الاتصالات السعودية
SAUDI TELECOM

SAUDI TELECOM COMPANY

Reference Offer for Data Access (RODA)

Annex C, Attachment 3

ENVIRONMENTAL & POWER

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Environmental and Power Requirements

1. GENERAL

1.1 Introduction

1.1.1 This attachment contains the requirements to ensure conformity of the Other Licensed Operator's (OLO) equipment, it's whole life operation within the expected climatic, mechanical and electrical environment.

1.1.2 Requirements given by fixed figures are referenced to international accepted standards for testing procedures. For each type of equipment there shall be a proof of compliance to the relevant environmental requirements.

1.1.3 For verification of environmental requirements, the IEC test procedures are specified. The OLO may apply to STC for approval to use relevant ETSI compliant test procedures as an alternative.

2. CONSTRUCTION REQUIREMENTS

2.1 Protection of Personnel

2.1.1 All equipment shall be constructed in a way that it causes no damage to persons or the environment.

2.1.2 The construction shall give adequate protection against accidental contacts with parts carrying a voltage higher than 50 V.

2.1.3 It shall not be possible to touch with the 'standard test finger'[1] the functional insulation[2] of parts carrying voltages above 250 V rms.

[1] Test finger denotes the "standard test finger" described in IEC publication 435 (Safety of data processing equipment).

2.1.4 The enclosure of the equipment shall have no openings giving access to parts with dangerous voltages other than those openings supplied for the normal maintenance of the equipment. If such openings are used, sufficient protection against contact with parts carrying dangerous voltages (i.e. above 50 V) shall be provided.

2.1.5 There shall be no energy hazards in operator access areas[3].

3. ACOUSTIC NOISE

3.1 Noise Levels

3.1.1 The equipment shall not generate acoustic noise exceeding the following levels of sound pressure:

a) Not greater than 60 dB(A) re 1 pW in premises where persons normally are present.
b) Not greater than 80 dB(A) re 1 pW otherwise.
c) For impulse noise or permanent tone the above levels shall be reduced by 10 dB(A).
d) No installation shall introduce acoustic noise into its environment that exceeds the existing ambient noise by 2 dB, during the quietest time normal to the area. The measurement shall be made at a distance of 30 metres from the installation.
e) Testing procedures according to ISO 3741 or ISO 3743 shall be used to verify the requirements to acoustic noise.

4. OPERATION IN PREMISES OF CONTROLLED CLIMATE

4.1 Environment

[2] Functional insulation denotes the insulation necessary for the proper functioning of the equipment, and for basic protection against electric shock.

[3] Energy hazard denotes a hazard that exists at any live part of a piece of equipment if, between the exposed live part and an adjacent exposed metal part of different polarity, there exists a potential of 2 V or more and an available continuous power level of 240 volt-amperes or more, or a reactive energy level of 20 joules or more. Above 50 V the protection against electric shock shall also protect against energy hazards.

4.1.1 This sub-section contains the environmental conditions for equipment operating in premises where temperature and humidity are both regulated.

4.2 Electrical Protection

4.2.1 The equipment must be protected so that it functions when exposed to the electrical environment. The equipment shall be resistant to the maximum values of static electricity, overcurrents and overvoltages given in this sub-section. The protection can in general be included in the equipment itself or implemented by external protection devices.

4.3 Static Electricity

4.3.1 The equipment shall comply with the test procedures of IEC 801-2, Electromagnetic Compatibility for Industrial Measurement and Control Equipment Part 2, Electrostatic Discharge Requirements.

4.3.2 The test voltage shall be applied to those input connectors and parts of the equipment, which can be touched or reached without removing covers. The equipment shall operate according to specification during testing at level 3 for both direct contact and air-discharge. The equipment shall not be damaged when tested at level 4 for both direct contact and air-discharge.

4.3.3 ESD precautions according to STTP shall be used during maintenance of the equipment (e.g. wrist straps when removing PCB's). The Contractor shall provide the necessary tools to comply with this specification.

