



Acquisition Directorate

Tiziana.Pezzi@ncia.nato.int
Telephone: +32 (0) 2 707 8472

NCIA/ACQ/2020/12947
15 December 2020

To: All Nominated Prospective Bidders

Subject: Amendment No. 1 to Request for Quotation RFQ-CO-115172-RACKS
PROVIDE RACK MOUNTED NETWORK EQUIPMENT
Project Serial: 2016/0CM03101

Reference: A. AC/4(PP)D/27731-ADD2; AC/4-DS(2019)0012
B. AC/4(PP)D/27656-ADD3; AC/4-DS(2019)0029
C. AC/4(PP)N(2020)0057; AC/4-DS(2020)0015
D. AC/4(PP)N(2020)0057-COR1; AC/4-DS(2020)0015-COR1
E. NCIA/ACQ/2020/12882 RFQ-CO-115172-RACKS dated 27 November 2020

Dear Sir/Madam,

1. At Reference E your firm was invited, in conformance with the terms of your active Basic Ordering Agreement (BOA) with the NCI Agency to participate in a BOA competition for the for the provision of twenty two (22) racks with mounted network equipment with delivery at CIS Service Support Centrum (CSSC) at Brunssum, Netherlands.
2. The purpose of this Amendment 1 is to:
 - a) Publish Purchaser's answers to the Clarification Requests (CRs) received to date for the subject RFQ. The Purchaser provided their response to the CRs attached as Annex A to this letter.
 - b) Extend the bid closing date;
 - c) Issue revised RFQ documents (Book II) as follows:
 - RFQ-CO-115172-RACKS-AMD1 - Book II - Part IV SOW Annex A (SRS)
3. To allow sufficient time to address the changes made as part of this amendment, the closing time for the submission of quotations in response to this RFQ is hereby extended to **12:00 HOURS (BRUSSELS TIME) ON FRIDAY, 15 JANUARY 2021.**
4. This Amendment makes the following revisions:

RFQ-CO-115172-RACKS-AMD1 - Book II - Part IV SOW Annex A (SRS)

 - Section 3.2 (SRS-15) - Updated to show the changes on the Power Distribution Units (PDU);



NATO Communications
and Information Agency
Agence OTAN d'information
et de communication

www.ncia.nato.int

- Section 3.3.1 (SRS-18) - Updated to show the change on Rackmount Console with Integrated KVM Switch where the minimum MTBF shall be 40,000 hours instead of 400,000 hours.
- 5. Some answers to Bidders questions have necessitated changes to the RFQ bidding documents. Revised bidding documents as indicated in Paragraph 1 above is attached to this RFQ Amendment 1 and replaces the original versions in its entirety. Potential Bidders are strongly advised to carefully review revised bidding documents.
- 6. With the exception of the revisions mentioned above, all other RFQ documents remain unchanged from their original version as issued on 27 November 2020.
- 7. Prospective Bidders are advised that the NATO NCI Agency reserves the right to cancel this RFQ at any time in its entirety and bears no liability for bid preparation costs incurred by firms or any other collateral costs if bid cancellation occurs.
- 8. The reference for the RFQ is: **RFQ-CO-115172-RACKS** and all correspondence concerning this RFQ should reference this number.
- 9. The Purchaser point of contact for all information concerning this Request for Quotation is:

NATO Communications and Information Agency
Acquisition Directorate
NATO Headquarters, Boulevard Leopold III
1110 Brussels, Belgium

Attn: Tiziana Pezzi, Principal Contracting Officer
Cc: Irina Barabancea, Contracting Officer (Contractor)

Email: RFQCO115172RACKS@ncia.nato.int

FOR THE DIRECTOR OF ACQUISITION:

Tiziana Pezzi
Principal Contracting Officer

Enclosures:

- 1) Annex A - Purchaser's answers to the Clarification Requests
- 2) Revised Bidding Documents:
 - a) RFQ-CO-115172-RACKS-AMD1 - Book II - Part IV SOW Annex A (SRS)

**DISTRIBUTION LIST FOR Amendment No.1 to REQUEST FOR QUOTATION
RFQ-CO-115172-RACKS**

Offerors (sent separately in electronic version)

NATO Delegations (Attn: Investment Adviser):

