新界西・醫院聯網
New Territories West Cluster
聯網辦事處Cluster Office
屯門醫院 Tuen Mun Hospital
23 Tsing Chung Koon Road, Tuen Mun, New Territories, Hong Kong. Tel:(852) 2468 5111 Fax:(852) 2455 1911
新界屯門青松觀路23號 電話: (852) 2468 5111 傳真: (852) 2455 1911

Tender Reference : NWT00226
File Reference : NW/TM/FE/DR/46

Date : 13 October 2026

Dear Sir / Madam,

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital New Territories West Cluster, Hospital Authority

We invite you to quote for the supply and installation of the above item(s) as specified in the tender documents attached.

Would you please submit your offer in four copies using the enclosed Schedules, subject to and in accordance with the following documents :

(1) **Acknowledge Receipt for Invitation (1 page)**
(2) **Reply Slip for Invitation (1 page)**
(3) **Tender Form HA(G)231A (Parts I to V) (10 pages)**
(4) **Terms of Tender (Supplement) (26 pages)**
(5) **Tender Specifications (307 pages)**
(6) **Schedule A (Price) (9 pages)**
(7) **Schedule B (Schedule of Compliance) (23 pages)**
(8) **Schedule C (Tenderer's Operational Experience and Capability) (2 pages)**
(9) **Schedule D (Declaration of Conflict of Interest by Tenderer) (2 pages)**
(10) **Special Conditions of Contract (37 pages)**
(11) **Notice for Submission of Tenders (1 page)**
(12) **Review Body on Bid Challenges (1 page)**

Your tender should be properly completed and addressed to the **Chairman, Quotation/Tender Opening Committee, Cluster Procurement and Materials Management Unit, New Territories West Cluster, Hospital Authority** and deposited in the Quotation/ Tender Box situated at **15/F., Block A, Staff Quarters, Tuen Mun Hospital, Tsing San Path, Tuen Mun , New Territories, HKSAR** before **12:00 noon on 24 November 2026.**

Please submit your tender in sealed **PLAIN** envelopes according to the guideline stated in "Lodging of Tender".

Failure to comply with the above requirement may render your tender unsuccessful. **LATE TENDERS** will not be considered.

If you are unable to quote against this request for quotation, we would appreciate if you could let us know why you are not in a position to submit an offer.

For any inquiries of this tender, please contact **Ms. Joanne CHU** at telephone no. **(852) 3767 1794** or **K K CHAN** at **(852) 2468 6817**. We look forward to receiving your tender.

Yours faithfully,

(Stephen LAM)
for Cluster Chief Executive
New Territories West Cluster
Hospital Authority

Tender / LQ no.: NWT00226

Closing Date: 24 November 2026 before 12:00 noon

Tenderer / Bidder should acknowledge receipt of tender / LQ invitation by returning this reply slip to Tuen Mun Hospital by fax or mail.

Fax: (852) 2456 9034 / 2460 4059

Address: Cluster Procurement and Materials Management Unit, New Territories West Cluster, Hospital Authority, 15/F, Block A, Staff Quarters, Tuen Mun Hospital, Tsing San Path, Tuen Mun, New Territories, HKSAR.

Attn: Mr. K K CHAN

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital New Territories West Cluster, Hospital Authority

I hereby acknowledge receipt of the above tender / LQ invitation. Thank you.

Company name : _____

Name of contact person : _____

Signature :_____

Contact tel. no. :_____

Date : _____

Reply Form on Site Visit and Briefing Session

To : Cluster Procurement & Materials Management Unit
New Territories West Cluster, Hospital Authority
(Attn.: Ms. Joanne CHU / K K CHAN)
Fax : (852) 2456 9034 / 2460 4059

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital
New Territories West Cluster, Hospital Authority
(Tender Reference: NWT00226)

Please tick as appropriate and fax to (852) 2456 9034 / 2460 4059 not later than 21 October 2026.

(I) Site Visit and Briefing Session

Date : to be confirmed
Time : to be confirmed
Venue : Department of Radiology and Nuclear Medicine of Tuen Mun Hospital

☐ We will attend the Site Visit and Briefing Session with details as follows :

Name of Representative(s) : _____

Contact Tel./Mobile No. : _____

☐ We will NOT attend the Site Visit and Briefing Session.

Signature of person authorised to sign : _____

Name of Tenderer (with company chop): _____

Tel No.: _____Fax No.: _____ Date: _____

Reply Slip for Quotation / Tender Invitation

- Vendors who do not intend to make offer to this quotation invitation should complete and return this 'No Offer Reply Slip' before the closing date and time as specified below.

Cluster Procurement and Materials Management Unit, New Territories West Cluster, Hospital Authority
Chairman of Tender Opening Committee
Fax: (852) 2456 9034 / 2460 4059

Quotation / Tender Details

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service Quotation / Tender ref: NWT00226 Closing date & time: 24 November 2026 before 12:00 noon

(Please tick against the box where applicable)

☐ I confirm that I would provide quotation / tender proposal by returning it to New Territories West Cluster of the Hospital Authority as indicated in the invitation letter;

☐ I regret that I am unable to submit the quotation / tender proposal due to the following reason(s):

- ☐ The requirement is out of our range of supply/service. We are selling: ___ _____
- ☐ The required quotation / tender specifications cannot be met. (Please list out which clause that cannot be met.) _____ _____
- ☐ The delivery date of the goods / service job cannot be met.
- ☐ Others (Please specify) _____

_____ (Signature)

_____ (Name in Block Letters)

_____ (Post Title)

_____ (Name of Company)

_____ (Date)

_____ (Company stamp)

醫院管理局
HOSPITAL AUTHORITY

Name of Hospital : Tuen Mun Hospital

Tender Ref: NWT00226_____ *Contract No: _____File Ref.: NW/TM/FE/DR/46*

TENDER FOR THE SUPPLY OF GOODS

LODGING OF TENDER

To be acceptable as a tender, this form, properly completed **in THREE hard copies and one soft copy (in CD or DVD or USB Flash) respectively** and enclosed in two separately sealed plain envelopes, one marked as "Technical Proposal" which should include all tender submission except Price Proposal. The other envelope marked as "Price Proposal" which should include **Schedule A (Price) and all any supplementing quotations**. Both envelopes should clearly state the subject of this tender "Tender for the for (Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital, New Territories West Cluster, Hospital Authority,

Tender Ref. **NWT00226** Tender Closing Date **24 November 2026**" and addressed to the Chairman, Quotation/Tender Opening Committee, Cluster Procurement and Materials Management Unit, New Territories West Cluster, Hospital Authority, must be deposited in the Tender Box situated at **CPMMU, 15/F., Block A, Staff Quarters, Tuen Mun Hospital, Tsing San Path, Tuen Mun, New Territories, Hong Kong** before**12:00 noon** (Hong Kong time) on **24 November 2026** (date).

INTERPRETATION

In this form, unless the context otherwise requires:

"Contract"	means the contract for the supply of Goods created hereunder on the terms of tender in PART I and PART II hereof;
"Contractor"	means the Tenderer whose tender is accepted as hereinafter provided;
"Goods"	means the articles and/or materials referred to in the Schedule attached hereto ("the Schedule");
"Authority"	means the Hospital Authority, a body corporate established under the Hospital Authority Ordinance 1990;
"Authority Representative"	means the Cluster Chief Executive acting for and on behalf of the Authority or any duly authorised officer for the time being performing his duties;
"Hospital"	means any public hospital managed and controlled by the Authority;
"Tender"	means the Tender submitted by the Tenderer for the supply of Goods;
"Tender Closing Date"	means the latest date by which Tender must be lodged (as stated above);
"Tenderer"	means the person or persons and/or the firm or the company whose details are set out in Part IV.

PART I
TERMS OF TENDER

1. Invitation to Tender

Tenders are invited for the supply of Goods to be delivered subject to and in accordance with these Terms of Tender, the General Conditions set out in Part II and the Special Conditions if any, set out in Part III hereof. In the event of any inconsistencies between them, the terms contained in different Parts of this Tender shall prevail in the following order of priority:

Part III (Special Conditions)

Part II (General Conditions)

Part I (Terms of Tender)

2. Tender

(a) This Tender relates to the supply of all (or any part) of the Goods whose details and specifications are set out in the Schedule.

(b) The Tender Documents are to be completed in English or Chinese (except where technical information is expressly required to be provided in English) and in permanent ink or typescript and submitted in the manner stipulated. Tenderers are required to stamp and initial next to any corrections made. Where documents to be provided under the Tender Documents are in a language other than the English or Chinese language, a true, accurate and complete English or Chinese translation certified by the translator stating his/her relevant qualifications shall be provided with the original foreign-language document. Tenders not so completed may not be considered.

(c) The Schedule issued with this Tender must not be altered by the Tenderer. Any modification of the Schedule considered necessary by the Tenderer should be the subject of a separate letter accompanying the Tender. Figures should not be altered or erased; any alteration should be effected by striking through the incorrect figures and inserting the correct figures in ink above the original figures. All such amendments should be initialled by the Tenderer in ink.

(d) Tenders are to be completed in permanent ink or typescript; Tenders not so completed may not be considered.

(e) Tenders may not be considered if complete information is not given with the Tender or if any particulars and data asked for in the Schedule are not furnished in full. Where appropriate, descriptive and technical literature on the Goods should be submitted with the Tender. The Authority Representative may request clarification of particulars and data supplied, or additional particulars and data, and if so the Tenderer shall have five working days or such period as the Authority Representative may specify to submit such further information. Failure to do so within the time period shall result in the Tender being considered incomplete.

3. Tender Validity Period

(a) The Tender validity period is **180** calendar days or such longer period as may be extended as provided for below (the "**Tender Validity Period**") from the Tender Closing Date (as defined in the "Lodging of Tender").

(b) If an award cannot be made within the Tender Validity Period, a request may be made to some or all Tenderers to extend the tender validity period, at which time they may elect to extend or withdraw their tender.

(c) The Tender shall remain binding on the Tenderer at any time before the expiration of the Tender Validity Period unless and until the Tender is cancelled or terminated by the HA.

4. Tender Prices

The prices to be quoted by the Tenderer are to be in Hong Kong currency and must only be shown on the Schedule. Such prices shall be net prices allowing for all trade and cash discounts and shall include the cost of containers, packing materials, delivery to the location specified in the Schedule. Installation, on-site testing and commissioning fee, training, and any other costs incurred by the Tenderer in performance of this Tender should be separately quoted when required. Prices must remain valid for the duration of the Contract and for the supply of all of the Goods.

5. Acceptance

The successful Tenderer will receive as an indication of acceptance a duplicate copy of this form with PART V hereof duly completed by the Authority Representative. Tenderers who do not receive any notification within **180** days from the Tender Closing Date may assume that their Tenders have not been accepted.

6. Samples

All samples submitted for consideration must be collected by unsuccessful Tenderers within 7 days of either the expiration of the Tender Validity Period or any extended period, or notification of non-acceptance of their offer, whichever shall be the earlier. If, at the expiration of such 7-day period, no arrangements have been made with the Authority Representative for the collection of such samples the Tenderer shall be deemed to have given up all title thereto and the Authority Representative may dispose of the same as he sees fit without being responsible to the Tenderer in respect thereof. The Authority reserves the right to recover from the Tenderer the costs and expenses incurred in disposal of the samples and the Tenderer shall pay such costs and expenses on demand. Receipts must be obtained for the deposit of samples with the Authority Representative who reserves the right to retain such samples unless such receipt is produced at the time of collection.

7. Saving

The Authority Representative is not bound to accept the lowest or any tender and reserves the right to accept all or any part of any tender at any time within the Tender Validity Period.

8. Personal Data

Tenderer's Personal Data may be requested for purposes related to evaluation of offer. When Personal Data is provided, please make sure that the data is accurate and complete. If Tenderer fails to provide with the information required or if the information provided is inaccurate or incomplete, the evaluation of the Tenderer's offer will be affected.

Personal Data may be made available to:

(a) Authority Representative

(b) any other relevant parties who require it for matters related to evaluation of Tenderer's offer.

(c) any relevant government departments/appropriate authorities when the Authority is required to provide it under the relevant legislation for use for the purposes of that legislation.

The Authority Representative will only use, disclose or transfer the Personal Data the Tenderer provided

(a) for the purposes relating to evaluation of offer or directly related purposes; or

(b) where permitted by law.

The Authority Representative will obtain the Tenderer's consent before using his Personal Data for any other purposes.

If the Tenderer wishes to require access to and /or correction of his Personal Data, he may do so under Personal Data (Privacy) Ordinance.

Dated this 13th day of October 2026

(Mr. Stephen LAM)
for Cluster Chief Executive
New Territories West Cluster
Hospital Authority

PART II
GENERAL CONDITIONS OF CONTRACT

1. Total Quantities

The quantities of each item of Goods specified in the Schedule are estimates only and the amount ordered by the Authority may be up to 50% less or 50% more than such quantity. Within such limits, the Tenderer shall be bound to supply the Goods in the quantities ordered in accordance with Clause 4 of this Part and at the rates specified by the Tenderer in the Schedule, and shall have no claim against the Authority for failure to order the estimated quantities.

2. **Assignment**

The Contractor shall not, without the written consent of the Authority Representative, assign or otherwise transfer or subcontract this Contract or any part share or interest therein, and the performance of this Contract by the Contractor shall be deemed to be personal to him.

3. Goods, Specifications and Proof Notes

(a) The Goods supplied under this Contract shall be of merchantable quality, fit for the purpose for which Goods of that kind are commonly bought, and comply with the specification as described in the Schedule and any technical literature supplied by the Contractor with his Tender. Unless otherwise stated in the specification, all Goods supplied under this Contract shall be new and unused. If the Goods are not fit for the purpose or of merchantable quality or fail to comply with the specification and notwithstanding the provisions of clause 5 of this Part, the Authority Representative may by notice in writing at any time and from time to time (i) reject all or part of the Goods delivered hereunder, or (ii) require the Contractor to repair or replace all or part of the Goods delivered hereunder or (iii) terminate the Contract forthwith.

(b) Any drawings and information reasonably required for the Contractor's guidance in the execution of this Contract shall be furnished to him free of charge. Drawing which are furnished shall be returned on completion of the Contract, if required.

(c) The Contractor, if required, shall furnish the Authority Representative with a proof note or a certificate showing that the Goods have been subjected to the normal tests for such Goods or such tests as the Authority Representative may reasonably require.

4. Delivery

(a) The Contractor shall, on receipt of a written order signed by the Authority Representative or any person duly authorised by him, supply and deliver at his own expenses the Goods in accordance with the delivery conditions specified in the order and to the destination named in such order, the quantities of Goods therein specified within the time specified in such order, or if no time specified, then within 14 clear working days from the date of such order and for this purpose, time shall be deemed to be the essence of the Contract. Each delivery shall be accompanied by a copy of the order, and the Contractor shall ensure that he obtains a receipt from the Authority Representative, but such receipts shall not constitute an acknowledgement that the Goods therein mentioned are acceptable or satisfactory.

(b) Orders for Goods placed not less than 14 days before the expiration of the Contract shall remain in force until fulfilled in accordance with the terms of this Contract notwithstanding the intervening expiration of this Contract by effluxion of time.

5. Inspection and Acceptance

All Goods delivered shall be subject to inspection and / or testing by the Authority and shall be deemed to have been accepted only when:

(a) the Authority Representative or any person duly authorised by him, furnishes the Contractor with an acceptance note; or

(b) a period of 30 clear working days or otherwise specified in the Contract has expired from the date of delivery and Goods have not been rejected,

whichever date is the later.

6. Rejections

(a) If the Authority rejects any Goods in accordance with clause 3(a), the Contractor shall remove the same at his own expense within 48 hours of being notified in writing by the Authority Representative of the rejection. If the Contractor fails to remove the Goods within such period, the Authority Representative may dispose of the Goods as he sees fit. No liability shall attach to the Authority in respect of such disposal.

(b) If required by the Authority Representative under clause 3.(a)(ii), the Contractor shall within a reasonable period of time following the rejection replace the Goods rejected. In the case where replacement Goods have to be obtained from sources outside Hong Kong, the Contractor must advise the Authority of the delivery date of such replacement Goods and such date must be to the satisfaction of the Authority Representative. Time shall be of the essence for delivery of such replacement Goods.

(c) In the event that the Contractor offers for delivery any Goods which have previously been rejected by the Authority Representative the Authority shall immediately thereupon be at liberty to terminate this Contract in the manner provided in clause 8.

7. Payment for Goods

When Goods are delivered under this Contract, an invoice stating the order number, the particulars of Goods delivered and the quantity, rate and value of each item shall be sent by the Contractor to the place of delivery or as otherwise directed by the Authority Representative. Unless otherwise agreed by the Authority Representative, no payment for Goods delivered will be made until the same have been accepted within the meaning of clause 5 of this Part. Once accepted, payment will be made within 30 clear working days.

8. Default

If the Contractor fails to deliver all or any of the Goods ordered within the time specified in the order or as otherwise provided in clause 4 of this Part, or the Goods are rejected in accordance with clause 3(a), or the replacement Goods are not delivered within the period mentioned in clause 6(b) the Authority Representative shall immediately thereupon be at liberty to terminate this Contract by written notice addressed to the Contractor, but without prejudice to any claims by the Authority Representative for breach of Contract and, in particular, his right to procure any Goods then outstanding from any other source, and the Contractor shall be liable for any sums so incurred in excess of the Contract price.

9. Recovery of Sums Due

Whenever under this Contract or otherwise any sum of money shall be recoverable by the Authority from or payable to the Authority by the Contractor, the same may be deducted from any sum then due or which at any time thereafter may become due to the Contractor under this or any other Authority contract.

10. Liability and Indemnities

(a) The Authority and its employees or agents shall not be under any liability whatsoever for or in respect of:

(i) any loss of or damage to any of the Contractor's property or that of its employees or agents however caused (whether by any negligence of the Authority or any of its employees or agents or otherwise).

(ii) any injury to or death of any of the Contractor's employees or agents save and except any such injury or death was caused by the negligence of the Authority or any of its employees or agents.

(b) The Contractor shall indemnify the Authority and its employees or agents against any claim or demand made against or liability incurred (including all costs, charges or expenses whatsoever) by the Authority or any of its employees or agents in respect of:

(i) any loss, damage, injury or death referred to in sub-clause (a) of this clause (save and except injury or death caused by the negligence of the Authority or any of its employees or agents).

(ii) any loss or damage sustained by or any injury to or death of any third party in consequence of any negligence of the Contractor or any of its employees or agents.

(c) In the event of any of the Contractor's employees or agents suffering any injury or death in the course of or arising out of this Contract and whether there be a claim for compensation or not, the Contractor shall within 7 clear working days give notice in writing of such injury or death to the Authority Representative.

(d) Where required by the Authority, the Contractor shall take out and maintain insurance with a reputable insurer in such manner as it is agreed with the Authority to cover its legal liabilities for loss or damage to property and injury or death to persons as a result of the performance of this Contract.

(e) For the purpose of this clause "negligence" shall have the same meaning as that assigned to it in Section 2(1) of the Control of Exemption Clause Ordinance.

11. Bankruptcy

The Authority Representative may at any time by notice in writing terminate this Contract without entitling the Contractor to any compensation in any of the following events:

(a) If the Contractor shall at any time be adjudged bankrupt, or shall have a receiving order or order for administration of his estate made against him, or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purports so to do; or

(b) If the Contractor, being a company shall pass a resolution or the Court shall make an order for the liquidation of its assets or a Receiver or Manager shall be appointed over any assets of the Contractor, or circumstances shall have arisen which entitle the court or a creditor to appoint a Receiver or Manager.

Provided always that such determination shall not prejudice or affect any right or action or remedy which shall have accrued or shall accrue thereafter to the Authority.

12. Corrupt Gifts

If the Contractor or any employee or agent of the Contractor shall be found to have committed an offence under the Prevention of Bribery Ordinance for the time being in force or any subsidiary legislation made thereafter or under any law of a similar nature in relation to this Contract or any other Authority contract, the Authority Representative may, on behalf of the Authority, terminate this Contract, without entitling the Contractor to any compensation therefor and the Contractor shall indemnify the Authority against all costs, claims, damages, losses and expenses necessarily incurred or suffered as a result by the Authority.

13. Guarantee and Warranty

(a) Without prejudice to the generality of clause 3(a) hereof, the Contractor will provide a warranty of and guarantee the quality of the Goods, and any part or portion thereof, for a period of 12 months from the date of acceptance thereof.

(b) Notwithstanding clause 5 of this Part, the Contractor shall make good as soon as possible and without charge, all defects in the Goods arising from defective design, materials, workmanship or any other cause discovered within the said period referred to in sub-clause (a) above.

(c) In the event that the Contractor is required to replace any defective Goods but he does not at the same time call for the return of the defective Goods, no responsibility for the defective Goods shall rest upon the Authority, and the Authority may dispose of them after a reasonable time in whatever manner as it sees fit and retain any proceeds thereof.

(d) If any defects are not made good within a reasonable time, the Authority may, after serving notice of intent on the Contractor, proceed to rectify the defects by repair or replacement at the Contractor's risk and expense without prejudice to any other rights which the Authority may have against the Contractor.

(e) The Contractor shall remain liable to the Authority under the terms of this clause whether or not the Goods, or any part thereof, were manufactured by him, and the Contractor shall ensure that the supplier of any Goods not manufactured by him shall be under at least the same liability to the Contractor as the liability undertaken by the Contractor to the Authority pursuant to this clause.

14. Patent Rights

The Contractor shall indemnify the Authority against all claims arising at any time that the sale, use or possession of the Goods infringes any patent rights, copyrights or registered design or other intellectual property rights of a third party, or on account of any claims for royalties arising from the sale, use or possession of the Goods, and the Contractor shall also be liable for any cost to the Authority that may arise from any such claims.

15. Applicable Law

(a) The validity and interpretation of this Contract shall be governed in all respects by the laws of Hong Kong and the parties shall submit to the exclusive jurisdiction of the courts of Hong Kong in the event of dispute.

(b) The Contractor shall comply with all applicable international and local laws, rules and regulations pertinent to its obligations under this Contract.

16. Commitment to Environmentally Responsible Purchasing

(a) The Authority is sensitive to the environmental impact of purchasing decisions and takes account of legitimate environmental concerns while continuing to achieve best value for money in its purchasing functions.

(b) The Authority identifies products which present environmental concerns and addresses these concerns in the approval of the tender specifications and in the tender evaluation process.

17. These General Conditions of Contract shall apply to the extent which they are not inconsistent with the Special Conditions of Contract (if any) set out in Part III.

18. Termination

Notwithstanding any other provision of this Contract, the Contract will expire upon satisfactory fulfilment by the Contractor of its contractual obligations in accordance with this Contract, provided that the Authority may terminate this Contract at any time during the Term by not less than thirty (30) days' written notice to the Contractor. The Contractor agrees and acknowledges that if the Authority terminates this Contract, the Authority has no liability to the Contractor arising from such termination other than paying the Contractor the fees and charges for Goods delivered up to the date of termination, provided that any such Goods have been delivered by the Contractor and have been endorsed and accepted by the Authority. Upon termination of the Contract, any licence (actual or implied) granted by the Authority to the Contractor shall immediately terminate.

PART III
SPECIAL CONDITIONS OF CONTRACT

PART IV
OFFER TO BE BOUND

1. I/We, do hereby bind myself/ourselves to execute orders for any or all of the goods specified in the Schedule, which may during the period or periods specified in the Schedule be placed by the Authority Representative at the prices quoted in the Schedule free of all other charges, subject to and in accordance with the Terms of Tender, the General Conditions of Contract and (if any) the Special Conditions of Contract.

2 I/We, also certify that the particulars given by me/us below, are correct:

(a) The number of my/our/the Company's Business Registration Certificate is .....….

(b) The date of expiry of my/our/the company's Business Registration Certificate is …….

(c) I/We/the Company is/are covered by an Employees' Compensation Insurance Policy, the particulars of which are as follows:

Policy No. ……

Name of Insurance Company ……..

Period covered by the Policy is from …… to …….

Brief particulars of the cover provided and any special conditions are as follows:

…….

…….

…….

…….

3. I am the Secretary / Managing Director of the Limited company hereinafter mentioned and duly authorised to bind the said Company by my signature.
I am a partner / We are partners in the firm hereinafter mentioned and duly authorized to bind the said firm and the partners therein for the time being.

4. The Tender is submitted with the authority and on behalf of …….....….
Company Limited whose registered office is situated at ……..…… Hong Kong.

- or -

This Tender is submitted on behalf of myself / ourselves and the firm known as ……

of …….

Hong Kong and other partners hereof namely; (state names and residential addresses of all other partners):

.....

.....

.....

5. In the event of any queries relating to our offer please contact …… Tel. No. …….

6. Name(s) and address(es) of person(s) signing:

……

.....

Signature (s) :

.....

.....

Dated this ..... day of .....

Note (i) All the particulars required above must be provided.
(ii) Strike out clearly alternatives which are not applicable.

PART V
MEMORANDUM OF ACCEPTANCE

On behalf of the Hospital Authority, I .....……..

(name and position of officer)

accept your offer upon the terms of this Contract so far as such offer relates to the following item(s) in the schedule:

.....

.....

.....

.....

Dated this ..... day of .....

Signed by the said:	]	in the presence of:	]
.....…….	]	.....…….	]
.....…….	]	.....…….	]
(name and designation of officer)	]	*(name and designation of officer)*	]

INTERPRETATION (Supplement)

In this Terms of Tender (Supplement), unless the context otherwise requires, the following expressions have the following meanings :-

"Authorised Users" means any persons authorised either explicitly or implicitly by the Authority to use the Medical Equipment / System;

"Confidential Information" means any information or data obtained or accessed by the Contractor or the Contractor Personnel which relates to the Authority or its activities that:

(a) is by its nature confidential;

(b) is designated as confidential; or

(c) the Contractor knows or ought reasonably to have known is confidential,

and includes:

(i) data stored in, processed by or retrievable from (or intended to be stored in, processed by or retrieved from) any computer system operated by or on behalf of the Authority, including the System;

(ii) information relating to the business, financial position, management, policies and strategies of the Authority;

(iii) the Tender Specifications;

(iv) information that has any actual or potential commercial value to the Authority;

(v) any electronically stored, processed, or transmitted information where unauthorized access to, or disclosure, alteration, or loss of, that information could cause significant harm to individuals, organizations or society; and

(vi) information and Personal Data relating to the employees, contractors, patients or suppliers of the Authority,

but does not include information which is in the public domain or is in or comes into the Contractor's possession independently of this Contract, other than due to a breach of this Contract;

"Contractor Personnel"	means all persons engaged in or deployed for performing the Services or the Contractor's obligations under this Contract (or any part thereof) including employees, agents, officers and sub-contractors of the Contractor and those employees and agents of the aforementioned sub-contractors;
"Defects"	means any failure of the Medical Equipment / System to comply with the Tender Specifications or any other error, fault or malfunction;
"Deliverables"	means all tangible and intangible subject matter, including without limitation those as specified in Tender Specifications and other items and materials, created, compiled, designed, developed, prepared, supplied, modified, maintained, and/or updated by the Contractor to the Authority pursuant to or for the purpose of this Contract or in relation to the Services (including all drafts, prototypes and uncompleted versions (whether published or unpublished) of any of the aforementioned items);
"Documentation"	means the documents including operation and maintenance manual(s), preventive maintenance (PM) checklist(s) (if PM is suggested by the manufacturer), installation manual / method statement, and all other related materials in human-readable form supplied to the Authority by the Contractor for aiding the use, application and maintenance of the Medical Equipment / System including any documentation specified in Clause 10 of Special Conditions of Contract and the relevant Tenderer's Schedule;
"Good Industry Practice"	means the standards, practices, methods and procedures conforming to law and the degree of skill and care, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced person engaged in a similar type of services as the Services under the same or similar circumstances;
"Goods"	means any products set out or referenced in Tender Specifications or the articles and/or materials referred to in the relevant Tenderer's Schedule to be supplied by the Contractor;
"Government"	means the Government of Hong Kong;
"Hardware"	means any hardware or Medical Equipment, as specified in the Tender Specifications and relevant Tenderer's Schedule;

"Implementation Plan"	means the time schedule and sequence of events for the performance of the Implementation Services (the details of which are set out in the relevant Tenderer's Schedule) or such other implementation plan as may be agreed by the parties to this Contract;
"Implementation Services"	means the delivery, installation, customisation, configuration, commissioning and preliminary testing of a System and each part of a System as specified in the relevant Tenderer's Schedule and the Tender Specifications;
"Intellectual Property Rights"	means patents, trade marks, service marks, trade names, design rights, copyright, domain names, database rights, rights in know-how and other intellectual property rights (of whatever nature and wheresoever arising) in each case whether registered or unregistered and including applications for the grant of any such rights;
"Licence"	means the Hardware and/or Software licence granted or procured to be granted to the Authority by the Contractor pursuant to Clause 38 of Special Conditions of Contract (if applicable);
"Maintenance Services"	means the maintenance services to be provided by the Contractor pursuant to the requirements set out in Tender Specifications, Clauses 12, 13 and 18 of Special Conditions of Contract and relevant Tenderer's Schedule;
"Medical Equipment"	means the equipment having a medical purpose(s) with the requirements set out in Tender Specifications and relevant Tenderer's Schedule;
"Overall Specifications"	means the Tender Specifications, the original manufacturer's specifications or user manual and those specifications published by the manufacturers in respect of the Hardware and/or the Software supplied by the Contractor and the Authority;
"PDPO"	means the Personal Data (Privacy) Ordinance (Cap. 486 of the Laws of Hong Kong);
"Personal Data"	has the meaning given to that term in the PDPO;

"Services"	means all the installations, works, services, duties and obligations required to be provided and performed by the Contractor under the terms of this Contract including services and/or supply of all and any items as specified in this Contract;
"Software"	means any software component of the Medical Equipment / System as specified in the relevant Tenderer's Schedule;
"System"	means the computer operating system or imaging system or ancillary components with requirements set out in Tender Specifications and relevant Tenderer's Schedule to be provided by the Contractor;
"Security Breach"	means, in relation to data, any unauthorized, accidental or otherwise unlawful access, collection, processing, erasure, loss, alteration, disclosure, copying, transmission, destruction or use of such data;
"Tender Specifications"	means the technical and functional specifications of products and requirements set out or referenced in:- (a) part (iii) of this Tender Document; and (b) the relevant Tenderer's Schedule;
"Term"	means the term of this Contract commencing from the Commencement Date and expiring on the date upon satisfactory fulfilment by the Contractor of its contractual obligations in accordance with this Contract, unless earlier terminated pursuant to Clause 42 of Special Conditions of Contract or extended in accordance with any applicable provision of this Contract.
"Training Plan"	means the training in relation to the use and maintenance of each Medical Equipment / System to be provided by the Contractor for the Authority's staff, the details of which are set out in the relevant Tenderer's Schedule or as otherwise agreed by the parties in writing;

Tender for the
(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital New Territories West Cluster, Hospital Authority

Terms of Tender (Supplement)

1. Tender Documents

These tender documents identified as **NWT00226** comprise the following:-

(i)	Tender Form HA(G)231A (Parts I to V)	(Pages 1 to 10)
(ii)	Terms of Tender (Supplement)	(Pages 11 to 36)
(iii)	Tender Specifications - please refer to separate document attached	
(iv)	Schedule A (Price)	(Pages 38 to 46)
(v)	Schedule B (Schedule of Compliance)	(Pages 47 to 69)
(vi)	Schedule C (Tenderer's Operational Experience and Capability)	(Pages 70 to 71)
(vii)	Schedule D (Declaration of Conflict of Interest by Tenderer)	(Pages 72 to 73)
(viii)	Special Conditions of Contract	(Pages 74 to 110)
(ix)	Notice for Submission of Tenders	(Page 111)
(x)	Review body on bid challenges	(Page 112)

2. Tender Preparation

2.1 The Tender and all accompanying documents must be completed and submitted in the manner stipulated under 'Lodging of Tender' in the front page of the Tender Form HA(G)231A. If the Tender is to be submitted via a courier and a receipt is needed, please instruct the courier to contact the Tender Opening Committee Registry at CPMMU, 15/F., Block A, Staff Quarters, Tuen Mun Hospital, Tsing San Path, Tuen Mun, New Territories, Hong Kong before the courier deposits the Tender into the Tender Box.

2.2 Tenderers must complete Part IV "OFFER TO BE BOUND" of the Tender Form HA(G) 231A in **duplicate** and attach thereto all Tender Documents with the item(s) in the Schedule A (Price) of Tender fully priced and all necessary information provided including descriptive literature, catalogues, operating and maintenance manuals, drawings, diagrams and documentary evidence which are necessary for tender evaluation. Failure to comply with the requirement may render the Tender invalid.

2.3 Late tenders will not be accepted, except under very special circumstances, due to unforeseen circumstances e.g. act of God or a genuine mistake by a courier company (with proof of the tender being kept intact during transit before the closing date). The Authority shall have absolute discretion to decide whether or not to accept such a late tender.

2.4. Two-Envelope Bidding

2.4.1 This Tender shall be conducted in a two-envelope bidding process. Tenderers must submit the technical and price information in two separate sealed envelopes, one marked with the word "Technical Proposal" and the other with "Price Proposal" in the following manner:-

(i) Technical Proposal – contains the complete set of Tender Documents, except Schedule A (Price) and all any supplementing quotations.

(ii) Price Proposal – contains the Schedule A (Price) and all any supplementing quotations.

(Note: Tender reference number; Description and Closing Date shall be marked on the envelopes for easy identification.)

2.4.2 The Authority will complete the technical assessment first by evaluating the technical proposals of the Tenders according to the Tender Specification and sample submitted (if required). The price proposals of those Tenders who can meet the technical assessment and passed the sample testing/evaluation (if required) will be evaluated further based on the price proposal.

3. Criteria for Tender Evaluation and Marking Scheme

3.1 The Tender offers will be evaluated by a Tender Assessment Panel set up by the Authority. The Authority will only assess and consider the Tender offers that do not contain any equipment item(s) which are either supplied by

(a) a Tenderer which is being excluded by the Authority from participation in tendering; or

(b) any other companies which are being excluded by the Authority from participation in tendering.

3.2 A marking scheme will be applied for the evaluation of the Tenders.

3.3 The Tender Specifications are classified into mandatory (M) and desirable (D) requirements. Only those offers meeting all mandatory requirements will be considered. A marking scheme will be applied as follows:

(A) Quality Assessment on Desirable Requirements (30%)

The desirable requirements of the Tender Specifications are apportioned and denoted as below:

Total no. of desirable requirement (D) specified in Tender Specifications:
- **Item 1: 29**

The quality score of individual offers is :

$$\text{Formula applied : } 30 \times \frac{\text{No. of complied desirable requirement}}{\text{Total no. of desirable requirement}}$$

(B) Tenderer Assessment on Operational Experience and Capability (10%)

Tenderers shall indicate and submit proposals under **Schedule C (Pages 70 to 71) for details**. Tenderers may be invited to present their proposals, if deemed necessary, within **5** working days from date of receipt of written request.

(C) Record of Performance (10%)

Tenderers' performance record, including but not limited to product quality, post-sales services and maintenance services, so far as they are relevant to the present procurement, for a period of 18 months immediately preceding and including the tender closing date and up to the completion of tender assessment shall be taken into account in the tender evaluation.

(D) Price Assessment (50%)

The price score of individual offers is :

$$\text{Formula applied : } 50 \times \frac{\text{Lowest tender price among the conforming tenders}}{\text{Tender price of the tender being assessed}}$$

Normally the Tender with the highest combined score would be selected. The combined score will be calculated based on the formula below:

Total combined score = (A) Total marks of Quality Assessment + (B) Total marks of Tenderer Assessment + (C) Total marks of Record of Performance + (D) Total marks of Price Assessment

If two or more Tender offers obtain the same highest combined score, preference will be given to the Tender offer which obtains the highest technical score [i.e. (A)+(B)+(C)] or (in case of same technical score) the highest performance score [i.e. (C)].

3.4 The Authority will check the submitted certificates and documentary evidence for compliance with the mandatory requirements of the Tender Specifications. The Tender offers will not be evaluated further if any of the mandatory requirements of the Tender Specifications cannot be fully complied with.

3.5 The product samples of the Tender offers that possess sufficient and acceptable certificates and documentary evidence for proving the compliance with the mandatory requirements of the Tender Specifications will be evaluated and distributed to the major hospitals for clinical evaluation in the correctness of compliance and acceptability against the major clauses of the Tender Specifications.

3.6 The Tender offers will be regarded as acceptable with the majority of hospitals confirming acceptance and will be put into next evaluation stage to evaluate the price and terms of offer.

3.7 Before the Tender Assessment Panel makes any recommendation in relation to the award of the Contract to a Tenderer, financial vetting will be conducted in accordance with Clause 12 below in respect of such Tenderer if deemed by the Authority.

3.8 All costs associated with a Tender submission shall be entirely the responsibility of the Tenderer.

3.9 Pursuant to Clause 3.1, in the event that any Tenderer or company has been excluded from participation in tendering by the Authority before the award of the Contract, the concerned Tender offer(s) will not be evaluated any further. The Authority may then consider and accept other conforming Tender offer(s) in accordance with the criteria for tender evaluation stipulated in Clause 3 without giving any prior notice to the excluded Tenderer or company.

4. Negotiation

The Authority reserves the right to negotiate with any tenderer on the terms of the offer.

5. Accuracy of Tendered Prices

Tenderers are reminded to ensure the accuracy of their Tender prices quoted in the Price Proposal. Under no circumstance will the Authority accept any request for price adjustment on grounds that a mistake has been made in the Tender prices quoted by a Tenderer.

6. Tender Prices

6.1 Tenderers are requested to quote the prices in Hong Kong dollars, which must be net prices allowing for all trade and cash discounts and inclusive of all cost and expense to be incurred by the Tenderer in the performance of the Contract ("Tender Prices"). Prices quoted in other currencies will be considered and if accepted, payment will be made in the quoted currency. All bank charges incurred by the Contractor will be borne by the Contractor.

6.2 For price comparison purposes, any prompt payment discount offered by the Tenderer will not be taken into consideration in assessment of Tender Prices.

6.3 Prices must remain valid for the duration of the Contract unless Tenderers clearly stipulate otherwise.

7. Basis for Acceptance

7.1 Pursuant to Clause 7 of Terms of Tender, this Tender may be considered and accepted on **an overall** basis. The Authority reserves the right to award the Contract to more than one Tenderer.

8. Award of Contract

With reference to Clause 5 of Terms of Tender, the successful Tenderer will receive a letter of acceptance from the Authority prior to the receipt of the formal Contract document. This letter of acceptance shall constitute a binding contract between the Authority and the successful Tenderer.

9. Placement of Order

Orders will be placed by the Authority Representatives on an as and when required basis during the contractual period.

10. Tenderer's Enquiries

10.1 Any enquiries from Tenderers concerning this Tender document up to the date of lodging their Tenders with the Authority must be in writing and shall be submitted to:-

Cluster Procurement & Materials Management Unit
New Territories West Cluster
Hospital Authority
Attention : Ms. Joanne CHU or Mr. K K CHAN
15/F., Block A, Staff Quarters, Tuen Mun Hospital
Tsing San Path, Tuen Mun, New Territories
Hong Kong.

E-mail Address: cky054@ha.org.hk or chankk4@ha.org.hk
Tel : (852) 3767 1794 or (852) 2468 6817 Fax : (852) 2456 9034 / (852) 2460 4059

10.2 After lodging a Tender with the Authority, the Tenderer shall not attempt to initiate any further contact whether direct or indirect with the Authority on its Tender. The Authority shall have the sole right to initiate any such further contact and all such contacts and any replies to the Tenderer thereto shall be in writing or formally documented in writing.

10.3 Any complaints from Tenderers about tendering process or contract award must be in writing and shall be submitted to:-

Cluster General Manager (Administrative Services)
New Territories West Cluster
Hospital Authority
Attention: Mr. Stephen LAM
5/F., Rehabilitation Block, Tuen Mun Hospital
Tsing San Path, Tuen Mun, New Territories
Hong Kong.
E-mail Address: lamhw@ha.org.hk
Tel : (852) 2468 5023 Fax : (852) 2455 1911

11. Company / Business Organization Status

Tenderers must provide the following details to the Authority with their Tenders :

(i) Name and address of the company / business organization.

(ii) Length and nature of business experience including without limitation experience in the performance and / or supply of the products as listed in Schedule A (Price).

(iii) Shareholders / partners of the company / business organization.

(iv) Audited accounts/financial statements of the tenderer for the past three years. The latest audited accounts/financial statements must be for the period ended no more than eighteen (18) months before the tender submission date mentioned in Part IV OFFER TO BE BOUND. The audited accounts/financial statements must include Director's report, Auditor's report, Profit and loss statement/Statement of comprehensive income, Balance sheet/Statement of financial position, Statement of cash flow and Notes to the Accounts/financial statements. The accounts/financial statements shall be prepared on the same basis for each year in accordance with accounting principles generally accepted in the Hong Kong Special Administrative Region and the disclosure requirements of the Companies Ordinance, Cap. 32/Cap. 622 of the laws of Hong Kong (as applicable), or for overseas company the equivalent requirements of the local government; and

(v) Projected profit and loss accounts/Statement of comprehensive income and cash flow statements for the period of the contract, showing the revenue, operating expenses, capital expenditure and the sources of finance such as upfront investment and/or debt financing.

(vi) A copy of its Articles of Association or other documents evidencing its business status.

(vii) Copies of the organization's Certificate of Incorporation with the companies registry (if incorporated), its current business registration certificate and its application form for registration of business.

(viii) Copies of all current licence(s) or permit(s) issued in favour of the Tenderer by the relevant authorities that are required to legally perform and / or supply the products as listed in Schedule A (Price).

(ix) Documentary evidence of any agency claimed by the Tenderer in relation to the Tender, whether on a sole or exclusive basis or otherwise.

12. Financial Vetting

12.1 The Authority needs to be satisfied that a Tenderer has sufficient financial capability to undertake and fulfil its obligations under the Contract before it can be considered for Contract award. As a result, the Authority may require information in addition to that requested in Clause 11 above in order to conduct a financial assessment of any Tenderer.

12.2 The Authority reserves the right to reject any Tender submission or impose further requirements for the award of the Contract if in the opinion of the Authority (i) the result of the financial assessment is not satisfactory or (ii) a Tenderer fails to provide adequate information requested by the Authority for the financial assessment. The further requirements which may be imposed by the Authority include, without limitation, the provision of guarantee from the parent company/fellow subsidiary of the Tenderer having a healthy financial position to the satisfaction of the Authority in a form approved by the Authority or the increase of the Deposit from 2% to 5% of the Contract value.

13. Statement of Compliance

Tenderers are required to complete the Schedule B (Schedule of Compliance), in particular, provide the Certificate of Non-Collusion and confirm point by point against the Tender Specifications that offer(s) submitted comply with the required specifications. If Tenderers wish to include counter-proposal in their Tender reply, the counter-proposal must be clearly stated in the reply. The Authority reserves the right to accept or reject any such offer.

14. Payment Discounts

Tenderers are requested to indicate in Schedule B the discount they would allow on the Tender prices if acceptance of goods is confirmed and payment for each consignment is made in full.

15. Tender Samples

15.1 Tender samples for the item(s) specified in the Schedule A (Price) may be required for evaluation and testing and such samples (which should fully comply with Tender Specifications) MUST be made available by Tenderers free of all costs within **21** days from date of receipt of written request.

15.2 All the Tender samples to be submitted, if requested, shall be free of all costs including delivery expenses. Tenderers shall collect the Tender samples from designated hospitals after tender evaluation.

15.3 In delivery of Tender samples, Tenderers shall present a delivery note with detailed description and quantity of items contained in the Tender samples for receiving confirmation.

15.4 A label bearing the following information should be attached to each of the samples:-

(a) Tender reference number;
(b) Company stamp;
(c) Brief description of the item;

(d) Item number which should be identical to the item number shown on the Schedule
(e) Closing date of the Tender.

15.5 Tenderers are reminded that their offers will be jeopardized if samples have not been submitted in accordance with the above requirement.

16. Presentation / Product Demonstration

Tenderers may be invited to provide a brief presentation / product demonstration on each item offered.

17. Product Information

Tenderers shall submit with the Tender a sufficient and valid product information, e.g. catalogues, technical specifications, brochures, etc. Additional copies may be requested for Hospital to facilitate easy reference and ordering.

18. On Loan Instrument

18.1 Tenderers shall specify in the Tender the instruments, if any, that can be on loan to hospitals for use on a free of charge basis. Tenderers shall provide the selling price of the instruments for the Hospital's reference. Tenderers shall be responsible for the cost of delivery to and collection from the specified locations.

18.2 The title and risk of the 'on loan' instruments shall remain with the Tenderers who shall be responsible for the proper maintenance, if required, of the instruments to ensure their safety standard is always maintained to fit for the intended use.

18.3 Tenderers shall not claim for damage to the 'on loan' instruments that are caused by wear and tear under the normal use by the Hospital. If the 'on loan' instruments are found lost during the custody of the Hospital, Tenderers and the Hospital shall agree the settlement by negotiation but the charges for the lost instruments, if any, shall not exceed the selling price as quoted in the Contract or in the subsequent correspondence.

19. New Information Relevant to Qualified Status

Tenderers should inform the Authority in writing immediately of any factors which might affect their qualified status. The Authority reserves the right to review their qualified status in the light of any new information relevant to their qualification.

20. Life Expectancy of Product

The product is expected to have a normal life span of **10** years. Tenderers shall quote in Schedule B the normal life span of the offered product.

21. Total Life Cycle Cost and Net Present Value Analysis

21.1 The total life cycle cost [excluding all optional items as stipulated in the Tender Specifications, if any, and Trade-in value quoted in **Section D of Schedule A (Price)**] shall be included in the calculation of the Price Score. **For each of the Item offered in Section A to G of Tender Schedule A (Price),** tenderer is required to provide a detailed calculation/projection of the Total Life Cycle cost for each unit of the Equipment. The Total Life Cycle cost shall be fully comprehensive and without hidden costs. Details breakdown in relation to all the Schedules that have cost elements and contribute to the Total Life Cycle cost shall be provided. The dollar value of the cost elements shall be specified. Tenderer shall NOT specify them as a percentage of the equipment / system cost.

21.2 The Authority will use the present values to substitute the Tender Prices in Total Life Cycle Cost evaluation. The Total Life Cycle cost [excluding the price for basic machine as quoted in Section A of Tender Schedule A (Price)] shall be adjusted to the current price based on the latest available "Infrastructure Bond Programme (IBP) and Government Sustainable Bond Programme (GSBP) rate" on the Tender Closing Date. The Authority will adopt the "Closing Reference Rates" as disclosed in Section 10 of the IBP and GSBP - Table 10.4.3.1 "Prices and yields of institutional Government Bonds issued under the Infrastructure Bond Programme and Government Sustainable Bond Programme (daily figures)" available in the Monthly Statistical Bulletin published by The Hong Kong Monetary Authority (HKMA) as the Government Bond rate.

https://www.hkma.gov.hk/eng/data-publications-and-research/data-and-statistics/monthly-statistical-bulletin/table/

21.3 The purpose of conducting a net present value analysis is for tender assessment only and will not form part of the Contract.

22. Post Warranty Maintenance Services Cost

22.1 Tenderers shall quote in Schedule A (Price) the whole annual post warranty maintenance services costs of the offered product commencing from the expiry of the Warranty Period. The post warranty maintenance services costs quoted shall be of two types, i.e. (a) costs inclusive of labour, regular calibrations, preventive maintenance (PM), corrective maintenance (CM) and minor parts/components and (b) costs of all-inclusive. Each type shall include preventive maintenance (PM) frequency per unit per annum. The Authority will adopt type (b) of the post warranty maintenance services costs for Total Life Cycle cost evaluation. If Tenderers fail to quote such services costs for evaluation, the Authority will treat such tender as an incomplete offer. Tenders with incomplete offer quoted in the Tenderer's Schedule will not be considered.

22.2 The annual post warranty maintenance services costs must be quoted in a dollar value and for each unit of the equipment. Any quotation submitted in a value equivalent to a percent of the equipment cost being quoted in Schedule A (Price) or a lump sum value is not allowed.

22.3 The Authority may at its option enter into the post warranty maintenance services contract with the Tenderer for the duration at the Authority's discretion.

23. Accessories / Components

23.1 The price(s) quoted for the item(s) in Schedule A (Price) shall include all accessories / components for each unit of equipment per annum which is/are essential to the normal operation of the item(s).

23.2 Tenderers shall quote the optional accessories / components with itemized prices for each unit of equipment per annum in Schedule A (Price) for evaluation.

24. Spare Parts

24.1 Tenderers shall guarantee that spare parts are available to cover the full useful life of the product.

24.2 Tenderers shall quote the price for the recommended spare parts sufficient for at least one-year operation and maintenance and their lead time of delivery in Schedule A (Price).

24.3 Spare parts price may be taken into calculation of the total life cycle cost of the product.

25. Equipment Specific Consumables

Tenderers shall confirm in Schedule B if the consumables used on the offered product are specific and have no alternative/compatible. Tenderers shall submit quotation for the consumables with itemized price list in Schedule A (Price) for consideration. The consumables price may be taken into calculation of the total life cycle cost of the offered product.

26. Special Tools/Test Equipment

Tenderers shall provide and quote in Schedule B any special tools and test equipment which are essential for the operation and maintenance of the product.

27. Operational Training

Tenderer is required to provide operational training to operators/users free of charge. The operational training shall be designed to enable the operators/users to use the Goods safely, effectively and properly in all aspects. Tenderer shall specify in Schedule B the type of operational training to be provided.

28. Service Training

Tenderer is required to provide training on basic servicing of the Goods on-site for all service personnels who would normally be expected to service the equipment. A list of topics covered in the training shall be submitted in the tender. Tenderer shall specify in Schedule B the type of service training to be provided.

29. Factory and On-site Visit

29.1 If required by the Authority during the tender validity period, factory visit to the manufacturing plants of the products offered may be conducted by representatives of the Authority on request. The factory visit may not be limited to the following:-

(i) Manufacturing process;
(ii) Quality control; and
(iii) Support service.

29.2 Tenderer should note that the above visits, if required, would form part of tender evaluation. Tenderer should make necessary arrangement within 7 working days upon request of the Authority. Failure to comply with the above requirement may render the Tender invalid.

30. End-of-Support of obsolete versions of Microsoft Windows

Tenderers shall provide and quote in Schedule B (Schedule of Compliance) the questionnaire your proposed refreshment plan for the equipment to be offered to the Authority if your proposed equipment or system uses obsolete or to be obsolete versions of Microsoft Windows.

31. Tender Closing Time in case of Rainstorm/Typhoon/"Extreme Conditions"

The Tender Closing Time and Tender Closing Date will be extended to 12:00 noon the next working day in Hong Kong (i.e. any day from Monday to Friday which is not a public holiday) under the following situations :

(i) a black rainstorm signal or tropical cyclone warning signal No. 8 or above or "Extreme Conditions" issued by the Government is still in force between 9:00 am and 12:00 noon on the Tender Closing Date; or

(ii) it is announced by the Government between 9:00 am and 12:00 noon on the Tender Closing Date that a black rainstorm signal or tropical cyclone warning signal No. 8 or above or "Extreme Conditions" will be issued in Hong Kong between 9:00 am and 12:00 noon on the Tender Closing Date. For the avoidance of doubt, if it is announced by the Government that such signal will be issued at or before a time that falls beyond 12:00 noon on the Tender Closing Date, there will not be any extension of the Tender Closing Time or Tender Closing Date unless the relevant signal is actually issued and is in force between 9:00 am and 12:00 noon on the Tender Closing Date.

32. Ordinance Concerning Product Safety

32.1 Pursuant to Clause 15 of the General Conditions of Contract, Tenderers shall quote in Schedule B the details of the licences and/or test certificate/report which are required for the provision of the offered product under the Ordinance of Hong Kong, e.g. Telecommunications Ordinance (Cap. 106 of the laws of Hong Kong), Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations (Cap. 59 of the laws of Hong Kong), etc.

32.2 If the Authority is required by law to maintain the licences or test certificates for the possession or use of the offered product, Tenderers shall inform the Authority of such requirements in Schedule B.

33. Listing under the Medical Device Administrative Control System

33. 1 Currently, there is no specific legislation that regulates the manufacture, import, distribution and sale of MDs (which may include Medical Equipment and consumables) in Hong Kong. In order to pave the way for implementing the long-term statutory control of medical devices, the Department of Health ("DH") of the Government has set up the MDACS with the following features:

(a) a listing system for applicable MDs*, under which manufacturers of the applicable MDs or their respective local representative could voluntarily list their applicable MDs with DH; and
(* "Applicable MDs" are the Class II/III/IV general medical devices and Class B/C/D in-vitro diagnostic MDs according to the classification rules of MDs under MDACS.)

(b) an adverse event reporting system, through which the manufacturers (or their respective local representative), users, and the general public could report adverse events associated with MDs to DH.

33.2 The MDACS is run by the Medical Device Division ("MDD") under DH. Tenderers may visit MDD's website:

http://www.mdd.gov.hk/en/mdacs/index.html

or contact MDD at telephone number 3107 8484 or facsimile number 31571286 or via e-mail: mdd@dh.gov.hk for further information on the MDACS.

33.3 The Authority supports the MDACS's objective to safeguard patient safety, and has included in this Tender the requirement for Tenderers to commit the submission of their offered products which are applicable MDs to the MDD for listing under the MDACS by a date not later than six months after the contract commencement. Please provide relevant details on the listing in the Schedule B with supporting documents for all offered products which are applicable MDs. If Tenderers' offered products (or any of them) are not applicable MDs according to the classification rules of MDs under MDACS or are otherwise not subject to listing under the MDACS, please declare the same and provide the relevant details in Schedule B with supporting documents.

33.4 The successful Tenderer shall, upon request by the Authority, update the Authority the listing record of their offered products which are applicable MDs under MDACS and/or status of its submissions to DH for listing of such products under MDACS. If, in the sole opinion of the Authority, the successful Tenderer fails to submit its application(s) to DH before the committed date provided in accordance with **Clause 33.3 of this Part** or the MDACS listing cannot be completed within twelve (12) months after contract commencement or the successful Tenderer's declaration under **Clause 4 in Schedule B** are found to be invalid, incorrect or unsubstantiated, the Authority may, without prejudice to the Authority's other rights and remedies under the contract or by law, exercise all or any of its rights under Clause 33.1 of Special Conditions of Contract [and/or disqualify that Tenderer, its holding company and subsidiaries from participation

in any future tenders issued by the Authority], as the Authority may in its absolute discretion consider appropriate.

33.5 Tenderers shall confirm their agreement to comply with all statutory requirements within the prescribed period under the legislation should the statutory control of MDs takes effect in Schedule B.

34. Commitment to Environmentally Responsible Purchasing

34.1 The Authority is sensitive to the environmental impact of purchasing decisions and takes account of legitimate environmental concerns while continuing to achieve best value for money in its purchasing functions.

34.2 The Authority identifies products which present environmental concerns and addresses these concerns in the approval of the Tender Specifications and in the tender evaluation process.

35. Environmental Friendly Measure

The following environment friendly measures are recommended in the preparation of the tender documents:-

35.1 All documents should preferably be printed on both sides and on recycled paper. Papers exceeding 80 gsm are not recommended.

35.2 Excessive use of plastic laminates, glossy covers or double covers should be avoided as far as possible. Use of recyclable non-glossy art board paper as document covers is recommended.

35.3 Single line spacing should be used and excessive white space around the borders and in between the paragraphs should be avoided.

36. Consent to Disclosure

The Authority shall have the right to disclose whenever it considers appropriate, or upon request (verbal or written) by any third party (including unsuccessful Tenderers) information on the Contract, such as the name and address of the Contractor, product description/brand/model/country of origin (if applicable), description of the relevant services (if applicable) and the value of the Contract, without reference to or consent from the Contractor. Unsuccessful Tenderers may also enquire as to the reason for the rejection of their Tender submissions.

37. Contract Deposit

37.1 In the event that the Authority is exercising its option under Clause 22.3 above to award the post warranty maintenance services together with the supply of Goods to the successful Tenderer, the successful Tenderer is required to deposit with the Authority:

(a) before the commencement of the Contract or within 30 days from the date of the letter of acceptance whichever is the later, an amount equal to:

(i) where the successful Tenderer is a Tenderer which has passed the financial assessment referred to in Clause 12 above or in cases other than those provided in Clause 37.1(a)(ii) below, 2% of the total price of the Goods; or

(ii) if required by the Authority in case where the successful Tenderer is a Tenderer which, in the opinion of the Authority, fails in the financial assessment referred to in Clause 12 above, or fails to provide adequate information for the financial assessment, 5% of the total price of the Goods

(the "**Supply Phase Deposit**") as a security for the due and faithful performance of its supply of the Goods under the Contract and performance of its warranty under the Warranty Period ("**Supply Phase**"); and

(b) 30 days before the expiry of the Warranty Period, a further amount equal to:

(i) where the successful Tenderer is a Tenderer which has passed the financial assessment referred to in Clause 12 above or in cases other than those provided in Clause 37.1(b)(ii) below, 2% of the total post warranty maintenance services costs of the Goods for five years commencing from the expiry of the Warranty Period; or

(ii) if required by the Authority in case where the successful Tenderer is a Tenderer which, in the opinion of the Authority, fails in the financial assessment referred to in Clause 12 above, or fails to provide adequate information for the financial assessment, 5% of the total post warranty maintenance services costs of the Goods for five years commencing from the expiry of the Warranty Period,

(the "**First Maintenance Phase Deposit**") as a security for the due and faithful performance of its first five years' post warranty maintenance services under the Contract (the "**First Maintenance Phase**"); and

(c) 30 days before the expiry of the fifth year post warranty maintenance period, a further amount equal to:

(i) where the successful Tenderer is a Tenderer which has passed the financial assessment referred to in Clause 12 above or in cases other than those provided in Clause 37.1(c)(ii) below, 2% of the total post warranty maintenance services costs of the Goods for 4 years commencing from the expiry of the fifth year post warranty maintenance period; or

(ii) if required by the Authority in case where the successful Tenderer is a Tenderer which, in the opinion of the Authority, fails in the financial assessment referred to in Clause 12 above, or fails to provide adequate information for the financial assessment, 5% of the total post warranty maintenance services costs of the Goods for 4 years commencing from the expiry of the fifth year post warranty maintenance period,

(the "**Second Maintenance Phase Deposit**") as a security for the due and faithful performance of its last four years' post warranty maintenance services under the Contract (the "**Second Maintenance Phase**"),]

either by cheque or in the form of a duly executed and valid irrevocable Banker's Guarantee issued by a bank licensed in Hong Kong under the Banking Ordinance (Cap. 155 of the laws of Hong

Kong) in a form approved by the Authority. A banker's guarantee pre-approved by the Authority is set out in Appendix 1.

The First Maintenance Phase Deposit and the Second Maintenance Phase Deposit shall collectively be referred to as the "**Maintenance Phase Deposit**".

The First Maintenance Phase and the Second Maintenance Phase shall collectively be referred to as the "**Maintenance Phase**".

The Supply Phase Deposit and the Maintenance Phase Deposit shall collectively be referred to as the "**Phase Deposits**".

37.2 The successful Tenderer must place and maintain the full amount of:

(a) the Supply Phase Deposit throughout the Supply Phase and until the date falling 3 months after the end of the Warranty Period or the date on which all obligations and liabilities of the Contractor under the Supply Phase (including performance of its warranty under the Warranty Period) have been duly carried out, completed and discharged, whichever is the later; and

(b) the First Maintenance Phase Deposit throughout the First Maintenance Phase and until the date falling 3 months after the end of the First Maintenance Phase or the date on which all obligations and liabilities of the Contractor under the First Maintenance Phase have been duly carried out, completed and discharged, whichever is the later; and

(c) the Second Maintenance Phase Deposit throughout the Second Maintenance Phase and until the date falling 3 months after the end of the Second Maintenance Phase or the date on which all obligations and liabilities of the Contractor under the Contract have been duly carried out, completed and discharged, whichever is the later.

37.3 The Tenderer shall elect in Schedule B which method it prefers to pay the Deposit or the Phase Deposits (as the case may be) and, in the case of a banker's guarantee, details of the same including the issuing bank. In the event that the Tenderer fails to elect which method of providing the Deposit or the Phase Deposits (as the case may be) it prefers, it will be deemed that the Tenderer has agreed to pay the Deposit or the Phase Deposits (as the case may be) by cheque to the Authority.

37.4 Notwithstanding Clause 37.1(a), should the successful Tenderer fail to place all or part of the Maintenance Phase Deposit with the Authority by the due date or respective due dates aforesaid, the Authority may withhold the Supply Phase Deposit until the required Maintenance Phase Deposit has been placed with the Authority.

37.5 Should the successful Tenderer fail to place the Deposit or all or part of the Phase Deposits (as the case may be) with the Authority by the due date or respective due dates aforesaid, the Authority may in its absolute discretion terminate the Contract by notice in writing to the successful Tenderer.

38. Contractor Performance Monitoring

Tenderers should note that in the event a Tenderer is awarded a contract by the Authority, the Tenderer's performance, including but not limited to product quality, after sales services and Maintenance Services, where applicable, in the contract shall be monitored and taken into account in evaluating the Tenderer's

tenders in response to invitations for tenders by the Authority. If, based on the Tenderer's performance record, the Authority has a reasonable concern about the Tenderer's legal and financial capabilities and the commercial and technical abilities to undertake the relevant procurement, the Authority may in its absolute discretion (i) take into consideration the Tenderer's performance record, both for the equipment type(s) specified in the warning letter and for other equipment types/services provided by the Contractor in the tender evaluation and/or (ii) exclude that Tenderer, its holding company and subsidiaries from participation in tendering, for such period as the Authority may in its entire discretion consider appropriate. The Authority shall have the right to publicize or disclose, whenever it considers appropriate or upon request (verbal or written) by any third party, information of the Contractor/Tenderer who has been excluded from participation in tendering by the Authority, such as the name of the Contractor and duration, without reference to or consent from the Contractor/Tenderer. Tenders from the Tenderer who has been excluded from participation in tendering by the Authority shall be rejected.

39. Code of Conduct

Having due regard to the Authority's corporate image and reputation and the Authority's need to uphold the same, the Tenderers shall propose in Schedule B a code of conduct by reference to the "Sample Code of Conduct for Non-Governmental Organizations ("NGOs") / for Private Sector" issued by and obtainable from the Independent Commission Against Corruption ("ICAC"). The "Sample Code of Conduct for NGOs / for Private Sector" can be accessed via the link below in HA website under "Tender Notice":

http://www.ha.org.hk/visitor/ha_visitor_index.asp?Content_ID=2001&Lang=ENG&Dimension=100

40. Offering Gratuities

(a) Tenderers shall not, and shall procure that their employees, agents and sub-contractors shall not, offer, solicit or accept an advantage as defined in the Prevention of Bribery Ordinance (Cap. 201 of the laws of Hong Kong) in connection with this Tender.

(b) Failure to so procure or any act of offering, soliciting or accepting advantage referred to in paragraph 40(a) above committed by the Tenderer or by an employee, agent or sub-contractor of the Tenderer shall, without affecting the Tenderer's liability for such failure and act, result in its Tender submission being invalidated.

41. Cancellation of Tender

Without prejudice to the Authority's right to cancel the Tender, where there are changes of requirements after the Tender Closing Date, for operational or any other reasons, the Authority is not bound to accept any conforming Tender and reserves the right to cancel the Tender.

42. Destruction of Unsuccessful Tenders

Those unsuccessful tender submissions falling within the purview of the Agreement on Government Procurement of the World Trade Organization ("WTO GPA") shall be destroyed 3 years after the date of the award of the Contract. Where a tender is cancelled (whether or not such tender is within the purview of WTO GPA), all tender submissions under that tender can be destroyed any time after cancellation.

43. Confidentiality and Protection of Personal Data/Confidential Information

Tenderers are requested to keep all information obtained from the Tender and Personal Data confidential and comply with the PDPO at all times. Upon request by the Authority, the Contractor shall procure that all the Contractor Personnel sign a confidentiality undertaking in the form set out in Appendix to Special Conditions of Contract prior to commencing any work in accordance with this Contract.

44. Manufacturer's Agreement

If a Tenderer is not the manufacturer of the Goods offered in its Tender, the Tenderer shall submit with its Tender a written undertaking issued by the manufacturer of the Goods evidencing the manufacturer's agreement to supply such Goods to the Tenderer should the Tenderer be awarded the Contract. The written undertaking shall be signed by a duly authorized representative of the manufacturer and dated no later than the Tender Closing Time but not earlier than six (6) months before the Tender Closing Time. If a Tenderer fails to submit the written undertaking before the Tender Closing Time, or by the time specified by the Authority, its Tender may not be considered

45. Conflict of Interest

45.1 Without limiting the Authority's right and the Contractor's obligations under Clause 31 of Special Conditions of Contract, Tenderers must declare in Schedule D whether any actual, apparent, potential or perceived conflict of interest will, or might, arise in the performance of their obligations under the Contract and the details of any such conflict. If at any time after submitting the Tender submission and prior to entering into the Contract with the Authority, any actual, apparent, potential or perceived conflict of interest arises or may arise for or becomes known to any Tenderer which is inconsistent with the declaration in Schedule D, such Tenderer should immediately notify the Authority in writing.

45.2 The Authority reserves the right to reject any Tender submission or take any other action it considers appropriate if, in the Authority's opinion, any conflict of interest will or might arise in respect of any Tenderer. However, identification of a potential or actual conflict of interest does not necessarily preclude a Tender submission from consideration. The Authority will carefully consider the circumstances surrounding the conflict of interest to determine whether the Tender submission should be rejected on this basis.

46. The Sale of Goods (United Nations Convention) Ordinance (Cap. 641 of the laws of Hong Kong)

The provisions of the United Nations Convention on Contracts for the International Sale of Goods shall not apply to this invitation to Tender and a Tender submitted by a Tenderer in response to this invitation to Tender.

47. National Security

Notwithstanding anything to the contrary in the Tender Documents, the Authority reserves the right to disqualify a Tenderer on the grounds that the Tenderer has engaged, is engaging, or is reasonably believed to have engaged or be engaging in acts or activities that are likely to cause or constitute the

occurrence of offences endangering national security or otherwise the exclusion is necessary in the interest of national security, or is necessary to protect the public interest of Hong Kong, public morals, public order or public safety. The Tenderers shall in Schedule B confirm and warrant that they have not engaged, are not engaging and will not engage in the aforesaid acts or activities. Failure to observe the requirement shall render all related submissions null and void and any such submission shall not be considered.

48. General

48.1 The Authority reserves the right in its absolute discretion to cancel this Tender at any time.

48.2 The Authority will not be responsible for or liable to any Tenderer for any cost or expense incurred in relation to (i) the preparation or submission of the Tender submission; or (ii) any communication between the Tenderer and the Authority in relation to the Tender, under any circumstances (including the cancellation of this Tender by the Authority).

48.3 The Contractor acknowledges and agrees that the Authority is not responsible for the accuracy of any information provided in this Tender, and the Contractor has made its own independent evaluation of the business potential of the Tender Subject Matter and it has submitted its Tender submission based solely on the result of such independent evaluation.

Appendix 1 to Terms of Tender (Supplement)

HA's Pre-approved Form of Banker's Guarantee for the Performance of a Contract

THIS GUARANTEE is made the day of 20XX.

By [name of bank]_____
of [address of registered office / principal place of business in HK] , a bank within the meaning of the Banking Ordinance (Chapter 155 of the Laws of Hong Kong) (hereinafter called the "Guarantor")
In favour of
The Hospital Authority (hereinafter called the "Hospital Authority") of the other part.

WHEREAS:

(A) By a contract (hereinafter called the "**Contract**") dated the made between _____ (hereinafter called the "**Contractor**") of the one part and the Hospital Authority of the other part (designated as Hospital Authority Contract No.), the Contractor agreed to perform all its obligations under the Contract for _____ (Contract Description).

(B) The Guarantor has agreed to guarantee in the manner hereinafter appearing, the due and faithful performance of the Contract by the Contractor.

Now the Guarantor HEREBY AGREES with the Hospital Authority as follows:

(1) Where applicable, words and expressions used in this Guarantee shall have the meaning assigned to them under the Contract.

(2) In consideration of the Hospital Authority entering into the Contract with the Contractor:

(a) The Guarantor hereby irrevocably and unconditionally guarantees the due and punctual performance and discharge by the Contractor of all of his, her and their obligations and liabilities under the Contract and the Guarantor shall pay to the Hospital Authority on demand and without cavil or argument all monies and liabilities which are now or at any time hereafter shall become due or owing by the Contractor to or in favor of the Hospital Authority under or in connection with the Contract together with all costs, charges and expenses on a full indemnity basis which may be incurred by the Hospital Authority by reason or in consequence of any default on the part of the Contractor in fulfilling, performing or observing any of the obligations terms conditions stipulations or provisions of the Contract.

(b) The Guarantor, as a principal obligor and as a separate and independent obligation and liability from its obligations and liabilities under sub-clause (a) above, irrevocably and unconditionally agrees to indemnify or keep indemnified the Hospital Authority against and shall pay to the Hospital Authority on demand and without cavil or argument all losses, damages, costs, charges and expenses on a full indemnity basis suffered or incurred by the Hospital Authority arising from or in connection with the failure of the Contractor to perform

fully or promptly any of his, her or their obligations terms conditions stipulations or provisions of the Contract.

(c) Subject to Clause 8, the Guarantor further agrees that all dividends, compositions and payments which the Hospital Authority may at any time receive from the Contractor or from his, her or their estate or estates, whether in liquidation, bankruptcy or otherwise, in respect of such all losses damages costs charges expenses shall be taken and applied by the Hospital Authority as payments in gross, and that this Guarantee shall stand good in respect of the full amount stipulated in Clause 15.

(3) This Guarantee shall not be affected by any change of name or status in the company, firm or individual described as "the Contractor" or where "the Contractor" is a partnership, any change in the partners.

(4) The Guarantor shall not be discharged or released from this Guarantee by any compromise, settlement or arrangement made between the Hospital Authority and the Contractor or by any alteration in the obligations imposed upon the Contractor by the Contract or by any waiver, forbearance or suspension granted by the Hospital Authority to the Contractor as to payment, time, performance or otherwise whether or not such compromise, settlement, arrangement, alteration, waiver or forbearance may have been or is made or granted with or without knowledge or assent of the Guarantor.

(5) Without prejudice to Clause 4 above, the obligations of the Guarantor under this Guarantee shall remain in full force and effect and shall not be affected or discharged in any way by, and the Guarantor hereby waives notice of:

(a) any suspension of, variation to or amendment of the Contract (including without limitation extension of time for performance of any obligations under the Contract or extension of the duration of the Contract) or any concession or waiver by the Hospital Authority, in whole or in part, in respect of the Contractor's obligations under the Contract;

(b) any provision of the Contract being or becoming illegal, invalid, void, voidable, severed, severable or unenforceable;

(c) the termination of the Contract (whether for reason of breach of any party or otherwise) or of the engagement of the Contractor under the Contract for any reason;

(d) any forbearance or waiver of any right of action or remedy that the Hospital Authority may have against the Contractor and/or the negligence, failure, omission, indulgence or delay by the Hospital Authority in enforcing any right, power, privilege to or remedy available to the Hospital Authority in relation to the obligations of the Contractor set out in the Contract;

(e) the voluntary or involuntary liquidation, bankruptcy, dissolution, sale of assets, receivership, general assignment for benefit of creditors, insolvency, reorganization arrangement, composition, or other proceedings of or affecting the Contractor or its assets, or any change in the constitution of the Contractor;

(f) any assignment or sub-contracting by the Contractor of any or all of its obligations set out in the Contract, whether or not such assignment or sub-contracting has been consented to by the Hospital Authority or the Guarantor;

(g) without prejudice to the generality of the foregoing, any fact or event (whether similar to any of the foregoing or not) which in the absence of this provision would or might constitute or afford a legal or equitable discharge or release of or defence to the Guarantor, other than the express release by the Hospital Authority of the Guarantor's obligations.

(6) This Guarantee shall extend to any variation of or amendment to the Contract and to any agreement supplemental thereto agreed between the Hospital Authority and the Contractor and for the avoidance of doubt, the Guarantor hereby authorizes the Hospital Authority and the Contractor to make any such amendment, variation or supplemental agreement.

(7) This Guarantee shall have immediate effect upon execution and is a continuing security. This Guarantee shall cover all of the obligations and liabilities of the Contractor under the Contract and shall remain in full force and effect and irrevocable until-

(a) the date falling three months after the expiry of the Contract; or

(b) the date on which all the obligations and liabilities of the Contractor under the Contract have been duly carried out, completed and discharged in accordance with the Contract,

whichever is the later. Notwithstanding the foregoing, if prior to the date of expiry of this Guarantee as aforesaid, there shall be any claim, litigation or threatened litigation concerning or arising out of the Contractor's possible breach of Contract, the Guarantor agrees that this Guarantee shall, upon notice of the Hospital Authority of such claim, litigation or threatened litigation, be automatically extended for a period until three months following the final conclusion of such claim, litigation or threatened litigation. For the avoidance of doubt, this Guarantee shall be further extended if there shall be any appeal proceedings until three months after a final decision which is non-appealable is delivered.

(8) This Guarantee is in addition to and shall not merge with or otherwise prejudice or affect any contractual or other right or remedy or any guarantee, indemnity, lien, pledge, bill, note, charge or any other security which the Hospital Authority may at any time hold (collectively "Other Security") and this Guarantee may be enforced by the Hospital Authority without first having recourse to any of the Other Security or taking any steps or proceedings against the Contractor, and notwithstanding any release, waiver or invalidity of the Other Security.

(9) Any demand, notification or certificate given by the Hospital Authority specifying amounts due and payable under or in connection with any of the provisions of this Guarantee shall be conclusive and binding on the Guarantor.

(10) The obligations expressed to be undertaken by the Guarantor under this Guarantee are those of primary obligor and not as a surety.

(11) This Guarantee shall be governed by and construed according to the laws for the time being in force in the Hong Kong Special Administrative Region ("**Hong Kong**") and the Guarantor agrees to submit to the exclusive jurisdiction of the Courts of Hong Kong.

(12) The application of the Contracts (Rights of Third Parties) Ordinance is expressly excluded and no person who is not a party to this Guarantee shall be entitled to enforce any right or term of this Guarantee pursuant to the Contracts (Rights of Third Parties) Ordinance.

(13) All documents arising out of or in connection with this Guarantee shall be served:

(a) upon the Hospital Authority, at the Room 310N, 3/F., Hospital Authority Building, 147B Argyle Street, Kowloon, Hong Kong, facsimile number (852) 2515 9046;

(b) upon the Guarantor, at _____.
Hong Kong, marked for the attention of _____.
facsimile number _____.

(14) Documents to be served under this Guarantee shall be deemed to have been duly served by one party if sent by letter or fax addressed to the other party at the address stated above or to the facsimile number set out above. The documents so served shall be effective (a) on the date of delivery if hand-delivered; (b) on the date of transmission if sent by facsimile; and (c) if dispatched by mail (whether registered or not), on the day on which they are tendered for delivery by the postal authority in Hong Kong.

(15) The aggregate amount of the Guarantor's liability under this Guarantee shall not exceed .

IN WITNESS whereof the said Guarantor ……. has caused its Common Seal to be hereunto affixed the day and year first above written.

The Common Seal of the said)
Guarantor was hereunto affixed)
in the presence of)
…….)

@ Signed Sealed and Delivered)
for and on behalf of and as)
lawful attorney of the Guarantor)
under power of attorney dated)
……..… and deed of delegation)
dated ……)
by ……)
and in the presence of ……..)
……..)

@ See Powers of Attorney Ordinance Cap. 31

Note: When Banker's Guarantees are executed under power of attorney, a photocopy of the power of attorney, certified on each page by a Hong Kong solicitor that it is a true and complete copy of the original, should be submitted.

Tender Specifications for the (Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital New Territories West Cluster, Hospital Authority

(M) : Mandatory Requirement **(D) : Desirable Requirement** **(O) : Optional Requirement** The product offered shall incorporate the following components / requirements / features.	Tenderers **MUST** indicate below the extent of compliance of the offered product(s) by filling in "**Yes**" or "**No**" and **provide the specifications of the offered product(s)** point by point against each clause of the Tender Specifications. (Please tick "√" where appropriate)

Clause		**M/D**	**Yes**	**No**	**Provide details**

Please refer to separate document attached.

(To be included in the Price Proposal)

Schedule A (Price)
Section A - Price of the Basic Machine

Item No.	Description	Estimated Quantity	Brand	Model	F.I.S./Hong Kong Price Including Installation		Delivery Lead Time
					Unit Price (HK$)	Total Amount (HK$)	
1	Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems	1					
2	Provision of Maintenance Service	9 years	Please state the total amount of 2nd to 10th maintenance services of **part (i)** of the Schedule A (Price)-Section C (Price of Post Warranty Maintenance Services) and complete part (ii) and (iii) for reference.				
				Total Estimated Value (HK$) :			

Notes:
a) The unit price should comprise only the standard items in the basic machine. All prices of optional items must be quoted separately and submitted in the Price Proposal.
b) The product details (excluding any pricing information) of the standard items in the basic machine must be provided clearly in a separate sheet and be submitted in the Technical Proposal.

Person Authorized to Sign Tender

Name of Tenderer : _____

Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Telephone No. : _____ Facsimile No. : _____

(To be included in the Price Proposal)

Schedule A (Price)

Section B1 - Consumables / Spare Parts and Accessories (for Each Unit of Basic Machine Quoted in Section A)

Item No.	Description	Brand	Model	Unit of Measure	Equipment Specific (Y/N)	Useful Lifespan for the Item *(e.g. 8 hrs, 7 days, per patient etc.)* Note (3) & (4)	F.I.S./Hong Kong Price Including Installation			Delivery Lead Time
							Unit Price (HK$)	Estimated Quantity per basic equipment throughout the 10-year useful life Note (3) & (4)	Total Amount (HK$)	
1										
2										
3										
4										
						Total Estimated Value (HK$) :				

Notes:

1. All other essential proprietary consumables / spare parts / accessories must be included.
2. Itemized price list for the other consumables / spare parts and special tools / test equipment should be quoted in separate sheets and submitted in the Price Proposal.
3. Throughout the 10-year useful lifespan of each basic equipment on offer, should the actual useful lifespan / estimated quantity of an item in real operation is significantly shorter than the quoted duration in the above table, the Authority has the right to claim for a new item as replacement free of charge.
4. Pursuant to Part I Terms of Tender (Supplement) Clause 21, the Authority will adopt Net Present Value Analysis in calculation of the Total Life Cycle Cost. Information as quoted in this table should be aligned with Section B2 of Schedule A (Price).

Name of Tenderer : _____

_____

Tenderer's Chop : _____

Date : _____

Person Authorized to Sign Tender

Name : _____

Position Held : _____

Telephone No. : _____

Authorized Signature : _____

E-mail Address : _____

Facsimile No. : _____

(To be included in the Price Proposal)

Schedule A (Price)
Section B2 - Consumables / Spare Parts and Accessories (for Each Unit of Basic Machine Quoted in Section A)

Pursuant to Part I Terms of Tender (Supplement) Clause 21, the Authority will adopt Net Present Value Analysis in calculation of the Total Life Cycle Cost. All essential proprietary consumables / spare parts / accessories must be included within the useful lifespan of the basic machine. Tenderers are required to state in below table the required quantity in appropriate useful lifespan year.

Item No.	Description	Useful Lifespan of Item (Note 1)	Estimated Quantity per basic equipment Throughout the 10-year useful life (Note 1)										Total Quantity (Note 2)
			1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	
	For examples: Battery	2 years	0	0	1	0	1	0	1	0	1	0	4
	Electric Pump	3 years	0	0	0	1	0	0	1	0	0	1	3
1													
2													
3													
4													

Note 1 : Assume the item will be replaced after each complete useful lifespan. For example : A 2-year lifespan for the battery, 1st replacement will be taken at the start of 3rd year, 2nd replacement will be taken at the start of 5th year and so on.

Note 2 : Total quantity and useful lifespan of item should be aligned with the information as quoted in Section B1 of Schedule A (Price).

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No. : _____ Fax No. : _____

(To be included in the Price Proposal)

Schedule A (Price)
Section C (Price of Post Warranty Maintenance Services)

The annual post warranty maintenance services costs of the products for the first nine (e.g) years commencing from the expiry of the Warranty Period:-

The Authority will adopt type (i) all-inclusive comprehensive post warranty maintenance services costs for Total Life Cycle Cost evaluation. If Tenderers fail to quote such services costs for evaluation, the Authority will treat such tender as an incomplete offer. Tenders with incomplete offer quoted in the Tenderer's Schedule will not be considered.

(i) All-inclusive comprehensive post warranty maintenance services costs inclusive of charges for labour, regular calibrations, preventive maintenance (PM), corrective maintenance (CM) and all spare parts (including X-ray tube with unlimited exposure, LCD monitor, detector assembly, UPS with batteries and OEM equipment). Details please refer to Clause 4 and its sub-clauses under Item 2 of Tender Specification :-

No. of Preventive Maintenance (annually)	Services Costs Per Unit Per Annum (HK$)									
	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
(a) With at least 4 times PM (annually)	**Free Warranty Period**									
(b) No. of preventive maintenance (PM) service : _____time(s) per year (c) For OEM items, at least 1 time PM per year (except 2 times PM per year for defibrillator) (d) Response time to fault report to carry out CM: within _____ hours.										

Quote for reference	Services Costs Per Unit Per Annum (HK$)									
	11th year	12th year	13th year							
(a) With at least 4 times PM (annually)										
(b) No. of preventive maintenance (PM) service : _____time(s) per year (c) For OEM items, at least 1 time PM per year (except 2 times PM per year for defibrillator) (d) Response time to fault report to carry out CM: within _____ hours.										

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No. : _____ Fax No. : _____

(ii) All-inclusive comprehensive post warranty maintenance services costs inclusive of charges for labour, regular calibrations, preventive maintenance (PM), corrective maintenance (CM) and all spare parts (including LCD monitor, detector assembly, UPS with batteries and OEM equipment but excluding X-ray tubes). Details please refer to Clause 4 and its sub-clauses under Item 2 of Tender Specification :-

No. of Preventive Maintenance (annually)	Services Costs Per Unit Per Annum (HK$)									
	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
(a) With at least 4 times PM (annually)	**Free Warranty Period**									
(b) No. of preventive maintenance (PM) service : _____time(s) per year (c) For OEM items, at least 1 time PM per year (except 2 times PM per year for defibrillator) (d) Response time to fault report to carry out CM: within _____ hours.										

Quote for reference	Services Costs Per Unit Per Annum (HK$)									
	11th year	12th year	13th year							
(a) With at least 4 times PM (annually)										
(b) No. of preventive maintenance (PM) service : _____time(s) per year (c) For OEM items, at least 1 time PM per year (except 2 times PM per year for defibrillator) (d) Response time to fault report to carry out CM: within _____ hours.										

Person Authorized to Sign Tender

Name of Tenderer : _____

Tenderer's Chop : _____

Date : _____

Name : _____

Position Held : _____

Tel. No. : _____

Authorized Signature : _____

E-mail Address : _____

Fax No. : _____

(iii) Post warranty maintenance services costs inclusive of charges for labour, regular calibrations, preventive maintenance (PM), corrective maintenance (CM) and *minor parts/components. Details please refer to Clause 4 and its sub-clauses under Item 2 of Tender Specification :-

No. of Preventive Maintenance (annually)	Services Costs Per Unit Per Annum (HK$)									
	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
(a) With at least 4 times PM (annually)	**Free Warranty Period**									
(b) No. of preventive maintenance (PM) service : _____time(s) per year (c) For OEM items, at least 1 time PM per year (except 2 times PM per year for defibrillator) (d) Response time to fault report to carry out CM: within _____ hours.										

Quote for reference	Services Costs Per Unit Per Annum (HK$)									
	11th year	12th year	13th year							
(a) With at least 4 times PM (annually)										
(b) No. of preventive maintenance (PM) service : _____time(s) per year (c) For OEM items, at least 1 time PM per year (except 2 times PM per year for defibrillator) (d) Response time to fault report to carry out CM: within _____ hours.										

* Minor parts/components costing not more than HK$ _____. Details are attached.

Remarks:-

1. Pursuant to Part I Terms of Tender (Supplement) Clause 21, the Authority will adopt Net Present Value Analysis in calculation of the Total Life Cycle Cost
2. Post Warranty Maintenance Cost offered in percentage will not be considered.
3. Annual adjustments with reference to the percentage change in the Consumer Price Index published in the Hong Kong Monthly Digest of Statistics or other basis will not be considered.

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No. : _____ Fax No. : _____

(To be included in the Price Proposal)

Schedule A (Price)
Price Summary

	Total Cost (HK$)
Sub-total (Section A to C(i)):	
(D) Training :	
(i) Local Operational Training	
(ii) Local Maintenance Training	
(E) Site Works under 8096MM (Clause 32 and its sub-clauses under Item 1 of Tender Specification) :	
(F) Site Works under CBV (except those clauses under 8096MM) :	
(G) Other Price, if any :	
(H) Total (Section A to G) :	

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No. : _____ Fax No. : _____

(To be included in the Price Proposal)

Schedule A (Price)
Section D – Optional Item

Item No.	Description	Unit Price
1	Overseas Maintenance Training *(Details please refer to Clause 64.3 and its sub-clauses under Item 1 of Tender Specification)*	
2	Quotation for Replacement of CT X-ray Tube *(Details please refer to Clause 65 and its sub-clauses under Item 1 and Clause 4.3.1 under Item 2 of Tender Specification)*	
3	Hourly charge rates for service calls outside user's normal working hours *(Details please refer to Clause 3.3 under Item 2 of Tender Specification)*	

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No. : _____ Fax No. : _____

(To be included in the Price Proposal)

Schedule A (Price)
Section D – Trade-in

Item No.	Description	Unit Rate (HK$)
1	Trade-in of existing used Radiographic/Fluoroscopic Systems, Angiography/Interventional (Clause 37 and its sub-clauses under Item 1 of Tender Specifications)	

Remarks:

- The trade-in value quoted above is for reference only and will **not** be taken for Total-Life-Cycle-Cost evaluation.

- Subject to requirement, hospital will exercise the trade-in with the quoted value which turns in as part payment for the purchase of a new Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems.

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No. : _____ Fax No. : _____

Schedule B
(Schedule of Compliance)

Tenderers shall provide without any omission the following information in respect of their offer.

1. Statement of Compliance

   I/we provide point-by-point comparison between the Tender specifications and the specifications of the offered product in the space provided in the Tender Specification. The comparison and full details of any deviations shall be provided in separate sheets to be attached to this 'Schedule of Compliance'.

2. Validity Period

   Our/My offer remain valid for a period of 180 days from the closing date of this Tender.

3. Particulars of Offer

   (a) Country of Origin : _____
   (Substantial place of manufacture of goods)

   (b) Name and Address of Manufacturer:
   [Name] _____
   [Address] _____

   (c) Name and Address of Manufacturing facility/site of offered goods [if different from 3(b)]:
   [Name] _____
   [Address] _____

   (d) Relationship between Tenderer and Manufacturer: _____

   (e) Details of Offer (Tenderers are required to complete the following table to provide information on the offer.)

# Item No.	Description	HA Item Code	Brand	Model	Packing
1	Interventional Radiographic-Fluoroscopic/ Computed Tomography				
2	Provision of Maintenance Service				

Corresponding to the item no. tabulated in Schedule A (Price).

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date _____ : Tel. No: _____ Fax No.: _____

4. Listing under the Medical Device Administrative Control System

I/We confirm that:

(a) The following medical device(s) under offer is/are already listed under the MDACS with the following details:-

Medical device under offer (Manufacturer, Brand and Model)	Listing number issued by the DH	Validity of the MDACS certificate		Device Description under MDACS	Risk Rating (Class II/III/IV or Class B/C/D)
		(From)	(To)		

(b) The following medical device(s) under offer **has/have been** submitted to the Medical Device Division (MDD) under DH for listing under the MDACS on the following date(s):-

Medical device under offer (Manufacturer, Brand and Model)	Actual date of submission to DH	Application reference number and Issue Date provided by DH (for submitted device only)	Risk Rating (Class II/III/IV or Class B/C/D)

I / We also confirm that the information and supporting documents provided under the "Checklist for Medical Devices to be Listed under MDACS" in the Appendix 1 to this Schedule B are accurate and not misleading.

(c) The following medical device(s) under offer **will be** submitted to the Medical Device Division (MDD) under DH for listing under the MDACS by the following date(s):-

Medical device under offer (Manufacturer, Brand and Model)	Planned date of submission to DH (a date not later than 6 months after contract commencement)	Risk Rating (Class II/III/IV or Class B/C/D)

I / We also confirm that the information and supporting documents provided under the attached "Checklist for Medical Devices to be Listed under MDACS" in the Appendix 1 to this Schedule B are accurate and not misleading.

(d) The following medical device(s) under offer are not applicable MDs according to the classification rules of MDs under MDACS or are otherwise not subject to listing under the MDACS. The reasons are provided below and the relevant supporting documents are attached:

Medical device under offer (Manufacturer, Brand and Model)	Reason(s) of MDACS Listing being inapplicable (with supporting documents) (For example: Class I of general MDs or Class A in-vitro diagnostic MDs according to the classification rules of MDs under MDACS)

(e) I / We agree to comply with all statutory requirements within the prescribed period under the legislation should the statutory control of medical devices takes effect and will demonstrate to the Authority my / our compliance with the statutory requirements upon request by the Authority.

Person Authorized to Sign Tender

Name of Tenderer : _____

Name : _____

Authorized Signature : _____

Tenderer's Chop : _____

Position Held : _____

E-mail Address : _____

Date : _____

Tel. No: _____

Fax No.: _____

Appendix 1 of Schedule B

Checklist for Medical Devices to be Listed under MDACS

(Note to Tenderers: Please complete this part if the offered product(s) fall within Clause 4(b) or (c) of Schedule B. The information provided by successful Tenderer(s) in this part will be passed to MDD under DH for reference. Tenderers shall note that HA does not play any part in the MDACS listing application process and any onward transmission of these documents to DH does not imply any endorsement of the content of these information and supporting documents by HA. In order to initiate and complete the application process for MDACS listing, Tenderers are required to make formal application and submission of the required supporting documents with/to DH direct.)

Pursuant to Clause 4 of Schedule B, I/we confirm that my/our medical device(s) under offer which has/ have been or will be submitted to the MDD under DH and submit the attached supporting documents in this connection:-

The confirmation below is applicable to tender items [please specify the tender item numbers _____ to _____quoted in Section A of Schedule A (Price). Separate new sheet(s) is/are added for other items or different manufacturers for same item description, if applicable.

Tender Reference	NWT00226
Tender Subject	Tender for the (Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital, New Territories West Cluster, Hospital Authority
Manufacturer of Tender items	
Application Reference No. provided by DH (if available)	

( ) Please tick "√" as appropriate N.A. = Not Applicable

Compliance ***(Please insert Comply / Not Comply / N.A.)***	**Supporting Document Submitted**	**Please indicate the Page No. of information provided**	**Checklist Item No.**	**Information / Document**	**Explanatory Notes**
	( )		1.1	Quality Management System certificate	Established Quality Management System (e.g. ISO 13485, GB/T 42061) for the Manufacturer.
	( )		1.2	Provision of accessories or consumables (if applicable)	Information tabulated, or in equivalent format, describing available accessories or consumables compatible to the medical device.
	( )		1.3	Provision of Maintenance Services (if applicable)	Information tabulated, or in equivalent format, describing concerned services provided by the supplier, the Local Responsible Person (LRP), or available in Hong Kong.
	( )		2.1	Brand, model and product code	Product identifier of the medical device
	( )		2.2	Intended use	The specific claim made by the Manufacturer about the designated way of use and intended outcome of using the device.

	( )		2.3	Sterility (if applicable)	Information stating the device is supplied sterile or can be re-sterilized.
	( )		2.4	Instructions for Use	The instructions for use, also known as user manual, in paper form or other style that is supplied with the medical device to inform user of the device's proper use and precaution to be taken.
	( )		2.5	Package labeling	Package labeling indicating necessary information, e.g. contact, warning signs, sterility, etc. to provide a clear overview and identification of device.
	( )		2.6	Risk analysis report/summary (if applicable)	Report or summary in the format of Failure Modes and Effects Analysis (FMEA), Fault Tree Analysis, etc. to assess and mitigate foreseeable risk. The clinical benefit shall outweigh the residual risk to be satisfactory.
	( )		2.7	Technical report (if applicable)	Technical assessment reports or certificates usually in engineering sense about tests and verifications conducted to demonstrate the Safety, Quality and Performance of the Device, e.g. laboratory certificate of IEC60601-1: Safety requirements for medical electrical systems
	( )		2.8	Availability of Marketing approval	Marketing approval from jurisdictions outside Hong Kong, such as Chinese Mainland (approval from National Medical Products Administration), member countries of European Union that have implemented relevant EU directives or regulations, United States of America (approval from U.S. Food and Drug Administration), etc.

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature :_____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

_____

5. Payment Discounts

Pursuant to Clause 14 of Terms of Tender (Supplement), I/We provide _____% discount that I/we will allow on the tendered price(s) if acceptance of goods is confirmed and payment for each consignment is made in full:

Acceptance of Goods shall be construed within the meaning of Clause 5 of the General Conditions of Contract.

N.B.: Tenderers are requested to insert the word 'NIL' in the spaces provided above if no payment discount is offered.

6. Life Expectancy

( ) The offered product(s) is/are expected to have a normal life span of **10** years.

( ) The offered product(s) is/are expected to have a normal life span of _____ years.

[Please tick ( ) and/or fill in the _____]

7. Safety Requirements

( ) Comply with IEC60601 Type CF

( ) Comply with IEC60601 Type BF

( ) Comply with IEC60601 Type B

( ) Comply with IEC61010

( ) Deviations: _____

( ) Please tick "✓" where appropriate

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature : _____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date : _____	Tel. No: _____	Fax No.:_____

8. Electromagnetic compatibility (EMC) requirements

( ) Comply with IEC60601-1-2

( ) Comply with IEC61326-1

( ) Deviations: _____

9. Environmental Requirements

( ) Comply with requirements as stipulated in the Conditions of Contract.
(a) Temperature 10ºC - 35ºC
(b) Relative Humidity 30% - 85%

( ) Deviations: _____

10. Electrical, compressed air and/or oxygen supply requirements for proper operation of equipment offered. Power plug provided for equipment shall meet the appropriate BS or other equivalent standard e.g. BS 1363 for 13A plug.

( ) 13 Ampere, 220V ± 6%, 50Hz ± 2%, single-phase A.C. electrical supply.

( ) _____ Ampere, 380V ± 6%, 50Hz ± 2%, three-phase A.C. electrical supply.

( ) 35 - 45 litre/min, 350 - 450 kPa medical compressed air supply.

( ) 350 - 400 kPa oxygen supply.

( ) Deviations: _____

11. Other Requirements for proper operation of equipment offered, such as water supply, gas supply, drainage, exhaust, air-conditioning, air filtration, floor loading, etc.

