√	
T104.15	**PATIENT COUCH**						
	Couch movements shall be motorised in all directions.	√		√		√	
	Couch operation controllable from both sides of the gantry assembly and from the operators' console.	√		√		√	
	Couch lowest position above floor level at no higher then:	<600 mm		<600 mm		<600 mm	
	Longitudinal travel range at least:	1500 mm		1500 mm		1500 mm	
	COUCH LONGITUDINAL TRAVEL IN INCREMENTS OF:	1.0 mm		1.0 mm		1.0 mm	
	Position reproducibility within:	0.25 mm		0.25 mm		0.25 mm	
	Translation speed range:	10-75 mm/sec		10-75 mm/sec		10-75 mm/sec	
	Patient load capacity.	150 kg		150 kg		150 kg	
	Provision for rapid patient egress from the gantry.	√		√		√	
	Couch contoured to maximise patient comfort.	√		√		√	
	Suitable for either head-first or feet-first loading.	√		√		√	
	TYPICAL COUCH ACCESSORIES SUCH AS HEAD HOLDER, RESTRAINING STRAPS, PADS, CUSHIONS TO BE INCLUDED AS STANDARD**.**	√		√		√	
T104.16	**Operator's Console**						
	The operator's console shall house all scan, display, hardcopy and archive controls.	√		√		√	
	It shall have a facility for entering patient data, image annotation and access and execution of various computer functions of the system.	√		√		√	
	Couch positioning controls shall be accessible from the operator's console to move the couch to the scan start position.	√		√		√	
	There must be an emergency off button located on or near the console for instant disable of x-ray and drive system functions.	√		√		√	
	The console shall include a user-defined programming facility for selection and modification of scanning protocols.	√		√		√	
	In an emergency, scanning can be allowed without entering						

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	patient details prior to the examination.	√		√		√	
	An in-built intercom for two-way voice communication between a patient and the operator, including separate volume adjustments for both locations.	√		√		√	
	Ergonomically designed operator's chair with 5 legs (on castors) and with , adjustable height and back support.	√ 2 chairs		√ 2 chairs		√ 2 chairs	
T104.17	**Scan Programming**						
	Scan parameters shall be fully variable to allow for programming of any combination of scan time, thicknesses, interscan time delay and interscan space intervals, all in one protocol.	√		√		√	
	Scan parameters and patient data shall be displayed with each image.	√		√		√	
	Each individual scan location shall be indicated on the scanogram.	√		√		√	
T104.18	**Image Processing and Display**						
	Acquired image raw data set can be reconstructed with various available algorithms.	√		√		√	
	Initially acquired data shall allow for image reconstruction of both bone and soft tissue details.	√		√		√	
	Number of different reconstruction algorithms shall be available allowing display of soft tissue, bony details, standard and high resolution images.	6 √		5 √		4 √	
	Reconstruction methods: - Scan & View for scan, reconstruct and display of each individual slice.	√		√		√	
	- Scan & Scan for rapid sequence scanning with reconstruction and display occurring concurrently.	√		√		√	
	Displayed image shall include information on scan factors, reconstruction parameters and patient identification data	√		√		√	
	Monitor Image display matrix.	1024x1024		1024x1024		512 x 512	
	Image display monitor size.	51 cm		42 cm		42 cm	
	The system shall display recalculated degree of attenuation						

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	of the X-ray and converted to International Hounsfield Scale.						