Albania	1
Belgium	1
Bulgaria	1
Canada	1
Croatia	1
Czech Republic	1
Denmark	1
Estonia	1
France	1
Germany	1
Greece	1
Hungary	1
Iceland	1
Italy	1
Latvia	1
Lithuania	1
Luxembourg	1
Montenegro	1
Netherlands	1
North Macedonia	1
Norway	1
Poland	1
Portugal	1
Romania	1
Slovakia	1
Slovenia	1
Spain	1
Turkey	1
The United Kingdom	1
The United States of America	1
<u>Belgian Ministry of Economic Affairs</u>	1

Embassies in Brussels (Attn: Commercial Attaché):

Albania	1
Belgium	1
Bulgaria	1
Canada	1
Croatia	1
Czech Republic	1
Denmark	1
Estonia	1
France	1
Germany	1
Greece	1
Hungary	1
Iceland	1
Italy	1
Latvia	1
Lithuania	1
Luxembourg	1
Montenegro	1
Netherlands	1
North Macedonia	1
Norway	1
Poland	1
Portugal	1
Romania	1
Slovakia	1
Slovenia	1
Spain	1
Turkey	1
The United Kingdom	1
The United States of America	1

Date: 14 December 2020

ADMINISTRATIVE/ CONTRACTUAL					
Serial Nr	RFQ Book	RFQ Section Ref.	QUESTION	ANSWER	RFQ amended
A.1	Book I Book II, Part IV (SOW)	Annex A - Bidding Sheets Section 1.2	<i>The provided timeline of maximum 12 weeks after EDC are very tight, especially with the requirement of Tempest B, assembly, certifications and tests they are not feasible, can they be extended?</i>	Unfortunately, the schedule is very tight for this programme, so we are unable to extend the delivery deadline	No amendment to RFQ required

TECHNICAL					
Serial Nr	RFQ Book	RFQ Section Ref.	QUESTION	ANSWER	RFQ amended
T.1	Book II, Part IV (SOW)	Section 5.3.3	<i>Which Level of TEMPEST certification is requested for each type of equipment?</i>	TEMPEST Level B certification is required for the following components: - Rackmount Console with Integrated KVM Switch in combination with the KVM cables of SRS26 - Ethernet Switches For the other components no TEMPEST certification is required	No amendment to RFQ required
T.2	Book II, Part IV (SOW)	Section 7	<i>Can the control of the configuration management done by ourselves or by somebody external? In which case wants the NCIA a desk in our offices to perform the Quality Control?</i>	The Configuration Management activities are done by the Design Authority and are part of the Systems Engineering Processes. If you are the design Authority (e.g. the System Integrator of the different selected components) you are supposed to do CM activities with internal resources; however it is possible to hire a consultant. With regard to Quality Assurance, NCIA personnel does not need/require to have a representative hosted in your premises: QA/QC activities shall be done by the contractor directly and NCIA will maintain supervisory authority on the relevant activities.	No amendment to RFQ required

<p>T.3</p>	<p>Book II, Part IV (SOW) Annex A – SRS</p>	<p>Section 3.2 SRS-15 Power distribution</p>	<p><i>Could the Purchaser please confirm that 10 port IEC C13 Socket horizontal PDU's can substitute the 0U (Zero U) 16 port IEC C13 Vertical PDU?</i></p> <p><i>As calculated, even if PFE positioning is fully populated each PDU would need maximum 9 ports. If as requested 2 x 16 Port PDUs are to be inserted in the design onto the right side only, there is a high possibility of restricting rack design</i></p>	<p>Only vertically mounted PDUs shall be used, and each with at least 15 IEC C13 ports (empty rack positions will be populated at a later stage).</p> <p>These PDUs may be installed: 1) In Zero U space at the rear of the rack, with one PDU at the right side and one PDU at the left side. In this case two horizontal cable lacing bars with lacing points shall be provided in addition to accessories included in the SRS. 2) Attached to the right side inside of the rack at the rear.</p> <p>In either case the PDUs shall be selected and installed such that access to the rack screws and nuts, used for equipment installation, is not blocked.</p>	<p>Please see Amendment 1, Book II, The Prospective Contract, Part IV, Statement of Work, Annex A - SRS, Section 3.2 (SRS-15)</p>
<p>T.4</p>	<p>Book II, Part IV (SOW) Annex A – SRS</p>	<p>Section 3 Equipment Requirements – 3.3.2 Ethernet Switches (SRS-19) - points 7, 11 and 12</p>	<p><i>The documentation states that the switches offered must be on the NATO AFPL list, according to the AFPL list only certain models of Cisco switches can be offered, for example:</i></p> <ul style="list-style-type: none"> • Cisco IOS for use on Cisco Catalyst 2960 Series Switches • Cisco IOS for use on Cisco Catalyst 3560 Series Switches <p><i>The only switches that meet the AFPL criterion are:</i></p> <ul style="list-style-type: none"> • WS-C3560CX-8TC-S • WS-C2960CX-8TC-L <p><i>However, they do not meet the following requirement: Recent product, defined as market introduction of the switch type in or after 2017., these switches came out before 2017. Can we offer the listed switch models even though they are older than 2017. or can we get an updated</i></p>	<p>The most recent AFPL includes the approval for Cisco IOS XE 16.12.4. Using that IOS version several switch products are available that were introduced in or after 2017.</p>	<p>No amendment to RFQ required</p>