( ) Nil

( ) Please specify below _____

( ) Please tick "✓" where appropriate

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature :_____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date _____ : Tel. No: _____ Fax No.:_____

12. Delivery and Installation

( ) Provision of equipment delivery, on-site testing and commissioning with appropriate calibrated tools at no additional cost.

( ) Quotation for delivery of equipment, on-site testing and commissioning attached.

13. Documentation (either in English or in Chinese)

( ) Comply with requirements as stipulated in the Special Conditions of Contract.
Confirm delivery of at least 1 set of hardcopy and 1 set of softcopy of documents together with the delivery of each equipment.

i) Validity of Documents

( ) Confirm documents are of the latest version

( ) There are other time-limited validity deviations: _____

14. Mounted equipment (Installation and Maintenance Services)

( ) Comply with requirements as stipulated in the Special Conditions of Contract.

( ) Not applicable

[Please tick ( ) and/or fill in the _____]

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature :_____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date _____	: Tel. No: _____	Fax No.:_____

15. Warranty and Maintenance Services

( ) Comply with requirements as stipulated in the Special Conditions of Contract.

(a) Warranty Period

_____ months from date of acceptance of Goods.

(b) Warranty Party

Company name : _____
Contact Person : _____
Contact telephone number : _____

Method of receiving HA EAM (Enterprise Asset Management) System work orders:
( ) Email : _____
( ) Fax : _____
( ) GS1 Hong Kong's Web-based EZ*TRADE or the Gateway Solution
[Please tick either one of the above ( ) and/or fill in the _____]

(c) Maintenance Personnel

( ) Comply with requirements as stipulated in the Conditions of Contract. A list of English or Chinese full name of qualified maintenance personnel who provide Maintenance Services shall be provided. The qualification/ competency records/ certificates of service personnel shall be provided upon request.

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature : _____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date _____	: Tel. No: _____	Fax No.: _____

(d) Preventive Maintenance (PM)

PM interval recommended by manufacturer: ____months

Number of routine service (preventive maintenance) visits during the warranty period: _____ times per year (minimum **four** per year). If applicable, the Contractor shall carry out electrical safety test on the equipment annually during the warranty period. The electrical safety standard shall be IEC 60601-1 / IEC 61010-1 / IEC 62353 or equivalent. Any variation to the specified standards shall be clearly stated in details: _____.

The Contractor is required to submit consolidated corrective and preventive maintenance summary to the respective user, administration department in hospital.

(e) Corrective Maintenance (CM)

( ) Comply with requirements as stipulated in the Special Conditions of Contract
Response time to fault report to carry out corrective maintenance (CM) : within _____ hours.

( ) Deviations: _____

[Please tick ( ) and/or fill in the _____]

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature :_____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

_____

(f) Maintenance Record/ Service Reports

( ) Comply with requirements as stipulated in the Conditions of Contract.
Confirm provision of service report and checklist for evaluation

16. Necessary Service / Parts Replacement

The Contractor shall confirm whether regular replacement with interval of safety parts is necessary in accordance with manufacturer's recommendation or O&M manual until the end-of-support of the equipment as per manufacturer's advice. The information of safety parts with price shall be provided for hospital's evaluation and consideration. The Contractor shall list all services that need to be regularly performed with interval as recommended by the manufacturer until the end-of-support of the equipment as per manufacturer's advice. Such items include, but not limited to, certification services, calibration services, O2 sensors, springs, PM kits, filters and batteries replacement, etc.

( ) Nil

( ) Please specify below with details

_____

_____

17. Accessories / Components

(a) I/We confirm that the tender price(s) quoted in Schedule A include all accessories / components which are essential to the normal operation of the product.

(b) Itemized price list for the optional accessories / components is attached in Section B of Schedule A (Price).

18. Consumables

I/We confirm that the consumables used on the product:-

( ) are equipment specific and quotation with itemized price is attached.

( ) are not equipment specific.

(Please put a tick as appropriate)

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

19. Spare Parts and Special Tools/Test Equipment

(a) I/We confirm that spare parts and special tools/test equipment for the product under this Tender will be available to cover full useful life of the product.

(b) Lead time for purchase of spare parts and special tools/test equipment from receipt of order to delivery : _____ days.

(c) Itemised price list for recommended spare parts and special tools/test equipment is attached.

20. Training

I/We confirm that the following trainings will be provided to Authority Representatives.

Operational Training:- ( ) Local briefing upon request.

( ) Formal local training (course outline attached).

( ) Formal overseas training, course outline and quotation attached.

Service Training:- ( ) Local training upon request.

( ) Formal local training (course outline attached).

( ) Formal overseas training, course outline given, and cost included in tender sum / quotation attached*.

Please put a tick in ( ) as appropriate

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

21. Contract Deposit

I/We am/are prepared to pay the Authority:

(a) before the commencement of the Contract or within 30 days from the date of the letter of acceptance whichever is the later, an amount equal to 2% or 5% of the total price of the Goods; and

(b) 30 days before the expiry of the Warranty Period, a further amount equal to 2% or 5% of the total post warranty maintenance services costs of the Goods for five years commencing from the expiry of the Warranty Period; and

(c) 30 days before the expiry of the fifth year post warranty maintenance period, a further amount equal to 2% or 5% of the total post warranty maintenance services costs of the Goods for 4 years commencing from the expiry of the fifth year post warranty maintenance period,

according to Clause 37.3 of the Terms of Tender (Supplement) by:

( ) Cheque

( ) Banker's Guarantee (Name of Bank: _____)

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

_____

22. Tenderer's Code of Conduct

Pursuant to Clause 39 of Part I Terms of Tender (Supplement) in relation to the prevention of bribery and the Tenderer's code of conduct, Tenderers are required to submit its code of conduct applicable to its staff. The "Sample Code of Conduct for NGO/ Private Sector" issued by the Independent Commission Against Corruption ("ICAC") is accessible through the HA website under "Tender Notice" below for Tenderer's reference:

http://www.ha.org.hk/visitor/ha_visitor_index.asp?Content_ID=2001&Lang=ENG&Dimension=100

23. Statutory requirement / Ordinances Concerning Product Safety

The contractor shall engage appropriate authorized technical party for equipment examination at own cost and provide the certificate(s) of Test and Examination/ Results to hospital free of charge for fulfilment of statutory requirement.

I/We confirm that :-

(a) Licence(s) for the provision of the offered product:-
( ) is required under the Chapter _____ of Hong Kong Ordinance and a copy of which is attached.
( ) is not required.

(b) Test certificate/report for the provision of the offered product is required and a copy of which:-
( ) is attached.
( ) will be completed and submitted during acceptance of goods.
( ) Test certificate/report for the provision of the offered product is not required.

(c) The Authority * is required / is not required to maintain the licence(s) / test certificate(s) for the possession or use of the offered product.

(Please put a tick in ( ) and delete * as appropriate)

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date _____ : Tel. No: _____ Fax No.:_____

24. Technology Substitution

( ) Comply with requirements as stipulated in the Special Conditions of Contract.

25. Type approval certificate from the Office of Communication Authority (OFCA) or Industrial, Scientific and Medical Electronic Machine (ISMEM) Licence

( ) Comply with requirements as stipulated in the Special Conditions of Contract
( ) Type approval certificate is provided /ISMEM Licence is required
( ) Exempted from Licensing
( ) Not applicable

26. Product Safety Issue

( ) Comply with requirements as stipulated in the Special Conditions of Contract

( ) Confirm the offered model is NOT currently affected by any outstanding/ incomplete/ unsettled product recall/ safety notice/ field safety notice issued by manufacturer or other regulatory bodies

( ) Currently affected.
Please specify below and provide details for hospital's evaluation and consideration. Failure to provide the requested information may render the tender invalid.

_____

_____

27. Waste Electrical and Electronic Equipment (WEEE) / Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directives

( ) Comply with the WEEE / RoHS Directives on restriction of use of hazardous substances in electrical and electronic equipment.

( ) Please tick "✓" where appropriate

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

_____

28. Certificate of Non-Collusion

I/We certify that this is a bona fide tender, and that I/we have not fixed or adjusted the amount of the Tender by or under or in accordance with any agreement or arrangements with any other person. I/We also certify that I/we have not done and I/we undertake that I/we will not do at any time before the date of notification of acceptance of this Tender any of the following acts:

(a) Communicate to any person other than the person calling for those Tenders the amount or approximate amount of the proposed Tender, except where the disclosure, in confidence, of the approximate amount of the Tender was necessary to obtain insurance premium quotations required for the preparation of the Tender;

(b) Enter into agreement or arrangements with any other person that he shall refrain from tendering or as to the amount of any Tender to be submitted;

(c) Offer or pay or give or agree to pay or give any sum of money or valuable consideration directly or indirectly to any person for doing or having done in relation to any other tender or proposed Tender any act or thing of the sort described above.

In this certificate, the word "person" includes any person and any body or association, corporation or unincorporated, and "any agreement or arrangement" includes any such transaction, formal or informal, and whether legally binding or not.

I/We expressly acknowledge and agree that, without prejudice to any other rights of the Authority, if this certification is in anyway incorrect, or becomes incorrect prior to the award of this Tender, the Authority may:

(i) disqualify my/our Tender from consideration;

(ii) withdraw any confirmation of award of tender already made, without penalty or liability;

(iii) disqualify me/us, our holding company and subsidiaries from participation in any future tenders issued by the Authority for such period as the Authority may in its entire discretion consider appropriate;

(iv) take such other actions, including reporting me/us to the Government or regulatory authorities in Hong Kong or elsewhere, as the Authority considers appropriate.

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature : _____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date _____	: Tel. No: _____	Fax No.:_____

29. End-of-Support of obsolete versions of Microsoft Windows

(a) Microsoft Corporation has announced / will announce the end of support for its desktop Operating System Windows from time to time. Microsoft would no longer provide technical support and security patches for obsolete Windows versions.

I/We certified that I am/we are reminded that if the equipment or system provided to the Authority contains computers that are using obsolete / to be obsolete Windows versions, I/we have the responsibility to plan and take appropriate actions on the equipment or system to safeguard against the risks of Windows obsolescence, including to upgrade the computers to a latter Windows desktop Operating System version or implement necessary measures that could avoid the underlying support and security risks.

In order for the Authority to evaluate my/our Windows refreshment plan, the attached simple questionnaire is duly completed and returned together with the tender document by lodging to the HA Tender Box on or before the stipulated tender closing date/time.

(b) I certified that I shall/we will provide a reliable anti-virus, anti-spyware and anti-hacking solution for the medical system on offer. The solution provided shall not affect the normal performance of the imaging system. Details of the solution shall be stated. I shall/We will regularly update the anti-virus program. Preferably using hospital's virus definition, that is, to connect to hospital network for the daily update of anti-virus program. If this is successfully awarded of contract, I am/We are required to follow the latest HA network security policies and guidelines.

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature : _____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date : _____	Tel. No: _____	Fax No.:_____

Questionnaire
Windows Refreshment Plan for Equipment to be installed in HA

A. Tenderer's Information

1. Supplier Name: _____ Tender Ref.: _____
2. Supplier Contact Person: _____ Phone: _____ Email: _____

B. Equipment Information

3. Equipment model / Part #: _____ Type of Equipment: _____
4. Description of Equipment:

   _____

C. IT Component of the Equipment

5. Does it contain one or more computers? ☐Yes ☐No **(If no, no need to proceed with the questionnaire.)**
6. What type of computers is it? ☐Server ☐Desktop ☐Others (Please specify :_____)
7. Do the computers require connection to the HA network? ☐Yes ☐No
8. Do the computers store patient information? ☐Yes ☐No

   If yes, please specify the types of patient information:

   _____

9. What OS (Operating System) is running on the computers?

   ☐MS Windows ☐ UNIX ☐LINUX ☐Embedded ☐Others (Please specify :_____)

   Please specify the version of the OS above_____

D. Windows Refreshment Plan (No need to complete if the computer OS is not an obsolete / to be obsolete Windows version)

10. If the computer is running on obsolete / to be obsolete Windows version, do you have a plan to upgrade? ☐Yes ☐No
11. If yes, please indicate the estimated date of completion _____
12. If no, please specify the appropriate actions to avoid that you would take to avoid Windows obsolescence risks.

    _____
    _____
    _____
    _____
    _____
    _____
    _____

The estimated date of completion _____

** If space is not enough, please attach additional sheets.

30. Compliance with Radiation Ordinance (Cap. 303 of the laws of Hong Kong)

I/We confirm that:-

( ) The offered product(s) contain(s) radioactive substances (RS).
( ) The offered product(s) do(es) not contain any radioactive substances (RS).

( ) The offered product(s) is an / are irradiating apparatus(es). (IA)
( ) The offered product(s) is not / are not irradiating apparatus(es). (IA)

If the offered product is IA or contain any RS, I/we confirm/commit to the following:-

( ) I/We have obtained the necessary license from Radiation Board for selling the offered RS/IA product in Hong Kong, **or**

( ) I shall/We will obtain the necessary license from Radiation Board for selling the offered RS/IA product in Hong Kong.

Tenderer is required to provide the information of the offered IA/RS product in below space (e.g. type, activity, etc.), if applicable :-

_____
_____
_____
_____

[Please refer to Hong Kong Radiation Ordinance (Cap. 303 of the laws of Hong Kong) for the definition of RS and IA]

( ) Please tick "✓" where appropriate

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : Tel. No: _____ Fax No.:_____

_____

31. National Security

(a) I/We confirm that, before I/We sign this undertaking, I/We have read and fully understand this undertaking, Clause 47 of the Terms of Tender (Supplement), and Clause 35 of the Special Conditions of Contract on "National Security".

(b) I/We, represent and warrant that I/We have not engaged, am/are not engaging and will not engage in acts or activities that are likely to constitute or cause the occurrence of offences endangering national security or which would otherwise be contrary to the interest of national security.

(c) I/We shall indemnify and keep indemnified the Authority against all losses, damages, costs or expenses arising out of or in relation to any breach of any of the representations and/or warranties above, including but not limited to damages for delay, costs and expenses of re-tendering and other costs incurred.

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature : _____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date : _____	Tel. No: _____	Fax No.:_____

Schedule B

Location and Site Preparation and Equipment Layout Plan

Tenderers should provide in this Schedule a location and site preparation plan for the Equipment on offer.

Tenderers shall submit Equipment Layout Plan.

Person Authorized to Sign Tender

Name of Tenderer : _____

Name : _____

Authorized Signature : _____

Tenderer's Chop : _____

Position Held : _____

E-mail Address : _____

Date : _____

Tel. No: _____

Fax No.:_____

Schedule B

Building and Building Services

Tenderers should provide in this Schedule the Building and Building Services installation requirement plan for the Equipment on offer.

Person Authorized to Sign Tender

Name of Tenderer : _____

Name : _____

Authorized Signature : _____

Tenderer's Chop : _____

Position Held : _____

E-mail Address : _____

Date : _____

Tel. No: _____

Fax No.: _____

Schedule B

Implementation

Tenderer should provide the proposed timing for delivery, installation and commissioning of the Equipment by completing the following table :

			Date	
Stage	Activities	Duration	From	To
	Building works / site preparation Hardware delivery Hardware installation Software delivery and installation Testing, Safety Checks Documentation delivery Manufacturer's certification that the Equipment has been tested Acceptance Tests Commissioning Training			

Completion Date: _____

N.B. The above activities are only served as indicators. Tenderer is required to include all necessary activities in the Implementation plan.

Person Authorized to Sign Tender

Name of Tenderer : _____ Name : _____ Authorized Signature : _____

Tenderer's Chop : _____ Position Held : _____ E-mail Address : _____

Date : _____ Tel. No: _____ Fax No.:_____

Schedule C
Tenderer's Operational Experience and Capability

Pursuant to Part I Terms of Tender (Supplement) Clause 3.3(B), Tenderers shall complete the following information for the Authority's consideration.

1. The product(s) offered is/are currently listed under the Medical Device Administrative Control System (MDACS) of Department of Health (DH) of the Government:

   ☐ Yes, Listing number: _____
   ☐ No

2. The Tenderer is the Local Responsible Persons (LRP) listed in MDACS in respect of the product(s) offered for handling product alerts, modification, recalls and adverse incident in Hong Kong for offered item(s):

   ☐ Yes, LRP Listing Number (if applicable): _____ (Please provide supporting document)
   ☐ No

3. ESG Proposals

   Tenderers shall provide relevant proposals to improve ESG for the Authority's consideration.

   These measures may but need not be directly relevant to the products/services being procured, but which can bring about positive values/benefits to the Authority or public at large. Examples of such positive values or benefits may include the following and one ESG proposal may cover all or any one of them. Below are examples for illustration only, Tenderers are welcomed to provide any other ESG proposals.

   (a) Environmental Protection
   For examples:
   - Use of green materials/products
   - Reduction in energy consumption or promotes waste reduction in the execution of the contract

   (b) Social Responsibility
   For examples:
   - Employment of people with disabilities and/or rehabilitated persons for the contract

   (c) Governance
   For example:
   - A dedicated department/team within the company to oversee ESG matters

4. Company experience and proven track record for Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems installed in Hong Kong for the past 5 years from the tender closing date

☐ Yes, number of proven track record: _____ (Please provide supporting document)
☐ No

Person Authorized to Sign Tender

Name of Tenderer : _____	Name : _____	Authorized Signature : _____
Tenderer's Chop : _____	Position Held : _____	E-mail Address : _____
Date _____	Tel. No: _____	Fax No.:_____

Schedule D

Declaration of Conflict of Interest By Tenderer

The Tenderer, hereby declares and represents that, having made all reasonable enquiries, either:-

(a) none of the Tenderer and the Related Persons (as defined below) have any known actual, apparent, potential or perceived conflicts of interest that will, or might, arise in respect of the Tender, the Tender submission, the provision of the Services or the performance of the obligations under the Contract (if awarded to the Tenderer); or

(b) the Tenderer has in this Declaration declared all such actual, apparent, potential or perceived conflicts to the Authority.

The Tender represents that, having made all reasonable enquiries, the following represents all of its actual, apparent, potential or perceived conflicts of interest in respect of the Tender, the Tender submission, the provision of the Services or the performance of the obligations under the Contract (if awarded to the Tenderer):-

(List any conflict details or state "Nil Conflicts")

The Tender undertakes to advise the Authority in writing and keep the Authority advised of any actual, apparent, potential or perceived conflict of interest which the Tenderer or any Related Persons may have in respect of the Tender, the Tender submission, the provision of the Services or the performance of the obligations under the Contract (if awarded to the Tenderer) (including all or any facts which may reasonably be considered to give rise to conflict of interest) immediately upon becoming aware of the same.

"Related Persons" means:-

(a) the directors, employees, agents and sub-contractors of the Tenderer (and if the Tenderer is a partnership, any of the members/partners of that partnership) who are or will be involved in the Tender, the Tender submission, the provision of the Services or the performance of the obligations under the Contract (if awarded to the Tenderer); and

(b) any person or entity (i) which has control, directly or indirectly, over the Tenderer; (ii) which is controlled, directly or indirectly, by the Tenderer; or (iii) which is controlled by, or has controlled over, a person/entity referred to in paragraphs (i) or (ii). For the purposes of this Declaration, "control" means:

(aa) the possession by one person, directly or indirectly (through one or more intermediaries) of the power (whether holding office as director or otherwise) to affect, secure, direct and/or cause the direction of the management, affairs or policies of another person;

(bb) with respect to a corporation, partnership or other body corporate, such power in (aa) may be evidenced by (but is not limited to) that person: (i) holding shares or interests or possessing voting power in or in relation to that or any other person such as, but not limited to, the right to exercise, directly or indirectly, more than fifty percent (50%) of the other body corporate; and / or (ii) having powers conferred on that person by any constitution, memorandum or articles of association, partnership, agreement or arrangement (whether legally enforceable or not); and

(c) (i) any member of a partnership in which the Tenderer is a member or (ii) any company one or more of whose Directors is in common with one or more of the Directors of the Tenderer.

"Conflicts of interest" shall include (but are not limited to) (a) any situation where the personal, financial, commercial or other interest of the Tenderer or any of its Related Persons, conflict or compete, or may be expected to conflict or compete, with the Tenderer's duties to the Authority under the Contract; and (b) any situation where the Tenderer or any of its Related Persons may have any personal, financial, commercial or other interests in any potential service, advice, proposals or recommendations made or which may be made by the Tenderer under the Contract.

Signed by the Signatory for and on behalf of Tenderer:-

Name of Tenderer:	_____	Name and Title of Signatory:	_____
Tel:	_____	E-mail:	_____
Fax:	_____		
Date :	_____	Company Chop:	_____

Special Conditions of Contract

1. Contract Period

This Tender will be concluded as an **eleven (11)** years Contract with effect from the date as specified in letter of acceptance of offer.

2. Estimated Quantities

2.1 The quantity of each item of Goods specified in the Schedule of Requirements is an estimate of probable requirement only. Within such limits, the Seller shall be bound to supply the Goods at the contract prices against orders placed during the Contract Period.

2.2 This clause supersedes Clause 1 of General Conditions of Contract, Part II of HA(G)231A.

2.3 For the avoidance of doubt, the Authority shall not have any obligation under this Clause if this Contract is terminated by the Authority in accordance with the terms and conditions of the Contract.

3. Survey Expenses

Without prejudice to other rights or remedies of the Authority herein or at law, if there are any Defects in the Goods, the Contractor shall be responsible for any expenses incurred in employing a surveyor or any expert to establish the nature of the Defects.

4. Inspection or Examination

4.1 The Contractor shall upon request of the Authority permit Authority Representatives to inspect or examine warehouse(s) or distribution operation (such to include without limitation, logistics, manpower, facilities or transportation arrangements) in respect of the Goods.

4.2 The Contractor shall upon request of the Authority procure written permission from the manufacturer(s) of the Goods to permit Authority Representatives to inspect or examine the manufacturing facilities and process (including storage) in respect of the Goods.

4.3 The Contractor shall take or procure to be taken any reasonable action to rectify any reasonable concerns raised by the Authority following inspection or examination under this Clause. The Contractor shall also furnish the Authority with a report satisfactory to the Authority on the action taken, within such time frame as may reasonably be requested by the Authority.

5. Country of Origin

The Authority reserves the right to reject any delivery in the event that the Goods are manufactured in the country other than the one originally quoted.

6. Manufacturer

The Authority reserves the right to reject any delivery in the event that the Goods are manufactured by the manufacturer and in the manufacturing facility other than the one originally quoted.

7. Payment Correspondence

Invoice and correspondence concerning payment must be forwarded to the Hospital concerned after delivery. The Authority shall not be held responsible for any delay in payment if invoices and correspondence concerning payment are not properly addressed.

8. Order Records

Contractors are required to maintain an updated report on the purchase order history. The report should be provided to the Authority on quarterly basis (every three months). Upon request of the Authority, unless otherwise specified, Contractors are required to provide the order history **NOT** more than 7 working days. The report shall include details such as order number, date, hospital name, ordering quantity and value, batch no. of product delivered, etc.

9. Equipment Requirements

9.1 Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.

9.2 Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.

9.3 Equipment offered shall be suitable for use throughout the environmental ranges unless otherwise specified:

(a) Temperature 10ºC - 35ºC

(b) Relative Humidity 30% - 85% / _____ *

9.4 The equipment shall remain operational and within specification throughout the voltage range of 220V $\pm$ 6%, 50Hz $\pm$ 2%, 1-phase A.C. electrical supply.

9.5 Single phase mains operated equipment shall be fitted with a power plug with strain relief or equivalent protection mechanism, suitable for the site condition. The plug shall comply with relevant standards e.g., BS1363 for 13A plug.

9.6 Where a 3-phase supply is required, Hospital Authority (HA) shall furnish a 4-wire earthed neutral power supply at 380V $\pm$ 6%, 50Hz $\pm$ 2%, A.C. The equipment shall remain operational and within specification throughout the voltage range and specification.

9.7 Other than items 9.4 and 9.6 above, any other special power supply requirements such as D.C. or stabilised supply shall be the responsibility of the Contractor.

9.8 The Contractor shall also provide details of other utilities and/or special conditions, which are required for the proper operations of the equipment such as water supply, gas supply, drainage, exhaust, air-conditioning, air filtration, floor loading, etc.

9.9 The Contractor shall submit the type approval certificate from the Office of Communication Authority (OFCA), Hong Kong for the medical devices with radio frequency transmission not exempted from licensing, and assist the hospital to obtain Industrial Scientific and Medical Electronic Machine (ISMEM) licence before the medical devices are used.

For those medical devices exempted from licensing (with frequency band listed in Schedule 2 of Telecommunications (Telecommunications Apparatus) (Exemption from Licensing) Order (Cap. 106 sub. Leg. Z of the laws of Hong Kong)), the respective technical criteria as stated in the Order shall be complied with. The aforementioned medical devices include but are not limited to Bluetooth products, IEEE 802.11a, IEEE 802.11b/g and other wireless LAN products.

9.10 The Contractor shall declare whether the offered model subject to statutory requirement of testing and/or examination prior to use, including but **not** limited to Factories & Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations (Cap.59J of the laws of Hong Kong), and Boiler & Pressure Vessel Ordinance (Cap. 56 of the laws of Hong Kong). The Contractor shall engage appropriate authorized technical party for equipment testing and/or examination at the Contractor's own cost, and provide the certificate(s) of Test and Examination/ Results to HA for inspection free of charge for fulfilment of statutory requirement.

9.11 The Contractor shall provide HA the information on the equipment power dissipation, heating and any adverse effects to the environment as well as waste disposal procedures, if applicable, for consideration.

9.12 The Contractor shall supply HA with Medical Equipment with international directive of Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS), Waste Electrical and Electronic Equipment (WEEE), etc. in restriction and control of heavy metal contents, disposition and recyclable options wherever possible, for HA consideration. Detailed information, if any, shall be provided during tender submission.

10. Documentation

10.1 The Contractor shall submit the documents listed as below in form of at least one hardcopy and one softcopy upon delivery of each equipment. All photocopies shall be properly binded, stamped and certified as true copies of the original by the manufacturer. If the Contractor cannot provide softcopy of documents, the Contractor shall scan and provide the full documents as digital file (e.g. PDF file). The documents shall include, but not limited to, the latest version of (1) operation and maintenance (O&M) manual(s), in English or in Chinese complete with procedures of preventive maintenance (PM) and corrective maintenance (CM) and maintenance interval, (2) PM checklist(s) endorsed by equipment manufacturer (if PM is suggested by the manufacturer) and (3) installation manual/ method statement (if applicable) to user and hospital administration department.

10.2 The Contractor hereby consents to HA's disclosure to any third party whenever it considers appropriate or upon the request of such third party (written or otherwise) any

of the aforesaid manuals, checklists, or method statements for the purpose of repairing and/or maintaining the Equipment. The Contractor hereby agrees that HA shall have the right to disclose to any third party whenever it considers appropriate or upon the request of such third party (written or otherwise) any of the aforesaid manuals, checklists, or method statements without first seeking the prior consent of the Contractor for the purpose of repairing and/or maintaining the Equipment.

10.3 Should any original equipment manufacturer products be included, the documents as specified in 10.1 above shall also be provided.

10.4 The Contractor shall ensure that all documents provided under this paragraph are of the latest version and declare any time-limited validity. The Contractor shall have a mechanism/ procedure in placed and followed for maintaining and following the up-to-date documents until the end-of-support of the equipment as per manufacturer's advice. Should there be any updated versions/supplements in respect of the documents already submitted under this paragraph or any new release of documents, the Contractor shall inform and supply an electronic copy of the same by email to the users, hospital administration department and Biomedical Engineering services Section (BESS) within 10 calendar days upon the availability of such updates/supplements/new release. Hardcopy version shall be provided upon request without additional cost.

11. Certificate of Compliance

The Authority will not conduct acceptance tests unless and until it has received a certification from the manufacturer that the manufacturer has conducted its own tests and finds that the equipment in question meets the specifications in the Contract.

12. Warranty

12.1 The Contractor shall provide at least one-year warranty for the Goods supplied, or any part or portion thereof, starting from the date of acceptance of the Goods. During the warranty period all Services which include replacement of faulty parts, scheduled and breakdown services by qualified maintenance personnel, shall be provided free of charge.

All repair/replacement work shall be fully documented in service reports provided to the hospital. A label or equivalent shall be affixed to the equipment to indicate the last parts replacement date and next replacement due date, if any.

12.2 The Contractor shall establish procedures to handle maintenance and service arrangements to provide PM and CM, including calibration, provision of spare parts and other services to the users.

12.3 The Contractor shall maintain the entire technical system/ Medical Equipment including the software associated with the system/ Medical Equipment to the equipment performance specifications published by the original equipment manufacturer(s) at the time of manufacture of the equipment. The Contractor shall inform affected users and hospital administration department as and when any model or spare parts become obsolete (such as end of service life and end of supply of spare parts) in writing within 10 calendar days upon notification from the equipment manufacturers with supporting document from manufacturer or its authorized agent. The Contractor shall use reasonable

endeavour to secure sufficient genuine spare parts for the maintenance of affected equipment throughout the warranty period.

12.4 The Contractor shall provide all transport, necessary tools and testing instruments/ equipment required for the satisfactory execution of service. All measuring instruments/ equipment shall be under regular calibration by facilities traceable to international standards. The Contractor shall provide calibration certificates to HA upon request.

12.5 Maintenance Personnel

Maintenance Services shall be provided by suitably qualified maintenance personnel. A list of English or Chinese full name of qualified maintenance personnel who provide Maintenance Services shall be provided upon commencement of contract. Organization chart of organization description of their maintenance organization with brief notes on the areas of responsibility of each post shall be provided upon request. Maintenance personnel who have received training or have been authorized by the Contractor/manufacturer/manufacturer's appointed agents for maintaining the equipment offered shall be clearly identified. The qualification/ competency records/ certificates/ training records or other supporting documents of maintenance personnel shall be provided upon request. The on-site maintenance personnel shall facilitate ward staff's verification of the identity of maintenance personnel as authorized maintenance personnel to perform equipment maintenance by presenting evidence of his/ her identity to ward staff. Should there be change of maintenance personnel and/or renewal of training certificate or validity, the Contractor is responsible for updating the list of authorized maintenance personnel with supporting documents and the maintenance team structure, if necessary, and informs HA accordingly.

12.6 Unless otherwise specified in tender documents/ specification, the Maintenance Services shall be provided free of additional charges during the normal working hours as follows:

- 09:00 - 18:00 Monday to Friday, excluding Public Holiday
- 09:00 - 13:00 Saturday, excluding Public Holiday

12.7 The following shall be provided free of additional charges by the Contractor:

- All scheduled maintenance and system upgrade
- All maintenance work carried out during normal working hours
- All repair work carried out even beyond normal working hours. This shall be free if the Contractor is notified of the equipment fault during normal working hours

12.8 Preventive Maintenance (PM)

(a) The Contractor shall submit as an essential part of the offer a yearly maintenance schedule indicating the number of PM services recommended by equipment manufacturer for ensuring a satisfactory performance of the equipment offered. Supporting document of intervals of PM from O&M manual(s) and/or manufacturer's confirmation shall be submitted upon request. The Contractor shall perform PM at regular intervals according to manufacturer's recommendation. If such information is not available, at least one complete session of PM services shall be provided annually.

(b) The Contractor is required to provide information including the service scopes, service report template and checklists of the PM service for the equipment. The scope

of Services shall comply with the recommendations in the latest O&M manuals / instruction manuals issued by the equipment manufacturer.

(c) The Contractor shall be responsible for arranging, coordinating and agreeing on a program acceptable to the users for PM and shall take all reasonable steps to avoid causing any interference with the normal clinical operation of the hospital.

(d) The routine service shall include all necessary inspection of entire technical system/ Medical Equipment including computer system with software, accessories and peripherals, troubleshooting, repairs, replacement of parts required periodically replacement, adjustments, calibration, cleaning, system checks, system patches update, software update, dust removal, lubrication, any recommendations stipulated in O&M manual/ maintenance procedures, necessary to ensure that the equipment is safe to use, in normal operation and conforms to the performance specifications stipulated to the equipment's service manual.

(e) The Contractor shall complete PM work orders within the scheduled month. Any non-fulfilment of work orders shall be promptly reported through established mechanism or channel with hospitals. The Contractor shall provide PM reminder to users directly one month in advance from the scheduled date. The Contractor shall inform and provide detailed justification to hospitals for PM work orders being completed outside the scheduled month, or on-hold, or rejected in writing within 7 calendar days.

(f) A new PM label shall be affixed on the equipment after each PM to indicate the asset number, service provider's name, PM date and the next PM due date.

(g) The Contractor shall inform users the equipment condition/ status right after PM with user's signature on the maintenance record to acknowledge the maintenance work. The equipment condition/ status of each equipment shall be recorded on maintenance record clearly. If the Contractor found a problem during PM of an equipment and determined that the equipment cannot be returned to service (e.g. not safe to use or not in normal operation), the Contractor shall inform ward/department in-charge or his delegate right after maintenance work.

(h) Such Maintenance Services and service interval shall be performed by trained competent maintenance personnel in accordance with the maintenance procedures as described and/or recommended in the latest version of equipment operation and maintenance manual issued by the manufacturer.

(i) The Contractor shall carry out safety test on the equipment at least once every 12 months. The safety standards required shall comply with IEC60601-1 / IEC61010-1 / IEC62353 or equivalent if applicable. If the Contractor found a problem during the safety test and determined that the equipment cannot be returned to service (e.g. not safe to use or not in normal operation), the Contractor shall inform ward/department in-charge or his delegate right after maintenance work.

12.9 Corrective Maintenance (CM)

Unless otherwise specified in tender documents/ specification and accepted by HA, herein the CM services shall be provided as follows:

(a) Upon notification by the user, Hospital or a representative of either, of Defects (departure from performance specifications) in the operation of the equipment, the Contractor shall attend to the fault on-site within 4 normal working hours. This service shall include all necessary repairs, adjustments, replacement of parts and safety test to restore the equipment to its normal operational conditions in a time of no more than 3 normal working days or a time limit acceptable to the user. Otherwise, the Contractor shall provide loan unit to user for its normal operation. Maintenance Services shall be performed in accordance with the maintenance procedures as described and/or recommended in the equipment service manual by the manufacturer.

(b) The Contractor shall ensure that equipment after repair shall be well protected (e.g., from rain, fall, etc.) and returned to user department in the original condition of configuration. Single phase mains operated equipment shall be fitted with a power plug with strain relief or equivalent protection mechanism, suitable for the site condition. The plug shall comply with relevant standards e.g. BS1363 for 13A plug.

(c) If the Defects of the equipment are required to be rectified out of the hospital, the Contractor shall specify the time period for the repairs to the user each time.

(d) The Contractor shall inform user the equipment condition/status right after CM with user's signature on the maintenance record to acknowledge the maintenance work. The equipment condition/ status of each equipment shall be recorded on maintenance record clearly. If the Contractor determined that an equipment cannot be returned to service (e.g. not safe to use or not in normal operation), the Contractor shall inform ward/department in-charge or his delegate right after maintenance work.

(e) Contractor shall be responsible to make good to the satisfaction of the Hospital's representatives, any Defects on the equipment due to improper workmanship, faulty design or component failure which may arise within the warranty period of the equipment.

12.10 Mounted Equipment

For mounted equipment, the PM service shall include but not limited to the followings and be performed by qualified maintenance personnel:

(a) The tightening torque on each mounting screw shall be checked at regular intervals according to operation and maintenance manual(s) and/or manufacturer's recommendations. Torque wrench or special tools to be used for tightening torque checking advised by manufacturer shall be with valid calibration by qualified independent laboratory, such as laboratory possessing HOKLAS accreditation. Any mounting screw that was found loosed shall be handled according to latest manufacturer recommendation, or otherwise, the loosed screw shall be replaced with a brand new one.

(b) If there is any replacement interval of spare parts (such as mounting screw) recommended by manufacturer, the Contractor must provide this information to user and hospital administration department and follow the recommendation to replace the spare parts accordingly within the contract period.

12.11 On-site inspection

HA reserves the right to conduct on-site inspection on any maintenance activities conducted by the contractors. The Contractor shall respond and provide schedule to on-site inspection by HA/ HA appointed agents upon request. If any failure on the mutual agreed arrangement of on-site inspection, that maintenance activities shall be considered as incomplete and Contractors may rearrange and conduct the maintenance activities again without additional cost.

12.12 Up-time Guarantee

Unless otherwise specified in tender documents/ specification and accepted by HA, herein the up-time shall be followed as follows:

Uptime is calculated as follows:

$$\text{Uptime} = \frac{Base\ Time - Downtime}{Base\ Time} \times 100\%$$

The contractor shall guarantee an equipment uptime (X) of not less than 95% of the total normal working hours. If the contractor fails to achieve an uptime of 95% averaged over each consecutive period of 6 months, the warranty period shall be extended based on the following table:

% of Equipment Uptime (X)	Extension of Warranty Period
$90\% \leqq X < 95\%$	1 month
$85\% \leqq X < 90\%$	2 months
$80\% \leqq X < 85\%$	3 months
Below 80	Further negotiation is required

"Base time" = the total number of calendar days within the applicable 6-months period
"Down Time" will be calculated from the time that the equipment breakdown call is issued to the contractor to the time of completion of the repair and issuance of a service report to the hospital, counting normal working hours as referred in 12.6 above.
"Down Time" is the time when the system is down and not available for operation. However, it shall not include the time for any scheduled maintenance and system upgrade.

12.13 Maintenance Record/ Service Reports

Upon completion of any maintenance work, the Contractor shall complete a service record with checklist and measured data with passing criteria wherever applicable to indicate whether the equipment can be return to service (i.e. safe to use) and in normal operating conditions after maintenance work. Justification for PM work order complete outside the scheduled month or on-hold shall be provided. Legible service report that contains information as listed shall be provided to both user and Hospital administration department for review.

(a) Equipment type, brand, model, serial number and HA asset number;
(b) Nature of service (PM or CM);
(c) PM scheduled date
(d) Equipment location;
(e) Arrival date & time on site;
(f) Fault reported (date & time);

(g) Fault corrected (date & time);
(h) Reinstatement date and time
(i) Action taken;(including if any periodic service taken)
(j) Result including equipment condition after maintenance work (safe to use; safe to use but corrective service is required at no additional cost, safe to use but replacement of accessary is required at cost, removed from use, collected from user for offsite service)
(k) Spare parts used; (including if any periodic parts replaced)
(l) Consumable items used;
(m) Response time;
(n) Down time;
(o) Current price of spare parts used;
(p) Current price of consumable items used;
(q) Measurement or test data with passing criteria (if applicable) and Status/ Condition of rechargeable battery (if applicable) (safe to use or not safe to use)
(r) Test instrument details including test instrument type, model, serial number, last calibration date, etc.
(s) Full English/ Chinese name of maintenance personnel of Contractor

The Contractor shall adopt and use HA's electronic maintenance management system for on-site technical personnel admittance, maintenance work order management, equipment status update, and the upload of service reports with relevant checklists. The Contractor shall engage in multiple system tests and trials for all equipment covered in this electronic system under the Contract across all HA premises.

12.14 Warranties for System

12.14.1 The Contractor warrants that each Medical Equipment / System will be new and free from Defects during the Warranty Period and the Contractor shall provide the Maintenance Services to maintain each Medical Equipment / System during the relevant Warranty Period in compliance with the Tender Specifications at no cost to the Authority.

12.14.2 The Contractor warrants that each Medical Equipment / System will be of merchantable quality and will be fit for the purpose as specified in the Tender Specifications. Unless otherwise stated in the specification, all Medical Equipment / System, Hardware and Goods supplied under this Contract shall be new and unused.

12.14.3 The Contractor warrants that the Documentation will provide adequate instructions to enable the Authority to make proper use of such facilities and functions.

12.14.4 The Contractor warrants that it has the right to sell the Hardware and to grant the Licence or any part of it and that such items of the Hardware and the Software are free from any charge or any encumbrances before the Contract is made.

12.14.5 If the Contractor receives written notice from the Authority of any breach of the said warranties, then the Contractor shall, without prejudice to the Authority's other rights or remedies, at the Contractor's own expense and as

soon as possible after receiving such notice, remedy the Defects or error in question.

12.14.6 If any of the Hardware or Software ceases to be produced by the manufacturer or developer, the Contractor undertakes to inform the Authority in writing at least 3 months prior to the date of cessation and to propose product substitution for the Authority's consideration.

12.14.7 The Contractor warrants that the provision of the Deliverables and Services by the Contractor or the use or possession of the Deliverables, Hardware and/or Software or other materials produced or supplied by the Contractor under the Contract by the Authority, its Authorised Users and their successors in title shall not infringe the Intellectual Property Rights of any third party.

12.14.8 The Contractor warrants that the Software is free from any virus or other malicious code which may corrupt or damage any computer and systems on which the Software is installed.

12.14.9 The Contractor warrants that the Software is free from any mechanism (including but not limited to a software lock, software key or time bomb) the purpose of which is to disable or reduce the functionality or performance of all or any part of the Software.

12.14.10 The Contractors liability under this clause shall be in addition to any warranty or condition, express or implied, statutory or otherwise as to the merchantability or fitness for a particular purpose of the Hardware, Software and Medical Equipment / System (or any part thereof.

12.14.11 The Contractor warrants and represents that the Contractor's entry into the Contract and the Contractor's performance of its obligations under the Contract will not conflict with or result in breach of:

(i) any provision of the Memorandum and Articles of Association, or other equivalent constitutional documents governing the Contractor;
(ii) any contract or arrangement to which the Contractor is a party or by which the Contractor is bound;
(iii) any order, judgment or decree of any court or government agency to which the Contractor is a party or by which the Contractor is bound; or
(iv) any applicable laws or regulations.

12.14.12 The Contractor warrants and represents that the Services shall be performed, and the Medical Equipment / System and all Deliverables and the provision of any location and network for the Medical Equipment / System (if required) shall be in compliance with all applicable laws and regulations.

12.14.13 The Contractor warrants and represents that the Services shall be performed, and the Medical Equipment / System and all Deliverables, and the provision of any location and network for Medical Equipment / System (if required) shall be in accordance with all professional methodologies, standards, guidelines and code of practices as published by relevant government bureau and department from time to time during the Contract

Period, unless and to the extent any provisions therein are inconsistent with any express requirements of the Contract or unless otherwise agreed by the Authority on a case by case basis.

12.14.14 If the Contractor fails to perform its obligations under this clause or breaches one of the warranties, then the provisions of Clause 41 and Clause 42 will apply.

13. Post- Warranty Maintenance (If applicable)

Unless otherwise specified in tender documents/ specification and accepted by HA, the post-warranty service requirements shall be the same as warranty maintenance service level, specified in Section (12) Warranty.

14. Safety and Functional Test

14.1 Safety Test

For the purpose of this Contract the Goods shall be subject to a safety test after delivery and installation. Such test is to be carried out by the HA Representative or his authorized nominee or nominees. The safety test will normally be conducted within 6 to 8 weeks after delivery and installation of the Goods. The date of completion of safety test for the Goods shall be determined by the HA based upon the satisfactory result of such safety test. The Contractor shall provide technical support and operation training to HA at safety test upon request without additional cost.

14.2Functional Test

For the purpose of this Contract the Goods shall be subject to a functional test for its conformance with the operational and reliability requirements to the satisfaction of the Authority. In the event that the equipment fails to conform to the above stated requirements, the Contractor is required to carry out appropriate remedial measures and/or rectification works, including replacement of the entire equipment, where deemed necessary. The date of acceptance of the Goods shall be determined by the Cluster/Hospital based upon the satisfactory completion of such functional test.

15. Payment

For Item 1: Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems

Payment will be made with details listed in following table.

Tender Value	**Payment will be made within 30 days with following details:**
60%	For site works and provision of document of equipment ordering
30%	Upon equipment delivery
10%	After goods acceptance

The Goods shall not be deemed to have been accepted unless:-

15.1 The Goods have been tested and perform satisfactorily.

15.2 The operation and maintenance manuals stipulated in **Clause 10** have been delivered and verified to be satisfactory.

15.3 The Contractor has carried out its obligations under the Contract.

Notwithstanding above, should there be any outstanding items to be supplied and/or minor works to be done by the Contractor the Authority has the discretion to take over the Goods for operational use and the Contractor shall then be entitled to receive up to a maximum of 90% payment of the Contract value of the Goods so taken over. The remaining payment will be made when all the outstanding items have been supplied and accepted and/or outstanding works have been satisfactorily completed.

For Item 2: Provision of Maintenance Service

15.4 Payment will be made within 30 days after the date of receipt of invoice or the date of acceptance of services whichever is the later.

15.5 Payment shall be made by the Authority for the maintenance charges set out in the specification on yearly payment in advance basis or an agreeable payment period between the Hospital and the Contractor. Addition and / or deduction to the quantity of Equipment to be maintained under this Contract could take place anytime during the Term of the Contract by giving not less than 30 days advance notice to the Contractor and the annual maintenance charges will be adjusted on a pro-rata basis accordingly, payable in the next payment cycle. The balance amounts of the deleted equipment should be remitted to the hospital within 30 days from the date of hospital notification for such service cessation of the maintenance service.

15.6 Invoices and correspondence concerning payment must be forwarded to the Tuen Mun Hospital. The Hospital shall not be held responsible for any delay in payment if invoices and correspondence concerning payment are not properly addressed.

15.7 Payment will be made in Hong Kong dollars. Price quoted in other currencies will be considered and if accepted, payment will be made in the quoted currency. All bank charges incurred by the Contractor will be borne by the Contractor.

16. Cost of Additional and Alternative Works

The Contractor will be responsible for the cost as determined by the Hospital for any additional or alternative works to suit the equipment delivery, storage, installation and commissioning requirements if such have not been highlighted clearly by the Contractor and confirmed acceptable by the Hospital before the award of the Contract.

17. Clearance of Materials

17.1 The Contractor shall be responsible for the clearance of all packing materials after delivery / installation of the equipment and shall be responsible to removal and disposal of all materials to a legal place away from the Hospitals.

17.2 The Contractor shall undertake to remove, reinstate or re-align any of its works undertaken in respect of this provision if so required by the Hospital at any time during the warranty period.

18. Maintenance Services / Device Installation Requirements

18.1 The Contractor shall be responsible for the proper and safe installation, testing and commissioning of the offered equipment.

18.2 The Contractor shall abide to the Occupational Safety and Health Ordinance (Cap. 509 of the laws of Hong Kong) and Subsidiary Regulations of Hong Kong SAR to ensure that the all maintenance personnel's safety and health at work are properly taken care of either in their own or HA premises, by providing necessary equipment safety training from appropriate institution or organization wherever applicable.

18.3 The Contractor shall abide to the relevant legal requirements and regulations of environmental ordinance of Hong Kong SAR in order to restrict and reduce the adverse effects on environment as a result of their services / products provided. The maintenance for Medical Equipment must be carried out by competent staff / agents in compliance with regulatory requirements, international safety standards and in accordance with the manufacturers' recommendations to ensure the safety, quality and proper functioning of the Medical Equipment.

18.4 The Contractor shall follow installation manual issued by manufacturer and use appropriate calibrated tools for equipment installation. The installation record shall be kept by the Contractor and a copy of record shall be provided to HA for record, upon request.

18.5 Technical/Service training shall be provided to the HA without additional charges upon request.

18.6 For mounted equipment, the Contractor shall install the offered equipment strictly according to the latest installation manual/ protocol and method statement recommended by the equipment manufacturer. Such technical documents shall be provided to hospital before installation and shall include but not limited to the information of recommended tightening torque (if applicable) of all mounting screws. If any modification of the installation is required, it shall be agreed by the manufacturer with supporting document. All mounting screws shall be tightened by a torque wrench which is with valid calibration by qualified independent laboratory, such as laboratory possessing HOKLAS accreditation. After installation, an installation report signed by qualified person appointed by the Contractor shall be provided to the hospital administration department and user.

19. Damage to Hospital Property

The Contractor should note that he will be held responsible for any damage to Hospital property as may be caused during equipment transportation and installation. All due measures should be taken by the Contractor to protect such property.

20. Remedy on Contractor's Failure to Perform

20.1 Pre-acceptance Stage

If after delivery and installation of the equipment and prior to acceptance of the Goods the Contractor fails to demonstrate to HA Representative within a period of three (3) months that the equipment installed complies with the specification in every respect, HA Representative may terminate this Contract by notice in writing addressed to the Contractor without prejudice to any other rights which HA Representative may have against the Contractor.

20.2 Within Warranty Period

If during the warranty period, the Contractor fails to maintain the equipment to its performance specification such that the equipment remains unfit for use for a cumulative period of ninety (90) calendar days, HA Representative may without prejudice to other remedies.

(i) proceed, after serving notice of intent on the Contractor, to do the work at the Contractor's risk and expense; or

(ii) terminate this Contract and demand a rebate of any payment made in respect of the equipment by notice in writing addressed to the Contractor and the Contractor shall forthwith pay back to HA such sum or sums so demanded.

21. Changes and Substitution of Goods

21.1 The Contractor must keep the Authority advised of any changes in Goods including but not limited to change in design, material, part numbers, supersessions, during the contractual period.

21.2 The Contractor shall undertake to provide the Authority at any time before Goods delivery with an option to substitute Goods with new technology for any or all of the offered Goods. The substitute Goods shall have performance characteristics and functional capability equivalent to or better than the originally offered Goods. Such substitution(s) shall cost less than or equal to the replaced Goods. The terms and conditions of this Contract shall remain applicable to such substitutions(s) and the Authority reserves the right to accept or reject the proposed substitution(s).

22. Notification of Upgrade and Modification

The Contractor shall inform both the hospital users and the Authority in writing within 5 working days for any upgrade and modification affecting the equipment supplied under this tender.

23. Product Safety Issue (Product Recall, Hazard Alert and Safety Notice)

23.1 In case there is adverse incident happened locally and/or in overseas countries affecting the Goods supplied under this tender that leads to a product recall, hazard alert or safety notice action, the Contractor is obligated to inform the Authority in writing via e-mail

(hopsrmqabessimt@ha.org.hk) within 24 hours after the Contractor knew or reasonably should have known the happening of the incident.

23.2 The Contractor shall establish procedures/ mechanism to manage product recall/ safety alerts/ field safety notice and related corrective actions.

23.3 The Contractor shall declare if the offered model is currently affected by any outstanding/ incomplete/ unsettled product recall/ safety notice/ field safety notice issued by manufacturer or other regulatory bodies and provide supporting document from manufacturer for hospital's evaluation and consideration. Failure to provide the requested information may render the tender invalid.

23.4 If the offered model is affected by any product recall / safety notice / field safety notice and related corrective actions issued by manufacturer or other regulatory bodies until the end-of-support of the equipment as per manufacturer's advice, the supplier/manufacturer or its representative shall notify users, hospital administration department and BESS of HA Head Office and provide replacement parts / product upgrade / replacement / updated Documentation/ inspection / checking on item(s) with same/similar models or other mitigation plan and corresponding rectification time frame acceptable to HA on the affected models at no extra cost to eliminate the associated risks in writing within 10 calendar days upon notification from the equipment manufacturers or other regulatory bodies. The Contractor shall follow up the actions, and submit progress reports upon request.

Immediately when the Equipment is subject to any product recall notice / safety notice / field safety notice or any other notices of a similar nature issued by the manufacturer of the Equipment or any regulatory bodies of any country, HA may at any time terminate this Contract without entitling the Contractor to compensation. In such case, any sums of money already paid by HA shall be refunded to HA within 21 days, and any sums of money payable by HA shall cease to be payable. Provided always that Provided always that termination shall not prejudice or affect any right or action or remedy which shall have accrued or shall accrue thereafter to HA.

23.5 Efficient communication channels

The Contractors shall maintain efficient communication channels with the manufacturers such that any updated device information can be disseminated to the related parties including, but not limited to, user, hospital administration department and BESS of HA Head Office effectively, while feedbacks can be collected and delivered to the manufacturers for actions.

23.6 Keeping of transaction records

The Contractor shall establish procedures for the keeping of transaction records and maintain an updated list of distributors and transaction records of all their products. The transaction records shall include the manufacturer, brand, model, batch number, serial number, and quantity of devices, owning hospital and department with contact information, as appropriate. The Contractor shall provide and confirm the assets details and mitigation plans upon request in handling any product recall / safety notice / field safety notice and related inspections (if any) and corrective actions. Such records shall contain sufficient information to trace the sold and distributed medical device(s) and to permit a prompt and complete withdrawal of the device(s) from HA when needed. The transaction records shall be retained until the end-of-support of the equipment as per

manufacturer's advice, or at least 7 years from the date of product distribution, whichever is longer.

23.7 Complaint handling

The Contractor shall handle complaints from HA. The procedure shall include, but not limited to, the following key activities: (a) Receiving and evaluating information to determine if the feedback, constitutes a complaint; (b) Investigating complaints; (c) Reporting to regulatory authorities as appropriate; (d) Handling of complaint related devices; (e) Determining and initiating corrective or preventive actions on the basis of risk; and (f) Defining requirements for complaint records.

23.8 Managing adverse incidents

The Contractor shall establish procedures/ mechanism to manage adverse incidents. When an adverse incident that has occurred in HA is informed to the Contractor directly or from other sources, the Contractor shall conduct an investigation into the incident and report to HA. The investigation may be done in conjunction with the manufacturer or other parties. In summary, if the incident has caused any death or serious injuries or is of a serious public health concern, the report shall reach the HA as soon as possible but not later than time period agreed after the Contractor was informed of the incident. Upon request, the Contractor shall provide assistance to HA to conduct a separate investigation.

23.9 Safety Investigation

The Contractor shall attend to the call on site as soon as practically reasonable, conduct safety investigation to identify the root cause and provide interim and full investigation report with safety recommendation when there is a safety issue happened related to the offered equipment within a time frame agreed by both parties. The scope of investigation may include item(s) with same/ similar models supplied by the Contractor to HA.

The Contractor shall assist in the safety investigation when requested by Biomedical Engineering Services Section of HA Head Office or its representative, until the end-of-support of the equipment as per manufacturer's advice.

23.10 Handling Field Safety Notice/Safety Notice/Product Recall

The Contractor shall perform following actions (included but not limited to) to handle field safety notice/safety notice/product recall of equipment offered in a time frame acceptable/agreed by HA:

- To response with enquiry from HA regarding the field safety notice/ safety notice;
- To propose corrective action/recommendation suggested by manufacturer/regulatory body, with reasonable implementation schedule;
- To perform inspection/checking on same/similar model item(s) supplied to HA upon HA's request;
- To perform corrective action suggested by manufacturer/regulatory body;
- To perform other request from HA/regulatory body regarding field safety notice/safety notice.

23.11 Performance on handling Field Safety Notice/Safety Notice/Product Recall

The Contractor shall note that the Contractor's performance on handling field safety notice/safety notice/product recall is regarded as after sales services and will be taken into

account in evaluation of future quotations/ tenders by the Authority. Details please refer to individual quotation/tender document regarding the evaluation criteria.

24. Necessary Service / Parts Replacement

24.1 The Contractor shall confirm whether regular replacement with interval of safety parts is necessary in accordance with manufacturer's recommendation or O&M manual until the end-of-support of the equipment as per manufacturer's advice. The information of safety parts with price shall be provided for hospital's evaluation and consideration.

24.2 The Contractor shall list all services that need to be regularly performed with interval as recommended by the manufacturer until the end-of-support of the equipment as per manufacturer's advice. Such items include, but not limited to, certification services, calibration services, O2 sensors, springs, PM kits, filters and batteries replacement, etc.

24.3 The Contractor shall commit to maintaining production and supply of all spare and replacement parts to enable normal operation of the whole system of equipment until the end-of-support of the equipment as per manufacturer's advice to HA/ HA appointed agents, including the following items but not limited to, safety parts, spare parts and essential tools for maintenance use and consumable items, Software and Hardware.

25. Publicity

The Contractor shall submit to the Authority and/or the Hospital all advertising or other publicity material relating to the Contract or the Goods supplied or other work done in connection with the Contract wherein the name of the Authority or the Hospital is mentioned or from which a connection with the Hospital or the Authority can reasonably be inferred or implied. The Contractor shall not publish or use any advertising or other publicity material relating to the Authority and/or the Hospital or otherwise use or mention the name of the Authority and/or the Hospital for any promotion or marketing purposes without the prior written consent of the Authority and/or the Hospital. Nothing in this Contract expressly or impliedly constitutes an endorsement of any Goods or Services and each party agrees not to conduct itself in such a way as to imply or express any such approval or endorsement.

26. Contract Deposit

26.1 The Contractor is required to place and maintain the Phase Deposits (as the case may be) with the Authority as security for the due performance of all the Contractor's warranties, undertakings and obligations under this Contract.

26.2 The Contractor must maintain the full amount of:

(a) the Supply Phase Deposit throughout the Supply Phase and until the date falling 3 months after the end of the Warranty Period or the date on which all obligations and liabilities of the Contractor under the Supply Phase (including performance of its warranty under the Warranty Period) have been duly carried out, completed and discharged, whichever is the later; and

(b) the respective Maintenance Phase Deposit throughout the respective Maintenance

Phase and until the date falling 3 months after the end of the respective Maintenance Phase or the date on which all obligations and liabilities of the Contractor under the respective Maintenance Phase or the Contract (as the case may be) have been duly carried out, completed and discharged, whichever is the later.

26.3 The Contractor hereby irrevocably agrees and allows the Authority to, at any time prior to the expiry of the duration as set out in Clause 26.2(a), withdraw, deduct or set-off from the Supply Phase Deposit any amount which the Authority may recover from the Contractor under the Supply Phase of this Contract.

26.4 The Contractor hereby irrevocably agrees and allows the Authority to, at any time prior to the expiry of the duration as set out in Clause 26.2(b), withdraw, deduct or set-off from the Maintenance Phase Deposit any amount which the Authority may recover from the Contractor under the Maintenance Phase of this Contract.

26.5 If the Authority shall make any withdrawal, deduction or set-off thereby reducing any Phase Deposit (as the case may be), the Contractor must, within seven (7) days from notice of the Authority, top up such Phase Deposit (as the case may be) to maintain it at the level required in Clause 26.2.

26.6 Upon expiry of the respective duration as set out in Clause 26.2(a) and (b), the Authority shall return to the Contractor without interest the relevant Phase Deposit (as the case may be) after any withdrawal, deduction or set-off as allowed under Clause 26.3 or 26.4 (as the case may be). The return of the Phase Deposits (as the case may be) in full or in part does not prejudice the Authority's right to pursue any claim for loss, damage or liability under this Contract.

27. Occupational Safety and Health ("OSH")

27.1 The Contractor shall, so far as is reasonably practicable, take all reasonable steps to ensure the health and safety at work of all its employees performing the Contractor's obligations under this Contract. The Contractor shall for the purpose of this Contract where applicable:

(a) provide and maintain plant and systems of work that are safe and without risks to health;
(b) conduct regular work safety risk assessment exercises and make arrangements to ensure the safety and absence of risks to staff's health in connection with the use, handling, storage and transportation of plant or substances;
(c) provide adequate information, instructions, training and supervision to its employees on work safety;
(d) maintain the workplace, including ingress and egress thereto, as far as is within its control, safe and without risks to health;
(e) comply with HA's infection control policy guidelines and procedures, including personal protective equipment, hospitals' house rules and emergency procedures;
(f) conduct and monitor OSH compliance;
(g) keep and provide proper documentation of training records, duty rosters, incident reports, audit and inspection records and personal particulars of staff, if required by the HA; and
(h) ensure that the Contractor's employees take care of the safety and health of other persons who may be affected by their act of omission and co-operate with the

HA's representatives and such other persons to ensure compliance with any applicable statutory requirements.

27.2 The Contractor shall fully indemnify the Authority from and against all claims, actions, proceedings, demands and suits brought against and/or fines and penalties imposed on the Authority arising directly or indirectly out of or in connection with the failure of the Contractor to comply with Clause 27.1 of this part or any other obligations imposed under any applicable statutory requirements, including the Occupational Safety and Health Ordinance (Cap 509 of the Laws of Hong Kong) and all costs and expenses in connection therewith.

28. Expiry Date

Where product labelling and/or shelf life requirements are set out in the Tender Specifications, the use before date of all medical devices and consumables, if indicated in the format of MM/YY, will be made reference as use before the first day of the month.

29. Contracts (Rights of Third Parties) Ordinance (Cap. 623 of the Laws of Hong Kong)

The application of the Contracts (Rights of Third Parties) Ordinance is expressly excluded and no person who is not a party to this Contract shall be entitled to enforce any right or term of this Contract pursuant to the Contracts (Rights of Third Parties) Ordinance (Cap. 623 of the Laws of Hong Kong).

30. Conflict of Interest

30.1 The Contractor shall on appointment and during the Term and for six (6) months thereafter:

(a) immediately declare any actual, apparent, potential or perceived Conflict of Interest that will, or might, arise in respect of the provision of the Services or the performance of its obligations under the Contract, including but not limited to any interest or association, the Contractor, its Associated Persons may have with any contractors, suppliers or sub-contractors related to this Contract, directly or indirectly; and

(b) forthwith notify the Authority in writing and keep the Authority notified of all or any facts which may reasonably be considered to give rise to a Conflict of Interest.

30.2 The Contractor shall render its advice or recommendations pursuant to this Contract to the Authority on an impartial basis without giving favour to any particular service, equipment or product in which the Contractor has a direct or indirect commercial interest. The Contractor shall obtain from each and every one of its Directors, employees, agents and sub-contractors who are involved in this Contract a written undertaking to observe this sub-clause and sub-clause 30.3 below

30.3 The Contractor shall require its Directors, employees, agents and sub-contractors involved in this Contract to declare in writing to the Authority and keep the Authority informed regularly of any actual, apparent, potential or perceived Conflict of Interest,

including but not limited to all or any facts which may reasonably be considered to give rise to a Conflict of Interest. In the event that any Conflict of Interest becomes known to the Contractor or any of its Directors, employees, agents and sub-contractors involved in this Contract and / or is disclosed in a declaration, the Contractor shall forthwith take such measures as are necessary to mitigate as far as possible or to remove the Conflict of Interest so disclosed.

30.4 The Contractor shall prohibit its Directors and employees who are involved in this Contract from engaging in any work or employment other than in the performance of this Contract, with or without remuneration, which could give rise to any actual, apparent, potential or perceived Conflict of Interest. The Contractor shall procure that its agents and sub-contractors impose similar restrictions on their Directors and employees by way of a contractual provision.

30.5 The Contractor shall take all necessary measures (including by way of contractual provisions where appropriate) to ensure that its Directors, employees, agents and sub-contractors who are involved in this Contract are aware of the provisions under Sub-clause 30.2 to the Sub-clause 30.4 above. Where the Contractor has obtained the Authority's written approval to appoint sub-contractors to undertake any part of the Services, the Contractor shall take all necessary steps to procure and ensure that the same covenants in this Clause are imposed on the sub-contractors and shall take all necessary steps to enforce such covenants.

30.6 In this Clause 30:

(a) "Associated Company" in relation to the Contractor means any company which is the holding company or subsidiary company or sister company of the Contractor. A 'sister company' means a company which belongs to the same holding company as the Contractor's;

(b) "Associate Person" or "Related Person" means:

- the Directors, employees, agents and sub-contractors of the Tenderer / Contractor (and if the Tenderer / Contractor is a partnership, any of the members/partners of that partnership) who are or will be involved in the Tender, the Tender submission, the provision of the Services or the performance of the Contractor's obligations under the Contract;

- any person or entity (i) which has Control, directly or indirectly, over the Tenderer / Contractor; (ii) which is Controlled, directly or indirectly, by the Tenderer / Contractor; or (iii) which is Controlled by, or has Control over, a person/entity referred to in (i) or (ii); and

- (i) any member of a partnership in which of the Tenderer / Contractor is a member or (ii) any company one or more of whose Directors is in common with one or more of the Directors of the Tenderer / Contractor.

(c) "Control" or Controlled" means

- the possession by one person, directly or indirectly (through one or more intermediaries) of the power (whether holding office as Director or otherwise) to affect, secure, direct and / or cause the direction of the management, affairs or policies of another person;

- with respect to a corporation, partnership or other body corporate, such power in (a) above may be evidenced by (but is not limited to) that person: (i) holding shares or interests or possessing voting power in or in relation to that or any other person such as, but not limited to, the right to exercise, directly or indirectly, more than fifty percent (50%) of the voting rights attributable to the shares of or interest in such corporation, partnership or other body corporate; and / or (ii) having powers conferred on that person by any constitution, memorandum or articles of association, partnership, agreement or arrangement (whether legally enforceable or not);

(d) "Conflict(s) of Interest" shall include (but are not limited to) (a) any situation where the personal, financial, commercial or other interest of the Tenderer / Contractor or any of its Related Persons, conflict or compete, or may be expected to conflict or compete, with the Tenderer's / Contractor's duties to the Authority under the Contract; and (b) any situation where the Contractor or any of its Related Persons may have any person, financial, commercial or other interests in any potential service, advice, proposals or recommendations made or which may be made by the Tenderer / Contractor under the Contract;

(e) "Director" means any person occupying the position of director by whatever name called and without limitation a de facto or shadow director;

30.7 Notwithstanding any provisions in this Clause, the restrictions in this Clause shall not prohibit the holding (directly or through nominees) of investments in companies which investments are listed on any stock exchange provided that such investments do not exceed 5 per cent of the issued shares of any one company.

31. Admission of Contractor Personnel to HA Premises

31.1 Upon request from time to time by HA, the Contractor shall provide to HA a list of the names, posts, staff identity card numbers, addresses and telephone numbers of all Contractor Personnel who may at any time require admission on behalf of the Contractor to any premises owned, managed, controlled or occupied by HA ("HA premises") for the purposes of the Contract if so required by the Authority Representative, and in that event such list shall specify the capacities in which those persons are employed by or connected with the Contractor and shall contain such other particulars as the Authority Representative may reasonably require.

31.2 The Contractor shall ensure that while any of the Contractor Personnel is on HA premises, they shall observe HA's rules, regulations, guidelines and code of practice which are from time to time applicable to the Contractor's execution of all or any part of the services at the HA premises.

31.3 The Contractor shall obtain from all Contractor Personnel consent to disclose and/or submit to HA their Personal Data for the purposes of the provisions of this Clause 31 and other provisions of the Contract.

31.4 The Authority Representative reserves the right to refuse to admit to the HA premises, or the right to evict from the HA premises, any person, whose admission would be, in the reasonable opinion of the Authority Representative, undesirable.

31.5 In the event that the Contractor fails to comply with this Clause 31 and it is determined that such failure is prejudicial to the interests of HA, the Authority Representative may thereupon terminate the Contract.

31.6 Without prejudice to any other provision of the Contract, the Contractor shall indemnify and keep indemnified HA against all losses, claims, costs, demands and expenses that may arise out of or in consequence of any breach of this Clause 31.

31.7 The Contractor acknowledges and agrees that:

(a) HA may at any time vary unilaterally the entry requirements (including any vaccination and/or testing requirements) to any HA premises;

(b) it will comply with the guidelines and/or directions issued by HA from time to time on entry requirements (including any vaccination and/or testing requirements) to the HA premises.

32. The Sale of Goods (United Nations Convention) Ordinance (Cap. 641 of the Laws of Hong Kong)

The Authority and the Contractor agree that the provisions of the United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Contract.

33. Listing under the Medical Device Administrative Control System

33.1 The Contractor shall, upon request from the Authority, update the Authority the listing record of the Goods which are applicable MDs under MDACS and/or status of its submissions to DH for listing of such Goods under MDACS. If, in the sole opinion of the Authority, the Contractor fails to submit its application(s) to DH before the committed date provided in accordance with **Clause 33.3 of the Terms of Tender (Supplement)** or the MDACS listing cannot be completed within twelve (12) months after contract commencement or the Contractor's declaration under **Clause 4 in Schedule B** is found to be invalid, incorrect or unsubstantiated, the Authority may, without prejudice to the Authority's other rights and remedies under the contract or by law, in its absolute discretion,

(i) reject all or part of the Goods which fail to meet any of the above requirements (or those which the Contractor fails to demonstrate compliance with the above requirements) ("Relevant Goods") delivered hereunder (notwithstanding any acceptance or deemed acceptance of the Relevant Goods by the Authority or the making of payment by the Authority);
(ii) cancel, or suspend the performance of, any order placed by the Authority for the Relevant Goods which is not yet delivered;
(iii) delete the Relevant Goods from the Contract (if the Contract is awarded with more than one item) such that the Authority shall not be obliged to order a minimum quantity of the Relevant Goods with the Contractor during the term of the Contract notwithstanding any provision contained in the Contract; and/or
(iv) terminate the Contract forthwith.

33.2 The Contractor agrees to comply with all statutory requirements within the prescribed period under the legislation should the statutory control of medical devices takes effect. The Contractor shall

demonstrate to the Authority its compliance with the statutory requirements upon request by the Authority. If the Contractor fails to comply with any statutory requirement or demonstrate compliance of the same, and without prejudice to the Authority's other rights and remedies provided under this Contract or otherwise according to law, the Authority shall have the options set out in Clause 33.1 above, and reference to "Relevant Goods" shall be construed to include the Goods which fail to meet any statutory requirement (or those which the Contractor fails to demonstrate compliance with the statutory requirements).

33.3 Any monies paid by the Authority to the Contractor in respect of the Relevant Goods which have been rejected, pursuant to Clauses 33.1 and/or 33.2 of this Part, shall be refunded to the Authority and the Authority may purchase from other sources alternate supplies to substitute for the Relevant Goods rejected and those which, but for the deletion of the Relevant Goods from the Contract or the termination of the Contract, would be supplied by the Contractor to the Authority under the Contract, and the Contractor must, on demand by the Authority, pay to the Authority the additional costs and expenses in obtaining such alternate supplies, including but not limited to price difference and related freight and delivery charges.

34. Contractor Performance Monitoring

The Contractor should note that the Contractor's performance record, including but not limited to product quality, after sales services and Maintenance Services, where applicable, in the Contract shall be monitored and taken into account in evaluating the Contractor's tenders in response to invitations for tenders by the Authority. If, based on the Contractor's performance record, the Authority has a reasonable concern about the Contractor's legal and financial capabilities and the commercial and technical abilities to undertake the relevant procurement, the Authority may in its absolute discretion (i) take into consideration the Contractor's performance record, both for the equipment type(s) specified in the warning letter and for other equipment types/services provided by the Contractor, in the tender evaluation and/or (ii) exclude that Contractor, its holding company and subsidiaries from participation in tendering, for such period as the Authority may in its entire discretion consider appropriate. The Authority shall have the right to publicize or disclose, whenever it considers appropriate or upon request (verbal or written) by any third party, information of the Contractor who has been excluded from participation in tendering by the Authority, such as the name of the Contractor and duration, without reference to or consent from the Contractor.

35. National Security

35.1 The Contractor shall not engage in acts or activities that are likely to constitute or cause the occurrence of offences endangering national security or which would otherwise be contrary to the interest of national security.

35.2 The Authority may immediately terminate the Contract upon the occurrence of any of the following events:

(a) the Contractor has engaged or is engaging in acts or activities that are likely to constitute or cause the occurrence of offences endangering national security or which would otherwise be contrary to the interest of national security;
(b) the continued engagement of the Contractor or the continued performance of the Contract is contrary to the interest of national security; or
(c) the Authority reasonably believes that any of the events mentioned above is about to occur.

35.3 In the event that the Contract is terminated in accordance with Clause 35.2 above, the Contractor shall be liable for and shall indemnify and keep indemnified the Authority against, all losses, damage, costs and expenses incurred by the Authority arising out of or in relation to the termination.

35.4 In the event that the Contract is terminated in accordance with Clause 35.2 above, the Authority shall not be responsible for any claim, legal proceeding, liability, loss (including any direct or indirect loss, any loss of revenue, profit, business, contract or anticipated saving), damages (including any direct, special, indirect or consequential damages of whatsoever nature) or any cost or expense, suffered or incurred by the Contractor arising out of or in relation to the termination.

36. Products and Services to be provided

36.1 The Contractor hereby agrees to:-

(i) grant or procure to be granted to the Authority and/or its Authorised Users the Licence to use the Software on and in conjunction with the Hardware;
(ii) deliver and install each Medical Equipment / System according to the need-by date and location specified in the purchase order;
(iii) provide the Implementation Services in accordance with the Implementation Plan;
(iv) provide training in accordance with the Training Plan and Documentation to the Authority and/or its Authorised Users;
(v) provide Maintenance Services for each Medical Equipment / System to the Authority and/or its Authorised Users; and
(vi) provide the other services described in this Contract, upon the terms and conditions of this Contract.

36.2 The Contractor acknowledges and agrees that the Authority may place order for any Goods or Services under this Contract on its own behalf, or as an agent of any Authorised User. Both the Contractor and the Authority agree that in the event an order is placed by the Authority as an agent of any Authorised User, the following shall apply:

(i) before the Authority makes any such order, the Authority shall inform the Contractor in the relevant purchase order;
(ii) once the relevant purchase order has been received by the Contractor, a contract will automatically be formed between the Contractor and the Authority as agent on behalf of an Authorised User in respect of the relevant order on the same terms and conditions of this Contract, with only the necessary changes as may be stipulated by the Authority from time to time;
(iii) each of the Authority and the Authorised User shall have the full right to enforce this Contract in respect of any orders made by the Authority. Until notified by the Authority, the Contractor shall deal with the Authority on all matters relating to the Contractor's supply of Goods and/or Services under this Contract; and
(iv) The Contractor shall execute all such documents and do all such other acts as may be required by the Authority from time to time in order to give full force and effect to the contractual arrangements with the Authorised User as contemplated in this Contract in respect of any order the Authority makes as agent for the Authorised User.

36.3 The Contractor shall diligently, promptly and properly provide and coordinate the provision of Services to the Authority and comply with its duties and obligations in this Contract to the satisfaction of the Authority.

36.4 Contractor shall be responsible for providing, in accordance with the provisions of this Contract,

the Services for the duration of the Term and the Authority shall pay to the Contractor, subject to the remaining terms of the Contract, all sums due to the Contractor for the performance of the Services.

36.5 Contractor shall at all relevant times exercise in the performance of the Services the same reasonable skill, care and diligence expected of a professional consultant who is qualified, competent and experienced in carrying out duties and services of a similar type, scope, scale, complexity and purpose to those specified in this Contract.

36.6 The Contractor shall ensure that at all times it has, and will assign, adequate staff, tools and equipment to efficiently and properly fulfil its obligations under this Contract. The Contractor shall ensure that the Contractor Personnel who perform its obligations under this Contract are adequately and appropriately experienced, qualified and trained.

36.7 The Contractor acknowledges and agrees that the appointment or replacement of any Contractor Personnel to undertake any part of the Services shall not relieve the Contractor from any liability or obligation under this Contract and the Contractor shall be responsible for the acts, omissions, defaults and neglects of the Contractor Personnel as fully as if they were the acts, omissions, defaults or neglects of the Contractor.

36.8 The Contractor will provide the Services in a satisfactory and skilful manner and shall meet to the satisfaction of the Authority any complaints and criticisms that may be made.

36.9 The Contractor shall perform its obligations under this Contract in compliance with:-

(i) Good Industry Practice or Tender Specifications, whichever is higher;
(ii) all laws, rules and regulations applicable to its provision of the Services; and
(iii) the most current version or edition of all codes and standards that are relevant and applicable to its provision of the Services.

36.10 The Contractor shall provide all necessary assistance and all information on all matters in relation to the Services requested by the Authority and/or its Authorised Users.

36.11 The Contractor shall obey all instructions and comply with all reasonable requests that may be put forth by the Authority and/or its designated representatives.

36.12 The Authority may issue warnings to the Contractor on all matters relating to the provision of the Services and the Contractor shall immediately take all remedial action which may reasonably be required.

36.13 The Contractor and the Contractor Personnel shall not perform any duties and obligations under this Contract in such a way that may cause disturbance to patients, staff or visitors of the Authority or disruption to the normal routines and operations of the Authority.

36.14 The Contractor shall not use any materials in the provision of the Services in any way that may cause harm, discomfort or detriment to the health of the patients, staff or visitors of the Authority.

36.15 The Contractor acknowledges that the time, dates and periods shall be of the essence with respect to the performance of the Services specified to be subject to such requirement under this Contract as well as any times, dates or periods that may by agreement between the parties be substituted for any of them.

36.16 The Contractor acknowledges and agrees that the appointment or replacement of any Contractor Personnel to undertake any part of the Services shall not relieve the Contractor from any liability or obligation under this Contract and the Contractor shall be responsible for the acts, omissions, defaults and neglects of anyone of the Contractor Personnel as fully as if they were the acts, omissions, defaults or neglects of the Contractor.

37. Contractor's Acknowledgement

The Contractor acknowledges and agrees that when entering into this Contract, it has already been supplied with sufficient information to enable it to supply to the Authority, install, commission and maintain each Medical Equipment / System and perform the Services which comply fully with the requirements set out in the Overall Specifications and other provisions/ requirements of this Contract. The Contractor shall not be entitled to any additional payment or extension of time and shall not be excused from any obligation or liability under this Contract as a consequence of any alleged lack of knowledge or information or any misinterpretation by the Contractor of any matter or fact relating to the Medical Equipment / System or Overall Specifications, the said requirements or any other provisions of this Contract.

38. Licence

38.1 The Contractor hereby grants or procures to be granted a non-exclusive, perpetual, royalty-free, irrevocable, worldwide, and transferable Licence to the Authority and the Authorised Users, their assigns and successors in title (the "Licensed Parties") to use the Software for the Licensed Parties' respective business purposes on and in conjunction with the Hardware subject to the terms and conditions contained in this Contract.

38.2 The Software is to be used on and in conjunction with the Hardware save that:

38.2.1 If the Software cannot be used with the Hardware because it is inoperable for any reason then the Licence shall be temporarily extended without additional charge to use with any other compatible equipment until such failure has been remedied. The Authority shall promptly notify the Contractor of such temporary use and of the commencement and cessation thereof;

38.2.2 For the purpose of Clause 38.2.1 above, the Authority shall be entitled, before any of the Hardware becomes inoperable, to use the Software on any other equipment for the purpose of ensuring that such equipment can be used to substitute for the Hardware;

38.2.3 The Licensed Parties may use the Software on and in conjunction with any replacement equipment if the use of the Software on and in conjunction with the Hardware is permanently discontinued, provided notification is given by the Authority to the Contractor of such use. Upon such notification being given the replacement equipment shall become the Hardware for the purposes of the Licence.

38.3 The Contract shall in all aspects apply to all improved versions of any item of the Software and all other new releases as introduced from time to time by the Contractor and accepted by the Authority ("Updated Software"). The Contract shall also apply to all other hardware which is connected to the System either as a replacement or as an upgrade of any item of the Hardware ("Updated Hardware"). The Contract shall in all aspects apply to all changes made to any configurations as specified in the relevant Tenderer's Schedule ("Updated Configuration"). Tender Specifications shall be deemed to be amended to the extent that the specifications for Updated Software, Updated Hardware and Updated

Configuration supersede the relevant parts of the Tender Specifications. Notwithstanding any clause contained in this Contract provided to the contrary, the Authority shall not be liable for payment for any further charge, fee, cost or whatever payment in connection with Updated Software, Updated Hardware and Updated Configuration.

38.4 Without limiting the generality of Clause 38.1 above, where the Authority acts as agent of any Authorised User to purchase any Software in relation to the eHR Programme, the Authority shall have the right to transfer any Licence it holds on such Software to the Authorised User as and when required.

38.5 The Authority shall not permit any third party (other than a Licensed Party) to use the Software (except the third party has a need to know for the purposes of this Contract) or use the Software on behalf of any third party (other than a Licensed Party).

39. Confidentiality and Protection of Personal Data/Confidential Information

Authority's Confidential Information

(a) The Contractor undertakes that it and the Contractor Personnel will keep confidential and not disclose, use, or reproduce any Confidential Information without the Authority's prior written consent, other than as is necessary to enable performance of its obligations under this Contract. The Contractor shall not use the expertise evident in the Confidential Information in any manner detrimental to the interests of the Authority.

(b) Paragraph (a) shall not prevent the Contractor from disclosing any information which:
  (i) is in its possession (with full right to disclose) prior to receiving it from the Authority; or
  (ii) is or later becomes public knowledge other than by breach of this Clause; or
  (iii) it may independently develop or receive from a third party (with full right to disclose); or
  (iv) it is compelled to disclose by applicable law, rules or regulations or directions of the Authority or any supervisory authority exercising control over it.

(c) Upon request by the Authority, the Contractor shall procure that all the Contractor Personnel sign a confidentiality undertaking in the form set out in the Appendix to this part prior to commencing any work in accordance with this Contract

(d) The Contractor agrees to take all prudent steps, including maintaining effective security measures, to protect the Confidential Information from unauthorised access, use, copying or disclosure.

(e) Upon the completion, expiry or termination of this Contract or request by the Authority, the Contractor shall return to the Authority or destroy or permanently erase all the Confidential Information (including all copies).

(f) The Contractor acknowledges that the value of the Confidential Information is

such that an award of damages or an account of profits may not be adequate compensation for breach of this Clause. The Contractor acknowledges that the Authority may seek and obtain an ex-parte interlocutory injunction or final injunction to prohibit or restrain the Contractor or the Contractor Personnel from any breach or threatened breach of this Clause, without compromising its rights to seek damages or receive any other form of relief in the event of a breach of this Clause.

(g) This Clause shall survive the expiry or early termination of this Contract.

Confidentiality of Software

(h) The Authority undertakes to treat as confidential all information contained or embodied in the Software (except as specified otherwise under this Contract) and the Overall Specifications (collectively referred to as the "Information") provided that this Clause shall not extend to any information which was rightfully in the possession of the Authority prior to the commencement of the negotiations leading to this Contract or which is already public knowledge or becomes so at a future date (other than as a result of a breach of this Clause).

(i) The Authority shall not without the prior written consent of the Contractor divulge any part of the Information to any person except: -

1. the Authority's own employees, on a need-to-know basis;
2. the Authority's supervisory authorities exercising control over it and any other persons or bodies having a right, duty or obligation to know the business of the Authority and then only in pursuance of such right, duty or obligation;
3. any person who is for the time being appointed by the Authority to maintain any equipment on which the Software are for the time being used (in accordance with the terms of the Licence) and then only to the extent necessary to enable such person to properly maintain such equipment.

(j) The foregoing obligations as to confidentiality shall remain in full force and effect notwithstanding any termination of the Licence or this Contract.

Data Privacy and Security

(k) The Contractor shall and shall procure the Contractor Personnel, to comply with any applicable privacy or data protection laws (including the Data Protection Principles and other provisions of the PDPO (including any amendments thereto from time to time)), all guidelines issued by the Office of the Privacy Commissioner for Personal Data, Hong Kong, any privacy procedures or policies stipulated by the Government from time to time, and any applicable codes of practice, guidance notes or regulations in the handling of Personal Data provided or disclosed to or otherwise obtained or collected by the Contractor under this Contract.

(l) The Contractor shall not, and shall procure the Contractor Personnel not to, keep Personal Data longer than is necessary for the fulfilment of the purposes (including any directly related purposes) for which the same was obtained by the Contractor under this Contract. The Contractor shall:

1. return, destroy or permanently erase all such Personal Data;

2. destroy or permanently erase all copies of such Personal Data held by the Contractor; and
3. use all reasonable endeavours to ensure that anyone who has received any such Personal Data destroys or permanently erases such Personal Data and any copies held by it or him,

in each case, save to the extent that the Contractor or the recipients are required to retain any such Personal Data by any applicable law, rule or regulation or by any competent judicial, governmental, supervisory or regulatory body.

(m) The Contractor shall take all practical steps and have in place, maintain and regularly review all practicable technical and organisational security measures to protect Personal Data or Confidential Information in its possession or control from any Security Breach, having particular regard to:

1. the kind of Personal Data or Confidential Information and the harm that could result if any of those things should occur;
2. the physical location where the Personal Data or Confidential Information are stored;
3. any security measures incorporated (whether by automated means or otherwise) into any equipment in which the Personal Data or Confidential Information are stored such as encryption or equivalent protection, segregation of environments and secure backup arrangements;
4. any measures taken for ensuring the integrity, prudence and competence of persons having access to Personal Data or Confidential Information;
5. any measures taken for ensuring the secure transmission of Personal Data or Confidential Information such as encryption or equivalent protection;
6. any measures taken for ensuring the integrity and security of systems such as vulnerability management, patching and malware protection; and
7. any measures for incident prevention, management and notification such as log keeping, monitoring and incident detection and appropriate incident response procedures.

In this regard, the Authority may conduct periodic security audits (e.g. a Hong Kong Standard on Assurance Engagements ("HKSAE") 3000 assurance report, or a System and Organization Controls ("SOC") 2 Type 2 Report) to confirm that the measures implemented by the Contractor comply with the requirements of this Contract.

(n) The Contractor shall immediately notify the Authority if it becomes aware of or suspects a Security Breach or any corruption, compromise or misuse of the Authority's Confidential Information, Software, Hardware or Personal Data or any other sign of abnormalities (e.g. audit trail shows unusual frequent access of the Confidential Information, Software, Hardware of Personal Data of the Authority by a Contractor Personnel at odd hours), and provide full cooperation and all necessary access to the Authority (at the Contractor's expense) to allow the Authority to contain, remediate and investigate such Security Breach and to notify any affected individuals and the relevant authorities and to prevent recurrence of the relevant

incident.

(o) The Contractor shall, and shall procure the Contractor Personnel to, comply with all applicable laws of Hong Kong that govern the security and confidentiality of computer systems and data, all guidelines (including codes of practice) issued by regulating authorities under those laws, and all guidelines, directions and policies of the Authority relating to the Authority's compliance with those laws. Without limiting the foregoing, the Contractor shall:

(i) immediately notify the Authority of any change to the Medical Equipment / System of which the Authority is not already aware;

(ii) provide any assistance required by the Authority in relation to the preparation of any plan relating to security of the Medical Equipment / System;

(iii) cooperate with, and provide any assistance required by the Authority in relation to the conduct of, any assessment, audit, drill or other exercise relating to the security of the Medical Equipment / System;

(iv) comply with any direction from the Authority to provide any information, and produce any document in its possession or control, that is relevant to the security of the Medical Equipment / System; and

(v) comply with any direction of the Authority in relation to the security and secure operation of the Medical Equipment / System.

(p) The Contractor shall not, and shall procure the Contractor Personnel not to, access, interfere with, copy, modify, delete, damage, disable, reverse engineer, circumvent or attempt to compromise any system, network, application, software, hardware, data or security control of the Authority except to the extent strictly necessary for performance of this Contract in accordance with the principle of least privilege and with the Authority's prior written consent. Any request for access must be submitted in writing by the Contractor and the Authority may approve, or modify such access requests at its sole discretion.

(q) The Contractor shall ensure that access is granted only to Contractor Personnel specifically authorised by the Authority and that appropriate security measures, including strong authentication and secure transmission controls, are implemented and maintained at all times. Upon completion of the relevant activities or when access is no longer required, the Contractor shall promptly notify the Authority to revoke such access.

(r) The Contractor shall have personal data protection policies and procedures in place and provide adequate training to the Contractor Personnel to ensure that the Contractor Personnel will comply with these policies and procedures and with the obligations under this Contract regarding the handling of Personal Data.

(s) The Authority may carry out security and compliance audits, or inspect and monitor the Contractor in order to verify how the Contractor handles and stores Personal Data and whether the Contractor and the Contractor Personnel are adhering to the terms of this Contract. The Contractor shall, and shall procure the Contractor Personnel to, provide reasonable assistance to the Authority in this regard.

(t) If the Contractor has engaged a sub-contractor to provide the Services, its

agreement with the sub-contractor should impose the same confidentiality and data security obligations set out in this Contract on the sub-contractor. Where the sub-contractor fails to comply with such obligations, the Contractor shall remain fully liable to the Authority for such failure. The Contractor shall not be relieved from any of its obligations under this Contract by entering into any sub-contract for the performance of any part of this Contract. The Contractor shall be responsible for all acts, omissions, defaults and neglects of each sub-contractor, and the agents and employees of such sub-contractor as fully as if they were the acts, omissions, defaults or neglects of the Contractor.

(u) The Contractor shall submit annual security reports to the Authority to report its compliance with the above requirements.

(v) The obligations in this Clause shall survive the expiry or termination of this Contract and shall be without prejudice to any rights or remedies available to the Authority under this Contract or applicable law.

40. Indemnities and Liabilities

40.1 The Contractor shall indemnify the Authority, its employees, directors and agents, and, where applicable, the Authorised Users and their employees, directors and agents ("Authority Indemnified Parties") and keep the Authority Indemnified Parties fully and effectively indemnified from and against any and all losses, expenses (whether direct, indirect or consequential) including all legal fees and costs, damages or liabilities (whether civil, criminal, statutory or otherwise) claims, demands, actions, proceedings of whatever nature suffered or incurred by the Authority Indemnified Parties arising out of or in relation to or resulting from:

(i) a breach of this Contract by the Contractor or the Contractor Personnel;
(ii) any negligent act, omission, defaults or neglects of the Contractor or the Contractor Personnel;
(iii) damage to any property or injury to any persons caused by any negligent act or omission or wilful conduct of the Contractor or the Contractor Personnel; or
(iv) any Defects in the design, material, workmanship or installation of the Medical Equipment / System including Hardware and/or Software.

40.2 The Contractor warrants and undertakes: -

(i) that it has good and sufficient title in each Medical Equipment / System and in every part thereof to enable it to pass the title of each Medical Equipment / System to the Authority;
(ii) that where the Contractor supplies a third party software to the Authority, it has or shall have, prior to the delivery of such Software, a valid and continuing licence under which it is entitled to sub-license without further payment all Intellectual Property Rights (including without limitation any patent, copyright, registered design or trademark) to the Authority under this Contract.

40.3 The Contractor shall indemnify the Authority Indemnified Parties and keep the Authority Indemnified Parties fully and effectively indemnified against all costs, claims, demands, expenses and liabilities of whatsoever nature arising out of or in connection with any claim that the use or possession of each Medical Equipment / System or any

part thereof infringes the Intellectual Property Rights (including without limitation any patent, copyright, registered design or trademark) of any third party, subject to the following conditions :

(i) the Authority shall promptly notify the Contractor in writing of any allegations of infringement of which it has been notified and will not make any admissions without the Contractor's prior written consent;

(ii) the Authority, at the Contractor's request and expense, shall allow the Contractor to conduct and/or settle all negotiations and litigation resulting from any such claim;

(iii) the Authority shall, at the request of the Contractor, afford all reasonable assistance with such negotiations or litigation, and shall be reimbursed by the Contractor for any expenses incurred in so doing.

40.4 If the Authority's use or possession of each Medical Equipment / System or any part thereof is held by a court to constitute an infringement of a third party's Intellectual Property Rights or if such use or possession is likely to constitute such an infringement then the Contractor shall, without prejudice to any of the Authority's other rights or remedies, promptly and at its own expense:

(i) procure for the Authority the right to continue using and possessing such Medical Equipment / System; or

(ii) modify or replace such Medical Equipment / System (without detracting from its overall performance) so as to avoid the infringement (in which event the Contractor shall compensate the Authority for the amount of any direct loss and/or damage sustained or incurred by the Authority during such modification or replacement); or

(iii) if neither of the things specified in Clauses 40.4 (i) or (ii) can be accomplished, remove such Medical Equipment / System from the Authority and refund to the Authority all sums previously paid to the Contractor under this Contract.

40.5 If any such allegations of infringement come to the knowledge of the Contractor or in the reasonable opinion of the Contractor such allegations are likely to be made, the Contractor shall forthwith notify the Authority in writing and the Contractor shall act as stated in Clause 40.4.

40.6 The Authority shall hold the benefit of this Contract on trust for the benefit of the Authority Indemnified Parties.

40.7 Any postponement or consequential extension of time or change or suspension pursuant to any applicable provisions of this Contract shall not release the Contractor from any of its obligations or liabilities or give rise to any waiver or estoppel in relation to any of its obligations or liabilities.

40.8 This Clause 40 (Indemnities and Liabilities) shall survive the termination of this Contract.

41. Termination of Licence

(a) The Authority may terminate the Licence (or part thereof listed as a separate item

in the relevant Tenderer's Schedule) at any time by giving at least 30 days' prior written notice to the Contractor.

(b) Forthwith upon the termination of the Licence or part thereof the Authority shall return to the Contractor the relevant items of Software within a reasonable time and if requested by the Contractor, shall destroy the same (in the case of the Software by erasing them from the magnetic media on which they are stored. The Contractor shall bear all the costs and expenses for destruction or any further arrangement on the relevant items of Software.

(c) Clauses 41(a) and 41(b) shall survive the termination of the Contract.

42. Termination of the Contract

42.1 Notwithstanding any other provision of this Contract, the Contract will expire upon satisfactory fulfilment by the Contractor of its contractual obligations in accordance with this Contract, provided that the Authority may terminate this Contract at any time during the Term by not less than thirty (30) days' written notice to the Contractor.

42.2 Without prejudice to any express right of termination contained in other clauses, the Authority may at any time by notice in writing immediately terminate this Contract and any licence that may be granted in this Contract (if applicable), without entitling the Contractor to compensation and liability, if:-

(i) the Contractor, being an individual or a partnership, at any time receives a bankruptcy notice or petition or be adjudged bankrupt, or has a receiving order or order for administration of his estate made against him, or takes or suffers any proceedings for liquidation or composition under any Bankruptcy Ordinance (Cap. 6 of the Laws of Hong Kong) (or similar legislation) or distress or any form of execution against him or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purports so to do;

(ii) the Contractor, being a company, becomes insolvent or enters into any composition or arrangement with its creditors or pass a resolution for winding up (other than for the purpose of amalgamation or reconstruction) or receives a winding up notice or petition or a court makes an order for the liquidation of its assets or a receiver or manager shall be appointed on behalf of the debenture holders over the whole or part of its assets, or circumstances arise which entitle the court or debenture holders to appoint a receiver or manager, or suffers distress or any form of execution against it;

(iii) the Contractor or any Contractor Personnel is found to have committed any offence under any applicable laws and regulations, in particular the laws of Hong Kong (including offences under the Prevention of Bribery Ordinance (Cap. 201 of the Laws of Hong Kong), the Crimes Ordinance (Cap. 200 of the Laws of Hong Kong), PDPO or similar legislation or regulations), whether in relation to this Contract or other contracts with any public hospital managed and controlled by the Authority;

(iv) the Contractor ceases, or threatens to cease, to carry on business;

(v) the Contractor is in breach of any term of this Contract, the Authority notifies the Contractor of such breach in writing, and the Contractor fails to rectify such breach within [7 days of being required to do so by the Authority]/[such time period as the Authority shall stipulate];

(vi) the Contractor is in breach of any term of this Contract and such breach is incapable of rectification;

(vii) the Contractor is in breach of Clause 39 (Confidentiality and Protection of Personal Data/Confidential Information) of this Contract;

(viii) there is a change in direct or indirect control of the management or ownership of the Contractor or any of its associated companies [as that term is defined in Clause 30 (Conflict of Interest) of this contract] which in the reasonable opinion of the Authority adversely impacts the Contractor's ability to provide the Services;

(ix) the Contractor assigns its rights or novates its obligations (or purports to do so) otherwise than in accordance with this Contract;

(x) the Contractor fails to pay its staff or fails to pay its debts as they fall due;

(xi) in the absolute discretion of the Authority, the Services do not meet the standard of service which the Authority requires or if they fail to comply with the Tender Specifications in any respect;

(xii) the Permit (if any) which authorises the Contractor and/or the Contractor Personnel to perform the Services is withdrawn, cancelled, suspended or modified to such extent that the Services can no longer be legally performed; or

(xiii) any failure on the part of the Contractor to comply with any applicable laws and regulations, in particular relevant legislation in Hong Kong, whether in the performance of this Contract, any contracts or arrangements with third parties, in its operation or otherwise,

provided always that such termination shall not prejudice or affect any right or action or remedy which shall have accrued or shall accrue thereafter to the Authority.