4.3.4 Replaced and repaired PCB's shall be delivered in static shielded protective packing material and be protected in boxes suitable for repetitive transport between store and field locations. The packing shall protect electronic components from physical damage and damage from electrostatic and electromagnetic fields in accordance with TSP 2529.

4.4 Overcurrents and Overvoltages

4.4.1 The main sources of overcurrents and overvoltages are lightning surges, inductions from failure or unbalance in the power system and direct contact with power lines. This sub-section contains the minimum criteria for the resistibility of the equipment to overvoltages and overcurrents from these sources.

4.4.2 The principles of protection against overcurrents and overvoltages shall be in accordance with ITU-T Rec. K.11.

4.4.3 For exchanges the levels of resistance shall be grouped in these 2 categories:

a) unexposed environment (ITU-T Rec. K.20, Table 1/K.20)
b) exposed environment (ITU-T Rec. K.21, Table 1/K.21).

4.4.4 All exchange lines shall be protected according to the requirements of Exchange Specification, Volume ES.

4.4.5 The protection performance of gas discharge tubes and solder melt pellets shall comply with STC material specification MAT-3301.

4.4.6 For equipment external to exchanges (e.g. repeaters), the electrical protection should be based on ITU-T Rec.K.17.

5. ELECTROMAGNETIC INTERFERENCE

5.1 General

5.1.1 Digital systems are sources of electromagnetic emissions, which may interfere with other systems or radio receivers. Equally, they can be susceptible to the electromagnetic energy emitted by radio transmitters, or noise generated by other systems or electric equipment.

5.1.2 Demonstration of compliance with the requirements of these specifications shall be performed in accordance with the test methods and instrumentation as outlined in the appropriate CISPR (Comite International Spécial des Perturbations Radioéléctriques) specifications.

5.2 Electromagnetic Radiation

5.2.1 The radiation of electromagnetic fields from the equipment shall not be greater than 30 V/m in the frequency range of 3 - 1000 MHz measured at a distance of 30m.

5.2.2 The equipment shall function according to specifications during an incoming electric field of 5 V/m in the frequency range of 3 - 1000 MHz.

5.2.3 The equipment performance shall function normally when it is subjected to a magnetic field of strength 3 A/m at 60 Hz, decreasing 10 dB per decade to 250kHz.

5.2.4 The above requirements shall be tested according to CISPR publication 16.

5.3 Conducted Interference - Conducted emission on power lines

5.3.1 Equipment shall not generate interference voltages above 1 mV rms for any frequency below 100 MHz into any power line.

5.4 Resistance to conducted interference

5.4.1 The equipment shall operate according to the specifications when the following interference test voltages are superimposed onto the power feed line or between power feed line and ground:

a) For equipment including DC power supply the superimposed interference test voltage shall be 0.5 V rms in the frequency range 10-10^7 Hz.
b) For equipment including AC power supply the superimposed interference test voltage shall be:

- 1.5 V RMS in the frequency range 10 - 5.5×10^5 Hz.
- 4.0 V RMS in the frequency range 5.5×10^5 - 2×10^6 Hz.
- V RMS in the frequency range 2×10^6 - 3×10^7 Hz.

6. MECHANICAL DESIGN

6.1 Construction

6.1.1 The equipment to be installed according to this specification, shall conform to sound engineering practices with respect to design and construction.

6.1.2 The equipment shall be designed and constructed without any protruding sharp corners or edges that could cause danger to persons or surroundings.

6.1.3 The mechanical construction of racks, plugs, jacks, covers etc. shall not be mounted in a way that requires extensive dismantling work in order to access equipment.

6.1.4 The equipment modules (shelves and PCB assemblies) shall be easily accessible and easy to change for maintenance or repair.

6.1.5 Appropriate dust covers and enclosures shall be used on all equipment.

6.1.6 Cabinets and racks shall be designed to provide an evenly distributed floor load.

6.1.7 All equipment drawers shall be capable of being fully extended and/or pivoted while still on the slides to gain access to the underside for ease of maintenance.

