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## 1. Introduction

Unless otherwise stated in the contract or technical specification, the requirements laid down in this document shall apply to all specifications for the procurement of electronic equipment falling within the responsibility of Electrical and Mechanical Services Department (EMSD).

## 2. Standard Requirements

### 2.1 Related documents and references

#### 2.1.1 Standards

The aim is to supply and install equipment to conform to the general principles of the standards and codes of practice laid down by international, regional and national organizations. The followings are of particular relevance :

- (a) IEC 61082 - Preparation of document used in electrotechnology
- (b) ISO 9001 - Quality management systems
- (c) ISO 14001- Environmental management
- (d) IEC 60300 - Dependability management
- (e) IEC 60068 - Environmental testing
- (f) IEC 60050 - International electrotechnical vocabulary
- (g) IEC 60065 - Audio, video and similar electronic apparatus – Safety requirements
- (h) CISPR 14-1 - Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1 : Emission

Notwithstanding the aforesaid standards, other equivalent international, regional or national standards would also be considered if the tenderers can provide adequate information for their relevance. Any deviation should be stated clearly in the tender submission. Where specific standards are stipulated in any general or particular specifications, these standards shall be mandatory.

#### 2.1.2 Other standards and regulations

- (a) The Telecommunications Ordinance, (Hong Kong) Cap. 106, and Subsidiary Legislation made under the Ordinance.

- (b) Electricity Ordinance, (Hong Kong) Cap. 406, and Subsidiary Legislation made under the Ordinance.
- (c) Electricity Supply Rules by local power supply companies.

## 2.2 Conditions in which equipment is to be installed, used or stored

### 2.2.1 Environmental

The equipment must be suitable to operate continuously to specification throughout its normal life span in the Hong Kong climate. The following parameters shall normally apply : -

- (a) Temperature : 0°C to 45°C
- (b) Relative Humidity : up to 99%
- (c) Salt Corrosion : Salty atmosphere as found in tropical coastal regions
- (d) Chemical Corrosion : Atmospheric vapours of sulphur combustion product and hydrogen sulphide
- (e) Sealing : Equipment shall be vermin proof. Outdoor items shall be weather and splash proof to prevent ingress of rain. Items that are not fully sealed shall have adequate provision for ventilation.
- (f) Solar Radiation : Equipment sited outdoors in direct sunlight shall be capable of withstanding the effects of solar radiation above the ambient.
- (g) Mould Growth : Materials which promote mould growth shall not be used.
- (h) Shock : Equipment must be capable of withstanding knocks and jolts likely to occur during repair work or rough handling on a work bench.

### 2.2.2 Electrical supply

Where equipment is to be powered by the mains supply then the equipment shall operate at the voltage of 220Vac nominal single phase, 50 Hz with variations as stated in the Supply Rules of Power Companies. If power transformers are used they shall where possible be integral with each individual equipment. Adequate provision shall be made to protect the equipment from the adverse effects of excessive voltage and current spikes and surges.

### 2.2.3 Safety

All equipment supplied shall be of a safe design and shall not present hazards to the user or the public in anyway. Warnings of any potential hazards associated with the equipment shall be displayed.

### 2.2.4 Others

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.

## 2.3 Design practice

### 2.3.1 General

- (a) The equipment shall be designed for prolonged, continuous and reliable operation. The design and construction must be of high engineering standard and must withstand handling and transportation without degradation of performance.
- (b) The equipment shall be supplied complete with all the detachable item e.g. connectors, interconnection cables etc. required for normal operation. Connectors shall have dedicated locations and it should not be possible to insert a connector into an incorrect position. Where the same type of connector is used on more than one cable then the connectors shall be polarised to prevent an inadvertent connection of wrong parts.
- (c) All units, sub-assemblies, components and adjustable controls shall be readily accessible for maintenance purposes.
- (d) Adequate test points and other test facilities shall be provided to permit ease of maintenance.
- (e) Modular design involving plug-in sub-assemblies is preferred to other forms of construction.

### 2.3.2 Interchangeability

- (a) All units / subassemblies and components of the same type must be mechanically and electrically interchangeable without the necessity of changing components.
- (b) Correct impedance and level matching shall be maintained at all interfaces between items of equipment.

### 2.3.3 Appearance and protective finish

Metal surfaces must be either corrosion-resistant or protected against corrosion by painting, plating, galvanizing, anodizing or any other suitable surface treatment. Any such protective layer should be continuous and free from blemishes and scratches. Electrical contacts and PCBs shall also be protected in an appropriate manner that does not impair the electrical characteristics.