42.3 If the Authority terminates this Contract under Clause 42.2, the Authority may, without limitation:

(i) perform the balance of the uncompleted Services;
(ii) procure or engage another contractor or contractors to perform the balance of the uncompleted Services and/or supply the undelivered Goods; or
(iii) instruct the Contractor to identify, or assist the Authority to procure and/or engage, another contractor or contractors to the Authority's satisfaction to perform the balance of the uncompleted Services and/or supply the undelivered Goods,

and in that event, the Contractor shall:

(iv) indemnify the Authority for any sums incurred in performing the Services / supplying the Goods or procuring another contractor or contractors to perform the Services / supply the Goods, in excess of the Price; and

(v) if required by the Authority, consent to assign, novate or transfer its rights and obligations under this Contract to the replacement contractor or contractors.

42.4 Except as expressly provided in this Contract, the Authority has no liability to the Contractor under this Contract in any circumstances (including termination of this Contract based on Clause 42.1) for or in respect of:

(i) any indirect, incidental, consequential or exemplary losses or damages;
(ii) any loss of income or profits; or
(iii) any claim, demand or action made or brought against the Contractor or the Contractor's affiliates by a third party.

42.5 Unless and until separately terminated under Clause 41 (Termination of Licence), the Licence will survive the termination of the Contract and continue in perpetuity.

42.6 Any termination of the Licence or this Contract (howsoever occasioned) shall not affect any accrued rights or liabilities of either party nor shall it affect the coming into force or the continuance in force of any provision hereof which is expressly or by implication intended to come into or continue in force on or after such termination. The Contractor agrees and acknowledges that if the Authority terminates this Contract, the Authority has no liability to the Contractor arising from such termination other than paying the Contractor the fees and charges for the Services performed and/or the Goods delivered up to the date of termination, provided that any such Services have been completed or such Goods have been delivered by the Contractor and have been endorsed and accepted by the Authority.

42.7 Upon termination of this Contract, any licence (actual or implied) granted by the Authority to the Contractor shall immediately terminate.

43. Personal Data

(a) The Authority may, to permit performance of this Contract, require that certain Personal Data or information of the Contractor and the Contractor Personnel be provided by the Contractor.

(b) Any such Personal Data will be used for purposes relating to this Contract. If insufficient or incorrect information is provided, the Authority may terminate this Contract for breach in accordance with Clause 42 (Termination of Contract).

(c) Personal data provided by the Contractor may be disclosed to the parties responsible for overseeing the performance of this Contract, evaluating the Contractor in relation to this Contract, and to comply with legal obligations on the Authority.

44. General

(a) This Contract is personal to the Contractor and the Contractor shall not assign, transfer, sub-contract or purport to assign, transfer or sub-contract to any other person any of its rights, or sub-contract any of its obligations, under this Contract unless the Authority's prior written approval has been obtained.

(b) This Contract and all the rights and obligations under it may be assigned or transferred by the Authority.

(c) The Contractor shall be an independent contractor and nothing herein shall be taken to constitute a partnership between the parties or the appointment of one of the parties as agent or employee of the other.
(d) Any notice or document to be given under this Contract shall be in writing and shall be left at or sent by prepaid post or facsimile transmission to such address and such facsimile number as may have been last notified in writing by such party to the other party. All notice or document to be sent to the Authority shall be marked for the attention of the Authority Representative.
(e) Any such notice of document shall be deemed to have been duly given at the time of delivery (if given by hand) or on the third (3rd) day after posting (if given by prepaid post) or immediately upon transmission with confirmatory answerback (if given by facsimile).
(f) No waiver by the Authority of any breach of this Contract by the Contractor shall be considered as a waiver of any subsequent breach of the same or any other provision.
(g) Any variation to this Contract shall be binding only if it is recorded in a document signed by both parties.
(h) If any provision of this Contract is held by any court or competent authority to be invalid or unenforceable in whole or in part, the validity of the other provisions of this Contract and the remainder of the provision in question shall not be affected thereby.
(i) The rights of the parties under this Contract are cumulative and do not exclude or restrict any other rights (except as otherwise provided in this Contract).
(j) This Contract shall be governed by and construed in accordance with the laws of Hong Kong. The parties submit to the non-exclusive jurisdiction of the courts of Hong Kong.

45. Order of Precedence

In the event that there is any conflict, contradiction or ambiguity between any documents which form part of the Contract, the following order of precedence shall be applied in order to resolve any such conflict, contradiction or ambiguity:

(a) Special Conditions of Contract
(b) Tender Specifications
(c) General Conditions of Contract
(d) Schedules
(e) Terms of Tender (Supplement)
(f) Terms of Tender in Form HA(G)231A

Appendix to Special Condition of Contract

Confidentiality Undertaking

This DEED OF UNDERTAKING is made _____ day of _____ 20_____.

BY_____of _____ (HKID Card/Passport No.) (the "**Confidee**") in favour of the [, a hospital under the management and control of][1] the Hospital Authority, a statutory body incorporated under Chapter 113 of the laws of Hong Kong ("[**Hospital/Hospital Authority**]").

1. Through the agreement between the [Hospital/Hospital Authority] and [name of Contractor] dated [date] (designated as Hospital Authority Contract No.) ("**Agreement**"), the Confidee shall have access to [the Hospital and/or][2] the Hospital Authority's Confidential Information (as defined below).

2. The Confidee hereby undertakes and covenants with the [Hospital/Hospital Authority], in respect of or for the purposes of the Agreement, as follows:

   (a) All information, drawings, specifications, documents, contracts, design materials and all other data (including without limitation any medical records, personal particulars records and Personal Data (as defined in the Personal Data (Privacy) Ordinance (Cap. 486)) and materials of any nature (in or on whatever media) collected, generated, produced or accessible by the Confidee from the Hospital and/or the Hospital Authority under the Agreement or which the [Hospital/Hospital Authority] has for the purposes of or in the course of the Agreement disclosed supplied made available or communicated to the Confidee, shall be treated as confidential information (collectively "**Confidential Information**").

   (b) The Confidee shall not, during the continuance of the Agreement or at any time thereafter, disclose to any person any Confidential Information other than in performance of the Confidee's duties and obligations under the Agreement or with the prior written consent of the [Hospital/Hospital Authority].

   (c) Clause 2 shall not apply to the disclosure of any Confidential Information:

      (i) already known to the recipient other than as a result of disclosure by the Confidee; or

      (ii) which is or becomes public knowledge other than as a result of disclosure by or fault of the Confidee.

   (d) The Confidee shall not make use of or reproduce any Confidential Information, other than in the performance of the Confidee's duties and obligations under the Agreement or with the prior written consent of the [Hospital/Hospital Authority].

3. For the avoidance of doubt, this Deed shall survive the expiration or early termination of the Agreement.

IN WITNESS WHEREOF this Deed has been executed on the day and year first above written.

SIGNED and DELIVERED)
By the Confidee in the presence of:)

_____
Confidee

_____
Witness

[1] *Delete if inappropriate.*
[2] *Delete if inappropriate.*

NOTICE FOR SUBMISSION OF TENDERS

(In addition to Clause 8 - Part I of Tender Form HA(G)231A,
please read this notice before you provide any Personal Data to us)

The Hospital Authority ("HA") is a statutory body which manages public hospitals. Our staff members may ask you to provide your Personal Data for purposes related to evaluation of your tender/offer of tender contract.

If you wish to require access to and/or correction of your Personal Data, you may do so under Personal Data (Privacy) Ordinance. For request(s) relating to Hospital Authority Head Office, please contact the relevant Data Controller during office hours at:

Address: ***Cluster Procurement and Materials Management Unit, New Territories West Cluster, Hospital Authority, 15/F., Block A, Staff Quarters, Tuen Mun Hospital, Tsing San Path, Tuen Mun, New Territories.***

Tel No.: ***(852) 2468 5808*** Fax No.: ***(852) 2456 9034 / (852) 2460 4059***

REVIEW BODY ON BID CHALLENGES

This tender is covered by the Agreement on Government Procurement of the World Trade Organisation ("WTO GPA") and the provisions of the WTO GPA will apply to this Tender. Tenderers are requested to note that a Review Body on Bid Challenges (under WTO GPA) ("the Review Body") has been set up by the Government to deal with challenges made against alleged breaches of the WTO GPA and the relevant procedures for handling bid challenges are set out in the Rules of Operation of the Review Body ("the Rules") which are available for inspection at the Secretariat of the Review Body located at the Trade and Industry Department or which may be downloaded from the website http://www.info.gov.hk/reviewbody-gpa. In the event that a Tenderer believes that a breach of the WTO GPA has occurred, the Tenderers may, within ten (10) working days after he/she knew or reasonably should have known the basis of the challenge, lodge a challenge to the Review Body on the alleged breaches of the WTO GPA. Nevertheless, the Tenderer is encouraged to seek resolution of its complaint in consultation with the Authority before lodging a complaint to the Review Body. In such instances, the Authority shall accord impartial and timely consideration to any such complaint, in a manner that is not prejudicial to obtaining corrective measures through the Review Body.

Tenderers are also to note that the Review Body may receive and consider a late challenge, if satisfied that reasonable cause for the delay has been shown, but a challenge shall not be considered if it is filed later than thirty (30) days after the basis of the challenge is known or reasonably should have been known.

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital
New Territories West Cluster, Hospital Authority

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
Part A	**Angiography System**			
1	**X-ray Generator**			
1.1	X-ray generating units for single-plane interventional radiographic / fluoroscopic imaging system with flat panel detector incorporating with the following features:	M		
1.2	3-phase, microprocessor-controlled high frequency converter or constant potential generator.	M		
1.3	Automatic line voltage compensation.	M		
1.4	Maximum power output not less than 100 kW.	M		
1.5	Maximum continuous power output: 2.5 kW for 15 minutes.	M		
1.5.1	Preference will be given to highest maximum continuous power output for 30 minutes. Please specify: _____	D		
1.6	Voltage range: 50kV - 125kV or wider.	M		
1.7	Maximum frame rate:			
1.7.1	Pulsed fluoroscopy: 30 f/s at $1k^2$ / 12 bits or higher.	M		
1.7.2	Digital acquisition: 30 f/s at $1k^2$ / 12 bits or higher.	M		
1.8	Suitable for monoplane fluoroscopy/acquisition.	M		
1.9	Generator overload protection circuitry.	M		
1.10	Automatic exposure control for pulsed fluoroscopy and digital acquisition.	M		
1.11	All related protection circuitry for the safe operation of the X-ray generating system.	M		
2	**X-ray Tube**			
2.1	Provision of ONE X-ray tube be mounted on a “Ceiling- Mounted Assembly”	M		

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2.2	Tri focal spots provided:	M		
2.2.1	0.4mm or smaller for the smallest focal spot.	M		
2.2.2	0.6mm or smaller for the intermediate focal spot.	M		
2.2.3	1.0mm or smaller for the largest focal spot.	M		
2.3	Maximum tube loading shall not be less than 65 kW.	M		
2.4	Maximum tube voltage: 125 kV or higher.	M		
2.5	Heat storage capacity of anode: 5MHU or higher. Tenderers should quote the value for reference.	D		
2.6	Direct cooled for continuous operation.	M		
2.7	Maximum continuous cooling capacity of anode: 1.50 MHU/min or higher.	D		
2.8	Preference will be given to maximum assembly continuous heat dissipation	D		
2.9	X-ray tube overload protection circuitry.	M		
2.1	Total filtration 2.5 mm Al eq. or higher for tube voltage at 75kV.	M		
2.11	Grid switching or equivalent at dynamic pulsed fluoroscopy.	M		
2.12	Tube housing heat storage capacity shall be greater than or equal to 2.5 MHU.	M		
2.13	Maximum tube current in pulsed fluoroscopy using small (0.4mm or smaller) focal spot shall be 250mA or higher.	D		
3	**Beam Limitation Device**			
3.1	Automatic limitation of the X-ray beam to the size of the selected input field of the flat panel detector in both fluoroscopy and digital acquisitions. The size of the exposure area shall be user adjustable.	M		

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3.2	Allows virtual collimation and adjustment of anatomical filters with reference to Last-Image-Hold (LIH) without the need of further fluoroscopy.	M		
3.3	Iris Diaphragm or Rectangular shutters.	M		
3.4	Anatomical filters for application of digital subtractions.	M		
3.5	Independent rotation of the anatomical filters.	M		
3.6	Synchronous rotation, including intermediate positions, of the detector and collimator units to compensate for image rotation at different examination position.	M		
3.7	Radiation leakage of the tube housing shall comply with the current requirements of the International Commission on Radiological Protection (ICRP) and the Radiation Ordinance of Hong Kong.	M		
4	**Radiation Dose Management**			
4.1	Incorporated with Automatic Brightness Control and Automatic Exposure Control for optimal dose management.	M		
4.1.1	Automatic exposure control (AEC) to optimize five independent X-ray parameters (tube current, tube voltage, pulse width, focal spot selection and copper pre-filtration) simultaneously according to change of C-arm angulation, SID and collimation.	M		
4.1.2	Preference is given to contrast-to-noise-ratio (CNR) driven automatic exposure control (AEC) to optimize five independent X-ray parameters (tube current, tube voltage, pulse width, focal spot selection and copper pre-filtration) simultaneously according to change of C-arm angulation, SID and collimation.	D		
4.2	Radiation-free object positioning via graphic display of the central X-ray beam and image edges on the Last- Image-Hold (LIH).	M		
4.3	Virtual collimation.	M		
4.4	>3 numbers of copper filters for dose reduction.	M		
4.5	Dose-area product (DAP) measurement shall be integrated with the system on offer for recording the current patient dose and accumulated patient radiation dose.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
4.5.1	DAP information display on the "Live Image" monitor in the examination area and on the console monitor in the control area.	M		
4.6	Entrance skin dose / entrance surface dose (ESD) measurement shall be integrated with the system on offer for monitoring the current patient dose rate and recording accumulated patient radiation dose. The reference point of the measurements should be documented and labelled on the equipment.	M		
4.6.1	ESD information display on the "Live Image" monitor in the examination area and on the console monitor in the control area.	M		
4.7	Fluoroscopy timer display on the "Live Image" monitor in the examination area and on the console monitor in the control area and total fluoroscopy time should display in the dose report.	M		
4.8	Typical patient dose and dose index in specific exposure programs including rotational digital angiography and digital subtraction angiography should be provided for onsite verification during acceptance.	M		
4.9	Grid removal shall be allowed for pediatric imaging. No internal parts of the system shall be exposed, and detector protective cover shall remain intact after removing the grid.	M		
4.10	Provision of latest radiation dose reduction package.	M		
5	**Image Detector**			
5.1	ONE set of flat-panel detector to be mounted on ceiling suspended C-arm shall be provided.	M		
5.2	The detector shall be constructed of scintillation crystal coupled with amorphous silicon photodiodes or equivalent.	M		
5.3	Detector size (diagonal) should be 48cm or more	M		
5.4	Four or more different sizes (diagonal) of input fields selectable:	M		
5.4.1	At least 4 input field sizes (diagonal) are selectable. Tenderers shall quote the value for reference.	M		
5.4.2	The smallest field size (diagonal) shall not more than 11 cm. Tenderers shall quote the value for reference.	M		
5.5	Detector matrix: 2000 x 1500 or higher.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
5.5.1	Image output matrix: 2000 x 1500 or higher.	M		
5.6	Pixel size: 155μm or smaller.	M		
5.7	Grayscale resolution per pixel: 16 bits or higher.	M		
5.8	Detector quantum efficiency (DQE) at 0 lp/mm 73% or higher. Uncertainty may be provided for evaluation. Please provide supporting document:	M		
5.9	Spatial resolution (Nyquist frequency): 3.0 lp/mm or higher. Please provide supporting document:	M		
5.9.1	Preference will be given to spatial resolution (Nyquist frequency): 3.25 lp/mm or higher in the 2D standard mode for the largest FOV.	D		
5.10	Detector orientation: portrait, landscape and any angles in between.	M		
5.11	Synchronized rotation of collimator and flat detector when the detector is in portrait, landscape and any angles in between.	M		
5.12	Touch buttons should be available on detector housing for the control of detector movement and C-arm angulation in all 4 sides.	D		
5.13	ONE set of integrated laser cross-hair on the detector housing should be provided for radiation-free positioning of anatomy to center of X-ray beams. Laser cross-hair integrated in the flat-panel detector housing with table side operation should work with the 3D module for planning and controlling needle-guided procedures (clause 11.5) to indicate the correct skin entry point and the correct entry angle of the needle.	D		
6	**Imaging Equipment Support System, Ceiling Mounted**			
6.1	ONE set of ceiling-suspended supporting system to carry one X-ray tube, one detector unit to allow fluoroscopy and digital imaging angiography operations with the following features:	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
6.2	Isocentric design: the X-ray beam to remain center to the anatomical part under investigation regardless of changes in projections.	M		
6.3	The C-arm inner depth shall be 89cm or larger. Please provide details:_____	M		
6.3.1	Preference will be given to system with biggest c-arm inner depth_____	D		
6.4	The focal spot to isocenter distance shall be 68cm or larger. Please provide details:_____	M		
6.5	The source image distance shall be at least 94cm to 118cm. Please provide details:_____	M		
6.6	Motorized C-arm movements:	M		
6.6.1	Tube/image detector rotation and angulations at head end of the table shall not be less than 120° LAO to 120° RAO and 90° CRAN to 90° CAUD	M		
6.6.1.1	Preference will be given to widest C-arm rotation range (LAO /RAO), please specify:_____	D		
6.6.2	Tube / image detector angulations at side positions of the table shall not be less than 90º LAO to 90º RAO.	M		
6.6.3	C-arm gantry stand can rotate at any angle in between - 135º to +135º around the table. Imaging shall be possible regardless of the C-arm gantry stand angle.	M		
6.6.3.1	Preference will be given to Double Lateral C-arm design which allows independent rotation and angulation, so as to provide full caudal and cranial angulations for all LAO and RAO projections.	D		
6.6.4	Variable rotation/angulation speed up to at least 25°/s.	M		
6.6.5	Longitudinal C-arm movement shall be 15cm/s or faster.	M		

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6.6.6	Preference will be given to system with longest longitudinal travel distance along the examination table Please specify your offer:_____	D		
6.6.7	Lateral movement with range of the c-arm column shall be 900mm or better.	M		
6.6.8	Preference will be given to system with longest 3D acquisition coverage longitudinally Please specify your offer:_____	D		
6.7	Anti-collision mechanism to stop further advance movement of the C-arm in the event of physical contact with the examination table, patient or other equipment in the close vicinity.	M		
6.8	Free space at head and two sides of the patient table for access during clinical emergency.	M		
6.9	At least 50 programmable stand positions shall be available.	M		
6.10	Digital display of unit adjustment data with pre- programmed positioning.	M		
6.11	Emergency evacuation of C-arm from patient table for resuscitation, supplier should provide alternative (e.g. UPS) to support such movement during power interruption if manual mode is not available.	M		
6.12	Safety mechanism to guard against free fall of C-arm or any other ceiling-mounted components in the event of lock, spring cable or other support failure, if applicable.	M		
6.13	Manual or motorized swivel of c-arm into park position	M		
7	**Radiological Examination Table**			
7.1	ONE set of floor-mounted swiveling patient table with telescopic foot, floating and tiltable tabletop, motor- driven stepping for digital peripheral angiography with following features:	M		

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7.1.1	Uninterruptible power supply to bridge a power failure of all system- and table movements, as well as imaging system and monitors for a period of at least 10 min. during a primary power failure.	M		
7.2	Radiolucent carbon fiber tabletop with an attenuation value less than 1.5mm Al equivalent at 100kVp.	M		
7.3	Free floating table top with electro-magnetic brakes.	M		
7.4	Table tilting (head-down/head-up): 15°/15° or larger.	M		
7.5	Table pivoting movement capability: +/- 90° or larger.	M		
7.6	Hand switch for releasing table brakes.	M		
7.7	Support a patient load of 200kg or above.	M		
7.8	Table length: 260cm or longer.	M		
7.9	Free overhang of tabletop: 200cm or longer.	M		
7.10	Table-top adjustment height range: 80cm - 100cm above the floor level or wider.	M		
7.11	Longitudinal table float range: 120cm or longer.	M		
7.12	Lateral table travelling distance: 35cm or larger.	M		
7.13	Emergency stop button for table top movement.	M		
7.14	Side rails and rear rail for the attachment of control modules and other accessories.	M		
7.15	TWO pieces of heated mattress to match with the contour of the table top.	M		
7.16	The heated mattress shall be integrated heating elements with the following specifications:	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
7.16.1	All heating elements are fully integrated in the mattress. - The surface temperature of the mattress can be set between 32°C and 39°C, in 0.5° increments. -Heating time required from 20°C to 37°C in less than 10 minutes. -Alarm functions for over- and under- temperatures, cable break, and timeout during heating.	M		
7.16.2	The temperature control module can be mounted on the table side rail. LED display of the set and current temperature. The mattress surface temperature can be set directly at the module.	M		
7.17	Accessories for the examination table that can be attached to the table top or securely mounted on side rails:	M		
7.17.1	ONE pair of curved arm holders.	M		
7.17.2	TWO detachable, articulated arm supports.	M		
7.17.3	ONE set of cable clip.	M		
7.17.4	TWO sets of immobilization straps.	M		
7.17.5	TWO lateral table accessory rails.	M		
7.17.6	TWO sets of head positioning cushions with two shapes.	M		
7.17.7	ONE set of head positioning cushion for prone positioning.	M		
7.17.8	ONE set of carbon fiber head holder with cushion sets.	M		
7.17.9	TWO sets of bottle holder. Each holds up to 4 infusion bottles.	M		
8	**Flat-panel Image Display**			
8.1	ONE set of medical-grade ceiling suspended high definition, DICOM compatible color LCD/LED display in the Examination Room with the following features:	M		
8.1.1	Display with size not less than 55” in diagonal.	M		
8.1.2	4K Resolution of not less than 3840x2160 pixels.	M		
8.1.3	Maximum calibrated brightness: 400 cd/m2 or higher.	M		
8.1.4	Contrast ratio: 1000:1 or higher.	M		

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8.1.5	Viewing angle: 170° or better (vertical and horizontal) Please specify your offer:	M		
8.1.6	Capable of high contrast display for live, reference, and roadmap images.	M		
8.1.7	Capable to offer viewing of total not less than 24 sources simultaneously including HD grayscale medical images, prior image comparison, real time ultrasound images, reconstructed or multimodality color images and patient monitoring.	M		
8.1.7.1	Simultaneous display of live fluoroscopy, roadmap image and reference image during DSA roadmap.	M		
8.1.8	Control module for directly switching between screen layouts at tableside and control area.	M		
8.1.9	Provision of a protective glass for the large display with the following specification: -At least 98% spectral transmission -Not more than 1% residue reflection - Surface imperfection DIN 10110-7 5/1x1.0 E 0.63 (100x100mm) compliant or equivalent -Abrasion resistance (glass only) DIN 58 196-5:50 strokes compliant, or ISO 9211-4 200 strokes (glass only), or equivalent - Adhesion test (glass only) DIN 58 196-6-K2 and MIL-C-48497 compliant, or ISO 9211-4 200 strokes, or equivalent -Salt spray (glass only) DIN EN ISO 9227 CASS: 24h compliant or equivalent	M		
8.1.9.1	The protective glass shall be directly mounted on the large display and can be detached and replaced if damage.	M		
8.2	The monitor (clause 8.1) shall mount on a ceiling suspended display carriage inside the examination room. The ceiling suspended display carriage shall allow height adjustment, longitudinal travel, and swivel with the following features:	M		
8.2.1	Vertical adjustment range: 30cm or wider.	M		
8.2.2	Longitudinal travel range: 300cm or longer.	M		
8.2.3	Rotation of display assembly: 300° or larger.	M		

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8.2.4	Allow a full range of image viewing either at the head end or sides of the patient. The carriage shall not interfere with the full movement range of the imaging system.	M		
8.2.5	Tenderers shall provide TWO additional 19" or larger medical grade 1 megapixel monitor and mount on the ceiling mounted suspended display carriage for display of live image and reference image simultaneously.	M		
8.3	Image monitors in the Control room	M		
8.3.1	TWO sets of medical-grade flat-panel slave displays for the live & reference images of frontal plane. One of the flat-panels shall also serve as a display for the Control Console.	M		
8.3.2	ONE set of medical-grade color flat-panel display for 3D and prior images OR integrated to control console displays (**Clause 8.3.1)**	M		
8.3.3	Hardware configuration of the LCD/LED displays shall comply with **clause 8.4**.	M		
8.4	Hardware configurations of 19"or larger display in control room:	M		
8.4.1	Diagonal display: 19"or larger.	M		
8.4.2	Brightness of display: 350cd/m^2 or higher.	M		
8.4.3	Contrast Ratio: 800:1 or higher.	M		
8.4.4	Image display matrix: 1k^2 x 10 bits or higher (gray scale & color).	M		
9	**Control Console/Modules**			
9.1	Provision of one user interface in the control room with at least the following functions and features:	M		
9.1.1	Control the system power on and off.	M		
9.1.2	Reset fluoroscopy timer and switch X-ray on and off.	M		

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9.1.3	User programmable settings for C-arm angulation, source-detector distance and collimation.	M		
9.1.4	User programmable exposure and related parameter settings for not less than 60 anatomical regions.	M		
9.1.5	Display of all radiographic parameters and acquisition factors prior to acquisition.	M		
9.1.6	Display of actual exposure data delivered.	M		
9.1.7	Display of error code with self-diagnostic function.	M		
9.1.8	Tube load monitoring with data display.	M		
9.1.9	Patient data entry.	M		
9.1.10	Transfer the acquired images to the post-processing 3-D workstation (**clause 12**) for processing, evaluation, documentation and archiving.	M		
9.1.11	Direct filming from the console.	M		
9.1.12	DICOM 3.0 compliant.	M		
9.2	THREE sets of integrated control modules, one at the table side, one set on mobile trolley in examination room, and one inside the control room with the following functions and features:	M		
9.2.1	The control shall be of touch screen design that can be operated at table side.	M		
9.2.2	The control shall be able to mount on the rails on any position of the table side.	M		
9.2.3	Image / run selection for display, processing and evaluation.	M		
9.2.4	Control for fluoroscopy and digital acquisition.	M		
9.2.5	Movement control for C-arm, table top and collimators.	M		
9.2.6	Automatic adjustment of the patient orientation to the mounting position of the table side control module.	M		

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9.3	Provision of ONE set of intercom for the communication between the exam room and the control room.	M		
10	**Image Acquisition, Display, Processing and Evaluation**			
10.1	Hardware configurations:			
10.1.1	Provision of the latest version of software and hardware configuration of the host computer for the system on offer at the time of delivery.	M		
10.1.2	Details of the hardware and software including operating system, RAM, hard drive array, display peripheral, storage capacity shall be stated.	M		
10.1.3	Hard drive capacity: not less than 100,000 images at 1k²x 12 bits or higher.	M		
10.1.4	CD-R/DVD-RW drive or equivalent.	M		
10.2	Image acquisition & display.	M		
10.2.1	ONE set of hand switches for initiating fluoroscopy and digital acquisition shall be provided and installed in control room.	M		
10.2.2	THREE sets of programmable multi-purpose footswitch shall be provided.	M		
10.2.2.1	One set of them shall be wireless programmable multi-purpose footswitch with the following functionalities in examination room: i. single-plane fluoroscopy ii. acquisition iii. roadmap on / off and reset of roadmap mask iv. room light on / off	M		
10.2.3	The foot switch shall be protected against ingress of water and meet IEC60529 IPx8 or higher.	M		
10.2.4	Self-adjusting image-processing algorithms for noise and contrast.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
10.2.5	Dedicated automatic exposure control algorithms and adapt the five exposure parameters to optimize visualization of different materials: iodine, barium, iron, platinum, tantalum, calcium, gadolinium, and gas. It shapes the X-ray spectrum to meet the individual X-ray adsorption characteristics of each material. Tenderers should provide details.	D		
10.2.6	Real-time digital subtraction angiography.	M		
10.2.7	Real time digital angiography (no subtraction).	M		
10.2.8	Image acquisition matrix: 1k x 1k or higher.	M		
10.2.9	Image display matrix: $1k^2$ x 10 bits or higher.	M		
10.2.10	Digital pulsed fluoroscopy with selectable range for selection: 1 p/s or less to 30 p/s or faster.	M		
10.2.11	Digital radiology: 30 f/s or faster.	M		
10.2.12	Digital subtraction angiography: 30 f/s or faster.	M		
10.2.13	Variable frame rate.	M		
10.2.14	Single image acquisition.	M		
10.2.15	Storage and replay of dynamic fluoro sequences with at least 1000 frames and not be less than 90 seconds at a time.	M		
10.2.16	Concurrent image acquisition, reconstruction, processing, evaluation, documentation and archival.	M		
10.2.17	Display of native and subtracted images.	M		
10.2.18	Display of reference images.	M		
10.2.19	Repositioning of patient using the "Last-Image-Hold" without fluoroscopy.	M		
10.2.20	Automatic positioning of patient using the "Last-Image- Hold" without fluoroscopy.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
10.2.21	Automatic positioning of C-arm to the angulation and collimation of the selected 2D/3D reference image.	M		
10.2.22	Road mapping, 2D for CO2 contrast medium.	M		
10.2.23	Road mapping, 2D for iodinated contrast medium.	M		
10.2.24	Superimpose of reference images.	M		
10.2.25	Overlay of real time fluoroscopic (live) image on the 3D volume display.	M		
10.2.26	Peak opacification for iodinated and CO2 contrast medium.	M		
10.2.27	Peripheral digital subtraction angiography with bolus chase by movement of X-ray table or the C-arm stand for both iodinated and CO2 contrast medium.	M		
10.2.28	Rotational digital angiography.	M		
10.2.29	Real-time rotational digital subtraction angiography.	M		
10.3	Image processing	M		
10.3.1	Automatic mask for subtraction acquisition.	M		
10.3.2	Re-masking for subtraction acquisition.	M		
10.3.3	Subtraction of mask from contrast filled images.	M		
10.3.4	Real time display of subtracted images.	M		
10.3.5	Grayscale inversion.	M		
10.3.6	Image zoom and roam.	M		
10.3.7	Automatic and manual pixel shift.	M		
10.3.8	Automatic pixel shift without any need of user intervention, nor post-processing, for all DSA settings before live image being displayed.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
10.3.9	Real time edge and contrast enhancement in all acquisitions, without any user interaction nor post- processing, before displaying the live images.	M		
10.3.10	Dynamic image density optimization in fluoroscopy and digital acquisition modes.	M		
10.3.11	Real-time noise reduction in all fluoroscopy and digital acquisition, without any user interaction nor post- processing, before displaying the live images.	M		
10.3.12	Display of anatomical background.	M		
10.3.13	Cine-loop display of the best-filled images.	M		
10.3.14	Automatic window & level adjustment.	M		
10.3.15	Image flip	M		
10.3.16	Electronic shutter on displayed images	M		
10.3.17	Graphics and text annotation can be saved with the images.	M		
10.3.18	Distance, angle, and diameter measurements with automatic and manual calibration.	M		
11	**Advanced Image Acquisition Technique**			
11.1	Peripheral Angiography shall allow fast and accurate demonstration of lower peripheral vasculature with the following features:	M		
11.1.1	Peripheral angiography by C-arm / table movement.	M		
11.1.2	Automatic storage of collimator setting.	M		
11.1.3	Automatic storage of filter setting.	M		
11.1.4	Variable frame rate.	M		
11.1.5	Real time subtraction display during contrast filling run.	M		
11.1.6	Synchronize with power injector.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
11.2	3D Rotational Angiography shall allow 3D vascular imaging to facilitate endovascular interventions with the following features:	M		
11.2.1	Dynamic acquisition and display of images without subtraction.	M		
11.2.2	3D Rotational Angiography at head-end position:	M		
11.2.2.1	Maximum C-arm rotation speed at head end: 50º/s or faster.	M		
11.2.2.1.1	Preference will be given to offer with the shortest CBCT scan time. Please specify:_____	D		
11.2.2.2	Maximum acquisition range of rotation at head end position: 200º or wider.	M		
11.2.2.2.1	Preference will be given to the widest acquisition range of rotation at head end. Please specify: _____	D		
11.2.3	3D Rotational Angiography at side positions:	M		
11.2.3.1	Maximum C-arm rotation speed at side position: 50º/s or faster.	M		
11.2.3.2	Maximum acquisition range of rotation at side position: 180º or wider.	M		
11.2.3.3	Preference will be given to the widest acquisition range of rotation at both tableside positions. Please specify:_____	D		
11.2.4	Angle-resolution shall be adjustable, adjustable angulation shall be not more than 1º.	M		
11.2.5	Angle-triggered exposure.	M		
11.2.6	Synchronize with power injector.	M		
11.2.7	Continuous back-and-forth C-arm movement for data acquisition.	M		
11.2.8	Automatic pixel shift over the entire rotational run.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
11.2.9	Automatic transfer of the acquired image data sets to the dedicated workstation (clause 12) for further processing and evaluation.	M		
11.2.10	Navigate and zoom into the 3D volume by using the table side joystick or touch screen shall be achievable without using keyboard / mouse of control room workstation / consoles	M		
11.3	Generation of 3D volumes CT-like images with Soft Tissue Resolution	M		
11.3.1	Reconstruction and visualization possible within 30s for soft tissue display at 512 x 512 matrix, 16-bit grayscale resolution.	M		
11.3.2	Acquisition program for abdomen: 10s or less.	M		
11.3.3	Acquisition program for neuro: 20s or less.	M		
11.3.4	High frame rates to enable scans to be performed within approximately 20 seconds.	M		
11.4	3D Module for planning and controlling needle procedures: - Allows needle path be planned in a 3D volume. - External data (e.g. MR or CT) sets can be used for needle planning. - Allows the start and the target point be planned in arbitrary double oblique MPR slices. - The start and the target point can be planned in VRT display. - Suggests favorable system positions automatically for controlling the needle procedure under fluoroscopy. - The planned path can be laid over the fluoro image during the actual needle procedure. - The planned path laid over the 2D fluoro image automatically shall be adapted if angulation, table position, SID, or Zoom changed.	M		
11.5	Laser beam shall be available to work with the 3D module for planning and controlling needle-guided procedure (clause 11.4) to indicate the correct skin entry point and the correct entry angle of the needle.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
11.6	3D Roadmap	M		
11.6.1	Visualization and fading between 2D live fluoro and 3D images acquired in the procedures for improved orientation and effective device guidance.	M		
11.6.2	The 3D Roadmap shall match the real-time 2D fluoro images with the 3D reconstruction of the vessel tree.	M		
11.6.3	The 3D road map shall update to match the 2D fluoro if one moves the table, changes the C-arm position, the SID and / or the Field of View of the flat detector.	M		
11.7	Visualization of a complete DSA run in a full color single image to provide greater understanding of contrast flow within the pathology, greater ease in visualizing the success of a procedure and assists the clinician in image review.	M		
11.7.1	Measure time to peak opacification and area under curve values, and display contrast concentration vs time curve for user-defined ROIs.	M		
11.8	2D/3D Fusion software for co-registration of 2D live fluoro with the pre-op 3D volumes (e.g. CT, MR and PET). Only 2 projections of 2D live fluoro images shall be required for co-registration with the 3D volume. Fused pre-op 3D volume can be used for 3D roadmap (clause 11.6), needle guidance (**clause 11.4**), and embolization guidance (**clause 11.11**).	M		
11.9	Ultra-high resolution CT-like image reconstruction with spatial resolution up to 2.58 lp/mm for visualization of small structures such as temporal bones, micro stents, flow diverters and stapes prostheses.	M		
11.10	Overlay of 3D graphics and fluoroscopy images:	M		
11.10.1	Graphics that are drawn into the 3D volume be overlaid on the 2D fluoro image on the live monitor simultaneously.	M		
11.10.2	Graphics supported on following types:	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
11.10.3	Dots	M		
11.10.4	Lines	M		
11.10.5	Lines combinations	M		
11.10.6	Position of the mouse pointer on MPR slices in the 3D volume can be laid over the current 2D fluoro image on the live monitor.	M		
11.10.7	Trace of the currently displayed 3D volume can be laid over the 2D fluoro image on the live monitor.	M		
11.10.8	All graphics laid over the 2D fluoro image automatically shall be adapted if angulation, table position, SID, or Zoom changed.	M		
11.10.9	Misregistration of 2D image and 3D graphics can be corrected.	M		
11.11	Provision of embolization planning application: Automatic feeder detection for complete embolization of liver tumors. Detect catheter and tumor feeding vessels automatically in liver embolization. Show feeder vessels on live fluoroscopy for live guidance. Allow the use of intra-op Cone beam CT and pre-operative CT/MRI volumetric images as sources for tumor segmentation and volume determination.	M		
11.11.1	Detect the tumor automatically by drawing a line across the tumor. Display of the tumor as tumor sphere and the safety margin in two different colors.	M		
11.11.2	Automatic detection of feeder vessels. Allow add, edit, delete, change of color coding, toggle on/off of feeder vessels with single-click operation. Provide scale markers, standard and fore-shortening views.	M		
11.12	Visualization of 3D cerebral vasculature in time- resolved series using a dedicated 3D acquisition and injection protocol. Users can rotate the 3D vascular tree during playback of the time-resolved series to assess the flow pattern in 3D.	D		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
11.13	Simultaneous visualization of dual-volume imaging (e.g. stent and contrast-enhanced vessels) with special reconstruction algorithm that takes the mask image as well as the subtracted image into account and displays both 3D images simultaneously. In this reconstruction mode, bones, solid materials (e.g. aneurysm clips, coils, stimulation electrodes, or hooks) and vessels can be visualized in one 3D rendering at the same time.	M		
11.14	Advanced AVM analysis Fusion capability of early phase and late phase volume data of brain vessels (two volumes in different phase with different colours) in one viewer thus to facilitate diagnosis of large vessel and collateral lesions for patients with AVM, tumor or stroke. The fused volume should be allowed to overlay on live fluoroscopy to be used as 3D road map.	D		
11.15	Provision of a special/dedicated metal artifact reduction Secondary reconstruction algorithm in CT-like imaging that allow visualization of complications such as bleeding close to metallic objects.	M		
11.16	With one click, a mask of the bony structure can be automatically calculated and cropped from thoracic, pelvic, and abdominal CBCT 3D volumes, to have a better visualization of the vascular structure. The bony structure can then be brought back to the 3D volume, by one click as well.	M		
11.16.1	Automatic bone removal application while maintaining high density structures like stents and guidewires in the vessel without operator's intervention.	M		
12	**3D Processing Workstation for 3D Rotational Angiography**			
12	ONE Integrated 3D processing unit in system computer or separate workstation for processing of image data sets generated by the imaging system and the real time processing of image data generated by 3D rotational angiography with following specification.	M		
12.1	Hardware configurations:			

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
12.1.1	Microprocessor(s) with the fastest clock speed available.	M		
12.1.2	System memory 32GB or higher.	M		
12.1.3	Hard drive capacity: not less than 100,000 images at $1k^2$x 12 bits or higher.	M		
12.1.4	DVD-RW or equivalent.	M		
12.1.5	Graphic accelerator for real-time 3D volume rendering. Tenderers shall provide detail.	M		
12.1.6	Tenderer shall integrate the 3D image display as an image source in the control room display (**clause 8.4**) for side-to-side comparison with live, reference and roadmap images. Separate set of 20" or larger medical- grade color flat-panel display system is also acceptable.	M		
12.2	Applications software packages:			
12.2.1	MIP, MPR, SSD & VRT.	M		
12.2.2	Interactive real time VRT display of complete range of volume data sets for angiography.	M		
12.2.3	Separation of organs/objects via histograms.	M		
12.2.4	Interactive editing in the 3D volume.	M		
12.2.5	Distance, angle, diameter and volume measurements with automatic and manual calibration.	M		
12.2.6	Processing of native and subtracted angiography series.	M		
12.2.7	Measurement of distance and angle in the 3D volume.	M		
12.2.8	Measurement of volume in the 3D volume.	M		
12.2.9	Measurement of stenosis in 3D volume.	M		
12.2.10	Coil, clip and bone reconstruction.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
12.2.11	Quantitative vessel analysis, including stenosis, stent size and length quantification.	M		
12.2.12	Creation of snapshots and video clips in AVI or MPEG formats.	M		
12.2.13	3D visualization of fused anatomical and functional volume data sets.	M		
12.2.14	Reconstruction of CT-like images.	M		
12.2.15	DICOM 3.0 compliant.	M		
13	**System integration of Angiography system and Computerized Tomography system**			
13.1	The Angiography (Angio) system and Computerized Tomography (CT) on rail system shall allow intra-procedural CT and fusion of CT volume with live fluoroscopy for image guidance.	M		
13.2	The CT Sliding Gantry can be motorized to move along the rails with precise movement to scan patient on a fixed examination table.	M		
13.2.1	Safety mechanism shall be provided to ensure CT system will not irradiate X-ray when in defined parking position and independently from the angiography system.	M		
13.3	Angiographic patient table installed shall be shared use for both angiographic and CT systems. Switching of patient table is not required for both Angio and CT systems.	M		
13.3.1	Quick switching between Angio and CT systems shall be achieved by sliding the patient table back and forth, where Angio or CT System is not required to be in parking position.	M		
13.4	The Angio system shall be able to park aside or in foot-end to allow open access for CT intervention at head and both sides of the patient.	M		
13.5	Quick access button shall be available at table side control module to prepare c-arm position and patient table height to “CT-ready” position	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
13.6	Bi-directional communication between the sliding CT and angiographic system to provide collision protection, direct image transfer, image fusion, and smooth combined angio-CT procedure.	M		
13.6.1	C-arm movement shall be operable at full speed (clause 6.6) when the distance between two systems is >50 cm. All C-arm image acquisitions and rotational angiography shall also be allowed.	M		
13.6.2	The movement speed of angiography system shall be reduced when the distance between the two systems is < 50cm	M		
13.6.3	All C-arm movement shall be restricted when the distance is <18cm	M		
13.6.4	If the patient table or the Angio system is moved out of "CT-ready" position, the movement of CT Sliding Gantry shall be blocked.	M		
13.7	The display layout of flat panel image display in clause 8 shall be configurable at table side for display of either image data from angiography system (e.g. Live fluoroscopy, road map image and reference image during DSA road map) or CT system.	M		
13.7.1	Simultaneous display of angiographic and CT images/applications on the flat panel image display for streamline workflow.	M		
13.7.2	The display layouts can be changed and selected at table side control module.	M		
13.8	2D/3D Fusion of Angio and CT images	M		
13.8.1	Co-registration of 2D live fluoro with CT images by only 2 projections of 2D live fluoro images.	M		
13.8.2	The overlay of CT 3D volume on live fluoro image allows image-guided procedures e.g. needle guidance and embolization guidance.	M		

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13.9	X-ray can only be released from one system at a time for safety purpose.	M		
13.10	Emergency stop buttons of both systems shall be available to terminate system movement and X-ray exposures.	M		
14	**Other Requirements**			
14.1	Tenderers shall declare their offered product(s) the compliance with Radiation Ordinance (Cap. 303) with details in Schedule B.	M		
Part B	**CT-on-rail (Sliding CT) System**			
15	**General**			
15.1	ONE set of CT-on-rail system with full integration with angiographic system in Part A. The sliding CT gantry shall be motorized to move along the rails with precise movement to scan patient on a fixed examination table.	M		
15.2	Bi-directional communication between the sliding CT and angiographic system to provide collision protection, direct image transfer, image fusion, and smooth combined angio-CT procedure.	M		
16	**Gantry**			
16.1	Continuously rotating tube-detector unit driven by slip ring technology.	M		
16.2	Rotational time per 360º ≤ 0.35 second	M		
16.2.1	Preference would be given to rotation time per 360° ≤ 0.24 second	D		
16.3	Diameter of gantry aperture ≥ 78 cm	M		
16.4	Minimum gantry cover to isocenter distance shall be ≤ 480mm.	M		
16.5	Isocenter to floor distance shall be within 1,000 mm to 1,200 mm.	M		
16.6	Motorized gantry movement on rail.	M		
16.7	Supply and installation of rails. Rail shall be sealed against fluids and flush with floor.	M		

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16.8	The rail shall be level with the finished floor to avoid trapping of fluids and contaminants.	M		
16.9	Support travel path of CT gantry from its parking position to its operating position at the Angiographic table up to 2,500mm, shall be configurable to fit site-specific settings.	M		
16.10	The maximum scan range over the angiographic table shall be at least 1,100mm. Please specify your offer: _____	M		
16.11	Cable column can be selectable on the left side of the gantry or on the right side of gantry or under-floor, depending on final decision by users.	M		
16.12	Provision of cable tray (or equivalent) to contain and guide cable for smooth motorized movement of the gantry, or equivalent design. Please provide details: _____	M		
16.13	Maximum scan speed by motorized gantry movement: 100mm/s or faster.	M		
16.14	Anti-collision mechanism to stop advance movement of the gantry in the event of physical contact with the examination table, patient or other equipment in the close vicinity.	M		
16.15	Angle of gantry tilt: ± 25º or wider	D		
16.16	3D laser lights for scan plane localization with an accuracy of ± 2mm or better.	M		
16.17	2 sets of gantry touch panels on the gantry housing for gantry tilting (if applicable), laser light localizer and gantry movement. They shall be located on the front covers of the gantry housing to allow user access from either side of the patient table.	M		
16.18	Motorized gantry movements can be controlled at the gantry control units or remote control by console.	M		

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16.19	Display of gantry angulation (if applicable) & position on front of the gantry housing.	M		
16.20	Integrated intercom system for 2-way communication between the operator at the scanning console and the patient inside the gantry.	M		
16.21	Safety mechanism to allow manual movement of gantry in case of power interruption.	M		
17	**Detector Assembly**			
17.1	Stable, low drift with high dose efficiency and linear characteristics.	M		
17.2	Decay time for detector scintillator ≤ 3μs	M		
17.3	After glow ≤ 0.1% after 3 ms.	M		
17.4	The X-ray photon absorption efficiency ≥ 95 % at 120 kVp.	M		
17.5	Detector geometric efficiency along z-axis ≥ 70%.	M		
17.6	Automatic calibration of detectors.	M		
17.7	Number of detector rows ≥ 64	M		
17.7.1	Preference would be given to highest number of detector rows: more than 64	D		
17.8	Number of slices acquired per rotation ≥ 128.	M		
17.9	Number of in-plane channels / per slice shall be 890 or more.	M		
17.10	Advanced technologies to improve z-axis resolution by oversampling or 3-dimensional cone beam projection acquisition or equivalent.	M		
17.11	Minimum detector size in z-direction ≤ 0.6 mm	M		
17.12	Maximum detector z-coverage per 360° rotation (with volume pitch ≤1) ≥ 38.4mm	M		
18	**X-ray Generator**			

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18.1	3-phase, high frequency inverter system with microprocessor control.	M		
18.2	kV range: from ≤ 80kV to ≥135kV. Please specify your offer: _____	M		
18.2.1 new	Preference will be given to offer with kVp range: from ≤ 70 kV to ≥135kV Please specify:_____	D		
18.3	Maximum tube current at 120 kV ≥ 800mA	M		
18.3.1 new	Preference will be given to offer with maximum tube current at 120 kV ≥1400mA Please specify:_____	D		
18.4	Maximum rated power output ≥100kW	M		
18.5	kV and mA accuracy shall be ± 5% or smaller and shall comply with international recommendations.	M		
18.6	Automatic space-charge compensation.	M		
18.7	Automatic tube voltage regulation and stabilization.	M		
18.8	Automatic tube filament voltage and current regulation and stabilization.	M		
18.9	Display of preset exposure data on scanning console.	M		
18.10	Display of actual radiation dose delivery on scanning console.	M		
18.11	Display of error code with self-diagnostic function.	M		
18.12	Incorporated with protection circuits for the safe operation of the X-ray generator.	M		
19	**X-ray Tube**			
19.1	Dual focus, heavy duty x-ray tube	M		
19.2	Small focal spot size ≤ 0.8mm x 1.0mm (IEC60336:2005)	M		
19.3	Large focal spot size: ≤ 1.5mm x 1.6mm, ≥0.8mm x 0.9mm (IEC60336:2005)	M		

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19.4	Maximum power: at least 90kW at 135kV or larger Please specify your offer: _____	M		
19.5	Effective anode heat storage capacity ≥ 7.5 MHU	M		
19.6	Total filtration of the x-ray tube and housing ≥ 2.5mm Al equivalent at 80 kVp.	M		
19.7	Radiation leakage of the x-ray tube housing shall comply with the current standard of ICRP recommendations and Radiation Ordinance in Hong Kong.	M		
20	**General System Performance**			
20.1	Maximum scan field of view for all slice thickness ≥500mm	M		
20.2	Maximum display field of view for all slice thickness ≥780mm.	M		
20.3	Minimum slice thickness ≤ 0.6 mm.	M		
20.4	Dedicated scan protocols for trauma and biopsy studies	M		
20.5	Dedicated scan protocols CT fluoroscopy and CT guided intervention procedure.	M		
20.5.1	Scanning footswitch, control modules, and other accessories for CT fluoroscopy mode shall be provided.	M		
20.5.2	Interventional toolbar with measurement tools via buttons and joysticks shall be mountable on the side rail of the angiographic table (or equivalent) to allow operator to manipulate settings at bedside.	M		
20.5.3	CT intervention images shall be displayed on the Angio large displays in exam room. Support side-by-side display with angiographic X-ray images.	M		
20.5.4	The intervention layout is user-configurable. Up to 6 image display for more navigation of the volume	M		
20.5.5	Switch scan modes on the fly during intervention with one single click.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
20.5.6	Spiral intervention mode.	O		
20.5.7	Axial intervention mode.	M		
20.5.8	3D intervention mode.	O		
20.5.8.1	Generation of coronal, axial, sagittal MPR, and VRT image for intervention guidance.	O		
20.5.8.2	Needle path planning tool with auto needle detection.	O		
20.5.9	Real-time fluoroscopic mode.	M		
20.5.9.1	Fluoroscopic mode at 512 x 512 matrix, up to 10 frames/second or higher.	M		
20.5.9.2	Maximum scan time for fluoroscopic mode shall be 100 seconds or longer.	M		
20.5.9.3	Dose and scan time shall be displayed for continuous observation.	M		
20.5.10	The system shall equip with special dose reduction settings that can avoid direct X-ray irradiation of the hand of the surgeon or radiologist during the intervention by switching off the X-ray exposure for a 100° angle between three user selectable positions.	M		
20.6	Alert user to modify the scanning parameters before the start of the scan when the prescribed scan exceeds the maximum capacity of tube loading.	M		
20.7	Dedicated scan protocols for infant and child shall be incorporated.	M		
20.8	Perfusion	M		
20.8.1	Automated programs for brain perfusion	M		
20.8.2	Automated programs for body perfusion	M		
21	**Advanced System Performance**			

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21.1	Dual Energy Acquisition			
21.1.1	Dual-energy acquisition	M		
21.1.2	All dual energy/Spectrum acquisition shall be performed in one continuous helical scan with one table movement, and the table movement in one direction only.	M		
21.1.3	Preference will be given to offer of dual energy acquisition using split-filter technique to acquire full low and high energy projection data simultaneously within a single rotation. Please provide supporting documentation for verification.	D		
21.1.4	Bone removal for CTA images with single scan	M		
21.1.5	Generation of monoenergetic or monochromatic images with energy levels ranging from at least 40 to 140keV (or a wider range). Provision of spectral / monochromatic HU attenuation curves to compare the HU enhancement at different energy levels for at least 3 user-defined ROIs.	M		
21.2	Dose Reduction Techniques			
21.2.1	Automated tube current modulation according to patient attenuation to reduce radiation dose to superficial tissues.	M		
21.2.2	Automated dose-optimized selection of X-ray tube voltage, which can be further fine-tuned by defining the quality reference mAs and selection of type of exam being performed.	M		
21.2.3	Spiral pitch-mA modulation for radiation dose reduction.	M		
21.2.4	Automated modification of the shape of x-ray beam to block unused portion of x-ray at the beginning and end of a helical scan to minimize unnecessary radiation.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
21.2.5	In addition to the bow tie filter, the system should be equipped with an additional protocol-driven spectrum optimization mechanism (via hardware beam-hardening filtration or advanced deep-learning reconstruction technology) to optimize the X-ray spectrum and reduce image noise for ultra-low dose imaging and improved image contrast in single-energy non-enhanced CT. Provision of low-dose optimized protocols for CT interventions, lung scan, spine and extremities with significant dose reduction compared to standard protocols.	M		
21.2.6	Provide the latest iterative reconstruction algorithm or modified filtered back projection process, e.g. ASIR, PIQE, ADMIRE, iDose or equivalent, to reduce noise components for better image quality and radiation dose reduction. Specify the dose reduction technique offered.	M		
21.2.7	Provide and install both the hardware and software required for the proper execution of the features offered at no additional charges.	M		
21.2.8	The optimal performance of the system shall not be affected by the dose reduction technique.	M		
21.2.9	DICOM dose structured report (Dose SR) with patient demographics, study information, imaging technique and geometry and all typical dose metrics (e.g. CTDIvol, DLP). Dose information are displayed as accumulated and in break-down for each irradiation event.	M		
22	**Scanning Console**			
22.1	ONE set of scanning console for executing scan procedure, controlling examination functions and performing image reconstruction and data processing to be installed in control room. Scanning console should fulfill the following specification:	M		
22.2	Provide details of configuration of the console for efficient scanning, data processing and image analysis.	M		
22.3	Image reconstruction and data processing can be performed in parallel with the scan procedure.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
22.4	Allow retrospective image reconstruction from raw projection data.	M		
22.5	Hardware requirement for each console:			
22.5.1	Keyboard, mouse or trackball as input devices.	M		
22.5.2	Medical grade LCD color display with size ≥ 48cm and screen resolution ≥ 1280 x 1024.	M		
22.5.3	The CPU of the host computer shall be that of the latest model available in the market. The type and the speed of the host CPU shall be quoted.	M		
22.5.4	RAM size for system operation ≥ 8.0 GB.	M		
22.5.5	Capacity for raw data storage ≥ 1.5 TB.	M		
22.5.6	Capacity for image data storage ≥ 400 GB	M		
22.5.7	The number of uncompressed 512x512 images that can be stored at the storage capacity ≥ 800,000.	M		
22.5.8	One set of DVD/CD-R drive for reading and writing of DICOM image data and 3D objects. The DVD/CD-R drive shall meet the following requirements: - DICOM 3.0 standard. - Support DICOM 3.0 point to point send, receive and pull/query protocol.	M		
22.6	Uninterrupted Power Supply (UPS) of at least 5 minutes for the host computer for data protection in the event of power failure.	M		
22.7	The host computer shall be capable of simultaneous handling of scan control, system operation, image archiving and filming.	M		
22.8	Reconstruction matrix ≥ 512 x 512.	M		
22.9	Capability of off-centred reconstruction.	M		
22.10	Speed of image reconstruction at 512 x 512 matrix ≥ 70 images / second.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
22.10.1	Speed of image reconstruction at 512 x 512 matrix with iterative reconstruction ≥ 40 images / second.	M		
22.10.2	Speed of image reconstruction at 512 x 512 matrix with iterative reconstruction: 80 images/ seconds or better	D		
22.11	At least six different reconstruction algorithms (including standard and bone) on raw data shall be possible. Provide details of the algorithms available.	M		
22.12	Direct MIP / MPR reconstruction from raw data without thin slice reconstruction.	M		
22.13	Preset scan protocols for different anatomical regions, with modification of individual parameters permissible.	M		
22.14	Not less than 100 user-defined examination protocols for different anatomical regions covering the whole body.	M		
22.15	Multiple user-recordable auto-voices for patient instruction during scanning.	M		
22.16	Auto-viewing of acquired images.	M		
22.17	Auto-filming with not less than 2 window level settings.	M		
22.18	Provide necessary AV connectivity to display CT images on large displays with angiography system.	M		
22.19	Auto-sending of CT data to 3D workstation of the Angiographic system for image-guided applications.	M		
22.20	Auto-archiving of acquired images to the local image archive & main Radiology PACS.	M		
22.21	Capable of auto-routing of acquired images with selection choices or preset criteria to the local image archive, the main Radiology PACS and the hospital ePR-ID system.	M		
22.22	Capable of fetching patient information from RIS via DICOM get worklist.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
22.23	Fully automatic self-diagnostic software for monitoring the performance status of the equipment.	M		
22.24	Provide anti-virus, anti-spyware and anti-hacking solution. The solution provided shall not affect the normal performance of the CT system on offer.	M		
23	**Acquisition Modes**			
23.1	Scout Scan Mode			
23.1.1	Selection of at least 3-scan perspectives including AP, PA and lateral.	M		
23.1.2	Scan length at maximum FOV: ≥1,100mm.	M		
23.1.3	Automatic positioning of patient to the selected slice location from the quick overview scans with an accuracy of ±1 mm or better.	M		
23.1.4	Display of cut lines on scout view in relation to the position of the planned slices.	M		
23.1.5	Capable of manual interruption of the scout scan once desired anatomy has been covered.	M		
23.1.6	Single scout scan is needed for both scan planning and radiation dose reduction	M		
23.2	Transaxial Scan Mode			
23.2.1	Maximum scanning speed for non-cardiac acquisition≤ 0.35 second per rotation.	M		
23.2.2	Scan length at maximum FOV: ≥1,100mm.	M		
23.2.3	Slice thickness shall be selectable and executable from 0.6mm (FWHM) to 10mm (FWHM) with not less than 3 intermediate selections in between.	M		
23.2.4	Fastest scan cycle time (scan, reconstruction & display) at 512 x 512 matrix ≤ 2 seconds.	M		
23.3	Dynamic Scan Mode			
23.3.1	Maximum scanning speed ≤ 0.35 second per revolution.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
23.3.2	Scan length at maximum FOV: ≥ 160mm.	M		
23.3.3	Maximum duration of one single acquisition ≥60 seconds.	M		
23.3.4	Multiple series of scans can be programmed into a single run with pauses in between.	M		
23.3.5	Minimum pause interval between scans of multiple series ≤5 seconds.	M		
23.3.6	Spiral scan triggered by arrival of contrast medium. Provide details on the triggering mechanism.	M		
23.3.7	One or more regions of interest (ROI) can be used for scan triggering by the arrival of contrast medium.	M		
23.3.8	Interval of CT number measurement for scan triggering ≤ 1 second.	M		
23.3.9	Allow manual triggering of continuous volume spiral scan by monitoring CT number against time.	M		
23.4	Continuous Volume (Spiral/Helical) Scan Mode			
23.4.1	Maximum scanning speed for non-cardiac applications: ≤ 0.35 second per rotation.	M		
23.4.2	Maximum duration of one single acquisition ≥ 100 seconds.	M		
23.4.3	Maximum length of a single-spiral scan without cooling delay ≥ 1,100mm. Please specify your offer: _____	M		
23.4.4	The cooling time after running the maximum scan length with maximum tube loading shall be stated.	M		
23.4.5	Minimum delay for X-ray after automatic contrast triggering ≤ 3 seconds.	M		
23.4.6	Multiple volume scans can be programmed into a single run with breathing pauses in between.	M		
23.4.7	Minimum inter-scan delay ≤ 5 seconds.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
23.4.8	Maximum number of programmable multiple volume scan groups ≥ 6.	M		
23.4.9	Slice thickness selection shall be independent of pitch value.	M		
23.4.10	Highest achievable image quality shall be the same for all volume pitch settings. State the recommended pitches for optimal image quality.	M		
23.4.11	Capable of multi-directional volume scan groups.	M		
23.4.12	Reconstructed slice thickness shall be selectable from 0.6 mm to 10 mm with intermediate selections in between.	M		
23.4.13	Thinnest reconstructed slice ≤ 0.6mm	M		
23.4.14	Prospective and retrospective reconstruction at any table position in 0.1 mm increment.	M		
23.4.15	Prospective overlap, contiguous reconstruction across multiple continuous scan boundaries.	M		
23.4.16	Variable CT pitch shall be selectable.	M		
23.4.16.1	CT pitch shall be 1.4 or higher when all detector rows are used.	M		
23.4.16.2	Support continuous CT pitch selection with increment ≤ 0.05 to achieve the scan coverage and scan time defined by users while keeping selected slice thickness and image quality.	M		
24	**Image Quality**			
24.1	Maximum spatial resolution (x-y direction) using sub-second full scan mode shall be equal to or better than 16.4 lp/cm at 2% MTF or equivalent. State the acquisition parameters at which the spatial resolution is measured.	M		
24.1.1	Maximum spatial resolution (z direction) using sub-second full scan mode shall be at least 16.5 lp/cm or better at 10% MTF or at 2% MTF (limiting resolution) or equivalent.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
24.2	Minimum isotropic resolution measured with Catphan phantom at standard algorithm ≤ 0.31mm. Please specify your offer: _____	M		
24.2.1	Preference will be given to the offer with smallest minimum isotropic resolution (in mm) measured with Catphan phantom. Please provide details:_____	D		
24.3	Low contrast detectability shall be better than 5.0mm at 0.3% or equivalent. State the acquisition parameters at which the contrast is measured.	M		
24.4	The $CTDI_{vol}$ at 120kVp for 32cm body phantom is 8.5mGy/100mAs or lower.	M		
24.5	Cross field uniformity (maximum deviation in a 20cm water phantom) shall be +/-4 Hounsfield units or better.	M		
24.6	Provision of dedicate metal artifact reduction function to reduce the artifacts in image data caused by large, high density metal objects such as prosthetic hip, spine, shoulder and extremity implants.	M		
24.6.1	The metal artifact reduction shall be based on single energy adaptive raw data mixing. The metal artifact reduction algorithm shall not require special acquisition protocol. Support retrospective reconstruction of a previous CT scan to correct metal artifacts from raw data.	M		
24.6.2	Preference will be given to the offer that provide the highest numbers of dedicated algorithms to reduce metal artefact of different implants. Tenderer shall specify the number of dedicated algorithms for different implants.	D		
24.6.3	Metal artifact reduction can be used in combination with iterative reconstruction, extended FOV, 4D CTA, and dual energy dataset.	M		
25	**Image Presentation**			
25.1	Display of scan date, time and patient demographic data automatically on screen and film.	M		

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25.2	Display matrix ≥ 1024 x 1024.	M		
25.3	Image display by number or by anatomical location.	M		
25.4	Visualization algorithms filter ≥ 6 selections.	M		
25.5	Multiple image display of up to 16 images or more.	M		
25.6	Image rotation and flip.	M		
25.7	Magnification factor: 0.8x to 10x. Pre-defined in scan protocol but can be re-defined at any time during study.	M		
25.8	Reference image display for localization of scan plan. Simultaneous display of axial CT image and corresponding quick overview image on a reduced scale or vice versa.	M		
25.9	Continuous window / level adjustment, not less than 3 presets for different predetermined regions.	M		
25.10	Dual-window display.	M		
25.11	CT number display range: -1000 to +3000 Hounsfield Units or wider.	M		
25.12	Graphic and text annotations	M		
26	**Image Analysis**			
26.1	Display of grid coordinates for spatial reference.	M		
26.2	Selection of region of interest (ROI) for:	M		
26.3	Area calculation.	M		
26.4	Volume calculation.	M		
26.5	Mean value, standard deviation, pixel number, min & max CT numbers	M		
26.6	Display of 1 to 5 ROIs or more on a single image	M		
26.7	Measurement of CT number at 5 x 5 pixels or less.	M		

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27	**Image Processing**			
27.1	Concurrent scanning, image reconstruction, filming and archiving.	M		
27.2	Transfer of image data to Angiographic system for image fusion and image guided therapy.	M		
27.3	Selectable priority queue for prospective and retrospective image reconstruction from raw projection data.	M		
27.4	Display field of view shall be variable in size and centre.	M		
27.5	Techniques for reduction of volume & motion artefacts. Provide details of the technique offered.	M		
27.6	Retrospective image reconstruction using different image reconstruction algorithms and visualization filters.	M		
27.7	Number of reconstruction algorithms ≥ 25	M		
27.8	Real-time multi-planar reconstruction along different axis.	M		
27.9	Reconstruction along different axis shall be isotropic in size.	M		
27.10	Provide all available algorithms for surface and volume rendering.	M		
28	**Filming & Archiving**			
28.1	Drag & drop filming	M		
28.2	One button print image series	M		
28.3	One button print image page	M		
28.4	Multi-image formats	M		
28.5	DICOM 3.0 basic grayscale print service class	M		
28.6	DICOM print to DICOM-compliant printer	M		
28.7	Image storage and retrieval in DICOM 3.0 format using DVD/CD media with DICOM viewer.	M		
29	**DICOM Conformance**			

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29.1	Compliance with DICOM 3.0 conformance standards: – DICOM 3.0 Modality Worklist Display & Management – DICOM 3.0 Storage Service Class – Service Class User (SCU) for image send – Service Class Provider (SCP) for image receive – DICOM 3.0 Query / Retrieve Service Class – DICOM 3.0 Media Storage – DICOM 3.0 Storage Commitment – DICOM 3.0 Print User Class – DICOM 3.0 Modality Performed Procedure Step – DICOM CD Export – DICOM CD Export with Browser – DICOM CD Import – DICOM Reading & Display	M		
30	**Image Post Processing Server**			
30.1	The successful tenderer shall provide a solution to integrate the image post-processing server and existing image-post-processing server in Department of Radiology.	M		
30.2	Advance 3D Post-Processing System that supports client-server architecture and with thin client capability.	M		
30.3	The system shall be based on Oracle, SQL or other equivalent database.	M		
30.4	Client operating system shall be compatible with MS Windows 11 PRO or higher.	M		
30.5	Load balancing and auto-bandwidth compression.	M		
30.6	Provide anti-virus, anti-spyware and anti-hacking solution. The solution provided shall not affect the normal performance of the CT system on offer. Free upgrade of anti-virus software for the warranty period and during post warranty contract maintenance.	M		

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30.7	The successful tenderer shall provide a solution that at least three concurrent user licenses in basic application packages (clause **30.12** and their sub-clauses) and three concurrent user licenses in advanced clinical application packages (clause **30.13** and its sub-clauses) offered with at least 45,000 slices for concurrent rendering are available to connected clients in the post-processing server.	M		
30.8	All licenses provided shall possess with valid license certificate, demo licenses are not accepted.	M		
30.9	Hardware requirement for the server:	M		
30.9.1	The solution on offer shall provide at least one unit of server that can cater all the functionalities specified in the mandatory clauses. The tenderers shall ensure the number of servers provided can support five concurrent users to simultaneously use the system's advanced applications.	M		
30.9.2	Processor: Intel® Xeon® Silver 4410T 10 Core @ 2.7GHz, equivalent or better. Tenderers shall specify the brand/model of CPU offered.	M		
30.9.3	RAM size for system operation ≥ 192.0 GB.	M		
30.9.4	RAID with Flash based Cache 2 GB	M		
30.9.5	Graphical Processing Unit: 1x NVIDIA GPU with a total of 16 GB internal memory on-board	M		
30.9.6	Capacity for image data storage ≥ 6 TB	M		
30.9.7	The number of uncompressed 512x512 images that can be stored at the storage capacity ≥ 2,000,000	M		
30.9.8	Operating System: Windows Server 2025 - Standard, equivalent or better.	M		
30.9.9	Keyboard, Mouse	M		
30.9.10	Uninterrupted Power Supply (UPS) of appropriate KVA for the server shall be provided with at least 5 minutes for backup	M		

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30.10	DICOM & IHE conformance standards. – DICOM 3.0 storage service class. – Service Class User (SCU) for image send. – Service Class Provider (SCP) for image retrieve. – DICOM 3.0 query / retrieve service class. – DICOM 3.0 storage commitment service class. – DICOM 3.0 basic grayscale print service class.	M		
30.11	Requirement for the client workstations:	M		
30.11.1	The successful tenderer shall provide **THREE** sets of client workstations each with the following hardware requirements:	M		
30.11.2	The workstation hardware shall have the following specification, equivalent or better: •Intel® Xeon® E-2286G Processor (4.0 GHz, up to 4.9 GHz w/Intel® Turbo Boost Technology, 12MB cache, 6 core) •32 GB RAM •NVIDIA® Quadro RTX™ 5000 (16 GB GDDR6, 4 x DisplayPort 1.4; USB-C) Graphics display card •1 TB SSD HDD •1x 10 Gigabit Ethernet LAN •USB Optical Scroll Mouse •USB standard international Keyboard •Window 11 PRO or above	M		
30.11.3	Dual Color Monitor with at least 1920x1200 pixels Diagnostics Grade.	M		
30.11.4	The solution on offer shall be able to deploy thin-client software on the existing PACS workstations in the radiologist's room in the department.	M		
30.12	Basic software requirement for the sliding CT workstation:			
30.12.1	Capable of displaying multimodality: CT, MR, CR, Angiography, Fluroscopy, PET/CT, Ultrasound, Mammography images and allow side-by-side comparison and viewing to up to 4 series volume using VRT, MIP, MinIP or MPR renderings.	M		
30.12.2	Auto-correlation of orientation, zoom and pan settings between rendering modes.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
30.12.3	Oblique MIP, MPR, including double-oblique capability	M		
30.12.4	"Cube View" mode for isolating a cubic volume of interest	M		
30.12.5	Volume measurement in the 2D and 3D Views	M		
30.12.6	Triangulation between 3D and Axial / Coronal / Sagittal views.	M		
30.12.7	Batch output tool for generating batched reformats or 3D view sequences.	M		
30.12.8	Import / Export of DICOM data	M		
30.12.9	Tools for calculating distances, ROI statistics, angles	M		
30.12.10	The system shall provide auto-preprocessing (without user interaction) capability as standard feature	M		
30.12.11	Support auto loading of datasets into appropriate applications with user specific preferred layouts	M		
30.12.12	Support dual-monitor display. The following configurations shall be acceptable: i) Study list on one monitor and the images display / manipulation on the second monitor. OR ii) Images display / manipulation on both monitors	M		
30.12.13	Support ad-hoc multi modality image loading through drag & drop functionality on the same application screen without exiting currently opened application	M		
30.12.14	Support of interactive slice thickness adaptation	M		
30.12.15	Provides bookmarks/ reanimations enabling the location of marked significant findings to appear in image view and layout with a single click	M		
30.12.16	Support multi-modality fusion and multi-volume fusion.	M		
30.12.17	Bone and table removal	M		
30.12.18	2D & 3D reference lines	M		
30.12.19	3D reference point	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
30.12.20	Automatic spine and rib labelling	M		
30.12.21	Enhanced 3D visualization technique (other than conventional VRT) that renders the light reflections of materials to mimic the photo-realistic appearance of the anatomy through computed simulations, such as ambient occlusion, shadows, scattering, and high dynamic range. The 3D visualization technique should be able to apply to CT and MR datasets and ready within seconds. Support routine manipulations such as pan, zoom, rotate and clip for users to view inside an anatomy, at different angles, overview and magnify.	M		
30.13	Advanced Clinical Application Packages	M		
30.13.1	Neuro Perfusion package:	M		
30.13.1.1	Evaluation of dynamic CT data of the brain following contrast bolus injection	M		
30.13.1.2	Tissue-at-risk model with user defined perfusion parameters (e.g. CBF, CBV, TTD, TTS, TTP, MTT)	M		
30.13.1.3	Calculation of perfusion parameters based on at least two different perfusion models	M		
30.13.1.4	Flexible penumbra tool including grey-white-matter differentiation	M		
30.13.1.5	Normalization	M		
30.13.1.6	Multiparameter view	M		
30.13.1.7	Dynamic evaluation and time attenuation curves	M		
30.13.1.8	Allow time point and volume navigation	M		
30.13.1.9	Dedicated motion correction and 4D noise reduction algorithm.	M		
30.13.1.10	Bone removal	M		
30.13.1.11	Statistical ROI analysis	M		
30.13.2	Digital Subtraction CT Angiography for Neuro Applications	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
30.13.2.1	CTA-CT subtraction with automatic registration of pre- and post-contrast images, followed by subtraction or dense-voxel masking technique which removes high-intensity structures (like bone and surgical clips) from the CTA scan without increasing noise, leaving contrast-enhanced vascular structures intact.	M		
30.13.3	Body Perfusion package:	M		
30.13.3.1	Evaluation of dynamic CT data of the body following contrast bolus injection.	M		
30.13.3.2	Quantitative volume (3D) evaluation of dynamic CT data of organs and tumor, allowing assessment of perfusion disturbances and perfusion changes during therapy.	M		
30.13.3.3	Calculation of blood flow, blood volume, mean transit time and permeability.	M		
30.13.3.4	Allow separate calculation of the arterial and portal venous component of hepatic perfusion.	M		
30.13.4	Tumor Analysis			
30.13.4.1	Supports 1 click segmentation and evaluation of lesions in lung, liver, lymph nodes and other organs.	M		
30.13.5	Automated RECIST 1.0 or 1.1 calculation	M		
30.13.6	CT Angiography package:	M		
30.13.6.1	Real-time maximum and minimum intensity projections	M		
30.13.6.2	Volume and surface rendering	M		
30.13.6.3	Real-time analysis of displayed images	M		
30.13.6.4	Real-time MPR for different image planes	M		
30.13.6.5	Navigation mode for image viewing	M		
30.13.6.6	Vessel tracing	M		
30.13.6.7	Automatic image creation with user-defined protocols	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
30.13.6.8	Vessel stenosis quantification: Stenosis diameter and area, curved length, minimum lumen identification, effective diameter etc. with a single click	M		
30.13.6.9	Detection of vessel centre-line and computation of cross-sectional area, minimum, maximum and mean diameters at selected locations.	M		
30.13.6.10	Supports 3D vessel assessment in occluded vessels or vessels without centrelines in cross section and longitudinal views	M		
30.13.6.11	Segmentation of bony structures from abdominal and extremity CT angiography data using single energy dataset.	M		
30.13.6.12	Merge of volume from dual energy datasets	M		
30.13.6.13	Loading of multiple volumes for dynamic studies	M		
30.13.6.14	Ability to evaluate dynamic CT data and supports the visualization of the vessel enhancement over time	M		
30.13.6.15	Ability for to view up to 5000 images at a time from time-resolved CT data and create sub-series for export.	M		
30.13.7	Dual Energy Scan Evaluation Package			
30.13.7.1	Support inspection of mixed images, low-kV dataset and high-kV dataset to be able to choose the image with the best image quality	M		
30.13.7.2	Support separated windowing of the low and high kV datasets	M		
30.13.7.3	One click for optimized iodine contrast and slide bar for a fast optimization of the image quality	M		
30.13.7.4	Evaluation of iodine concentration in mg/ml and HU values in the virtual unenhanced and enhanced image as well as calculation of relative iodine enhancement between two ROIs.	M		
30.13.7.5	Display of monoenergetic images with selection of energy levels in between 40 keV to 140 keV or wider.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
30.13.7.6	On a defined Monoenergetic ROI, the software supports display of the HU graph representing the HU values as a function of the monoenergetic beam energy and a graph representing the estimated contrast-to-noise ratio for iodine as a function of the monoenergetic beam energy	M		
30.13.7.7	Identification and characterization of different kinds of kidney stones based on evaluation of dual energy data and display of the kidney stones in color codes. The software application shall provide a navigator for single-click navigation through all visualized potential kidney stones.	M		
30.13.7.8	Visualization and localization of uric acid crystals in inflamed joint.	M		
30.13.7.9	Generate virtual non contrast brain images automatically with zero-click to detect active hemorrhage for post- surgery/intervention cases without any user interaction and can be auto-archive to PACS.	M		
Part C	**Site Specific Requirement**			
31	Tenderers shall note that the installation sites shall be at existing Room 6 & 7, Dept. of Radiology, G/F, Main Block, Tuen Mun Hospital (TMH).	M		
32	**Site work (To be funded by 8096MM)**			
32.1	The site of the works shall be at the existing Room 6, Room 7, part of store behind Room 6 and system control cabinet nearby by Room 7, G/F Main block, Department of Radiology, Tuen Mun Hospital. Successful tenderer shall be responsible for the design, provision and installation of ALL building services and builders' work as detailed in clauses below, which are required for the proper and safe installation and operation of all the equipment on offer.	M		
32.2	The successful tenderer shall be responsible for removing and disposing of existing fittings and fixtures etc. where necessary, to facilitate the proposed works including provision of lead linings to affected walls/floors and making good the finishes to match existing and/or to receive the new finishes.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.3	The Contractor shall, wherever applicable, design, construct, supply, install, and decorate, all the necessary or required structures, utilities, facilities, fixtures, fitments, fittings, furnishings and decor in the interior and exterior of the location stated in **clause 31**, as required and approved by the Hospital. The requirements are listed non-exhaustively in the subsequent clauses.	M		
32.4	**Wall & partitioning**			
32.4.1	The successful tenderer shall be responsible for removing and disposing of existing lead partition screen at Room 6 & Room 7.	M		
32.4.2	The successful tenderer shall re-layout the site to form a new Angio-CT examination room, control room, plant room and store room with opening new entrances to the corridor.	M		
32.4.3	The successful tenderers shall supply and install lead lining onto the wall partition, ceiling and floor for radiation protection.	M		
32.4.4	The Successful Tenderer shall design and execute the radiation shielding in full compliance with the Hong Kong Radiation Ordinance (Cap. 303), unconditionally guaranteeing that the Instantaneous Dose Rate shall not exceed 3 μGy/h at any barrier boundary under maximum operating parameters, and that no significant or localized radiation leakage shall be detected outside the shielded enclosure; detailed calculations and site plans must be submitted for prior approval by the Hospital Medical Physicist, and the Tenderer shall at its own cost rectify any shielding deficiencies if the post-installation radiation survey fails.	M		
32.4.5	A lead partition screen shall be established between examination Room and the control room. radiation protection panel with formica plastic laminate facing or other approved finishes shall cover from finished floor to the true ceiling in height. Exact construction design shall meet radiation protection requirement behind a protection barrier under the prevailing Hong Kong Radiation Ordinance. Lead over-lapping shall be provided at all joints, angles, window framing, etc., to provide full radiation protection.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.4.6	The successful tenderer shall be responsible for removal of existing wall finishes/painting and provide new wall finishes and wall protective sheets and laminated finishes for the examination room and control room. Should the existing wall to be modified for system installation, tenderer shall be responsible for making good of the affected area. New wall material shall match with the existing adjoining area. The final design shall be agreed by Hospital and subject to Hospital's decision.	M		
32.4.7	Successful tenderer shall supply and install lead lined window frame for lead vision panel, including the wall opening work and labour cost to install the lead vision panel.	M		
32.4.8	Tenderers shall supply new lead glass window(s). The lead glass window(s) (at least 1,000mm in height × 2,000mm in width) with sufficient lead equivalence installed in concrete between control room and examination room. The degree of inclination of the lead glass window(s) should be determined by end-user. The successful tenderer shall be responsible for the additional shielding if necessary reference to **clause 32.4.4**.	M		
32.4.8.1	The lead glass should be colorless, optically clear, transparent, artefact-free and with no visible defect. The certificate of quality (lead equivalence, physical thickness and optical properties) for the lead glass should be provided by the manufacturer.	M		
32.4.8.2	The lead glass window on offer should be in one piece and not laminated.	M		
32.4.8.3	The lead equivalence of the lead glass should be clearly and indelibly marked on the lead glass.	M		
32.4.8.4	Radiation protection of the lead glass shall comply with the standard as required by the latest Hong Kong Radiation Ordinance and ICRP.	M		
32.4.8.5	Final design of the screen shall meet radiation protection regulation and medical physicist's testing	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.4.9	Tenderers shall supply a switchable smart film to cover the lead glass (**Clause 32.4.8**) between control room and the examination scan room to serve the purpose of enhancing patient privacy with the following features:	M		
32.4.9.1	Physical thickness: 0.4-0.5 mm	M		
32.4.9.2	Multiple pieces can be joined on acrylic/glass/ lead glass	M		
32.4.9.3	Optical Transmittance %: >/= 80%	M		
32.4.9.4	Electrical Driving Voltage: 48V	M		
32.4.9.5	Lifetime: >/= 80,000 hours	M		
32.4.9.6	Cover the whole lead screen as stated in **clause 32.4.8**	M		
32.4.9.7	Self-adhesive film with simple peel and stick technique	M		
32.4.9.8	Simple On-Off Mode to switch from frosted to clear state	M		
32.4.9.9	Color: Milky	M		
32.5	**False Ceiling System**			
32.5.1	Successful tenderer shall be responsible for the supply and install the whole false ceiling system for examination room, control room and all affected areas. The format and material of the false ceiling system shall help to maintain positive pressure (min 2.5Pa) in examination room and easy to access the space above false ceiling level for routine maintenance. Sample of material used shall be submitted for user's acceptance.	M		
32.5.2	Existing false ceiling system, if any, shall be removed and disposed by the successful tenderer.	M		
32.5.3	Should the existing ceiling to be modified for system installation, tenderer shall be responsible for making good of the affected area. New ceiling tiles shall match with the existing adjoining area.	M		
32.6	**New Vinyl flooring**			

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.6.1	Existing floor finishes of the examination room and control room shall be replaced. New floor material shall be featuring a 2mm thick waterproof and anti-static conductive sheet or equivalent. Sample of material used shall be submitted for user's acceptance. Existing vinyl sheets on the floor shall be removed and disposed by the successful tenderer. Should the existing floor to be modified for system installation, tenderer shall be responsible for making good of the affected area and adjacent areas to be modified for system installation. New floor material shall match with the existing adjoining area.	M		
32.6.2	Floor levelling within the examination room and control room shall be ensured self-levelled.	M		
32.6.3	The successful tenderer shall provide floor finishing for each of the Examination Room, Control Room and store room after the installation of recessed floor cable trunking.	M		
32.7	**Doors**			
32.7.1	ONE set of door leading to Examination Room from corridor shall be electrically-controlled door of sliding-type with a width of not less than 1,400mm and lead-lined of sufficient thickness to the international radiation protection standard. The successful tenderer shall submit the design specific for Hospital's approval before installation, reference to clause 32.4.4. The motion of the door shall be controlled and activated by 3 sets of hand switch (inside & outside of the door and 1 located at the control panel) and 2 sets of foot switch inside and outside of the door at ergonomic position. Door interlock system shall be provided and activated during X-ray exposure. A master lock button shall also be installed in control panel for deactivation of all the door switches. A safety sensor shall be incorporated in such a way that the moving door can be stopped automatically or other measure which comply the latest statutory requirements before it hits on an obstacle during its movement. The motor driven mechanism of the door can be overridden manually by means of break glass system in an event of power failure. An emergency stop shall also be provided to stop the door from moving in emergency situation.	M		
32.7.1.1	X-ray shall be disabled when the door is opened. Interfacing between the X-ray machine and the doors shall be voltage free dry contact, and shall be undertaken by the successful tender.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.7.2	ONE set of door leading to Examination Room from control room shall be electrically-controlled door of sliding-type with a width of not less than 900mm and lead-lined of sufficient thickness to the international radiation protection standard. The successful tenderer shall submit the design specific for Hospital's approval before installation, reference to clause 32.4.4. The motion of the door shall be controlled and activated by 3 sets of hand switch (inside & outside of the door and 1 located at the control panel) and 2 sets of foot switch inside and outside of the door at ergonomic position. Door interlock system shall be provided and activated during X-ray exposure. A master lock button shall also be installed in control panel for deactivation of all the door switches. A safety sensor shall be incorporated in such a way that the moving door can be stopped automatically or other measure which comply the latest statutory requirements before it hits on an obstacle during its movement. The motor driven mechanism of the door can be overridden manually by means of break glass system in an event of power failure. An emergency stop shall also be provided to stop the door from moving in emergency situation.	M		
32.7.3	ONE set of door leading to Examination Room from plant room shall be electrically-controlled door of swing-type with a width of not less than 1,000mm and lead-lined of sufficient thickness to the international radiation protection standard. The successful tenderer shall submit the design specific for Hospital's approval before installation, reference to clause 32.4.4. The motion of the door shall be controlled and activated by 3 sets of hand switch (inside & outside of the door and 1 located at the control panel) and 2 sets of foot switch inside and outside of the door at ergonomic position. Door interlock system shall be provided and activated during X-ray exposure. A master lock button shall also be installed in control panel for deactivation of all the door switches. A safety sensor shall be incorporated in such a way that the moving door can be stopped automatically or other measure which comply the latest statutory requirements before it hits on an obstacle during its movement. The motor driven mechanism of the door can be overridden manually by means of break-glass system in an event of power failure. An emergency stop shall also be provided to stop the door from moving in emergency situation.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.7.4	ONE set of door leading to control room from corridor shall be electrically-controlled door of sliding-type with a width of not less than 900mm. The motion of the door shall be controlled and activated by 3 sets of hand switch (inside & outside of the door and 1 located at the control panel) and 2 sets of foot switch inside and outside of the door at ergonomic position. A master lock button shall also be installed in control panel for deactivation of all the door switches. A safety sensor shall be incorporated in such a way that the moving door can be stopped automatically or other measure which comply the latest statutory requirements before it hits on an obstacle during its movement. The motor driven mechanism of the door can be overridden manually by means of break glass system in an event of power failure. An emergency stop shall also be provided to stop the door from moving in emergency situation.	M		
32.7.5	ONE set of door leading to control room from store room shall be electrically-controlled door of sliding-type with a width of not less than 900mm. The motion of the door shall be controlled and activated by 3 sets of hand switch (inside & outside of the door and 1 located at the control panel) and 2 sets of foot switch inside and outside of the door at ergonomic position. A master lock button shall also be installed in control panel for deactivation of all the door switches. A safety sensor shall be incorporated in such a way that the moving door can be stopped automatically or other measure which comply the latest statutory requirements before it hits on an obstacle during its movement. The motor driven mechanism of the door can be overridden manually by means of break glass system in an event of power failure. An emergency stop shall also be provided to stop the door from moving in emergency situation.	M		
32.7.6	ONE set of door leading to store room from corridor shall be manual folding type with a total width of not less than 1200mm. Stainless steel door frames and corner guards shall be supplied and install by the successful tenderer. The design specific shall be submitted for Hospital's approval before installation.	M		
32.7.7	Any electric door lock should be connected with a break-glass system and can be released upon activation of fire alarm in accordance with the requirement of latest Code of Practice for Fire Safety in Buildings.	M		

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32.7.8	All lead lined automatic doors to the examination Room and the related system e.g. electric driven and inter-locking system etc. shall be maintained by the successful vendor in the warranty and the post-warranty period.	M		
32.8	**Fittings and furniture**			
32.8.1	The tenderers shall undertake to dismantle the fixed furniture for the purpose of equipment installation.	M		
32.8.2	Fittings and furniture, including cabinets, wall hung cupboards, worktops, shelves and decorations shall be installed in the examination rooms and control rooms. Design, material and color of the worktops and cabinets shall be agreed by the user before installation.	M		
32.8.3	Tenderers shall supply and install **THREE** worktops with under bench storage cabinets for the housing of operator console, imaging workstations etc. inside the examination room and control room. Sizes, design, material and colour of the worktops shall be agreed by the user before installation. All worktops should be wooden with lacquer and laminated finishes, concealed hinges, lockable, with PVC skirtings. Tenderers may elect to offer commercially available items of similar or better make and finished for consideration.	M		
32.8.4	Tenderers shall supply and install TWO to **FOUR** fixed cabinets inside the examination room and control room. Sizes, design, material and colour of the cabinets shall be agreed by the user before installation. All cabinets should be wooden with lacquer and laminated finishes, concealed hinges, lockable, with PVC skirtings. Tenderers may elect to offer commercially available items of similar or better make and finished for consideration.	M		
32.8.5	Tenderers shall supply and install **ONE** fixed cabinets with folding doors outside examination room. Sizes, design, material and colour of the cabinet shall be agreed by the user before installation. The cabinet should be wooden with lacquer and laminated finishes, concealed hinges, lockable, with PVC skirtings. Tenderers may elect to offer commercially available items of similar or better make and finished for consideration.	M		
32.8.6	Worktops in examination room and control room shall be made of scratch-proof, waterproof material (Corian or equivalent).	M		

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32.8.7	Any builder's works not specifically mentioned in the tender requirement but necessary or essential for the completion of the works and to enable the proper functioning and operation of the completed works unless expressly stated to be excluded from this contract are deemed to form part of the scope of the work.	M		
32.9	**Corner guards & Kick Plates**			
32.9.1	The successful tenderer shall supply and install corner guards/ kick plates at locations where deemed appropriate as considered by the user.	M		
32.10	**Signage**			
32.10.1	Successful tenderer shall be responsible for provision and installation acrylic plastic signage to doors and functional rooms etc., to match surroundings, colours, style and make, cut to size and grounded/ polished edges including all necessary fitting.	M		
32.10.2	Signage for radiation warning should meet the international standard AND latest requirements of ICRP and Radiation Ordinance of Hong Kong.	M		
32.11	**MVAC system**			
32.11.1	Successful tenderer shall, if necessary, shall be responsible for the modification the existing MVAC system for the proper operation of all the equipment on offer. Should the existing HVAC system be modified, tenderer shall be responsible for the installation/modification work. Exact MVAC arrangement including location of VRV outdoor unit, supply and exhaust air grill shall be submitted for end users' approval. All associated fittings / wiring / pipework etc., where appropriate, shall be provided. Successful tenderer should provide adequate air conditioning system capacity to suit the operational requirement of the equipment. The temperature inside examination room shall be adjustable by user. The calculation of estimated cooling load requirement shall be submitted to hospital for approval. The brand and model shall be subject to the user's agreement before delivery.	M		
32.11.2	Provision of ONE number of temperature and humidity monitor in the examination room.	M		

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32.11.3	The successful tenderer shall fulfill the HA guideline "Hospital Engineering Design Standard Checklist for Indoor Environmental Criteria for Clinical Area" about the function of space as "X-ray (procedure room)" for the MVAC setting of the examination room. The detail of the MVAC setting is listed below.	M		
32.11.3.1	Minimum Total ACH: at least **15**.	M		
32.11.3.2	Minimum Outdoor ACH: at least 3	M		
32.11.3.3	Pressure related to adjacent Area: positive	M		
32.11.3.4	Air Recirculated by Means of Room Units: not allow	M		
32.11.3.5	The design temperature: 21°C-24°C.	M		
32.11.3.6	The design relative humidity: not allow exceed 60%.	M		
32.11.4	Any cooling unit(s) for X-ray Tube/transformer shall be provided with acoustic hood and ventilation system.	M		
32.11.5	The performance of the MVAC system (including the total ACH, room temperature and relative humidity) after the modification work should not be worse than the original. Successful tenderer is strongly recommended to measure and record the performance of the MVAC system before commencement of the site preparation for reference.	M		
32.12	**Fire Service System**			