6.1.8 All slide-in units shall contain guide pins or slots.

6.1.9 All controls and visual indicators shall be located at a height of less than 2 metres from the floor.

6.1.10 Cableways, storage hooks for flexible cables etc. shall be smooth and free from sharp edges.

6.1.11 All indicators shall be clearly visible at an angle of 60 degrees from dead centre in any direction.

6.1.12 The indicators shall be clearly visible in a room of normal illumination without the need for shades or additional lighting.

6.1.13 All cables shall be properly ‘dressed’.

6.1.14 It shall not be possible to ‘squeeze’ or ‘pinch’ cables when opening or closing equipment doors or panels.

6.1.15 All cables that have plug-ends that are required for inter-equipment connections and connection to printed circuit boards, shall have a mechanical latching device to prevent accidental disconnection.

6.1.16 All connectors shall have adequate spacing between adjacent connectors and/or other units to allow a firm grasp on the associated plug for removal. When adequate spacing is not possible, plugs must be equipped with a suitable handle.

6.1.17 All connectors shall have ease of access for plug-in and removal.

6.1.18 Connectors shall be reinforced and able to withstand a minimum of 500 connections and disconnections without impairment of the performance.

6.1.19 All exposed surfaces shall be either painted, anodized, chrome-plated or otherwise protected to comply with tropical climate requirements.

6.1.20 All exposed surfaces and access openings shall be free from sharp edges, or pointed ends.

6.1.21 For the safety of personnel, all frames, racks, cabinets and conduits shall be grounded (earthed) to the STC exchange earth.

6.1.22 Heavy equipment that requires removal for maintenance shall be mounted at, or as near to, the bottom of a rack as possible.

6.1.23 Each portable unit that has a weight of 12kg or more shall have a separate label indicating the weight.

6.2 Physical Protection

6.2.1 The racks and frames housing the equipment shall be designed to give sufficient physical protection to the equipment and components.

6.2.2 When drawers or modules are extended, devices should be fitted that afford protection from side impacts. Temporary, easy assembly / disassembly, protection brackets or screens shall be attached to the racks or frames, if needed, for this purpose..

7. MECHANICAL DIMENSIONS

7.1 General

7.1.1 The equipment should be within the 3.4m ceiling height limit.

7.1.2 Equipment floor loading shall not exceed 750 kg/m^2.

7.1.3 During installation, no equipment unit shall have a weight of more than 500 kg.

7.1.4 Replaceable units shall not have a weight of more than 25 kg. I/O devices can be accepted outside of this limitation on request.

7.2 Space Allocations

7.2.1 The configuration and layout of equipment shall comply with the following requirements:

a) Minimize the use of available floor space in existing buildings.
b) Permit easy extension of the installed equipment.
c) Provide easy access for maintenance.
d) Include areas for administrative and maintenance operations.

7.3 Distance Between Racks

7.3.1 No detailed requirements are given for the distance between equipment racks, however, the distance shall be large enough to allow for safe and easy execution of the installation and maintenance work required and allow unrestricted access for the opening of equipment cabinet doors.

7.3.2 The Other Licensed Operator shall maintain appropriates and safe distance between racks for new installations.

7.3.3 The Other Licensed Operator shall ensure the necessary clearance between racks and walls & columns, as well as aisle spacing for general maintenance of equipment.

7.4 Cabling

7.4.1 The cables shall be designated at both ends. It should be possible to ascertain the destination of any cable from either end directly from the label or by a reference number recorded in the installation documentation.

7.4.2 The Other Licensed Operator shall identify if the cabling between racks shall be positioned in cable trays or above the equipment under a false floor or in trenches.

7.5 Marking

7.5.1 Each rack shall be provided with a label giving the appropriate serial number for the rack.

7.5.2 All equipment hazards that maintenance staff may be exposed to (e.g. high voltage, laser beams) shall have warning notices clearly indicating the type of hazard.

7.6 Heat Dissipation

7.6.1 Racks containing electronic components shall be designed for efficient cooling. The principle of self-convection is the preferred method.

7.6.2 The maximum heat dissipation in each type of rack shall be clearly marked and recorded.