	This representing water at defined value of 0 and the air at defined value of (-) 1,000).	√		√		√	
	Those values to be displayed as CT numbers in the range of (-) 1,000 to (+) 3,000 minimum.	√		√		√	
	The attenuation values (C.T. numbers) of the displayed image are referred as "window" and defined by its level and width.	√		√		√	
	Selection of both window level and window width must be available over the full range of scale of C.T. numbers.	√		√		√	
	Magnification of selected details.	≥ 6 times		≥ 6 times		≥ 6 times	
	Multiple image display on the screen.	1-12 images		1-12 images		1-12 images	
	Cine function of sequential viewing of images acquired for dynamic studies.	√		√		√	
	Cine display at a frame rate of minimum 8 fps.	√		√		√	
T104.19	**<u>Image Presentation and Analysis</u>**						
	The system shall be capable of performing analytical functions during image presentations.	√		√		√	
	- Measurements of distance and angle between selected details on the image.	√		√		√	
	Display of any part of the image as Region of Interest (ROI) for further processing and analysis.	√		√		√	
	- Number of ROI's selection.	4		4		4	
	- Pixel statistics in the form of profiles and histograms either on the selected ROI or the entire image.	√		√		√	
	<u>Profiles</u> shall represent graphical display of CT values along any selected line of the image.	√		√		√	
	<u>Histograms</u> shall display the CT number distribution within selected areas in graphical and numerical form. This is to show representation of the frequency of the CT number values in a particular region to indicate density distribution in tissue.	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
T104.20	**Operating Dose** The CT Scanner design shall be based on appropriate utilisation of the dose administered to the patient. The system efficiency is to ensure that good image quality is achieved with relatively low patient dose. Typical dose per slice (Tenderer to state the factors applicable for measuring of the dose level).	√ 35 mGy (3.5 rads)		√ 35 mGy (3.5 rads)		√ 35 mGy (3.5 rads)	
T104.21	**Software Programs** In addition to the operations specified previously, the software programs, normally provided with the scanner, shall allow for at least the following minimum functions: - Multiplanar reconstruction (MPR) - Window processing including linear and non-linear contrast scale and level detection - Magnification - Measurements to include distance and angle - Volume calculation - Profiles - Histograms - ROI setting - CT numbers display - Gray scale display - Gray scale reversal - Scale and grid display - Image reversal up/down and left/right - Image hard copying - SMPTE test pattern display Clinical results showing studies should be included for evaluation with the tender submission.	√ optional		√ optional		√ optional	
T104.22	**3D IMAGE RECONSTRUCTION AND DISPLAY –** 3D Reconstruction software package shall be supplied. The feature shall provide:	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	- 3 dimensional image reconstruction from a set of axial images - surface rendering - volume rendering - max/min intensity projection (MIP) - multiplanar reconstructions (MPR) - image rotation in all orientations - zooming, panning - measurements.						
T104.23	**Accessories** C.T. Scanner shall be provided with the following accessories: - Teflon coated Patient Slide, size 1500 x 600 mm. - QA phantom (slice thickness, spatial and to contrast resolution). - Calibration phantoms for various FOV. - Phantom positioner. - Couch accessories as indicated in clause T104.15.	√		√		√	
T104.24	**Dicom Conformance** The CT scanner shall conform to Dicom 3 standard. Its communication with hardcopy devices, laser printers, archiving facilities, diagnostic workstations of various vendors shall be based on Dicom 3 format protocols. The offered CT shall include as a minimum Dicom interfaces for the following operations: - Print class (Service Class User) - Storage class (Service Class User) - Storage commit - Modality Worklist Management - Modality Performed Procedure Steps (MPPS) - Query/ retrieve (Service Class User and Provider)	√ √ √ √ √ √ √		√ √ √ √ √ √ √		√ √ √ √ √ √ √	
T104.25	**Image Archiving Device** The C.T. Scanner shall be supplied with an image archiving	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	device able to receive downloaded image data from the main system to store it in digital form.						