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.12.1	Successful tender shall be responsible for modification of existing pre-action fire sprinkler system with smoke detectors for the examination room and control room to match with the installation requirement of the equipment on offer. The fire services system shall include, among other works, connection to and interfacing with the Hospital's central control & monitoring system (CCMS, and/or the main fire services control panel), provision of repeater panels as required, provision of all necessary accessories and fittings. Testing and commissioning the new and modified fire services installation with submission of relevant as-fitted drawings, systems self-testing report and certificates such as FS 251, FS314A, etc. If applicable, it is preferrable to adopt multi sensor type smoke detectors in the provided fire services system.	M		
32.12.2	All the installation and modification work including the layout diagrams shall be submitted to hospital for approval. The successful tenderer shall be responsible for FSD submission if their site preparation works will involve alteration or addition of any fire services installations and equipment in the premises.	M		
32.12.3	The fire services system installation work shall be in full compliance with the latest FSD's requirement and relevant regulations, specifications and documents.	M		
32.12.4	Fire services alarm system shall be connected and interfaced with the main FS Control Panel of the Hospital.	M		
32.12.5	The appointment of designated maintenance contractor of the hospital is required in case there is work involving connection to/ modification of existing central building service system, such as fire service installation, CCMS signal, etc.	M		
32.12.6	Successful tenderer shall provide drain point or other feasible measures in the location of existing valve of the pre-action fire sprinkler system.	M		
32.13	**Plumbing and drainage installation**			
32.13.1	TWO washing basins shall be provided in examination and control rooms. The position of washing sink shall be decided by the user.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.13.1.1	Worktops of the washing basin shall be scratch-proof, waterproof & integrated in one piece with the sink	M		
32.13.2	Auto-sensor faucet/mixer and all necessary plumbing/ drainage and pipe fitting shall be provided.	M		
32.13.3	Successful tenderer should connect the washing sink and auto-sensor faucet/mixer with the hot and cold water supply, drainage. Non-return valve should be installed in both hot and cold water supply pipe.	M		
32.13.4	Tee-off connection from existing plumbing and drainage system may be required and the tee-off location shall be coordinated with Hospital facility management team.	M		
32.13.5	There shall be no abandoned pipes and dead-leg in all water systems (e.g. cold water, hot water, etc.) left within the site upon completion of works.	M		
32.13.6	Auto-sensor faucet/mixer shall be maintained by the successful vendor in the warranty and the post-warranty period.	M		
32.14	**Electrical installation**			
32.14.1	Lighting panels and/or spot lights (dimmable) shall be provided for the areas within the scope of works. Existing lighting fittings shall be replaced to LED or T5 type with parabolic diffusers to cope with Buildings Energy Efficiency Ordinance. Dimmer control for the exam room shall be provided and at least 500 Lux at the working bench level shall be achieved.	M		
32.14.1.1	Zoning of the lighting in the examination room and control room shall be agreed by user.	M		
32.14.2	The successful Tenderer shall be responsible for the supply and installation of all relevant cables, wiring, cable trays, distribution boards, circuit breaker, voltage regulator/stabilizers and line filters accessories, protection circuits, pipework etc. which are required to for the equipment on offer and daily operation of hospital.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.14.3	All power sockets located in the control room and examination room shall be provided by the successful tenderer. It includes at least 2 twin 13A essential power sockets and 10 twin 13A non-essential power sockets, at least 6 twin image data ports, RIS data ports, telephone outlets, CCTV outlet and intercom outlet with mounting plates. The door release switch outlets shall be installed on the panel above the worktop level. One 13A non-essential power socket and door release switches on the front of the screen. Final design shall be submitted for user's approval before installation.	M		
32.14.4	At least 6 nos. floor water-proof sockets and 3 twin image data ports in examination room.	M		
32.14.5	Provision and installation of concealed conduits and terminal box(es) for telephone socket(s).	M		
32.14.6	Provision and installation of trunking and concealed conduits connecting the Image Network of Radiology Department for image data ports and hospital network for RIS data ports.	M		
32.15	**ELV installation**			
32.15.1	Successful tenderer is responsible for the provision of point-to-point intercom system from control room to table side of examination room for patient instruction during examination with volume control. The system should include two-way speakers to facilitate patient and staff communication.	M		
32.15.2	Successful tenderer shall undertake of the provision and installation of localized color CCTV system which connect areas at examination Room, control room and corridor outside. Exact routing and location for the CCTV should be submitted for end users' approval before installation. All existing surface mounted conduits in working areas of examination Room and corridor shall be made concealed in walls/trunking.	M		
32.15.2.1	The CCTV systems shall comprise of at least SIX camera and shall be capable to perform pan / till / zoom function for patient condition monitoring in examination room and adjacent areas. At least one camera shall be high resolution and at least 10x zooming. Positions of the camera shall be agreed by the end-user.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
32.15.2.2	The CCTV system shall comprise of ONE color LCD monitor of not less than 19" diagonal with split display shall be located in the control room. Position of the cameras and monitor shall be agreed by the end-users.	M		
32.15.2.3	All the accessories, including switches, cables and control box for panning, zooming, focusing, iris control of the camera shall be provided and installed.	M		
32.15.2.4	Tenderers shall be responsible for the installation and wiring concerned to put the systems in full operation.	M		
32.15.2.5	Tenderers shall submit their proposals in the tender return for consideration.	M		
32.16	**Medical gas**			
32.16.1	The successful tenderer shall provide THREE oxygen outlets, THREE vacuum outlets, TWO N2O outlets and TWO medical air outlets including the medical gas pipelines in examination room. Locations of all Medical gas outlets have to be agreed by end user before installation.	M		
32.16.2	The successful tenderer shall provide TWO Anaesthetic Gas Scavenging System(AGSS) outlets by connecting with existing system with necessary modification or upgrading the existing AGSS. The new location of AGSS outlets have to be agreed by end user before installation.	M		
32.16.3	Medical gas quality test shall be provided for all new installed Medical gas outlet. The successful tenderer shall employ qualified personnel and qualified sub-contractors (if applicable) in Hong Kong for the MG quality test. The test shall include but not limited to the pressure test, gas type identification and purity test for each gas outlets installed by the contractor	M		
33	**Site work (To be funded by CBV)**			
33.1	**Radiation warning and protection setting**			
33.1.1	All radiation warning devices and engagement lights shall be provided and installed by tenderers.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
33.1.2	Successful tenderer shall be responsible for the supply and installation of radiation warning lights at all entrances of the examination room with corresponding X-ray control unit on offer for synchronization of the warning with X-ray exposure.	M		
33.1.3	Provision of necessary quantity of emergency stop buttons inside control room and examination room for the imaging system. Each emergency stop button shall incorporate with a Perspex protective guard. The emergency stop button shall be of mushroom type. Locations of all emergency stop buttons have to be agreed by end user before installation.	M		
33.1.4	Provision of Radiation Signage to all doors to the X-ray room. The signs shall conform to the end user requirement.	M		
33.1.5	Provision and installation of concealed conduits and terminal box(es) for radiation warning devices, engagement lights and emergency stop buttons or other related radiation warning and protection setting.	M		
33.2	**Image data port cabling**			
33.2.1	Tenderers shall be responsible for all the necessary hardware, software (where appropriate) and service charges for cabling all the image data ports in this tender to Picture Archiving and Communicating System and its related workstations. All switches, hubs, routers, etc. and necessary cost shall have been fully included in the tender sum without additional charges.	M		
33.2.2	Tenderers shall provide TWO uplink switches (Primary Switch and Resilent Switch) in the examination room to ensure the captioned system under 100% network backup.	M		
33.2.3	Tenderers shall provide not less than EIGHT PACS ports and not less than THREE HA-IT ports in captioned imaging room.	M		
33.2.3.1	The two ports from each dual port shall be connected to respectively the primary switch and resilient switch of the Radiology Image Network System for 100% network backup.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
33.2.4	Tenderers shall be responsible for all the necessary hardware, software (where appropriate) and service charges for cabling all the image data ports in this tender to Hospital Information System. All switches, hubs, routers, etc. and necessary cost shall have been fully included in the tender sum without additional charges.	M		
33.2.4.1	The successful tenderer shall provide a Gigabyte peer-to peer network cable from the equipment to the laser image printer for direct printing when the PACS network is down.	M		
33.2.4.2	Provision and installation of trunkings and concealed conduits for the Gigabyte peer-to-peer network cable from imaging room to the laser printer for direct printing when PACS network break down.	M		
33.2.4.3	Provision and installation of trunkings and concealed conduits connecting the Radiology Image Network for image data ports and hospital network for RIS/CMS data ports.	M		
33.2.4.4	Provision and installation of trunkings and concealed conduits connecting the hospital network data port.	M		
34	**Safety Requirement**			
34.1	Equipment offered and its ancillary equipment shall comply with latest version of the following requirements:	M		
34.2	IEC 60601-1 or equivalent Medical Electrical Equipment – Part 1: General requirements for basic safety and essential performance.	M		
34.3	IEC60601-1-2 or equivalent Medical Electrical Equipment – Part 1-2: General Requirements for basic safety and essential performance- Collateral Standard: Electromagnetic Compatibility - Requirements and Tests.	M		
34.4	IEC 60601-1-3 or equivalent Medical electrical equipment - Part 1-3: General requirements for basic safety and essential performance - Collateral Standard: Radiation protection in diagnostic X-ray equipment	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
34.5	IEC 60601-2-43 or equivalent Medical electrical equipment - Part 2-43: Particular requirements for the basic safety and essential performance of X-ray equipment for interventional procedures	M		
34.6	IEC60601-2-44 or equivalent Medical electrical equipment - Part 2-44: Particular requirements for the basic safety and essential performance of X-ray equipment for computed tomography	M		
34.7	The radiation safety of the equipment shall comply with the latest requirements of ICRP and the statutory requirements of the Hong Kong Radiation Ordinance.	M		
34.8	Provision of emergency stop buttons for on-rail CT, C-arm and tabletop movements.	M		
34.9	Provision of emergency stop buttons for emergency disconnection of electrical power supply to the imaging equipment on offer.	M		
34.10	Provision of sufficient number of emergency stop button inside control room/fluoroscopy room for the imaging system. Each emergency stop button shall incorporate with a Perspex protective guard. The emergency stop button shall be of mushroom type.	M		
34.11	Fuse protection in AC inputs.	M		
35	**Radiation Protection Requirements**			
35.1	The successful tenderer shall be responsible for the modification of existing X-ray room to meet radiation protection requirements, if found necessary. Tenderers shall propose the appropriate means for assessing the adequacy of radiation protection. These include information such as “as built” drawings or on-site test. Tenderers shall also provide a schedule for on-site test, if required, for the consideration of users. Visiting to the various sites can be arranged if required.	M		
35.2	The successful tenderer shall be responsible for the additional shielding, if necessary, to comply with the latest requirement of ICRP and make sure that the radiation level at public area shall meet the requirement of the Radiation Ordinance of Hong Kong.	M		

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35.3	Detailed drawings on the design specifics of the facilities such as lead-lined partition and lead-lined door shall be provided. The design on lead-lined partition shall include outlets for power, telephone, intercom, room light switches and network connections.	M		
35.4	Tenderers shall supply and install lead lining onto the wall partition, ceiling and floor for radiation protection if it is necessary.	M		
35.5	Radiation protection of the lead glass shall comply with the standard as required by the latest Hong Kong Radiation Ordinance and ICRP.	M		
35.6	Successful tenderer shall be responsible for the supply and installation of radiation warning lights at all entrances of the x-ray room with corresponding X-ray control unit on offer for synchronization of the warning with X-ray exposure.	M		
35.7	Door interlock system shall be provided and activated during X-ray exposure. The doors from corridor to the Examination room should be auto locked during X-ray exposure.	M		
35.8	The successful tenderer shall be responsible for all necessary radiation protection installation to meet the international standard AND latest requirements of ICRP and Radiation Ordinance of Hong Kong.	M		
35.9	Radiation safety of the equipment and examination room shall be subject to an acceptance test by Hospital Authority representative following the completion of installation by the successful supplier. The Hospital Authority will not conduct acceptance test until it has received full certification that the supplier has conducted its own tests and found that the equipment meets all the specifications as listed in this document.	M		
35.10	Where existing structural barriers (including floor and ceiling slabs) are insufficient, additional lead lining shall be installed to ensure full compliance with the aforementioned radiation protection requirements, reference to **clause 32.4.4**.	M		

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36	**Insurance Coverage, Occupational Safety and Health**			
36.1	The contractor shall fully indemnify the Hospital from and against any claims, actions, proceedings, demands and suits brought against and/or fines and penalties imposed on the Hospital arising directly or indirectly out of or in connection with the failure of the contractor to comply with any applicable statutory requirements including the Occupational Safety and Health Ordinance.	M		
36.2	The contractor shall take all reasonable steps to ensure the occupational safety and health at workplace for all its employees in performing their works related as specified in this tender.	M		
36.3	24-hour emergency contact persons must be provided to end user and Hospital Administration. The persons must be at managerial level of this tender.	M		
36.4	The contractor shall be responsible for the purchase of insurance coverage against any liability for personal injury, loss of life, damage to property and equipment etc. occurred as a result of or related to the work carried out by the contractor or its representatives, which include site preparation and construction work and equipment delivery, installation and testing.	M		
36.5	Take-out “Contractor’s all risk insurance” for a project of this type, to cover the risks to the building and the building users, arising out of the works including fire.	M		
36.6	The successful tenderer shall arrange insurance to cover accidental damages to the equipment during the period of delivery, site storage, installation, testing and commissioning.	M		
36.7	Successful tenderer shall undertake the shipping, storage, delivery, offloading, transfer, installation, and testing of the Equipment with adequate insurance coverage.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
36.8	The Public Liability Insurance Policy shall be taken out with Limit of Indemnity of not less than HK$30,000,000 (any one incident) for any one claim or series of claims arising out of any one event and unlimited in amount for the period of insurance, and shall extend to over any property including that of individual hospital involved in this tender, or to any person including any employee and consultant of the hospital. The tenderer should provide Employees' Compensation Insurance and be solely responsible for accidents or injuries to workpeople.	M		
37	**Trade-in and Disposal of the existing Radiographic/Fluoroscopic system and Radiation Protection Lead Glasses**			
37.1	Tenderer shall quote a trade-in value in HK dollars for the existing Radiographic/Fluoroscopic Systems located in X-ray Room 6 & Room 7, Department of Radiology (DR), G/F, Main Block, Tuen Mun Hospital (TMH).	M		
37.2	The successful tenderer be responsible for the removal and disposal of the replaced Radiographic/Fluoroscopic systems and associated accessories according to prevailing HKSAR regulation and comply to HA proceedings at no additional cost.	M		
37.3	The successful tenderer shall be responsible for preparing necessary documentation for the X-ray tube(s) disposal.	M		
37.4	The successful tenderer shall be responsible for disposal of the existing X-ray tube(s). The successful tenderer shall ensure that the disposal of the X-ray tube(s) is made in accordance with the Radiation Ordinance of Hong Kong Cap 303 and all relevant laws of Hong Kong (e.g. environmental consideration) and prepare relevant licenses.	M		
37.5	The successful tenderer shall fully cooperate with the Hospital on all licensing matters related to abandonment of the old equipment and shall not object to any licensing arrangement taken by the Hospital if the Hospital decide to complete the Radiation Board "Abandonment of Irradiation Apparatus" process before handing over of the old equipment.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
37.6	The successful tenderer shall be responsible for the disposal of existing X-ray tubes, remove and dispose all other waste materials resulting from the dismantlement of the existing Radiographic/Fluoroscopic Systems and building works involved in according to prevailing HKSAR regulation and comply to HA proceedings.	M		
37.7	Successful tenderer shall also inform HA the arrangement made to the dismantled system, such as resale or donate to other organization.	M		
38	**Observation**			
38.1	Tenderers are required to show clearly the relationship between the specifications of the equipment on offer and the equipment specifications required above. Failure on the part of the tenderers to comply with foregoing requirement may jeopardize consideration of the offer.	M		
39	**Building Services and Builder's Work Provisions for Equipment Installation**			
39.1	The successful tenderer shall be responsible for all the building services and builder works which are deemed necessary by the end user and for proper installation, commissioning and subsequent operation of the equipment on offer.	M		
39.2	Any builders and building services works not specifically mentioned in this Specification but deemed essential for proper functioning and operation of the system/ equipment on offer and the completed works unless expressly stated to be excluded from this tender specification are deemed to form part of the scope of this tender.	M		
39.3	The successful tenderer shall submit detailed design requirements to the Hospital for the equipment installation.	M		
39.4	The successful tenderer shall work in collaboration with the Hospital's contractor(s) to provide building service and builder works for smooth operation of the systems on offer.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
39.5	The successful tenderer shall be responsible for the following cabling works, if required: Provision and installation of cables: - From the isolator to the equipment inside the Examination Rooms. - Connection between the Examination and Control Rooms	M		
39.6	Successful tenderer shall be responsible for provision and installation of recessed floor cable trunkings and ceiling cabling tray with removable covers for the proper and safe operation/maintenance of all equipment item and computer cabinets, if necessary.	M		
39.7	All disturbed surfaces and finishes shall be made good after the works to the entire satisfaction of the Hospital.	M		
39.8	Successful tenderer shall provide floor finishing and perform light weight concrete pouring work for the examination scan room after the installation of recessed floor cable trunkings.	M		
39.9	Successful tenderer shall be responsible for the supply and installation of radiation warning lights at all entrances of the examination room and connecting necessary wiring of the radiation warning lights with corresponding X-ray control unit on offer for synchronization of the warning with X-ray exposure.	M		
39.10	Successful tenderer shall be responsible for any floor/ceiling loading reinforcement work or structural strengthening work for the installation of the imaging system.	M		
39.11	Supporting frame of equipment shall be provided by successful tenderer.	M		
39.12	Reinforcement for supporting the ceiling suspended component shall be done at the ceiling of the examination room.	M		
39.13	Reinforcement for supporting the floor mounted component shall be done at the ceiling of the lower floor if it is feasible. Successful tenderer can propose other alternative solution for Hospital's consideration.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
39.14	All floor loading /ceiling reinforcement work or any other structural strengthening works, if required, has to be checked, supervised and endorsed by the Registered Structural Engineer (RSE) and/or Authorized Person (AP). Structural calculations and drawings certified by a RSE/AP shall be submitted for Hospital review and retention if so required by the Hospital.	M		
39.15	If required, the successful tenderer shall co-ordinate with the PACS contractor for all interfacing details to ensure the accomplishment of networking between the image equipment on offer and the image archive system in the Hospital.	M		
39.16	The successful tenderer, if necessary, shall be responsible for the modification of existing air-conditioning system, provision of back-up air conditioning system, OR installation of chilled water-cooling system at no additional cost to cope with the heat loading requirement for the proper operation of all the equipment on offer. Detailed construction and layout diagrams shall be submitted to the Hospital for comment and approval.	M		
39.17	All back-up air conditioning system, such as fan coils, VRV, dehumidifier and the associated piping shall NOT be installed directly above the Radiographic/Fluoroscopic machine, its computer cabinets and other computer workstations. All installed back-up air conditioning system shall be accessible for maintenance services.	M		
39.18	The tenderers shall undertake to dismantle the fixed furniture for the purpose of equipment installation, and restore them to their original locations without damage on the completion of installation.	M		
39.19	Provide not less than 8 data ports of medical network including concealed conduits at new control room and Examination room.	M		
39.20	Connection to the existing image network and servers of hospital, and the ePR - image distribution system of HA shall be provided. All necessary switches, hubs, routers, etc. shall be included.	M		

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39.21	All cabling works for HA networks shall be in separated concealed conduits and trunking.	M		
39.22	All building services work provided shall include connections to/from the existing building services installations. The tenderers shall check carefully whether their proposed works and equipment on offer are compatible with the existing installation. Any proposal to modify the existing installation shall have the prior approval of hospital.	M		
40	**Site work and installation requirement**			
40.1	The successful tenderer shall be responsible to remove and dispose of all demolished structures to a legal place away from the hospital.	M		
40.2	The successful tenderer shall work out a mutually agreed schedule with the Hospital for the installation of the equipment.	M		
40.3	Work hours will be by arrangement with the Hospital but it must be understood that noisy, excessively dirty work and inconvenience to the building users should be reduced to minimum. When dirty work is carried out the entire area adjacent to the site shall be left clean and suitable for hospital work. Utility services in the building shall not be interrupted.	M		
40.4	If due to tight schedule or other reasons that the hospital requires the successful tenderer to work at night time or some other specified time, the tenderer shall be prepared to do so at no additional cost.	M		
40.5	The hospital has the right to initiate and requires the successful tenderer to attend work progress meetings or adhoc / special meeting before or after completion of the project.	M		
40.6	Tenderers shall observe all statutory requirements regarding safety. If installation is carried out during main contract construction, the tenderers shall comply with safety requirements as may be reasonably imposed by the main contractor.	M		
40.7	All workers employed by the contractor to carry out the Works shall be a registered construction worker under the Construction Workers Registration Ordinance.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
40.8	The successful tenderer shall provide one CO2 fire extinguisher to the site during the course of works for fire protection.	M		
40.8.1	The successful tenderer shall collect and take away the CO2 fire extinguisher after the completion of the site work and equipment installation.	M		
40.9	Successful tenderer shall be responsible for connecting the equipment to the corresponding infrastructure services provided as shown on the composite drawings. Any revision or addition work on the infrastructure services provided shall be responsible by the tenderers subject to such work to be approved.	M		
40.10	The Contractor shall be responsible for liaising with the other work agents employed by the Hospital as to undertaking the interfacing works with the Hospital's existing plants and systems. Existing building services in the building shall not be interrupted unless with prior approval of the Hospital is obtained.	M		
40.11	Any equipment to be maintained by the Hospital's works agent or EMSD shall be approved by the Hospital before installation.	M		
40.12	Successful tenderer shall coordinate with other contractors employed by the Hospital for any works to be carried out on site including builders works, building services works and IT network installation.	M		
40.13	The Successful Tenderer shall be responsible for the arrangements for site access, safety, security, materials delivery, installation, waste disposal etc. and comply with any directions as may reasonably be given by the hospital accordingly.	M		
40.14	The successful tenderer shall allow for the cooperation and co-ordination of the equipment delivery, storage, installation, testing and commissioning, and all other related works with the end users and other involved parties until the equipment is satisfactorily completed and accepted, so that the work and that of other parties can be carried out timely and smoothly, as well as in a coordinated manner.	M		

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40.15	Tenderers shall note that they shall be held responsible for any damage to hospital property or that of the main contractor as may be caused during equipment installation. All due measurements shall be taken by the tenderers to protect such property.	M		
40.16	The Successful Tenderer shall be responsible for supply, design, delivery, installation, testing and commissioning of the Equipment and Building Services provisions connecting to the installation site.	M		
41	**Compliances to building and building services requirements**	M		
41.1	The successful tenderer or its sub-contractor(s) to be appointed by the successful tenderer to carry out the associated building works and E&M works shall be on the respective List of Approved Public Works Contractors under the Buildings Category and the List of Approved Suppliers of Materials and Specialist Contractors for Public Works under the relevant discipline maintained by the Development Bureau of the HKSAR Government (A full list can be obtained from the web page of the Works Branch of the Development Bureau). Where works to be carried out are governed by the provisions of the Buildings Ordinance, the successful tenderer shall also appoint an Authorized Person and, where necessary, a Registered Structural Engineer and/or a Registered Geotechnical Engineer to perform design, submission, supervision and project management duties to ensure that both the design and construction works comply fully with the prevailing legislations in all aspects. All works shall comply with the relevant General Specifications for Building, Building Services and Electrical & Mechanical Services Installations published by the HKSAR Government. Moreover, the successful tenderer shall ensure all works are executed with the site maintained in a safe manner in full compliance with the prevailing legislations and/or requirements introduced by the Hospital Authority or the individual Hospital.	M		
41.2	All electrical work shall be carried out by registered electrical workers (REW) of the appropriate grades in accordance with the standards of materials and workmanship as mentioned in the latest General Specification of ArchSD and EMSD, as well as any local standard of individual hospital.	M		

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41.3	Low smoke zero halogen (LSOH) cable is required under this tender.	M		
41.4	All building services work including conduits, junction boxes, cables, pipe works and etc. shall be concealed and no surface mounting will be permitted unless otherwise so agreed. Proper radiation protection such as lead lining where applicable shall comply with the latest requirement of ICRP and shall be included, provided and installed by the successful tenderer. These works shall be deemed to have been included and allowed for by the tenderer in his returned tender sum.	M		
41.5	All materials and workmanship shall comply with the latest editions of General Specification for Air-conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings of the Special Administration Region and other relevant General Specifications by Building Services Branch, ArchSD, Code of Practice for Electricity (Wiring) Regulations by the Electrical & Mechanical Services Department and Supply Rules of the Electrical Supply Authority as relevant, and should be approved by the Hospital Authority prior to the Installation.	M		
41.6	All materials and workmanship shall comply with the latest editions of General Specification for Electrical Installation in Government Building of HKSAR, other relevant General Specification by Building Services Branch ArchSD, Code of Practice for Electricity (Wiring) Regulations by the Electrical & Mechanical Services Department and Supply Rules of the Electrical Supply Authority as relevant, and should be approved by the Hospital Authority prior to the installation.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
41.7	All materials and workmanship shall comply with the latest editions of General Specification for Fire Services Installation in Government Buildings of the Special Administration Region and should be approved by the Hospital Authority prior to the installation. And all works related to the alternation of Fire services installations, if applicable, shall comply with the latest edition of Code of Practice for Minimum Fire Services Installations and Equipment, Inspection and Testing of Installations and Equipment and the standard set by the Loss Prevention Council.	M		
41.8	The equipment and installation shall be in compliance with the relevant requirements of the latest edition of "Code of Practice for Electricity (Wiring) Regulations", enforced by EMSD. All electrical works by the supplier shall be carried out by Registered Electrical Workers (REWs) of the appropriate grades, and the corresponding original completion certificates on the installations shall be signed by the REWs and sent to user/hospital for retention in accordance with the current legislation. The result of testing (including insulation test) of the fixed electrical installation and installed equipment shall be stated on corresponding original completion certificate.	M		
41.9	All building work carried out by the tenderer and/or its contractor shall meet the minimum standards set out in "General Specification for Building (latest edition)" issued by ArchSD.	M		
41.10	All builder's work carried out by the supplier and/or its contractor shall meet the requirements of the latest version of "General Specification for Building" issued by ArchSD.	M		
41.11	The works shall comply with the Building Energy Efficiency Ordinance (CAP 610). The tenderer shall employ a Registered Energy Assessor (REA) to prepare and submit applications to EMSD and obtain approval in accordance with the Ordinance.	M		
41.12	All works shall comply with Building Ordinance Cap.123, Occupational Safety and Health Ordinance Cap.509 of Hong Kong Law and other related Legislations.	M		
41.13	All waterworks shall be carried out by licensed plumber employed by successful tenderer with all statutory submission as per Water Authority's requirement.	M		

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41.14	All building services provisions shall be subject to an acceptance test conducted by the Hospital Authority representative after installation has been completed by the successful tenderer.	M		
41.15	All drawings and calculations shall be submitted by an authorized person and/or Registered Structural Engineer under Buildings Ordinance appointed by the Successful Tenderer.	M		
41.16	The format of all submitted plans shall conform to the standard specified in the latest relevant General Specifications issued by the Architectural Services Department and be illustrated or supplemented with professional designs, scale drawings, diagrams, and calculations, wherever applicable.	M		
41.17	All building works and structural work shall be checked, endorsed and supervised by authorized person and / or Registered Structural Engineer appointed by the successful tenderer. All relevant structural calculations and certification shall be submitted to the Hospital for retention.	M		
41.18	All drawings and calculations shall be submitted by an authorized person and/or Registered Structural Engineer under Buildings Ordinance appointed by the successful tenderer. Any necessary statutory submission to government departments and utility undertaking (e.g. Building Department, Fire Service Department, etc.) shall be included in the tender offer by the successful tenderer.	M		
41.19	The successful tenderer shall use Lead-free solder materials for all plumbing installation and welding materials.	M		
41.20	All unwanted existing building services installation shall be isolated, taken down and casted away. All operating existing building services installation shall be carefully protected.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
41.21	The Contractor shall submit Building Services Plan to the Hospital covering (a) electrical power supply; (b) ventilation; (c) heating and air-conditioning; (d) temperature and humidity control; (e) medical gases supply; (f) fire services systems; (g) water supply and drainage; (h) lighting systems; (i) communications systems; (j) access control systems; (k) environmental monitoring systems; (l) IT systems, (m) and any other relevant services.	M		
41.22	All the building services and builder works prepared by the successful tenderer shall include one year defect liability period which will commence upon satisfactory completion of the work and certification by the Hospital.	M		
42	**Pre-installation Requirements**			
42.1	Tenderers must confirm if the existing building and building services provisions are suitable for the installation and proper operation of their equipment on offer.	M		
42.2	Tenderers are strongly advised to make site visits to the location as indicated before making any proposals on equipment and room layout. Upon request, tenderers shall be given a set of the 'as-built' drawings, showing the existing conditions of building works and building services provisions in the area. Any amendments, additions, omissions and modifications of existing installation shall have the prior approval of the hospital and shall be carried out by the successful tenderer and such cost shall deem to have been included in the tender sum.	M		
42.3	Tenderers shall check carefully whether their proposed works and equipment on offer are compatible with the existing building installation and/or building services provision.	M		
42.4	Tenderer should have site visit to familiarize with the site works requirement and the existing building and building services provisions. Any claim due to lack of knowledge will not be entertained. Besides, all layout drawings provided, if any, are for reference only and Tenderer should conduct cross checking on site to verify the accuracy.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
42.5	Tenderers are strongly advised to have a site visit prior to lodging of tender so as to acquaint themselves with the condition of the installation site, equipment delivery route. Tenderers shall check and confirm the building/building service provisions such as room space, ceiling height, ceiling and floor loading, mains supply current rating, air-conditioning capacity, existing supporting system for ceiling mount components, plumbing and drainage system, fire services installations, temperature and humidity etc. are suitable for equipment installation and for the entire project in this tender return.	M		
42.6	Tenderers shall confirm and highlight any incompatibility and / or inadequacy if any in the existing building and / or building services provision at the location for installation of the system on offer, which cannot be improved / modified to cope with the proper and safe installation and operation of the complete system on offer. Successful tenderer shall be responsible for all the modification / alteration works for installation of the system on offer and the associated function rooms in the works area.	M		
42.7	Tenderer shall submit at least 3 sets hard copy and 3 sets electronic copy of detailed proposals in AutoCAD and PDF format. The proposed drawings including, but not limited to, schematic drawing and elevation drawings for all the equipment on offer including accessories and fixtures such as storage cabinets, lead acrylic radiation panel, emergency cut off buttons and radiation warning lights etc., wiring diagram, equipment layout plan, building services installation plan, loading calculation, installation method statement, installation drawings, manufacturer's shop drawings, work program, etc. for Hospital's review and comment BEFORE commencement of work.	M		
42.8	Tenderers shall provide in their tender returns the following data/information:	M		
42.8.1	Proposed supporting system with dimensions, locations and mounting methods.	M		
42.8.2	Mounting details of the various components.	M		
42.8.3	Weight distribution of the main system and each of its components.	M		

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42.8.4	Heat dissipation of various components, cooling requirement for the proper operation of their equipment on offer, the required room climate and the required locations of air-conditioning outlets etc.	M		
42.8.5	Locations and wiring diagrams for all electrical fixtures including and not limited to emergency stop buttons, radiation warning lights, power sockets and lighting distribution etc.	M		
42.8.6	Schematic drawing(s) to show the detailed wirings of the connection cables and protective devices from the power supply terminate point to the radiographic/fluoroscopic system shall be submitted together with tender document for vetting. Failure to submit the required information may lead to the disqualification of the tender.	M		
42.9	All submissions including proposals, calculations, drawings and material samples shall be submitted 4 weeks before execution.	M		
42.10	Successful tenderer shall appoint a Registered Safety Officer (RSO) to supervise the site works throughout the works period. If building or structural work is involved, the work shall be checked, supervised and endorsed by a Registered Structural Engineer (RSE) or Authorized Person (AP), if required. The Contractor shall submit all relevant structural calculations and certification to the Hospital for retention.	M		
42.11	Organization chart, contact list, work program, Construction Waste Management Plan, Risk Management and Site Safety Plan for the supply and installation of the equipment/system on offer shall be submitted within 4 weeks after signing of the Contract. For works which will cause nuisance to the hospital users, approval of the Hospital shall be obtained before execution.	M		
42.12	All material and workmanship of the works shall comply with the latest edition of the relevant ArchSD's General Specification and Code of Practice issued by the Electrical & Mechanical Services Department (EMSD), Architectural Services Department (ArchSD) and Building Authority (BA), the Government of the HKSAR.	M		

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42.13	Successful tenderer shall be responsible for preparing submissions and making applications to the Government and utilities companies and obtain approval of the same whenever necessary or required for the equipment installation.	M		
43	**Power Supply Requirement**			
43.1	Tenderers are requested to state the total current rating, power consumption line resistance and earth resistance requirements of the complete system, its accessories and its OEM items.	M		
43.2	2 sets of power supply of three phase AC with maximum **160 Amp** is available within the installation site. The equipment including its accessories shall remain in full operation within the specification throughout the supply voltage range of 380V +/-10%, 50Hz +/- 2%, three phases A.C. or 220V +/-6%, 50Hz+/-2%, A.C. The supplier shall state the total current consumption requirements of the complete equipment and its peripheral items.	M		
43.3	The system including all OEM items on offer shall have protective device to safeguard the system from being damaged due to sudden power surge and interruption.	M		
43.4	The equipment on offer shall be able to ride through voltage dip according to Semiconductor Equipment and Material International (SEMI) curves, or equivalent.	M		
43.5	The successful tenderer shall undertake to provide and install the power supply equipment such as relevant cables, wiring, pipework, cable trays, distribution boards, circuit breaker, switchgear, protection circuits & devices, voltage stabilizers, uninterruptible power supply units (UPS) for workstations, line filters, etc. which are required to ensure all the equipment on offer, including computers, to work properly, safely and satisfactorily to specification.	M		
43.6	All the equipment, accessories, standard or optional, shall be suitable for full operation with the Hong Kong mains electricity supply of 220 V ± 6%, 50Hz ± 2%, 13 A or below for single phase AC supply; or 380V± 10%, 50Hz ± 2%, 32A or above for 3 phases AC supply.	M		

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43.7	The supplier shall state the mains amperage requirement needed for full operation of equipment on offer.	M		
44	**Hospital House Rule and Infection Control Measures**			
44.1	Successful tenderer and the appointed sub-contractors shall comply with the "Guideline for the construction site work by external vendor in TMH" during the work.	M		
44.2	Successful tenderer shall submit "Application form for external vendor working in TMH" with necessary information to obtain the Hospital's approval prior to the commencement of any works.	M		
44.3	Successful tenderer shall comply with all relevant infection control measures including but not limited to those requirements stated in the "NTWC Infection Control Manual – Construction and Renovation Risk Assessment" to safeguard the safety and health of public and personnel involved in the project.	M		
44.4	Successful tenderer shall submit Hoarding Plan according to infection control requirements to obtain the Hospital's approval prior to the commencement of any works.	M		
44.5	Successful tenderer shall arrange the construction of hoarding according to the approved Hoarding Plan and to implement all required infection control measures prior to the commencement of any works.	M		
44.6	Successful tenderer shall arrange to dismantle the constructed hoarding and make good all affected areas after site works and installations completed.	M		
45	**Delivery Requirements**			
45.1	The complete set of DR equipment and all necessary accessories shall be delivered to the Room 6 & 7, Department of Radiology, G/F of Main Block of Tuen Mun Hospital (TMH). Exact date of equipment delivery will be decided by Radiology Department.	M		
45.2	All goods, equipment and accessory shall be delivered and installed at the designated sites indicated by individual hospital.	M		

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45.3	Delivery is required to be made to the installation site upon mutually agreed date after the award of tender. Confirmation of the exact delivery date will be given by the Hospital Authority of Hong Kong prior to delivery.	M		
45.4	Successful tenderer shall make all his own arrangements as necessary for the delivery of his equipment offered. All delivery means, labours and the like shall be allowed for and provided by the equipment supplier. The proposal of delivery method, routing and schedule shall be submitted with the tender.	M		
45.5	Tenderers shall visit the Hospital and acquaint themselves with the routes and access to the site area where the Equipment is to be installed. Any claim due to lack of knowledge will not be entertained. Tenderers shall specify their preferred delivery routes, any special requirements, any potential damages and/or disturbances to the Hospital.	M		
45.6	Tenderers shall confirm that appropriate means of transportation can be arranged by themselves for the delivery of their equipment to the installation site and that they shall liaise/confirm with Hospitals and responsible for ensuring the route of delivery (including all the doors and entrances) to the installation site are of sufficient width, height and floor loading etc. for the passage of their equipment.	M		
45.7	Tenderers shall be responsible to clear away all packing materials, demolished and unused structural materials to a legal place after delivery/installation of the equipment in according to prevailing HKSAR regulation and comply to HA proceedings.	M		
45.8	No temporary storage space for any equipment shall be available within the construction site before the completion date. If any equipment arrives earlier than the agreed delivery schedule, the tenderer shall be responsible for the storage of the equipment outside the construction site at its own cost.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
45.9	Tenderers must indicate the detailed delivery route of the equipment. Detailed plan with drawings has to be prepared and endorsed by the AP employed by the successful tenderer. The endorsed equipment delivery plan shall be submitted for HA's approval prior to delivery of the Equipment to hospital.	M		
45.10	Tenderers shall confirm if the existing doors, entrances and the hospital lifts leading to the installation site is adequate for delivery of their equipment on offer. Should any alteration of the Hospital Authority properties and/or existing building structures (including floor loading reinforcement work) be required to facilitate the delivery, prior approval of the Hospital should be sought. The successful tenderer should be responsible for any costs incurred in the alteration works and shall make all arrangements as necessary for such works.	M		
45.11	Tenderers shall be responsible for the safety and building structural integrity as well as hospital 's properties along the Equipment's delivery routes. If any alterations or modifications of the hospital building structure and/or properties along the Equipment's delivery routes is necessary to facilitate the delivery, prior approval shall be sought. Successful tenderer shall employ Registered Structural Engineer (RSE) and/or Authorized Person (AP) to prepare and endorse the detailed plan with drawings about modification of building structure work and submit to hospital for retention. It is the tenderers' responsibility to restore all altered or modified structures to their original states and/or appearance after the delivery of the equipment. These works shall be deemed to have been included and allowed for by the tenderers in the returned tender sum.	M		
45.12	Successful tenderer shall note that they will be held responsible for any personal injuries and damages to hospital property and equipment as may be caused during equipment transportation and installation. All due measures shall be taken by the successful tenderer to protect such person, equipment and property.	M		

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45.13	In order not to disrupt any patient service, the successful tenderer shall be able to deliver the equipment after-office hours, on Sundays or public holidays, upon request and without additional charges to the Hospital.	M		
45.14	Tenderers must specify in their tender the conditions of delivery, such as packing and necessary environmental requirements for consideration.	M		
45.15	Successful tenderer shall be responsible, within a reasonable time after delivery/installation of the equipment, to clear away all packaging materials together with any costs of damages incurred in the course of delivery and installation.	M		
45.16	If the successful tenderer fails to deliver the equipment/services in accordance with the delivery date specified, the Hospital reserves the right to obtain the similar equipment/services from other sources and all incremental costs incurred thereby shall be borne by the successful tenderer.	M		
46	**Hand-over of the Building Services Installations**			
46.1	The contractor shall be responsible for the hand-over of the building services installations to the Hospital Authority, its representative or any departments concerned at the completion of the installation works and after the completion of the defect liability period.	M		
46.2	Tenderer shall provide 3 sets of hard copy and 3 sets of electronic copy, 2 sets of the as-built drawings in both AutoCAD and PDF format for all layout plans and installations.	M		
46.3	Any submitted plan or drawings shall conform to the latest version of CAD Standard for Works Projects (CSWP) as posted in the web site of the Works Branch, Development Bureau and in accordance with the latest version of CAD Manual for ArchSD Projects. Should any technical conflict between the CSWP and the CAD Manual arise, the CSWP shall take precedence.	M		

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46.4	Tenderer shall ensure all as-built drawings are accurate representation of the Installations, before submitting them to the Hospital. The as-built drawings required to be provided by the Tenderer for various types of Building Services / E&M installations shall include, but not limited to the following:	M		
46.4.1	Building services layout plans such as ducting arrangement, trunking arrangement, piping arrangement, as-fitted electrical wiring drawing, etc;	M		
46.4.2	System schematic diagrams, control diagrams and wiring diagrams;	M		
46.4.3	Concealed works layout plan such as concealed conduit routing, etc; and	M		
46.4.4	Installation details and assembly drawings such as LV cubicle switchboard layout, motor control cubicle layout, etc.	M		
46.5	The Contractor shall undertake to submit all available Operation, Application, and Maintenance Manuals, and any other manuals, to the Hospital in connection with the building and building services, related works and supplied products.	M		
46.6	The Contractor shall undertake to submit all the as-fitted drawings, original certificates and reports, certified testing and commissioning reports, operation and maintenance manuals, in both hard and soft copies, to the Hospital upon completion of all building and building services works. The standard and quality of these documents shall conform to the latest relevant clauses in the General Specifications issued by the Architectural Services Department of the HKSAR Government.	M		
47	**IT/IS Security Requirements**			
47.1	Should there be operational reasons that the system resided within HA premises needs to connect to the HA network for information exchange with HA IT systems, the successful tenderer shall be responsible for implementing such Medical System Network connection and ensure that the following security requirements are strictly adhered to.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
47.2	The network connection from the system to the HA network must be endorsed by HA and implemented/ operated according to latest "HA IT Security Requirements for Quotation/ Tender Procurement of non-IT Systems"	M		
47.3	The successful tenderer shall provide network diagram for equipment connection and shall be approved by the Hospital.	M		
47.4	The successful tenderer shall ensure the System/Equipment, where using the Microsoft Windows Operating System, hardens all its components and functionality in accordance with the prevalent Windows Server Hardening Guidelines provided by HA [Reference document (a), (b)], which is available for viewing by appointment at hospital venue after signing a non-disclosure agreement with hospital.	M		
47.5	The successful tenderer shall harden all non-Windows Servers provided and managed by it in the Medical System network securely according to the latest "Host Security Hardening Policy Guide" in HA.	M		
47.6	Tenderer shall bear all costs (include annual subscription licenses fee) to provide a reliable anti-virus, anti-spyware and anti-hacking solution for the system and ancillary components on offer which meet HA standard. Anti-virus definitions and system patches updates can be downloaded via HA's Anti-Virus Parent Server, and Microsoft's Windows Updates web site, respectively. HA's Internet account is usually not required when accessing Microsoft's Windows Update web site. System administrators are required to complete the Technical Service Request (Firewall) indicating the following: i. Apply the latest Anti-Virus Signature - HA's Anti-Virus Parent Server to be used. ii. Apply the latest system patches - IP subnet of the PCs to access HA's Internet Proxy Server (proxy.ha.org.hk).	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
47.7	Within warranty period / maintenance service contract period (if applicable), the successful tenderer shall install in all Servers, PCs and workstations in the Medical System network the latest security patches for the Operating Systems and related software within three months from the date of release of the security patch.	M		
47.8	Within warranty period / maintenance service contract period (if applicable), the successful tenderer shall be responsible for the on-going support of keeping the virus definitions and security patches for the Operating Systems and related software up to date in all Servers, PCs and workstations in the Medical System network. Virus definitions must be updated within 24 hours from the date of release, while security patches must be updated within three months from the date of release.	M		
47.9	Within warranty period / maintenance service contract period (if applicable), the successful tenderer shall be responsible for the regular scanning of all Servers and PCs in the Medical System network to ensure that they are not infected by virus, worms and spyware including the on-going support of scheduling and verifying the results of the virus scan.	M		
47.10	Within warranty period / maintenance service contract period (if applicable), the successful tenderer shall ensure that there should not be any external non-HA network connections to the Medical System network unless being authorized.	M		
47.11	In case of any security incident relating to the Medical System network, the successful tenderer shall report immediately to the Hospital management and the HA ITS Call Centre.	M		
47.12	Within warranty period / maintenance service contract period (if applicable), the successful tenderer shall submit security compliance reports to HA's representatives every three months with respect to the above security requirements stipulated within this specification.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
47.13	The successful tenderer shall liaise with the Hospital to install all server grade equipment, if any, in designated location and in accordance to Hospital's instructions.	M		
47.14	Data Security Requirements (a) Encryption of Sensitive Data: The Tenderer must ensure that sensitive data, including but not limited to identifiable patient information, downloaded from the System/Equipment to end-user devices, is adequately protected by encryption of a reasonable and industry-accepted standard. (b) Encryption of Stored Data: The Tenderer shall ensure that sensitive data stored within the System/Equipment is preferably encrypted, adhering to current encryption standards. (c) Encryption of Backup Data: All sensitive data stored in backup storage must be encrypted to maintain confidentiality and integrity. (d) Safeguarding Important Data: The Tenderer is required to ensure that all important data, including knowledge and System/Equipment configuration parameters, is safeguarded and preserved through an effective and reliable backup mechanism. (e) Restrictions on Data Export: The Tenderer must ensure that sensitive data is not exported for any purpose unless prior explicit authorization has been obtained from HA. Failure to comply with this requirement may result in legal consequences. (f) Prohibition on Data Transfer via Portable Media: Unless prior authorization has been obtained from HA, it is strictly prohibited to copy or move data from the System/Equipment to the HA network using portable media such as USB drives or CDs. (g) Logging of Sensitive Data: The Tenderer must ensure that sensitive or personal data is not logged unless operationally necessary. If logging is required, the data must be encrypted or secured with restricted access controls.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
47.15	Network Connectivity and Security (a) Restricted External Access: The Tenderer shall ensure that there are no non-HA (external) network connections to the System/Equipment unless supported by prior authorization and knowledge from HA. (b) Prohibition on Unauthorized Connections: The System/Equipment must not automatically establish any wireless or wired connections without prior explicit authorization from HA. (c) Secure HA Network Connectivity: For Systems/Equipment residing within HA premises, the Tenderer must ensure secure connectivity to the HA network for information exchange, adhering strictly to HA's security requirements, including but not limited to network segregation by firewall. (d) Endorsement and Compliance: Any network connection for the System/Equipment to the HA network must be endorsed by HA and implemented and operated according to HA's policies, procedures, and guidelines. (e) Security Solutions and Updates: The Tenderer must provide reliable antivirus, anti-spyware, and anti-hacking solutions for the medical Systems/Equipment. The solution should not compromise the normal performance of the Systems/Equipment and should be updated regularly, preferably using HA's virus definitions for daily updates. (f) Account Management: The Tenderer shall ensure each user identity (user-ID) for remote support must uniquely identify only one user. Sharing user account with other individuals is strictly prohibited. Any unauthorized use or access may result in consequences, including termination of the user account.	M		
48	**Networking Requirements**			
48.1	The successful tenderer shall set up a user Local Area Network (LAN) for connecting all servers, PCs and workstations in the Radiology system network before connecting the LAN to the HA network.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
48.2	The successful tenderer shall provide all necessary network equipment for the connection to existing PACS local network. The successful tenderer shall work with relevant Hospital staff and PACS vendor to ensure successful integration to PACS network with no extra cost.	M		
48.3	The successful tenderer shall use the IP addresses assigned by the HA to configure the user LAN and/or the equipment.	M		
49	**Data Security Requirements**			
49.1	Important data (knowledge, system configuration parameters) stored in the Software shall be safeguarded and preserved by effective backup mechanism. Sensitive data stored in the system shall preferably be encrypted. Sensitive data in backup shall be encrypted.	M		
49.2	The Confidential data downloaded or exported from the system to end-user devices (e.g. USB drive, optical disks) shall be protected by reasonable level of encryption. Confidential data thereafter refers to data including but not limited to identifiable patient information.	M		
49.3	Confidential data must NOT be exported unless explicitly being instructed or approved by HA.	M		
49.4	Important data (knowledge, system configuration parameters) stored in the Software shall be safeguarded and preserved by effective backup mechanism.	M		
50	**Application Security Requirements**			
50.1	The system must support role-based access control. A user can be assigned multiple user roles for performing clinical workflow seamlessly.	M		
50.2	The system must employ prevalent authentication mechanism.	M		
50.3	The system must provide prevalent system health checking and audit logging capabilities.	M		
50.4	The system shall provide comprehensive version control and configuration management mechanism.	M		

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50.5	The system must not contain any “time bomb” or “backdoor” that would either manually or automatically shuts down the system or exports data.	M		
51	**System Availability Requirements**			
51.1	The system shall achieve an overall system software availability of 95%, which is equivalent to an unplanned system downtime of less than 18.25 days per annum. Service interruption for each incidence should be less than 5 days.	M		
51.2	The successful tenderer shall provide adequate system resilience facility, including and are not limited to redundant hardware components. The switchover of service from faulty components to redundant components shall be free from error-prone manual procedures.	M		
52	**Support, Maintenance and Disposal Requirements**			
52.1	The successful tenderer must perform technical support on-site unless appropriate remote support arrangement is endorsed.	M		
52.2	The successful tenderer should provide any tools or software to allow testing and verification of new changes to the system that can be performed without interruption to services upon user's request.	M		
52.3	The successful tenderer must sign and fully comply with the non-disclosure confidentiality agreement during on-site and remote support.	M		
52.4	The successful tenderer must erase the confidential data in the storage devices of the equipment before taking away the equipment for repairing.	M		
52.5	Within the contract period, the successful tenderer must be responsible for the erasure the confidential data in vendor-supplied equipment before disposal.	M		
52.6	Upon decommissioning of the system, the tenderer shall provide data exports and data definition (sometimes known as data dictionary) of all clinical data, in a data structure and format as required by Hospital Authority. Tenderer shall also provide assistance, if necessary, to the data migration exercise to the new system as adopted by Hospital Authority.	M		

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53	**Clinical Data Exchange**			
53.1	The seamless electronic data exchange with Hospital Authority corporate systems must comply with Health Level Seven (HL7) version 2.3.1 and above (including HL7XML), as well as the Hospital Authority HL7 Implementation Guide.	M		
53.2	The electronic message exchange with Hospital Authority should include with reference keys of the following demographic listed (clauses 53.2.1 to 53.2.5) supplied by Hospital Authority corporate systems, in order to enable patient identification and automatic mapping to patient record of Hospital Authority.	M		
53.2.1	HKID	M		
53.2.2	Name	M		
53.2.3	Date of birth	M		
53.2.4	Sex	M		
53.2.5	HA case number	M		
53.3	The system shall maintain the existing exchange of patient data with Hospital Authority corporate systems and provide exchange for other data including but not limited to:	M		
53.3.1	a) Admit, Discharge & Transfer, and patient demographics	M		
53.3.2	b) Clinical order and results	M		
53.3.3	c) Operative data	M		
53.3.4	d) Scheduling and booking	M		
53.3.5	e) Medical report	M		
53.3.6	f) Multimedia and imagery data	M		
53.4	The system must automatically update patient's demographic data upon reception of ADT message. The ADT information exchange must compliance to the latest Hospital Authority HL7 Implementation Guide for ADT automation or ADT Query. Audit logging shall be provided for all ADT (Admit, Discharge and Transfer) interactions.	M		
53.5	The system must adopt HA's date format in order to achieve user friendliness and system interoperability:	M		
53.5.1	For the display of date in frontend screen: DD-MMM-YYYY (e.g. 01-JAN-2014)	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
53.5.2	For the display of date-time in frontend screen: DD-MMM-YYYY hh:mm:ss in either 12hr/24hr mode (e.g. 01-Jan-2014 15:30:45)	M		
53.5.3	For the transfer of date information to HA system: YYYYMMDD (e.g. 20140101)	M		
53.5.4	For the transfer of date-time information to HA system: YYYYMMDDhhmmss in 24hr mode (e.g. 20140101153045)	M		
54	**DICOM Compliance**			
54.1	The software on offer must be DICOM compliant and shall be compatible with all other DICOM workstations in the market. The successful tenderer shall be responsible for working with other equipment suppliers to ensure satisfactory performance of the software upon connection.	M		
54.2	The software on offer shall support multi-vendor platform at the DICOM network communication.	M		
54.3	The software on offer shall support at least but not limited to the following DICOM features (depending on individual component, it may be Service Class Provider, Service Class User or both):	M		
54.3.1	a) DICOM storage commitment	M		
54.3.2	b) DICOM Send and receive (C-STORE SCU and SCP) with all DICOM transfer syntaxes	M		
54.3.3	c) DICOM Query/Retrieve studies (C-FIND SCU, C-MOVE SCU) with all DICOM transfer syntaxes	M		
54.4	A written DICOM conformance statement with detailed technical description of the software shall be provided to confirm the DICOM functionality on offer.	M		
55	**Integration to HA electronic Patient Record Image Distribution (ePR-ID)**			

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55.1	The successful Tenderer is expected to provide integration services on planning, system integration, implementation and testing of the proposed Software. In case modifications are required during integration with HA IT systems, free changes of the Software must also be included as part of the integration services.	M		
55.2	The successful Tenderer shall be required to attend meeting with the HA IT teams on matters relating to integration and implementation at no charge.	M		
55.3	The Tenderer shall assist the Authority to plan, design, execute and evaluate at least the following software testing, but not limited to:	M		
55.3.1	a) integration test;	M		
55.3.2	b) system test on both functional and non-functional aspects;	M		
55.3.3	c) acceptance test with respect to user requirements;	M		
55.3.4	d) security test covering penetration testing and vulnerability scanning	M		
55.4	The Tenderer shall provide implementation services to enable connectivity between the software on offer and HA ePR-ID for image sharing.	M		
55.5	Connection / reconfiguration services for system configuration of devices (imaging systems, workstations, etc.) with the HA ePR-ID interface on offer shall deem to be fully covered in this tender price without additional cost.	M		
56	**Privacy Control**			
56.1	The system on offer shall support assignment of unique user ID to every user.	M		
56.2	The system on offer shall allow setting of complex password such as upper/lower case, alpha, numeric and special characters.	M		
56.3	The system on offer shall synchronize system time with a trustworthy time server such as HA time server for accurate system record.	M		
57	**Warranty Maintenance**			

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57.1	Tenderers shall guarantee and provide comprehensive maintenance of all the equipment, including X-ray tubes with unlimited exposure and flat detector, or any part thereof, and original equipment manufacturer (OEM) items (exceptions to be clearly stated with itemized prices, ordering information details and conditions of warranty), building and building services installations for a period of at least 12 months commencing from the date of full acceptance of the equipment. Service call and replacement of faulty parts shall be free of charge.	M		
57.2	Successful tenderer shall provide at least **FOUR** times of preventive maintenance service annually during the warranty period for the Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems, at least TWO times of preventive maintenance service annually during the warranty period for the defibrillator while at least ONE time of preventive maintenance service annually during warranty period for other minor medical equipment in Part D, and submit the maintenance schedule and QC programs required for ensuring a satisfactory performance of the equipment offered.	M		
57.3	The successful contractor shall carry out electrical safety test on the equipment at least annually. The electrical safety standard required shall comply with IEC 60601-1 / IEC 61010-1 / IEC62353 or equivalent.	M		
57.4	Should the equipment fail to comply with the safety standards listed in **Clause 57.3**, the successful contractor shall investigate the causes of the failure and take appropriate corrective actions. The hospitals must be immediately informed of the failure.	M		
57.5	Free software update and associated hardware upgrade shall be provided during the warranty maintenance period.	M		
57.6	During the warranty period, service call and repair service, including OEM items shall be available in user's normal working hours and free of charge.	M		
57.7	If any original equipment manufacturer offers as a standard practice a warranty of more than 12 months for the equipment or part thereof, this shall be clearly stated in the tender return.	M		

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57.8	Tenderers shall submit an organization chart or organization description of their maintenance organization with brief notes on the areas of responsibility of each post. Relevant document shall be provided by equipment manufacturer to prove that at least THREE engineers have received proper factory training and are eligible for providing maintenance service to the equipment offered. All maintenance services shall be done by qualified maintenance personnel.	M		
57.9	Upon notification by the user of a defect (departure from performance specifications) in the operation of the equipment, or part thereof, the tenderers shall attend to the fault within 2 normal working hours. This service shall include all necessary repairs and replacement of parts to restore the equipment to its normal operation conditions within 4 hours or such other time agreed.	M		
57.10	The following shall be provided free of overtime charges by the contractor:	M		
57.10.1	a) All scheduled maintenance and system upgrade.	M		
57.10.2	b) All maintenance work carried out during normal working hours.	M		
57.10.3	c) All repair work carried out even beyond normal working hours shall also be free of overtime charges, if this work is done in response to an equipment fault call which is made within the normal working hours.	M		
57.11	All report of service shall be documented and provided to the appropriate on-site hospital staff. The report shall record information including the following:	M		
57.11.1	a) Date and time notified	M		
57.11.2	b) Date and time of arrival on-site	M		
57.11.3	c) Description of malfunction of service to be performed	M		
57.11.4	d) Model No. / Serial No., and location of the equipment	M		
57.11.5	e) Time spent to repair	M		
57.11.6	f) Total time out of service	M		
57.11.7	g) Parts used/replaced	M		
57.11.8	h) Description of service performed	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
57.12	Normal working hours of User Department are as follows, unless otherwise stated by individual Radiology Department:	M		
57.12.1	0800hr - 1800hr Monday to Friday, excluding public holidays;	M		
57.12.2	0800hr - 1300hr Saturday, excluding public holidays.	M		
57.12.3	Tenderers shall accept the above for calculation of equipment uptime.	M		
57.13	Emergency service call shall be available and provided upon request. The 24 hours service hotline with direct contact to operator or engineer (without press / dial any number on-line) must be provided.	M		
57.14	Tenderers are required to state the separate rates of overtime charges for maintenance service undertaken outside the normal shift.	M		
58	**Uptime Guarantee for Warranty Maintenance**			
58.1	The contractor shall guarantee an equipment uptime of not less than 95% of the total normal working hours. If the contractor fails to achieve an uptime of 95% averaged over each consecutive period of 3 months, the warranty shall be extended based on the following calculation:	M		
58.1.1	% of Equipment Uptime (X): Extension of Warranty	M		
58.1.1.1	$90 \leqq X < 95$: 1 month	M		
58.1.1.2	$85 \leqq X < 90$: 2 months	M		
58.1.1.3	$80 \leqq X < 85$: 3 months	M		
58.1.1.4	Below 80: Further negotiation is required	M		
58.2	"Down Time" is the time when the system (including contrast media injector) or major peripheral is down and not available for normal full function for patient service. It shall not include the time for any scheduled maintenance, system upgrade, and the time when the system is down due to user misuse and negligence. However, Downtime should also be applied on peripheral component failure or partial system malfunction, for items provided by the Contractor.	M		
58.3	"Down Time" will be calculated from the time a down system call is received by the contractor to the time of completion of the repair and issue of service report to the hospital, counting user's normal working hours as referred in the previous clause.	M		

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59	**Acceptance Test and Functional Test**			
59.1	The complete set of equipment, including OEM items and peripheral systems, shall be subject to acceptance test and functional test performed by Hospital Authority representative with the following requirements:	M		
59.2	The Hospital Authority (HA) will not conduct acceptance test and functional test until it has received full certification from the supplier that the supplier has conducted its own tests and found that the equipment meets the specifications in the contract.	M		
59.3	Acceptance test shall include detail specification testing to ensure that every performance meets with the figures as quoted and required by the tender specification.	M		
59.4	In addition to the main system on offer, all other systems such as OEM accessories, Building Services and Builder Works Provisions etc. shall also be subject to similar tests.	M		
59.5	The successful tenderer may be required to use report to present the performances of all systems on offer. The format of report shall be agreed by the Hospital.	M		
59.6	For the purpose of this Contract the Goods shall be subject to a functional test for its conformance with the operational and reliability requirements to the satisfaction of the user. In the event that the equipment fails to conform to the above stated requirements, the Contractor is required to carry out appropriate remedial measures and/or any rectification works, including replacement of the entire equipment, where deemed necessary. The date of acceptance of the Goods shall be determined by the Cluster/Hospital based upon the satisfactory completion of such functional test.	M		
60	**System Security**			

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
60.1	Tenderers shall provide a reliable anti-virus, anti-spyware and anti-hacking solution for all the window-based systems and post-processing workstations on offer for the whole equipment lifespan. The solution provided shall not affect the normal performance of the aforesaid facilities. Details of the solution shall be stated. The successful tenderer shall regularly update the anti-virus program, preferably using cluster hospital's definition, that is, to connect with hospital network for the daily update of anti-virus program.	M		
60.2	Offers with no antivirus solution for acquisition / processing workstation, e.g. LINUX platform, will also be considered but factory support on such deviation must be submitted. Tenderers shall undertake to offer the solution free of charge when available in future.	M		
60.3	Tenderers shall propose a security mitigation plan for the imaging systems and ancillary components on offer if they are computer-based and end of support for their operating systems, such as Windows 11 and later versions happens within the equipment lifespan. It can include upgrading the operating system to a later version, server hardening, blocking USB ports, etc., and provision of necessary hardware and software, where applicable for implementing the plan. The cost will be considered covered in the tender price.	M		
60.4	The successful tenderer shall be responsible for reverting the system back to its original functional state in case the operating platform crashes or being infected by computer virus.	M		
60.5	Free upgrade and update for both the hardware and software for the above-mentioned security solution shall be provided.	M		
60.6	Provision of secure remote diagnosis and off-site maintenance for the imaging system on offer.	M		
61	**System Update**			
61.1	The successful tenderer shall guarantee to provide, at no additional cost within warranty and post warranty maintenance period, software update to all the components of the Angio/CT System on offer, including all software in all workstations and all optional items.	M		
62	**Software License**			

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
62.1	The software license for all clinical applications shall be permanent. Application software offered on a trial basis for a limited time will not be accepted.	M		
63	**Technology Substitution**			
63.1	The successful tender shall undertake to offer respective hospital and the hospital may at any time before delivery and at its sole option elect to obtain from the successful tenderer any unit of equipment in substitution, where the substitute unit contains new technology or has performance characteristics similar to or better than any unit of equipment on offer. Such substitute unit shall be offered to respective hospital at the successful tenderer's prevailing prices including discount offered to the hospital under this contract. In the event that the hospital elects to obtain the substitute unit of equipment from the successful tenderer, the provisions of this contract shall apply to such substitute unit.	M		
63.2	Tenderers shall ensure the non-obsolescence of the system on offer. Length of non-obsolescence period of the system shall be specified.	M		
63.3	Within warranty period / maintenance service contract period (if applicable), the successful tenderer must perform system update and associated hardware replacement, if there is any, without any charge within the contract period.	M		
64	**Training**			
64.1	Local Operational Training	M		
64.1.1	The successful tenderer shall provide operational training to a minimum of EIGHT hospital staff from the hospital, for not less than TWO weeks, at no additional charges.	M		
64.1.2	To be conducted by manufacturer certified application specialist(s) fully conversant with the operation and design of the equipment.	M		
64.1.3	The instructor(s) shall be fully conversant in English or Cantonese. All training and training materials provided shall be in English.	M		
64.1.4	The duration of the training and syllabus shall be specified and enclosed in the tender submission.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
64.1.5	The training shall include classroom instructions on theory and also on-site practical training with actual equipment.	M		
64.1.6	The time table and commencement date for the course shall be advised to the Hospital at least 3 months prior to the commencement of the course.	M		
64.1.7	The commencement of the course shall coincide with the completion of installation and commissioning of the system.	M		
64.1.8	The course of training shall include all materials such as notes, charts etc. for the participants. These materials shall be available at the time of training.	M		
64.1.9	Additional on-site application training session(s) shall be arranged upon the request of Radiology Department during the first year of operation of the equipment without additional cost.	M		
64.2	Local Maintenance Training	M		
64.2.1	Successful tenderer shall provide maintenance training to at least TWO hospital maintenance staff from the Medical Physics Unit (MPU) of individual Hospital at no additional cost.	M		
64.2.2	The course shall be conducted by qualified personnel(s) from the factory fully conversant with operation and design of the equipment.	M		
64.2.3	The instructor(s) shall be fully conversant in English or Cantonese. All training and training materials provided shall be in English.	M		
64.2.4	The commencement of the course shall coincide with the installation of the system with theoretical training first. The practical part shall coincide with the installation and commissioning of the system.	M		
64.2.5	The training shall include techniques in setting up, calibration, trouble shooting, fault diagnosis, preventive maintenance procedures, use of special tools and test instruments. Interpretation and understanding of circuits shall also be included.	M		
64.3	**Overseas Maintenance Training**	O		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
64.3.1	The successful tenderer shall provide official overseas field service training by the manufacturer to at least one staff member from the Medical Physics Unit (MPU) of individual hospital at no additional cost.	O		
64.3.2	The manufacturer provides a certificate of attendance upon completion of the course.	O		
65	**Quotation for Replacement of X-ray Tube**			
65.1	Tenderers shall quote separately the net cost for X-ray tube and the cost of replacement labor after the warranty period of the equipment. Unconditional warranty of at least 12 months shall be offered for the replacement X-ray Tube. The guarantee condition e.g. in terms of time or number of exposures, for the replacement X-ray tube shall also be quoted.	M		
65.2	Alternative proposal for the replacement of X-ray tube shall be provided for consideration. HA shall be the owner of X-ray tube after replacement	M		
66	**Documentation**			
66.1	(a) The Contractor shall submit the documents listed as below in form of at least one hardcopy and one softcopy upon delivery of each equipment (including accessories & ancillary medical equipment in Part D). All photocopies shall be properly binded, stamped and certified as true copies of the original by the manufacturer. If the Contractor cannot provide softcopy of documents, the Contractor shall scan and provide the full documents as digital file (e.g. PDF file). The documents shall include, but not limited to, the latest version of (1) operation and maintenance (O&M) manual(s), in English or in Chinese complete with procedures of preventive maintenance (PM) and corrective maintenance (CM) and maintenance interval, (2) PM checklist(s) endorsed by equipment manufacturer (if PM is suggested by the manufacturer) and (3) installation manual/ method statement (if applicable) to user and hospital administration department. (b) Should any original equipment manufacturer products be included, the documents as specified in (a) above shall also be provided.	M		
67	**Incident Investigation**			

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
67.1	In the case of medical equipment is reported with incident or safety problem, the successful contractor shall: -Attend to the call at site as soon as practically reasonable -Conduct investigation to identify the cause of the incident causing the safety problem -Advise the hospitals on the recommended actions to be taken based on investigation results. -Submit interim report and full investigation report to the hospitals within a time frame agreed by both parties.	M		
Part D	**Accessories & Ancillary Equipment**			
68	**Accessories & Ancillary Equipment**			
68.1	The tenderer shall offer equipment complete with all necessary components, parts and accessories to facilitate the equipment to be fully compatible in installation and functioning with the provided services and provisions, and operating with the optimum performance, to the complete satisfaction of the end users. All such components, parts and accessories are deemed to have been allowed for by the tenderer in his returned tender sum.	M		
69	**Ceiling-suspended radiation protection panel** TWO sets of ceiling suspended clear lead acrylic radiation protection panel such that the lead equivalence shall be clearly and indelibly marked.	M		
69.1	It shall be movable and height adjustable, fully counter-balanced, allowing swiveling and tilting movements of the lead acrylic radiation protection panel, and to be installed in such a way that it will not interfere, hinder or interrupt the full range of movement of the Tube-Detector Supporting systems and the examination table.	M		
69.2	The acrylic panel shall have a lead equivalent of 0.5 mm at 80kVp or more.	M		
69.3	The lead acrylic window shall be constructed in one piece, not laminated, and tint free.	M		
69.4	Size shall be not smaller than 40cm x 50cm.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
69.5	All edges of the lead acrylic window shall be rounded or laminated in metal.	M		
69.6	Successful tenderer should submit brochure and details for user consideration before installation.	M		
70	**Ceiling-Mounted Surgical Light** **[Final model shall be subject to hospital user's agreement.]** TWO sets of counterbalanced ceiling suspended OT lamp with the following features:	M		
70.1	The OT lamp system shall be mounted on one double-section suspension arm attached to a ceiling-mounted flange tube.	M		
70.2	Provision of focused illumination device with multispot LED light source.	M		
70.3	Optical / Illumination qualities			
70.3.1	Light intensity (illuminance): 130,000Lux ±10%	M		
70.3.2	Colour temperature : 4500K ±200K	M		
70.3.3	CRI at 4500K (R13) >= 99	M		
70.3.4	Light field size at 1m D10 : 180-230mm diameter	M		
70.3.5	Working distance : 700-1500mm	M		
70.3.6	Light field focusable at handle	M		
70.3.7	Intensity adjustable between 28-100% in 5 steps including 5% Endo Light Function	M		
70.4	Mechanical / Electrical properties			
70.4.1	Removeable handle can sustain autoclave 134°C steam sterilization to ISO 11607 standards	M		
70.4.2	Control panel on the lamp head unit	M		
70.4.3	Lamp housing protection to IEC60529 : IP42 (or better)	M		
70.4.4	Height adjustment range 1170mm (or larger)	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
70.5	Successful tenderer shall submit brochure and details for user consideration before installation.	M		
70.6	Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.	M		
70.7	Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.	M		
70.8	Equipment offered shall comply with IEC60601-2-41: Particular requirements for the basic safety and essential performance of surgical luminaires and luminaires for diagnosis or equivalent.	M		
70.9	The tenderer shall be responsible for providing all the information, e.g. load capacity, maximum load capacity, etc. The relevant mounting details and structural load calculation shall be reviewed and endorsed by an Authorized Person and/or Registered Structural Engineer (RSE) under Buildings Ordinance. The RSE report shall be provided to Hospital. Applicable loading test for each supporting frame shall also be conducted, reviewed and endorsed by an Authorized Person and/or Registered Professional Engineer. The loading test report shall be provided to Hospital.	M		
71	**Chair**	M		
71.1	FOUR numbers of ergonomically designed chairs. The model shall be subject to the user's agreement before delivery.	M		
71.2	TWO numbers of stools	M		
72	**Detachable radiation shield** ONE set of detachable radiation shield, mounted on either side of the examination table for lower body protection, shall be provided:	M		
72.1	The shield shall be adjustable to fit into the working position, or into parking underneath the table.	M		
72.2	An additional lower body protection shield shall be attached on the lower shield for additional radiation protection.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
72.3	All protection shields provided shall be lead equivalent of 0.5 mm at 80kVp or more.	M		
73	**Radiation Protection and Quality Assurance Accessories**			
73.1	TEN sets of ultra-light-weighted Lead-Free protective apron of vest & skirt type with monogram, embroideries, lead equivalent at 100 kV not less than 0.5 mm front portion and not less than 0.25 mm back portion. The choices shall meet user's requirement.	M		
73.2	ONE number of wall mounted lead apron rack capable of storing not less than ten lead aprons.	M		
73.2.1	FIFTHTEEN numbers of vest and skirt combo rack adapters	M		
73.2.2	The final model will subject to Hospital's final decision.	M		
73.3	TEN thyroid shields with Velcro-strapping of lead equivalent 0.5mm at 100 kV; The choices shall meet user's requirement.	M		
73.4	FIVE pairs of light weight lead glasses of 0.5 mm lead equivalent at 100kVp or better with wrap around design for radiation protection; The choices shall meet user's requirement.	M		
73.5	TWO numbers of mobile lead radiation protection panel of Pb equivalent of 2mm or more at 80kVp;	M		
73.5.1	The dimensions and final models will subject to Hospital's final decision.	M		
73.6	ONE set of Leeds Test Objects 18FG (Fluoroscopy/Radiography) Image Quality Phantom or an equivalent phantom with automated analysis software.	M		
73.6.1	ONE set of CTDI Phantom Set designed for the measurement of dose indices in both head and body protocols, compliant with IEC 60601-2-44 and FDA 21 CFR 1020.33 standards.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
74	**Digital Video Recorder** ONE set of medical DVD recorder for recording and playback of fluoroscopic cine acquisition and digital images with the following features:	M		
74.1	Recorder provided shall be capable of hard disk recording with a size not less than 500GB.	M		
74.2	The video recorder shall be fully compatible with imaging system on offer.	M		
74.3	Compatible with using USB flash drive and optical discs (DVD±RW or DVD-RAM or equivalent).	M		
74.4	Normal record, play, fast forward, rewind, pause, and stop functions.	M		
74.5	Variable speed forward and reverse play.	M		
74.6	Rapid search.	M		
74.7	Scan conversion system for compatibility between the video source of the imaging system and the digital video recorder.	M		
74.8	Allow automatic start/stop of the recorder to synchronize with the generation of X-ray during fluoroscopy and digital acquisition.	M		
74.9	Instant recording (available in a second before image acquisitions).	M		
74.10	Playback of recorded images shall be accomplished through the LCD display monitors used for review in examination room and the control console.	M		
74.11	Flicker-free stop frame and single frame advance facilities in the playback mode are required.	M		
74.12	Allow multiple exams recording on one disk.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
74.13	The system offered shall allow the video-output to be captured and digitized as video-clip for teaching purposes and Video-Fluoroscopic Swallowing Studies.	M		
74.14	Provision of cordless remote control for the recorder on offer.	M		
74.15	It shall be provided with 100 numbers compatible recording media of not less than 2 hours each.	M		
74.16	Tenderers shall suggest and provide solution for displaying and playback of the recorded images using monitors on offer. Otherwise, one number of separate LCD display not less than 17 inches diagonal shall be provided and installed in control room for such purpose.	M		
75	**Dual Head Contrast Media Injector of Angiography** **[Final model shall be subject to hospital user's agreement.]** ONE set of dual head contrast media injector system shall be offered.	M		
75.1	The injector shall not be only utilized as a single powerhead delivery system, but can also serve as an ideal solution for Dual Head contrast delivery system.	M		
75.2	Injector shall be exam table-mounted. Related installation and accessories for table mounting shall be provided by successful tenderer.	M		
75.3	The exact model shall be determined by the end-user.	M		
75.4	The system shall be FDA approved (or equivalent regulatory approved) dual-head contrast media injector for use in the angiographic environment; provides the ability to program a variety of contrast concentrations via dilution settings	M		
75.5	The injection system shall be equipped with the following features:	M		
75.5.1	A High Pressure DUAL headed syringe Auto-Injector compatible with the Angiography/CT system, shall be provided.	M		
75.5.2	Remote keyboard panel.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
75.5.3	Remote hand switches to ease users to start and stop injection.	M		
75.5.4	The system shall be freely movable and have user selectable multiple protocols.	M		
75.5.5	Snap-on / twist-off syringe design.	M		
75.5.6	Console control with touch screen.	M		
75.5.7	Stores and recalls not less than 240 protocols.	M		
75.5.8	Anatomical interface for protocol entry and personal protocol memory.	M		
75.5.9	Designed for bulk delivery.	M		
75.5.10	Design to prevent leakage into the powerhead.	M		
75.5.11	The following shall be included: i) Flow rate: 0.1 to 30 ml per second with 0.1 ml increment. ii) Volume: 0.1 - 99.9 ml	M		
75.5.12	The programmable pressure limit shall be 1200 PSI in 150 ml Syringe.	M		
75.5.13	Maximum hold time of Inject Delay ranged from 0 - 99.9 seconds or longer	M		
75.5.14	Automated function, which include auto prime and auto load function.	M		
75.5.15	Build-in heater blanket for both contrast and saline.	M		
75.5.16	Injection capability: - Contrast-only injection - Simultaneous saline flush and contrast injection - Contrast-then-saline injection	M		
75.5.17	Integrated with saline test injections.	M		
75.5.18	Real Time Pressure Graph during injection.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
75.5.19	Auto return simultaneously for contrast and saline to ease users to withdraw contrast and saline.	M		
75.5.20	Safety Mechanisms: - Flow Rate Monitoring - Over-volume Monitoring - Over Pressure Monitoring	M		
75.5.21	Comprehensive and automatic safety features shall be incorporated.	M		
75.5.22	Manual knob at the powerhead for each syringe, which allow operator to move its respective arm/plunger, especially for purging air from the syringe and drawing back blood to ensure proper venous placement of the catheter manually	M		
75.5.23	A series of power-up tests shall be performed to monitor the status of all systems when the machine is switched ON.	M		
75.5.24	During the enable process and injection, a continuous self-system checking mechanism on all necessary functions shall be in place.	M		
75.5.25	End Flow Rate shall be automatically calculated by the system and displays on the console Main Screen.	M		
75.5.26	The powerhead shall be in the downward position before the “Enable” key is being active. It allows any trapped air in the syringe to move to the plunger end of the syringe, which preventing from being inadvertently injected into the patient.	M		
75.5.27	It shall be able to Start/Stop an injection at the powerhead	M		
75.5.28	All syringes shall be isolated from any electrical contact with the injector.	M		
75.5.29	The system shall be able to automatically fill the syringe while minimizing the introduction of air into the syringe.	M		
75.5.30	Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
75.5.31	Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.	M		
75.5.32	Fuse protection in AC input.	M		
75.5.33	The equipment shall remain operational and within specification throughout the voltage range of 220V ± 6%, 50Hz ± 2%, 1-phase A.C. electrical supply.	M		
75.5.34	Single phase mains operated equipment shall be fitted with a power plug suitable for the site condition. The plug shall comply with relevant standards e.g. BS 1363 for 13A plugs.	M		
75.6	Training on the operation of the injectors on offer shall be arranged after completion of equipment installation.	M		
75.7	Accessories: a) 200 sets of injector syringe b) 100 sets of injection tubing	M		
76	**CT injector** **[Final model shall be subject to hospital user's agreement.]** ONE set of contrast injection system shall be provided with the following specification:	M		
76.1	The system shall be intended for specific purpose of injecting intravenous contrast media into humans for diagnostic studies in computed tomography (CT) applications.	M		
76.2	System Specifications	M		
76.2.1	The system shall be comprised of the injector system located in the scanning room; a WIFI hub and a WIFI communicated wireless touch screen control unit which are typically located in the control room.	M		
76.2.2	The system shall be in pedestal-mounted.	M		
76.2.3	The system shall be in piston-based fluid delivery method which provides a steady flow rate capability.	M		
76.2.4	The system shall be able to accommodate at least 50 – 500 ml of contrast bottle.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
76.2.5	The system shall be able to accommodate at least 50 – 1000 ml of saline bag/bottle.	M		
76.2.6	The system shall have at least 3 set of 200 ml reservoirs (two for contrast and one for saline).	M		
76.2.7	The fluid volume in the reservoirs shall be showed in unit of milli-liters (ml).	M		
76.2.8	The two contrast reservoirs shall be able to store the same or two different concentrations of contrast medium.	M		
76.2.9	The system shall have at least 3 optical inlet air sensors detecting air coming from the bottles/bags.	M		
76.2.10	The system shall have at least 1 ultrasonic outlet air sensor detecting air before it reaches the Patient Line.	M		
76.2.11	The system shall be operated by battery which can provide minimum 16 hours or up to 60 injections of capability.	M		
76.2.12	There shall be a touch screen display at the injector system for reviewing the protocol.	M		
76.2.13	There shall be an integrated prime container which can accommodate up to 680ml of volume.	M		
76.2.14	There shall be sensor to monitor the present and fluid volume of the prime container.	M		
76.2.15	The system shall equip with heat maintainers.	M		
76.2.16	There shall be eGFR calculator available on scan room and control room units as part of the standard configuration.	M		
76.2.17	There shall be password protection feature which could limit access to the controls and settings.	M		
76.2.18	The system shall host a web server that makes available injection data management features via a web-based application browser.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
76.3	Protocoling Specifications	M		
76.3.1	The system shall fulfill the below minimum delivery capability:	M		
76.3.1.1	Volume Range: 1 ml to 200 ml for contrast and saline flush phases. 1 ml to 400 ml for dual flow phases.	M		
76.3.1.2	Flow Rate Range: 0.1 to 10 ml/sec in 0.1 ml/sec increments.	M		
76.3.1.3	Dual Flow Capability: Simultaneous injection of contrast and saline in increments of 1%.	M		
76.3.1.4	Programmable Pressure Limit: 50 – 300 psi in 1 psi increments.	M		
76.3.1.5	Programmable Delay: 1 second to 900 second in 1 second increments.	M		
76.3.1.6	Pause Time: 20 minutes of pause time.	M		
76.3.1.7	Injection Capabilities: 6 phases per injection. 10 injections per exam.	M		
76.3.2	The system shall enable the user to stop the current phase of an injection and start the next phase.	M		
76.3.3	The system shall be able to provide a real time flow rate adjustment and multi-phase test injections.	M		
76.3.4	There shall be a feature of maximum flow rate reduction which could be set from 0 - 50%.	M		
76.3.5	There shall be a feature of pressure limit sensitivity which could be set as High / Medium / Low.	M		
76.3.6	There shall be preload protocol and re-prime features.	M		

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76.3.7	The system shall be equipped with personalized patient protocols technology.	M		
76.3.7.1	The integrated software shall be able to automate the calculation of individual contrast injection protocols based on but not limiting to the below factors, in order to increase consistency of individual protocols amongst clinicians: 1. Patient Body Weight 2. Contrast Concentration 3. Iodine Delivery Load 4. Iodine Delivery Rate 5. Tube Voltage Modifications 6. Catheter Size Modifications	M		
76.4	Disposables Specifications	M		
76.4.1	The system shall be compatible with the following disposables set.	M		
76.4.2	Patient Line: 1. Single Use 2. 250 cm in length 3. Snap-in single hand insertion design 4. 2 integrated check valves 5. Auto primes upon insertion 6. Recessed connection to prevent accidental touch. 7. Patient Line Volume: 9 ml 8. Auto-priming between patients: 15 ml 9. It shall be coiled tubing design.	M		
76.4.3	Day set: 1. Pre-assembled 3 x 200 ml syringe-type reservoirs. 2. Labeled for 24 hours use. 3. Recessed connection to prevent accidental touch.	M		
76.4.4	Replacement Spike: 1. Labeled for 24 hours use. 2. Can be changed in case of an accidental touch, without having to change the entire Day Set.	M		
76.5	Connectivity Specifications	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
76.5.1	The system shall be able to pull patient data from modality worklist.	M		
76.5.2	The system shall be able to transfer the contrast injection information in PACS as secondary capture.	M		
76.5.3	There shall be an integrated barcode reader on scan room unit for contrast tracking and recording.	M		
76.6	Other specifications	M		
76.6.1	Accessories: a) 100 sets of Multi-patient day Set b) 2,000 sets of Patient Line c) 100 sets of Replacement Spike	M		
76.6.2	The supplier shall guarantee and provide at least one preventive maintenance of the injectors, including original equipment manufacturer (OEM) items during warranty and maintenance period. Replacement of faulty parts and system updates shall be included.	M		
76.6.3	Training on the operation of the injectors on offer shall be arranged after completion of equipment installation.	M		
76.6.4	Vein test function to determine the integrity of the IV site should be available to perform unlimited times, with 3 adjustable parameters: Flow rate, volume and maximum pressure.	M		
76.6.5	The final model will subject to Hospital's final decision.	M		
76.7	Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.	M		
76.8	Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
77	**Digital Diagnostic Ultrasound System** **[Final model shall be subject to hospital user's agreement.]** ONE set of Fully Digital Diagnostic Ultrasound Systems with the following requirement:	M		
77.1	General Requirements	M		
77.1.1	The ultrasound system on offer shall have the following applications: Abdominal, Breast, Small Parts and Superficial, Pediatric, TCD and Neonatal, Urology / Prostate, Musculoskeletal, Obstetrical and Gynecological, Peripheral Vascular, Cardiology, Surgical, Contrast Imaging and real-time 2D, Automated 3D and real-time 3D Volumetric Imaging.	M		
77.1.2	Capable of supporting multiple transducer technologies, including: Linear array, Phased array, Curved array, motorized 3D, Single Crystal Arrays, Non-Imaging Pencil Doppler Array.	M		
77.1.3	Single Crystal Tech shall be available for linear array, curved array and motorized 3D transducers.	M		
77.1.4	The system shall be capable of reaching depth of imaging 55 cm or more, depending on probe.	M		
77.1.5	The system shall be capable of reaching full time input dynamic range of not less than 370dB, depending on imaging mode.	M		
77.1.6	The system shall be capable of acquiring a maximum frame rate of not less than 5,000 frames per second, depending on imaging modes.	M		
77.1.7	Support multi-frequency technology in all operative modes (2D, Colour Doppler, Doppler), the imaging frequencies in the range of 1.0 - 22MHz or wider, depending on probe and imaging mode.	M		
77.1.8	The system shall have at least 3 transducer connectors.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
77.1.9	The system shall have direct multifunction knob/key to activate and control primary modalities, including B/M mode, Depth/Zoom, Freq/TEI, PRF/Baseline Color, Steer/Angle, Doppler mode, Power output, tools and mark.	M		
77.1.10	The system shall provide imaging view angle up to 180 degrees or more, depending on probe.	M		
77.1.12	The system shall completely start up in 90 sec or less to facilitates swift usage during procedures.	M		
77.2	Operative modes The system shall support the following operative modes:	M		
77.2.1	B Mode real-time 2D imaging	M		
77.2.2	M Mode;	M		
77.2.3	Color Doppler (C);	M		
77.2.4	Power Doppler (PD);	M		
77.2.5	Directional Power Doppler;	M		
77.2.6	Spectral Doppler;	M		
77.2.7	Tissue Enhanced Imaging (Harmonic);	M		
77.2.8	Contrast Agent Imaging	M		
77.2.9	Tissue Doppler Imaging (TDI) or equivalent	M		
77.2.10	Trapezoidal View or equivalent;	M		
77.2.11	Single mode, Dual, and Quad Mode	M		
77.2.12	Quantitative Elastosonography by Shearwave	M		
77.3	Hardware Requirement	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
77.3.1	The main unit shall have a backlit control panel physical keyboard, LCD/LED touch screen control, encoder knob or equivalent, trackball/trackpad, gel holder and transducer holders, an articulated monitor arm with a LCD/LED/OLED color monitor on a four-wheel mobile cart.	M		
77.3.1.1	Wheel locks, control panel and monitor adjustments that facilitate optimal bedside exams	M		
77.3.1.2	Fully adjustable control panel with front and rear protruding handle	M		
77.3.1.3	Retractable physical keyboard	M		
77.3.2	Capable of outputting real-time image signal to exam room display by video signal cable	M		
77.3.3	Display Monitor	M		
77.3.3.1	21.5 inches (diagonal) or larger LCD/LED/OLED monitor	M		
77.3.3.2	Resolution: 1,920 x 1,080 x 24 bits, or higher	M		
77.3.3.3	Adjustable tilting and rotating	M		
77.3.3.4	Adjustable movement: Up/Down, Forth/Back	M		
77.3.4	Embedded Touch Screen	M		
77.3.4.1	14” (diagonal) or larger LED Touch Screen	M		
77.3.4.2	Digital TGC controls on touch screen for disinfection tasks	M		
77.3.5	Internal storage using integrated SSD with at least 500 GB capacity	M		
77.4	Real Time 2D Imaging	M		
77.4.1	The following or equivalent processing parameters shall be adjustable with multiple steps/selections:	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
77.4.2	Frequency, Spatial Compound Imaging, Speckle Reduction, Line Density, Dynamic Range, Frame average, Gray Map, Chroma Map	M		
77.4.3	Maximum acquisition frame rate of not less than 5,000 frames per second for B-mode imaging must be supported	M		
77.5	Color Doppler Imaging/Color Flow Mode (CFM)	M		
77.5.1	The system shall be capable of supporting colour Doppler imaging on all phased, linear, curved, motorized/electronic 3D/real-time 3D curved and tightly curved array transducers.	M		
77.5.2	The system shall have adjustable PRF from 50 Hz up to 25,900Hz or wider.	M		
77.5.3	The system shall have re-sizable colour Doppler/CFM box which can be steered from 30 deg to -30 deg.	M		
77.5.4	The system shall have at least 660Hz frame rate on Color Flow Function.	M		
77.6	The system shall be capable of supporting the Directional Power Doppler imaging.	M		
77.7	The system shall support micro-vascularization which is an astonishing sensitivity for small vessels and slow flows detection. It offers tiny and slow vessels detection without B-mode interferences (no noise related to hyperechoic structures) for the representation of information related to flows non-detectable with standard Doppler Technology.	M		
77.7.1	The system shall offer an alternative to power Doppler for visualizing slow flow micro-vascularized structures.	M		
77.8	The system shall provide a 3D visualization of 2D blood flow, which is a continuous and volumetric vascular image, by using 2D transducer.	M		
77.9	Pulsed Wave Doppler Imaging	M		

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77.9.1	The system shall be fully integrated for Triplex imaging.	M		
77.9.2	The system shall have a velocity range control to adjust display calibration while at the same time increasing PRF to optimize signal.	M		
77.9.3	PRF range of PW shall be at least from 1.1 to 35KHz.	M		
77.9.4	Sample Volume size: 0.5 to 25 mm or wider	M		
77.9.5	The system shall support Auto Doppler Measurement during the real time Doppler Spectrum and must show the following parameters in real time for the operator to access the vessels conditions:	M		
77.9.5.1	Flow Velocity Integral (FVI), Peak Systolic Velocity, End-diastolic Velocity, Mean Velocity, Pulsatility Index (PI), Resistive Index (RI), Systolic Velocity / Diastolic Velocity.	M		
77.10	The system shall provide a dedicated needle enhancement mode to increase the echogenicity of the needle during in-plane approach procedures.	M		
77.10.1	The System gain and beam steering angle can be adjusted individually to make the needle more clearly seen.	M		
77.11	Advance Tissue Harmonic Imaging with the following or equivalent features shall be provided.	M		
77.11.1	Generate Two different wide-band + Non-Linear Frequency; Reception of Four different wide-band + Non-Linear Frequency to provide better 2D images.	M		
77.12	The system shall provide Real Time Spatial Compound Imaging that use electronic beam steering of a transducer array to acquire several coplanar scans of an object from different view angles (or functionally equivalent).	M		
77.13	Speckle Reduction Imaging	M		

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77.13.1	The system shall be capable of supporting an adaptive image-processing technique or equivalent that performs real-time analysis of patterns at the pixel level and refines ultrasound images, and de-emphasizing artifacts, to improve visibility of existing tissue texture patterns and bringing margins and borders into greater definition, which shall be supported in Color Doppler.	M		
77.14	The systems shall provide a dedicated software to merge multiple B-mode images in one complete panoramic image and allow quantitative measurements within the panoramic image.	M		
77.15	The system shall support Shadow Reduction Imaging technology that composites both the brightness information from low Frequency image and high resolution from high Frequency image together to offer a wide dynamic range image as the final image, and compensate attenuation in shadowy area and get bright and detailed image from far to near view (or functionally equivalent).	M		
77.16	The system shall provide High-quality Image Restoration software that visualizes clearly anatomical structure of in-vivo organs such as nerve, muscle, ligament, etc., and enhances spatial resolution.	M		
77.17	The system shall support wide angle mode in convex probe with at least two steps of adjustment and Measurement can be done on Extended View mode.	M		
77.18	Measurement and Calculation Package	M		
77.18.1	The system shall allow multiple measurements to be made simultaneously on each screen frame under 2D/M-Mode/Doppler modes.	M		
77.19	Archive and Connectivity	M		
77.19.1	The system shall support network compatibility with DICOM protocols (storage, DICOM print, Worklist modes) for image archiving and worklist retrieval.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
77.19.2	Exam can be started with temporary Patient ID which can be changed to saved or new ID.	M		
77.19.3	The system shall be able to store images in USB port drive Memory stick/flash drive and CD/DVD in AVI file format for clips and BMP file format for still images. Equivalent image formats shall also be accepted.	M		
77.20	Transducers	M		
77.20.1	ONE set of Single Crystal or equivalent Curved Array Transducer with the following requirement:	M		
77.20.1.1	Bandwidth/Frequency range: 1 – 7 MHz or wider	M		
77.20.1.2	Radius of Curvature: between 40mm and 65mm	M		
77.20.1.3	Field of View: at least 100°	M		
77.20.1.4	Maximum Imaging Depth: 500mm or more.	M		
77.20.1.5	Number of Elements: at least 192	M		
77.20.1.6	Central marks, either original or added-on is available in long edge of the scanning head	M		
77.20.1.7	Support 2D-Shearwave Elastography	M		
77.20.1.8	Support Contrast Agent Imaging	M		
77.20.2	ONE set of Linear Array Transducer with the following requirement:	M		
77.20.2.1	Bandwidth/Frequency range: 3 – 14 MHz or wider	M		
77.20.2.2	Field of View: 50mm or more	M		
77.20.2.3	Maximum Imaging Depth: 120mm or more	M		
77.20.2.4	Number of Elements: at least 256	M		
77.20.2.5	Support Biopsy guide capabilities	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
77.20.2.6	Central marks, either original or added-on, is available in long and short edge of the scanning head.	M		
77.20.2.7	Factory calibrated 1 cm scale markers are available in the long edge of the scanning head.	M		
77.21	Equipment Electrical Safety and Environmental Policy.	M		
77.21.1	Equipment offered shall be manufactured in factory complying with ISO 13485 or equivalent.	M		
77.22	Training on the operation of the US system on offer shall be arranged after completion of equipment installation.	M		
77.23	Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.	M		
77.24	Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.	M		
77.25	Equipment offered shall comply with IEC60601-2-37: Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment or equivalent.	M		
78	**Physiologic Monitoring System** **[Final model shall be subject to hospital user's agreement.]** ONE set of Physiologic Monitoring System with the following features:	M		
78.1	Electrocardiogram (ECG)	M		
78.2	Pulse Oximetry (SpO_2)	M		
78.3	Capnography (End-Tidal CO_2), main stream and side stream	M		
78.4	Non-invasive blood pressure (NIBP) for both adult and neonatal application.	M		
78.5	Invasive blood pressure with cable.	M		

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78.6	Numeric displayed: Real time Heart Rate, Pulse Rate, SpO_2, $etCO_2$, Respiration and NIBP (including Systolic, Diastolic and Mean Pressures).	M		
78.7	The monitor shall be able to operate continuously for not less than 2.5 hours while under battery power supply.	M		
78.8	Provision of an additional secondary Lithium-ion battery.	M		
78.9	The trend data shall be stored and reviewed	M		
78.10	The monitor shall be selectable for adult, pediatric and neonatal applications by user at any time.	M		
78.11	The monitor shall be integrated with a thermal strip-chart recorder.	M		
78.12	The monitor shall be equipped with audible and visual alarms capable of being triggered by each measurement module function.	M		
78.13	The monitor shall be able to set automatic alarm limits.	M		
78.14	The monitor shall be able to work with AC power and shall have built-in AC power adapter.	M		
78.15	All the cartridge/modules used shall be easily inter-changeable by the end-users without requiring tools.	M		
78.16	Mechanical interlock shall be incorporated for the various probes, transducers and/or electrodes in connection with the respective cartridge/module.	M		
78.17	Module shall be capable of retaining patient data, alarm, calibration and zero settings if applicable during patient transport for at least 8 hours.	M		
78.18	Different sizes and types of reusable and disposable cuff for arm and thigh applications of adult, child and neonate patient shall be provided.	M		

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Status of requirements for the following specification are indicated as follows : M: Mandatory Requirement D: Desirable Requirement O: Optional Requirement		**Tenderers must indicate below, point by point, whether their offered product complies fully with the tender specification. Details must be given should the offered product differ from the specification.**		
Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
78.19	Different types of reusable sensor included Dura-Y Sensors or equivalent for different applications of adult, child and neonate patient shall be provided.	M		
78.2	The equipment offered shall be completed with all essential accessories, including but not limited to, probe and interconnecting cables, required for its normal operation.	M		
78.21	Capable to be mounted on the exam coach. Related installation and accessories for table mounting shall be provided by successful tenderer.	M		
78.22	Tenderer shall provide and install slave monitor in control room to show monitoring information	M		
78.23	Tenderer shall provide details of the monitor system on offer and subject to user acceptance.	M		
78.24	Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.	M		
78.25	Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.	M		
78.26	Equipment offered shall comply with IEC80601-2-49: Particular requirements for the basic safety and essential performance of multifunction patient monitoring equipment or equivalent	M		
79	**Defibrillator** **[Final model shall be subject to hospital user's agreement.]** ONE set of Defibrillator with the following features:	M		
79.1	Rechargeable lithium-ion	M		
79.2	AC power using a protectively grounded outlet.	M		
79.3	Request multi-function electrode cable.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
79.4	With AED mode, manual defibrillation, synchronized cardioversion, external pacing	M		
79.5	Tenderer shall provide details of the Defibrillator on offer and subject to user acceptance.	M		
79.6	Equipment offered shall comply with the safety requirements of IEC60601-1 / IEC61010-1 or equivalent.	M		
79.7	Equipment offered shall comply with the electromagnetic compatibility (EMC) requirements of IEC 60601-1-2 / IEC 61326-1 or equivalent.	M		
79.8	Equipment offered shall comply with IEC60601-2-4: Particular requirements for the basic safety and essential performance of cardiac defibrillators or equivalent.	M		
80	SIX Angiographic catheter storage cabinets	M		
80.1	The dimensions and final models will subject to Hospital's final decision.	M		
81	TWO number of IV bottle drip stands attachable to IR table and capable to hang at least 4 bottles	M		
82	ONE set of Hi-Fi system for patient comfort and cooperation	M		
83	ONE no. of ceramic fan heater with integrated mobile stand.	M		
84	ONE set of 2 on 1 ultra-slim X-ray film viewing box	M		
85	ONE set of battery operate digital temperature and humidity monitor shall be provided.	M		
85.1	Recorded temperature and humidity log can be exported in electronic format	M		
86	TWO number of medical grade radiolucent flexible patient transfer board (forming no artefact when imaged) for easy transfer of patient between examination table and the stretcher trolley.	M		