### 2.3.4 Method of marking and coding

- (a) All equipment supplied shall carry the name, trademark or other means of identifying the manufacturer. The equipment shall carry a label with model number, serial number and date of manufacture.
- (b) All electrical components shall be identified by circuit code numbers (or component reference numbers), which shall be marked alongside the component on part of the supporting structure. When this is not possible a layout drawing shall be included in the equipment handbook. The location and type of component should be clearly shown in the drawing against the appropriate circuit reference number.
- (c) Each sub-assembly of the equipment shall be clearly labeled, in English, in accordance with the function. A serial number must also be marked on each sub-unit for identification purposes.
- (d) Each cable shall be clearly labeled and preferably carry its own unique identification code. All wiring terminations shall be finished in a neat and approved manner and shall each be separately identified by a wiring code number.

## 2.4 Reliability

All equipment shall be designed to operate continuously without degradation in performance unless otherwise stated in the Particular Specification. A statement on the “Mean Time Between Failure” (MTBF) for each equipment should be included in the tender.

## 2.5 Environmental performance

### 2.5.1 Reduction/elimination of environmentally sensitive materials

All equipment supplied shall be free from any harmful chemicals or toxic substances. The Contractor should be aware of avoiding harmful chemicals or hazardous substances in the production of the equipment or prevent exposure to these hazardous substances during operation of the equipment.

### 2.5.2 Recycling

The Contractor shall study and propose the full life cycle of their products, including provision of take-back or recycling material (such as reporting paper, packaging material, etc.) once they become obsolete. The Contractor shall adopt recyclable materials for application or implementation as far as possible.

### 2.5.3 Energy conservation

The Contractor shall propose and adopt equipment with high energy efficiency performance, such as CPU with power consumption less than 70W, appliances with Energy Efficiency Label (such as electronic ballasts, photocopiers, laser printer, LCD monitors and computers) or products energized by renewable energy.

## 2.6 Life

The life of an equipment is to be regarded as the period over which the performance does not drop below a tolerable level, having regarding to reliability. This should normally be not less than 10 years. During this period it should be possible with reasonable repair and setting up to maintain the performance to the limits defined in the technical specification.

## 2.7 Testing

The Contractor shall be required to carry out tests to demonstrate that the equipment and system meet the specification and other contractual requirements. The Contractor shall also be responsible for the timely preparation and compilation of all allocation test schedules, test procedures and test reports.

### 2.7.1 Test methods and equipment for assessing performance

- (a) Test methods and procedures shall follow the agreed standards defined either by the manufacturer or as laid down in the technical specification.
- (b) The Contractor shall submit a schedule of site performance and commissioning tests at least 1 month prior to the commencement of the scheduled commissioning date.

- (c) Special tools, test equipment, test objects and simulators required for the demonstration of either bench or commissioning tests shall be made available by the Contractor at no extra charge to the Government.
- (d) All test equipment used by the Contractor shall be properly and periodically calibrated. Measuring standards used in calibration should be traceable to international or national measurement standards, or to an industry recognized manufacturer's internal reference, subject to approval of the Receiving Officer.
- (e) Calibration procedures and results shall be documented and signed by the certifying body where applicable. The Contractor may be requested to show evidence of calibration of test equipment by submission of copies of these calibration records prior to conduction of any tests.

#### 2.7.2 Acceptance Test

All equipment to be supplied may be subjected to inspection and bench testing at the specified EMSD Workshop. The Contractor shall meet the cost of deliveries for bench test. Notwithstanding, the Contractor shall have carried out the tests in accordance with the requirements and procedures stipulated in the Particular Specification and submitted the associated test reports for inspection. The Receiving Officer reserves the right to witness all tests at the Contractor's premises.

### 2.8 Control of Quality

#### 2.8.1 Quality requirements

Equipment shall be designed and manufactured in accordance with the principles of ISO9001 and ISO14001 or equivalent. The Contractor should establish and maintain a Quality Management System in respect of all elements of the works. This Quality Management System shall apply without prejudice to, or in any way limiting any Quality Management System that the Contractor already maintains. The Contractor should detail the quality control procedures used in both the manufacture of the equipment and during the installation of the system.

#### 2.8.2 Instruction regarding rejects and non-compliance

Any defects in the equipment or workmanship and materials found by the Receiving Officer should be notified to the Contractor in writing. The Contractor shall undertake to rectify such defects with due diligence and expediency and shall request the Receiving Officer for re-inspection. In the event that non-compliance still exists after the alignment or making

good, the Contractor shall be liable to supply another model of the same equipment category as approved by the Receiving Officer and at no extra cost to the Government.