	It shall also be able to load the archived data back into the main system for reviewing or re-processing if need be.	√		√		√	
	The archiving device must be compatible with the scanner and include all necessary interfacing facilities (hardware and software).	√		√		√	
	The archiving medium shall be in the form of optical disc.	√		√		√	
	Each archiving device shall be supplied with six (6) storage media discs.	√		√		√	
	Other alternative archiving technology may be offered as option.	√		√		√	
T104.25.1	**<u>Optical Disc Drive</u>** Minimum specification: - design based on the digital laser technology - storage capacity of minimum 2.3GB - 6000 images of 512x512 matrix per disc **<u>DVD-R/ CD-R (DVD Interchange)</u>** 9.4 GB Total (Double-sided, 4.7 GB per side) Max. 16,000 images for double –sided disc, DICOM format	√		√		√	
T104.26	**<u>Image Hardcopy Interface</u>** The offered CT scanner shall be capable of interfacing with any commonly used hardcopy device accepting either digital or analogue signals.	√		√		√	
	The scanner must include a suitable interface for data transfer to such a device.	√		√		√	
T104.27	**<u>Closed Circuit TV System (CCTV)</u>** A colour CCTV System for visual patient monitoring during CT examination shall be provided with the CT.	√		√		√	
	The system shall include: 1) One (1) Camera with automatic iris compensating	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	variable light level and standard lens suitable for comfortable viewing of the patient from the camera mounting position in the C.T. room. Camera minimum specification: - CCD technology - Horizontal resolution - 380 lines - Signal system - CCIR standard - Zoom on the patient area. 2) One (1) colour monitor installed in the Control Room (allow for wall mounting bracket). Monitor minimum specification: - Size 30 cm diagonally - Centre resolution 700 lines - Controls for power on/off, brightness, contrast	√		√		√	
	C.T. SCANNER - OPTIONAL ASSOCIATED EQUIPMENT						
T104.28	**CT SOFTCOPY REVIEW CONSOLE– (Optional)** Another separate console from the operator's console shall be provided. It shall connect to the CT system directly to access the CT data for display and manipulation of the images, as a softcopy review console with 3D and MPR functions.	√ √		√ √		√ √	
	The CT Review console shall include: - image display high definition monitor (≥ 1.6kx1k) - keyboard and all necessary controls - Access to 3D and MPR functions - operator's chair.	√		√		√	
T104.29	**CT SOFTCOPY REPORTING WORKSTATION – (Optional)** A freestanding softcopy reporting workstation, separate from the operator's console shall be provided. It shall connect to the CT system via a high-speed data communication link to access the reconstructed CT data	√ √		√ √		√ √	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	images for manipulation and display of the images for reporting purposes.						
	The workstation is to conduct its functions remotely from the main system, without interfering with the scanning operation.	√		√		√	
	The CT softcopy reporting WS shall include: - image display high definition monitor (≥ 1.6kx1k) - keyboard and all necessary controls - image manipulation unit - data storage facility - data link - operator's chair.	√		√		√	
	Communication and data transfer between CT scanner and the Workstation shall be based on Dicom standard.	√		√		√	
	The offered Workstation shall include as a minimum Dicom compatibility for the following operations: - Print (Service Class User) - Store (Service Class User) - Query/Retrieve (Service Class User and Provider).	√		√		√	
	The console shall feature facility for image archiving to store minimum 21 days of studies of usual workload and hard copying.	√		√		√	
	The intercom link for two way voice communications with the operator of the CT scanner may be offered as option.	√		√		√	
T104.30	**CT INDEPENDENT DIAGNOSTIC WORKSTATION – (Optional)** A freestanding diagnostic workstation, separate from the operator's console shall be provided. It shall connect to the CT system via a high-speed data communication link to access the CT data (both raw data and reconstructed images) for independent processing, display and manipulation of the images.	√		√		√	
	The workstation is to conduct its functions remotely and	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	independently from the main system, without interfering with the scanning operation.						