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Clause	**Specification**	**M/D/O**	**Yes No (provide details) (Please tick as appropriate)**	
87	TWO number radiopaque X-Ray Lead Ruler	M		
88	ONE set of radiolucent extension board for trans-radial access IR procedure with the following features:	M		
88.1	Mount on IR table with adjustable angulation	M		
88.2	Assist patient's position in hyper-extended and medially-rotated position	M		
88.3	Adjustable length to suit different arm length	M		
89	Provision of TWO back-up VRV ceiling-mount split type air conditioning system in control room and exam room, to cope with the heat loading requirement for the proper operation of the system on offer. Detailed construction and layout diagrams should be submitted to DR, TMH comment and approval.	M		
89.1	The ceiling-mount split type air conditioning system offered shall be inverter split type with cooling / heating functions.	M		
90	Provision of one ceiling mounted dehumidifier with heater function in control room.	M		
90.1	The dehumidifier offered shall be connected with drainage such that continuous operation is allowed without pause.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
1	The Contractor shall maintain the entire technical system including software associated with the system, peripherals, accessories, and third party components wherever applicable, to the equipment performance specification published by the original equipment manufacturer(s) at the time of manufacture of the equipment and to those specified in the tender document.	M		
2	The maintenance services shall be carried out in accordance with the maintenance procedures as described in the relevant equipment service or instruction manuals.	M		
3	Labour for maintenance services shall be provided free of additional charges covering the normal working hours as specified herewith unless otherwise stated separately:	M		
3.1	8:00 am – 6:00 pm, Monday to Friday exclude public holiday 8:00 am – 1:00 pm, Saturday exclude public holiday Emergency service call shall be available and provided upon request. The 24 hours service hotline with direct contact to operator or engineer (without press / dial any number on-line) must be provided.	M		
3.2	The following shall be provided free of overtime charges by the contractor:	M		
3.2.1	All scheduled maintenance, preventive maintenance and system update	M		
3.2.2	All maintenance work carried out during normal working hours.	M		
3.2.3	All repair work carried out even beyond normal working hours shall also be free of overtime charges, if this work is done in response to an equipment fault call which is made within the normal working hours.	M		
3.3	Tenderers are required to quote the hourly charge rates for service calls outside user's normal working hours.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
3.4	The uptime guarantee requirements as detailed in the clauses on Warranty Maintenance shall also be applied to Post Warranty Maintenance.	M		
3.5	Requirements on Report of Service shall also be met in Post Warranty Maintenance.	M		
4	Tenderers shall provide as an essential part of their offer an annual post-warranty maintenance for 9 years for the whole system including all OEM items on offer of lifespan up to at least 10 years, by completion of Price Schedule. Tenderers shall submit as an essential part of the offer a yearly maintenance schedule indicating the number of preventive maintenance services and safety tests required for ensuring a satisfactory performance of the equipment offered. Tenderers shall also quote the options for 11nd to 13th year post warranty maintenance service to be considered by the Hospital. The quotes for 11th to 13th year post warranty maintenance service will not be taken for Total-Life-Cycle-Cost evaluation. The number of complete preventive maintenance services and electrical safety test per year shall be the same as that for warranty period.	M		
4.1	The maintenance services shall be carried out in accordance with the maintenance procedures as described in the relevant equipment services manuals and subject to physicist protocol at least **ONE** complete QA and **FOUR** PMS per year for the Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems, at least TWO PMS per year for defibrillator and at least ONE PMS per year for other minor medical equipment in Part D of item 1 shall be provided.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
4.2	Annual comprehensive maintenance charges covering labour and all spare parts, X-ray tube contract with unlimited exposure, LCD monitor, detector assembly, UPS with batteries and OEM items shall be quoted for user's consideration. Breakdown maintenance charge in respect of the X-ray tube and all OEM equipment, including material and labour, shall be quoted for user's reference.	M		
4.2.1	Should hospital opt for maintenance plan that includes X-ray tube replacement coverage, any replaced X-ray tube within the contract period shall be regarded as hospital asset.	M		
4.2.2	Tenderers with incomplete offer quoted will not be considered.	M		
4.3	Annual maintenance services charges covering labour and all spare parts, LCD monitor, detector assembly, UPS with batteries and OEM excluding X-ray tube shall also be quoted for users' consideration. Breakdown maintenance charge of all OEM equipment, including material and labour, shall be quoted for user's reference.	M		
4.3.1	Tenderers shall quote separately the net cost for X-ray tube and the cost of replacement labour after the warranty period of the equipment. Unconditional warranty of at least 12 months shall be offered for the replacement X-ray Tube. The guarantee condition e.g. in terms of time or number of exposures, for the replacement X-ray tube shall also be quoted.	M		
4.3.2	Alternative proposal for the replacement of X-ray tube, such as annual contract, shall be provided for consideration. HA shall be the owner of X-ray tube after replacement	M		
4.4	If the system on offer contains OEM products, the tenderers shall give a breakdown of the maintenance charges in respect of the main equipment and OEM products.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
4.5	Prices quoted for post warranty maintenance service shall be in exact amount. Annual adjustments with reference to the percentage change in the Consumer Price Index published in the Hong Kong Monthly Digest of Statistics or other basis such as the currency exchange rate will not be considered.	M		
5	The Contractor shall provide all transportation, necessary tools and testing instruments required for the satisfactory execution of this contract.	M		
5.1	All measuring instruments used for maintenance service shall be under regular calibration by accredited facilities traceable to the relevant international standards.	M		
5.2	The Contractor shall provide a list of measuring instruments that will be used for this Contract with valid calibration certificates to the hospitals at the commencement of this contract or upon request.	M		
6	The Contractor shall deploy properly trained service personnel to carry out the maintenance services and ensure that all necessary precautions for their safety are taken.	M		
7	The Contractor shall be responsible for all equipment safety, radiation safety and other OSH measures in protection of people during its work and services, and also any personal injury and property damage which may be caused directly or indirectly as a result of the work carried out by its employees or agents.	M		
8	The Contractor shall hold sufficient genuine spare parts to enable the equipment to be restored to its normal operational conditions within a time limit as stipulated in Clause 13.1 below.	M		

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Clause	**Specification**	**M/O**	**Yes No (provide details) (Please tick as appropriate)**	
9	The Contractor shall inform the respective departments, the Biomedical Engineering Services Section immediately if there is any manufacturer recall, safety alert, adverse incident, site modification, etc., of the system maintained, and shall provide the recommendation(s) on resolving the matter within a time specified by Hospital. If necessary, the Contractor shall assist Hospital to perform investigations / rectifications.	M		
10	The Hospital shall have the right to delete any system as per hospital's requirement from time to time and the Contractor will be notified of such requirement 1 month in advance.	M		
10.1	For system that to be deleted from this contract, the maintenance cost shall be adjusted on a pro-rata basis, based on the amounts stipulated in this contract. The balance of advance payments made for such system shall be remitted to the hospital within 30 days from the cease date of the maintenance service.	M		
11	**Preventive Maintenance (PM)**	M		
11.1	The Contractor shall inspect the equipment including all components whereby any variation or exception to this understanding shall have been highlighted and indicated in the tender return, at minimum intervals of 3 months for the Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems, 6 months for the defibrillator and 12 months for other minor medical equipment in Part D of item 1. Should the no. of intervals from equipment service manual / manufacturer is less than HA's, the latter shall prevail in this case. This PM service shall include all necessary repairs, replacement of parts, adjustments, calibration for equipment performance, cleaning and lubrication necessary to ensure that the performance of the equipment conforms to the performance specifications referred to Clause 1 above.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
11.2	The Contractor shall upon completion of each PM inspection service submit to user department a detailed checklist on what has been tested or inspected.	M		
11.3	The Contractor shall furnish the user with a tentative schedule for the PM service at least on a quarterly basis. The user shall inform the Contractor should there be any adjustment on the schedule.	M		
11.4	The Contractor shall be responsible for arranging, coordinating and agreeing on a program acceptable to the user for PM and shall take all reasonable steps to avoid causing any interference with the normal operation of the hospital.	M		
11.5	The Contractor shall perform calibration for LCD monitor with reference to manufacturer's specification at least once a year as part of the preventive maintenance, wherever appropriate.	M		
11.6	A label shall be affixed on each equipment item to indicate the asset number, contractor, PM date and the next due date of the routine service.	M		
11.7	Whenever conducting PM for uninterrupted power supply (UPS), Contractor shall adhere to UPS manufacturer's protocol / procedure for thorough maintenance services. Appendix I is provided as general reference on good maintenance practice for UPS should there be no specific protocol from the manufacturer.	M		
11.8	PM Zero Tolerance Program (ZT Program) The ZT Programme shall ensure that planned PM scheduled for selected critical equipment is fulfilled in order to reduce the likelihood of equipment failure. The Programme will apply to any critical equipment categories as stipulated in Appendix II.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
11.8.1	Any critical equipment under the schedule of ZT will be subject to a one week rule which depicts that such equipment not released or located for the scheduled PM (including any required calibration) within one week of the scheduled time shall be reported to the users in written. Appendix II [Form (A)] serves as an example of notification.	M		
11.8.2	If the equipment still cannot be released and located one week after informing the user of the equipment, the hospital administration shall be informed on this situation in written. Appendix II [Form (B)] serves as an example of notification.	M		
11.8.3	The Tenderer shall liaise with hospital administration for follow up on the equipment PM until it is completed. The Tenderer shall also provide hospital administration with ZT exception report on regular basis.	M		
11.9	Mounted Equipment For mounted equipment, the PM service shall include but not limited to the followings and be performed by qualified maintenance personnel:	M		
11.9.1	The tightening torque on each mounting screw shall be checked at regular intervals according to operation and maintenance manual(s) and/or manufacturer's recommendations. Torque wrench or special tools to be used for tightening torque checking advised by manufacturer shall be with valid calibration by qualified independent laboratory, such as laboratory possessing HOKLAS accreditation. Any mounting screw that was found loosed shall be handled according to latest manufacturer recommendation, or otherwise, the loosed screw shall be replaced with a brand new one.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
11.9.2	If there is any replacement interval of spare parts (such as mounting screw) recommended by manufacturer, the Contractor must provide this information to user and hospital administration department and follow the recommendation to replace the spare parts accordingly within the contract period.	M		
12	**Safety Test (ST)**			
12.1	The Contractor shall carry out electrical safety test on the equipment once every 12 months, or otherwise as specified by the individual hospital. The safety standards required shall comply with: IEC 60601-1 or IEC62353 or equivalent	M		
12.2	Should the equipment fail to comply with the safety standard listed in Clause 12.1 above, the Contractor shall investigate the source of the failure and take appropriate corrective action. The user shall be informed immediately of the failure.	M		
12.3	The Contractor shall liaise with hospital Medical Physics Unit (MPU) or user to include at least the following radiation safety checking (Clause 12.3.1 – 12.3.4) on annual basis:	M		
12.3.1	Radiation dose rate outside x-ray room.	M		
12.3.2	Radiation leakage rate.	M		
12.3.3	Total filtration of useful beam of system.	M		
12.3.4	Verification of dose area product (DAP) or dose length product (DLP).	M		
13	**Corrective Maintenance (CM)**			

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
13.1	Tenderer shall attend to any fault (deviation from performance specifications) within 2 normal working hours. This service shall include all necessary repairs, adjustments and replacement of parts to restore the equipment to its normal operation conditions within 4 hours or such other time agreed.	M		
13.1.1	The same requirement shall also be applicable to emergency call outside normal working hours under Clause 3.1 above.	M		
13.1.2	Subject to the consent of the user, the Contractor may carry out, during a breakdown service visit, a part or the whole of the PM work covered by this agreement.	M		
13.2	Upon completion of the CM work, the Contractor shall complete a service report and obtain a signature from the user or his representative certifying that the equipment is in normal operational conditions. A copy of the same shall be provided to the user on the day of maintenance.	M		
13.3	The service report shall contain full technical information for any repair works; especially those involve the replacement of expensive vacuum component such as x-ray tube, etc., and at least the following information:	M		
13.3.1	Equipment items (with HA Asset Number)	M		
13.3.2	Nature of service (PM or CM)	M		
13.3.3	Fault reported (date & time)	M		
13.3.4	Fault corrected (date & time)	M		
13.3.5	Response time	M		
13.3.6	Action taken	M		
13.3.7	Spares used	M		

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Clause	**Specification**	**M/O**	**Yes No (provide details) (Please tick as appropriate)**	
13.3.8	Current prices of spares used	O		
13.3.9	Down time (Contractor shall indicate to the end user the actual time spent for the service based on definition highlighted in this tender)	M		
13.3.10	Measurement or test data	M		
13.4	The Contractor is required to inform the hospitals of the obsolescence of spare parts in writing immediately upon notification from the manufacturers / suppliers.	M		
13.5	In the event of any periodic QC test failure, the Contractor shall be solely responsible for providing immediate root cause analysis and performing all necessary repairs or adjustments at their own expense to restore the system to certified operating specifications.	M		
14	**Spare Parts and Special Tools**			
14.1	The tenderer shall be committed for maintaining production and supply of required spare parts throughout the life time span of not less than 10 years.	M		
14.2	Tenderers shall submit a list of recommended spare parts with ordering information details and itemized prices for maintenance use and a list of consumable items.	M		
14.3	Tenderers shall list the major spare parts kept in Hong Kong. For non-stock items, tenderers shall state the turn-around time for:	M		
14.3.1	Normal air delivery	M		
14.3.2	Air delivery by the most expeditious means	M		

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Clause	**Specification**	**M/O**	**Yes No (provide details) (Please tick as appropriate)**	
14.4	Provision of special tools including software and hardware keys and comprehensive diagnostic software for fault diagnosis, trouble shooting and quality assurance without additional cost even when the hospital adopts in-house maintenance service after the warranty period.	M		
14.5	Tenderers shall also quote the average life span of the X-ray tube. The guaranteed exposure counts shall be stated. The method and unit of counting the exposure shall also be stated.	M		
14.6	Life cycle costing of equipment			
14.6.1	Tenderers shall provide detailed estimation of the life cycle costing of the equipment. The life cycle costing shall include maintenance service and spare parts replacement and all OEM items. Cost of X-ray tube and its labor replacement shall be included in the calculation during post-warranty period. All cost elements for calculation shall be bounded by its maximum value. Annual adjustment against percentage change in the Consumer Price Index published in the Hong Kong Monthly Digest of Statistics will not be considered.	M		
15	The Contractor shall maintain records of all work done and by quoting the Contract No. submit a summary highlighting the no of PM, CM, and safety test performed, PM & CM hours, response time and total down time (please refer Clause 17.1 - 17.2 for definition) for each equipment maintained to the user twice annually.	M		
16	Maintenance data:			

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Clause	**Specification**	**M/O**	**Yes No (provide details) (Please tick as appropriate)**	
16.1	The Contractor shall complete the work orders created by Hospital Authority's Enterprise Asset Management (EAM), by filling in the maintenance data of all equipment in this contract in an electronic format specified by HA Information Technology Department within 7 days, either upon request from hospitals, or upon service completion for electronic portal platform. Guidance on the electronic maintenance data shall be referred to Appendix III for EAM interfacing.	M		
16.2	HA is now developing a new "Medical Equipment Maintenance Management System (MEMMS)" to enable the Contractor to update work orders and equipment status on-site, and upload service reports and related checklists in real-time to allow hospitals to track and monitor work orders in real-time. According to the actual development progress of MEMMS, when necessary, the Contractor shall agree to cooperate with HA to conduct testing, trial runs, and use MEMMS at appropriate times as agreed upon by both HA and the Contractor.	M		
17	Uptime Guarantee:			

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Clause	**Specification**	**M/O**	**Yes No (provide details) (Please tick as appropriate)**	
17.1	Guarantee of system uptime not less than 95% of the total normal working hours. Uptime is calculated as follows: Uptime = (Base Time - Downtime) x 100 Base Time "Base Time" equals (a) the number of days in the applicable 3 months times the number of normal working hours. If the Contractor fails to achieve an uptime of 95% averaged over each consecutive period of 3 months, the maintenance contractual period shall be extended as follows: % of Equipment Uptime (X) — Extension of Contract Period $90 \leqq X < 95$ — 1 month $85 \leqq X < 90$ — 2 months $80 \leqq X < 85$ — 3 months Below 80 — Further negotiation is required "Down Time" will be calculated from the time of a service call is received by the Contractor to the time of completion of the repair and issuance of a service report to the hospital, counting normal working hours as stated in Clause 3.1.	M		
17.2	"Down Time" is the time when the complete system is down instead of a peripheral component and not available for normal function for patient service. It shall not include the time for any scheduled maintenance, system upgrade, and the time when the system is down due to user misuse and negligence. However, Downtime should also be applied on peripheral component failure or partial system function which lasts for more than 10 working days after Contractor's attempt, counting normal working hours as stated in Clause 3.1 from the service call date.	M		

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Clause	**Specification**	**M/O**	**Yes**	**No (provide details) (Please tick as appropriate)**
18	Software update The Contractor shall be responsible to update any software revision made available by the manufacturer, and anti-virus definition which is pre-installed in the workstation under maintenance. The Contractor shall make arrangement with hospital for update interval which is subject to mutual agreement. Tenderers shall guarantee to provide free software update throughout the contract maintenance period.	M		
19	The Contractor shall submit samples of Corrective Maintenance, Preventive Maintenance and Safety Checklist forms for reference during tender submission.	M		
20	Incident / safety investigation	M		
20.1	In the case of medical equipment is reported with incident or safety problem, the Contractor shall :	M		
20.1.1	Attend to the call at site as soon as practically reasonable	M		
20.1.2	Conduct investigation to identify the cause of the incident causing the safety problem	M		
20.1.3	Advise the hospitals on the recommended actions to be taken based on investigation results.	M		
20.1.4	Submit interim report and full investigation report to the hospitals within a time frame agreed by both parties.	M		
21	Should an equipment under the statutory requirement of licensing, the Tenderer shall responsible for reminding hospitals of the license expiry date, engaging appropriate authorized technical party for equipment assessment, and providing support with relevant technical document to hospitals for license renewal so as to fulfil the statutory requirement wherever applicable.	M		

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital
New Territories West Cluster, Hospital Authority

Item 2

Clause Note: M = Mandatory Requirements; O = Optional Requirements The product offered shall incorporate the following components / requirements / features.		**Tenderers must indicate below, point by point, whether their offered product complies fully with the tender specification. Details must be given should the offered product differ from the specification.**		
Clause	**Specification**	**M/O**	**Yes No (provide details) (Please tick as appropriate)**	
22	Confidential data, if any, in the equipment must not be exported for the protection of patient data privacy and security. The Tenderer shall comply with personal data privacy, confidentiality requirements of HA and of the Personal Data (Privacy) Ordinance. Confidential data refer to data including but not limited to identifiable patient information.	M		
23	IT Security Requirements for Quotation / Tender Procurement of "non-IT" Systems and Malicious Code Protection Requirements for Medical Equipment Maintenance are enclosed in Appendix IV for reference respectively.	M		

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital New Territories West Cluster, Hospital Authority (Tender Reference: NWT00226)

Appendices for Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems (Item 1 of Tender Specification)

ANGIO-CT SCAN ROOM
ANGIO-CT CONTROL ROOM
STORAGE SPACE
ANGIO-CT EQUIPMENT ROOM

CONTINUED ON DRAWING NO. AC/WA/G/608AF

CONTINUED ON DRAWING NO. AC/WA/G/059AF

CONTINUED ON DRAWING NO. AC/WA/G/054AF

CONTINUED ON DRAWING NO. AC/WA/G/058AF

CONTINUED ON DRAWING NO. AC/WA/G/056AF

STAIR No. 3 (W/G.03)

MALE STAFF C D0092 (W/G.49)

FEMALE STAFF C D0094 (W/G.53)

C D0093 (W/G.51)

C D0092 (WG50)

CLEANER CD0094 (W/G.52)

X-RAY 1 C D0095 (W/G.01)

RECORDS C D0096A (W/G.54)

GENERAL OFFICE C D0096 (W/G.55)

RECEPTION C D0096B (W/G.56)

WAITING AREA (W/G.57)

FRESH AIR INTAKE

A/C PLANT ROOM C D0097 (W/G.58)

HOSPITAL STREET

QR/A/155

QR/A/130

QR/A/131

QR/A/132

CHANGING C D0090C (W/G.04A)

CHANGING C D0090B (W/G.04B)

CHANGING C D0090A (W/G.04C)

CHANGING C D0089C (W/G.03A)

CHANGING C D0089B (W/G.03B)

CHANGING C D0089A (W/G.03C)

CHANGING C D0088C (W/G.02A)

CHANGING C D0088B (W/G.02B)

CHANGING C D0088A (W/G.02C)

(W/G.21)

X-RAY 4 C D0080 (W/G.4)

X-RAY 3 C D0089 (W/G.3)

X-RAY 2 C D0088 (W/G.2)

W/G 45

W/G 44

W/G.42

W/G 42A

NURSING OFFICER CD0081/W/G.25)

STAFF WORK C D0081 (W/G.24)

MALE C D0052 (W/G.13)

FEMALE C D0051 (W/G.12)

SENIOR RADIOGRAPHER C D0050 (W/G.11)

SENIOR RADIOGRAPHER C D0049 (W/G.10)

(W/G.60)

STAIR No.14 (W/G.59)

PERSONAL SECRETARY/ STENOGRAPHER C D0053 (W/G.14)

LINEN C D0062 (W/G.23)

EQUIPMENT RACKING C D0063 (W/G.22)

SENIOR MEDICAL OFFICER C D0054 (W/G.15)

SENIOR MEDICAL OFFICER C D0055 (W/G.16)

CONFERENCE ROOM C D0056 (W/G.17)

COURT YARD (W/G.130)

X-RAY 7 C D0084 (W/G.05)

X-RAY 6 C D0085 (W/G.06)

BARIUM KITCHEN C D0085C

TOILET C D0085A

CHANGING C D0085B

CHANGING C D0086A (W/G.07A)

TOILET C D0086B (W/G.07B)

CHANGE 1 C D0066 (W/G.27A)

CHANGE 2 C D0067 (W/G.27B)

CHANGE 3 C D0068 (W/G.27C)

CHANGE 4 C D0069 (W/G.27D)

TOILET C D0065 (W/G.27)

TOILET C D0064A (W/G.05A)

(W/G.05B) CHANGING 2 C D0084B

CHANGING 1 C D0084C

TOILET C D0078 (W/G.39)

TOILET C D0077 (W/G.40)

TOILET C D0076C (W/G.09A)

CHANGING 2 C D0075B (W/G.09B)

CHANGING 1 C D0075A (W/G.09C)

SCRUB / PREP. C D0073 (W/G.35)

SLUICE C D0072 (W/G.30)

DIRTY UTILITY C D0070 (W/G.28)

REPORTING C D0071 (W/G.29)

FILM SORTING C D0076 (W/G.38)

X-RAY 9 C D0075 (W/G.09)

X-RAY 8 C D0074 (W/G.08)

(W/G.26)

NOTES:

1. ALL DIMENSIONS / LEVELS ARE IN mm, UNLESS OTHERWISE STATED
2. FOR ALL SYMBOLS AND ABBREVATION PLEASE REFER TO AC / S01 (AF)
3. APPROXIMATE SETTING OUT DIMENSION CAN BE SCALED FROM THE DRAWING
4. FOR ELECTRICAL AND PNEUMATIC SYSTEM PLEASE REFER TO THE RELEVANT PE SERIES DRAWING.
5. ALL LEVELS SHOWN ARE ABOVE PRINCIPLE DATUM.

no.	date	description	initial

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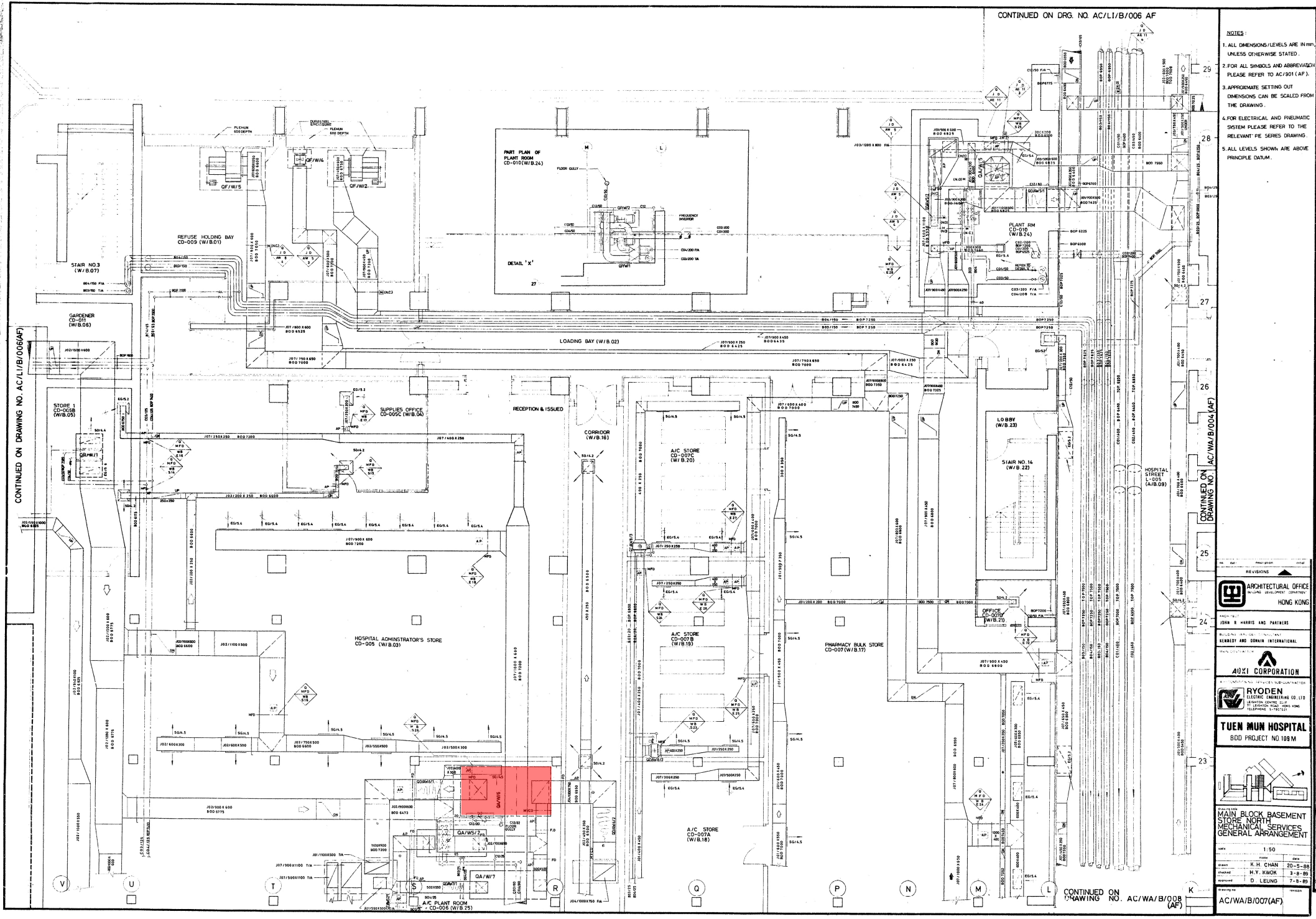
BDD PROJECT NO 109 M

drawing title
MAIN BLOCK G/F
RADIODIAGNOSTIC
MECHANICAL SERVICES
GENERAL ARRANGEMENT

	scale	1 : 50	
		name	date
drawn		JUM. WAI	27/5/88
checked		H.Y. KWOK	7/8/89
approved		D. LEUNG	7/8/89

drawing no. AC/WA/G/057(AF)

revision



NOTES:

1. ALL DIMENSIONS/LEVELS ARE IN mm UNLESS OTHERWISE STATED.
2. FOR ALL SYMBOLS AND ABBREVIATION PLEASE REFER TO AC/901(AF).
3. APPROXIMATE SETTING OUT DIMENSIONS CAN BE SCALED FROM THE DRAWING.
4. FOR ELECTRICAL AND PNEUMATIC SYSTEM PLEASE REFER TO THE RELEVANT 'PE' SERIES DRAWING.
5. ALL LEVELS SHOWN ARE ABOVE PRINCIPLE DATUM.

REVISIONS

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AOKI CORPORATION

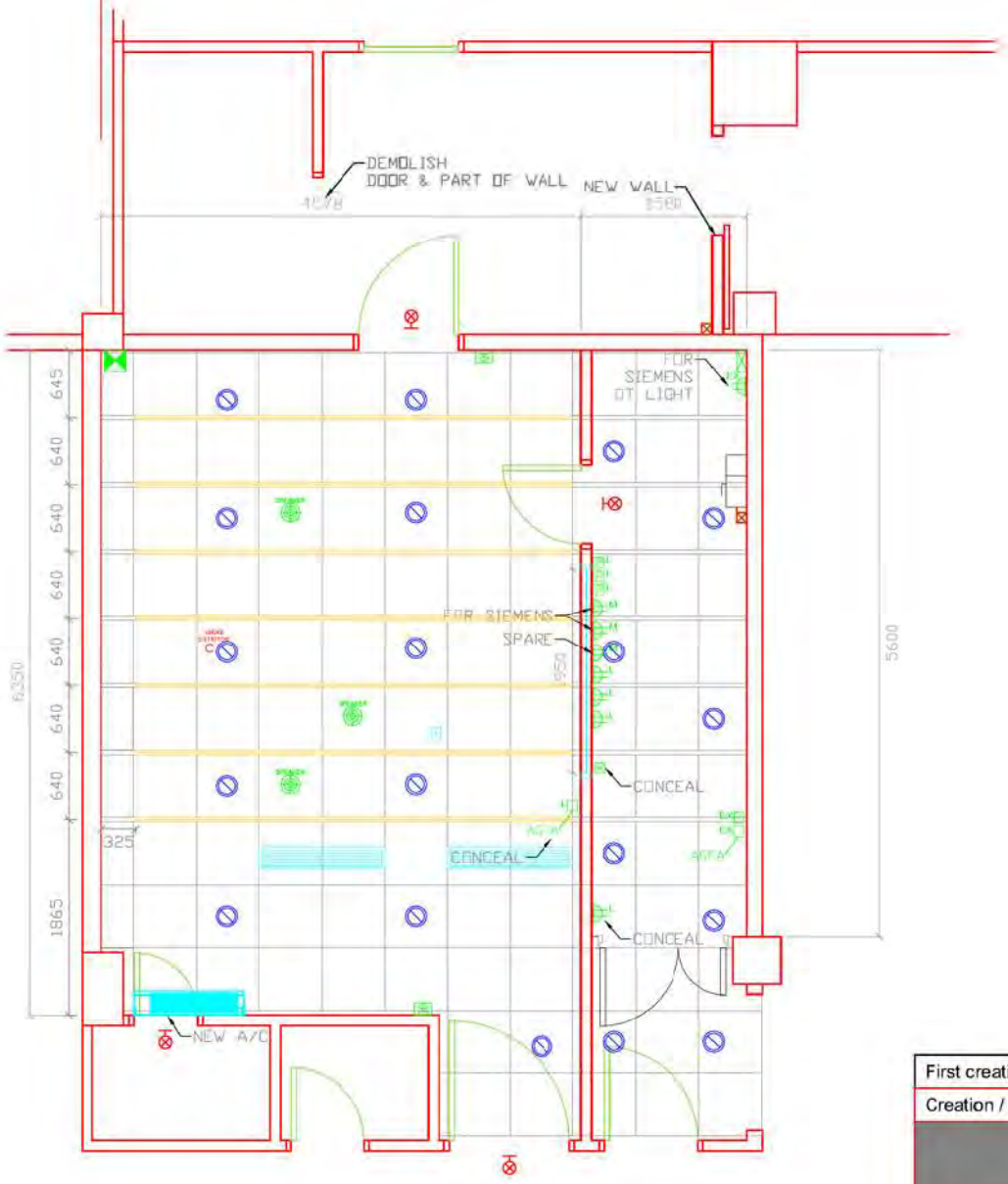
RYODEN
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TELEPHONE 5-7657321

TUEN MUN HOSPITAL
BDD PROJECT NO.109M

Drawing title
MAIN BLOCK BASEMENT STORE NORTH MECHANICAL SERVICES GENERAL ARRANGEMENT

scale	1:50	
	name	date
drawn	K.H. CHAN	20-5-88
checked	H.Y. KWOK	3-8-89
approved	D. LEUNG	7-8-89

drawing no. AC/WA/B/007(AF) revision



LEGEND

- WARNING LAMP (24V DC) (CONNECTED TO POWER CONTROL PANEL)
- E-STOP (CONNECTED TO POWER CONTROL PANEL)
- 13A SINGLE SOCKET
- AF ABOVE FALSE CEILING
- DOWN LIGHT

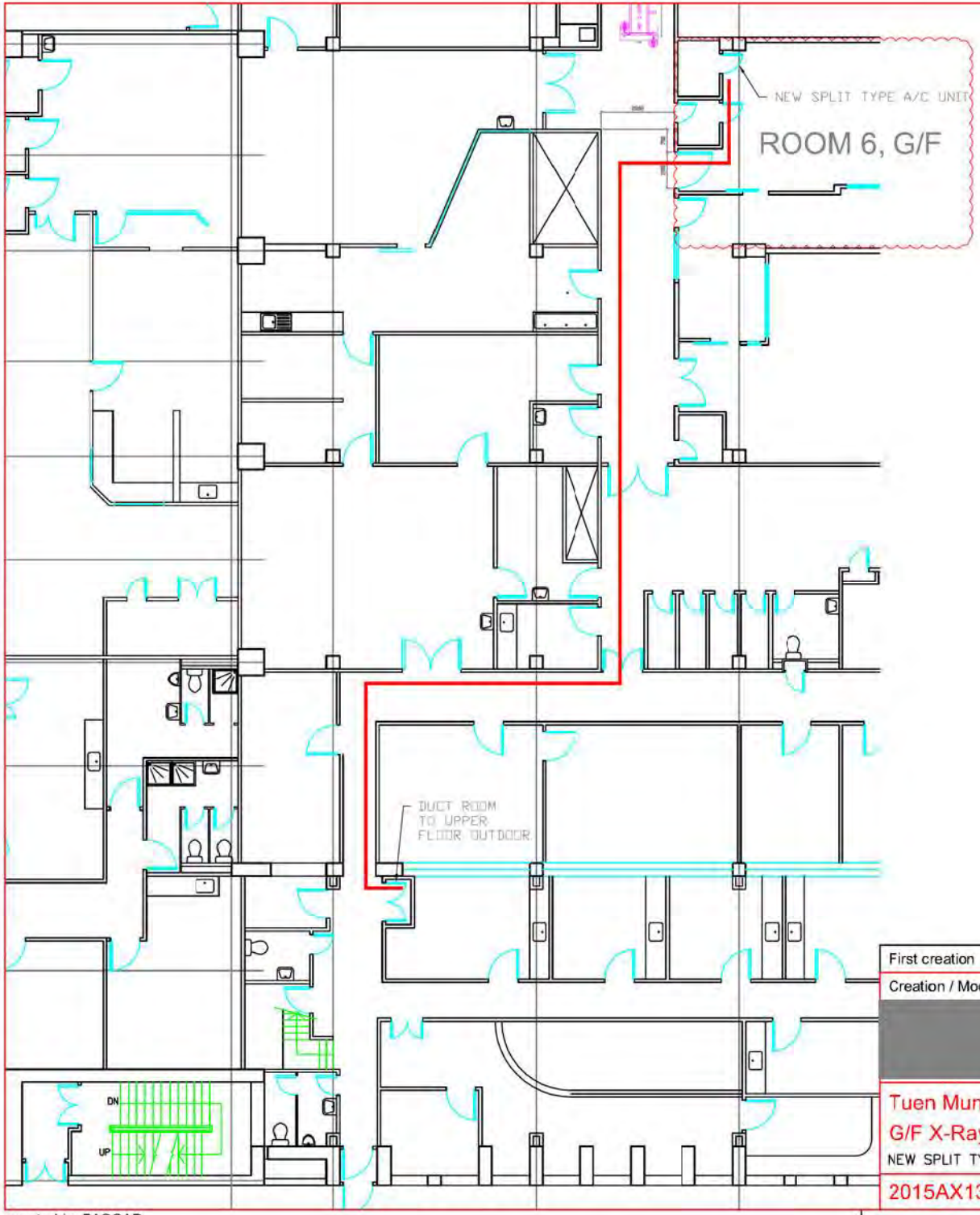
NOTE

ALL DIMENSION SHOULD BE VERIFIED ON SITE

First creation	DK 20 JAN 2015				
Creation / Modification (♦)	Edited	Sign.	Checked	Sign.	
	Room height finished floor to Concrete Ceiling 3800mm False ceiling 2960mm				
Tuen Mun Hospital G/F X-Ray Department, Room C6 CEILING LAYOUT PLAN	Scale 1:50 @A3 0m 1m 2m				
2015AX13-02 Rev.7	SAM-No				

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NOTE

ALL DIMENSION SHOULD BE VERIFIED ON SITE

First creation	DK 20 JAN 2015				
Creation / Modification (♦)	Edited	Sign.	Checked	Sign.	

Room height finished floor to
Concrete Ceiling 3800mm
False ceiling 2960mm

Tuen Mun Hospital
G/F X-Ray Department, Room C6
NEW SPLIT TYPE A/C PLAN

Scale NTS

2015AX13-06 Rev.7

SAM-No

created by PASCAD

Operation and Maintenance Manual

For

Surefire Single Interlocked

Pre-action System

Section 1	Testing and Commissioning Certificate on Fire Services Installation
Section 2	T & C Record for Surefire Single Interlocked Pre-action System
Section 3	Operations and Maintenance Instruction
Section 4	Schematic Diagram of Surefire Single Interlocked Pre-action System

Section 1

Testing and Commissioning Certificate on Fire Services Installation

Part 1: Details of project

Project Title: TUEN MUN HOSPITAL
Project Location: DEPARTMENT OF RADIOLOGY, MRI ROOM 9, AT G/F
Contract/Sub-contract/Quotation No:
Contractors: SHUN CHEONG ELECTRICAL ENGINEERING COMPANY LIMITED

Part 2: Declaration

2.1 I certify that the Fire Service Installation as specified in Contract / Sub-contract/Quotation at the above location has been inspected, tested and commissioned in accordance with this procedure and/or any other procedures agreed between the Project BSE and the c ontractor. The results are satisfactory in the aspects as mentioned in Section 2 and/or as recorded in this Certificate, except as indicated in the COMMENTS items.

2.2 I also certify that site test have been performed in accordance with the requirements set out in section 2 of this procedure and that the results are satisfactory. A record of the tests has been prepared and submitted to the project BSE.

Name of Contractor: SHUN CHEONG ELECTRICAL ENGINEERING COMPANY LIMITED

Signature of Contractor Representative: LEE HAU MAN

Full Name of Contractor Representative: Lee Hau Man

Section 2

T & C Record for Surefire Single Interlocked Pre-action System

1. Introduction

1.1. This is a testing and commissioning procedure of "VIKING" Surefire Single Interlocked Pre-action System that is newly installed on a fire services installation or modified on an existing fire services system. Please be noted that additional testing and commissioning of the Surefire Single Interlocked Pre-action system should be performed after a major alternation of the system.

1.2. System Data

Hazard Classification: OH3

Type of System: Single Interlocked Pre-action

Release Method: Electrical & Pneumatic

Type of Detector: ~~Smoke~~ / Heat / Others (Please specify: _____)

Type of sprinkler: Upright / Dry Pendent

Total nos. of detector: 7 PCS

Total nos. of sprinkler head: 19 PCS

1.3. Record of hydraulic test sprinkler pipeworks

Location/Section	Start Pressure (bar)	End Pressure (bar)	Duration (min)
MR1 ROOM 9	10.6	10.6	60

1.4. Recommended Air Pressure Setting

Water Supply (psi)	Low Air Supervisory SUP Zone 2 (psi)	Low Air Alarm Zone 2 (psi)	System air (psi)
0-100	20+	15+	30+
100-200	30+	25+	40+
200-250	40+	35+	50+

Water pressure 90 psi

Air maintenance compressor Cut-in: 35 psi (min. 30 psi)

Cut-out: 45 psi (max. 65 psi)

Supervisory alarm pressure 30 psi

Zone 2 low pressure alarm 25 psi

2. Visual Inspection

1.	Check the system is installed as the schematic diagram of Surefire pre-action system in section 4	Yes/~~No~~
2.	Check for system in normal conditions	Yes/~~No~~
	(a) Flow control valve	
	Main control valve (E.1) CLOSE	Yes/~~No~~
	Water alarm gong shut off valve (B.10) OPEN	Yes/~~No~~
	Priming line valve (B.2) CLOSE	Yes/~~No~~
	Flow test valve (C.4) CLOSE	Yes/~~No~~
	System drain valve CLOSE	Yes/~~No~~
	Auxiliary Drain Valve (C.1) CLOSE	Yes/~~No~~
	Alarm test valve (B.7) CLOSE	Yes/~~No~~
	Emergency release valve (B.1) CLOSE (the door is closed)	Yes/~~No~~
	(b) Pre-action control panel	
	Connect AC power first and then DC power; place the panel in service, charges batteries for 24 hours before continuing further test	Yes/~~No~~
	Power normal light ON	Yes/~~No~~
	Other light OFF	Yes/~~No~~
3.	Pressurize system piping by air compressor	Yes/~~No~~
	Air pressure gauge valve open (B.13) and the air pressure is same as supply air pressure at the pre-set setting	
	Air compressor cut-in pressure: 35 psi	
	Air compressor cut-out pressure: 45 psi	Yes/~~No~~
4.	Open priming line valve (B.2), ensure that water supply control valve (E.1) is closed	Yes/~~No~~
5.	Priming pressure water gauge valve (B.6) open and record the water pressure at the priming chamber	
	Priming chamber water pressure: 90 psi	Yes/~~No~~
6.	Water supply control valve (E.1) open	Yes/~~No~~
7.	Water supply pressure gauge valve open (B.9) and record the water pressure at the inlet chamber	
	Inlet chamber water pressure: 90 psi	Yes/~~No~~
8.	Priming chamber water pressure is larger or equal to Inlet chamber water pressure	Yes/~~No~~

3. Loss of pressure

1.	Open test and drain valve of the remote location of sprinkler pipeline, the air pressure gauge pressure drop	Yes/~~No~~
2.	Control Panel "Supervisory" signal activated at the pre-set setting	
	Supervisory alarm pressure: 30 psi	Yes/~~No~~
3.	Control Panel "Zone 2" signal activated at the pre-set setting	
	Zone 2 low pressure alarm: 25 psi	Yes/~~No~~
3.	The control valve remain close when system air pressure drop to 0 psi	Yes/~~No~~
4.	Reset the system – pressurize system piping by air compressor	Yes/~~No~~

4. Fire alarm test

1.	Activate the detection system	Yes/No
2.	"Zone 1" LED illuminate	Yes/No
3.	Priming chamber pressure gauge pressure drop	Yes/No
4.	The flow control valve open	Yes/No
5.	Reset the system according to the instruction in section.3	Yes/No

5. Loss of power

1.	Disconnect the DC Power	Yes/No
2.	"Power Trouble" LED ON	Yes/No
3.	Disconnect the AC Power	Yes/No
4.	All LED off	Yes/No
5.	Control valve remain close	Yes/No
6.	Open the test and drain valve, the air pressure gauge pressure drop	Yes/No
7.	The flow control valve open	Yes/No
8.	Reset the system according to the instruction in section.3	Yes/No

6. Manual operation

1.	Pull the emergency release (B.1) handle inside the Trimbox	Yes/No
2.	The flow control valve open	Yes/No
3.	Reset the system according to the instruction in section.3	Yes/No

Tested/ Checked by:
(Name of Contractor's Representative) LEE HAU MAN
Signature of Contractor's Representative: Lee Hau Man

2)Surefire Single Interlocked Pre-action System VFR400 Control Panel Wiring

PROGRAM #10						
For One Sprinkler System- NYC Special						
Viking Sprinkler System Types	Release Zone and Manual Release Zone	1. SUREFIRE Single Interlocked Preaction System				
		2. SUREFIRE Single Interlocked Preaction System - NYC Special				
		3. SUREFIRE Single Interlocked Preprimed Preaction System				
		4. SUREFIRE Single Interlocked Preprimed Preaction System - NYC Special				
OUTPUTS (Indicating Circuits)	ZONES (Initiating Circuits)					
	SUP 1	SUP 2	#1	#2	#3	#4
	Valve Tamper Supervisory Zone	Low Air Supervisory Zone	Conventional Detection Zone	Low Air Alarm Zone	Waterflow Zone	Manual Release Zone
#1 General Alarm			X		X	X
#2 Supervisory Bell	X	X		X		
#3 Release Solenoid			X			X
#4 Trouble Bell						

OPERATION DESCRIPTION	
Inputs:	1 Conventional Detection zone, 1 Waterflow zone, 1 Low Air Alarm zone, 1 Manual Release zone, 2 Superviosry zones
Outputs:	1 General Alarm, 1 Trouble Bell, 1 Release Solenoid, 1 Supervisory Bell
Operation:	Activation of Conventional Detection zone #1 will activate output #3 (Release Solenoid) and output #1 (General Alarm)
	Activation of Low Air Alarm zone #2 will activate output #2 (Supervisory Bell) and output #4 (N/O Solenoid)
	Activation of Waterflow zone #3 will activate output #1 (General Alarm)
	Activation of Manual Release zone #4 will activate output #3 (Release Solenoid) and output #1 (General Alarm)
	Activation of Valve Tamper Supervisory zone #1 or Low Air Supervisory zone #2 will activate output#2 (Supervisory Bell)
	A trouble condition will prevent output #4 (N/O Solenoid) from activating

NOTES:
1. Connect EOL Diode assembly IN SERIES as shown with Solenoid on output #3 (Release Solenoid) and output #4 (Release Solenoid). Black wire to negative terminal on panel and Red wire through Solenoid to positive terminal on panel.
2. Polarity is shown on indicating circuits in an activated (in alarm) condition.
3. Leave EOLR (provided) on all unnused circuits.
4. See the instruction manual for circuit information, panel limits, and battery sizing.
5. For wire routing instructions through the releasing panel, see Note 3 on page 56 of the instruction manual.
6. See instruction manual for proper programming.
7. See instruction manual for list of compatible smoke detectors.
8. See specific system type data page for proper pressure switch settings.
9. Loss of DC power below 20 volt causes output #3 (Release Solenoid) and output #4 (N/O Solenoid) to drop out.
10. See Viking technical data sheet F_051604 for Surefire single interlock operation.

Section 3

3.1 System Description

The Viking Surefire Single-interlocked pre-action system requires operation of the detection system to trip the Viking deluge valve and fill the system with water. It also utilizes supervisory air pressure in the system piping. Water will then be discharged on the fire when the sprinkler fuse. If the sprinkler piping or sprinkler is broken, a supervisory alarm will sounds, but the valve will not open. If the detection system operates due to fire, damage, or malfunction, the valve will open, but the water will be contained in the sprinkler piping. If the detection system does not operate, the valve will not open.

Supervision is generally used since control of accidental discharge is usually desired. The single interlocked preaction system is commonly used where it is desirable to have water available at the sprinkler when the sprinkler fuses and where the sprinkler piping is subject to damage. The most common applications are very large dry systems that exceed the capacity normally permitted on a dry valve.

3.2 System Operation

In the SET condition:

System water supply pressure enters the priming chamber of the Deluge Valve (A.1) through the 1/4”(8 mm) hose and 1/2”priming line which includes a N/O priming valve (B.2), strainer (B.3), restricted orifice (B.4) and check valve (B.5). In the SET condition, water supply pressure is trapped in the priming chamber by check valve (B.5), N/C Emergency Release (B.1), Pneumatic Actuator (B.12), Pressure Operated Relief Valve (PORV) (B.11) and N/C Release Solenoid Valve (B.14). Water Supply pressure in the priming chamber holds the clapper of the Deluge Valve (A.1) on the seat due to the differential design of the valve pressure. The clapper separates the inlet chamber from the outlet chamber, keeping the outlet chamber and system piping dry.

In Fire conditions:

When the detection system (G.2) operates, the VFR400 Control Panel (G.1) activates the system alarm and energizes normally closed Release Solenoid Valve (B.14) open. Pressure is released from thr priming chamber faster than it is supplied through restricted orifice (B.4). The deluge Valve (A.1) clapper opens to allow water to flow into the system piping and to alarm devices. Water will flow from any open sprinklers.

To return the system to “Normal” conditions, drain the system piping and replace any sprinklers that may have operated. Replace any detectors which have been damaged and re-establish system air pressure. Press the “System Reset” button on the VFR400 Control Panel (G.1) to clear all alarms.

Panel Trouble, Loss of Power Prior to Operation or Pipe Damage conditions:
During normal power conditions if the system piping and/or the sprinklers are damaged, the low pressure supervisory switch (B.7) will activate a supervisory alarm at the VFR400 release control panel (G.1) and the normally open solenoid valve (B.16) will be powered closed to prevent the deluge valve from opening.

In the event of a fire during a fault on the input circuit wiring, loss of primary AC power or complete loss of all power, the deluge valve will open allowing water flow if the following conditions occur:

1. The initiating devices (G.2) activate causing the VFR400 Release Control Panel (G.1) to enter an alarm and release condition. The N/C solenoid (B.14) will open allowing water pressure to be relieved from the priming chamber of the deluge valve (A.1). With pressure relieved from the priming chamber, the deluge valve will open and allow water flow. Water will not be discharged until a sprinkler head operates.
2. During a fault condition on the input wiring which caused a trouble alarm on the VFR400 Release Control Panel (G.1) or a complete loss of normal AC power and standby battery backup power the normally open solenoid (B.16) is prevented from operating. During this condition activation of a sprinkler head will allow a pneumatic release of the deluge valve (A.1). Water pressure will be relieved from the priming chamber, the deluge valve (A.1) will open and allow water to flow.

Loss of Power During Operation:
If all power fails while the system is flowing water, the normally open release solenoid (B.16) will open and the normally closed release solenoid (B.14) will remain close. The PORV (B.11) is already pressurized open to prevent pressure in the chamber from building up. Water from main supply will continue entering the sy stem, and through any open sprinkler(s).

Manual operation:
Any time inside the emergency release (B.1) is pulled, pressure is released from the priming chamber faster than it can be replaced through the priming line; the deluge valve (A. 1) will open. Water will fill the system piping, activating any connected alarms, but will not discharge from any closed sprinklers attached to the system until a sprinkler has operated, as in a fire. All alarms will operate normally. After operating the emergency release (B.1), do not close the emergency release until the system is ready to be reset.

3.3 To Place the System in Service:

A. Verify that the VFR400 control panel (G.1), detector circuits and detectors have been properly installed and energized according to instructions provided in the Viking Technical Data and the release control panel Owner's Manual.
B. Verify that the system has been properly drained. (When plunger is depressed on drip check (C.2), no water should flow.) System drain should be open. Verify that emergency release (B.11) is closed. Note: Emergency release (B.1) is closed when the handle is In-Line with the pipe.

C. Verify that the system main water supply control valve (E.1) is closed and the deluge valve (A.1) is trimmed according to current Viking trim charts and schematic drawings for the system used.
D. Verify that the system water supply piping is pressurized up to the closed system main water supply control valve (E.1) and the priming line is pressurized up to the closed priming valve (B.2).
E. Establish a normal condition on the the VFR Control Panel (G.1): Open panel and press "RESET". Release Solenoid Valve (B.14) should close. Flow from Release Solenoid Valve (B.14) to Drain Cup (C.3) should stop.
F. Establish system air pressure. Make sure supervisory air switch (B.18) is set to proper activation pressure.
G. Open priming valve (B.2).
H. Open flow test valve (C.4).
I. Partially open main water supply control valve (E.1) (If closed).
J. When full flow develops from flow test valve (C.4), close the flow test valve. Verify that there is no flow from open auxiliary drain (C.1).
K. Close auxiliary drain (C.1).
L. Fully open and secure the main water supply control valve. (E.1)
M. Verify that the alarm shut-off valve (B.10) is open and that all other valves are in their normal operating position.
N. Depress the plunger of drip check valve (C.2). No water should flow from the drip check valve when the plunger is pushed.

3.4 Resetting the system after operation

After a fire, verify that the fire is OUT and that placing the system out of service has been authorized by the appropriate Authority Having Jurisdiction. Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage and repaired or replaced as necessary.

A. If all system components are operational:

1. Open auxiliary drain (C.1).
2. Silence alarms (optional).
a: To silence electric alarms controlled by VFR400 control panel (G.1), open panel and press "ALARM SILENCE"
b: To silence electric alarms not controlled by VFR400 control panel (G.1), close alarm shut-off valve (B.10).
3. To return to service immediately, (when no maintenance or repairs are required):
a: Close auxiliary drain (C.1) if opened in step 1-A. If necessary, open system drain to drain system and/or alarm test valve (B.7) to drain the inlet chamber of the deluge valve (A.1).
b: Restore system air pressure.
c: Open VFR400 control panel (G.1) and press "RESET".
d: Open alarm shut-off valve (B.10) (If it was closed in step 2-b above).
e: Verify that all valves are secured in their normal operating position.

B. If it is necessary to remove the system from service:

1: Close the main water supply control Valve (E.1).

2: Close priming valve (B.2) (optional). If necessary, open system drain to drain system and/or alarm test valve (B.7) to drain the inlet chamber of the deluge valve (A.1).

3: Disconnect all power sources to the VFR400 control panel (G.1) prior to performing any maintenance or repairs to the detection system (G.2), the panel (G.1), solenoid valves (B.14, B.16), or any electrical component of the system.

C. Perform all maintenance procedures recommended in Par-3 Owner's Manual

1. Replace any piping, detectors (G.2), or sections of detection cable that have been damaged.

Note: The complete system operation must be tested after servicing, changing programming, addition or deletion of system components or after any modification, repair, or adjustment to system hardware or wir ing. All components, circuits, system operation or software functions known to be affected by a change must be 100% tested.

2. Replace any sprinklers and/or spray nozzles that have been damaged or exposed to fire conditions.

D. Restore the power

Restore AC power to VFR400 control panel (G.1). Ensure that standby batteries are charged or charging. Always connect and turn on AC power source prior to connecting the standby batteries. Connecting the standby batteries to the VFR400 control panel (G.1) before the AC power is connected and turned on may damage the panel.

E. Reset the system

Return the system to service. Refer to Section 3.3. PLACING THE SYSTEM IN SERVICE.

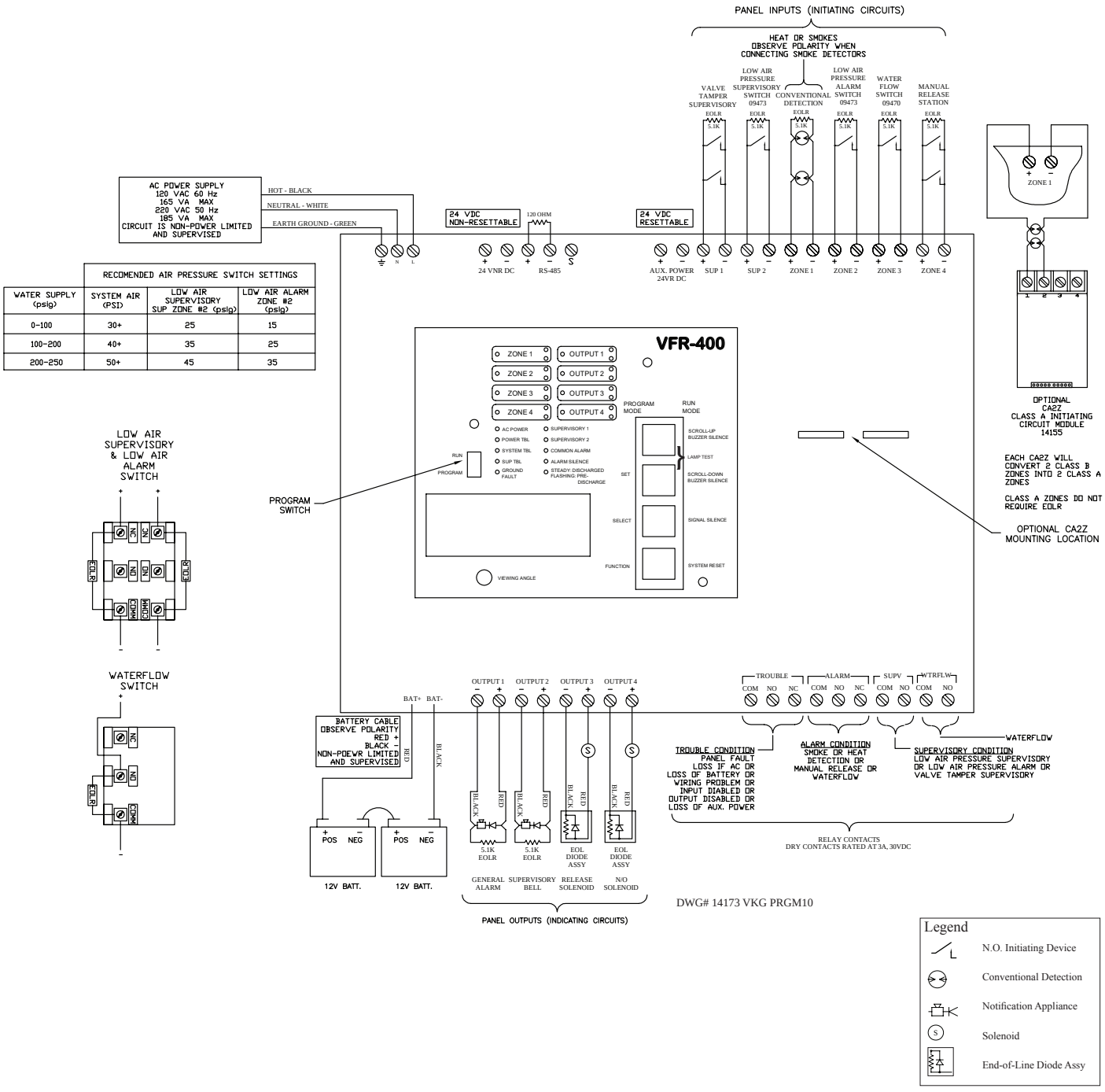
3.5 Inspections and Maintenance

NOTICE: The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

(1) Inspection of control valve

Weekly:

1. Verify that the main water supply control valve (E.1) is open and that all other valves are in their normal operating position and appropriately secured
2. Check for signs of mechanical damage, leakage, and/or corrosive activity. If detected. If necessary, replace the device
3. Verify that the valve and trim are adequately heated and protected from freezing and physical damage
4. Verify the air maintenance compressor can be start and stop at pre-determine setting by slowly open the system drain valve and close after the c ompressor starts



1. Run field wiring and ensure connections are proper by metering wires. Resistance reading should be 5.1K ohms with end-of-line resistor (EOLR) at last device. The end-of-line resistor is located on the mother board. Remove as needed. Leave factory installed EOLR on all unused circuits.
2. Connect one circuit at a time and apply AC power.
3. Connect batteries to the panel.
4. Once last connection is made, move Program switch down.
5. Press the FUNCTION (bottom) button until the display reads “PASSWORD = 000”.
6. To enter a password, press the SELECT button until the proper number is displayed above the ^ symbol, then press the SET button to move to the next digit. After entering the third number the display will change. (All panels are shipped with a 000 password.)
7. Press the FUNCTION (bottom) button until the display reads “PROGRAM #10”.
8. Press the SELECT button until the display reads “PROGRAM #10”.
9. Press the SET button.
10. The panel is completely programmed except for the custom banner and zone messages. Move the program switch back up.

Quarterly:

Low Pressure alarm test

1. Open the system drain valve slowly
2. Note the air compressor starting
3. Further open the system drain valve
4. Note the supervisory signal
5. Further open the main drain valve
6. Note the Zone 2 low air pressure alarm signal
7. Close the system drain valve
8. Note the stop of air compressor

Water flow alarm test

1. Notify the authority having jurisdiction and those in the area affected by the test
2. To test the local electric alarm (if provided) and/or mechanical water motor alarm (if provided), open the alarm test valve (B.7) in the flow control valve trim
    i) Electric alarm pressure switches (if provided) should activate
    ii) The local water motor gong should be audible
    iii) If equipped with remote station alarm signals devices, verify that alarm signals were received
3. When testing is complete, close the alarm test valve (B.7).
4. Verify
    i) All local alarm stop sounding and alarm panel reset
    ii) All remote station alarm reset.
    iii) Supply piping to water motor alarm properly drains
5. Verify that the alarm shut-off valve (B.10) is open, and the alarm test valve (B.7) is closed
6. Verify that the outlet chamber is free of water. No water should flow from the drip check (C.2) when the plunger is pushed
7. Notify the authority having jurisdiction and those in the affected area that testing is complete

System Flow Test

1. Notify the authority having jurisdiction and those in the affected by the test
2. Record pressure reading from the water supply pressure gauge (B.9)
3. Verify that the outlet chamber of the flow control valve is free of water. No water should flow from the drip check valve (C.2) when the plunger is pushed
4. Fully OPEN the flow test valve (C.4)
5. When a full flow is developed form the flow test valve (C.4) record the residual pressure from the water supply pressure gauge (B.9)
6. When the test is complete, SLOWLY CLOSE the flow test valve (C.4)
7. Compare test results with previous flow information. If deterioration of the water supply is detected, take appropriate steps to restore adequate water supply
8. Verify that water supply pressure has been restored to the inlet chamber, the priming chamber, and the release system. The pressure on the priming chamber

water pressure gauge should approximately equal the system water supply pressure
9. All alarm devices and valves are secured in normal operating position
10. Notify the authority having jurisdiction that the test is compete. Record and/or provide notification of test result as required by the authority having jurisdiction

Annual Trip Test
1. Notify the authority having jurisdiction and those in the area affecting by the test.
2. Fully open the flow test valve (C.4) to flush away any accumulation of foreign material
3. Close the flow test valve (C.4)
4. Close the isolation valve installed in the system side of the deluge valve (A.1)
5. Trip the system by operating the release system. Allow a full flow to pass through the deluge valve. Water flow alarms should operate
6. Return the system to service. Refer to Section 3.4: "RESETTING THE SYSTEM AFTER OPERATION"
7. Open the isolation valve installed in the system side of the deluge valve (A.1)

(2) Maintenance of air compressor
1. The motor compressor unit should be kept dirt-free
2. The compressor inlet filter should be cleaned or replace as required.
i) To inspect the inlet filter, pull the plastic cap to remove it from the filter case
ii) Filter can be remover for inspection. DO not clean filter elements with petroleum based products
iii) Re-install filter and cap. Do not operate compressor without a filter
3. Do not lubricate the compressor or motor. The bearings are permanently lubricated and sealed

(3) Maintenance of detector
The detector should be kept clean and tested for operation annually according to he manufacturer's recommendations

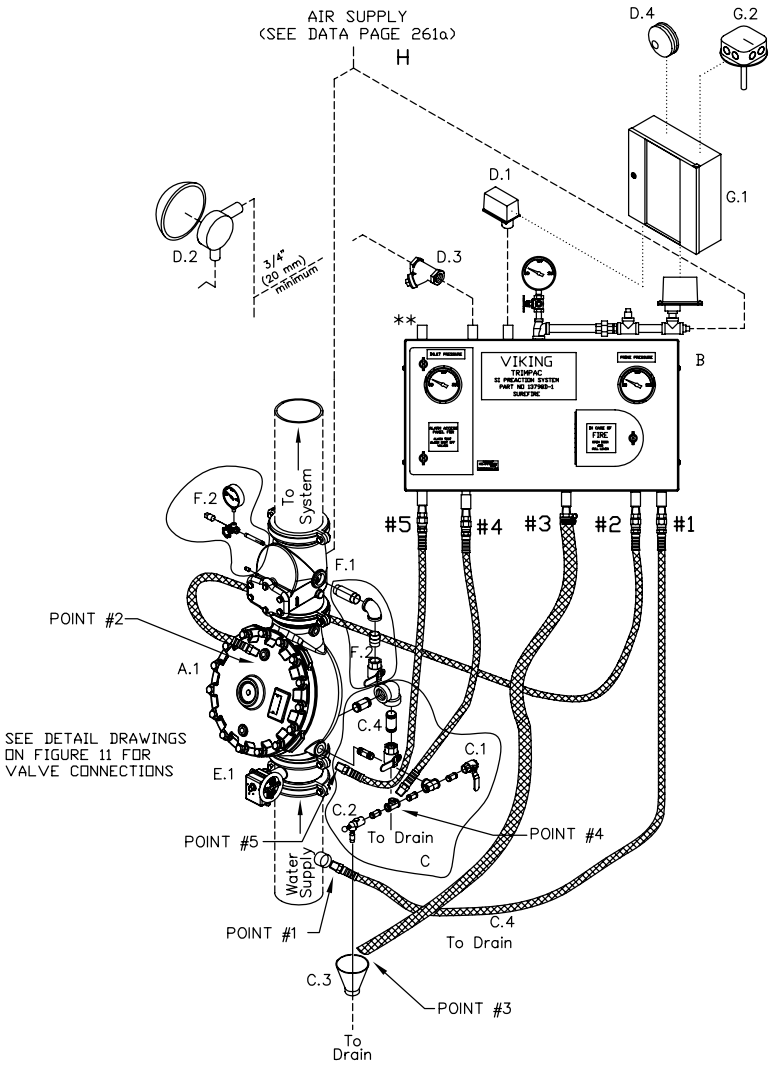
(4) Maintenance of VFR400 control panel
For details please refer to the VFR400 control panel manual

(4) Checking of battery
Remove the batteries. Check whether there is a voltage across charger output (17-19V). Reconnect batteries, measure battery voltage at battery terminals. If voltage is less than 85% of rated voltage, allow them to charge for 48 hours. If problem persists, replace batteries

Section 4
Supplementary Documents:
1. Surefire Single Interlocked Pre-action system diagram
2. Surefire Single Interlocked Pre-action VFR400 control panel wiring diagram

Supplementary Document

1) Surefire Single Interlocked Pre-action System Diagram



SUREFIRE SINGLE INTERLOCKED PREACTION SYSTEM

A System Valve
- A.1 Deluge Valve

B Trimpac
- Trimpac Components (See Figure 12)

C Trimpac Drain Package
- C.1 Auxiliary Drain Valve (NC)
- C.2 Drip Check Valve
- C.3 Drain Cup
- C.4 Flow Test Valve (NC)

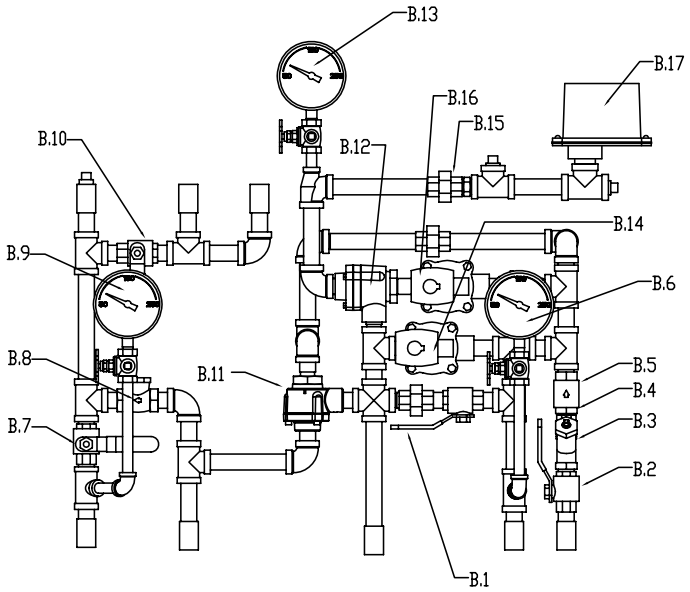
D Water Flow Alarm Equipment
- D.1 Alarm Pressure Switch
- D.2 Water Motor Alarm (F-2) (Optional)
- D.3 Strainer
- D.4 Electric Alarm Bell

E Riser
- E.1 Water Supply Control Valve

F Check Valve
- F.1 2-1/2"-6" Easy Riser Check Valve
- F.2 Check Valve Trim

G Release System
- G.1 Par-3 or VFR400 Release Control Panel (VFR400 Panel available 1st qtr. 2008)
- G.2 Electric Detection System (Heat Detector shown for clarity)

H Air Supply



B. TRIMPAC, SUREFIRE Single Interlocked
- B.1 Emergency Release (Normally Closed)
- B.2 Priming Valve (Normally Open)
- B.3 Strainer
- B.4 1/16" Restriction
- B.5 Spring Loaded Check Valve
- B.6 Priming Pressure Water Gauge and Valve
- B.7 Alarm Test Valve (Normally Closed)
- B.8 Drain Check Valve
- B.9 Water Supply Pressure Gauge and Valve
- B.10 Alarm Shut-Off Valve (Normally Open)
- B.11 Pressure Operated Relief Valve (P.O.R.V.)
- B.12 Pneumatic Actuator
- B.13 Air Pressure Gauge and Valve
- B.14 Solenoid Valve (Normally Closed)
- B.15 5/64" Restricted Orifice
- B.16 Solenoid Valve (Normally Open)
- B.17 Air Pressure Supervisory Switch (DPST)

Note: Emergency release (B.1) is closed when the handle is In-Line with the pipe. This allows the door to close when the valve is in the normal position.

FSI/314A

To : Director of Fire Services

Fire Service Installation Plans for Building at

Department of Radiology (X-Ray), MRI Room 9, G/F, Main Block, Tuen Mun Hospital,
No. 23 Tsing Chung Koon Road, Tuen Mun

This is to certify that the details and specifications of all installations shown on the attached fire service installation plans are as prescribed by the Fire Services Department and in accordance with the relevant Rules and Codes of Practice as listed below :-

☒ Rules of the Fire Offices' Committee for -
- ☒ Automatic Sprinkler Installations (29th Edition)
- ☒ Automatic Fire Alarm Installations (11th/12th Edition)
- ☐ Installation of External Drenchers (4th Edition)

☐ Rules of the Loss Prevention Council for Automatic Sprinkler Installations

☐ Codes of National Fire Protection Association for -
- ☐ Carbon Dioxide Extinguishing Systems (Standard 12)
- ☐ Clean Agent Fire Extinguishing Systems (Standard 2001)
- ☐ Water Spray Fixed Systems for Fire Protection (Standard 15)

☐ Code of Practice for Minimum Fire Service Installations and Equipment, Fire Services Department.
- ☐ Fire Alarm Systems
- ☐ Fire Hydrant / Hose Reel Systems

☐ Others

FIRE SERVICES DEPARTMENT Licensing & Certification Command RECEIVED 22 MAY 2023

Correspondence Address : 9/F, Block C, Hong Kong Spinners Ind. Bldg, Phase VI, No. 481-483 Castle Peak Road, Lai Chi Kok, Kowloon

Tel. : 34286161

Signature of FSI Contractor/ Consultant :

Full Name of FSI Contractor/ Consultant : Shun Cheong Electrical Engineering Company Limited

Date : 15/05/2023

☐ *Mark "x" where applicable*

(Rev. 01/2012)

FIRE SERVICE (INSTALLATIONS AND EQUIPMENT) REGULATIONS
消防（裝置及設備）規例
(Regulation 9(1))
（第九條(1)款）

FSD Ref.: 消防處檔號

A 8926358

CERTIFICATE OF FIRE SERVICE INSTALLATION AND EQUIPMENT
消防裝置及設備證書

Name of Client : 顧客姓名 Tuen Mun Hospital

Name of Building : 樓宇名稱 Tuen Mun Hospital

Street No./Town Lot : 門牌號數/市地段 No.23

Street/Road/Estate Name : 街道/屋苑名稱 Tsing Chung Koon Road

Block : 座 Main

District : 分區 Tuen Mun

Area : 地區 ☐HK 香港 ☐K 九龍 ☑NT 新界

Type of Building 樓宇類型 : ☐Industrial工業 ☐Commercial商業 ☐Domestic住宅 ☐Composite綜合 ☐Licensed premises持牌處所 ☑Institutional社團

Part 1 Annual Inspection ONLY 第一部 只適用於年檢事項

In accordance with Regulation 8(b) of Fire Service (Installations and Equipment) Regulations, the owner of any fire service installation or equipment which is installed in any premises shall have such fire service installation or equipment inspected by a registered contractor at least once in every 12 months. 根據消防（裝置及設備）規例第八條(b)款，擁有裝置在任何處所內的任何消防裝置或設備的人，須每12個月由一名註冊承辦商檢查該等消防裝置或設備至少一次。

Code號碼 (1-35)	Type of FSI 裝置類型	Location(s) 位置	Comment on Condition 狀況評述	Completion Date 完成日期(DD/MM/YY)	Next Due Date 下次到期日(DD/MM/YY)
			Nil		

Part 2 第二部 Installation / Modification / Repair / Inspection work 裝置/改裝/修理/檢查工作

Code號碼 (1-35)	Type of FSI 裝置類型	Location(s) 位置	Nature of Work Carried out 完成之工作內容	Comment on Condition 狀況評述	Completion Date 完成日期(DD/MM/YY)
4	Automatic Fixed Installation using Water-Pre-action System	G/F MRI Room	Supply & install of Preaction System x 1 set	Conforms with FSD requirements	24/04/23

Part 3 第三部 Defects 損壞事項

Code號碼 (1-35)	Type of FSI 裝置類型	Location(s) 位置	Outstanding Defects 未修缺點	Comment on Defects 缺點評述
			Nil	

I/We hereby certify that the above installations/equipment have been tested and found to be in efficient working order in accordance with the Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment published from time to time by the Director of Fire Services. Defects are listed in Part 3.

本人/我們證明以上之消防裝置及設備經試驗，證明性能良好，符合消防處處長不時公佈的最低限度之消防裝置及設備守則與裝置及設備之檢查測試及保養守則的規格，損壞事項列於第三部。

如證書涉及年檢事項，應張貼於大廈或處所當眼處以供消防處人員查核
This certificate should be displayed at prominent location of the building or premises for FSD's inspection if any annual maintenance work is involved.

F.S. 251 (Rev. 1/2016)

Authorized Signature : 受權人簽署

Name : 姓名 Yue Kam Man

FSD/RC No. : 消防處註冊號碼 RC1/30, RC2/67

Company Name : 公司名稱 Shun Cheong Electrical Engineering Company Limited

Telephone : 聯絡電話 34286161

Date : 日期 27/04/23

For FSD use only:

☐ Inspected

☐ Key-in

☐ Verified

FIRE SERVICE (INSTALLATIONS AND EQUIPMENT) REGULATIONS
消防（裝置及設備）規例
(Regulation 9(1))
（第九條(1)款）

FSD Ref.: _____
消防處檔號

A 8926358

CERTIFICATE OF FIRE SERVICE INSTALLATION AND EQUIPMENT
消防裝置及設備證書

Name of Client : 顧客姓名 **Tuen Mun Hospital**

Name of Building : 樓宇名稱 **Tuen Mun Hospital**

Street No./Town Lot : 門牌號數/市地段 **No.23**

Street/Road/Estate Name : 街道/屋苑名稱 **Tsing Chung Koon Road**

Block : 座 **Main**

District : 分區 **Tuen Mun**

Area : 地區 ☐ HK 香港 ☐ K 九龍 ☑ NT 新界

Type of Building 樓宇類型 : ☐ Industrial工業 ☐ Commercial商業 ☐ Domestic住宅 ☐ Composite綜合 ☐ Licensed premises持牌處所 ☑ Institutional社團

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Code編碼 (1-35)	Type of FSI 裝置類型	Location(s) 位置	Comment on Condition 狀況評述	Completion Date 完成日期(DD/MM/YY)	Next Due Date 下次到期日(DD/MM/YY)
			Nil		

Part 2 第二部 Installation / Modification / Repair / Inspection work 裝置/改裝/修理/檢查工作

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4	**Automatic Fixed Installation using Water-Pre-action System**	**G/F MRI Room**	**Supply & install of Preaction System x 1 set**	**Conforms with FSD requirements**	**24/04/23**

Part 3 第三部 Defects 損壞事項

Code編碼 (1-35)	Type of FSI 裝置類型	Location(s) 位置	Outstanding Defects 未修缺點	Comment on Defects 缺點評述
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This certificate should be displayed at prominent location of the building or premises for FSD's inspection if any annual maintenance work is involved.

Authorized Signature : 受權人簽署 [signature] SHUN CHEONG ELECTRICAL ENGINEERING COMPANY LIMITED

Name : 姓名 **Yue Kam Man**

FSD/RC No. : 消防處註冊號碼 **RC1/30, RC2/67**

Company Name : 公司名稱 **Shun Cheong Electrical Engineering Company Limited**

Telephone : 聯絡電話 **34286161**

Date : 日期 **27/04/23**

For FSD use only:

☐ Inspected

☐ Key-in

☐ Verified

F.S. 251 (Rev. 1/2016)

FSI/314A

To : Director of Fire Services

Fire Service Installation Plans for Building at

Department of Radiology (X-Ray), MRI Room 9, G/F, Main Block, Tuen Mun Hospital,
No. 23 Tsing Chung Koon Road, Tuen Mun

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  - ☐ Installation of External Drenchers (4th Edition)
- ☐ Rules of the Loss Prevention Council for Automatic Sprinkler Installations
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  - ☐ Water Spray Fixed Systems for Fire Protection (Standard 15)
- ☐ Code of Practice for Minimum Fire Service Installations and Equipment, Fire Services Department.
  - ☐ Fire Alarm Systems
  - ☐ Fire Hydrant / Hose Reel Systems
- ☐ Others

Correspondence Address : 9/F, Block C, Hong Kong Spinners Ind. Bldg, Phase VI, No. 481-483 Castle Peak Road, Lai Chi Kok, Kowloon

Tel. : 34286161

Signature of FSI Contractor/ Consultant :

Full Name of FSI Contractor/ Consultant : Shun Cheong Electrical Engineering Company Limited

Date : 15/05/2023

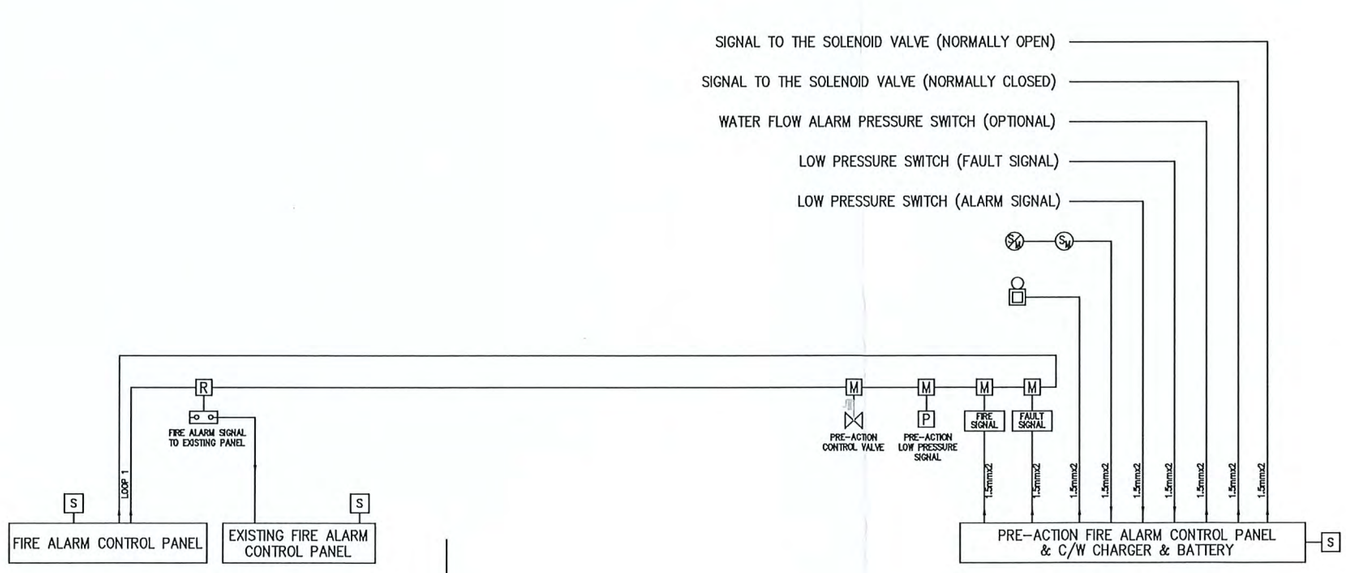
☐ *Mark "x" where applicable*

(Rev. 01/2012)

LEGEND

- ELECTRICALLY MONITORED VALVE (NORMALLY OPEN)
- EXISTING FLOW SWITCH
- MULTI–SENSOR SMOKE DETECTOR, SINGLE LAYER UNDER CEILING/FLOOR SLAB
- MULTI–SENSOR SMOKE DETECTOR, SINGLE LAYER INSIDE FALSE CEILING
- RELAY MODULE
- DRY CONTACT
- PRESSURE SWITCH
- 150mm FIRE ALARM BELL
- FUSED SPUR UNIT

1/F +12.6



G/F +8.50

MAIN BLOCK (MORTUARY)

MAIN BLOCK (DIAGNOSTIC RADIOLOGY X–RAY)

DRAWING STATUS

314A

REV.	DESCRIPTION	DATE	BY
0	314A SUBMISSION	MAY 23	MAN

FIRE SERVICE INSTALLATION CONTRACTOR

SHUN CHEONG ELECTRICAL ENGINEERING COMPANY LIMITED

	NAME	SIGNATURE
DRAWN BY	H.M. LEE	Man
CHECKED BY	K.H.NG	

PROJECT :

TUEN MUN HOSPITAL

DRAWING TITLE

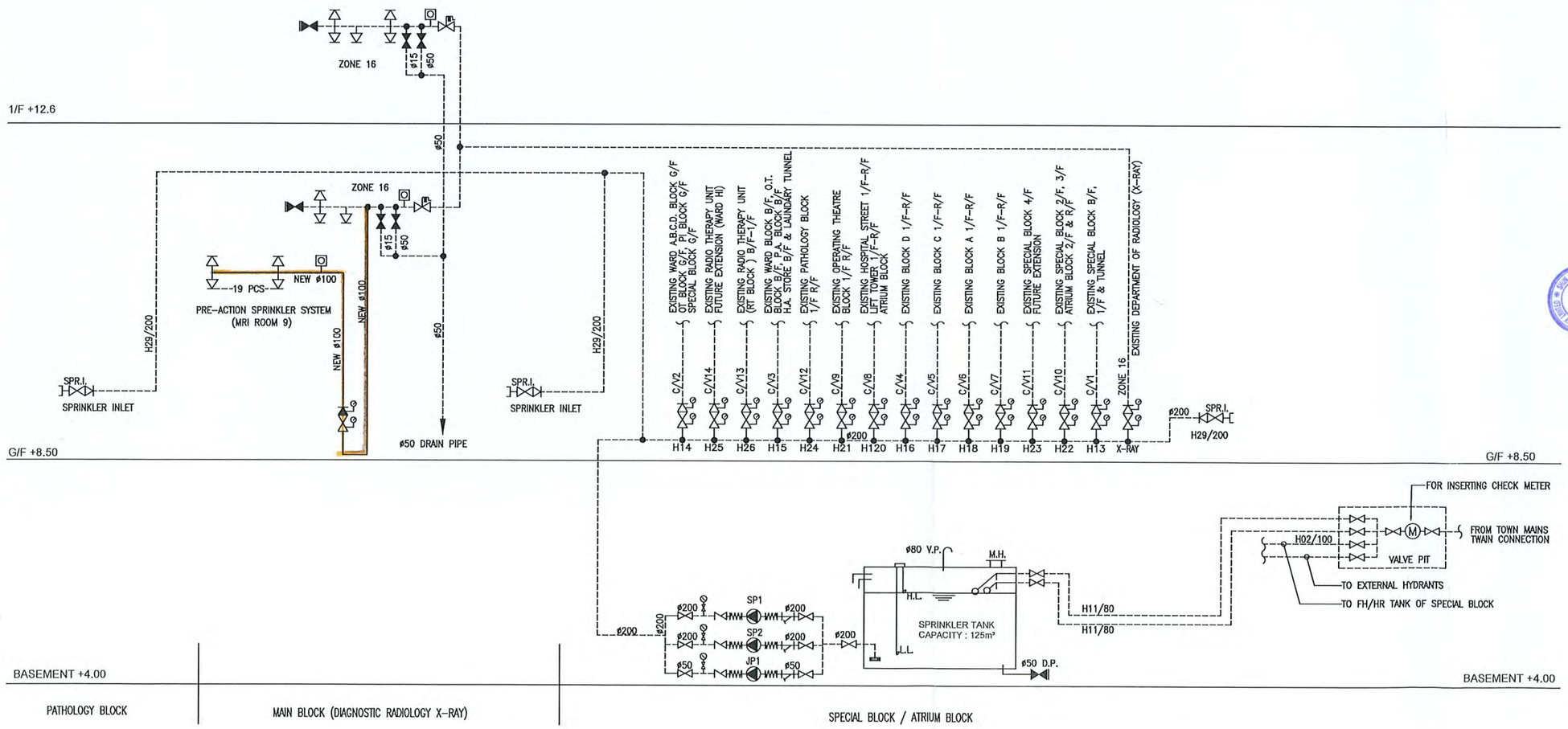
PART PLAN FOR DEPARTMENT OF RADIOLOGY (X–RAY) MRI ROOM 9, AT GROUND FLOOR – SHEET 1 OF 2

DRAWING SCALE/SIZE
NIL

DRAWING NO.
SCEE–TMH–FS–314A–001

LEGEND

- WATER CIRCULATING PUMP
- Y–STRAINER
- PUMP FLEXIBLE CONNECTOR
- GATE VALVE (NORMALLY OPEN)
- BALL FLOAT VALVE
- FLOAT SWITCH (HWL / LWL)
- FLOW SWITCH
- PRESSURE GAUGE WITH COCK
- DRAIN CORK C/W PLUG
- DRAIN CORK C/W PLUG
- GATE VALVE (NORMALLY CLOSE)
- SPRINKLER SYSTEM ALARM VALVE SET
- SPRINKLER INLET (SCHEMATIC) (SPR.I.)
- ELECTRICALLY MONITORED GATE VALVE
- SPRINKLER HEAD (SCHEMATIC)
- CONNECT POINT
- EXISTING SPRINKLER PIPE
- NEW SPRINKLER PIPE



DRAWING STATUS

314A

REV.	DESCRIPTION	DATE	BY
0	314A SUBMISSION	MAY 23	MAN

FIRE SERVICE INSTALLATION CONTRACTOR

SHUN CHEONG ELECTRICAL ENGINEERING COMPANY LIMITED

	NAME	SIGNATURE
DRAWN BY	H.M. LEE	Man
CHECKED BY	K.H.NG	

PROJECT :

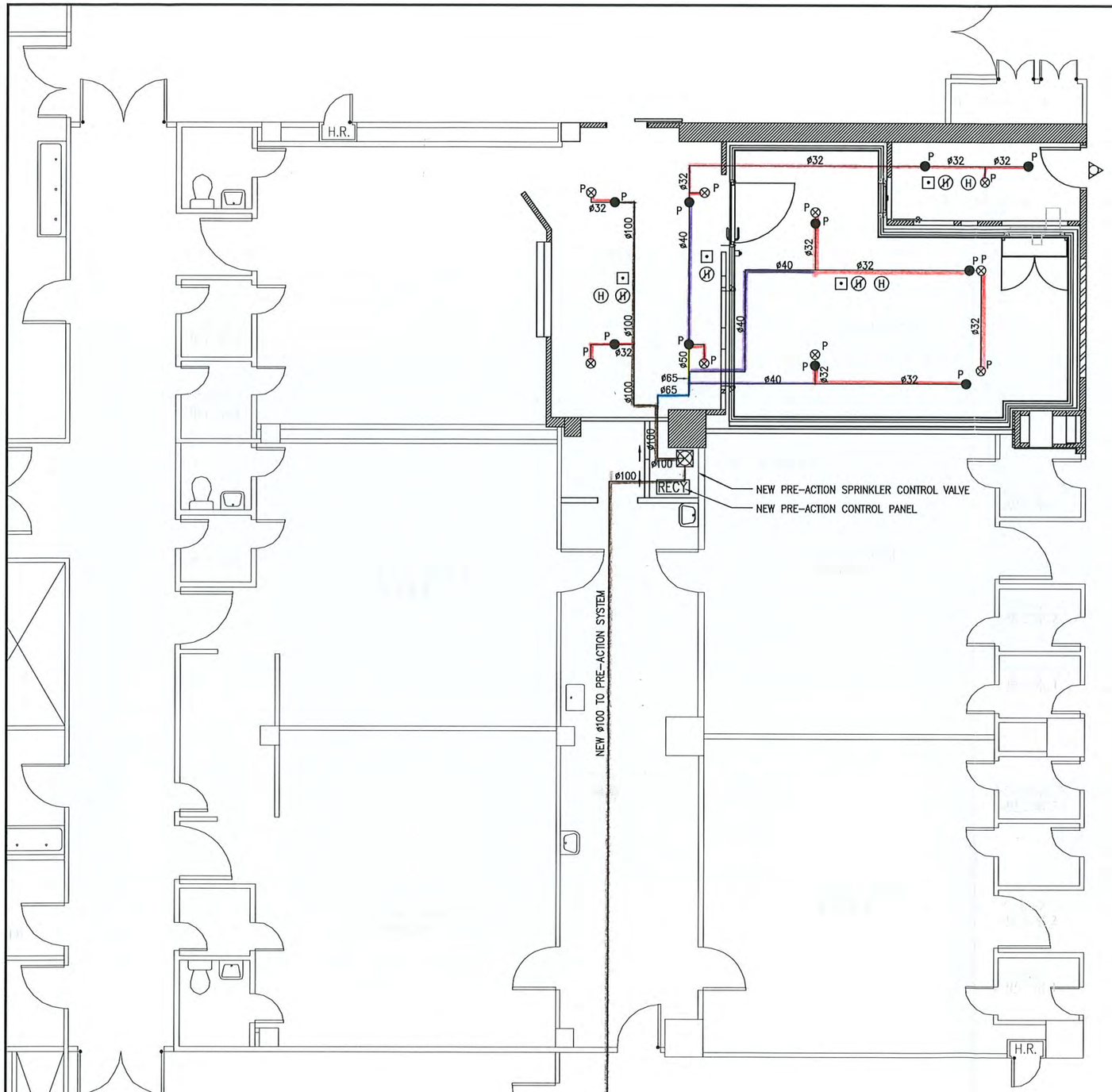
TUEN MUN HOSPITAL

DRAWING TITLE

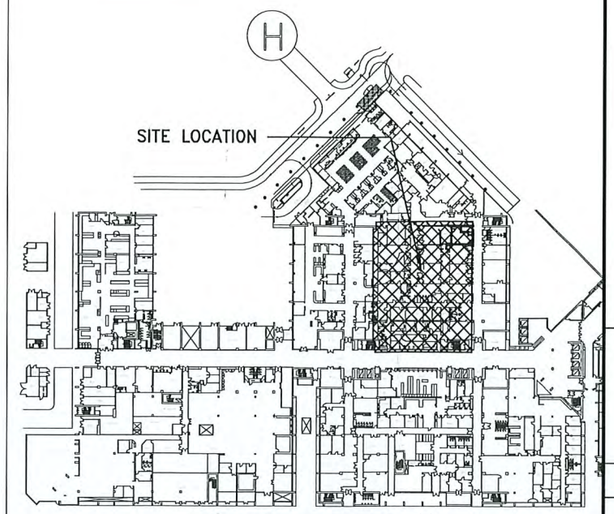
PART PLAN FOR DEPARTMENT OF RADIOLOGY (X–RAY) MRI ROOM 9, AT GROUND FLOOR – SHEET 1 OF 2

DRAWING SCALE/SIZE
NIL

DRAWING NO.
SCEE–TMH–FS–314A–002



REFER ON DRAWING NO. SCEE-TMH-FS-314A-004



SITE PLAN 1:2000

LEGEND

- NEW INSTALL SPRINKLER HEAD, SINGLE LAYER INSIDE FALSE CEILING
- NEW INSTALL SPRINKLER HEAD, SINGLE LAYER UNDER FALSE CEILING C/W CEILING PLATE
- NEW SPRINKLER HEAD, SINGLE LAYER UNDER FLOOR/CEILING SLAB
- NEW INSTALL PRE-ACTION SPRINKLER SYSTEM ALARM VALVE SET
- EXISTING ELECTRICALLY MONITORED VALVE (NORMALLY OPEN)
- EXISTING FLOW SWITCH
- EXISTING GATE VALVE (NORMALLY CLOSE)
- HEAT DETECTOR, SINGLE LAYER UNDER CEILING/FLOOR SLAB
- HEAT DETECTOR, SINGLE LAYER INSIDE FALSE
- REMOTE INDICATOR
- REMOTE INDICATOR (CEILING TYPE)

PIPE ZISE	COLOUR CODE
100mm	
65mm	
50mm	
40mm	
32mm	

DRAWING STATUS

314A

REV.	DESCRIPTION	DATE	BY
0	314A SUBMISSION	MAY 23	MAN

FIRE SERVICE INSTALLATION CONTRACTOR

SHUN CHEONG ELECTRICAL ENGINEERING COMPANY LIMITED

	NAME	SIGNATURE
DRAWN BY	H.M. LEE	Man
CHECKED BY	K.H.NG	

PROJECT :

TUEN MUN HOSPITAL

DRAWING TITLE

PART PLAN FOR DEPARTMENT OF RADIOLOGY (X-RAY) MRI ROOM 9, AT GROUND FLOOR - SHEET 1 OF 2

DRAWING SCALE/SIZE
1:100 @ A3

DRAWING NO.
SCEE-TMH-FS-314A-003

REFER ON DRAWING NO. SCEE-TMH-FS-314A-003

NEW ø100 TO PRE-ACTION SYSTEM

NEW ø100 TO PRE-ACTION SYSTEM

H.R.