## 2.9 Spares

- (a) The Contractor is required to guarantee that spares shall be available to cover the full life of the equipment. Sufficient spares shall be held in Hong Kong by the Contractor to cater for maintenance during the Guarantee Period.
- (b) The Contractor shall provide a list of recommended essential spares which are not normally available through local component vendors in Hong Kong. The list of spares suitable for normal consumption in a one year period immediately after the Guarantee Period shall be recommended.
- (c) The list shall itemise the cost of each spare. The total cost of the spares shall not be included in the contract sum but shall be listed as a separate item.
- (d) The Contractor is required to deliver the spare parts within six (6) months after receipt of the order, unless otherwise specified by the Contractor and accepted by the Receiving Officer.
- (e) Upon the request of the Receiving Officer, the Contractor shall, at no extra cost, demonstrate the proper functioning of some or all of the ordered spares by insertion or installation into the equipment.

## 2.10 Packaging

### 2.10.1 Specification

- (a) The equipment shall be shipped and delivered in cases which offer proper protection against normal rough handling during transportation. Dehydrating chemicals shall be packed with each package to prevent moisture absorption. “Static-sensitive” integrated circuits shall be transported on “anti-static” frames and containers.
- (b) All spare modules / sub-units shall be wrapped with the equivalent of no less than 12 mm thick polyethylene foam and cased in carton boxes. For electronic circuit modules employing CMOS integrated circuits, the module shall first be placed inside a bag made of conductive plastic before packaging in foam and carton box.

### 2.10.2 Period of storage of spares

It should be noted that the spare parts may be kept in stores for a long period of time. The Contractor shall state whether there is any storage life applicable to the spares holdings being specified.

## 2.11 Documentation

- 2.11.1 For each equipment offered, the Tenderer shall supply with the tender full and complete technical information in English sufficiently detailed to enable a technical assessment of the equipment to be made.
- 2.11.2 The Contractor shall, within one month prior to equipment delivery, supply sufficient number of equipment handbook in English language, as specified below giving full details on : -
- (a) Principle of operations;
  - (b) Details of installation and setting-up procedures;
  - (c) Maintenance and operation instructions;
  - (d) Schematic and block diagrams,
  - (e) Circuit diagrams with details down to component levels with their respective descriptions;
  - (f) Calibration procedures; and
  - (g) Full parts list.
- 2.11.3 Should any Original Equipment Manufacturer (OEM) products be included, the documents specified above shall also be provided.
- 2.11.4 One set of the manufacturer's operation manual in English shall be provided with each equipment ordered. Up to a maximum of three sets of maintenance manuals per model of equipment shall be provided.

All photocopies of operations and maintenance manuals shall be properly stamped and certified as true copies of the original by the manufacturer. The quality of these photocopies shall comply with Clause 9 of BS 4884 Part 2 : "Specification for Technical Manuals - Presentation".

Alternatively, soft copies in Adobe Acrobat format and/or AutoCad are also acceptable.

- 2.11.5 The Contractor shall not use confidentiality as a reason for withholding the supply of relevant documentation required by Government. The Government representative will if required certify that all sensitive material in handbooks will not be released to any organisation outside Government. Any charges for such material supplies shall be included in the Contract. The Contractor should make sure that all his/her overseas / local principals understand such obligation when submitting the Tender.

2.11.6 The Government shall be granted the right of duplicating the documents stated in Clause 2.11.4 of this Specification for internal use.

2.11.7 The Government shall be kept informed of any modifications during the operational life of the equipment.

## 2.12 Maintenance

2.12.1 During the Guarantee Period, in addition to any other obligations of the Contractor provided for in the Contract, the Contractor shall carry out the maintenance work for the equipment purchased.

2.12.2 After the expiration of the Guarantee Period, the Contractor may be required at the option of Government, to enter into a separate maintenance service contract, renewable annually. The Tenderer shall quote the annual maintenance charge. The charge shall be valid for at least two years after the expiry of the Guarantee Period, and thereafter not exceeding the Consumer Price Index (A) increases as published by Government unless agreed by the Receiving Officer.

2.12.3 The Tenderer shall state in his tender the "Mean Time to Repair" (MTTR) in hours for major equipment offered, and provide the same for other equipment upon request by the Receiving Officer.

2.12.4 Equipment sub-assemblies or components which are replaced during the Guarantee Period shall have a new Guarantee Period for one year commencing from the date of replacement.

2.12.5 The use of special tools and test equipment for maintenance purposes should be kept to an optimum but details of these should be supplied. The Tenderer shall recommend a list of all appropriate special tools and test equipment in order that the equipment and system can subsequently be serviced and maintained by maintenance staff of the Government. The list shall be appended with relevant technical details and price breakdown. Special tools shall include specially-shaped keys and wrenches, jumpers, extender cards and cords etc.

- END -