	The CT workstation shall include: - image display high definition monitor (≥ 1.6kx1k) - keyboard and all necessary controls - image processing unit - data storage facility - data link - operator's chair.	√		√		√	
	Communication and data transfer between CT scanner and the Workstation shall be based on Dicom standard.	√		√		√	
	The offered Workstation shall include as a minimum Dicom compatibility for the following operations: - Print (Service Class User) - Store (Service Class User) - Storage commitment (Service Class User) - Modality Worklist - MPPS - Query/Retrieve (Service Class User and Provider)	√		√		√	
	Software packages (as provided with the main system) must also be available on the CT Workstation.	√		√		√	
	The console shall have facility for image archiving and hard copying. The system shall be able to burn images in the CD writer, and have the facility to print off from the CD Storage.	√		√		√	
	The intercom link for two way voice communications with the operator of the CT scanner may be offered as option.	√		√		√	
T104.31	**CONTRAST INJECTOR – BOTH SINGLE AND DUAL PHASE MODELS (Optional)** A C.T compatible Contrast Media Injector shall be offered. It shall include control panel with provision for a rack mounted remote control from control room, injector head, pedestal mounting and microprocessor-controlled operation.	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	The unit shall be complete with 100 syringes of 200 ml capacity.	√		√		√	
	Allow for optional installation of the injector head suspended on a ceiling mounted overhead counterpoise, including all structural supports for mounting the counterpoise.	√		√		√	
	The Injector interface with the CT for synchronised operation may be offered as an option..	√		√		√	
T104.32	**LASER IMAGER – (Optional)** A dry laser imager shall be offered as a CT image hard copying device. The unit's minimum specification must include: - 35x43 cm film size - single and multi-image sheet formatting - daylight film loading procedure - direct control from the CT operator's console - multi input (min. 3) - digital signal interface.	√		√		√	
T104.33	**VARIOUS SOFTWARE PACKAGES - (Optional)** Tenderer should offer additional optional software packages as applicable to the CT examinations. They may include: - CT Fluoro. The tenderer shall detail, how it operates, minimum frame rates, display of images, whether flat panel /stand/wall/ceiling mounted. Shall also state whether cardiac scanning functions are possible and if so, scan times, software details etc are to be provided. - CT Angio - Virtual Endoscopy - Paediatric Package - Dental Package - ECG Gating - Cardiac Analysis	√		√		√	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	- Bone Mineral Study - VRT (Volume Rendered Technique) - Brain Perfusion - Other(Please specify)						
T104.34	**MAGNETIC TAPE DRIVE – (Optional)** Minimum specification: - tape cartridge technology - recognised as a common transfer medium - able to store either raw data or reconstructed images. Each archiving device shall be supplied with six (6) tape cartridges.	√		√		√	
T104.35	**ADDITIONAL DICOM CONFORMANCE - (Optional)** Additional Dicom Service Class conformance to be offered: - DICOM Send / Receive - Other, (please specify)	√		√		√	
	Additional Licences for Dicom interfaces - Print class (Service Class User) - Storage class (Service Class User) - Storage commit - Modality Worklist Management - Modality Performed Procedure Steps (MPPS) - Query/ retrieve (Service Class User and Provider)	√		√		√	
T104.36	**CT SIMULATION (RADIOTHERAPY PACKAGE) - (Optional)** Tenderers shall include an optional offer for a CT Scanner used as a CT Simulator in Radiotherapy applications. Generally, all specification details as indicated for Basic System shall apply, as relevant. The offer for the CT Simulator must identify any specific features of the proposed unit, particularly; any modifications to physical dimensions or operational processes, data	√ √ √		√ √ √		√ √ √	

	CT SCANNER – BASIC SYSTEM	**Parameters**	Tender Response	**Parameters**	Tender Response	**Parameters**	Tender Response
	transfer media and its compatibility with the protocols used in Radiotherapy Planning Computers, etc.						
	The CT Simulator shall feature a flat type couch top and a large bore Gantry >=800mm.	√ √		√ √		√ √	
	The offer should also include supply and installation of a external laser light alignment system suitable for radiotherapy applications.						
	Two laser lights systems shall be quoted:						
	(a) 3 moving (motor controlled) laser lights (one mounted overhead projecting a line in sagittal plane, two mounted on side walls projecting lateral cross).	√		√		√	
	(b) 1 moving (motor controlled) laser light mounted overhead projecting a line in sagittal plane, 2 fixed side laser lights projecting lateral cross.	√		√		√	
T104.37	**PERFUSION SCANNING (HEAD AND BODY) - OPTIONAL**	100		80		60	
	Number of scans programmable for perfusion scanning.	√		√		√	
	Protocols for series of scans performed with or without interscan delays.						
	Dynamic scan rate for survey of a selected anatomical region over a single slice area without couch movement	50 scans/min		40 scans/min		25 scans/min	
	The above shall be performed on 500 mm F.O.V. and with exposure factors at:	120 kVp, 250 mA, 1 sec scan		120 kVp, 200 mA, 1 sec scan		120 kVp, 200 mA. 3 sec scan	
	Tenderers to indicate Rate of Injection for perfusion						

√ = required

END OF SECTION – CT TECHNICAL PARTICULARS