NEW ø100 TO PRE-ACTION SYSTEM

ø100 EXISTING MAIN PIPE

ø100 EXISTING MAIN PIPE

ø100 EXISTING MAIN PIPE TO 1/F

ø100 EXISTING MAIN PIPE

ø100 EXISTING MAIN PIPE

ø50 EXISTING DRAIN PIPE

ø100 EXISTING SPRINKLER PIPE FOR DEPARTMENT OF RADIOLOGY (X-RAY) AT G/F

ø100 EXISTING MAIN PIPE FROM B/F TO H/L

ø100 EXISTING MAIN PIPE

DRAWING STATUS

314A

REV.	DESCRIPTION	DATE	BY
0	314A SUBMISSION	MAY 23	MAN

FIRE SERVICE INSTALLATION CONTRACTOR

SHUN CHEONG
ELECTRICAL
ENGINEERING
COMPANY LIMITED

	NAME	SIGNATURE
DRAWN BY	H.M. LEE	Man
CHECKED BY	K.H.NG	

PROJECT :

TUEN MUN HOSPITAL

DRAWING TITLE

FLOOR PLAN FOR DEPARTMENT OF RADIOLOGY (X-RAY) MRI ROOM 9, AT GROUND FLOOR - SHEET 2 OF 2

DRAWING SCALE/SIZE
1:100 @ A3

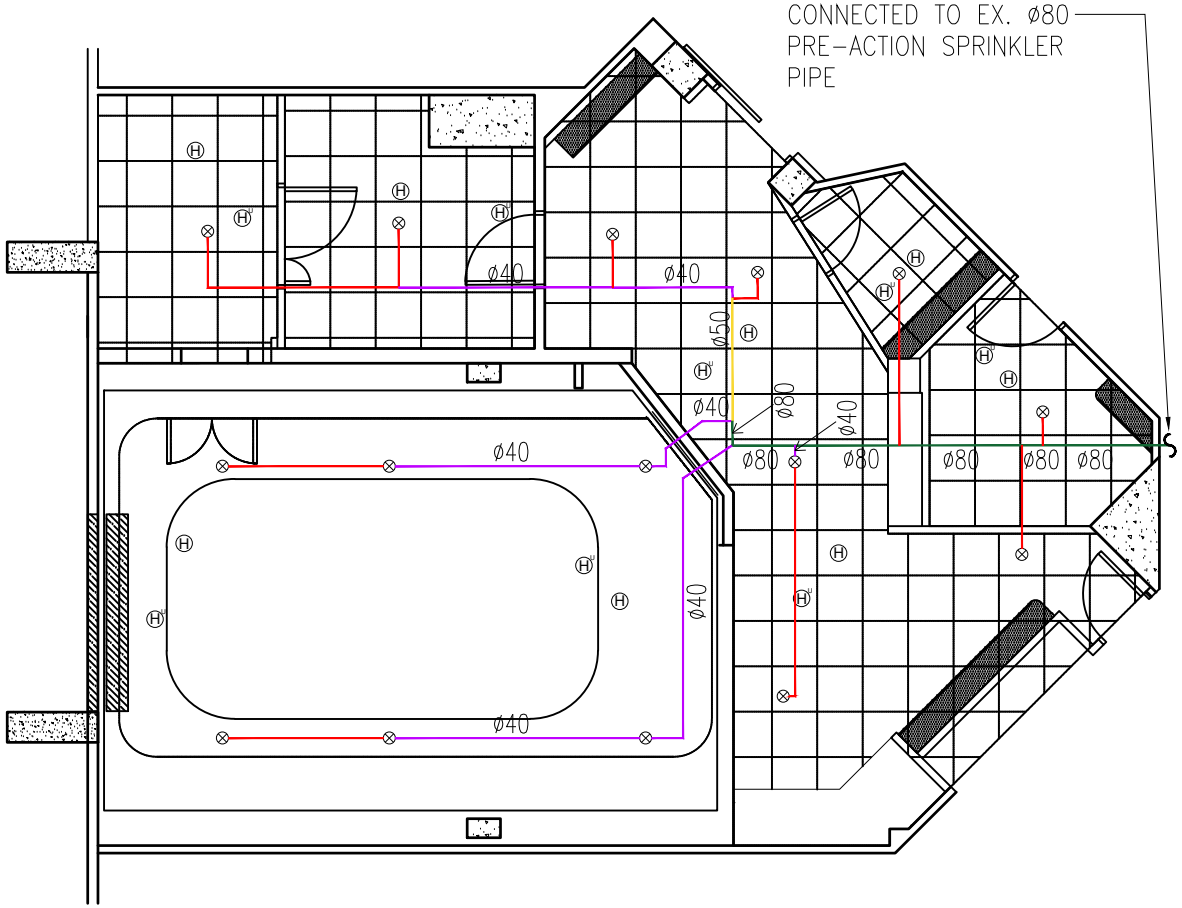
DRAWING NO.
SCEE-TMH-FS-314A-004

LEGEND

- HEAT DETRCTOR - UPPER LAYER (PRE-ACTION SYSTEM)
- HEAT DETECTOR - LOWER LAYER (PRE-ACTION SYSTEM)
- 68°C DRY PENDENT SPRINKLER HEAD - DOUBLE LAYER (PRE-ACTION SYSTEM)
- SPRINKLER PIPE

COLOUR CODE FOR PIPE SIZES

PIPE SIZE	COLOUR CODE	COLOUR SAMPLE
80mm	DARK GREEN	
65mm	LIGHT BLUE	
50mm	YELOW	
40mm	PURPLE	
32mm	RED	
25mm	GREEN	



Notes:
Do not scale drawing.
All dimensions must be verified at the work by the contractor.
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Date	Rev.	Description

JW E&M Engineering Co.
Office
Flat 01, Blk B, 7/F,
Hi-Tech Industrial Center,
491-501 Castle Peak Road,
Tsuen Wan, N.T.
Tel 3188 0713 Fax 3188 0713

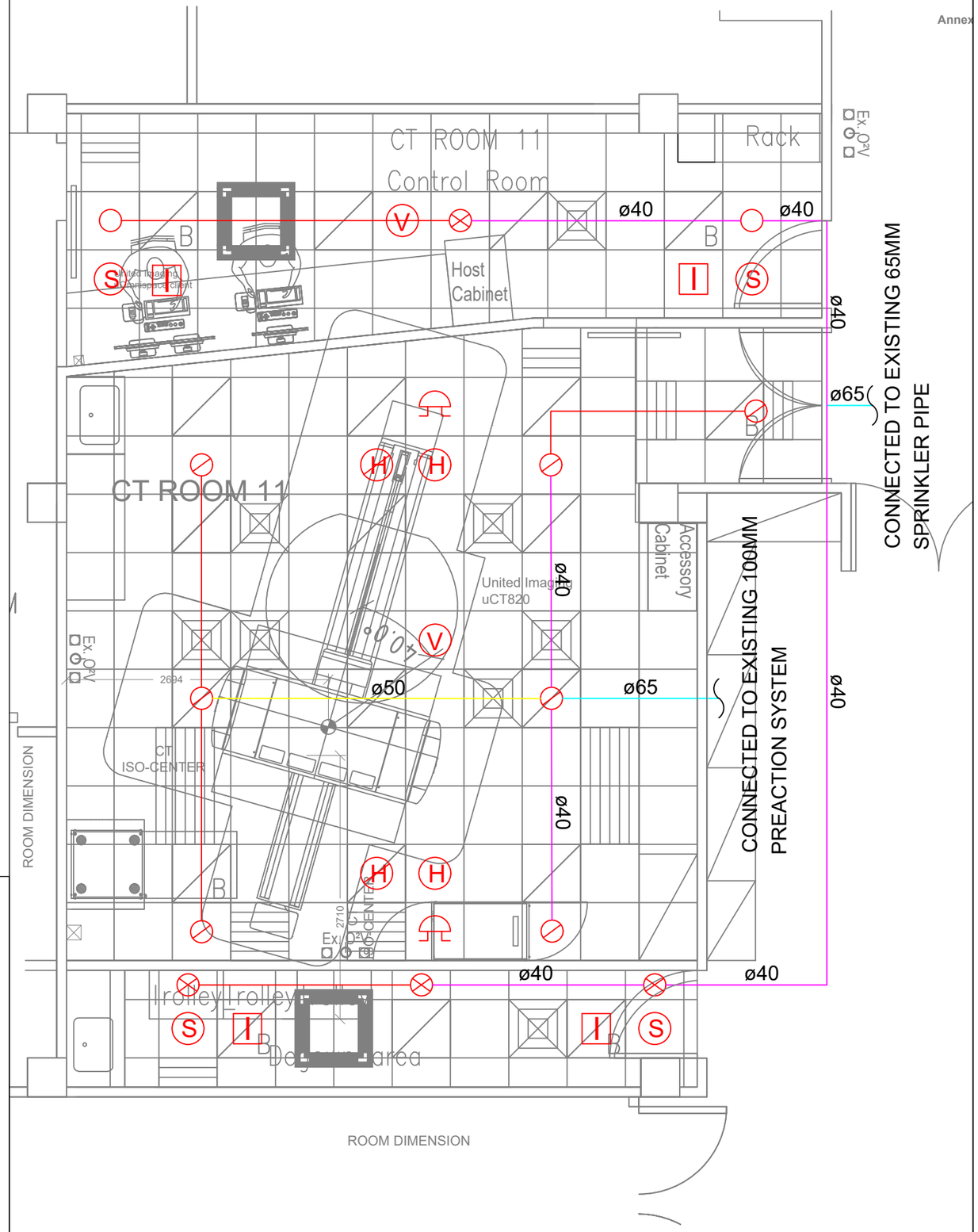
Project:
MRI ROOM 10, DEPARTMENT OF RADIOLOGY, G/F, 23 TSING CHUNG KOON ROAD, TUEN MUN, N.T.

Drawing Title.:
F.S. LAYOUT PLAN

Scale : 1:100	Unit.:
Drawn By : E.C.	Checked By : C.C.S.
Date : 2024/06/17	Project No: .
Drawing No.: TMH/FS001	



SITE MAP



LEGEND

- DOUBLE LAYER 68C SPRINKLER HEAD
- LOWER LAYER 68C SPRINKLER HEAD
- 68C DRY PENDENT SPRINKLER HEAD UNDER FALSE CEILING
- FIRE ALARM BELL UNDER CEILING SOFFIT
- VISUAL FIRE ALARM UNDER FALSE CEILING
- HEAT DETECTOR UNDER CEILING SOFFIT
- HEAT DETECTOR UNDER FALSE CEILING
- DOUBLE LAYER SMOKE DETECTOR
- REMOTE INDICATOR

PIPE SIZE SCHEDULE

PIPE SIZE	COLOR CODE	COLOR CODE
32 mm	RED	
40 mm	PURPLE	
50 mm	YELLOW	
65mm	LIGHT BLUE	

REGION
域 皐 工 程 有 限 公 司
REGION ENGINEERING (H.K.) CO., LIMITED
ADDRESS: ROOM 4316, 43/F, ONEMIDTOWN,
11 HOI SHING ROAD, TSUEN WAN, N.T.
TEL: 3953 5343 FAX: 3568 8740
EMAIL: INFO@REGION.COM.HK

PROJECT:

CT ROOM 11, G/F, TUEN MUN HOSPITAL,
23 TSING CHUNG KOON ROAD, TUEN MUN, NT

SCALE: 1:50@A3
DATE: 23/3/2026
DRAWN BY: JUSTIN WAN
CHECKED BY: JESSICA LO
APPROVED BY: NATHAN TSOI
TITLE: FIRE SERVICES LAYOUT PLAN

REV	DESCRIPTION	DATE
0	FS 314A SUBMISSION	23/3/2026

DRAWING NO.: FS/251004/001



LEGENDS

NOTES

1. UNCAPPED : IMPROPER PIPING TERMINATION

REVISIONS

NO.	DATE		CHECKED
1	7/96	AS FITTED	D.CHEUNG
2	10/10	2007848 – AS FITTED	P.LAW
3	10/13	22008589 – ADDITIONAL OF 1SET OF TERMINAL UNITS	M.F.CHOI
4	01/19	22010261 – S&I (O2, N2O, MA4, VAC and AGSS) at G/F, X-Ray Room 8	M. CHENG
5	01/21	22010842 – REPLACEMENT OF 1SET OF TERMINAL UNITS IN X-RAY RM 5	M. CHENG
6	09/21	22010842 – REPLACEMENT OF 1SET OF TERMINAL UNITS IN X-RAY RM 4	M. CHENG
7	03/23	22011492 – NEW MSPS FOR NEW MR 1.5 SCAN ROOM	R.LAM

PROJECT :

CONTRACT NO.: 2537EM147
MAINTENANCE OF MEDICAL GAS PIPELINE SYSTEM

TUEN MUN HOSPITAL

REFERENCE NO. : MC/WA/G/057

DRAWING TITLE :

PIPED MEDICAL GASES LAYOUT, MAIN BLOCK, GROUND FLOOR, RADIODIAGNOSTIC

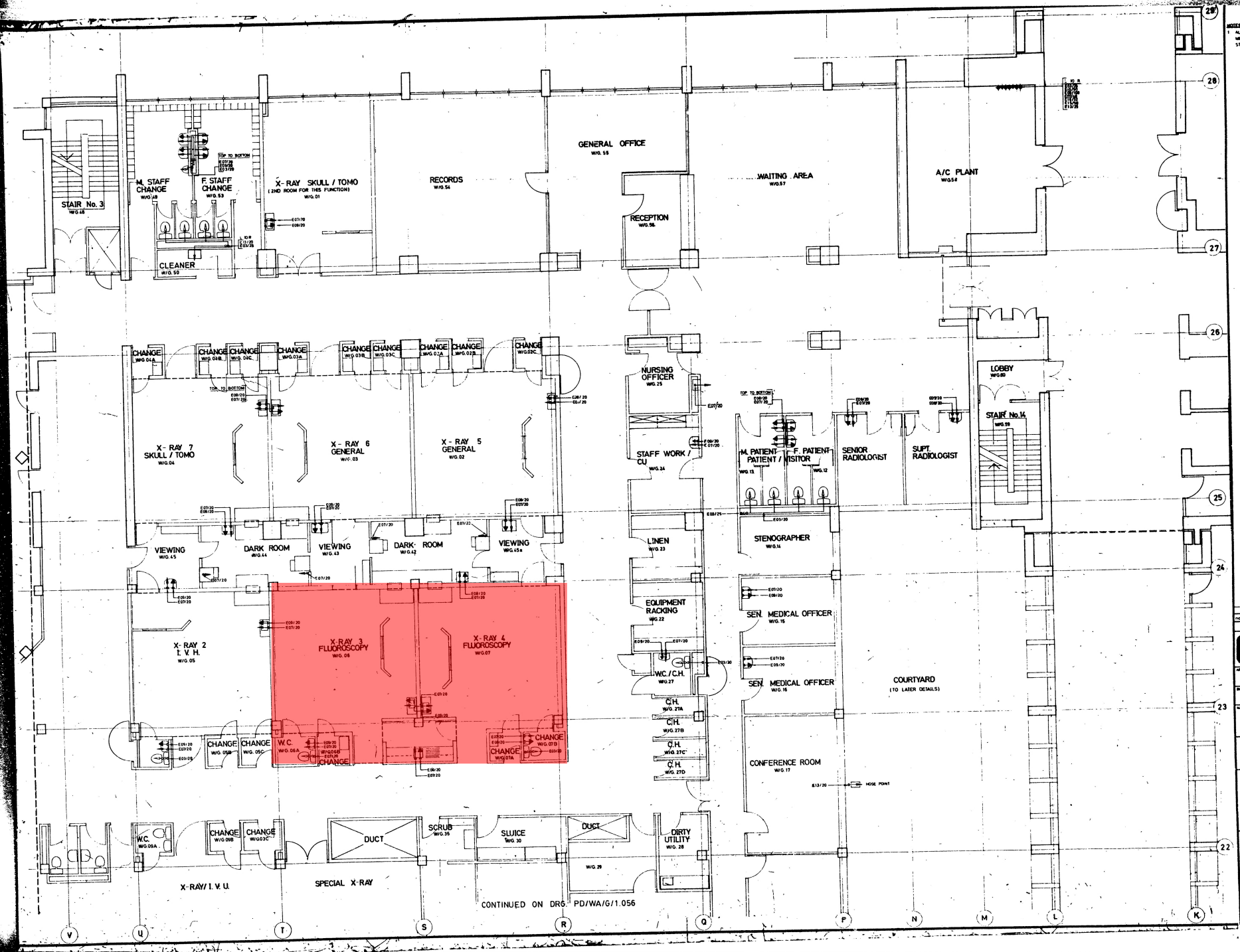
	NAME	SIGNATURE	DATE
DRAWN			
CHECKED			
APPROVED			

DRAWING NO.	REV.	SCALE
TMH/CG/LY/01		1:50

MAIN-CONTRACTOR

LINDE HKO LTD.

ELECTRICAL & MECHANICAL SERVICES DEPARTMENT
OPERATIONS & MAINTENANCE DIVISION 1



NOTES:
1. ALL MEASUREMENT ARE SHOWN IN MILLIMETRE UNLESS OTHERWISE STATED

no	date	description	initial
	DEC 92	AS FITTED	LS

REVISIONS

ARCHITECTURAL OFFICE
BUILDING DEVELOPMENT DEPARTMENT
HONG KONG

ARCHITECT: JOHN R HARRIS AND PARTNERS
BUILDING SERVICE CONSULTANT: KENNEDY AND DONKIN INT'L
MAIN CONTRACTOR: AOKI CORPORATION

TUEN MUN HOSPITAL
BDD PROJECT NO.109M

drawing title:
WN WARD BLOCK
G/F RADIODIAGNOSTIC
WATER SERVICES
(AS FITTED)

scale: 1 : 50

drawing no: PD/WA/G/1.057

M6C3271T

PD/WA/G/2.057

scale	1 : 50

drawing no

drawing title

WAN WARD BLOCK
G/F RADIODIAGNOSTIC UNIT
SOIL, WASTE & RAINWATER
(AS FITTED)

TUEN MUN HOSPITAL
BOD PROJECT NO.109W

AOKI CORPORATION
MAIN CONTRACTOR

KENNEDY AND DONKIN INT'L
BUILDING SERVICE CONSULTANT

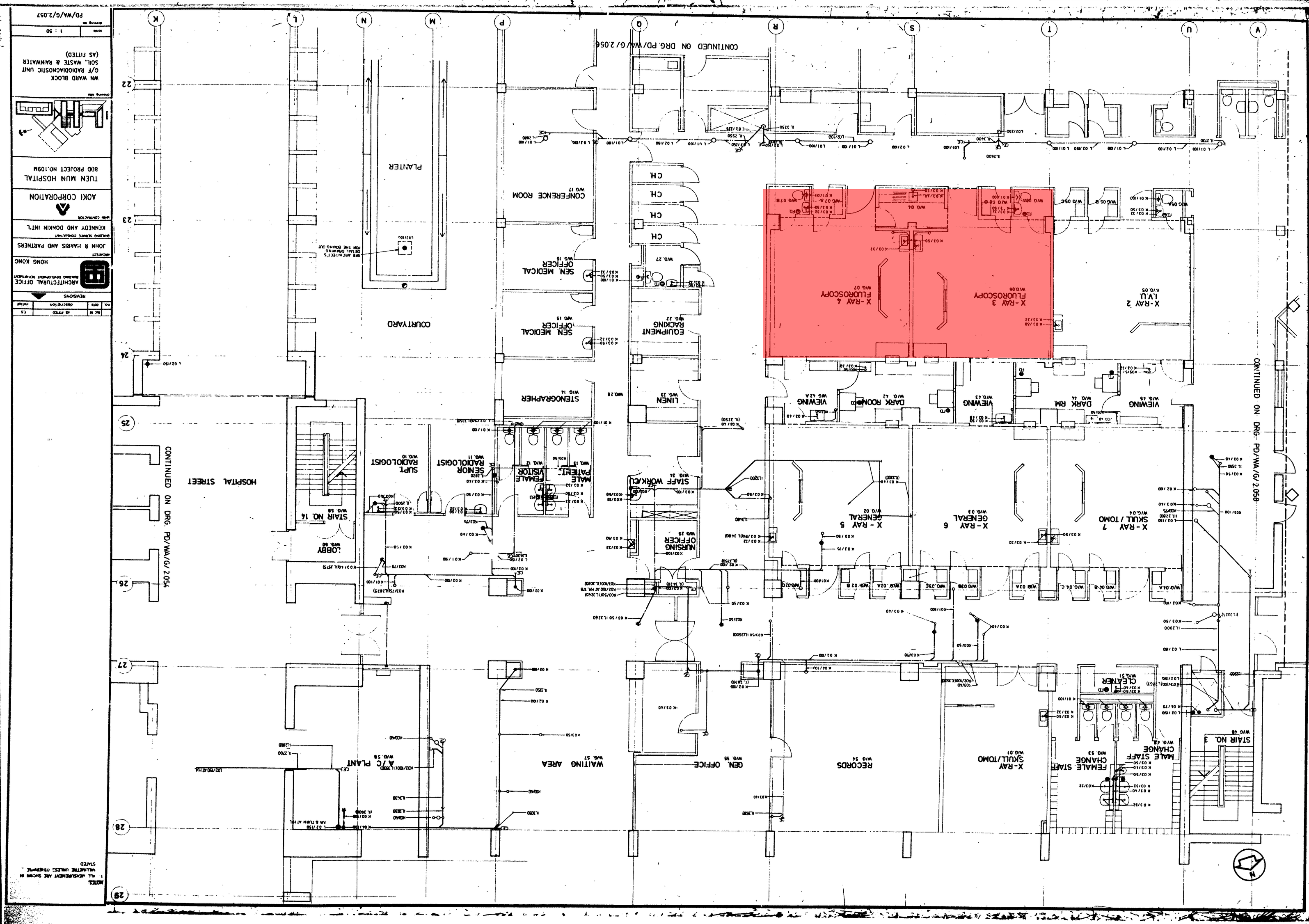
JOHN R JAHRIS AND PARTNERS

HONG KONG
ARCHITECTURAL OFFICE
BUILDING DEVELOPMENT DEPARTMENT
ARCHITECT

No.	Date	description	Initial
Ref. Nº		AS MADE	CS

REVISIONS

NOTES:
1. ALL MEASUREMENT ARE SHOWN IN MILLIMETRE UNLESS OTHERWISE STATED.



CASUALTY

RADIO - DIAGNOSTIC DEPT.

FOR CASUALTY WAITING HALL / SCANNER UNIT AND C.C. UNIT REFER TO DWG. 0.209

SERVICE YARD BELOW

AMBULANCE PARKING & SET DOWN

GERIATRIC DAY PATIENTS

HOSPITAL STREET

MAIN KITCHEN REF. TO DWG 0.208

OPEN YARD

WORKSHOPS

MORTUARY

PHARMACY / S.P.D.

no.	date	description	initial
REVISIONS			

ARCHITECTURAL OFFICE
BUILDING DEVELOPMENT DEPARTMENT
HONG KONG

貢理士建築師事務所
JOHN R HARRIS AND PARTNERS
Architects
2208, Harbour Centre, 25 Harbour Road, Wanchai, Hong Kong.
Tel. 5-729182

TUEN MUN HOSPITAL

BUD PROJECT NO.109 M

drawing title
MAIN BLOCK
GROUND FLOOR PLAN
LEVEL + 8.500

scale	1:200	
	name	date
drawn	S.L.	5.1.82
checked	C.J.S.	7.1.82
approved	[illegible] for D/BS	

drawing no. 5501 / 0.207

revision

LEGEND FOR PROTECTION RELAYS

EF	EARTH FAULT PROTECTION RELAY
OC	OVERCURRENT PROTECTION RELAY
UV	UNDERVOLTAGE RELAY

B

D

A
EN Block

C
WN Block

ROOF ▽ +50 800 — ROOF ▽ +50 500

10 / F ▽ +46 800 — 10/F ▽ +46 800

9 / F ▽ +43 000 — 9/F ▽ +43 000

8 / F ▽ +39 200 — 8/F ▽ +39 200

7 / F ▽ +35 600 — 7/F ▽ +35 600

6 / F ▽ +31 900 — 6/F ▽ +31 800

5 / F ▽ +27 800 — 5/F ▽ +27 800

4 / F ▽ +24 000 — 4/F ▽ +24 000

3 / F ▽ +20 200 — 3/F ▽ +20 200

2 / F ▽ +16 600 — 2/F ▽ +16 600

1 / F ▽ +12 800 — 1/F ▽ +12 800

G/F ▽ +8 500 — G/F ▽ +8 500

BASEMENT ▽ +2 500 — BASEMENT ▽ +2 500

DP/ES10 TYPE 'A' — DP/WS10 TYPE 'A' — DP/EN10 TYPE 'A' — DP/WN10 TYPE 'A'

DP/ES9 TYPE 'A' — DP/WS9 TYPE 'A' — DP/EN9 TYPE 'A' — DP/WN9 TYPE 'A'

DP/ES8 TYPE 'A' — DP/WS8 TYPE 'A' — DP/EN8 TYPE 'A' — DP/WN8 TYPE 'A'

DP/ES7 TYPE 'A' — DP/WS7 TYPE 'A' — DP/EN7 TYPE 'A' — DP/WN7 TYPE 'A'

DP/ES6 TYPE 'A' — DP/WS6 TYPE 'A' — DP/EN6 TYPE 'A' — DP/WN6 TYPE 'A'

DP/ES5 TYPE 'A' — DP/WS5 TYPE 'A' — DP/EN5 TYPE 'A' — DP/WN5 TYPE 'A'

DP/ES4 TYPE 'A' — DP/WS4 TYPE 'A' — DP/EN4 TYPE 'A' — DP/WN4 TYPE 'A'

DP/ES3 TYPE 'A' — DP/WS3 TYPE 'A' — DP/EN3 TYPE 'A' — DP/WN3 TYPE 'A'

DP/ES2 TYPE 'A' — DP/WS2 TYPE 'A' — DP/EN2 TYPE 'A' — DP/WN2 TYPE 'A'

DP2/E1 TYPE 'A' — DP/WS1 TYPE 'A' — DP/E1 TYPE 'A' — DP/WN1 TYPE 'A'

DP1/EG TYPE 'A' — DP1/WG TYPE 'A' — DP2/EG TYPE 'A' — DP3/EG TYPE 'A' — DP2/WG TYPE 'A' — DP3/WG TYPE 'A'

DP2/EB TYPE 'A' — DP2/WB TYPE 'A' — DP1/EB TYPE 'A' — DP/WB TYPE 'A'

11kV / 380V 1.5 MVA DISTRIBUTION TRANSFORMER REF. TR1/OTB

11kV / 380V 1.5 MVA DISTRIBUTION TRANSFORMER REF. TR2/OTB

346V 1200KVAr AUTOMATIC P.F. CORRECTION CAPACITOR (6 STEPS) REF. LCI/OTB

346V 2500A PVC SLEEVED INSULATED COPPER BUSBARS SHORT TIME CURRENT 50KA 1 SEC.

346V SWITCHBOARD REF. LS4/OTB

346V SWITCHBOARD REF. LS3/OTB

800A TP&N ACB (110V DC SOLENOID OPERATED)

2500A TP&N ACB (110V DC SOLENOID OPERATED)

ELECTRICAL & MECHANICAL INTERLOCKED

REMOTE METERING BY CCMS

FROM STANDBY GENERATOR 346V SWITCHBOARD REF. LS7/OTB

AUTOMATIC ELECTRICAL & MECHANICAL INTERLOCK

346V BOARD REF	LS3/OTB	
PANEL	10	11C
INCOMING SUPPLY AVAILABLE	CLOSED	OPEN
GENERATOR SUPPLY AVAILABLE	OPEN	CLOSED

346V BOARD REF	LS4/OTB	
PANEL	1C	2
INCOMING SUPPLY AVAILABLE	OPEN	CLOSED
GENERATOR SUPPLY AVAILABLE	CLOSED	OPEN

NOTE :

1. ALL MEASUREMENTS ARE SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED.
2. C11 - 1000mm² 600/1000V SINGLE CORE PVC SWA PVC CIRCULAR STRANDED COPPER CABLE
   C43 - 300mm² 600/1000V FOUR CORE PVC SWA PVC CIRCULAR STRANDED COPPER CABLE (C33 - THREE CORE)
   C45 - 185mm² 600/1000V FOUR CORE PVC SWA PVC CIRCULAR STRANDED COPPER CABLE
3. DISTRIBUTION BOARDS MARKED WITH AN ASTERISK * SHALL BE MOUNTED SEPARATE TO THE DISTRIBUTION PANEL.

no.	date	description	initial

REVISIONS

ARCHITECTURAL OFFICE
BUILDING DEVELOPMENT DEPARTMENT
HONG KONG

ARCHITECTS
JOHN R HARRIS AND PARTNERS

BUILDING SERVICES CONSULTANTS
KENNEDY AND DONKIN INTERNATIONAL
8/F WALEE COMMERCIAL BUILDING,
42-46 GLOUCESTER ROAD,
HONG KONG. TELEPHONE 5-277823

TUEN MUN HOSPITAL
BDD PROJECT NO.109 M

drawing title
MAIN BLOCK
346 V. DISTRIBUTION
SINGLE LINE DIAGRAM

scale	N.T.S.	
	name	date
drawn	J. LEUNG	MAY '83
checked	K.S.WONG	MAY '83
approved		SEPT '83

drawing no. T1075/N/851 SHEET 2 OF 6

IT Security Requirements for Quotation / Tender - Procurement of "non-IT" System/Equipment

Version	Effective Date
16.0	31/07/2026

Document Number	HAHO-ITD-PD-ISP-007-v16
Author	William WONG, HOIT&HI SM(ISO)1
Custodian	William WONG, HOIT&HI SM(ISO)1
Approved/ Endorsed By	ITD
Approval Date	31/07/2026
Distribution List	All HA HOIT&HI Staff / Cluster IT Staff

Amendment History

Version No.	Date of Amendment	Prepared by	Description
1.0	7/09/2017	Dale Johnstone First draft	ALL
2.0	7/11/2017	Dale Johnstone	Add Appendix C&D
3.0	28/12/2017	Dale Johnstone	Add Appendix E
4.0	13/04/2018	John Tse	Update A.16.3 & A.16.4 in Appendix A
5.0	07/12/2018	William Wong	- Re-format document - Change A.4 Availability in Appendix A - Replace diagram in Appendix B - Add "Privacy Control" in Appendix E
6.0	15/03/2019	William Wong	- Change name in Further Information
7.0	16/12/2019	William Wong	- Update document link "Guidelines on Connecting Medical System Networks (Information Technology Circular 1/2019)" in Reference - Add Note i) & ii) in Appendix A - Add A19.9 in Appendix A
8.0	09/10/2020	John Tse	- Change Medical System networks to External network - Update A.19 in Appendix A - Update Appendix B to "External Network Architecture - Remove Appendix C and Appendix D - Change Appendix E to Appendix C
9.0	09/12/2020	John Tse	- Update the External Network architecture to indicate building switch is L3 switch - Correct the link for "Guidelines for Cabling System and Network Setup in External Network"
10.0	15/12/2020	John Tse	- Correct the numbering for section 3 - Remove point c) from section 4 (ie. appendix for "Guidelines for Cabling System and Network setup in External network")
11.0	29/12/2020	William Wong	- Update distribution list
12.0	12/7/2021	John Tse	- Restore version 7 until the latest guideline for cabling and network setup is ready
13.0	13/07/2022	Yorky Wong	- Update Reference

			- Update Further Information contacts - Update A.12.2 and A.20.1 in Appendix A
14.0	15/08/2022	John Tse	- Add the link for "Guidelines for Cabling System and Network Setup in External Network" in References - Update A.19 to align with "One Network for All" strategy - Update Appendix B to "External Network Architecture" - Combine Appendix C and D to Appendix C - Change Appendix E to Appendix D
15.0	21/02/2025	ISO1	- Update Reference - Update clause 5 - Update clause 6 Further Information - Add A.10.7 for logging sensitive data - Update A.11.2 for role-based access control - Update A.13.2 for patch management - Update A.15.1 for network segregation - Update A.18.3 for security compliance - Update A.20.1 for data exchange - Add A.21 for public cloud service - Update A9.1, A9.2, A11.5, A19.4 and A19.9 (a) for reference document viewing arrangement - Consolidate Appendix as Part A, B, C and D with updated checklist
		N5	- Update A.19, Appendix Part B and C for the Layer 2 switch
16.0	27/07/2026	ISO1	- Add A.2.3, A2.4, A2.5 for enhanced confidentiality undertaking and account management of tenderer staff - Add A9.4 for the PC security requirements - Update A10.5 and 10.6 for strengthening data export prohibition for any purpose unless prior authorization has been obtained from HA - Update A16.2, A16.3, A16.4 for connecting media or device which was obtained prior authorization from HA during maintenance support - Update A18.3 and Appendix D for Vendor System Security Compliance Report

IT Security Requirements for Quotation / Tender –

Procurement of "non-IT" System/Equipment

THE TERMS AND DEFINITIONS BELOW ARE GENERAL REQUIREMENTS WHICH APPLY TO THE ACQUISITION AND INSTALLATION OF "NON-IT SYSTEMS" (SYSTEM)/EQUIPMENT WITH HA.

"NON-IT SYSTEMS"/EQUIPMENT IS TECHNOLOGY BEING ACQUIRED BY HA THAT MAINTAINS IT COMPONENTS BUT WHICH IS NOT NORMALLY PROCURED BY HA INFORMATION TECHNOLOGY AND HEALTH INFORMATICS DIVISION (IT&HID).

THERE MAY ADDITIONALLY BE PROJECT SPECIFIC REQUIREMENTS.

SUBJECT OFFICERS OF INDIVIDUAL PROJECTS ARE ADVISED TO CONSULT HA IT&HID DURING THE TENDER SPECIFICATION PREPARATION STAGE.

SUBJECT OFFICERS SHOULD NOTE THAT PROJECTS HAVE TO RESERVE FUNDING FOR SETTING UP AND ESTABLISHING ANY NETWORK CONNECTIVITY THAT WILL BE PERFORMED BY HA IT&HID.

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1. Purpose

The purpose of this document is to provide model IT security related terms and definitions clauses to be used by HA when preparing and evaluating "Requests for Quotations" and "Requests for Tender" for the procurement of non-IT Systems ("Systems")/Equipment.

2. References

(a) Guidelines for Windows Server Hardening
http://it.home/doc/HAHO-ITD-GL-T03-010.aspx

(b) Guidelines for Connecting External Network in HA (Information Technology Circular 1/2019)
http://ha.home/circular2/IT-2019-01.pdf

(c) Guidelines for Connecting External Network in HA
http://it.home/doc/HAHO-ITD-GL-N02-001.aspx

(d) Guidelines for Host Security Hardening
http://it.home/doc/HAHO-ITD-GL-T02-001.aspx

(e) OWASP Top 10 Vulnerabilities
https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project

(f) Malicious Code Protection Requirements for Medical Equipment Maintenance
(IT Circular 2/2018)
http://ha.home/circular2/IT-2018-02.pdf

(g) Guidelines for Application Security
http://it.home/doc/HAHO-ITD-GL-ISO-005.aspx

(h) Adopting Security Specifications Standard
http://it.home/doc/HAHO-ITD-SD-ISO-001.aspx

(i) Guidelines for Mobile Device Security
http://it.home/doc/HAHO-ITD-GL-ISO-003.aspx

(j) Guidelines for IoT Security
http://it.home/doc/HAHO-ITD-GL-ISO-008.aspx

(k) Guidelines for Cabling System and Network Setup in External Network
http://it.home/doc/HAHO-ITD-GL-N05-001.aspx

(l) Cloud Security Standard
http://it.home/doc/HAHO-ITD-SD-ISO-004.aspx

(m) Guidelines for Vulnerability Management Process
http://it.home/doc/HAHO-ITD-GL-ISO-001.aspx

(n) Guidelines for Security Patch Management
http://it.home/doc/HAHO-ITD-GL-ISO-013.aspx

(o) Guidelines for Security Requirements for HA PCs and Notebooks
http://it.home/doc/HAHO-ITD-GL-ISO-009.aspx

3. Introduction

Tenderer are reminded that:

(a) the procurement process shall be considering risks that could be introduced to HA as a result of the selection of a System/Equipment;

(b) details shall be described in the respective Schedule(s) pertaining to "Statement of Compliance" as to how the System/Equipment proposes to implement security requirements, including product names, product specifications and interconnection diagrams;

(c) an alternative security solution able to achieve the same or better security protection, shall be proposed where any System/Equipment security requirements are unable to be fulfilled due to product design limitations;

(d) where an alternative security solution is being proposed details shall be included which describe the alternative security solution in an Appendix to the "Statement of Compliance";

(e) the security requirements outlined in Clause 5 are critical.

4. Overview

4.1 Scope

The scope of these IT security requirements are applicable to all "Requests for Quotations" and "Requests for Tender" for the procurement of non-IT Systems ("Systems")/Equipment in HA.

4.2 Objective

The scope of this document cover security requirements with terms and definitions for procurement of non-IT Systems ("Systems")/Equipment in HA, including data security, application security, network security, server security, client/desktop security, security incident reporting and vendor maintenance and etc.

5. IT Security Requirements

The IT security requirements for all "Requests for Quotations" and "Requests for Tender" within HA with a view to:

(a) providing "Terms and Definitions" please refer detail noted in Appendix Part A;

(b) providing “Network Connection between Vendor Network and HA Network”, please refer detail noted in Appendix Part B;

(c) providing “Failure and Recovery Scenarios in Hospitals for vendor managed L3 network switches”, please refer detail noted in Appendix Part C;

(d) providing “Vendor System Security Compliance Report (Sample)”, please refer detail noted in Appendix Part D (The form can be downloaded from https://hateams.home/~rndKs)

Note: Appendix is a clean standalone version that can be directly incorporated into tendering document for procurement process. All clauses stated are required whenever applicable.

6. Further Information

Further information and details concerning IT Security Requirements for Quotation / Tender - Procurement of “non-IT” System/Equipment can be obtained by contacting:

- William Wong, SM(ISO)1, 3906 3577, wongwwl@ha.org.hk
- Jackson Lam, SM(N)5, 3969 3123, jackson.lam@ha.org.hk

Appendix Details of IT Security Requirements

A. Terms and Definitions

These terms and definitions apply to any System/Equipment requiring access to the HA IT network. Additional terms and definitions appear below in "Connectivity of Vendor Managed Network to HA" (A.19) for System/Equipment operated by the Tenderer on a separate self-contained "vendor" network.

Note:

i) An alternative security solution able to achieve the same or better security protection, shall be proposed where any System/Equipment security requirements are unable to be fulfilled due to product design limitations;

ii) where an alternative security solution is being proposed details shall be included which describe the alternative security solution

Reference Document:

(a) Guidelines for Windows Server Hardening
http://it.home/doc/HAHO-ITD-GL-T03-010.aspx

(b) Guidelines on Connecting External Network in HA (Information Technology Circular 1/2019)
http://ha.home/circular2/IT-2019-01.pdf

(c) Guidelines for Connecting External Network in HA
http://it.home/doc/HAHO-ITD-GL-N02-001.aspx

(d) Guidelines for Host Security Hardening
http://it.home/doc/HAHO-ITD-GL-T02-001.aspx

(e) OWASP Top 10 Vulnerabilities
https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project

(f) Malicious Code Protection Requirements for Medical Equipment Maintenance (IT Circular 2/2018)
http://ha.home/circular2/IT-2018-02.pdf

(g) Guidelines for Application Security
http://it.home/doc/HAHO-ITD-GL-ISO-005.aspx

(h) Adopting Security Specifications Standard
http://it.home/doc/HAHO-ITD-SD-ISO-001.aspx

(i) Guidelines for Mobile Device Security
http://it.home/doc/HAHO-ITD-GL-ISO-003.aspx

(j) Guidelines for IoT Security
http://it.home/doc/HAHO-ITD-GL-ISO-008.aspx

(k) *Guidelines for Cabling System and Network Setup in External Network*
http://it.home/doc/HAHO-ITD-GL-N05-001.aspx

(l) *Cloud Security Standard*
http://it.home/doc/HAHO-ITD-SD-ISO-004.aspx

(m) *Guidelines for Vulnerability Management Process*
http://it.home/doc/HAHO-ITD-GL-ISO-001.aspx

(n) *Guidelines for Security Patch Management*
http://it.home/doc/HAHO-ITD-GL-ISO-013.aspx

(o) *Guidelines for Security Requirements for HA PCs and Notebooks*
http://it.home/doc/HAHO-ITD-GL-ISO-009.aspx

A.1 Safety

A.1.1 Tenderer shall ensure the System/Equipment remains secure and malicious code free in accordance with the terms and conditions of the relevant contract.

A.1.2 Tenderer shall ensure the System/Equipment when being used for healthcare related patient outcomes does not cause danger, risk, harm, injury, or loss to the safety of an individual.

A.1.3 Tenderer shall ensure the System/Equipment is protected from being used in a manner relied upon by other System/Equipment that could result in danger, risk, harm, injury, or loss to the safety of an individual.

A.1.4 Tenderer shall ensure the System/Equipment does not create any non-compliance with regulatory or legal frameworks.

A.2 Confidentiality and Privacy

A.2.1 Tenderer shall ensure the System/Equipment does not capture, store or process sensitive data and/or any data related to any individual, including personal health information, in a manner that allows the data to be made available or disclosed in an unauthorized manner.

A.2.2 Tenderer shall ensure the System/Equipment provides appropriate authentication controls on privacy control when allowing any user, protocol or other form of connection.

A.2.3 Tenderer shall ensure that all its staff and appointed sub-contractors and agents involved in the performance of the Services sign a confidentiality undertaking, declaration form, declaration checklist prior to commencing any work in HA onsite and remote access.

A.2.4 Tenderer shall ensure each user identity (user-ID) for remote support must uniquely identify only one user. . Sharing user account with other individuals is strictly prohibited.

Any unauthorized use or access may result in consequences, including termination of the user account.

A.2.5 Tenderer shall ensure to review on the validity and on-going need for each of the User accounts of System/Equipment annually.

A.3 Integrity

A.3.1 Tenderer shall ensure the System/Equipment preserves the accuracy and completeness (i.e. integrity) of data and the methods used to process and manage this data.

A.3.2 Tenderer shall ensure the System/Equipment minimises any potential to cause business disruption if the System/Equipment does not operate as expected/planned.

A.3.3 Tenderer shall ensure the System/Equipment can be accurately relied upon as a result of its function.

A.3.4 Tenderer shall provide evidence to HA that any source code associated with the System/Equipment is free of common "OWASP Top 10 Vulnerabilities" [Reference Document (e)].

A.4 Availability

A.4.1 Tenderer shall ensure the System/Equipment will be accessible and usable when needed.

Tenderer shall ensure the System/Equipment achieves an overall level of availability with reference to the requirement of Uptime under warranty and maintenance support related clause in the Tender Specifications.

A.4.2 Tenderer shall ensure any System/Equipment interruption with reference to the requirement of Corrective Maintenance under warranty and maintenance support related clause in the Tender Specifications.

A.4.3 Tenderer shall ensure the System/Equipment provides adequate System/Equipment resilience facilities, including and not limited to redundant hardware components, enabling any faulty components to be switched over to redundant components if applicable.

A.4.4 Tenderer shall ensure the System/Equipment is supported by uninterruptable power supply (UPS) for maintaining the committed level of System/Equipment availability if applicable.

A.4.5 Tenderer shall ensure the System/Equipment minimises any disruption if not performing as expected/planned.

A.5 Compatibility

A.5.1 Tenderer shall ensure the System/Equipment is able to effectively function together with other System/Equipment.

A.5.2 Tenderer shall ensure the System/Equipment does not adversely interfere with the effective operation of any other System/Equipment.

A.5.3 Tenderer shall ensure the System/Equipment continues to function correctly following any System hardening and security specification requirements imposed by HA.

A.6 Longevity

A.6.1 Tenderer shall ensure the length of effective service of the System/Equipment (i.e. many years) and all of its components will be sufficient to meet the needs of HA.

A.6.2 Tenderer shall ensure the System/Equipment continues to operate beyond the period of time expected by HA.

A.6.3 Tenderer shall ensure updates for patching of vulnerabilities are maintained throughout the System/Equipment's lifetime expected by HA.

A.7 Technological Substitution

A.7.1 Tenderer shall ensure that within the warranty period/maintenance service contract period (if applicable), System/Equipment upgrades are performed, if there is any, without any charge within the contract period.

A.8 Data Sovereignty

A.8.1 Tenderer shall ensure the data processed or stored by the System/Equipment resides in Hong Kong.

A.8.2 Tenderer shall ensure the System/Equipment does not process or store data outside of Hong Kong.

A.8.3 Tenderer shall ensure the System/Equipment is governed by the laws of Hong Kong.

A.9 System Hardening

A.9.1 Tenderer shall ensure the System/Equipment, where using the Microsoft Windows Operating System, hardens all its components and functionality according to "Guidelines for Windows Server Hardening" [Reference document (a), which is available for viewing after signing a non-disclosure agreement with hospital].

A.9.2 Tenderer shall ensure the System/Equipment where using the non-Windows solutions are secured according to "Guidelines for Host Security Hardening" [Reference document (d), which is available for viewing after signing a non-disclosure agreement with hospital].

A.9.3 Tenderer shall ensure the System/Equipment avoids the presence of hard-coded authentication credentials.

A.9.4 Tenderer shall ensure the PC connecting System/Equipment which meet following security requirements

(a) Disable default Administrator account, and create another super user account for use instead which should not be granted to end-users

(b) Enable password-protected screen saver

(c) File sharing access must not be granted to “Everyone”, and should be permitted based on pre-defined access rights if and when needed

(d) Install endpoint protection software (e.g. MDE) with the latest definition

(e) Install the latest security patch

(f) Enable personal firewall for blocking incoming network connections, and disabling vulnerable network services such as LLMNR and NBT-NS

(g) Install with encryption software for enabling removable media encryption

(h) Encrypt files and folders containing confidential data, which should be stored in centralized file server instead of local hard disk drive

(i) Confidential files should only be copied into removable storage devices supporting mandatory encryption

(j) Enable full disk encryption and power-up password protection for Notebooks

A.10 Data Security

A.10.1 Tenderer shall ensure sensitive data downloaded from the System/Equipment to end-user devices is protected by a reasonable level of encryption.

Note: Sensitive data refers to data including but not limited to identifiable patient information.

A.10.2 Tenderer shall ensure sensitive data stored within the System/Equipment is preferably encrypted.

A.10.3 Tenderer shall ensure sensitive data stored in backup storage is encrypted.

A.10.4 Tenderer shall ensure all important data (knowledge, System/Equipment configuration parameters) stored in the System/Equipment is safeguarded and preserved through an effective backup mechanism.

A.10.5 Tenderer must ensure that sensitive data is NOT exported for any purpose unless prior authorization has been obtained from HA. Failure to comply with this requirement may result in illegal activities.

A.10.6 Unless prior authorization has been obtained from HA, it is prohibited to copy or move data from the System/Equipment to the HA network using portable media (i.e. USB Drive or CD).

A.10.7 Tenderer shall ensure sensitive or personal data is not logged as much as possible; if there is operational need to log such data, ensure it is encrypted or secured with restricted access control.

A.11 Application Security

A.11.1 Tenderer shall ensure the System/Equipment employs prevalent authentication and authorisation mechanisms at reasonable safety level.

A.11.2 Tenderer shall ensure the System/Equipment supports role-based access control. For example, general user shall be restricted from system administration and setting function, which shall only be performed by authorized users.

A.11.3 Tenderer shall ensure the System/Equipment applies network level encryption.

A.11.4 Tenderer shall ensure the System/Equipment provides comprehensive version control and configuration management mechanisms.

A.11.5 Tenderer shall ensure the System/Equipment conforms to "Guideline for Application Security" [Reference document (g), which is available for viewing after signing a non-disclosure agreement with hospital].

A.12 Malicious Code Protection

A.12.1 Tenderer shall ensure the System/Equipment is protected with the installation of a reputable Anti-Virus program in all servers, PC and Workstation components.

A.12.2 Tenderer shall ensure the System/Equipment is protected with regular updates of the latest virus definitions.

Note: It is highly preferred that Tenderer shall use the same product as HA to have virus definition update automatically.

A.12.3 Tenderer shall be responsible for the on-going support and for keeping the virus definitions and related software up-to-date in all Servers, PCs and workstations.

A.12.4 Tenderer shall ensure virus definitions are updated within 24 hours from the date of release.

A.12.5 Tenderer shall be responsible for the regular scanning of all Servers and PCs in the System/Equipment every three months to ensure that they are not infected by virus, worms and spyware including the on-going support of scheduling and verifying the results of the virus scan.

A.13 Vulnerability / Patch Management

A.13.1 Tenderer shall maintain ongoing System/Equipment support, including the installation of the latest security patches for the Operating Systems and related software in all System servers, PCs and workstations.

A.13.2 Tenderer shall ensure critically affected security patches are updated as soon as practically possible; for non-critical ones, within twelve months from the date of release.

A.14 Restricted External Access

A.14.1 Tenderer shall ensure that there are no non-HA (external) network connections to the System/Equipment unless supported by prior authorization and knowledge of HA.

A.14.2 Tenderer shall ensure that the System/Equipment does not automatically establish any wireless connections without prior authorisation and knowledge of HA.

A.14.3 Tenderer shall ensure that the System/Equipment does not establish any wired connections without prior authorisation and knowledge of HA.

A.15 HA Network Connectivity

A.15.1 Tenderer shall be responsible, where operational reasons exist, for a System/Equipment residing within HA premises to connect to the HA network for information exchange with HA IT systems, for implementing such network connection in accordance with HA requirements and to ensure all security requirements are strictly adhered to (e.g. network segregation by firewall to ensure security attacks due to the System/Equipment would not directly impact HA).

A.15.2 Tenderer shall ensure any network connection for a System/Equipment to the HA network is endorsed by HA and implemented and operated according to HA policies, procedures and guidelines.

A.15.3 Tenderer shall ensure connectivity of the System/Equipment to the HA network adheres to the network diagram as depicted in **Part B**.

A.16 Maintenance Support

A.16.1 Tenderer shall ensure that when maintenance is performed on the System/Equipment or when accessing the System/Equipment in any remote manner that the tools and software have been confirmed to be free of malicious code.

A.16.2 Tenderer shall ensure that where maintenance on the System/Equipment needs to be performed, that HA is provided with a level of assurance that the vendor has undertaken proactive actions to ensure their connecting media or device (USB stick, portable media, laptops, iPads, etc.) which was obtained prior authorization from HA. It has been scanned

for malicious code before and after every time that portable media is used to apply changes/updates to the System/Equipment.

A.16.3 Tenderer shall bring with them a mobile computer (i.e. laptop) which was obtained prior authorization from HA. It contains the latest version of anti-virus software, complete with up-to-date virus signatures to confirm onsite within HA premises that their media to be connected (i.e. USB) is free of malicious code.

A.16.4 Tenderer shall ensure portable media (USB stick, CD/DVD, etc.) which was obtained prior authorization from HA. It is scanned (in addition to clause A.16.3) on a HA PC to ensure that the media is not infected by virus, worms and spyware before being used to apply changes/updates to the System/Equipment.

A.16.5 Tenderer shall ensure the vendor provides HA a completed attestation of compliance to confirm the media or device to be connected to the System/Equipment has been scanned for viruses and found to be free of malicious code.

A.16.6 Tenderer shall perform technical support on-site unless appropriate remote support arrangement is endorsed.

A.16.7 Tenderer shall erase the sensitive data in the storage devices of the System/Equipment before taking away the equipment for repairing or disposal.

A.16.8 Tenderer shall sign and fully comply with a non-disclosure confidentiality agreement during on-site and remote support.

A.16.9 Tenderer should use different portable media (i.e. USB sticks), which have been scanned for malicious code, for each item of medical equipment they need to apply an update to.

A.16.10 Tenderer shall where not able to use different individual portable media (i.e. USB sticks) for applying changes/updates to multiple items of medical equipment (see clause A.16.10), repeat Clauses A.16.3 and A.16.4 before proceeding to attach/apply the portable media to the second and subsequent items of medical equipment.

A.17 Decommissioning Support

A.17.1 Tenderer shall ensure that upon decommissioning of the System/Equipment, data exports and data definitions (sometimes known as data dictionary) are provided for all clinical data, and other data as appropriate, in a data structure and format as required by Hospital Authority.

A.17.2 Tenderer shall provide assistance, as required, for the successful migration of any data to a new replacement System/Equipment(s) as adopted by Hospital Authority.

A.18 Security Incident Reporting and Compliance

A.18.1 Tenderer shall ensure the System/Equipment provides health-checking and audit logging capabilities.

A.18.2 Tenderer shall immediately report to the Hospital management and the HA ITS Call Centre any security incident relating to the System/Equipment.

A.18.3 Tenderer shall monitor its security compliance and comply with HA's regular review process with respect to the requirements stipulated in this document. **Part D** provides a sample of a "Vendor System Network Security Compliance Report" which should be used.

A.19 Connectivity of Vendor Managed Network to HA

A.19.1 For Medical Systems, HA will install External Network data ports next to the equipment for connection with the HA Network, or HA will install External Network Wireless LAN for the equipment that supports Wi-Fi for connection with the HA Network.

(Note: Tenderer shall confirm with HA if External Network data ports can be provided)

A.19.2 The External Network data ports are based on the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standards and support 10BASE-T at 10 Mbit/s (IEEE 802.3i), 100BASE-TX Fast Ethernet at 100 Mbit/s (IEEE 802.3u) and 1000BASE-T Ethernet at 1 Gbit/s (IEEE 802.3ab) connections.

A.19.3 The External Network is an Internet Protocol (IPv4) routable network. It supports the following communication protocols, including Internet Protocol (IP), Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). The IP address will be assigned by HA.

A.19.4 In case the tenderer cannot use HA-provided External Network data ports, the tenderer shall set up the network and implement the cabling system according to the "Guidelines for Cabling System and Network Setup in External Network" [Reference Document (k) , which is available for viewing after signing a non-disclosure agreement with hospital].

A.19.5 Other than the provision by HA IT&HI as specified in the tender document, if the tenderer considered the HA IT&HI provision not sufficient/applicable to its proprietary Medical Systems, the tenderer may propose additional installation (in such case the additional installation works shall be carried out by the tenderer according to the "Guidelines for Cabling System and Network Setup in External Network" at its own cost [Reference Document (k)]). HA will not bear any additional charges, and the tenderer shall bear all such related costs which shall have been included in the tender price submitted by the tenderer.

A.19.6 Tenderer shall put their servers in Hospital Data Center as far as possible.

A.19.7 Tenderer shall provide the network diagram to illustrate the network architecture if the tenderer follows A19.4. **Part B.1** illustrates the architecture of External Network for Medical Systems.

A.19.8 Tenderer shall ensure the System/Equipment connecting to the External Network Wireless LAN comply with the following requirements and specifications:

(a) Tenderer shall comply with the HA Wi-Fi infrastructure and standard guidelines

(b) The end devices provided by the tenderer shall support IEEE 802.11a/g/n/ac/ax. For the end devices which support IEEE 802.11ax, they shall be compatible with IEEE 802.11a/g/n/ac

(c) The end devices provided by the tenderer shall support 2.4GHz channel 1-13 and/or 5GHz channel under U-NII-1, U-NII-2A, U-NII-2C and U-NII-3

(d) The end devices provided by the tenderer shall support WPA2 with AES encryption and PSK authentication

(e) The end devices provided by the tenderer shall support DHCP/static IP configuration

(f) The end devices provided by the tenderer shall support roaming across access points without session drop

(g) Tenderer shall provide MAC addresses of the end devices for registration and PSK authentication in order to access Wi-Fi network

(h) Tenderer shall arrange a Wi-Fi connectivity test with users and Hospital/HA IT&HI before the production rollout

(i) Only 1 common SSID will be provided by HA for all non-IT systems

(j) Non-IT systems shall use IP addresses as assigned by HA

(k) IP routable network will be provided for Wi-Fi and wired equipment

A.19.9 For Non-Medical Systems such as Operational Technology (OT), the tenderer shall comply with the following requirements and specifications:

(a) Tenderer shall set up the network and implement the cabling system according to the "Guidelines for Cabling System and Network Setup in External Network" [Reference Document (k) , which is available for viewing after signing a non-disclosure agreement with hospital].

(b) Refer to the "Guidelines for Cabling System and Network Setup in External Network" [Reference Document (k), tenderer shall install at least one Layer 2 switch or with resilient when HA requires at the tenderer's cabinet and shall cater for different auto network failover and recovery scenarios according to the network diagrams illustrated in **Part C.1 and C.2**. If Layer 3 switch installation is required, the tenderer shall contact HA IT&HI in advance for consideration.

(c) Tenderer shall provide the network diagram to illustrate the network architecture. **Part B.2** illustrates the architecture of External Network for Non-Medical Systems.

(d) HA shall arrange HA Authorized Cabling Contractor to install the backbone cablings and HA Equipment Vendor to install the Gigabit Interface Converters (GBICS) at HA switch in Building Closets for the network connection to the tenderer's switch.

(e) HA will not bear any installation and maintenance related charges (except for backbone cabling, i.e. B.4 in **Part B.2**), and the tenderer shall bear all such related costs which shall have been included in the tender price submitted by the tenderer

A.20 Clinical Data Exchange

A.20.1 Tenderer shall ensure seamless electronic data exchange with Hospital Authority corporate systems, complying with Health Level Seven (HL7) version 2.3.1 and above, including support for the HL7 FHIR (Fast Healthcare Interoperability Resources) standard. The data transfer protocols should include MLLP with native HL7, SOAP, or RESTful-based web services with HL7XML, as well as FHIR API interfaces. Additionally, the Clinical Information System (CIS) must have the capability to receive events from and publish events to hospital systems in a timely manner to ensure real-time or near real-time data availability and synchronization. Furthermore, the file server storing clinical report files to be downloaded by the Hospital Authority system must support the SFTP protocol.

A.20.2 Tenderer shall ensure the implementation of electronic data exchange with Hospital Authority corporate systems complies Hospital Authority HL7 Guidelines.

A.20.3 Tenderer shall ensure any electronic message exchange with the Hospital Authority includes reference keys supplied by Hospital Authority corporate systems such as:

(a) HKID
(b) Name
(c) Date of birth
(d) Sex
(e) HA case number
(f) HA system unique patient key

Note: Electronic message exchange is important to ensure high integrity associated with patient identification and automatic mapping to patient records within the Hospital Authority.

A.20.4 Tenderer shall ensure the System/Equipment maintains the existing exchange of patient data with Hospital Authority corporate systems and provides exchange for other data including but not limited to:

(a) Admit, discharge & transfer, and patient demographics
(b) Allergy, Adverse Drug Reaction and Alert information
(c) Clinical order, observations and results
(d) Multimedia and imagery data

A.20.5 Tenderer shall ensure the System/Equipment automatically updates patient's demographic data upon reception of ADT message.

A.20.6 Tenderer shall ensure ADT information exchanged is in compliance with the latest Hospital Authority HL7 Implementation Guidance.

A.20.7 Tenderer shall ensure audit logging is provided for all ADT (Admit, Discharge and Transfer) interactions.

A.20.8 Tenderer shall ensure the System/Equipment adopts the preferred Hospital Authority date format.

(a) For the display of date in frontend screen: DD-MMM-YYYY (e.g. 01-JAN-2014)

(b) For the display of date-time in frontend screen: DD-MMM-YYYY hh:mm:ss in either 12hr/24hr mode (e.g. 01-Jan-2014 15:30:45)

(c) For the transfer of date information to HA system: YYYYMMDD (e.g. 20140101)

(d) For the transfer of date-time information to HA system: YYYYMMDDhhmmss in 24hr mode (e.g. 20140101153045).

Note: This enables user friendliness and system interoperability to be achieved.

A.20.9 Tenderer shall ensure the System/Equipment sends update or delete messages, if necessary, to perform corresponding actions with Hospital Authority corporate systems, with proper authorization mechanism from supervisor and audit trail.

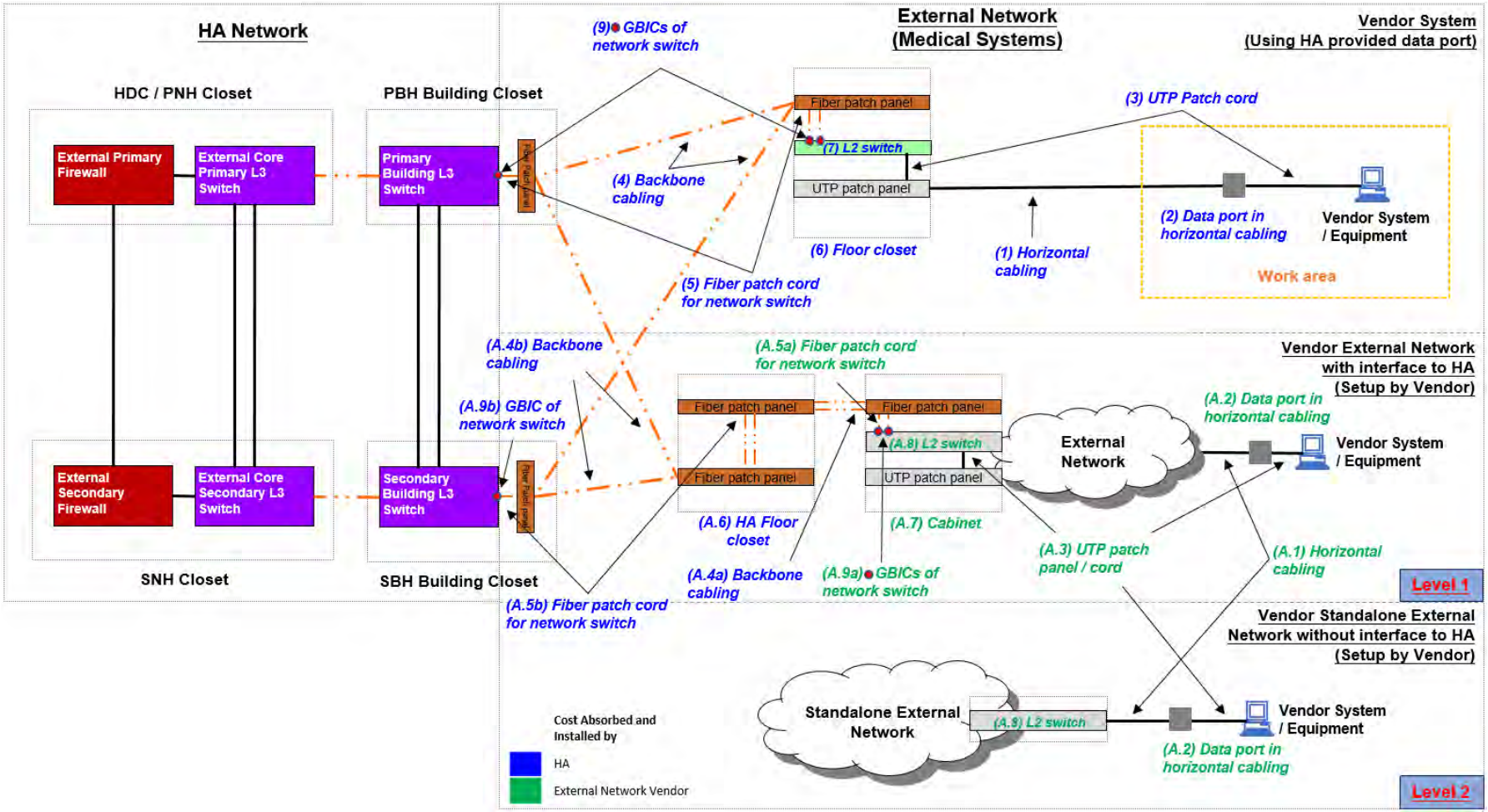
A.20.10 Tenderer shall ensure the System/Equipment provides appropriate feedback to users to indicate the successfulness of message exchange with Hospital Authority corporate systems. (e.g. dashboard system, system alert to users).

A.21 Public Cloud Service

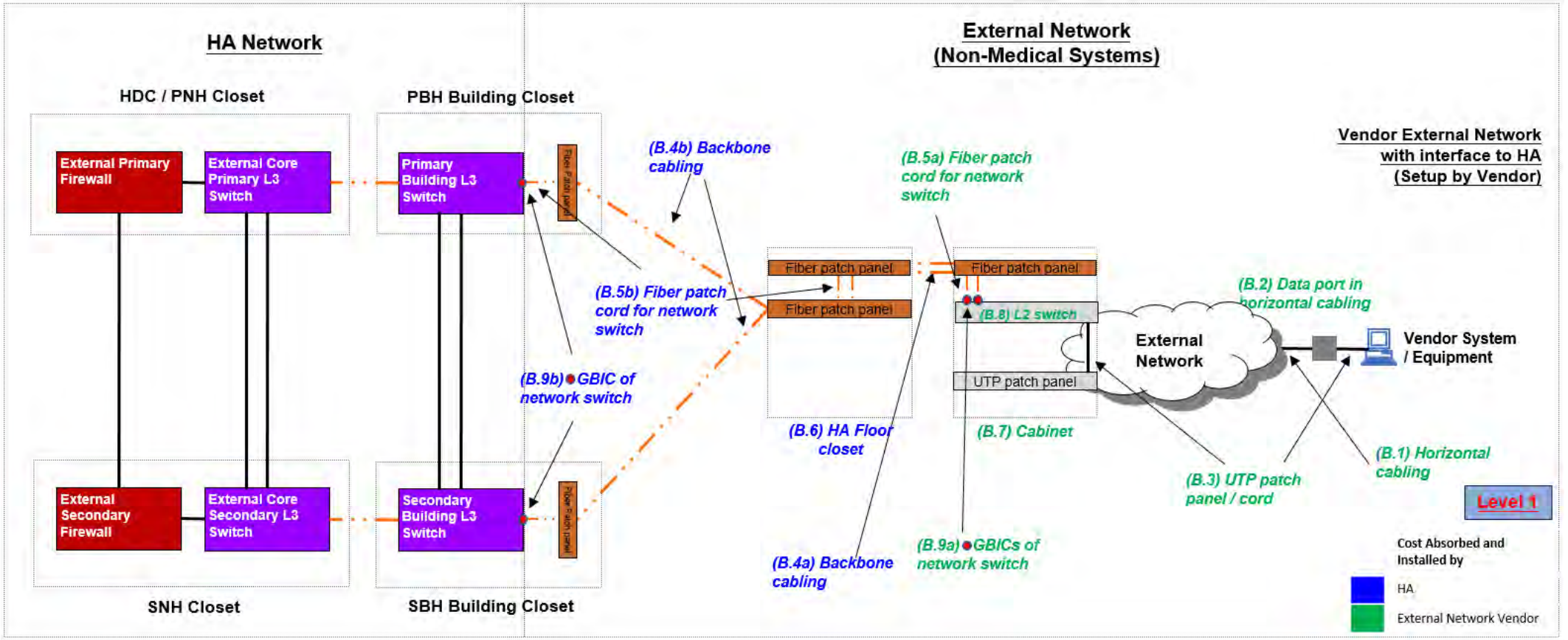
A.21.1 Tenderer shall ensure the System/Equipment, where using public cloud service (e.g. Software as a Service/SaaS), conforms to "Cloud Security Standard" [Reference document (l), which is available for viewing after signing a non-disclosure agreement with hospital].

B. External Network Architecture

1) Below diagram illustrates the External Network Architecture for Medical Systems



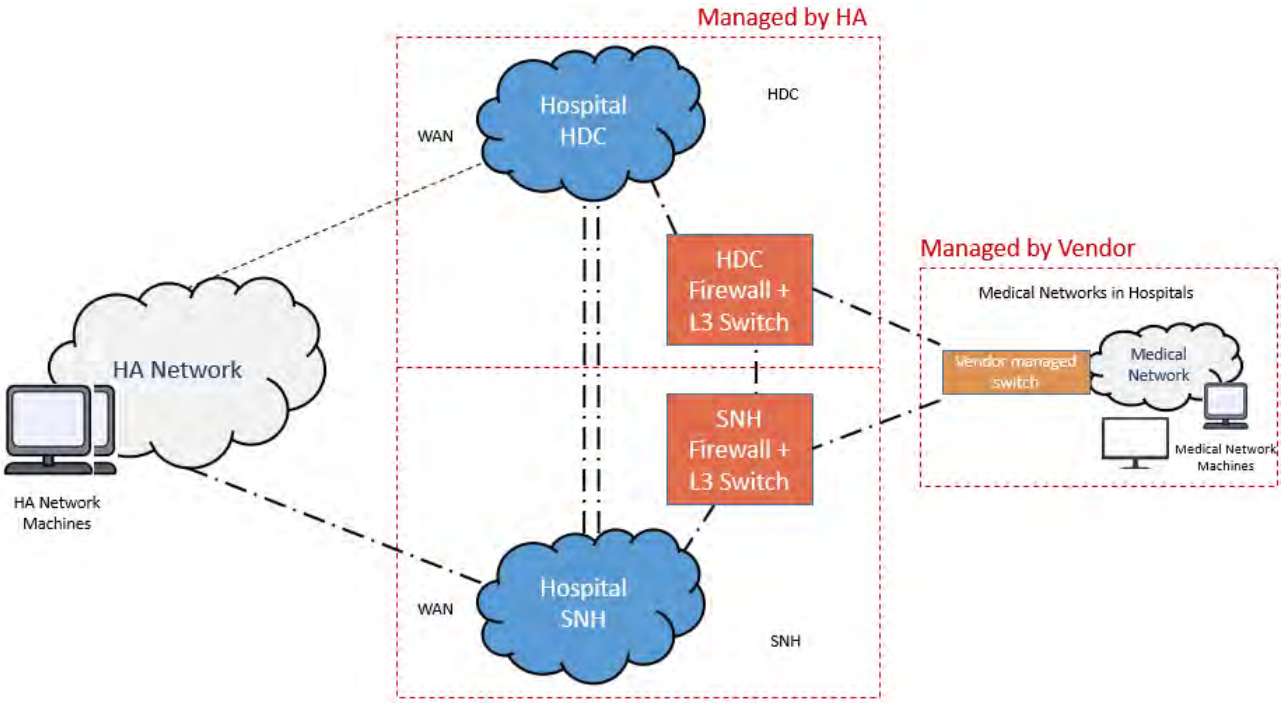
2) Below diagram illustrates the External Network Architecture for Non-Medical Systems



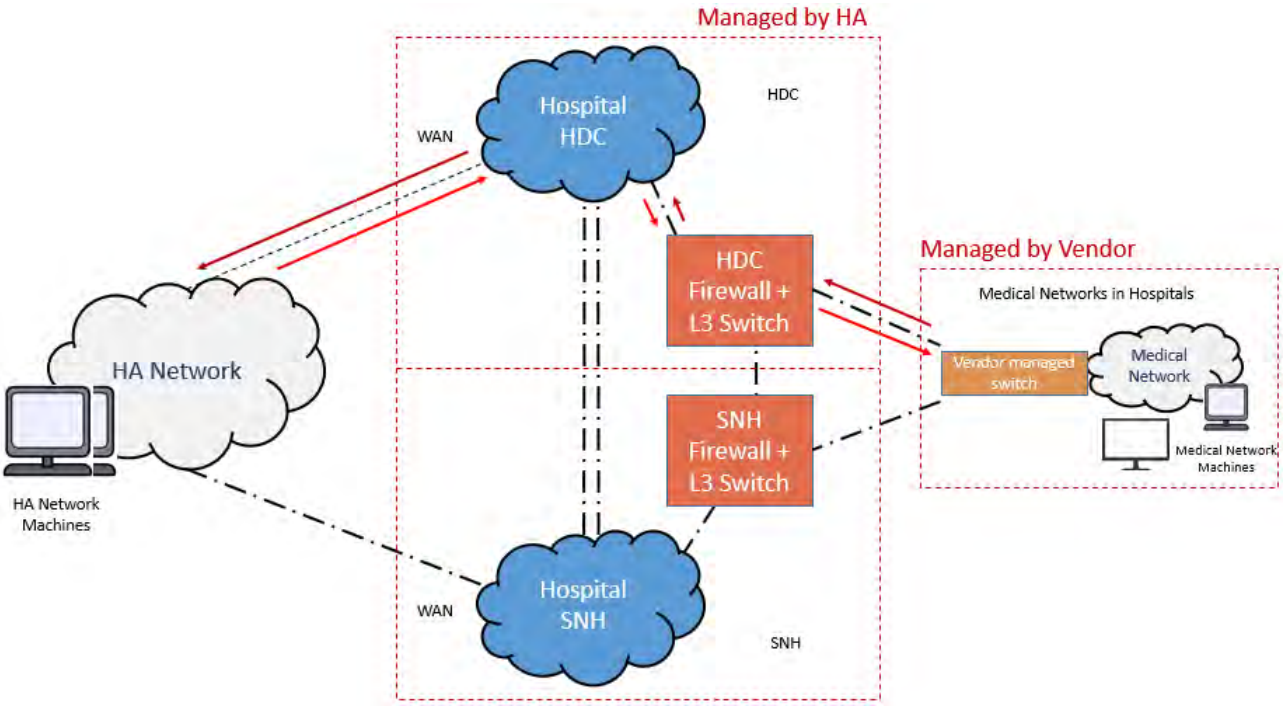
C. Failure and Recovery Scenarios in Hospitals for Vendor Managed Network Switches

C.1 Model A (Single Vendor Managed Layer 2 Switch)

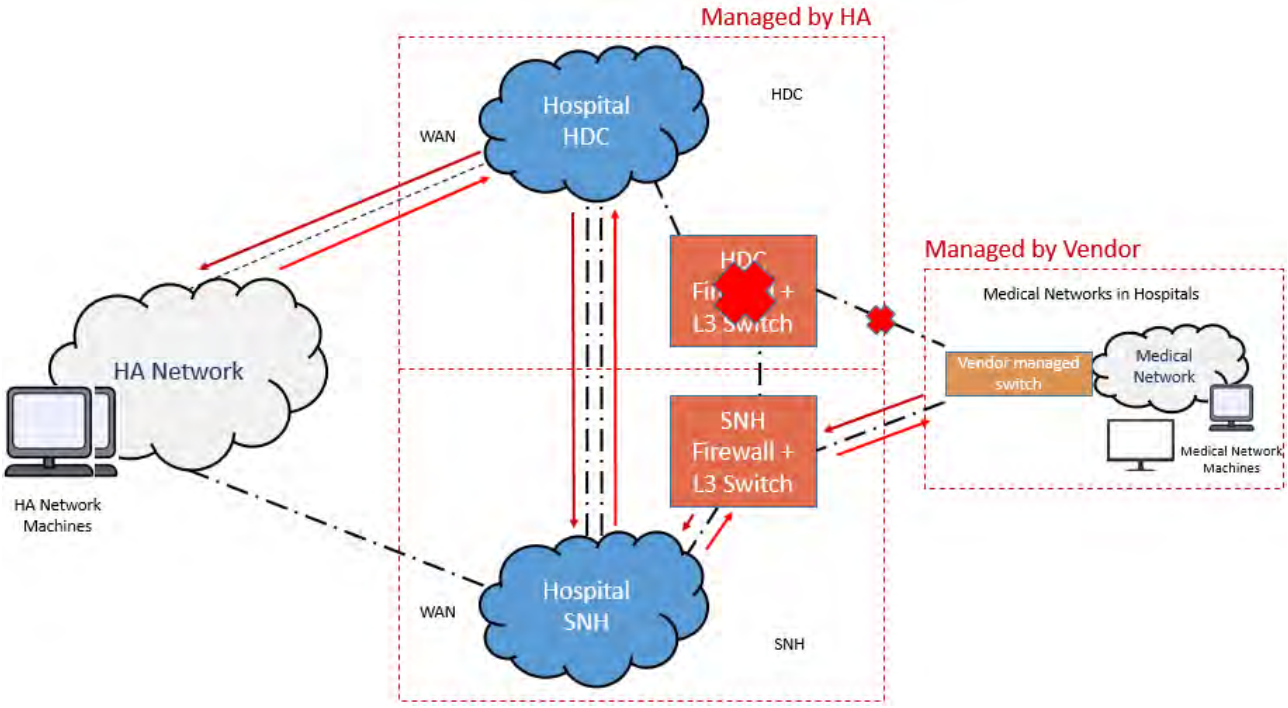
C.1.1 Network Diagram



C.1.2 Normal Network Path

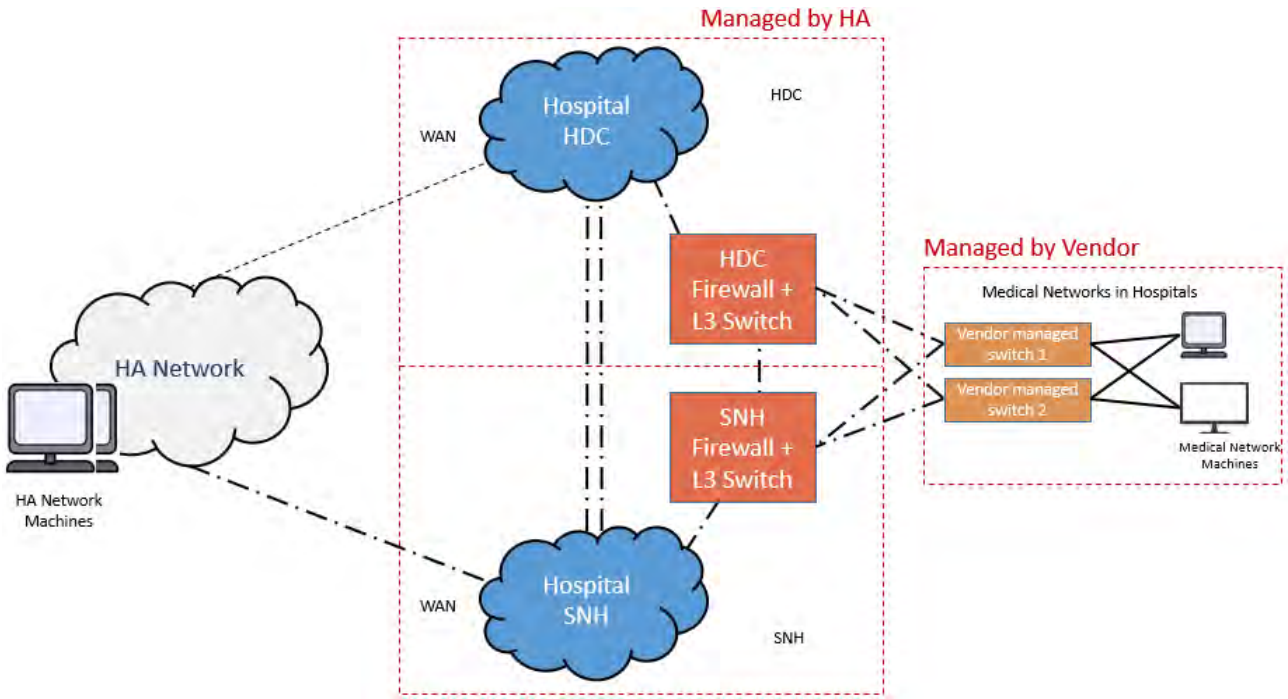


C.1.3 Failure Scenario

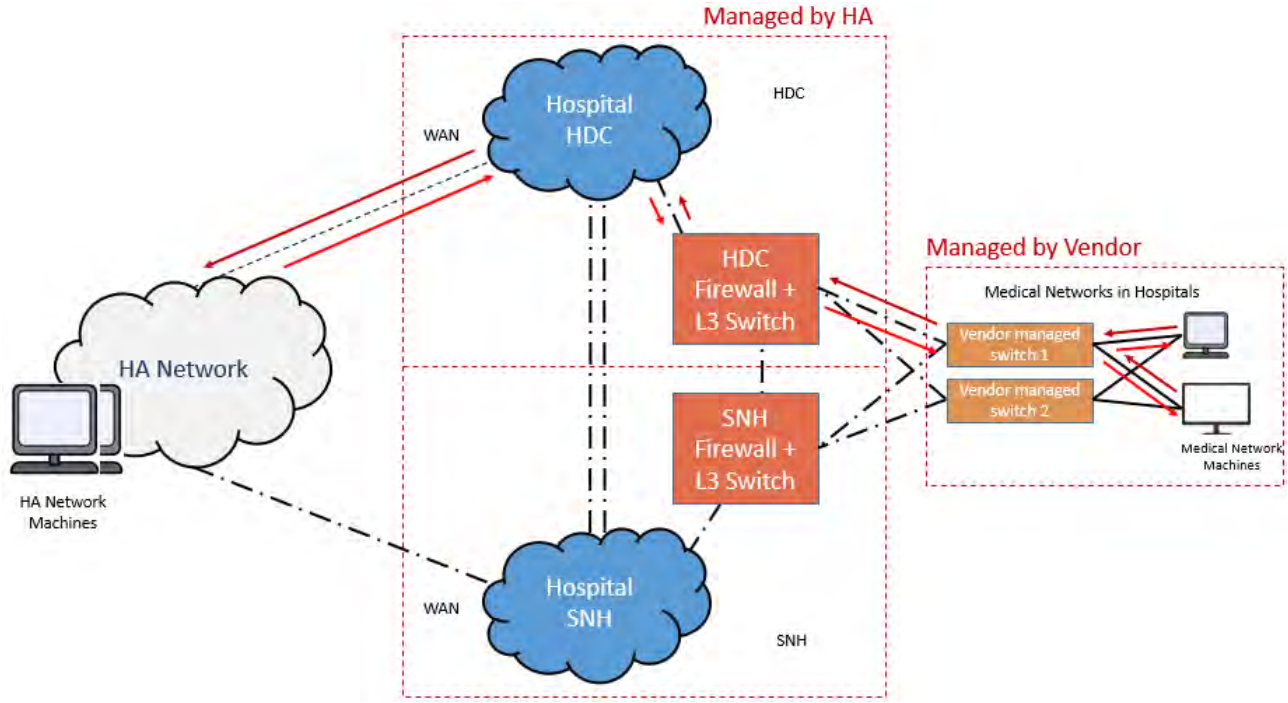


C.2 Model B (Resilient Vendor Managed Layer 2 Switches)

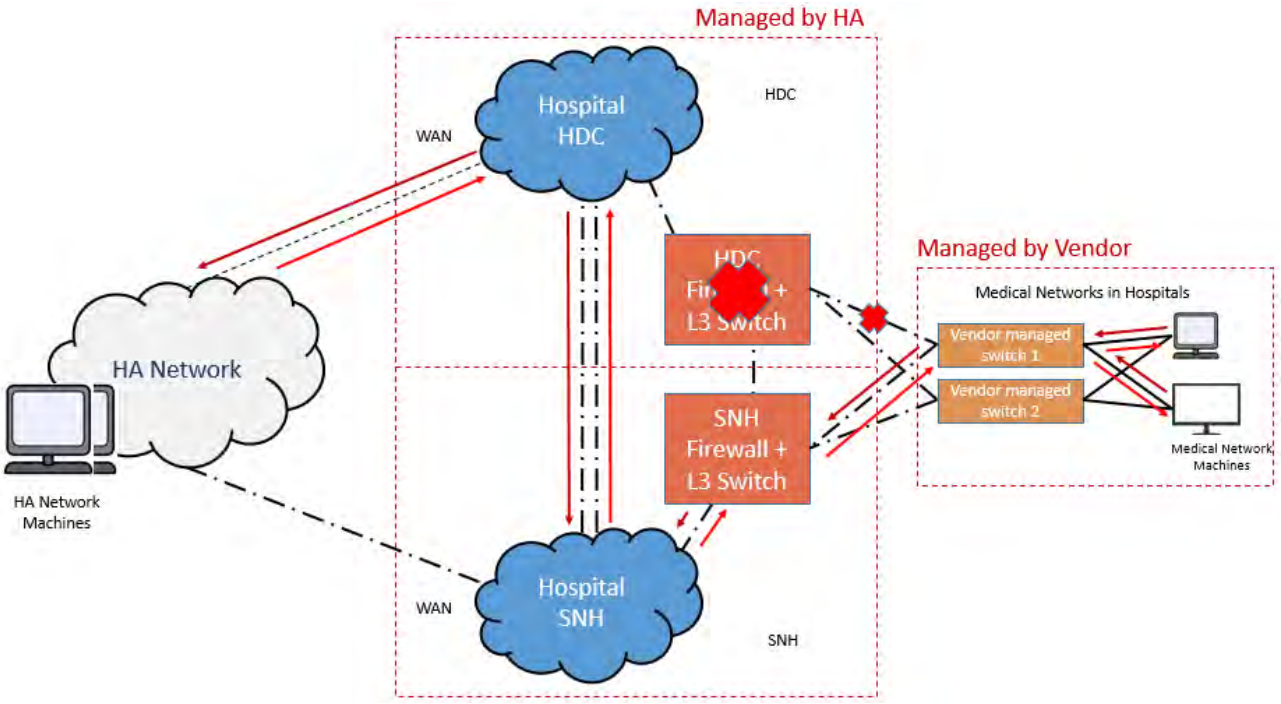
C.2.1 Network Diagram



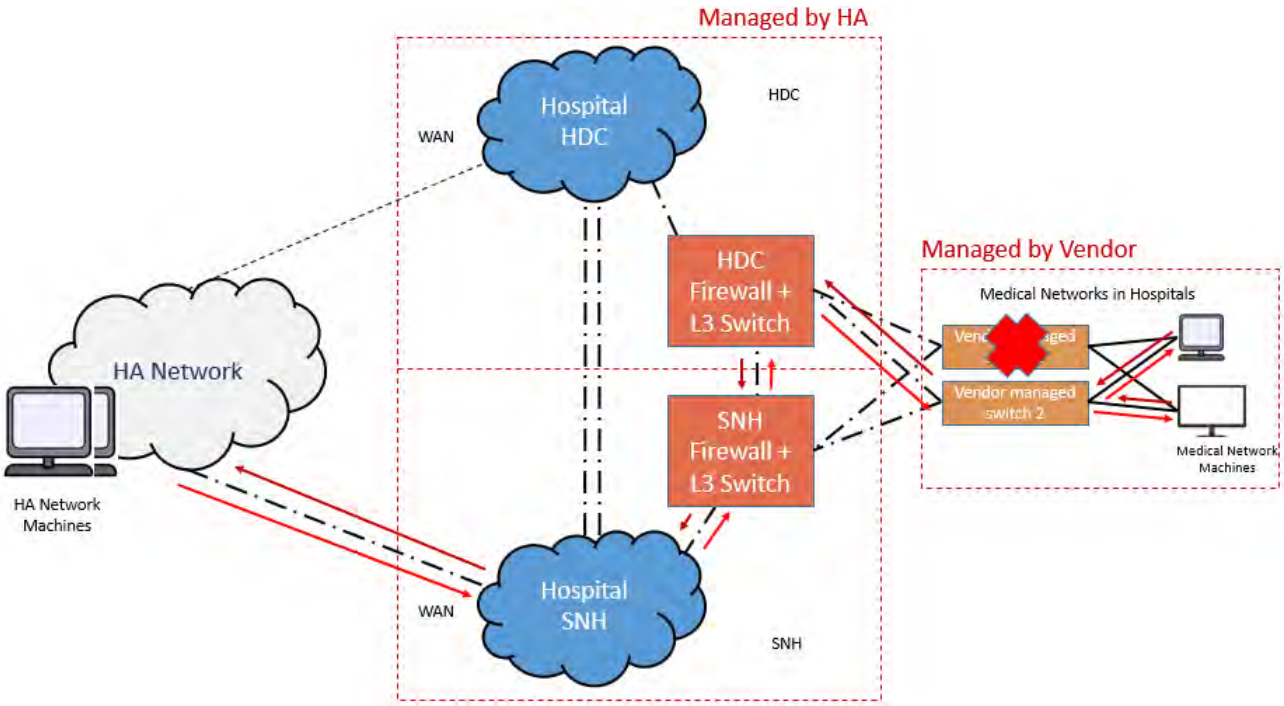
C.2.2 Normal Network Path



C.2.3 Failure Scenario B1



C.2.4 Failure Scenario B2



D. Vendor System Security Compliance Report (Sample)

Hospital: _____ **Name of Systems:** _____

Installation Location: _____ **IP Subnet:** _____

Security Requirements for Vendor System/Equipment Installed in HA

Items for Verification with Vendor		Comply (Y/N/NA)	Remark (if "N" or "NA")
A.	**Data Security (Review in regular basis)**		
A1	Confidential data downloaded from the System/Equipment to end-user devices should be encrypted		
A2	Confidential data transferring between the System/Equipment and other HA IT systems should "preferably" be encrypted		
A3	Confidential data stored within the System/Equipment should "preferably" be encrypted		
A4	Confidential data stored in backup storage should be encrypted		
A5	Confidential data must not be exported for any usage unless prior authorisation has been obtained from HA.		
A6	Is the confidential data in System/Equipment and backup being protected from unauthorized access / leakage, including physical security controls? Please specify the controls in "Remark"		
B.	**Application Security (Review in regular basis)**		
B1	The application should support role-based access control		
B2	The application should employ prevalent authentication mechanism at reasonable safety level		
B3	The application should apply network level encryption		
B4	The application should provide health-checking information		
B5	The application should keep audit logs		
B6	Conformance to HA's Guidelines for Application Security		
C.	**Network Security (Review in regular basis)**		
C1	The System/Equipment should not have any network connection to external parties and should not have any unauthorized network connections		

Items for Verification with Vendor		Comply (Y/N/NA)	Remark (if "N" or "NA")
C2	The System/Equipment network should connect to the network port provided by HA		
C3	The System/Equipment network should use IP addresses as assigned by HA		
C4	Only the authorised network traffic is permitted between the System/Equipment network and HA network		
C5	Formal change request and endorsement process for defining and implementing the network firewall policies		
D.	**Server Security (Review in regular basis)**		
D1	Vendor should implement the server security as described in the Guidelines for Windows Server Hardening and the Guidelines for Host Security Hardening		
D2	Vendor should install into the servers an anti-virus program running with the latest virus definitions		
D3	Vendor should install the latest security patches in the servers		
D4	Vendor should perform a regular scanning in the servers		
E.	**Client / Desktop Security (Review in regular basis)**		
E1	Vendor should implement the security controls at the PCs of the System/Equipment as described in the Guidelines for Security Requirements for HA PCs and Notebooks		
F.	**Security Incident Reporting (On-going exercise)**		
F1	Vendor should immediately report security incidents to Cluster/Hospital management		
G.	**Vendor Maintenance (Review in regular basis)**		
G1	Vendor should erase the data in storage devices before taking away the equipment for repair		
G2	Vendor should perform technical support on-site unless appropriate remote support arrangement is endorsed		
G3	Vendor support staff should sign the non-disclosure confidentiality agreement		
G4	When equipment is required to be taken away for offsite repair, are there ways to remove / erase / protect the confidential data in the equipment form leakage? Please specify the controls in "Remark"		

Items for Verification with Vendor		Comply (Y/N/NA)	Remark (if "N" or "NA")
H.	**Privacy Control (Review in regular basis)**		
H1	Are there any user authentication controls present in the System/Equipment?		
H2	Is unique user ID being assigned to every user?		
H3	Does the System/Equipment allow setting of complex password such as upper / lower case, alpha, numeric and special characters?		
H4	Does the System/Equipment provide audit trails of user accesses? Please specify the controls in "Remark".		
H5	Is there any means to synchronize System/Equipment time with a trustworthy time server such as HA time server for accurate system record?		
H6	Perform user account review annually and disable inactive user immediately.		

Assumptions

1. in-direct offline storage should not be used

Full Name of Vendor Staff: _____ **Vendor Company:** _____

Position of Vendor Staff _____ **Company Chop:** _____

Signature of Vendor Staff: _____ **Date:** _____

Guidelines for Cabling System and Network Setup in External Network

Version	Effective Date
5.0	29/11/2022

Document Number	HAHO-ITD-GL-N05-001-v05
Author	Will NG, HOIT&HI SA(N5)3
Custodian	C K HUNG, HOIT&HI SSM(N)
Approved/ Endorsed By	ITD
Approval Date	29/11/2022
Distribution List	All HA HOIT&HI Staff / Cluster IT Staff

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Amendment History

Version No.	Date of Amendment	Prepared by	Description
1.0	09/10/2020	John Tse	First version
2.0	09/12/2020	John Tse	Update the External Network Architecture Diagram in section 4 to indicate the building switch is a L3 switch
3.0	20/07/2021	John Tse	Update the cabling system and L2 switch guidelines and specifications
4.0	15/8/2022	John Tse	Update Section: 4. Guidelines to Setup External Network 5. External Network Architecture 6. Roles & Responsibilities 7. Network Cabling System & Network Equipment 8. Network Cabling in External Network 9. External Network Setup by Vendor 10. L2 Switch Specification Requirements 11. L2 Switch Configuration 12. Acceptance to Checklist 13. Appendix A and Appendix B
5.0	25/11/2022	Will Ng	Update words in section 7

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1. Purpose

The purpose of this document is to provide guidelines for External Network Vendor to perform cabling work and network setup for External Network System.

2. Reference

N/A

3. Overview

3.1 Objectives

The objectives of this Guidelines includes:

(a) To provide the External Network architecture for Vendors to follow;

(b) To provide the cabling / network equipment specification requirements for Vendors to follow;

(c) To provide the guideline for network cabling in External Network;

(d) To provide the guideline for network switch configuration.

3.2 Scope

The scope of this IT guidelines is applicable to all External Network systems.

3.3 Background

(a) Previously there is no standard for External Network Vendors to implement cabling system and network;

(b) Cabling system and/or network equipment cannot be reused when the External Network end of support;

(c) A guideline shall be developed to maintain the standards of cabling system implementation and network setup in External Network.

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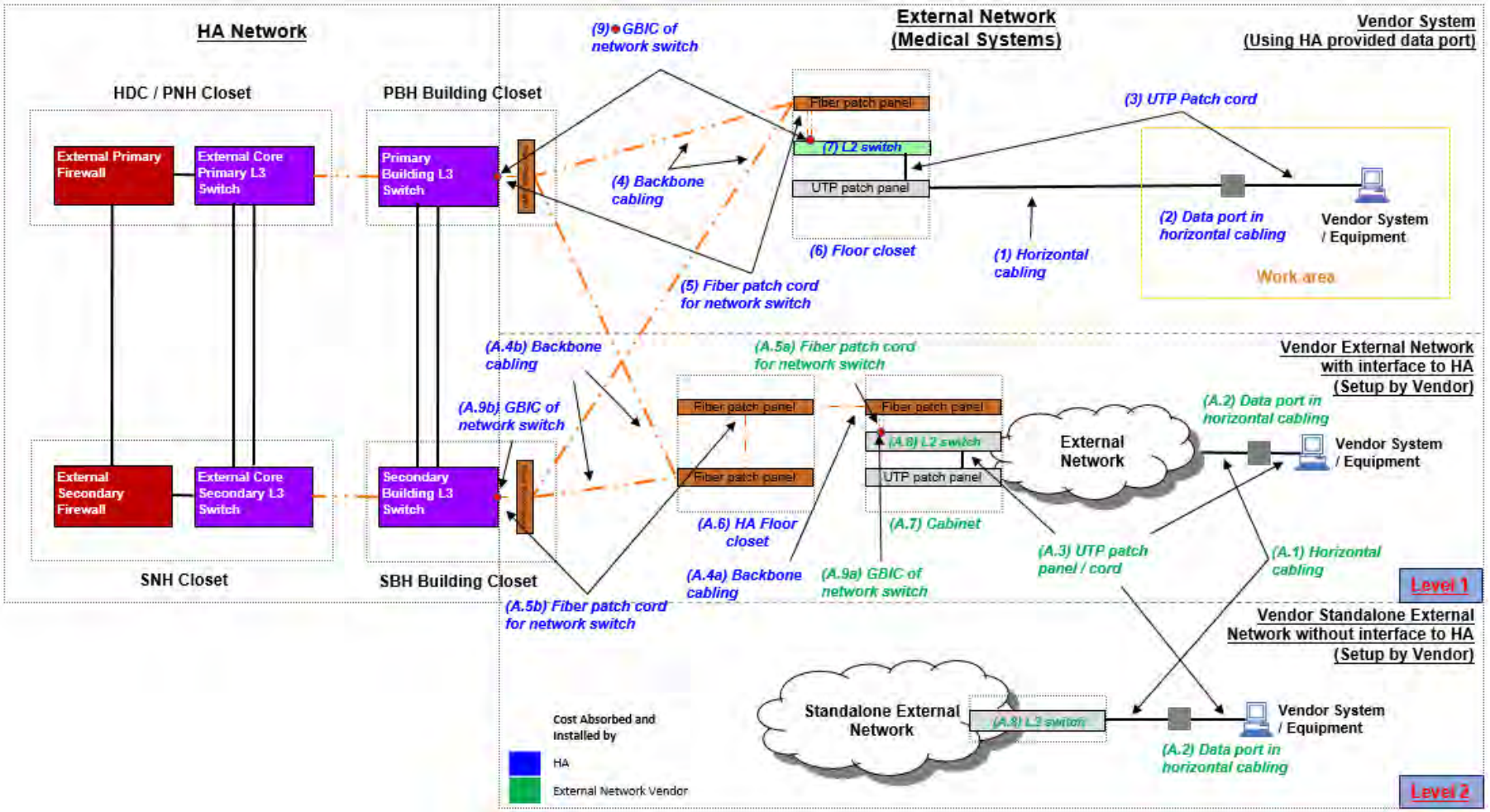
4. Guidelines to Setup External Network

Level	Type	Standards and Guidelines	Cabling	Network Equipment	Criteria
1	Vendor External Network with interface to HA	Follow: 1. IT Security Requirements for Quotation / Tender – Procurement of "non-IT" System/Equipment 2. This guideline for cabling system and network setup	Vendor can use their own cabling contractor (Except backbone cabling to be done by HA cabling contractor)	Vendor can use their own L2 switch that meet the specification in this guideline	Vendor shall provide the Cabling System and Network Setup Checklist for record purpose
2	Vendor Standalone External Network without interface to HA		Vendor can use their own cabling contractor	Vendor can use their own L2 switch	

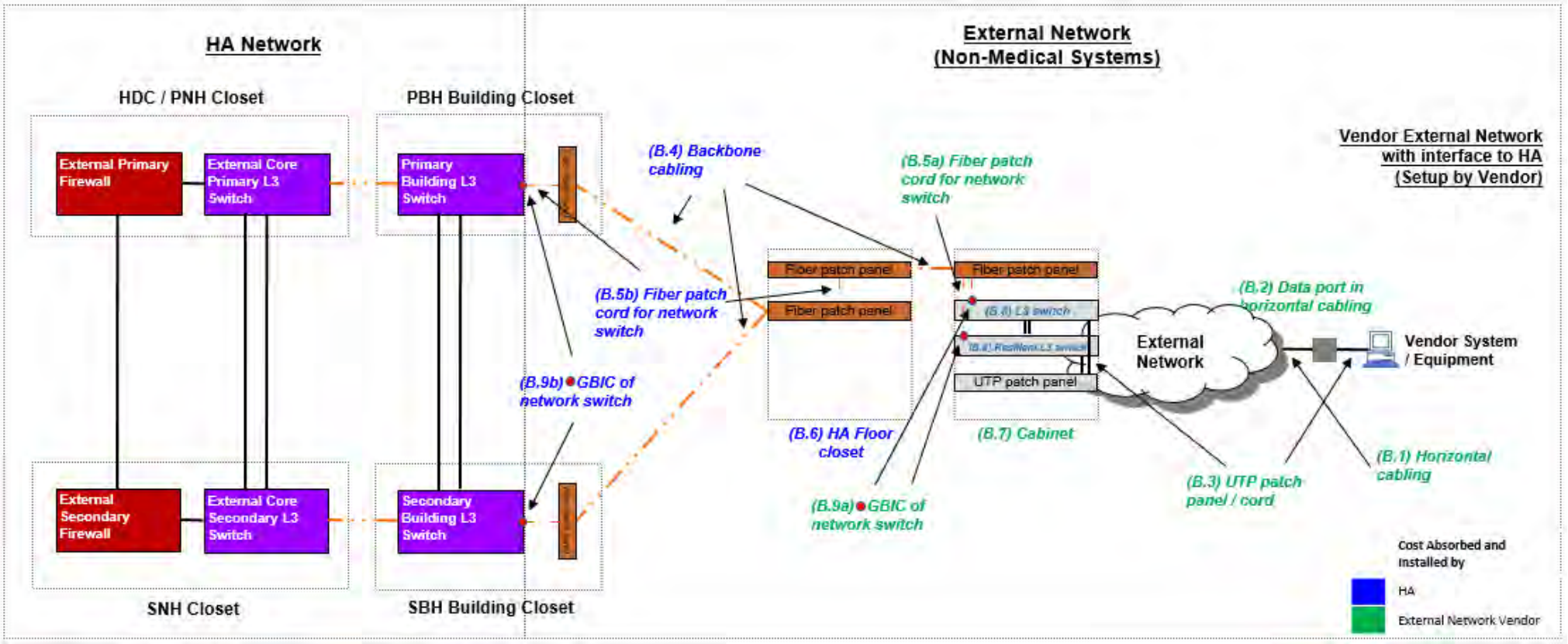
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5. External Network Architecture

Below diagram illustrates the External Network Architecture for Medical Systems



Below diagram illustrates the External Network Architecture for Non-Medical Systems



6. Roles & Responsibilities

Level	External Network	Component	Cost Absorbed and Installed by
1	Vendor External Network with interface to HA	(A.1) Horizontal cabling (Between Data port and vendor cabinet)	External Network Vendor
		(A.2) Data port (in horizontal cabling)	
		(A.3) UTP patch panel / cord for data port and in vendor cabinet	
		(A.4a) Horizontal Backbone cabling	HA
		(A.4b) Vertical Backbone cabling	
		(A.5b) Fiber patch cord for network switch	
		(A.6) HA Floor closet	
		(A.7) Cabinet	External Network Vendor
		(A.8) L2 Switch	
		(A.9a) GBIC of Network switch at vendor cabinet	
		(A.9b) GBIC of Network switch at PBH / SBH building closets	HA Network Equipment Vendor
2	Vendor Standalone External Network without interface to HA	(A.1) Horizontal cabling (Between Data port and vendor cabinet)	External Network Vendor
		(A.2) Data port (in horizontal cabling)	
		(A.3) UTP patch cord for data port and in vendor cabinet	
		(A.5a) Fiber patch cord for network switch	
		(A.8) L2 Switch	

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7. Network Cabling System & Network Equipment

External Network	Usage	Product Description
Network cabling system	(A.1) Horizontal cabling (A.2) Data port (in Horizontal cabling)	Cat6 / Cat6A cable, LSZH rated
		Faceplate with modular Jack, angled outlet with shutter/latch or rack-mounted RJ45 patch panel with modular jacks, 24-port, 1U, straight, each modular jack shall be separately replaceable
	(A.3) UTP Patch panel / cord for Data port and in vendor cabinet	1-metre Cat6 / Cat6A slim patch cord with RJ45 connectors at both ends, straight, LSZH rated, factory-terminated
		2-metre Cat6 / Cat6A slim patch cord with RJ45 connectors at both ends, straight, LSZH rated, factory-terminated
		3-metre Cat6 / Cat6A patch cord with RJ45 connectors at both ends, straight, LSZH rated, factory-terminated
		Rack-mounted RJ45 patch panel with modular jacks, 24-port, 1U, straight, each modular jack shall be separately replaceable
	(A.4a) Horizontal Backbone cabling (A.4b) Vertical Backbone cabling	Indoor / outdoor 12-core, 9/125mm OS2 single-mode optical fiber, LSZH rated, with duplex LC connector at both ends
		Rack-mounted single-mode fiber patch panel with 24 duplex LC couplers/adapters, 48 cores, 1U
	(A.5a) Fiber patch cord for network switch (A.5b) Fiber patch cord for network switch	2-metre / 3-metre, single-mode OS2 fiber patch cord, LSZH rated, with duplex LC connector at both ends, factory terminated
	(A.6) Cabinet	Communication equipment cabinet (Floor-standing, steel, at least 1000kg load capacity, fully perforated front door, fully perforated middle-split rear door, all doors equipped with key locks, heavy duty casters with feet): 1. 42U racking space (Dimension: height 2050mm x width 800mm x depth 1100mm) or 2. 42U racking space (Dimension: height 2050mm x width 800mm x depth 870mm) or 3. 42U racking space (Dimension: height 2050mm x width 600mm x depth 1100mm) or 4. 42U racking space (Dimension: height 2050mm x width 600mm x depth 870mm) or

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		5. 37U racking space (Dimension: height 1800mm x width 600mm x depth 870mm) or 6. 27U racking space (Dimension: height 1400mm x width 600mm x depth 870mm) In Hospital Data Centre (HDC): Communication equipment cabinet (Same as the above requirements): 1. 42U racking space (Dimension: height 2050mm x width 600mm x depth 1200mm) Server cabinet (Same as the above requirements except the load capacity is 1500kg): 1. 42U racking space (Dimension: height 2050mm x width 600mm x depth 1200mm) or 2. 47U racking space (Dimension: height 2250mm x width 600mm x depth 1200mm) The cabinet size is subject to actual site environment.
Network equipment	(A.8) L2 switch	1. For Vendor External Network with interface to HA (Level 1): - Vendor can use other L2 switch according to the L2 Switch Specification Requirements and L2 Switch Configuration specified in section 10 and 11 respectively 2. For Vendor Standalone External Network without interface to HA (Level 2): - Vendor can use their own L2 switch
	(A.9a) GBIC of network switch at Building closet	1000BASE-LX/LH SFP transceiver module MMF/SMF 1310nm.
	(A.9b) GBIC of network switch at vendor cabinet	1000BASE-LX/LH SFP transceiver module MMF/SMF 1310nm

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8. Network Cabling In External Network

8.1 Cabling System Structure In Hospital

The elements of the cabling system structure in hospital are:

a. Backbone cabling;

b. Horizontal cabling;

c. Data port (in Horizontal cabling);

d. Floor closet.

8.2 Backbone Cabling

a. The function of the backbone cabling is to provide interconnections between Floor closet of External Network and Building closets of HA Network.

b. Backbone cabling consists of the backbone cables, intermediate and main cross-connects mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection. Backbone cabling also includes cabling between buildings.

c. For fiber backbone cable, fiber patch cord, the fiber polarity shall be pair-flipped (A-to-B and B-to-A connection) to ensure transmit-to-receive connectivity.



d. Recognized cables

Below type of cable is recognized and recommended for use in the backbone cabling system in HA network:

- 9/125 µm OS2 single mode optical fiber.

Recognized cables, associated connecting hardware, patch cords and equipment cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.3.

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8.3 Horizontal Cabling

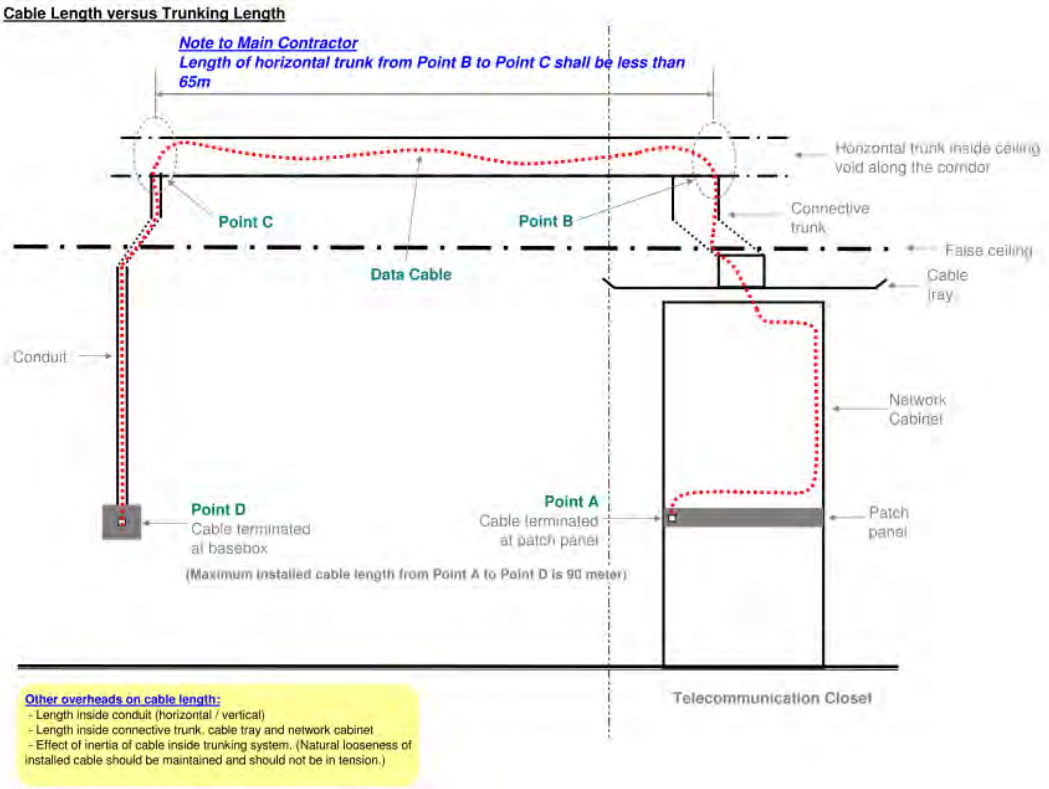
a. The horizontal cabling is the portion of the telecommunication cabling system that extends from the Data port in work area to the Floor closet. In HA environment, that also means the linkage between user Data port and patch panel in network closet;

b. The horizontal cabling includes horizontal cables, Data port in the work area, mechanical terminations and patch cords or jumpers located in the Floor closet;

c. The term "horizontal" is used since typically the cable in this part of the cabling system runs horizontally along the floor of a building;

d. Horizontal distances:

The horizontal distance is the cable length from the mechanical termination of the media at the horizontal cross-connect in the Floor closet to the Data port in the work area. The maximum horizontal distance for copper cabling shall be 90m and the cable inside ceiling trunking shall not exceed 65m length;



For each horizontal channel, the total length allowed for cords in the work area plus patch cords or jumpers plus equipment cables or cords in the Floor closet shall not exceed 10 m (33 ft). An allowance was made for 5 m (16 ft) from the telecommunications outlet to the work station.

e. Recognized cables

Two types of cables are recommended for use in the horizontal cabling system in HA network, as designated by HA:

- Four-pair 100-ohm foiled/unshielded twisted-pair (F/UTP). Cat.6a cable or;
- Four-pair 100-ohm unshielded twisted-pair (UTP). Cat.6 cable.

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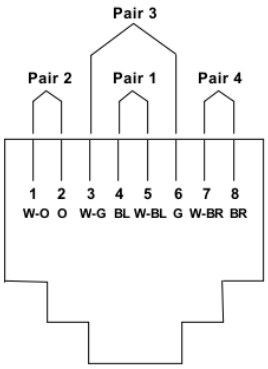
Recognized cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2.

8.4 Data Port (In Horizontal Cabling)

a. The work area components extend from the Data port to the Medical work station;

b. The Data port for 100-ohm UTP cable shall meet the requirements of ANSI/TIA/EIA-568-B.2;

c. T568B wiring scheme shall be used for termination of copper cabling system in HA;

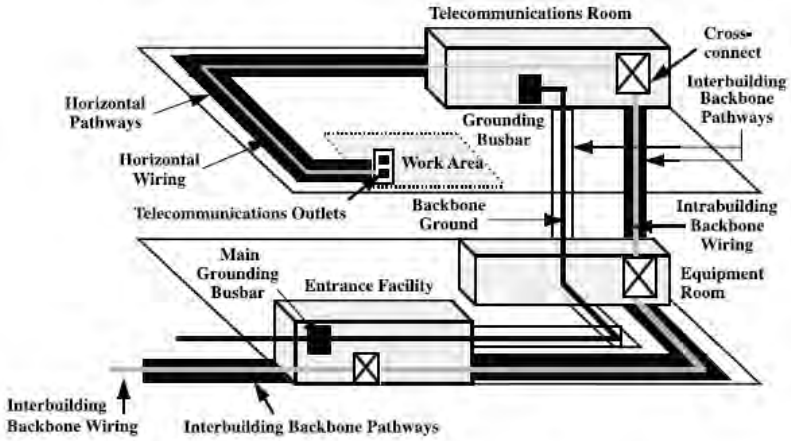


Eight-position jack pin/pair assignment (T568B)

d. Patch cords used in the work area shall meet or exceed the performance requirements in ANSI/TIA/EIA-568-B.2. Therefore, allowed maximum length of work area cord is 5m and 3m cord is for generic used;

e. Labelling of Data port:

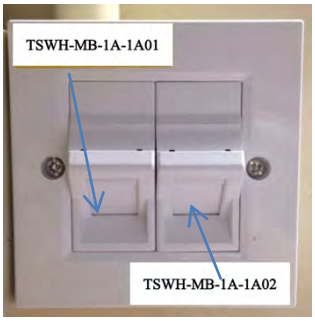
HA follows ANSI/TIA/EIA-606-A for labelling of Data ports;



Scope of ANSI/TIA/EIA-606-A

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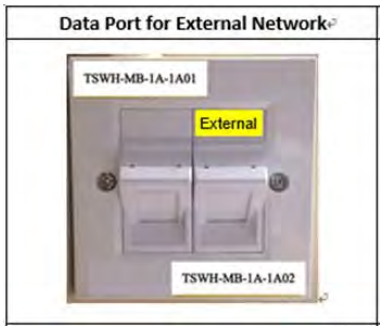
Data port's ID shall be printed on white label with black ink. The ID of left-hand side outlet shall be affixed on the upper left-hand corner and the right-hand side outlet shall be on the lower right-hand corner of the faceplate as below:



Labelling of Data port's usage:

- Labels shall be printed in black word on yellow label in 2cm x 1cm size as below:

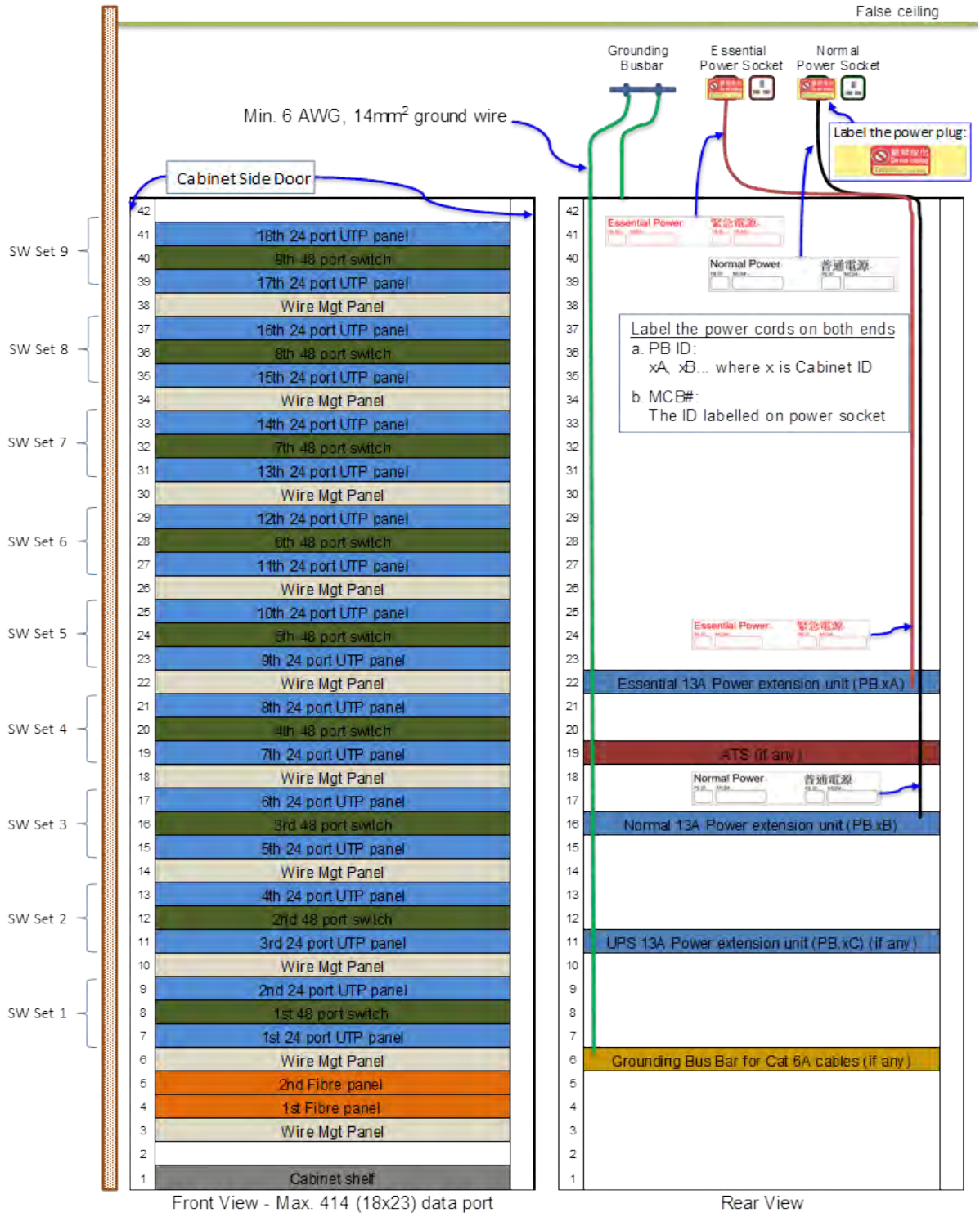
External Network Data port: Yellow label



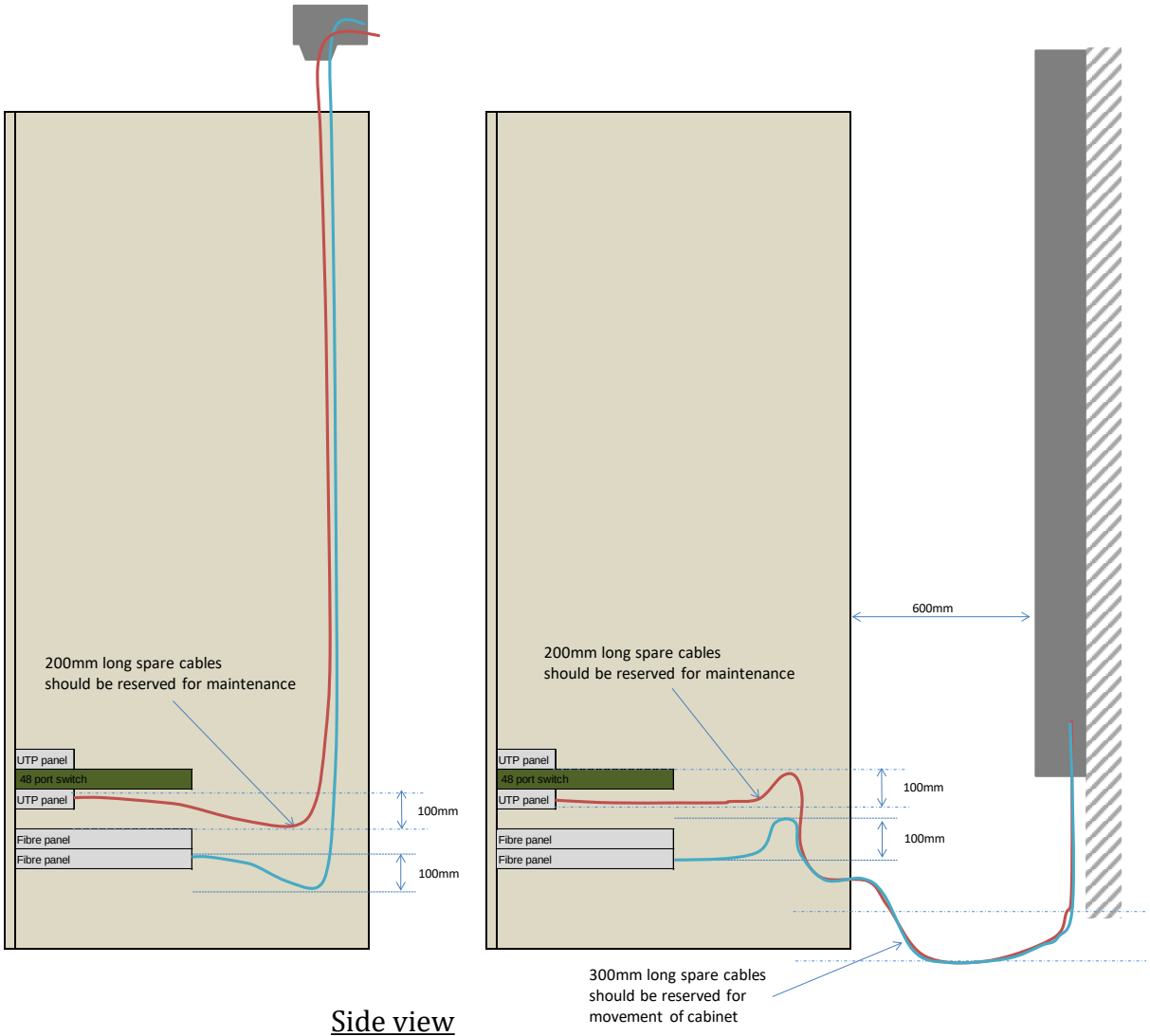
8.5 Floor Closet Setup

a. Floor-stand cabinet:

Cabinet space assignment:



Termination of network cables for floor-stand cabinet:



Side view

9. External Network Setup by Vendor

For Vendor External Network with interface to HA (Level 1) and Vendor Standalone External Network without interface to HA (Level 2), External Network Vendor shall follow below guidelines to setup the External Network:

9.1 Shall setup the Local Area Network (LAN) of Vendor External Network (Level 1) and (Level 2) regarding the roles and responsibilities in section 6.

9.2 Horizontal cabling for Vendor External Network (Level 1) and (Level 2):

a. Recognized cables:

Two types of cables are recommended for use in the horizontal cabling system in HA network, as designated by HA:

- Four-pair 100-ohm foiled/unshielded twisted-pair (F/UTP). Cat.6a cable or;

- Four-pair 100-ohm unshielded twisted-pair (UTP). Cat.6 cable;

Recognized cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2.

b. Most of hospitals have been adopted Cat. 6 cable that the External Network Vendor shall use Cat.6 cable by default.

c. The External Network Vendor shall install Cat.6a cabling standard in those hospital buildings that Cat.6a cabling systems are installed. (Please refer to Appendix A for the list of new hospital or building).

d. The type of horizontal cabling to be adopted is subject to the confirmation by HA.

9.3 For Vendor External Network (Level 1) setup, the backbone cables (Two orange long dash dotted lines from Building closets to HA Floor closet and one orange long dash dotted lines from vendor cabinet to HA Floor closet) and GBICs at Building closets (the red dots at Primary & Secondary Building L3 switches of HA Network) in the diagram of section 5 “External Network Architecture” shall be installed by HA.

9.4 Backbone cable of Vendor External Network (Level 1) to HA Network:

a. Backbone cabling consists of the backbone cables, intermediate and main cross-connects mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection. Backbone cabling also includes cabling between buildings;

b. Recognized cables:

Below type of cable is recognized and recommended for use in the backbone cabling system in HA network:

- 9/125 µm OS2 single mode optical fiber.

Recognized cables, associated connecting hardware, patch cords and equipment cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.3.

9.5 HA shall arrange HA Authorized Cabling Contractor to install these backbone cablings and HA Equipment Vendor to install the GBICs at Building closets.

9.6 External Network Vendor shall install the GBICs in the switch at vendor cabinet.

9.7 At least one L2 switch or with resilient when HA requires and shall cater for different auto network failover and recovery scenarios.

9.8 The External Network Vendor shall coordinate with hospital end user to install floor-standing cabinet for accommodation of network and cabling equipment. Detail of floor-standing cabinet could be referred to section 8.5 “Floor closet setup”.

9.9 All network connections and corresponding network diagrams shall be well documented.

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10. L2 Switch Specification Requirements

10.1 For Vendor External Network with interface to HA (Level 1) setup, External Network Vendor is required to supply, deliver, install and maintain the Layer-2 Ethernet switch and related hardware, software and services to support the network requirements of the External Network.

10.2 The configuration of the proposed switch shall support:

10.2.1 24 numbers or above of wire-speed full duplex auto-sensing 100/1000Baase-T Ethernet ports plus at least 4 numbers of wire-speed full duplex auto-sensing pluggable transceiver Ethernet ports support 1Gbps and 10Gbps;

10.2.2 Shall support bridging and at least 16,000 MAC address table size;

10.2.3 Shall provide Layer-2 switching capacity of at least 64Gbps bandwidth in full duplex (that is, 128Gbps bandwidth for transmit and receive simultaneously);

10.2.4 Shall support Resilience link assigned to any pair of ports without using Spanning Tree Protocol (STP). Only one link is in transmission mode and the other one is in standby/backup mode;

10.2.5 Shall support Link Aggregation Control Protocol (LACP);

10.2.6 Shall support IEEE 802.1Q VLANs. The VLANS shall be grouped by ports within a single switch;

10.2.7 All ports shall be able to be assigned to both tagged and untagged VLANs at the same time;

10.2.8 Shall support packet classification and filtering by user-defined criteria based on TCP/UDP ports and/or Source/Destination IP addresses without Layer-3 routing protocol enabled;

10.2.9 Shall support IPv4 and IPv6 protocols;

10.2.10 Shall support IGMP V1/v2 and Snooping;

10.2.11 Shall support RFC 2138 RADIUS Authentication;

10.2.12 Shall support RFC 2139 RADIUS Accounting;

10.2.13 Shall support the authentication through the RADIUS. At least two RADIUS servers (Primary and Backup/Secondary) can be defined;

10.2.14 Shall support NTP or SNTP with at least two time servers;

10.2.15 Shall support IEEE802,1x EAP Authentication;

10.2.16 Shall support 802.1x MAC-based mechanisms network login;

10.2.17 Shall support syslog remote logging to at least two servers;

10.2.18 Shall support the following network management features:

10.2.19 local and remote management including but not limited to changing configuration, upload/download configuration files to management server, download firmware from management server, resetting switch port and reboot with following connectivity:

(i) at least one out-of-band 100-BaseT or 1000-BaseT management port for remote management over SSHv2 (RFC4251 and associated RFCs);

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(ii) REST based or equivalent API for remote management;

(iii) Console port for local management.

10.2.20 Mirror port for attachment of network analyzer;

10.2.21 SNMP V2c/V3 and RFC1213 MIBII;

10.2.22 Shall support Access Control Lists (ACLs);

10.2.23 Shall support not be greater than 1U (45mm);

10.2.24 Shall come with power cord meeting the following specifications subject to HA instruction:

(i) 2 meter IEC320 C14 to IEC320 C13 or IEC320 C15 (10A / 15A rating, straight / L-Shape as per request) power cord with both side lockable; or

(ii) 2 meter BS1363 plug to IEC320 C13 or IEC320 C15 lockable connector (10A / 15A rating, straight / L-Shape as per request) power cord.

10.2.25 Shall support dual hot-swappable power supply;

10.2.26 The depth of the Layer-2 switch shall not be greater than 420mm; and

10.2.27 To ensure the compatibility with HA network, the vendor L2 switch shall compatible with the following HA network switch at Building including but not limited to:

(i) Cisco Nexus Series Layer-3 switches;

(ii) Extreme Networks Layer-3 switches; and

(iii) Huawei CloudEngine Layer-3 switches.

11. L2 Switch Configuration

11.1 For Vendor External Network with interface to HA (Level 1) setup, Vendor is required to configuration the Layer-2 Ethernet switch to support the network requirements of the External Network.

11.2 The L2 switch shall have two 1000BASE-LX SFP uplink port such as:

a. Port 51 is Primary uplink to Primary Building Switch in HA Network.

b. Port 52 is Resilience uplink to Secondary Building Switch in HA Network.

11.3 The switch port status shall be shutdown if NO connection. The switch is required to be enabled when the Vendor system / equipment to be connected to the switch.

11.4 VLANs are required to be created for Vendor system / equipment in configuration:

a. VLAN ID to be provided by Hospital Authority when project to be implemented.

11.5 For switch port of Primary uplink and Resilience uplink such as:

a. The port status of Port 51 (Primary uplink) is required to be enabled. The port mode is “mode trunk”. Backup port is Port 52 (Resilience uplink).

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b. The port status of Port 52 (Resilience uplink) is required to be enabled. The port mode is "mode trunk". No backup port is needed.

11.6 For other configuration of switch port such as 1 to 48, Port mode is "mode access". Port security shall be enabled. Port security violation mode to be restricted. Port logging to be enabled. No MDIX is required.

11.7 The network switches shall connect to the end device directly.

11.8 No daisy-chaining or cascading of network switches are allowed.

11.9 Additional configuration according to HA request.

Below is the Cisco Catalyst L2 switch basic configuration. The proposed L2 switch shall implement the same or equivalent feature / status and shall be fully compatible with the existing HA environment:

Switch Port	**Feature / Status**	**Switch Configuration**
Port 1 - 48	Port Status	shutdown (refer to 11.3)
	Port Mode	mode access
	Port VLAN ID	VLAN xxx (refer to 11.4)
	Port security	Enable
	Port security violation mode	restrict
	Port logging	disable
	MDIX	No
Port 51 (Primary Uplink)	Port Status	no shutdown
	Port Mode	mode trunk
	Active Port	rep segment xxx edge no-neighbor primary
Port 52 (Resilience Uplink)	Port Status	no shutdown
	Port Mode	mode trunk
	Backup Port	rep segment xxx edge no-neighbor preferred

12. Checklist

12.1 External Network Vendor shall submit the "Cabling System and Network Setup Checklist" with respective to the requirements stipulated in this guideline for record purpose. (Please refer to Appendix B for the sample checklist)

12.2 The completed "Cabling System and Network Setup Checklist" shall return to Head Office Information Technology (HOIT) by email to "n5.extnet@ha.org.hk" within 3 months after the installation / network setup.

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12.3 For any general enquiries relating to Cabling System and Network Setup, please contact HOIT by email to "n5.extnet@ha.org.hk".

13. Further Information

Further information and details can be obtained by contacting:

- Will Ng, HO IT&HI SA(N5)3, 35426027, nwt404@ha.org.hk
- HO IT&HI N5 External Network, n5.extnet@ha.org.hk
- C K HUNG, HO IT&HI SSM(N), 2300 6602, ck.hung@ha.org.hk

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Appendix A: List of Hospital Adopting Cat. 6a cable

List of new hospital buildings installed with Cat.6a cabling systems

No.	Hospital Name
1	H K Red Cross Blood Transfusion Service (BTS) - New Annex Building
2	Haven of Hope Hospital (HHH) - Trinity Block
3	Hong Kong Children's Hospital (HKCH) – all blocks
4	Multi-service Centre (MSC) – all blocks
5	Shatin Hospital (SH) - Block D
6	Tune Mun Hospital (TMH) – OT Block Extension
7	Kwong Wah Hospital – New Block

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Appendix B: Cabling System and Network Setup Checklist

Hospital: _____ Name of External Network: _____
Location: _____ IP Subnet: _____
Reviewer: _____ Post Reviewer: _____
Date: _____

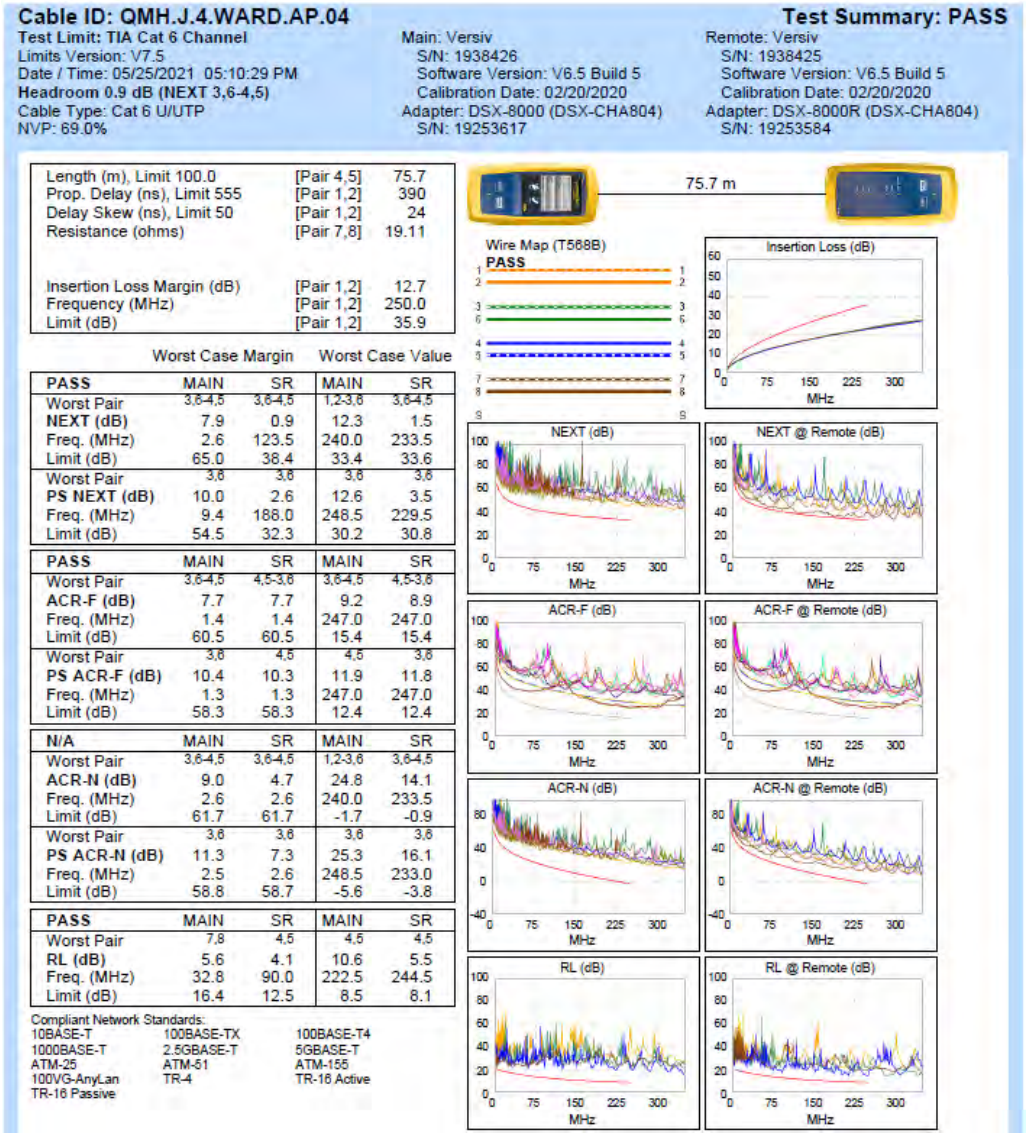
Cabling System and Network Setup Checklist

No.	Description	(Y/N)	Remark
A	**Cabling System**		
A1	All cables passed with soft copy of test report submitted		
A2	All cables for use in the horizontal cabling system are: - Four-pair 100-ohm unshielded twisted-pair (UTP). Cat.6 cable or; - Four-pair 100-ohm foiled/unshielded twisted-pair (F/UTP). Cat.6a for using in new building / hospital		
A3	All cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2		
A4	The data ports for 100-ohm UTP cable shall meet the requirements of ANSI/TIA/EIA-568-B.2 and T568B wiring scheme shall be used for termination of copper cabling system		
A5	Patch cords used in the work area shall meet or exceed the performance requirements in ANSI/TIA/EIA-568-B.2		
A6	All fiber cables, associated connecting hardware, jumpers, patch cords, equipment cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.3		
A7	Follow HA standards in the labelling of data ports		
A8	Follow HA standards to install floor-stand cabinet and cabinet space assignment		
B	**Network Switch**		
B1	Provide the brand and model of the network switch: _____		
B2	Provide the configuration of the network switch		
B3	The network switch port shall be shutdown if NO connection		
B4	There is no daisy-chaining or cascading of network switches		
B5	The network switch port to connect end device shall enable with port security and port security violation mode restrict.		
B6	All network connections and corresponding network diagram shall be well documented		
B7	Drill test shall be performed regularly to ensure the entire application / system and network failover is working as expected		
C	**Network Switch Interface to HA Network**		
C1	The network switch shall have two uplink ports connect to Primary and Secondary building switches in HA Network respectively		
C2	The uplink ports shall have two 1000BASE-LX Small form-factor pluggable (SFP) transceiver		
C3	The resilience link assigned to any pair of uplink ports without using spanning tree protocol (STP) and only one link is in transmission mode and the other one is in standby/backup mode		

This printed copy may not be the most updated version. Please refer to the electronic version for confirmation if in doubt

C4	The port mode has been configured as "mode trunk" in the primary and resilience uplinks of the network switch		
C5	The VLAN ID provided by HA has been created in the network switch		

"Passed" Cabling Test Report Sample



Cable ID: QMH.J.4.WARD.AP.04 — **Test Summary: PASS**

Test Limit: TIA Cat 6 Channel
Limits Version: V7.5
Date / Time: 05/25/2021 05:10:29 PM
Headroom 0.9 dB (NEXT 3,6-4,5)
Cable Type: Cat 6 U/UTP
NVP: 69.0%

Main: Versiv
S/N: 1938426
Software Version: V6.5 Build 5
Calibration Date: 02/20/2020
Adapter: DSX-8000 (DSX-CHA804)
S/N: 19253617

Remote: Versiv
S/N: 1938425
Software Version: V6.5 Build 5
Calibration Date: 02/20/2020
Adapter: DSX-8000R (DSX-CHA804)
S/N: 19253584

Length (m), Limit 100.0	[Pair 4,5]	75.7
Prop. Delay (ns), Limit 555	[Pair 1,2]	390
Delay Skew (ns), Limit 50	[Pair 1,2]	24
Resistance (ohms)	[Pair 7,8]	19.11
Insertion Loss Margin (dB)	[Pair 1,2]	12.7
Frequency (MHz)	[Pair 1,2]	250.0
Limit (dB)	[Pair 1,2]	35.9

	Worst Case Margin		Worst Case Value	
PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
NEXT (dB)	7.9	0.9	12.3	1.5
Freq. (MHz)	2.6	123.5	240.0	233.5
Limit (dB)	65.0	38.4	33.4	33.6
Worst Pair	3,6	3,6	3,6	3,6
PS NEXT (dB)	10.0	2.6	12.6	3.5
Freq. (MHz)	9.4	188.0	248.5	229.5
Limit (dB)	54.5	32.3	30.2	30.8

PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	4,5-3,6	3,6-4,5	4,5-3,6
ACR-F (dB)	7.7	7.7	9.2	8.9
Freq. (MHz)	1.4	1.4	247.0	247.0
Limit (dB)	60.5	60.5	15.4	15.4
Worst Pair	3,6	4,5	4,5	3,6
PS ACR-F (dB)	10.4	10.3	11.9	11.8
Freq. (MHz)	1.3	1.3	247.0	247.0
Limit (dB)	58.3	58.3	12.4	12.4

N/A	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
ACR-N (dB)	9.0	4.7	24.8	14.1
Freq. (MHz)	2.6	2.6	240.0	233.5
Limit (dB)	61.7	61.7	-1.7	-0.9
Worst Pair	3,6	3,6	3,6	3,6
PS ACR-N (dB)	11.3	7.3	25.3	16.1
Freq. (MHz)	2.5	2.6	248.5	233.0
Limit (dB)	58.8	58.7	-5.6	-3.8

PASS	MAIN	SR	MAIN	SR
Worst Pair	7,8	4,5	4,5	4,5
RL (dB)	5.6	4.1	10.6	5.5
Freq. (MHz)	32.8	90.0	222.5	244.5
Limit (dB)	16.4	12.5	8.5	8.1

Compliant Network Standards:
10BASE-T, 100BASE-TX, 100BASE-T4
1000BASE-T, 2.5GBASE-T, 5GBASE-T
ATM-25, ATM-51, ATM-155
100VG-AnyLan, TR-4, TR-16 Active
TR-16 Passive

有關屯門醫院進行工程的指引

商戶，承建商及轄下工作工程人員(以下簡稱商戶)須遵守下列規則：

一般守則：

1. 在本醫院內工作必需符合本港所有有關之法例，例如：
   - 鍋爐及壓力容器條例 (香港法例第 56 章)
   - 僱傭條例 (香港法例第 57 章)
   - 工廠及工業經營條例 (香港法例第 59 章)
   - 入境條例 (香港法例第 115 章)(有關禁止僱用非法入境者的第 IVB 部)
   - 建築物條例 (香港法例第 123 章)
   - 建築物(小型工程)規例 (香港法例第 123N 章)
   - 僱員補償條例 (香港法例第 282 章)
   - 空氣污染條例 (香港法例第 311 章)
   - 職業安全健康局條例 (香港法例第 398 章)
   - 僱員補償保險徵款條例 (香港法例第 411 章)
   - 建築工地升降機及塔式工作平台（安全）條例 (香港法例第 470 章)
   - 職業安全及健康條例 (香港法例第 509 章)
   - 建造業工人註冊條例 (香港法例第 583 章)
2. 工程及其設施不得影響本醫院之大廈結構，機電及樓宇裝備設施。
3. 工程開始前須提交設計圖則及計劃書，並由本醫院同意始能動工，而商戶仍需為已同意之圖則及計劃書承擔所有責任。
4. 工程開始前需提交所有員工的人數及名單給管事部(電話 2468-5205)，以作記錄用途。
5. 在工程開始時，應將工程負責人的 24 小時聯絡電話及傳呼機號碼留給管事部，以便有需要時聯絡。
6. 各商戶於工作期間，需配戴所指定的臨時工作證。
7. 所有施工材料，只可放於施工的範圍內，不可亂放。
8. 所有垃圾及棄置的材料只可擺放於醫院指定的物料棄置區，並需定時清理及搬走。
9. 施工期間，商戶只可於工程開始前與院方批准的指定時間事前內使用指定升降機運送物料及垃圾。如需於指定時間外使用升降機，商戶須預先通知院方，並獲得院方同意。
10. 於使用指定的升降機期間，須於升降機內加設防護設施，以保持升降機整潔。
11. 在施工期間應盡量減低噪音及塵埃。如有任何工程會產生噪音，請預先通知醫院作出適當安排及指導，並須符合噪音管制條例。

12. 地盤臨時水、電須要兩星期前向院方申請。商戶之臨時電箱須符合電力條例，必須裝有漏電保護裝置及有效證書(WR1)。

13. 如工程會影響水、電、煤、醫療氣體、冷氣系統、消防裝置、保安裝置或其他設備供應，請詳細列明所影響地方範圍，時間，日期及有關資料，並於兩星期前通知院方，以便院方作出適當安排及通知。

14. 院方不會提供泊車服務，並須遵守院內實施的交通管制條例。如有違例者，院方將會根據賦予權力追究。

15. 所有工程車輛只可停泊或逗留於建築工地範圍內，如有需要逗留或停泊於醫院範圍，請至少於一天前通知醫院作出適當安排，並須符合院內交通管制條例。

16. 須核實所有工程車輛，方可進入工程範圍。

17. 在施工期間，需自行管理所有工具及物料，如有任何損毀或遺失，院方恕不負責。

18. 所有商戶及其委派的工程人員切勿於醫院範圍內赤露上身工作、吸煙、賭博及粗言穢語。

19. 切勿於非工作時間內逗留在本院及施工範圍。

20. 所有工程應在符合政府條例下進行，保障環境、工人及本院員工安全。如在施工過程中而引致觸犯政府條例，商戶需承擔一切法律責任。本院不會負上任何法律責任，而本院亦會保留一切追究及起訴商戶的權利。

21. 根據香港法例（醫院管理局附例第七條 1b），在醫院範圍內吸煙即屬犯法。所有工程承建商必需遵守此法例。

22. 在施工前，醫院代表與商戶安排於施工地點，進行工地交收，商戶需於施工地點檢查所有工地內之設備是否損壞或失去功能，並立即通知醫院代表跟進。當工程完成後，如發現該工地之設備或任何地方有損壞時，商戶需自行修補有關損毀或負責所需維修之費用。

<u>安全守則</u>：

1. 所有易燃物品，應妥善存放，以免發生火警。

2. 如遇火警或意外，除採取適當行動外，須盡快通知管事部。

3. 任何與火種有關的工序，如燒焊等，均需要預先通知院方，獲得批准後，並在足夠的安全措施下方可進行。

4. 地盤範圍必須以圍板圍封並張貼告示，以防與工程無關人士進入。所有工程車輛必須依照所指定的出入口進出。

5. 須根據工程性質，提供至少一名安全主任於施工範圍內監管所有安全措施，並須符合職業安全及健康條例。

屯門醫院工程預約表格

致屯門醫院設施管理組 / 機電工程署:

甲部: 工程資料

1. 工程事項：_____
2. 工程地點 ：_____
3. 工程時間：_____年 ____月 ____日, 時間 _____
   至 _____年 ____月 ____日, 時間 _____
   (包括 / 不包括星期六、星期日及公眾假期)

4. 出入口安排 :❑ 不需要 ❑ 需要 車牌號碼: (如適用) _____
5. 工程性質是否有機會引致消防系統誤鳴: ❑ 不會 ❑ 會

5.1 消防系統隔離 ❑全幢掛牌 ❑局部隔離 (時段及地點) _____

乙部: 工作人員資料

1. 負責人姓名：甲. _____ 乙. _____ (如有)
2. 聯絡電話：甲. _____ 乙. _____ (如有)
3. 傳真號碼 ：_____
4. 公司名稱：_____

工人名單: (如空間不足, 請填寫附件一)

姓名:	安全咭號碼:	身份證號碼:

注意事項 :

1. 所有隔離消防系統 (俗稱“掛牌”) 不得超過連續 8 小時。
2. 如因工程引致消防系統誤鳴，有關承建商必需於三個工作天內提交事故報告予本院設施管理組作記錄。

填妥表格後請電郵或傳真致本院設施管理組/機電處。經確認後，本文件將轉交支援服務組跟進。

❑ 請確認你已經詳細閱讀及了解有關在屯門醫院進行工程的指引

申請人簽署 ：_____ 確認人簽署 ：_____

部 門： _____ 內線 _____

日 期：_____ 日 期：_____

註：本組接受填妥的電腦表格，然後以電郵回覆 ； 或請傳真: 2468-6626（只接受有來電顯示的傳真號碼）

機電署傳真: 24560977

附件一

姓名:	安全咭號碼:	身份證號碼:

(Item 1) Supply and Installation of Interventional Radiographic-Fluoroscopic/ Computed Tomography Systems and (Item 2) Provision of Maintenance Service for Department of Radiology and Nuclear Medicine of Tuen Mun Hospital New Territories West Cluster, Hospital Authority (Tender Reference: NWT00226)

Appendices for Maintenance Service (Item 2 of Tender Specification)

Appendix I

Good UPS Maintenance Practices

1. Regular Preventive Maintenance (quarterly / semi- / annual)

1.1 For large sized UPS

(a) Preventive maintenance on cable connections, cleaning, indicator check, etc.

(b) Annual battery discharge and charging test (at 100% rated load by dummy load or combination of dummy load and actual loads)

(c) Annual measurement of terminal voltage and internal impedance of battery cells (by battery tester)

1.2 For small sized UPS (typically <2kVA)

(a) Preventive maintenance on cable connections, cleaning, indicator check, etc.

(b) Battery discharge/charge test and detailed measurement would be conducted only when necessary.

2. Built-in UPS battery monitoring program (if available) provides real time battery status monitoring

3. Battery replacement plan

3.1 For large sized UPS

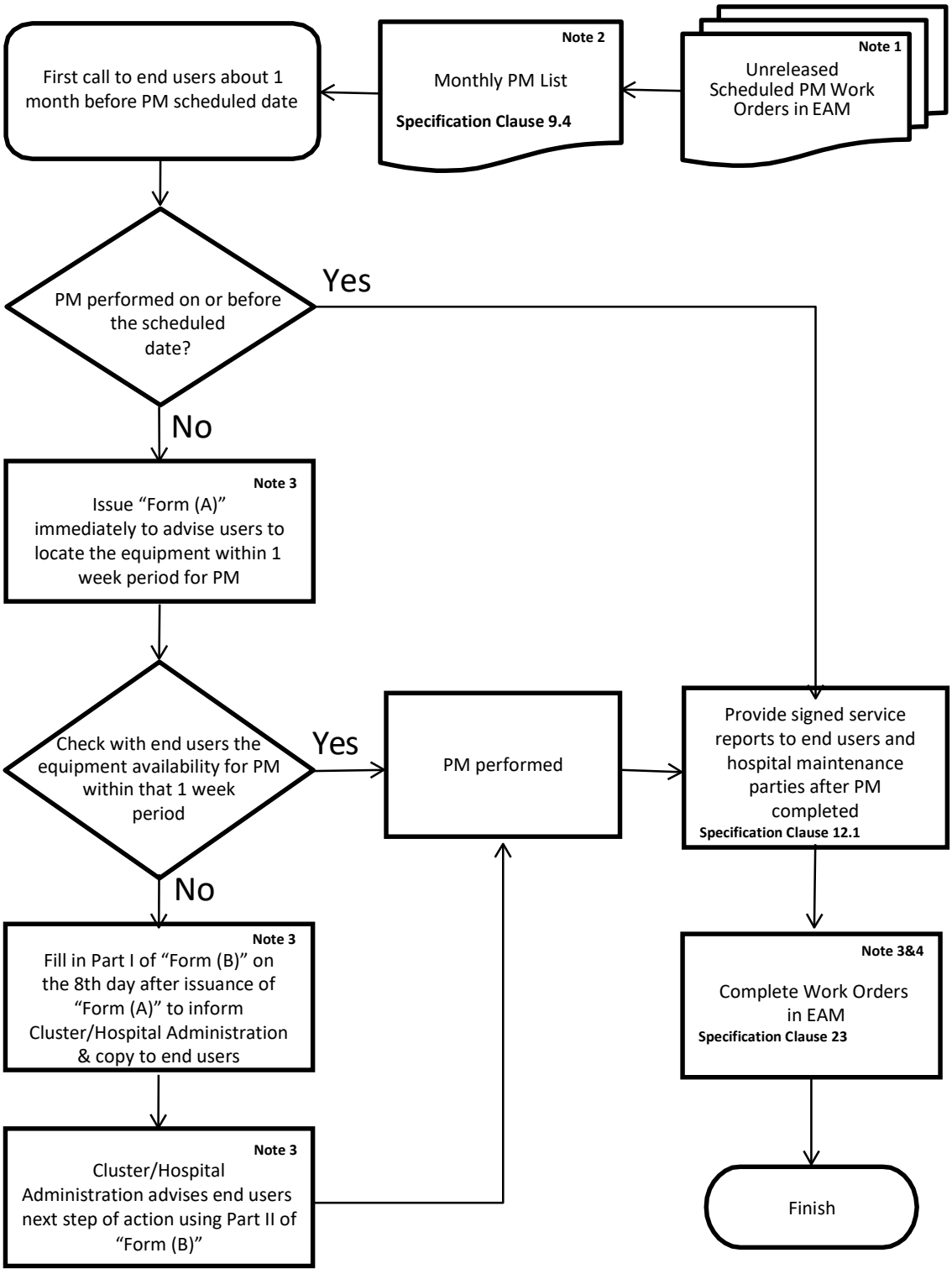
(a) Typical battery design life >10 years; replacement could be considered after reaching 50% design life (e.g. Year 6 for batteries with 10-year design life)

(b) Actual operation condition should also be considered

3.2 For small sized UPS (typically <2kVA)

Battery replacement interval would be decided considering manufacturer's recommendation

Flowchart for Managing PM Work Orders for Critical Equipment



Note 1:The tentative scheduled PM date of the work orders should have been confirmed with contractors.

Note 2:Contractors should prepare the PM list of zero tolerance equipment after receiving PM work orders from Hospital Administration/ Hospital Maintenance Parties.

Note 3:All forms and PM list should be sent to end users and Hospital Administration/Hospital Maintenance Parties/ Facilities Management.

Note 4:Monthly exceptional reports of PM results, completed monthly PM List and outstanding PM items should be sent to cluster management.

Zero Tolerance Preventive Maintenance Program
List of Critical Equipment

No.	Item description
1	ANESTHESIA UNITS
2	AUTOTRANSFUSION UNITS, BLOOD PROCESSING
3	BLOOD CELL PROCESSORS
4	CARDIAC OUTPUT UNITS, THERMAL DILUTION
5	CIRCULATORY ASSIST UNITS, CARDIAC, INTRA-AORTIC BALLOON
6	CIRCULATORY ASSIST UNITS, CARDIAC, VENTRICULAR
7	DEFIBRILLATOR/PACEMAKERS, EXTERNAL
8	ELECTROSURGICAL UNITS, MONOPOLAR/BIPOLAR
9	HEART-LUNG BYPASS UNITS
10	HEART-LUNG SUPPORT UNITS
11	HEMODIALYSIS UNITS
12	HEMODIALYSIS UNITS, CONTINUOUS REPLACEMENT THERAPY, RENAL
13	INCUBATORS, INFANT
14	INCUBATORS, INFANT, TRANSPORT
15	INFUSION PUMPS
16	INFUSION PUMPS, AMBULATORY
17	INFUSION PUMPS, GENERAL-PURPOSE
18	INFUSION PUMPS, MULTICHANNEL
19	INFUSION PUMPS, ANALGESIC, PATIENT-CONTROLLED
20	INFUSION PUMPS, MULTITHERAPY, SYRINGE
21	LASERS, ARGON, OPHTHALMIC
22	LASERS, CARBON DIOXIDE, SURGICAL/DERMATOLOGIC
23	LASERS, DIODE, DERMATOLOGIC
24	LASERS, DIODE, OPHTHALMIC
25	LASERS, DIODE, SURGICAL
26	LASERS, DYE, DERMATOLOGIC
27	LASERS, EXCIMER, ANGIOPLASTY
28	LASERS, HO-YAG, SURGICAL
29	LASERS, ND-YAG, DERMATOLOGIC
30	LASERS, ND-YAG, FREQUENCY-DOUBLED, OPHTHALMIC
31	LASERS, ND-YAG, OPHTHALMIC
32	LASERS, ND-YAG, SURGICAL

Zero Tolerance Preventive Maintenance Program
List of Critical Equipment

No.	Item description
33	MONITORING SYSTEMS, PHYSIOLOGIC, ACUTE CARE
34	MONITORING SYSTEMS, PHYSIOLOGIC, CARDIAC CATHETERIZATION
35	MONITORING SYSTEMS, PHYSIOLOGIC, CARDIAC ELECTROPHYSIOLOGY
36	MONITORS, PHYSIOLOGIC, FETAL, ANTEPARTUM, BEDSIDE
37	MONITORS, PHYSIOLOGIC, FETAL, INTRAPARTUM, BEDSIDE
38	MONITORS, BEDSIDE, INTRACRANIAL PRESSURE
39	MONITORS, PHYSIOLOGIC, MULTIPURPOSE, BEDSIDE
40	MONITORS, BEDSIDE, PHYSIOLOGIC, NEONATAL
41	MONITORS, PERSONAL, GLUCOSE, IMPLANTABLE SENSOR
42	MONITORS, TELEMETRIC, FETAL
43	MONITORS, TELEMETRIC, PHYSIOLOGIC
44	OXIMETERS, PULSE
45	OXIMETERS, PULSE, TELEMETRIC
46	PERCUTANEOUS DISCECTOMY SYSTEMS, MICROSURGERY
47	PERITONEAL DIALYSIS UNITS
48	POSITIVE AIRWAY PRESSURE UNITS, BI-LEVEL
49	POSITIVE AIRWAY PRESSURE UNITS, CONTINUOUS
50	PUMPS, EXTRACORPOREAL PERFUSION
51	RESUSCITATORS, CARDIOPULMONARY
52	RESUSCITATORS, PULMONARY, MANUAL, REUSABLE
53	RESUSCITATORS, PULMONARY, PNEUMATIC
54	VENTILATORS, INTENSIVE CARE, ADULT
55	VENTILATORS, INTENSIVE CARE, ADULT, HIGH-FREQUENCY
56	VENTILATORS, INTENSIVE CARE, NEONATAL/PEDIATRIC
57	VENTILATORS, INTENSIVE CARE, NEONATAL/PEDIATRIC, HIGH-FREQUENCY
58	VENTILATORS, PORTABLE/HOME CARE
59	VENTILATORS, TRANSPORT

End

Request To Perform ZT Preventive Maintenance (PM) for BES Equipment [Form A]

From:	**Tenderer**	To:	User of Ward YY, ZZ hospital
Tel.:	Fax:	(Attn.:	)
Our Ref.:		Your Ref.:	
Date:		Dated:	

Please be informed that the PM services for the following BES equipment with EAM numbers as shown below are now overdue and urgent PM is required. The equipment listed below could not be located nor made available to us for carrying out the scheduled PM services. In view that the equipment is/are classified as "Critical" equipment, it may affect patient safety if PM is not carried out as scheduled. Hence, please urgently make available the equipment and inform us to carry out the PM services within one week.

Should you have any enquiry, please contact the undersigned.

Signature: _____ Name: _____

PM services are required for the following BES equipment with EAM numbers as follows / as per equipment list attached. **

_____	_____	_____
_____	_____	_____
_		
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

** delete as appropriate.

Acknowledgement by User

Signature: _____ Date: _____

Name: _____ Post: _____

for _____ Hospital Te1./Fax: _____

Final Request to Perform ZT Preventive Maintenance (PM) [Form B]

Part I

From:	**Tenderer**	To:	Cluster/Hospital Administration
Tel.:	Fax:	(Attn.:	)
		c.c.	User of Ward YY, ZZ hospital
Our Ref.:		Your Ref.:	
Date:		Dated:	

Please be informed that the following BES equipment are not available for PM and have been overdue for more than one week. The EAM numbers of the concerned BES Equipment are as follows:

_____ _____ _____
_____ _____ _____

End users may continue to use the above BES equipment until the end of this month, but please arrange with us to carry out PM work. End users shall take note of the risk that there is no guarantee on the equipment designed functionality after the end of this month.

Signature: _____ Name: **Tenderer**

Part II

BES Equipment Not Available for Performing ZT Preventive Maintenance (PM) Follow Up Action by Hospital

From:	Cluster / Hospital Administration	To:	User of Ward YY, ZZ hospital
Tel.:	Fax:	(Attn.:	)
Our Ref.:		Your Ref.:	
Date:		Dated:	

Since the above BES equipment is/are not available for PM, you are required to follow up with immediate actions as per contractor's comments in Part I above.

Should you, due to operation or other constraints, anticipate difficulty or have different view in meeting contractor's above recommendation, please provide a response to the undersigned for coordination by cluster administration.

Signature: _____ Name: _____

for Cluster / Hospital Administration

Data Interface Procedures and Requirements

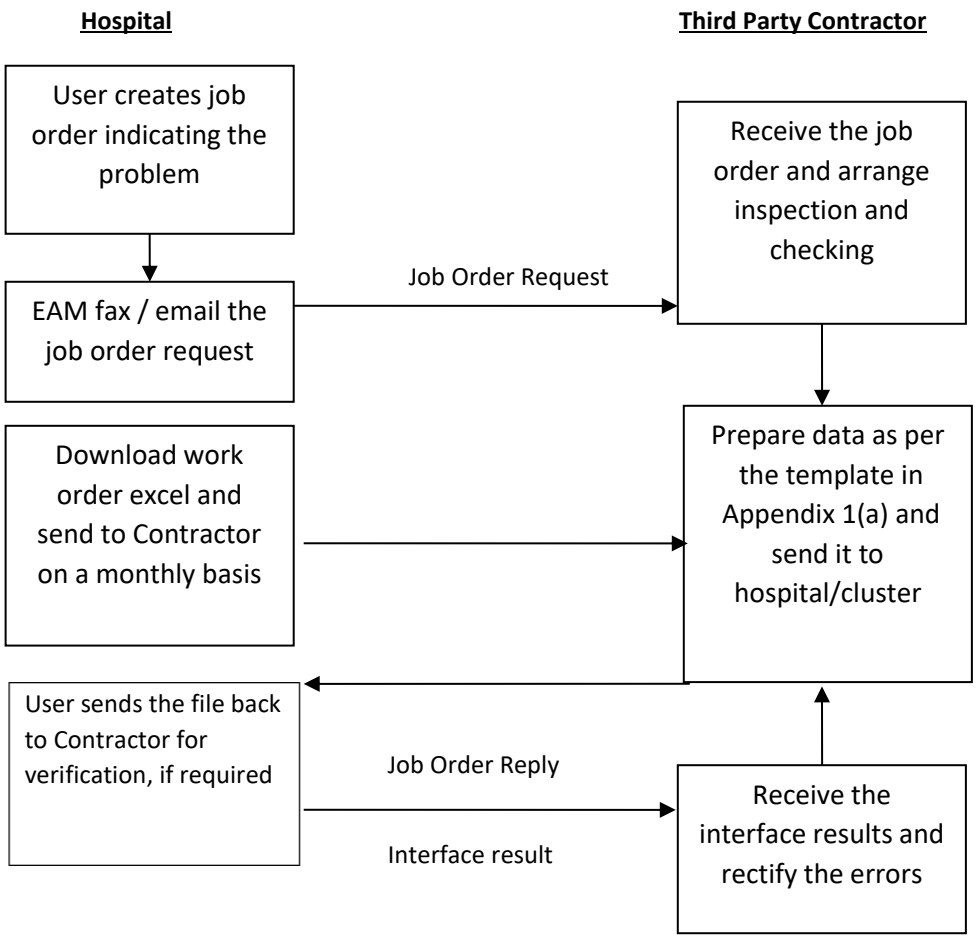
Background

In Hospital Authority (HA), the maintenance data of equipment is maintained by the corporate Enterprise Asset Management System (EAM). When equipment has broken down, HA user will initiate a maintenance job order (CORRECTIVE) through the EAM. Periodic preventive check (PREVENTIVE) is scheduled and arranged mainly by third party maintenance contractors. Preventive check can also be initiated online by EAM user where they think it is necessary depending on the condition of the equipment. EAM will then determine the maintenance contract and the maintenance body who looks after the piece of equipment. The maintenance job order will be faxed or emailed or sent via GS1 gateway to the maintenance body requesting them to come and service the equipment.

After the actual maintenance job order work is performed, the maintenance data in EAM should be updated to reflect e.g. the re-instatement date and time, the diagnostics, the parts that have been replaced, the cost of the materials …etc. There are two types of data interface mechanisms.

(I) Excel Upload

Maintenance data can be uploaded in bulk and processed into EAM through a batch interface process called ***EAM Third Party Maintenance Data Interface***. Hospitals upload the interface data sent by third party contractor via e-mail. The provided data will be verified and fed into EAM. At the end, the interface results will be sent back to the third party contractor through email. The process is summarized in the diagram below.


Hospital
Third Party Contractor
User creates job order indicating the problem
EAM fax / email the job order request
Job Order Request
Receive the job order and arrange inspection and checking
Download work order excel and send to Contractor on a monthly basis
Prepare data as per the template in Appendix 1(a) and send it to hospital/cluster
User sends the file back to Contractor for verification, if required
Job Order Reply
Interface result
Receive the interface results and rectify the errors

(II) Web or Gateway Interface

The Contractor shall install and use the GS1 Hong Kong's (a new name of Hong Kong Article Numbering Association) Web-based EZ*TRADE or the Gateway Solution to receive and return Job Order details. All the fees mentioned below are for reference only.

Details of GS1 Hong Kong's Web-based EZ*TRADE and the Gateway Solution are as follows:-

The Web-based EZ*TRADE enables contractors to conduct EDI transactions by using a web browser on the Internet without involving additional set-up costs or special technical skills. The Gateway Solution, which requires communications software, internal IT support, an alignment of underlying processes and is for products which required Vendor Managed Inventory (VMI) with sophisticated transaction details. Implementation checklist for GS1 Hong Kong's Web-based EZ*TRADE and the Gateway Solution:

1. Join GS1 Hong Kong as member

Membership Fee : HK$3,440.00 for Entrance Fee (one off charge); and
HK$3,440.00 for Annual Fee

(Please contact GS1 HK for payment procedure and updated charges)

GS1 HONG KONG will assign mailbox ID, user ID and password to member for using Web EZ*TRADE Service.

2. Internal IT Consideration and System Installation Preparation

- Based on the tender requirement to determine the required solution to be implemented.
- Details please consult GS1 Hong Kong.

3. Inform Hospital Authority about the readiness of the system

4. Conduct testing with Hospital Authority

5. Align with Hospital Authority to agree on the Start Date

6. Monthly Charges to be paid (Please contact GS1 HK for payment procedure and updated monthly charges)

	Documents per month	Monthly Charges
Level 1 End Users	0 – 10	HK$50.00
Level 2 End Users	11 – 50	HK$100.00
Level 3 End Users	51 – 300	HK$200.00
	301 or above	HK$0.80/doc

Interface Data Requirement for Job Order Replies

Below table describes the vendors must make use of the columns to reply the work order completion information in Excel template format against the expected data format.

Column Name	Length	Format	Descriptions	CM	PM	Remarks	Data Sample
Asset Number	10	varchar	EAM Asset Number	Read-Only	Read-Only		*645484*
Asset Owner	50	varchar	Asset owner From HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*PYC-DR-MD*
Asset Group	50	varchar	Asset group From HA asset attribute	Read-Only	Read-Only		*HAASSET (NON-IT)*
Asset description	150	varchar	Asset description from HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*SCANNING SYSTEMS, COMPUTED TOMOGRAPHY, SPIRAL*
Owning Department	50	varchar	Owning Department from HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*PY-CS-SUR*
Asset location	50	varchar	Location Institution + block/floor/room	Read-Only	Read-Only	From HA asset attribute	KH-AB-G-FLOOR
Work Order Number	10	varchar	Maintenance Work Order Number	Read-Only	Read-Only		*1220254*
Work order Type	10	varchar	Work order Type	Read-Only	Read-Only	'Corrective' for CM. 'Preventive' for PM.	*Corrective*
Work order Status	10	varchar	Work order Status	Read-Only	Read-Only	Should be “Released” when HA send work order to supplier	*Released*
WO Default Contact Method	50	varchar	Contact Method of vendor to received Work Order	Read-Only	Read-Only	‘Email-YES’,’Fax-YES’,’Phone-NO’,’XML or Portal-YES’	*Email-YES*
Scheduled Datetime	datetime	datetime	Original date schedule for Preventive Maintenance	Read-Only	Read-Only	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 15:22

Column Name	Length	Format	Descriptions	CM	PM	Remarks	Data Sample
Maintenance Body	50	varchar	Vendor Name of Work Order	Read-Only	Read-Only		*ABC H.K Ltd*
Remarks	150	varchar	Remarks of the work order	Read-Only	Read-Only		It is Urgent Maintenance
Break Down Date	datetime	datetime	Equipment breakdown date for Corrective Maintenance. It is the date time that user discovered the problem of the equipment.	Read-Only	Read-Only	Data field from work request The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 15:22
Manufacturer	150	varchar	Asset Manufacturer Name from HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*TOSHIBA*
Brand Name	150	varchar	Asset Brand Name from HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*TOSHIBA*
Model	150	varchar	Asset Model from HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*AQUILION CX*
Serial Number	50	varchar	Asset serial Number from HA asset attribute	Read-Only	Read-Only	From HA asset attribute	*NCA10X2245*
Disinfection Status	20	varchar	Disinfection status	Read-Only	Read-Only	Either 'COMPLETED', 'NOT PRACTICABLE' or 'NOT NECESSARY'.	*NOT PRACTICABLE*
Work Request description	150	varchar	Description of the work request	Read-Only	Read-Only	Further describe the work request	*equipment cannot print*

Column Name	Length	Format	Descriptions	CM	PM	Remarks	Data Sample
Maintenance Contract Number	10	varchar	Maintenance Contract number of the asset	Read-Only	Read-Only		*8110007666*
Supplier Agreement No	150	varchar	Supplier Agreement No. from maintenance contract header	Read-Only	Read-Only	For vender reference	*C8110007666*
Work Order Status (*&)	10	varchar	Work order status	Mandatory	Mandatory	'Complete' status filled by vendors	*Complete*
HA contact person (with phone no) (*)	50	varchar	The HA person who contact supplier and request for a repair and the corresponding phone number	Mandatory	Mandatory		*Mr. Lee (26326470)*
PM Scheduled Datetime (DD/MM/YYYY HH:MM)	datetime	datetime	Original date schedule for Preventive Maintenance	Blank	Mandatory	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 15:22
[CM] Call Received Datetime (DD/MM/YYYY HH:MM)	datetime	datetime	Date and time when vendor received the call for repair.	Mandatory	Optional	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 15:22
Equipment Received DateTime (DD/MM/YYYY HH:MM)	datetime	datetime	Date and time when vendor received the equipment that was sent by HA for repair.	Optional	Optional	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 15:22
[CM/PM] Attendance DateTime	datetime	datetime	Date and time that vendor went to HA to perform the repair	Mandatory if WORK_ORDER_ STATUS is "Complete"	Mandatory if WORK_ORDER _STATUS is "Complete"	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 16:22

Column Name	Length	Format	Descriptions	CM	PM	Remarks	Data Sample
(DD/MM/YYYY HH:MM)							
[PM] Completion DateTime (DD/MM/YYYY HH:MM)	datetime	datetime	Completion date for Preventive Maintenance	Blank	Mandatory if WORK_ORDER_STATUS is 'Complete'	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 17:22
[CM] Reinstatement DateTime (DD/MM/YYYY HH:MM)	datetime	datetime	Reinstatement date for Corrective Maintenance	Mandatory if WORK_ORDER_STATUS is 'Complete'	Blank	The datetime format should be DD/MM/YYYY HH:MM	04/07/2016 17:22
[CM] Failure Cause Code (&)	150	varchar	Cause determined by the repairman	Mandatory if WORK_ORDER_STATUS is 'Complete'	Optional	It should be within the complete list of Cause Code in Appendix.	*OTHERS*
[CM] Failure Symptom Code (&)	150	varchar	Fault Symptom	Mandatory if WORK_ORDER_STATUS is 'Complete'	Optional	It should be within the complete list of Failure Set in Appendix.	*Others*
[CM] Repair Resolution Code (&)	150	varchar	Code that indicate which task was done during maintenance	Mandatory if WORK_ORDER_STATUS is 'Complete'	Optional	It should be within the complete list of Resolution Code in Appendix.	*REPAIR*
[CM] Equipment Condition (&)	150	varchar	Indicate whether the equipment is 'Breakdown' or 'Fault' or "Misoperation"	Mandatory if WORK_ORDER_STATUS is "Complete"	Optional	'Breakdown' or 'Fault' or "MISOPERATION". It should be within the complete list of Equipment Condition in Appendix	*BREAKDOWN*

Column Name	Length	Format	Descriptions	CM	PM	Remarks	Data Sample
[CM/PM] Work Order Completed by	40	varchar	Indicate Work Order Completed by vendor's staff for data entry	Mandatory	Mandatory		*Mr. Chan Tai Man*
Result and Action Taken (*CM)	150	varchar	Indicate the detail result and action taken	Mandatory	Optional	Describe the actions taken by vendor	*Repair the engine*
[CM/PM] Service Report Reference	50	varchar	Indicate service report reference	Mandatory if WORK_ORDER_STATUS is 'Complete'	Mandatory if WORK_ORDER_STATUS is 'Complete'	Describe the service report provided by vendor	*EX-123456*
Labor Cost(#)	18	numeric	Labor Cost with max 2 d.p.	Optional	Optional	E.g. 250.00 or 1500.25	*5000*
Spare Part Cost(#)	18	numeric	Material Cost with max 2 d.p.	Optional	Optional		*500*
Spare Part Description(#)	150	varchar	Material description	Optional	Optional		*Parts A*
Additional Labor Cost(#)	18	numeric	Additional labor cost with max 2 d.p.	Optional	Optional		*120*
Additional Material Cost(#)	18	numeric	Additional material cost with max 2 d.p.	Optional	Optional		*650*
Additional Material Description(#)	150	varchar	Additional material description	Optional	Optional		*Parts B*

Column Name	Length	Format	Descriptions	CM	PM	Remarks	Data Sample
Technician Name(#)	40	varchar	Technician Name	Mandatory if WORK_ORDER_STATUS is "Complete"	Mandatory if WORK_ORDER_STATUS is "Complete"		*LI CHOR HIN*
Vendor Reference Number(#&)	15	varchar	Vendor's reference number that each vendor can identify each interface message in case of any error data for correction required	Mandatory if WORK_ORDER_STATUS is "Complete"	Mandatory if WORK_ORDER_STATUS is "Complete"	A number that can uniquely identify vendor's work order update / create interface record. (Same functionality as the contractor_ref_noof the XML upload in former AMS)	*43384485-10*
Disinfection Status	20	varchar	Disinfection status	Optional	Optional	It should be within the complete list of Disinfection status in Appendix A. Default to 'NOT PRACTICABLE' if not specified.	NOT PRACTICABLE

Notes for both CM and PM work order reply:

1. The column of CM and PM work order reply are equal. Read-Only are for data information only
2. Fields marked with * are mandatory.
3. Fields marked with # are optional.
4. Fields marked with & will be validated in system with the List of Value of the data field with case sensitive (Refer to Appendix – List of Value)
5. Fields marked with "[PM]" are required for Preventive Maintenance when Work Order Status is 'Complete'
6. Fields marked with "[CM]" are required for Corrective Maintenance when Work Order Status is 'Complete'
7. Fields marked with "[CM/PM]" are required when Work Order Status is 'Complete'
8. Fields marked with "*CM" are required for Corrective Maintenance
9. No Urgent order in Excel template
10. For work order maintenance has any pending situation, e.g. waiting for parts, vendors should use 'On Hold' for WORK ORDER STATUS and provide detail situation in Action And Result Taken.

Work Order Excel Upload Validation (HA Version 5.0)

HA users and maintenance vendors shall also aware of such validation rules when they input data via Excel template.

Interface Code	Interface Message
E0002F	Asset number %1% not found
E0004F	Attendance datetime %1% should not be earlier than call received datetime %2% for CORRECTIVE work order
E0005F	Attendance datetime %1% should not be earlier than equipment received datetime %2% for CORRECTIVE work order
E0006F	Attendance datetime %1% should not be earlier than the break down datetime %2% for CORRECTIVE work order
E0007F	Attendance datetime should not be blank for work order status is 'Complete' or 'Complete – No Charges'
E0011F	Call received datetime %1% should not be earlier than break down datetime %2% for CORRECTIVE work order
E0012F	Call received datetime %1% should not be later than equipment received datetime %2% for CORRECTIVE work order
E0013F	Call received datetime should not be blank for CORRECTIVE work order
E0014F	Completion datetime %1% must not be later than current datetime for PREVENTIVE work order
E0016F	Completion datetime should not be blank when work order status is COMPLETE and PREVENTIVE work order
E0017F	Equipment received datetime %1% should not be earlier than break down datetime %2%
E0018F	disinfection status should be match with List of Values in database
E0019F	Invalid work order status: %1% (It should be either 'Released', 'Complete','Cancelled','Complete – No Charges')
E0023F	Work order number not found: %1%
E0024F	Reinstatement datetime %1% should not be earlier than attendance datetime %2% for CORRECTIVE work order
E0025F	Reinstatement datetime %1% should not be earlier than call received datetime %2% for CORRECTIVE work order
E0026F	Reinstatement datetime %1% should not be earlier than equipment received datetime %2% for CORRECTIVE work order
E0030F	Vendor reference no should not be blank for work order status is Complete or Complete - No Charges;
E0032F	Preventive maintenance event already exists on the other work order number with same schedule date (%1%) by asset number

E0033F	Equipment condition should match with List of Values in database for CORRECTIVE work order.
E0035F	Cause Code should match with List of Values in database
E0036F	Resolution Code should match with List of Values in database
E0037F	Failure Code should match with List of Values in database
E0039F	Work Order update is rejected due to the Work Order is in 'Closed'
E0044F	Invalid data type of labour cost %1%’
E0045F	Invalid data type of material cost %1%’
E0046F	Invalid data type of additional labour cost %1%’
E0047F	Invalid data type of additional material cost %1%’
E0048F	Cause Code should not be blank for work order status is COMPLETE and CORRECTIVE work order
E0049F	Resolution Code should not be blank for work order status is COMPLETE and CORRECTIVE work order
E0050F	Failure Code should not be blank for work order status is COMPLETE and CORRECTIVE work order

List of Value

MESSAGE_SUBTYPE
Work Order
Work Order Reply
Urgent Order

WORK ORDER TYPE
Corrective
Preventive

WORK ORDER STATUS
On Hold
Complete
Rejected

DISINFECTION STATUS
COMPLETED
NOT PRACTICABLE
NOT NECESSARY

Equipment Condition
BREAKDOWN
FAULT
MISOPERATION

CAUSE CODE
ACCESSORIES
ALARM BATTERY
ALIGNMENT
BATTERY
CALIBRATION
CLEANLINESS
COMPONENTS
COMPUTER HARDWARE
DISPLAY
LAMP/INDICATOR
MECHANICAL PARTS
NORMAL WEAR & TEAR
OPERATION MATTER
OPTICS
OTHERS
RESUME NORMAL
SOFTWARE
WIRE DAMAGE

RESOLUTION CODE
CLEAN AND CHECK
OPERATION REFRESH TRAINING
PENDING FOR REPLACEMENT
RECOMMENDED FOR CONDEMNATION
RELOAD
REPAIR
REPLACE
RESET
RESET / CALIBRATION

FAILURE CODE
ALARM MALFUNCTION
ALARM MESSAGE / ERROR INDICATION
CANNOT SWITCH ON / OFF
ELECTRICAL SHOCK / LEAKAGE
EQUIPMENT MALFUNCTION
EQUIPMENT OVERHEAT
INTERMITTENT ERROR
MECHANICAL / PHYSICAL DAMAGE
OTHERS
READING / IMAGE INACCURATE
SEND FOR INVESTIGATION
UNINTENDED SHUT DOWN

IT Security Requirements for Quotation / Tender - Procurement of "non-IT" System/Equipment

Version	Effective Date
16.0	31/07/2026

Document Number	HAHO-ITD-PD-ISP-007-v16
Author	William WONG, HOIT&HI SM(ISO)1
Custodian	William WONG, HOIT&HI SM(ISO)1
Approved/ Endorsed By	ITD
Approval Date	31/07/2026
Distribution List	All HA HOIT&HI Staff / Cluster IT Staff

Amendment History

Version No.	Date of Amendment	Prepared by	Description
1.0	7/09/2017	Dale Johnstone First draft	ALL
2.0	7/11/2017	Dale Johnstone	Add Appendix C&D
3.0	28/12/2017	Dale Johnstone	Add Appendix E
4.0	13/04/2018	John Tse	Update A.16.3 & A.16.4 in Appendix A
5.0	07/12/2018	William Wong	- Re-format document - Change A.4 Availability in Appendix A - Replace diagram in Appendix B - Add "Privacy Control" in Appendix E
6.0	15/03/2019	William Wong	- Change name in Further Information
7.0	16/12/2019	William Wong	- Update document link "Guidelines on Connecting Medical System Networks (Information Technology Circular 1/2019)" in Reference - Add Note i) & ii) in Appendix A - Add A19.9 in Appendix A
8.0	09/10/2020	John Tse	- Change Medical System networks to External network - Update A.19 in Appendix A - Update Appendix B to "External Network Architecture - Remove Appendix C and Appendix D - Change Appendix E to Appendix C
9.0	09/12/2020	John Tse	- Update the External Network architecture to indicate building switch is L3 switch - Correct the link for "Guidelines for Cabling System and Network Setup in External Network"
10.0	15/12/2020	John Tse	- Correct the numbering for section 3 - Remove point c) from section 4 (ie. appendix for "Guidelines for Cabling System and Network setup in External network")
11.0	29/12/2020	William Wong	- Update distribution list
12.0	12/7/2021	John Tse	- Restore version 7 until the latest guideline for cabling and network setup is ready
13.0	13/07/2022	Yorky Wong	- Update Reference

			- Update Further Information contacts - Update A.12.2 and A.20.1 in Appendix A
14.0	15/08/2022	John Tse	- Add the link for "Guidelines for Cabling System and Network Setup in External Network" in References - Update A.19 to align with "One Network for All" strategy - Update Appendix B to "External Network Architecture" - Combine Appendix C and D to Appendix C - Change Appendix E to Appendix D
15.0	21/02/2025	ISO1	- Update Reference - Update clause 5 - Update clause 6 Further Information - Add A.10.7 for logging sensitive data - Update A.11.2 for role-based access control - Update A.13.2 for patch management - Update A.15.1 for network segregation - Update A.18.3 for security compliance - Update A.20.1 for data exchange - Add A.21 for public cloud service - Update A9.1, A9.2, A11.5, A19.4 and A19.9 (a) for reference document viewing arrangement - Consolidate Appendix as Part A, B, C and D with updated checklist
		N5	- Update A.19, Appendix Part B and C for the Layer 2 switch
16.0	27/07/2026	ISO1	- Add A.2.3, A2.4, A2.5 for enhanced confidentiality undertaking and account management of tenderer staff - Add A9.4 for the PC security requirements - Update A10.5 and 10.6 for strengthening data export prohibition for any purpose unless prior authorization has been obtained from HA - Update A16.2, A16.3, A16.4 for connecting media or device which was obtained prior authorization from HA during maintenance support - Update A18.3 and Appendix D for Vendor System Security Compliance Report

IT Security Requirements for Quotation / Tender –

Procurement of "non-IT" System/Equipment

THE TERMS AND DEFINITIONS BELOW ARE GENERAL REQUIREMENTS WHICH APPLY TO THE ACQUISITION AND INSTALLATION OF "NON-IT SYSTEMS" (SYSTEM)/EQUIPMENT WITH HA.

"NON-IT SYSTEMS"/EQUIPMENT IS TECHNOLOGY BEING ACQUIRED BY HA THAT MAINTAINS IT COMPONENTS BUT WHICH IS NOT NORMALLY PROCURED BY HA INFORMATION TECHNOLOGY AND HEALTH INFORMATICS DIVISION (IT&HID).

THERE MAY ADDITIONALLY BE PROJECT SPECIFIC REQUIREMENTS.

SUBJECT OFFICERS OF INDIVIDUAL PROJECTS ARE ADVISED TO CONSULT HA IT&HID DURING THE TENDER SPECIFICATION PREPARATION STAGE.

SUBJECT OFFICERS SHOULD NOTE THAT PROJECTS HAVE TO RESERVE FUNDING FOR SETTING UP AND ESTABLISHING ANY NETWORK CONNECTIVITY THAT WILL BE PERFORMED BY HA IT&HID.

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1. Purpose

The purpose of this document is to provide model IT security related terms and definitions clauses to be used by HA when preparing and evaluating "Requests for Quotations" and "Requests for Tender" for the procurement of non-IT Systems ("Systems")/Equipment.

2. References

(a) Guidelines for Windows Server Hardening
http://it.home/doc/HAHO-ITD-GL-T03-010.aspx

(b) Guidelines for Connecting External Network in HA (Information Technology Circular 1/2019)
http://ha.home/circular2/IT-2019-01.pdf

(c) Guidelines for Connecting External Network in HA
http://it.home/doc/HAHO-ITD-GL-N02-001.aspx

(d) Guidelines for Host Security Hardening
http://it.home/doc/HAHO-ITD-GL-T02-001.aspx

(e) OWASP Top 10 Vulnerabilities
https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project

(f) Malicious Code Protection Requirements for Medical Equipment Maintenance
(IT Circular 2/2018)
http://ha.home/circular2/IT-2018-02.pdf

(g) Guidelines for Application Security
http://it.home/doc/HAHO-ITD-GL-ISO-005.aspx

(h) Adopting Security Specifications Standard
http://it.home/doc/HAHO-ITD-SD-ISO-001.aspx

(i) Guidelines for Mobile Device Security
http://it.home/doc/HAHO-ITD-GL-ISO-003.aspx

(j) Guidelines for IoT Security
http://it.home/doc/HAHO-ITD-GL-ISO-008.aspx

(k) Guidelines for Cabling System and Network Setup in External Network
http://it.home/doc/HAHO-ITD-GL-N05-001.aspx

(l) Cloud Security Standard
http://it.home/doc/HAHO-ITD-SD-ISO-004.aspx

(m) Guidelines for Vulnerability Management Process
http://it.home/doc/HAHO-ITD-GL-ISO-001.aspx

(n) Guidelines for Security Patch Management
http://it.home/doc/HAHO-ITD-GL-ISO-013.aspx

(o) Guidelines for Security Requirements for HA PCs and Notebooks
http://it.home/doc/HAHO-ITD-GL-ISO-009.aspx

3. Introduction

Tenderer are reminded that:

(a) the procurement process shall be considering risks that could be introduced to HA as a result of the selection of a System/Equipment;

(b) details shall be described in the respective Schedule(s) pertaining to "Statement of Compliance" as to how the System/Equipment proposes to implement security requirements, including product names, product specifications and interconnection diagrams;

(c) an alternative security solution able to achieve the same or better security protection, shall be proposed where any System/Equipment security requirements are unable to be fulfilled due to product design limitations;

(d) where an alternative security solution is being proposed details shall be included which describe the alternative security solution in an Appendix to the "Statement of Compliance";

(e) the security requirements outlined in Clause 5 are critical.

4. Overview

4.1 Scope

The scope of these IT security requirements are applicable to all "Requests for Quotations" and "Requests for Tender" for the procurement of non-IT Systems ("Systems")/Equipment in HA.

4.2 Objective

The scope of this document cover security requirements with terms and definitions for procurement of non-IT Systems ("Systems")/Equipment in HA, including data security, application security, network security, server security, client/desktop security, security incident reporting and vendor maintenance and etc.

5. IT Security Requirements

The IT security requirements for all "Requests for Quotations" and "Requests for Tender" within HA with a view to:

(a) providing "Terms and Definitions" please refer detail noted in Appendix Part A;

(b) providing “Network Connection between Vendor Network and HA Network”, please refer detail noted in Appendix Part B;

(c) providing “Failure and Recovery Scenarios in Hospitals for vendor managed L3 network switches”, please refer detail noted in Appendix Part C;

(d) providing “Vendor System Security Compliance Report (Sample)”, please refer detail noted in Appendix Part D (The form can be downloaded from https://hateams.home/~rndKs)

Note: Appendix is a clean standalone version that can be directly incorporated into tendering document for procurement process. All clauses stated are required whenever applicable.

6. Further Information

Further information and details concerning IT Security Requirements for Quotation / Tender - Procurement of “non-IT” System/Equipment can be obtained by contacting:

- William Wong, SM(ISO)1, 3906 3577, wongwwl@ha.org.hk
- Jackson Lam, SM(N)5, 3969 3123, jackson.lam@ha.org.hk

Appendix Details of IT Security Requirements

A. Terms and Definitions

These terms and definitions apply to any System/Equipment requiring access to the HA IT network. Additional terms and definitions appear below in "Connectivity of Vendor Managed Network to HA" (A.19) for System/Equipment operated by the Tenderer on a separate self-contained "vendor" network.

Note:

i) An alternative security solution able to achieve the same or better security protection, shall be proposed where any System/Equipment security requirements are unable to be fulfilled due to product design limitations;

ii) where an alternative security solution is being proposed details shall be included which describe the alternative security solution

Reference Document:

(a) Guidelines for Windows Server Hardening
http://it.home/doc/HAHO-ITD-GL-T03-010.aspx

(b) Guidelines on Connecting External Network in HA (Information Technology Circular 1/2019)
http://ha.home/circular2/IT-2019-01.pdf

(c) Guidelines for Connecting External Network in HA
http://it.home/doc/HAHO-ITD-GL-N02-001.aspx

(d) Guidelines for Host Security Hardening
http://it.home/doc/HAHO-ITD-GL-T02-001.aspx

(e) OWASP Top 10 Vulnerabilities
https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project

(f) Malicious Code Protection Requirements for Medical Equipment Maintenance (IT Circular 2/2018)
http://ha.home/circular2/IT-2018-02.pdf

(g) Guidelines for Application Security
http://it.home/doc/HAHO-ITD-GL-ISO-005.aspx

(h) Adopting Security Specifications Standard
http://it.home/doc/HAHO-ITD-SD-ISO-001.aspx

(i) Guidelines for Mobile Device Security
http://it.home/doc/HAHO-ITD-GL-ISO-003.aspx

(j) Guidelines for IoT Security
http://it.home/doc/HAHO-ITD-GL-ISO-008.aspx

(k) *Guidelines for Cabling System and Network Setup in External Network*
http://it.home/doc/HAHO-ITD-GL-N05-001.aspx

(l) *Cloud Security Standard*
http://it.home/doc/HAHO-ITD-SD-ISO-004.aspx

(m) *Guidelines for Vulnerability Management Process*
http://it.home/doc/HAHO-ITD-GL-ISO-001.aspx

(n) *Guidelines for Security Patch Management*
http://it.home/doc/HAHO-ITD-GL-ISO-013.aspx

(o) *Guidelines for Security Requirements for HA PCs and Notebooks*
http://it.home/doc/HAHO-ITD-GL-ISO-009.aspx

A.1 Safety

A.1.1 Tenderer shall ensure the System/Equipment remains secure and malicious code free in accordance with the terms and conditions of the relevant contract.

A.1.2 Tenderer shall ensure the System/Equipment when being used for healthcare related patient outcomes does not cause danger, risk, harm, injury, or loss to the safety of an individual.

A.1.3 Tenderer shall ensure the System/Equipment is protected from being used in a manner relied upon by other System/Equipment that could result in danger, risk, harm, injury, or loss to the safety of an individual.

A.1.4 Tenderer shall ensure the System/Equipment does not create any non-compliance with regulatory or legal frameworks.

A.2 Confidentiality and Privacy

A.2.1 Tenderer shall ensure the System/Equipment does not capture, store or process sensitive data and/or any data related to any individual, including personal health information, in a manner that allows the data to be made available or disclosed in an unauthorized manner.

A.2.2 Tenderer shall ensure the System/Equipment provides appropriate authentication controls on privacy control when allowing any user, protocol or other form of connection.

A.2.3 Tenderer shall ensure that all its staff and appointed sub-contractors and agents involved in the performance of the Services sign a confidentiality undertaking, declaration form, declaration checklist prior to commencing any work in HA onsite and remote access.

A.2.4 Tenderer shall ensure each user identity (user-ID) for remote support must uniquely identify only one user. . Sharing user account with other individuals is strictly prohibited.

Any unauthorized use or access may result in consequences, including termination of the user account.

A.2.5 Tenderer shall ensure to review on the validity and on-going need for each of the User accounts of System/Equipment annually.

A.3 Integrity

A.3.1 Tenderer shall ensure the System/Equipment preserves the accuracy and completeness (i.e. integrity) of data and the methods used to process and manage this data.

A.3.2 Tenderer shall ensure the System/Equipment minimises any potential to cause business disruption if the System/Equipment does not operate as expected/planned.

A.3.3 Tenderer shall ensure the System/Equipment can be accurately relied upon as a result of its function.

A.3.4 Tenderer shall provide evidence to HA that any source code associated with the System/Equipment is free of common "OWASP Top 10 Vulnerabilities" [Reference Document (e)].

A.4 Availability

A.4.1 Tenderer shall ensure the System/Equipment will be accessible and usable when needed.

Tenderer shall ensure the System/Equipment achieves an overall level of availability with reference to the requirement of Uptime under warranty and maintenance support related clause in the Tender Specifications.

A.4.2 Tenderer shall ensure any System/Equipment interruption with reference to the requirement of Corrective Maintenance under warranty and maintenance support related clause in the Tender Specifications.

A.4.3 Tenderer shall ensure the System/Equipment provides adequate System/Equipment resilience facilities, including and not limited to redundant hardware components, enabling any faulty components to be switched over to redundant components if applicable.

A.4.4 Tenderer shall ensure the System/Equipment is supported by uninterruptable power supply (UPS) for maintaining the committed level of System/Equipment availability if applicable.

A.4.5 Tenderer shall ensure the System/Equipment minimises any disruption if not performing as expected/planned.

A.5 Compatibility

A.5.1 Tenderer shall ensure the System/Equipment is able to effectively function together with other System/Equipment.

A.5.2 Tenderer shall ensure the System/Equipment does not adversely interfere with the effective operation of any other System/Equipment.

A.5.3 Tenderer shall ensure the System/Equipment continues to function correctly following any System hardening and security specification requirements imposed by HA.

A.6 Longevity

A.6.1 Tenderer shall ensure the length of effective service of the System/Equipment (i.e. many years) and all of its components will be sufficient to meet the needs of HA.

A.6.2 Tenderer shall ensure the System/Equipment continues to operate beyond the period of time expected by HA.

A.6.3 Tenderer shall ensure updates for patching of vulnerabilities are maintained throughout the System/Equipment's lifetime expected by HA.

A.7 Technological Substitution

A.7.1 Tenderer shall ensure that within the warranty period/maintenance service contract period (if applicable), System/Equipment upgrades are performed, if there is any, without any charge within the contract period.

A.8 Data Sovereignty

A.8.1 Tenderer shall ensure the data processed or stored by the System/Equipment resides in Hong Kong.

A.8.2 Tenderer shall ensure the System/Equipment does not process or store data outside of Hong Kong.

A.8.3 Tenderer shall ensure the System/Equipment is governed by the laws of Hong Kong.

A.9 System Hardening

A.9.1 Tenderer shall ensure the System/Equipment, where using the Microsoft Windows Operating System, hardens all its components and functionality according to "Guidelines for Windows Server Hardening" [Reference document (a), which is available for viewing after signing a non-disclosure agreement with hospital].

A.9.2 Tenderer shall ensure the System/Equipment where using the non-Windows solutions are secured according to "Guidelines for Host Security Hardening" [Reference document (d), which is available for viewing after signing a non-disclosure agreement with hospital].

A.9.3 Tenderer shall ensure the System/Equipment avoids the presence of hard-coded authentication credentials.

A.9.4 Tenderer shall ensure the PC connecting System/Equipment which meet following security requirements

(a) Disable default Administrator account, and create another super user account for use instead which should not be granted to end-users

(b) Enable password-protected screen saver

(c) File sharing access must not be granted to “Everyone”, and should be permitted based on pre-defined access rights if and when needed

(d) Install endpoint protection software (e.g. MDE) with the latest definition

(e) Install the latest security patch

(f) Enable personal firewall for blocking incoming network connections, and disabling vulnerable network services such as LLMNR and NBT-NS

(g) Install with encryption software for enabling removable media encryption

(h) Encrypt files and folders containing confidential data, which should be stored in centralized file server instead of local hard disk drive

(i) Confidential files should only be copied into removable storage devices supporting mandatory encryption

(j) Enable full disk encryption and power-up password protection for Notebooks

A.10 Data Security

A.10.1 Tenderer shall ensure sensitive data downloaded from the System/Equipment to end-user devices is protected by a reasonable level of encryption.

Note: Sensitive data refers to data including but not limited to identifiable patient information.

A.10.2 Tenderer shall ensure sensitive data stored within the System/Equipment is preferably encrypted.

A.10.3 Tenderer shall ensure sensitive data stored in backup storage is encrypted.

A.10.4 Tenderer shall ensure all important data (knowledge, System/Equipment configuration parameters) stored in the System/Equipment is safeguarded and preserved through an effective backup mechanism.

A.10.5 Tenderer must ensure that sensitive data is NOT exported for any purpose unless prior authorization has been obtained from HA. Failure to comply with this requirement may result in illegal activities.

A.10.6 Unless prior authorization has been obtained from HA, it is prohibited to copy or move data from the System/Equipment to the HA network using portable media (i.e. USB Drive or CD).

A.10.7 Tenderer shall ensure sensitive or personal data is not logged as much as possible; if there is operational need to log such data, ensure it is encrypted or secured with restricted access control.

A.11 Application Security

A.11.1 Tenderer shall ensure the System/Equipment employs prevalent authentication and authorisation mechanisms at reasonable safety level.

A.11.2 Tenderer shall ensure the System/Equipment supports role-based access control. For example, general user shall be restricted from system administration and setting function, which shall only be performed by authorized users.

A.11.3 Tenderer shall ensure the System/Equipment applies network level encryption.

A.11.4 Tenderer shall ensure the System/Equipment provides comprehensive version control and configuration management mechanisms.

A.11.5 Tenderer shall ensure the System/Equipment conforms to "Guideline for Application Security" [Reference document (g), which is available for viewing after signing a non-disclosure agreement with hospital].

A.12 Malicious Code Protection

A.12.1 Tenderer shall ensure the System/Equipment is protected with the installation of a reputable Anti-Virus program in all servers, PC and Workstation components.

A.12.2 Tenderer shall ensure the System/Equipment is protected with regular updates of the latest virus definitions.

Note: It is highly preferred that Tenderer shall use the same product as HA to have virus definition update automatically.

A.12.3 Tenderer shall be responsible for the on-going support and for keeping the virus definitions and related software up-to-date in all Servers, PCs and workstations.

A.12.4 Tenderer shall ensure virus definitions are updated within 24 hours from the date of release.

A.12.5 Tenderer shall be responsible for the regular scanning of all Servers and PCs in the System/Equipment every three months to ensure that they are not infected by virus, worms and spyware including the on-going support of scheduling and verifying the results of the virus scan.

A.13 Vulnerability / Patch Management

A.13.1 Tenderer shall maintain ongoing System/Equipment support, including the installation of the latest security patches for the Operating Systems and related software in all System servers, PCs and workstations.

A.13.2 Tenderer shall ensure critically affected security patches are updated as soon as practically possible; for non-critical ones, within twelve months from the date of release.

A.14 Restricted External Access

A.14.1 Tenderer shall ensure that there are no non-HA (external) network connections to the System/Equipment unless supported by prior authorization and knowledge of HA.

A.14.2 Tenderer shall ensure that the System/Equipment does not automatically establish any wireless connections without prior authorisation and knowledge of HA.

A.14.3 Tenderer shall ensure that the System/Equipment does not establish any wired connections without prior authorisation and knowledge of HA.

A.15 HA Network Connectivity

A.15.1 Tenderer shall be responsible, where operational reasons exist, for a System/Equipment residing within HA premises to connect to the HA network for information exchange with HA IT systems, for implementing such network connection in accordance with HA requirements and to ensure all security requirements are strictly adhered to (e.g. network segregation by firewall to ensure security attacks due to the System/Equipment would not directly impact HA).

A.15.2 Tenderer shall ensure any network connection for a System/Equipment to the HA network is endorsed by HA and implemented and operated according to HA policies, procedures and guidelines.

A.15.3 Tenderer shall ensure connectivity of the System/Equipment to the HA network adheres to the network diagram as depicted in **Part B**.

A.16 Maintenance Support

A.16.1 Tenderer shall ensure that when maintenance is performed on the System/Equipment or when accessing the System/Equipment in any remote manner that the tools and software have been confirmed to be free of malicious code.

A.16.2 Tenderer shall ensure that where maintenance on the System/Equipment needs to be performed, that HA is provided with a level of assurance that the vendor has undertaken proactive actions to ensure their connecting media or device (USB stick, portable media, laptops, iPads, etc.) which was obtained prior authorization from HA. It has been scanned

for malicious code before and after every time that portable media is used to apply changes/updates to the System/Equipment.

A.16.3 Tenderer shall bring with them a mobile computer (i.e. laptop) which was obtained prior authorization from HA. It contains the latest version of anti-virus software, complete with up-to-date virus signatures to confirm onsite within HA premises that their media to be connected (i.e. USB) is free of malicious code.

A.16.4 Tenderer shall ensure portable media (USB stick, CD/DVD, etc.) which was obtained prior authorization from HA. It is scanned (in addition to clause A.16.3) on a HA PC to ensure that the media is not infected by virus, worms and spyware before being used to apply changes/updates to the System/Equipment.

A.16.5 Tenderer shall ensure the vendor provides HA a completed attestation of compliance to confirm the media or device to be connected to the System/Equipment has been scanned for viruses and found to be free of malicious code.

A.16.6 Tenderer shall perform technical support on-site unless appropriate remote support arrangement is endorsed.

A.16.7 Tenderer shall erase the sensitive data in the storage devices of the System/Equipment before taking away the equipment for repairing or disposal.

A.16.8 Tenderer shall sign and fully comply with a non-disclosure confidentiality agreement during on-site and remote support.

A.16.9 Tenderer should use different portable media (i.e. USB sticks), which have been scanned for malicious code, for each item of medical equipment they need to apply an update to.

A.16.10 Tenderer shall where not able to use different individual portable media (i.e. USB sticks) for applying changes/updates to multiple items of medical equipment (see clause A.16.10), repeat Clauses A.16.3 and A.16.4 before proceeding to attach/apply the portable media to the second and subsequent items of medical equipment.

A.17 Decommissioning Support

A.17.1 Tenderer shall ensure that upon decommissioning of the System/Equipment, data exports and data definitions (sometimes known as data dictionary) are provided for all clinical data, and other data as appropriate, in a data structure and format as required by Hospital Authority.

A.17.2 Tenderer shall provide assistance, as required, for the successful migration of any data to a new replacement System/Equipment(s) as adopted by Hospital Authority.

A.18 Security Incident Reporting and Compliance

A.18.1 Tenderer shall ensure the System/Equipment provides health-checking and audit logging capabilities.

A.18.2 Tenderer shall immediately report to the Hospital management and the HA ITS Call Centre any security incident relating to the System/Equipment.

A.18.3 Tenderer shall monitor its security compliance and comply with HA's regular review process with respect to the requirements stipulated in this document. **Part D** provides a sample of a "Vendor System Network Security Compliance Report" which should be used.

A.19 Connectivity of Vendor Managed Network to HA

A.19.1 For Medical Systems, HA will install External Network data ports next to the equipment for connection with the HA Network, or HA will install External Network Wireless LAN for the equipment that supports Wi-Fi for connection with the HA Network.

(Note: Tenderer shall confirm with HA if External Network data ports can be provided)

A.19.2 The External Network data ports are based on the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standards and support 10BASE-T at 10 Mbit/s (IEEE 802.3i), 100BASE-TX Fast Ethernet at 100 Mbit/s (IEEE 802.3u) and 1000BASE-T Ethernet at 1 Gbit/s (IEEE 802.3ab) connections.

A.19.3 The External Network is an Internet Protocol (IPv4) routable network. It supports the following communication protocols, including Internet Protocol (IP), Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). The IP address will be assigned by HA.

A.19.4 In case the tenderer cannot use HA-provided External Network data ports, the tenderer shall set up the network and implement the cabling system according to the "Guidelines for Cabling System and Network Setup in External Network" [Reference Document (k) , which is available for viewing after signing a non-disclosure agreement with hospital].

A.19.5 Other than the provision by HA IT&HI as specified in the tender document, if the tenderer considered the HA IT&HI provision not sufficient/applicable to its proprietary Medical Systems, the tenderer may propose additional installation (in such case the additional installation works shall be carried out by the tenderer according to the "Guidelines for Cabling System and Network Setup in External Network" at its own cost [Reference Document (k)]). HA will not bear any additional charges, and the tenderer shall bear all such related costs which shall have been included in the tender price submitted by the tenderer.

A.19.6 Tenderer shall put their servers in Hospital Data Center as far as possible.

A.19.7 Tenderer shall provide the network diagram to illustrate the network architecture if the tenderer follows A19.4. **Part B.1** illustrates the architecture of External Network for Medical Systems.

A.19.8 Tenderer shall ensure the System/Equipment connecting to the External Network Wireless LAN comply with the following requirements and specifications:

(a) Tenderer shall comply with the HA Wi-Fi infrastructure and standard guidelines

(b) The end devices provided by the tenderer shall support IEEE 802.11a/g/n/ac/ax. For the end devices which support IEEE 802.11ax, they shall be compatible with IEEE 802.11a/g/n/ac

(c) The end devices provided by the tenderer shall support 2.4GHz channel 1-13 and/or 5GHz channel under U-NII-1, U-NII-2A, U-NII-2C and U-NII-3

(d) The end devices provided by the tenderer shall support WPA2 with AES encryption and PSK authentication

(e) The end devices provided by the tenderer shall support DHCP/static IP configuration

(f) The end devices provided by the tenderer shall support roaming across access points without session drop

(g) Tenderer shall provide MAC addresses of the end devices for registration and PSK authentication in order to access Wi-Fi network

(h) Tenderer shall arrange a Wi-Fi connectivity test with users and Hospital/HA IT&HI before the production rollout

(i) Only 1 common SSID will be provided by HA for all non-IT systems

(j) Non-IT systems shall use IP addresses as assigned by HA

(k) IP routable network will be provided for Wi-Fi and wired equipment

A.19.9 For Non-Medical Systems such as Operational Technology (OT), the tenderer shall comply with the following requirements and specifications:

(a) Tenderer shall set up the network and implement the cabling system according to the "Guidelines for Cabling System and Network Setup in External Network" [Reference Document (k) , which is available for viewing after signing a non-disclosure agreement with hospital].

(b) Refer to the "Guidelines for Cabling System and Network Setup in External Network" [Reference Document (k), tenderer shall install at least one Layer 2 switch or with resilient when HA requires at the tenderer's cabinet and shall cater for different auto network failover and recovery scenarios according to the network diagrams illustrated in **Part C.1 and C.2**. If Layer 3 switch installation is required, the tenderer shall contact HA IT&HI in advance for consideration.

(c) Tenderer shall provide the network diagram to illustrate the network architecture. **Part B.2** illustrates the architecture of External Network for Non-Medical Systems.

(d) HA shall arrange HA Authorized Cabling Contractor to install the backbone cablings and HA Equipment Vendor to install the Gigabit Interface Converters (GBICS) at HA switch in Building Closets for the network connection to the tenderer's switch.

(e) HA will not bear any installation and maintenance related charges (except for backbone cabling, i.e. B.4 in **Part B.2**), and the tenderer shall bear all such related costs which shall have been included in the tender price submitted by the tenderer

A.20 Clinical Data Exchange

A.20.1 Tenderer shall ensure seamless electronic data exchange with Hospital Authority corporate systems, complying with Health Level Seven (HL7) version 2.3.1 and above, including support for the HL7 FHIR (Fast Healthcare Interoperability Resources) standard. The data transfer protocols should include MLLP with native HL7, SOAP, or RESTful-based web services with HL7XML, as well as FHIR API interfaces. Additionally, the Clinical Information System (CIS) must have the capability to receive events from and publish events to hospital systems in a timely manner to ensure real-time or near real-time data availability and synchronization. Furthermore, the file server storing clinical report files to be downloaded by the Hospital Authority system must support the SFTP protocol.

A.20.2 Tenderer shall ensure the implementation of electronic data exchange with Hospital Authority corporate systems complies Hospital Authority HL7 Guidelines.

A.20.3 Tenderer shall ensure any electronic message exchange with the Hospital Authority includes reference keys supplied by Hospital Authority corporate systems such as:

(a) HKID
(b) Name
(c) Date of birth
(d) Sex
(e) HA case number
(f) HA system unique patient key

Note: Electronic message exchange is important to ensure high integrity associated with patient identification and automatic mapping to patient records within the Hospital Authority.

A.20.4 Tenderer shall ensure the System/Equipment maintains the existing exchange of patient data with Hospital Authority corporate systems and provides exchange for other data including but not limited to:

(a) Admit, discharge & transfer, and patient demographics
(b) Allergy, Adverse Drug Reaction and Alert information
(c) Clinical order, observations and results
(d) Multimedia and imagery data

A.20.5 Tenderer shall ensure the System/Equipment automatically updates patient's demographic data upon reception of ADT message.

A.20.6 Tenderer shall ensure ADT information exchanged is in compliance with the latest Hospital Authority HL7 Implementation Guidance.

A.20.7 Tenderer shall ensure audit logging is provided for all ADT (Admit, Discharge and Transfer) interactions.

A.20.8 Tenderer shall ensure the System/Equipment adopts the preferred Hospital Authority date format.

(a) For the display of date in frontend screen: DD-MMM-YYYY (e.g. 01-JAN-2014)

(b) For the display of date-time in frontend screen: DD-MMM-YYYY hh:mm:ss in either 12hr/24hr mode (e.g. 01-Jan-2014 15:30:45)

(c) For the transfer of date information to HA system: YYYYMMDD (e.g. 20140101)

(d) For the transfer of date-time information to HA system: YYYYMMDDhhmmss in 24hr mode (e.g. 20140101153045).

Note: This enables user friendliness and system interoperability to be achieved.

A.20.9 Tenderer shall ensure the System/Equipment sends update or delete messages, if necessary, to perform corresponding actions with Hospital Authority corporate systems, with proper authorization mechanism from supervisor and audit trail.

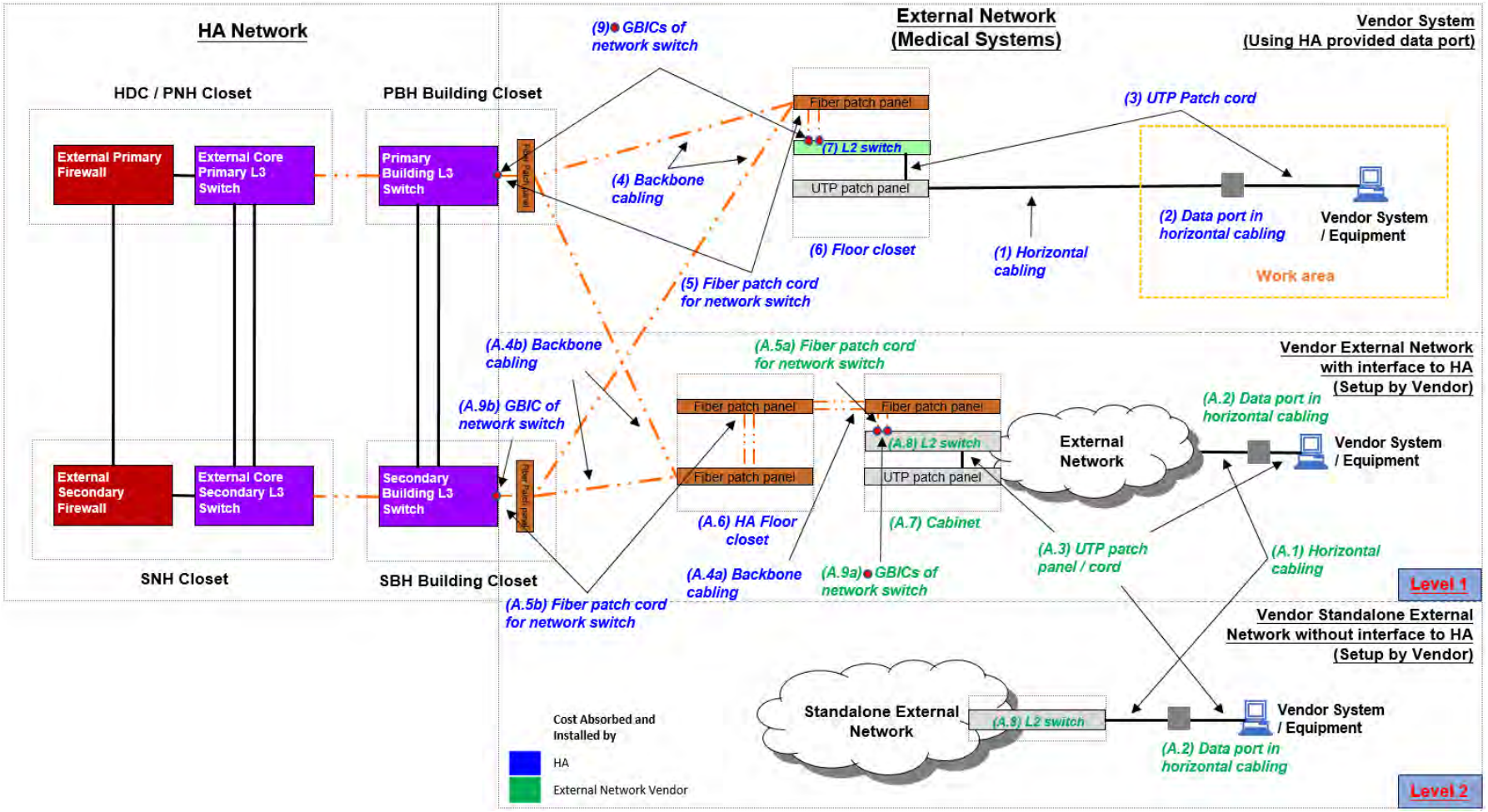
A.20.10 Tenderer shall ensure the System/Equipment provides appropriate feedback to users to indicate the successfulness of message exchange with Hospital Authority corporate systems. (e.g. dashboard system, system alert to users).

A.21 Public Cloud Service

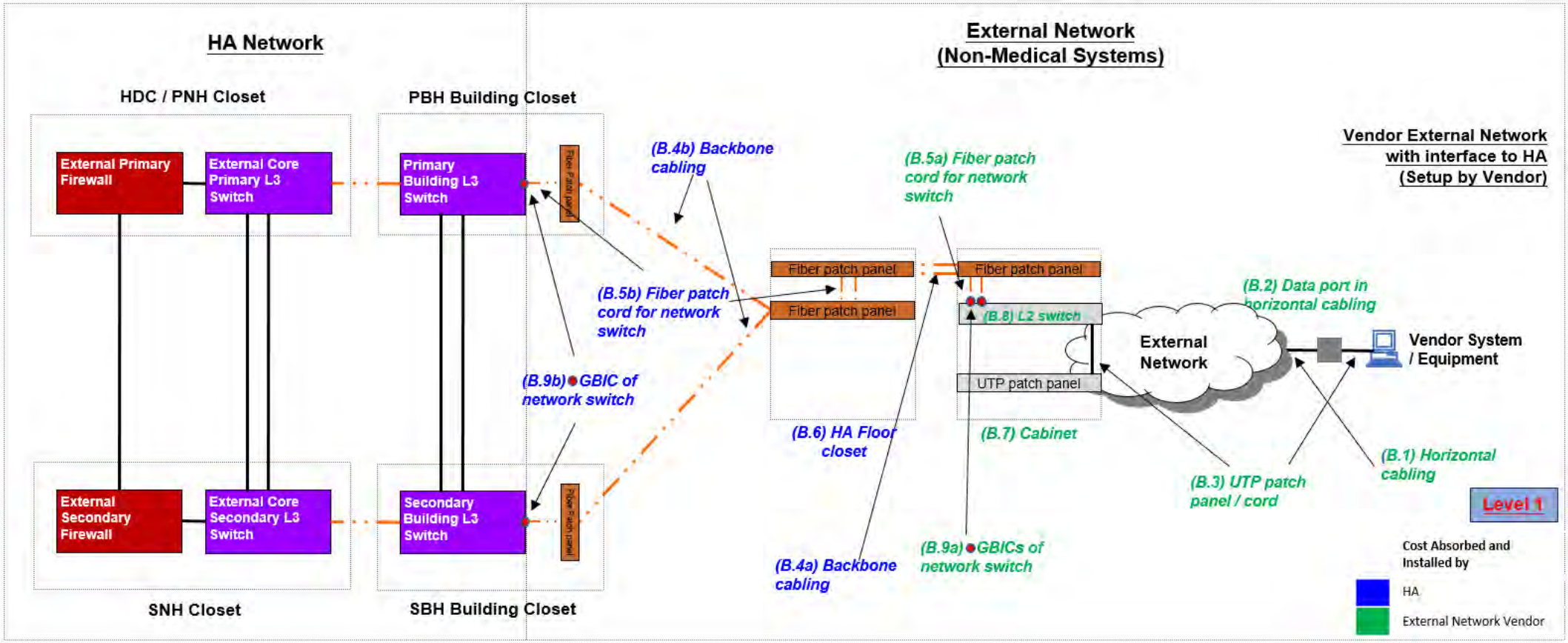
A.21.1 Tenderer shall ensure the System/Equipment, where using public cloud service (e.g. Software as a Service/SaaS), conforms to "Cloud Security Standard" [Reference document (l), which is available for viewing after signing a non-disclosure agreement with hospital].

B. External Network Architecture

1) Below diagram illustrates the External Network Architecture for Medical Systems



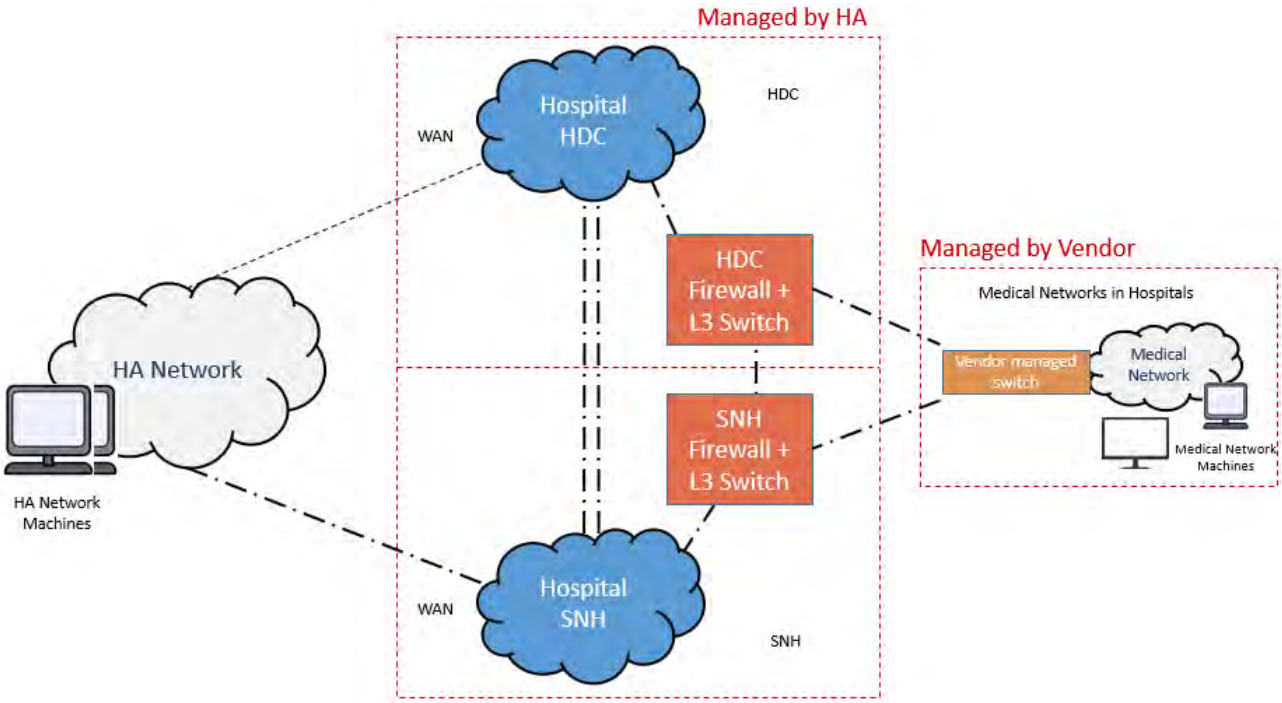
2) Below diagram illustrates the External Network Architecture for Non-Medical Systems



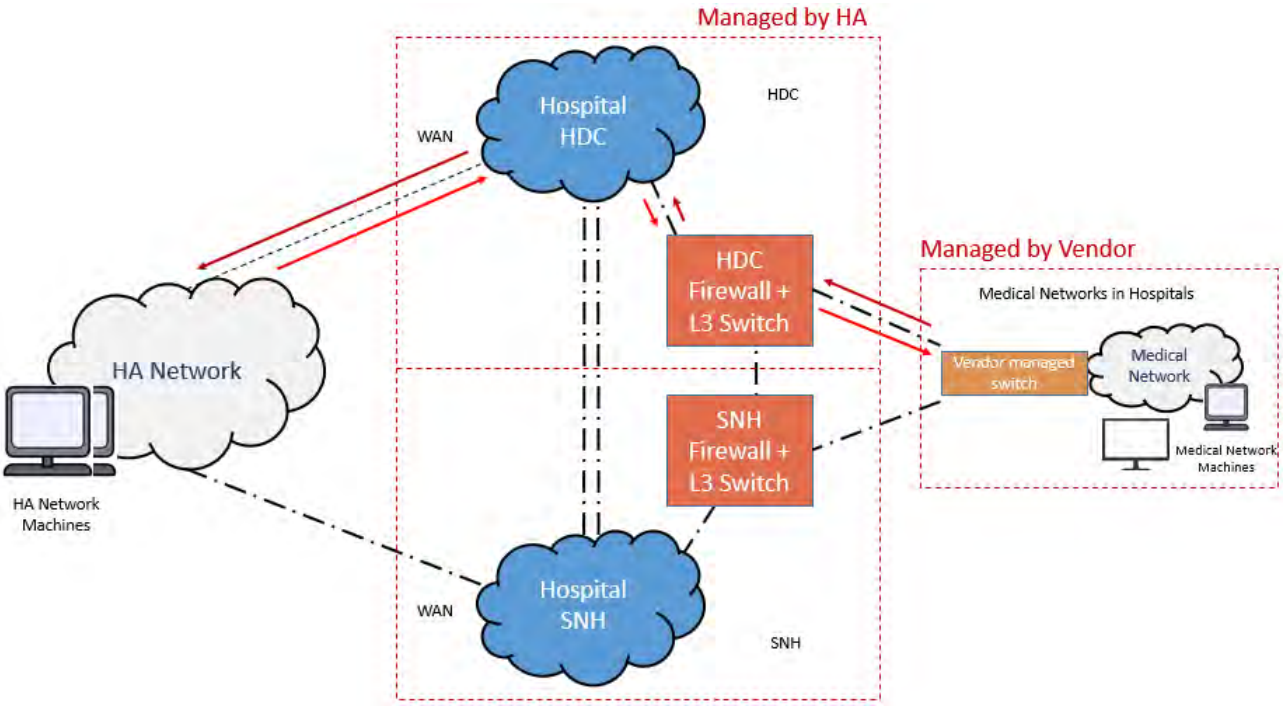
C. Failure and Recovery Scenarios in Hospitals for Vendor Managed Network Switches

C.1 Model A (Single Vendor Managed Layer 2 Switch)

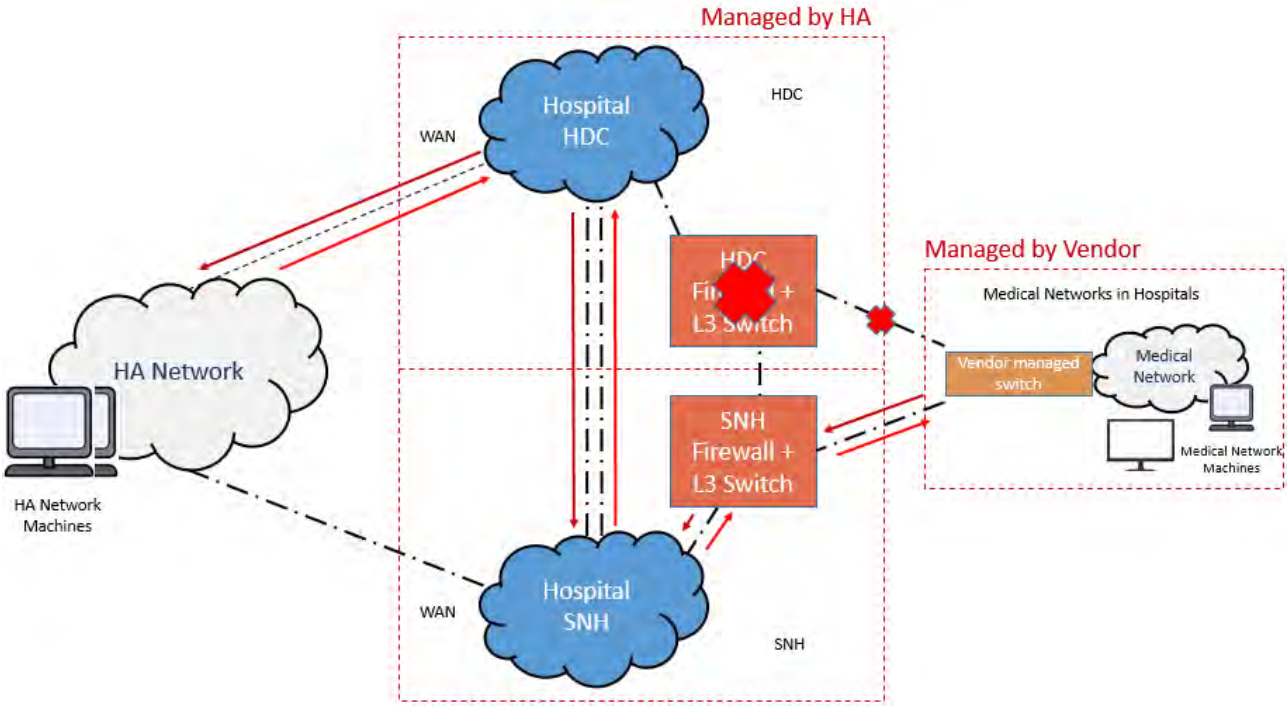
C.1.1 Network Diagram



C.1.2 Normal Network Path

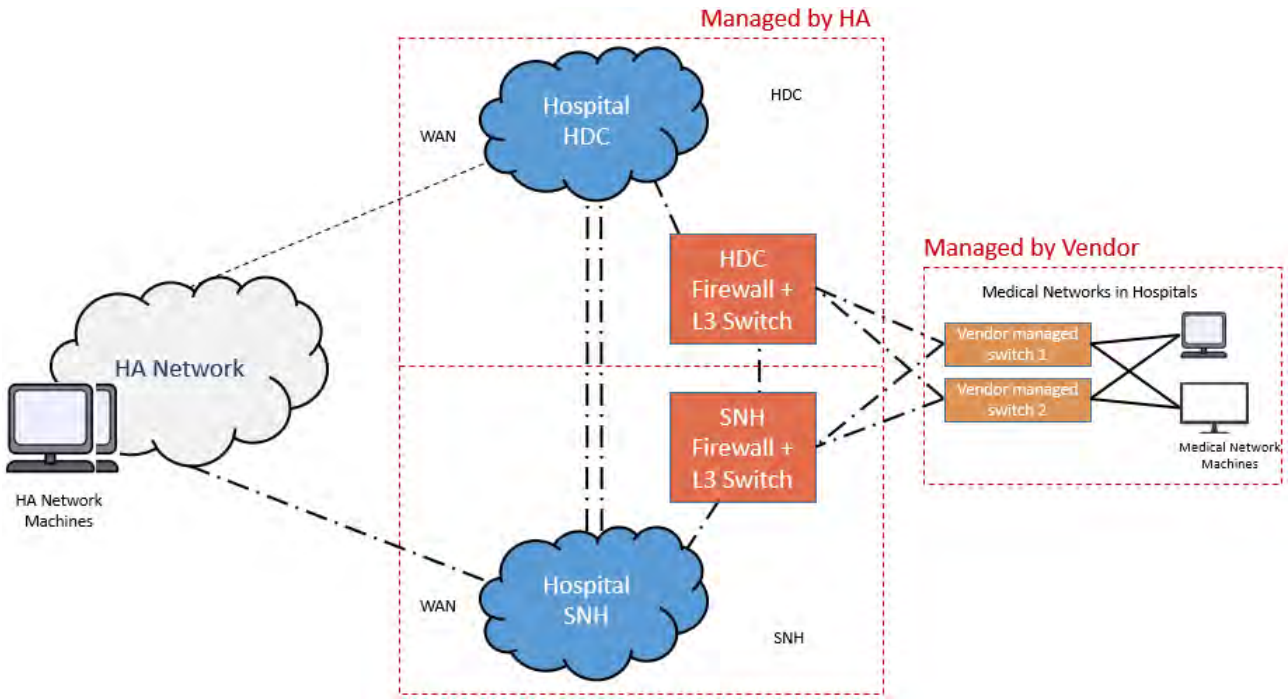


C.1.3 Failure Scenario

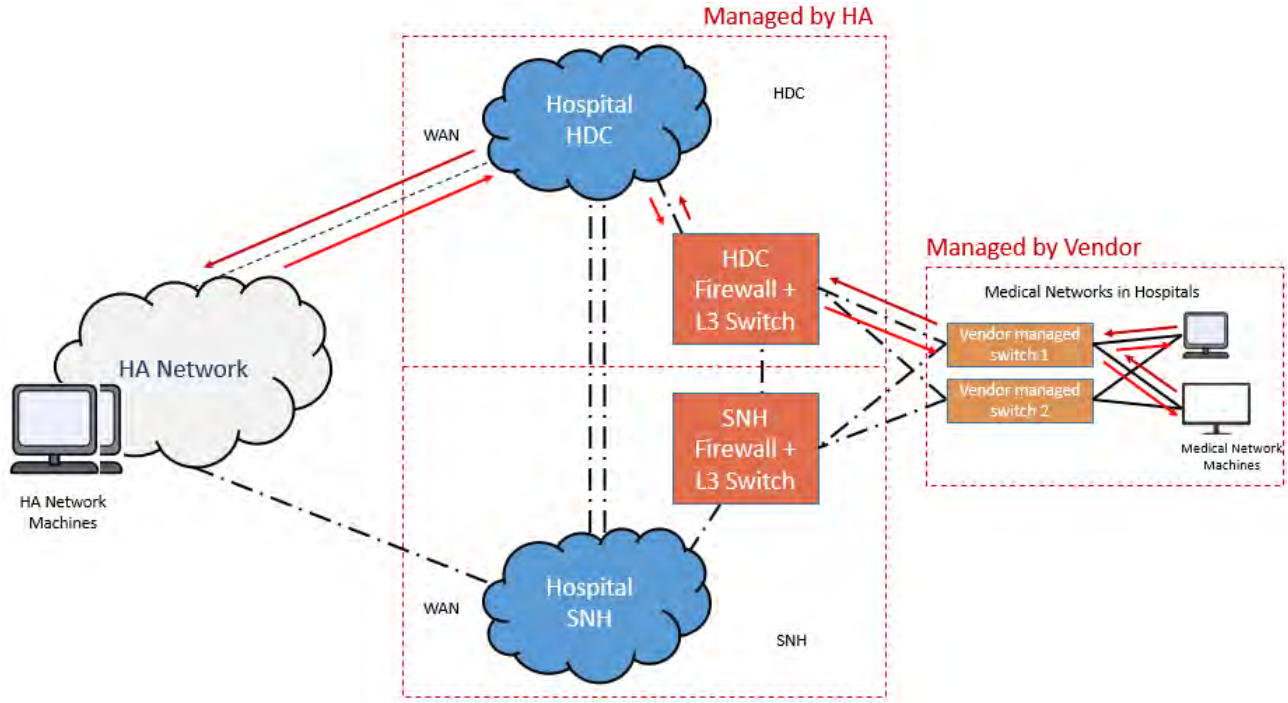


C.2 Model B (Resilient Vendor Managed Layer 2 Switches)

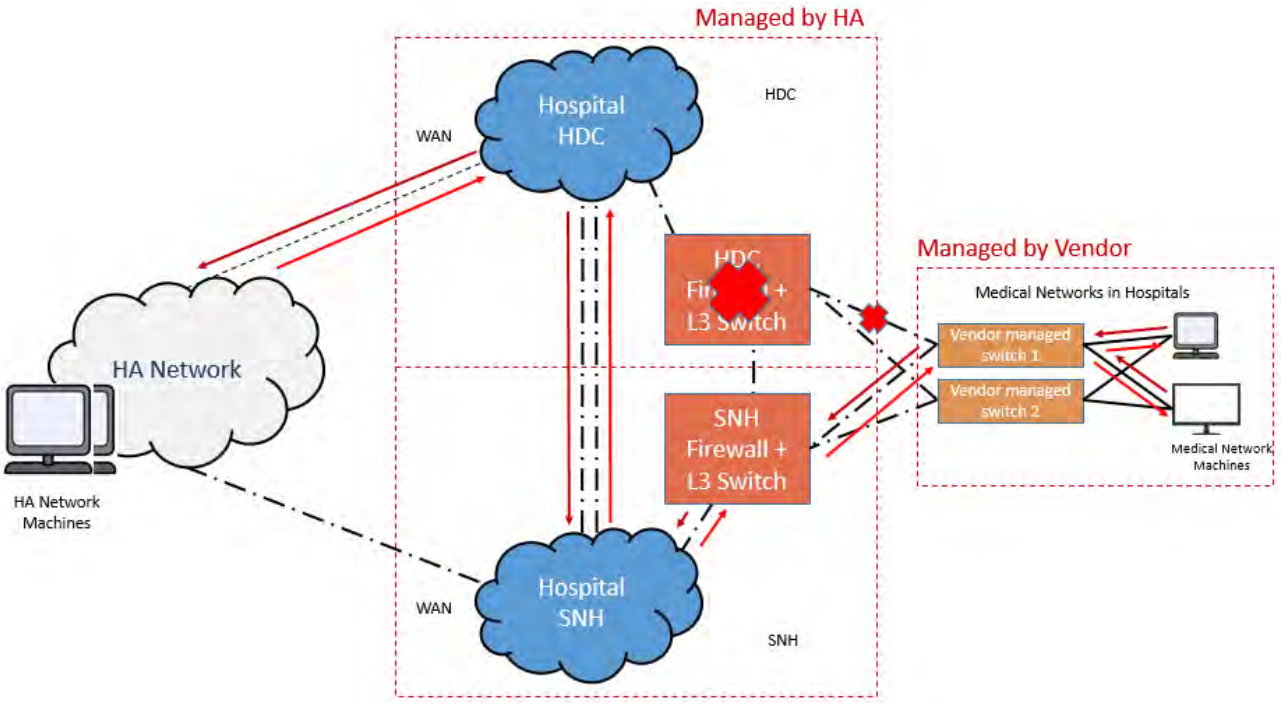
C.2.1 Network Diagram



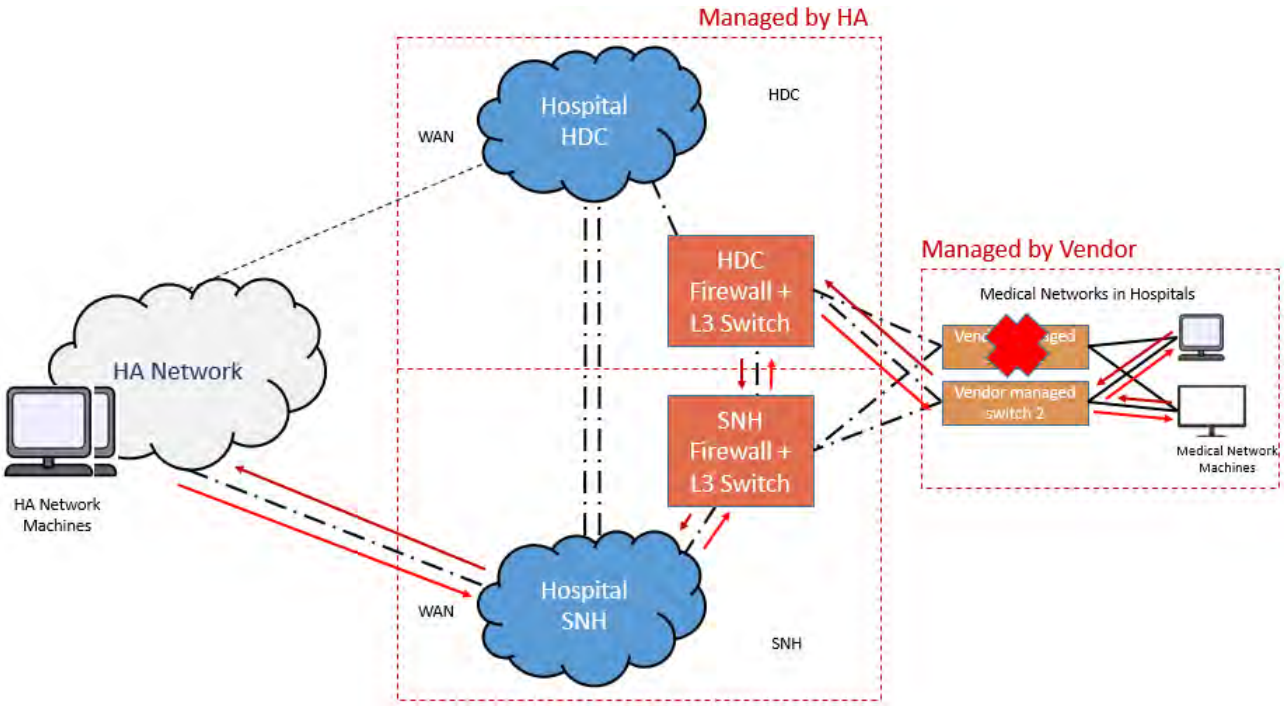
C.2.2 Normal Network Path



C.2.3 Failure Scenario B1



C.2.4 Failure Scenario B2



D. Vendor System Security Compliance Report (Sample)

Hospital: _____ **Name of Systems:** _____

Installation Location: _____ **IP Subnet:** _____

Security Requirements for Vendor System/Equipment Installed in HA

Items for Verification with Vendor		Comply (Y/N/NA)	Remark (if "N" or "NA")
A.	**Data Security (Review in regular basis)**		
A1	Confidential data downloaded from the System/Equipment to end-user devices should be encrypted		
A2	Confidential data transferring between the System/Equipment and other HA IT systems should "preferably" be encrypted		
A3	Confidential data stored within the System/Equipment should "preferably" be encrypted		
A4	Confidential data stored in backup storage should be encrypted		
A5	Confidential data must not be exported for any usage unless prior authorisation has been obtained from HA.		
A6	Is the confidential data in System/Equipment and backup being protected from unauthorized access / leakage, including physical security controls? Please specify the controls in "Remark"		
B.	**Application Security (Review in regular basis)**		
B1	The application should support role-based access control		
B2	The application should employ prevalent authentication mechanism at reasonable safety level		
B3	The application should apply network level encryption		
B4	The application should provide health-checking information		
B5	The application should keep audit logs		
B6	Conformance to HA's Guidelines for Application Security		
C.	**Network Security (Review in regular basis)**		
C1	The System/Equipment should not have any network connection to external parties and should not have any unauthorized network connections		

Items for Verification with Vendor		Comply (Y/N/NA)	Remark (if "N" or "NA")
C2	The System/Equipment network should connect to the network port provided by HA		
C3	The System/Equipment network should use IP addresses as assigned by HA		
C4	Only the authorised network traffic is permitted between the System/Equipment network and HA network		
C5	Formal change request and endorsement process for defining and implementing the network firewall policies		
D.	**Server Security (Review in regular basis)**		
D1	Vendor should implement the server security as described in the Guidelines for Windows Server Hardening and the Guidelines for Host Security Hardening		
D2	Vendor should install into the servers an anti-virus program running with the latest virus definitions		
D3	Vendor should install the latest security patches in the servers		
D4	Vendor should perform a regular scanning in the servers		
E.	**Client / Desktop Security (Review in regular basis)**		
E1	Vendor should implement the security controls at the PCs of the System/Equipment as described in the Guidelines for Security Requirements for HA PCs and Notebooks		
F.	**Security Incident Reporting (On-going exercise)**		
F1	Vendor should immediately report security incidents to Cluster/Hospital management		
G.	**Vendor Maintenance (Review in regular basis)**		
G1	Vendor should erase the data in storage devices before taking away the equipment for repair		
G2	Vendor should perform technical support on-site unless appropriate remote support arrangement is endorsed		
G3	Vendor support staff should sign the non-disclosure confidentiality agreement		
G4	When equipment is required to be taken away for offsite repair, are there ways to remove / erase / protect the confidential data in the equipment form leakage? Please specify the controls in "Remark"		

Items for Verification with Vendor		Comply (Y/N/NA)	Remark (if "N" or "NA")
H.	**Privacy Control (Review in regular basis)**		
H1	Are there any user authentication controls present in the System/Equipment?		
H2	Is unique user ID being assigned to every user?		
H3	Does the System/Equipment allow setting of complex password such as upper / lower case, alpha, numeric and special characters?		
H4	Does the System/Equipment provide audit trails of user accesses? Please specify the controls in "Remark".		
H5	Is there any means to synchronize System/Equipment time with a trustworthy time server such as HA time server for accurate system record?		
H6	Perform user account review annually and disable inactive user immediately.		

Assumptions

1. in-direct offline storage should not be used

Full Name of Vendor Staff: _____ **Vendor Company:** _____

Position of Vendor Staff _____ **Company Chop:** _____

Signature of Vendor Staff: _____ **Date:** _____

Guidelines for Cabling System and Network Setup in External Network

Version	Effective Date
5.0	29/11/2022

Document Number	HAHO-ITD-GL-N05-001-v05
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Approved/ Endorsed By	ITD
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Distribution List	All HA HOIT&HI Staff / Cluster IT Staff

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Amendment History

Version No.	Date of Amendment	Prepared by	Description
1.0	09/10/2020	John Tse	First version
2.0	09/12/2020	John Tse	Update the External Network Architecture Diagram in section 4 to indicate the building switch is a L3 switch
3.0	20/07/2021	John Tse	Update the cabling system and L2 switch guidelines and specifications
4.0	15/8/2022	John Tse	Update Section: 4. Guidelines to Setup External Network 5. External Network Architecture 6. Roles & Responsibilities 7. Network Cabling System & Network Equipment 8. Network Cabling in External Network 9. External Network Setup by Vendor 10. L2 Switch Specification Requirements 11. L2 Switch Configuration 12. Acceptance to Checklist 13. Appendix A and Appendix B
5.0	25/11/2022	Will Ng	Update words in section 7

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1. Purpose

The purpose of this document is to provide guidelines for External Network Vendor to perform cabling work and network setup for External Network System.

2. Reference

N/A

3. Overview

3.1 Objectives

The objectives of this Guidelines includes:

(a) To provide the External Network architecture for Vendors to follow;

(b) To provide the cabling / network equipment specification requirements for Vendors to follow;

(c) To provide the guideline for network cabling in External Network;

(d) To provide the guideline for network switch configuration.

3.2 Scope

The scope of this IT guidelines is applicable to all External Network systems.

3.3 Background

(a) Previously there is no standard for External Network Vendors to implement cabling system and network;

(b) Cabling system and/or network equipment cannot be reused when the External Network end of support;

(c) A guideline shall be developed to maintain the standards of cabling system implementation and network setup in External Network.

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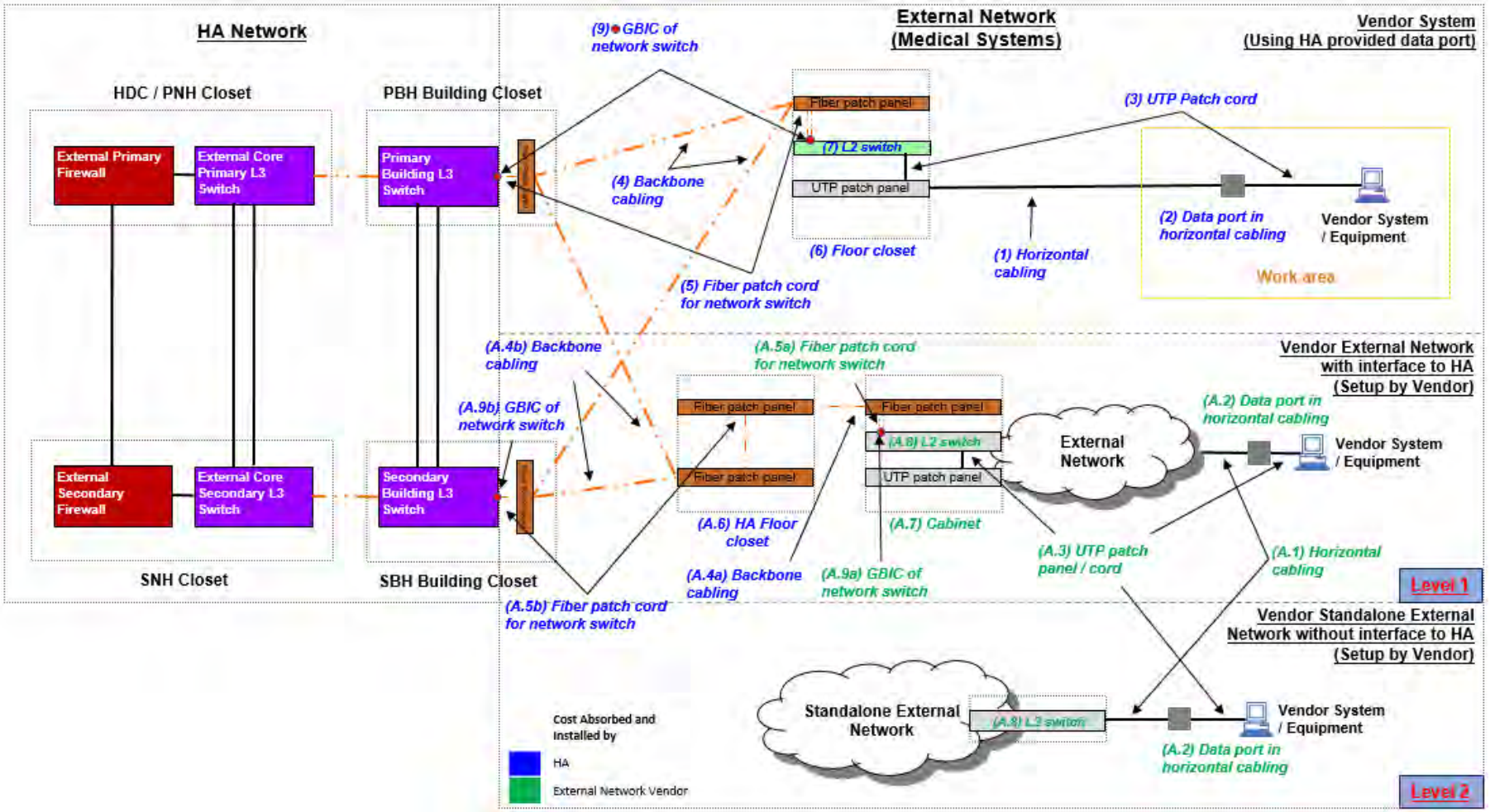
4. Guidelines to Setup External Network

Level	Type	Standards and Guidelines	Cabling	Network Equipment	Criteria
1	Vendor External Network with interface to HA	Follow: 1. IT Security Requirements for Quotation / Tender – Procurement of "non-IT" System/Equipment 2. This guideline for cabling system and network setup	Vendor can use their own cabling contractor (Except backbone cabling to be done by HA cabling contractor)	Vendor can use their own L2 switch that meet the specification in this guideline	Vendor shall provide the Cabling System and Network Setup Checklist for record purpose
2	Vendor Standalone External Network without interface to HA		Vendor can use their own cabling contractor	Vendor can use their own L2 switch	

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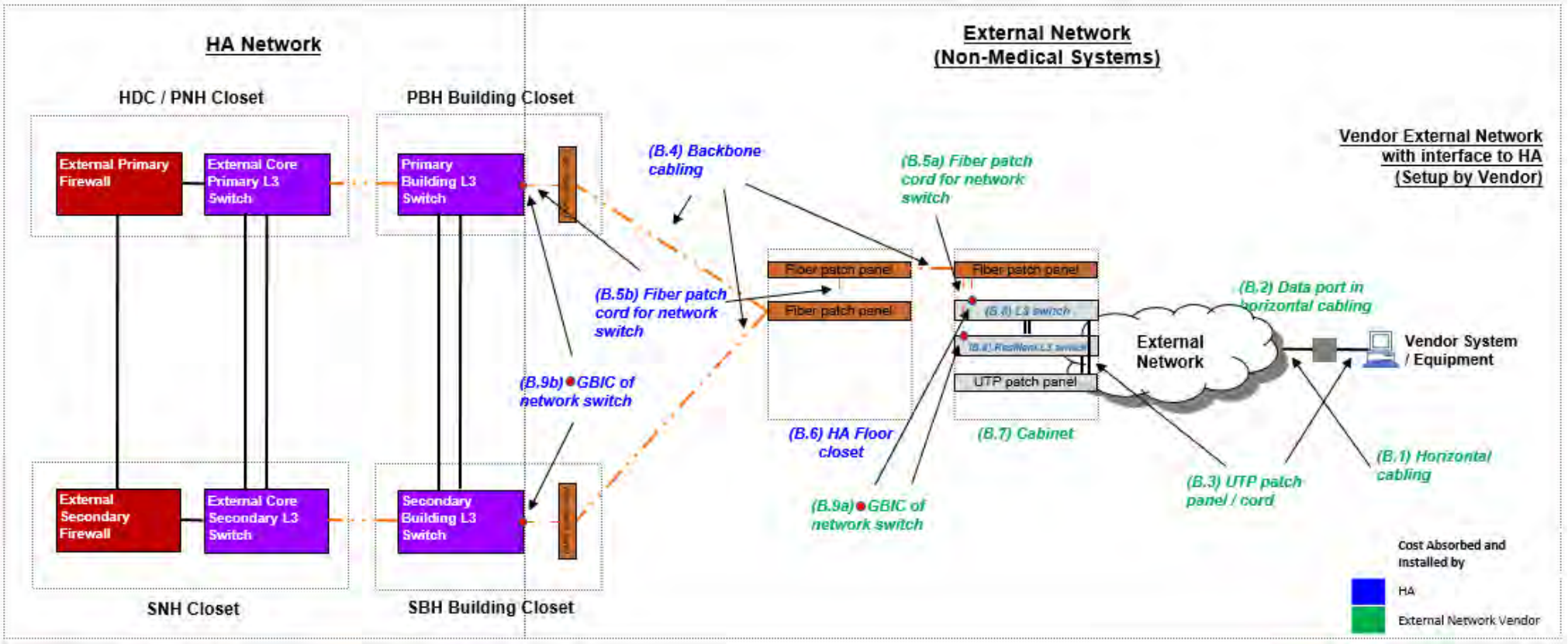
5. External Network Architecture

Below diagram illustrates the External Network Architecture for Medical Systems



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Below diagram illustrates the External Network Architecture for Non-Medical Systems



6. Roles & Responsibilities

Level	External Network	Component	Cost Absorbed and Installed by
1	Vendor External Network with interface to HA	(A.1) Horizontal cabling (Between Data port and vendor cabinet)	External Network Vendor
		(A.2) Data port (in horizontal cabling)	
		(A.3) UTP patch panel / cord for data port and in vendor cabinet	
		(A.4a) Horizontal Backbone cabling	HA
		(A.4b) Vertical Backbone cabling	
		(A.5b) Fiber patch cord for network switch	
		(A.6) HA Floor closet	
		(A.7) Cabinet	External Network Vendor
		(A.8) L2 Switch	
		(A.9a) GBIC of Network switch at vendor cabinet	
		(A.9b) GBIC of Network switch at PBH / SBH building closets	HA Network Equipment Vendor
2	Vendor Standalone External Network without interface to HA	(A.1) Horizontal cabling (Between Data port and vendor cabinet)	External Network Vendor
		(A.2) Data port (in horizontal cabling)	
		(A.3) UTP patch cord for data port and in vendor cabinet	
		(A.5a) Fiber patch cord for network switch	
		(A.8) L2 Switch	

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7. Network Cabling System & Network Equipment

External Network	Usage	Product Description
Network cabling system	(A.1) Horizontal cabling (A.2) Data port (in Horizontal cabling)	Cat6 / Cat6A cable, LSZH rated
		Faceplate with modular Jack, angled outlet with shutter/latch or rack-mounted RJ45 patch panel with modular jacks, 24-port, 1U, straight, each modular jack shall be separately replaceable
	(A.3) UTP Patch panel / cord for Data port and in vendor cabinet	1-metre Cat6 / Cat6A slim patch cord with RJ45 connectors at both ends, straight, LSZH rated, factory-terminated
		2-metre Cat6 / Cat6A slim patch cord with RJ45 connectors at both ends, straight, LSZH rated, factory-terminated
		3-metre Cat6 / Cat6A patch cord with RJ45 connectors at both ends, straight, LSZH rated, factory-terminated
		Rack-mounted RJ45 patch panel with modular jacks, 24-port, 1U, straight, each modular jack shall be separately replaceable
	(A.4a) Horizontal Backbone cabling (A.4b) Vertical Backbone cabling	Indoor / outdoor 12-core, 9/125mm OS2 single-mode optical fiber, LSZH rated, with duplex LC connector at both ends
		Rack-mounted single-mode fiber patch panel with 24 duplex LC couplers/adapters, 48 cores, 1U
	(A.5a) Fiber patch cord for network switch (A.5b) Fiber patch cord for network switch	2-metre / 3-metre, single-mode OS2 fiber patch cord, LSZH rated, with duplex LC connector at both ends, factory terminated
	(A.6) Cabinet	Communication equipment cabinet (Floor-standing, steel, at least 1000kg load capacity, fully perforated front door, fully perforated middle-split rear door, all doors equipped with key locks, heavy duty casters with feet): 1. 42U racking space (Dimension: height 2050mm x width 800mm x depth 1100mm) or 2. 42U racking space (Dimension: height 2050mm x width 800mm x depth 870mm) or 3. 42U racking space (Dimension: height 2050mm x width 600mm x depth 1100mm) or 4. 42U racking space (Dimension: height 2050mm x width 600mm x depth 870mm) or

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		5. 37U racking space (Dimension: height 1800mm x width 600mm x depth 870mm) or 6. 27U racking space (Dimension: height 1400mm x width 600mm x depth 870mm) In Hospital Data Centre (HDC): Communication equipment cabinet (Same as the above requirements): 1. 42U racking space (Dimension: height 2050mm x width 600mm x depth 1200mm) Server cabinet (Same as the above requirements except the load capacity is 1500kg): 1. 42U racking space (Dimension: height 2050mm x width 600mm x depth 1200mm) or 2. 47U racking space (Dimension: height 2250mm x width 600mm x depth 1200mm) The cabinet size is subject to actual site environment.
Network equipment	(A.8) L2 switch	1. For Vendor External Network with interface to HA (Level 1): - Vendor can use other L2 switch according to the L2 Switch Specification Requirements and L2 Switch Configuration specified in section 10 and 11 respectively 2. For Vendor Standalone External Network without interface to HA (Level 2): - Vendor can use their own L2 switch
	(A.9a) GBIC of network switch at Building closet	1000BASE-LX/LH SFP transceiver module MMF/SMF 1310nm.
	(A.9b) GBIC of network switch at vendor cabinet	1000BASE-LX/LH SFP transceiver module MMF/SMF 1310nm

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8. Network Cabling In External Network

8.1 Cabling System Structure In Hospital

The elements of the cabling system structure in hospital are:

a. Backbone cabling;

b. Horizontal cabling;

c. Data port (in Horizontal cabling);

d. Floor closet.

8.2 Backbone Cabling

a. The function of the backbone cabling is to provide interconnections between Floor closet of External Network and Building closets of HA Network.

b. Backbone cabling consists of the backbone cables, intermediate and main cross-connects mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection. Backbone cabling also includes cabling between buildings.

c. For fiber backbone cable, fiber patch cord, the fiber polarity shall be pair-flipped (A-to-B and B-to-A connection) to ensure transmit-to-receive connectivity.



d. Recognized cables

Below type of cable is recognized and recommended for use in the backbone cabling system in HA network:

- 9/125 µm OS2 single mode optical fiber.

Recognized cables, associated connecting hardware, patch cords and equipment cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.3.

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8.3 Horizontal Cabling

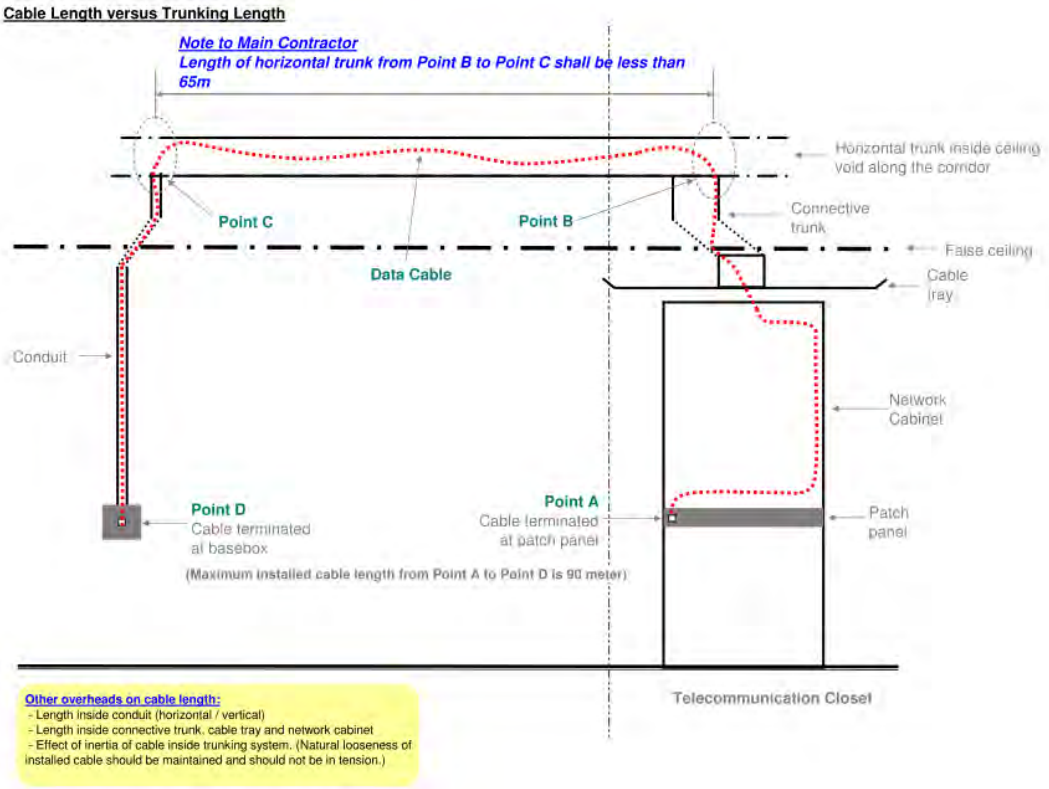
a. The horizontal cabling is the portion of the telecommunication cabling system that extends from the Data port in work area to the Floor closet. In HA environment, that also means the linkage between user Data port and patch panel in network closet;

b. The horizontal cabling includes horizontal cables, Data port in the work area, mechanical terminations and patch cords or jumpers located in the Floor closet;

c. The term "horizontal" is used since typically the cable in this part of the cabling system runs horizontally along the floor of a building;

d. Horizontal distances:

The horizontal distance is the cable length from the mechanical termination of the media at the horizontal cross-connect in the Floor closet to the Data port in the work area. The maximum horizontal distance for copper cabling shall be 90m and the cable inside ceiling trunking shall not exceed 65m length;



For each horizontal channel, the total length allowed for cords in the work area plus patch cords or jumpers plus equipment cables or cords in the Floor closet shall not exceed 10 m (33 ft). An allowance was made for 5 m (16 ft) from the telecommunications outlet to the work station.

e. Recognized cables

Two types of cables are recommended for use in the horizontal cabling system in HA network, as designated by HA:

- Four-pair 100-ohm foiled/unshielded twisted-pair (F/UTP). Cat.6a cable or;
- Four-pair 100-ohm unshielded twisted-pair (UTP). Cat.6 cable.

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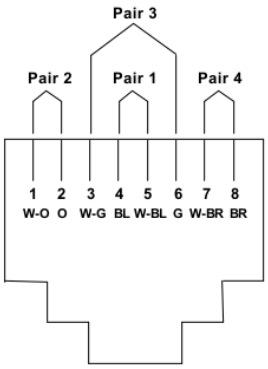
Recognized cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2.

8.4 Data Port (In Horizontal Cabling)

a. The work area components extend from the Data port to the Medical work station;

b. The Data port for 100-ohm UTP cable shall meet the requirements of ANSI/TIA/EIA-568-B.2;

c. T568B wiring scheme shall be used for termination of copper cabling system in HA;

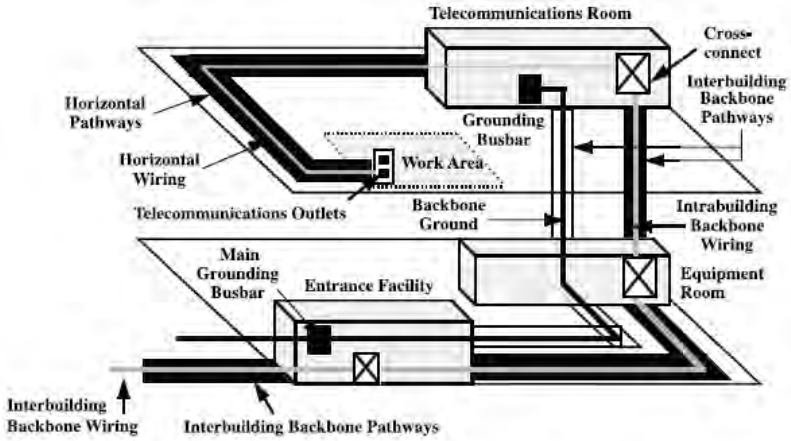


Eight-position jack pin/pair assignment (T568B)

d. Patch cords used in the work area shall meet or exceed the performance requirements in ANSI/TIA/EIA-568-B.2. Therefore, allowed maximum length of work area cord is 5m and 3m cord is for generic used;

e. Labelling of Data port:

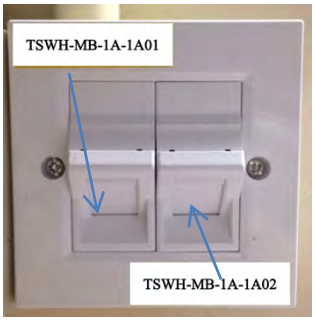
HA follows ANSI/TIA/EIA-606-A for labelling of Data ports;



Scope of ANSI/TIA/EIA-606-A

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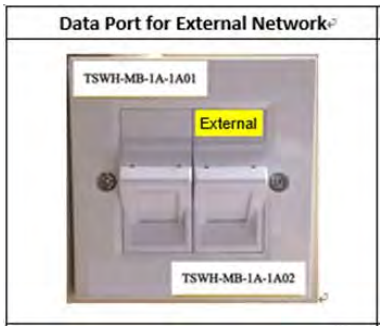
Data port's ID shall be printed on white label with black ink. The ID of left-hand side outlet shall be affixed on the upper left-hand corner and the right-hand side outlet shall be on the lower right-hand corner of the faceplate as below:



Labelling of Data port's usage:

- Labels shall be printed in black word on yellow label in 2cm x 1cm size as below:

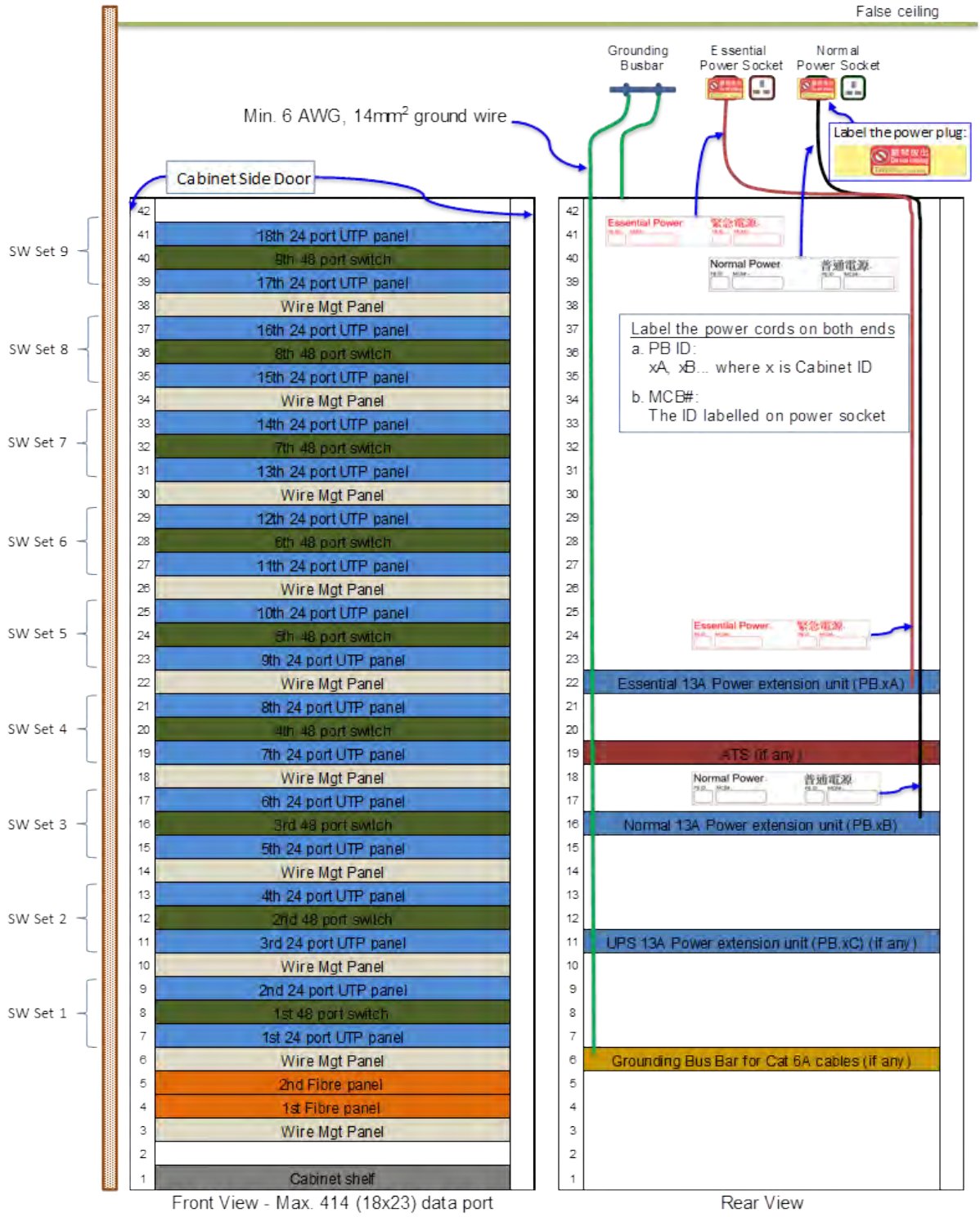
External Network Data port: Yellow label



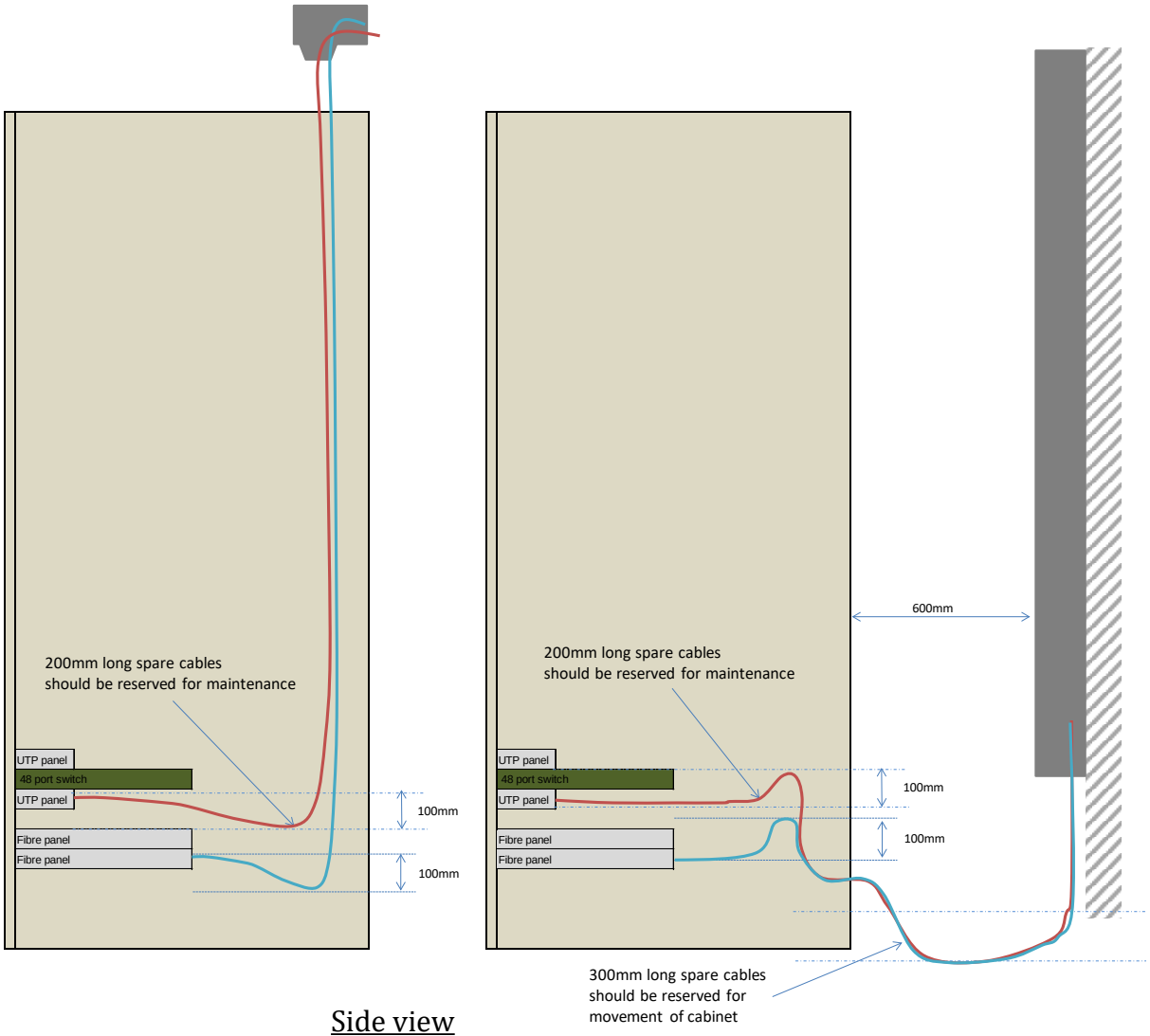
8.5 Floor Closet Setup

a. Floor-stand cabinet:

Cabinet space assignment:



Termination of network cables for floor-stand cabinet:



Side view

9. External Network Setup by Vendor

For Vendor External Network with interface to HA (Level 1) and Vendor Standalone External Network without interface to HA (Level 2), External Network Vendor shall follow below guidelines to setup the External Network:

9.1 Shall setup the Local Area Network (LAN) of Vendor External Network (Level 1) and (Level 2) regarding the roles and responsibilities in section 6.

9.2 Horizontal cabling for Vendor External Network (Level 1) and (Level 2):

a. Recognized cables:

Two types of cables are recommended for use in the horizontal cabling system in HA network, as designated by HA:

- Four-pair 100-ohm foiled/unshielded twisted-pair (F/UTP). Cat.6a cable or;

- Four-pair 100-ohm unshielded twisted-pair (UTP). Cat.6 cable;

Recognized cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2.

b. Most of hospitals have been adopted Cat. 6 cable that the External Network Vendor shall use Cat.6 cable by default.

c. The External Network Vendor shall install Cat.6a cabling standard in those hospital buildings that Cat.6a cabling systems are installed. (Please refer to Appendix A for the list of new hospital or building).

d. The type of horizontal cabling to be adopted is subject to the confirmation by HA.

9.3 For Vendor External Network (Level 1) setup, the backbone cables (Two orange long dash dotted lines from Building closets to HA Floor closet and one orange long dash dotted lines from vendor cabinet to HA Floor closet) and GBICs at Building closets (the red dots at Primary & Secondary Building L3 switches of HA Network) in the diagram of section 5 “External Network Architecture” shall be installed by HA.

9.4 Backbone cable of Vendor External Network (Level 1) to HA Network:

a. Backbone cabling consists of the backbone cables, intermediate and main cross-connects mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection. Backbone cabling also includes cabling between buildings;

b. Recognized cables:

Below type of cable is recognized and recommended for use in the backbone cabling system in HA network:

- 9/125 µm OS2 single mode optical fiber.

Recognized cables, associated connecting hardware, patch cords and equipment cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.3.

9.5 HA shall arrange HA Authorized Cabling Contractor to install these backbone cablings and HA Equipment Vendor to install the GBICs at Building closets.

9.6 External Network Vendor shall install the GBICs in the switch at vendor cabinet.

9.7 At least one L2 switch or with resilient when HA requires and shall cater for different auto network failover and recovery scenarios.

9.8 The External Network Vendor shall coordinate with hospital end user to install floor-standing cabinet for accommodation of network and cabling equipment. Detail of floor-standing cabinet could be referred to section 8.5 “Floor closet setup”.

9.9 All network connections and corresponding network diagrams shall be well documented.

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10. L2 Switch Specification Requirements

10.1 For Vendor External Network with interface to HA (Level 1) setup, External Network Vendor is required to supply, deliver, install and maintain the Layer-2 Ethernet switch and related hardware, software and services to support the network requirements of the External Network.

10.2 The configuration of the proposed switch shall support:

10.2.1 24 numbers or above of wire-speed full duplex auto-sensing 100/1000Baase-T Ethernet ports plus at least 4 numbers of wire-speed full duplex auto-sensing pluggable transceiver Ethernet ports support 1Gbps and 10Gbps;

10.2.2 Shall support bridging and at least 16,000 MAC address table size;

10.2.3 Shall provide Layer-2 switching capacity of at least 64Gbps bandwidth in full duplex (that is, 128Gbps bandwidth for transmit and receive simultaneously);

10.2.4 Shall support Resilience link assigned to any pair of ports without using Spanning Tree Protocol (STP). Only one link is in transmission mode and the other one is in standby/backup mode;

10.2.5 Shall support Link Aggregation Control Protocol (LACP);

10.2.6 Shall support IEEE 802.1Q VLANs. The VLANS shall be grouped by ports within a single switch;

10.2.7 All ports shall be able to be assigned to both tagged and untagged VLANs at the same time;

10.2.8 Shall support packet classification and filtering by user-defined criteria based on TCP/UDP ports and/or Source/Destination IP addresses without Layer-3 routing protocol enabled;

10.2.9 Shall support IPv4 and IPv6 protocols;

10.2.10 Shall support IGMP V1/v2 and Snooping;

10.2.11 Shall support RFC 2138 RADIUS Authentication;

10.2.12 Shall support RFC 2139 RADIUS Accounting;

10.2.13 Shall support the authentication through the RADIUS. At least two RADIUS servers (Primary and Backup/Secondary) can be defined;

10.2.14 Shall support NTP or SNTP with at least two time servers;

10.2.15 Shall support IEEE802,1x EAP Authentication;

10.2.16 Shall support 802.1x MAC-based mechanisms network login;

10.2.17 Shall support syslog remote logging to at least two servers;

10.2.18 Shall support the following network management features:

10.2.19 local and remote management including but not limited to changing configuration, upload/download configuration files to management server, download firmware from management server, resetting switch port and reboot with following connectivity:

(i) at least one out-of-band 100-BaseT or 1000-BaseT management port for remote management over SSHv2 (RFC4251 and associated RFCs);

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(ii) REST based or equivalent API for remote management;

(iii) Console port for local management.

10.2.20 Mirror port for attachment of network analyzer;

10.2.21 SNMP V2c/V3 and RFC1213 MIBII;

10.2.22 Shall support Access Control Lists (ACLs);

10.2.23 Shall support not be greater than 1U (45mm);

10.2.24 Shall come with power cord meeting the following specifications subject to HA instruction:

(i) 2 meter IEC320 C14 to IEC320 C13 or IEC320 C15 (10A / 15A rating, straight / L-Shape as per request) power cord with both side lockable; or

(ii) 2 meter BS1363 plug to IEC320 C13 or IEC320 C15 lockable connector (10A / 15A rating, straight / L-Shape as per request) power cord.

10.2.25 Shall support dual hot-swappable power supply;

10.2.26 The depth of the Layer-2 switch shall not be greater than 420mm; and

10.2.27 To ensure the compatibility with HA network, the vendor L2 switch shall compatible with the following HA network switch at Building including but not limited to:

(i) Cisco Nexus Series Layer-3 switches;

(ii) Extreme Networks Layer-3 switches; and

(iii) Huawei CloudEngine Layer-3 switches.

11. L2 Switch Configuration

11.1 For Vendor External Network with interface to HA (Level 1) setup, Vendor is required to configuration the Layer-2 Ethernet switch to support the network requirements of the External Network.

11.2 The L2 switch shall have two 1000BASE-LX SFP uplink port such as:

a. Port 51 is Primary uplink to Primary Building Switch in HA Network.

b. Port 52 is Resilience uplink to Secondary Building Switch in HA Network.

11.3 The switch port status shall be shutdown if NO connection. The switch is required to be enabled when the Vendor system / equipment to be connected to the switch.

11.4 VLANs are required to be created for Vendor system / equipment in configuration:

a. VLAN ID to be provided by Hospital Authority when project to be implemented.

11.5 For switch port of Primary uplink and Resilience uplink such as:

a. The port status of Port 51 (Primary uplink) is required to be enabled. The port mode is “mode trunk”. Backup port is Port 52 (Resilience uplink).

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b. The port status of Port 52 (Resilience uplink) is required to be enabled. The port mode is "mode trunk". No backup port is needed.

11.6 For other configuration of switch port such as 1 to 48, Port mode is "mode access". Port security shall be enabled. Port security violation mode to be restricted. Port logging to be enabled. No MDIX is required.

11.7 The network switches shall connect to the end device directly.

11.8 No daisy-chaining or cascading of network switches are allowed.

11.9 Additional configuration according to HA request.

Below is the Cisco Catalyst L2 switch basic configuration. The proposed L2 switch shall implement the same or equivalent feature / status and shall be fully compatible with the existing HA environment:

Switch Port	**Feature / Status**	**Switch Configuration**
Port 1 - 48	Port Status	shutdown (refer to 11.3)
	Port Mode	mode access
	Port VLAN ID	VLAN xxx (refer to 11.4)
	Port security	Enable
	Port security violation mode	restrict
	Port logging	disable
	MDIX	No
Port 51 (Primary Uplink)	Port Status	no shutdown
	Port Mode	mode trunk
	Active Port	rep segment xxx edge no-neighbor primary
Port 52 (Resilience Uplink)	Port Status	no shutdown
	Port Mode	mode trunk
	Backup Port	rep segment xxx edge no-neighbor preferred

12. Checklist

12.1 External Network Vendor shall submit the "Cabling System and Network Setup Checklist" with respective to the requirements stipulated in this guideline for record purpose. (Please refer to Appendix B for the sample checklist)

12.2 The completed "Cabling System and Network Setup Checklist" shall return to Head Office Information Technology (HOIT) by email to "n5.extnet@ha.org.hk" within 3 months after the installation / network setup.

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12.3 For any general enquiries relating to Cabling System and Network Setup, please contact HOIT by email to "n5.extnet@ha.org.hk".

13. Further Information

Further information and details can be obtained by contacting:

- Will Ng, HO IT&HI SA(N5)3, 35426027, nwt404@ha.org.hk
- HO IT&HI N5 External Network, n5.extnet@ha.org.hk
- C K HUNG, HO IT&HI SSM(N), 2300 6602, ck.hung@ha.org.hk

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Appendix A: List of Hospital Adopting Cat. 6a cable

List of new hospital buildings installed with Cat.6a cabling systems

No.	Hospital Name
1	H K Red Cross Blood Transfusion Service (BTS) - New Annex Building
2	Haven of Hope Hospital (HHH) - Trinity Block
3	Hong Kong Children's Hospital (HKCH) – all blocks
4	Multi-service Centre (MSC) – all blocks
5	Shatin Hospital (SH) - Block D
6	Tune Mun Hospital (TMH) – OT Block Extension
7	Kwong Wah Hospital – New Block

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Appendix B: Cabling System and Network Setup Checklist

Hospital: _____ Name of External Network: _____
Location: _____ IP Subnet: _____
Reviewer: _____ Post Reviewer: _____
Date: _____

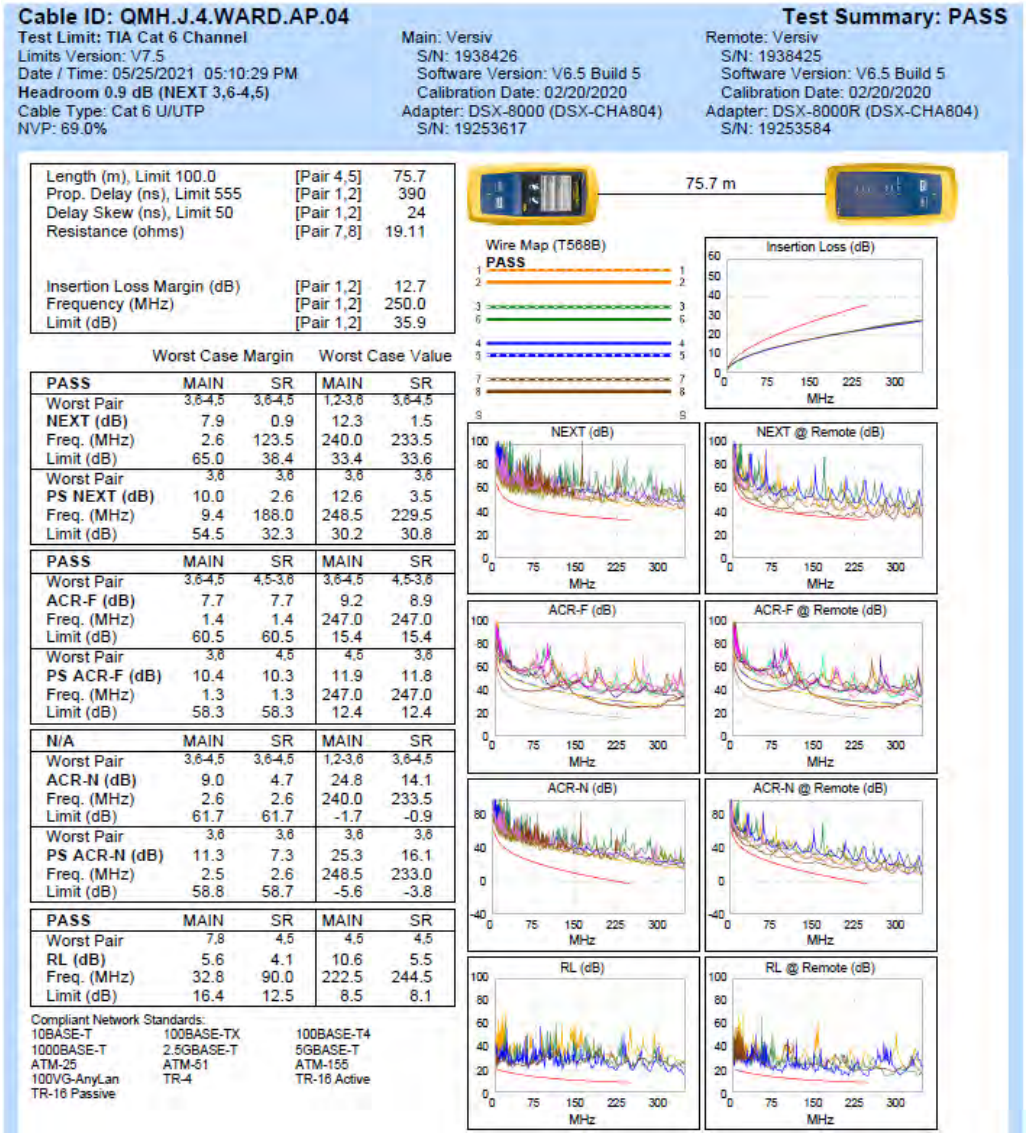
Cabling System and Network Setup Checklist

No.	Description	(Y/N)	Remark
A	**Cabling System**		
A1	All cables passed with soft copy of test report submitted		
A2	All cables for use in the horizontal cabling system are: - Four-pair 100-ohm unshielded twisted-pair (UTP). Cat.6 cable or; - Four-pair 100-ohm foiled/unshielded twisted-pair (F/UTP). Cat.6a for using in new building / hospital		
A3	All cables, associated connecting hardware, jumpers, patch cords, equipment cords, and work area cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.2		
A4	The data ports for 100-ohm UTP cable shall meet the requirements of ANSI/TIA/EIA-568-B.2 and T568B wiring scheme shall be used for termination of copper cabling system		
A5	Patch cords used in the work area shall meet or exceed the performance requirements in ANSI/TIA/EIA-568-B.2		
A6	All fiber cables, associated connecting hardware, jumpers, patch cords, equipment cords shall meet all applicable requirements specified in ANSI/TIA/EIA-568-B.3		
A7	Follow HA standards in the labelling of data ports		
A8	Follow HA standards to install floor-stand cabinet and cabinet space assignment		
B	**Network Switch**		
B1	Provide the brand and model of the network switch: _____		
B2	Provide the configuration of the network switch		
B3	The network switch port shall be shutdown if NO connection		
B4	There is no daisy-chaining or cascading of network switches		
B5	The network switch port to connect end device shall enable with port security and port security violation mode restrict.		
B6	All network connections and corresponding network diagram shall be well documented		
B7	Drill test shall be performed regularly to ensure the entire application / system and network failover is working as expected		
C	**Network Switch Interface to HA Network**		
C1	The network switch shall have two uplink ports connect to Primary and Secondary building switches in HA Network respectively		
C2	The uplink ports shall have two 1000BASE-LX Small form-factor pluggable (SFP) transceiver		
C3	The resilience link assigned to any pair of uplink ports without using spanning tree protocol (STP) and only one link is in transmission mode and the other one is in standby/backup mode		

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C4	The port mode has been configured as "mode trunk" in the primary and resilience uplinks of the network switch		
C5	The VLAN ID provided by HA has been created in the network switch		

"Passed" Cabling Test Report Sample



Cable ID: QMH.J.4.WARD.AP.04 — **Test Summary: PASS**

Test Limit: TIA Cat 6 Channel
Limits Version: V7.5
Date / Time: 05/25/2021 05:10:29 PM
Headroom 0.9 dB (NEXT 3,6-4,5)
Cable Type: Cat 6 U/UTP
NVP: 69.0%

Main: Versiv
S/N: 1938426
Software Version: V6.5 Build 5
Calibration Date: 02/20/2020
Adapter: DSX-8000 (DSX-CHA804)
S/N: 19253617

Remote: Versiv
S/N: 1938425
Software Version: V6.5 Build 5
Calibration Date: 02/20/2020
Adapter: DSX-8000R (DSX-CHA804)
S/N: 19253584

Length (m), Limit 100.0	[Pair 4,5]	75.7
Prop. Delay (ns), Limit 555	[Pair 1,2]	390
Delay Skew (ns), Limit 50	[Pair 1,2]	24
Resistance (ohms)	[Pair 7,8]	19.11
Insertion Loss Margin (dB)	[Pair 1,2]	12.7
Frequency (MHz)	[Pair 1,2]	250.0
Limit (dB)	[Pair 1,2]	35.9

	Worst Case Margin		Worst Case Value	
PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
NEXT (dB)	7.9	0.9	12.3	1.5
Freq. (MHz)	2.6	123.5	240.0	233.5
Limit (dB)	65.0	38.4	33.4	33.6
Worst Pair	3,6	3,6	3,6	3,6
PS NEXT (dB)	10.0	2.6	12.6	3.5
Freq. (MHz)	9.4	188.0	248.5	229.5
Limit (dB)	54.5	32.3	30.2	30.8

PASS	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	4,5-3,6	3,6-4,5	4,5-3,6
ACR-F (dB)	7.7	7.7	9.2	8.9
Freq. (MHz)	1.4	1.4	247.0	247.0
Limit (dB)	60.5	60.5	15.4	15.4
Worst Pair	3,6	4,5	4,5	3,6
PS ACR-F (dB)	10.4	10.3	11.9	11.8
Freq. (MHz)	1.3	1.3	247.0	247.0
Limit (dB)	58.3	58.3	12.4	12.4

N/A	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	1,2-3,6	3,6-4,5
ACR-N (dB)	9.0	4.7	24.8	14.1
Freq. (MHz)	2.6	2.6	240.0	233.5
Limit (dB)	61.7	61.7	-1.7	-0.9
Worst Pair	3,6	3,6	3,6	3,6
PS ACR-N (dB)	11.3	7.3	25.3	16.1
Freq. (MHz)	2.5	2.6	248.5	233.0
Limit (dB)	58.8	58.7	-5.6	-3.8

PASS	MAIN	SR	MAIN	SR
Worst Pair	7,8	4,5	4,5	4,5
RL (dB)	5.6	4.1	10.6	5.5
Freq. (MHz)	32.8	90.0	222.5	244.5
Limit (dB)	16.4	12.5	8.5	8.1

Compliant Network Standards:
10BASE-T, 100BASE-TX, 100BASE-T4
1000BASE-T, 2.5GBASE-T, 5GBASE-T
ATM-25, ATM-51, ATM-155
100VG-AnyLan, TR-4, TR-16 Active
TR-16 Passive