			<i>AFPL list with other models or network equipment manufacturers?</i>		
T.5	Book II, Part IV (SOW) Annex A – SRS	Section 3 Equipment Requirements – 3.3.1 Rackmount Console with Integrated KVM Switch (SRS-18)	<i>In SOW document under the point 3.3.1. there is described technical specification for the Rackmount Console with Integrated KVM switch with the needed MTBF of 400000 hours or higher for both. We would like to emphasize the fact that the KVM switch is able to fulfill the MTBF requirement while the standard KVM consoles on the market can not. The standard MTBF for the KVM consoles available on the market is around 45000 so we kindly ask the Contractor to lower the MTBF request for the KVM Console.</i>	The Purchaser agrees with the assessment done by the Bidder. The minimum MTBF for the Rackmount Console with Integrated KVM Switch shall be 40,000 hours instead of 400,000 hours.	Please see Amendment 1, Book II, The Prospective Contract, Part IV, Statement of Work, Annex A - SRS, Section 3.3.1 (SRS-18)
T.6	Book II, Part IV (SOW)	Section 5.3.3	<i>In the SOW at chapter 5.3.3 it is stated that all equipment shall come with a Tempest certificate. In Annex A, chapter 3.3.1 sub 8) it seems only the KVM should be tempested to Level B.</i> <i>a. Do you need all equipment tempested or only the equipment specifically indicated?</i> <i>b. If all what levels?</i> <i>c. If only the KVM, do you intend the complete set, which is a console plus KVM switch, or only the KVM switch?</i>	a. SOW ILS-55 (Each type of equipment shall be accompanied with its appropriate TEMPEST level certificate) only applies to equipment for which the SRS explicitly specifies TEMPEST certification. These are the Rackmount Console with Integrated KVM Switch (SRS-18) and the Ethernet Switches (SRS-19). So only those two equipment needs to be TEMPEST certified. b. LEVEL B c. As per SRS-18 “The console shall consist of a monitor, keyboard, mouse and KVM (Keyboard Video Mouse) switch all integrated in a single unit”. So the requirement is for a single unit, therefore the concept of ‘set’ is not applicable nor allowed. TEMPEST certification shall be for the unit, and not be restricted to subparts of the unit.	No amendment to RFQ required

T.7	Book II, Part IV (SOW)	Section 4 Testing and Acceptance	<p><i>Do you require a Declaration of Conformity and IC60950 test on the assembly or individual parts? Note that the individual parts come with these test from factory, but the assembly will require an entirely new one which takes a lot of time.</i></p>	<p>As per TA-3, if the equipment comes with OEM datasheets demonstrating compliance with the SRS then the Contractor does not have to provide in addition a quality assurance statement for the equipment. For the assembly a Declaration of Conformity shall be provided.</p> <p>As per TA-6, verification of the electrical safety requirements of the assembly of rack and equipment (TA-5 2)) is a condition for the Declaration of Conformity.</p>	<p>No amendment to RFQ required</p>
T.8	Book II, Part IV (SOW)	Section 4 Testing and Acceptance	<p><i>Who is responsible to write a test script?</i></p>	<p>The Contractor</p>	<p>No amendment to RFQ required</p>
T.9	Book II, Part IV (SOW)	Section 4 Testing and Acceptance	<p><i>Will it be enough to show the equipment turns on or do you require full stress tests? To which equipment?</i></p>	<p>As per TA-2: "All individual equipment as identified in Annex A (SRS) shall be quality inspected for damages prior to installation into the racks and all equipment shall undergo at least a power on cycle and, if available, go through a self-diagnostic test". After installation in the rack the same level of testing applies to TA-5 1), using the power cabling as specified in the SRS 4.2. All non-COTS cabling (i.e. cabling assembled by the Contractor) shall be verified by the Contractor.</p>	<p>No amendment to RFQ required</p>

<p>T.10</p>	<p>Book II, Part IV (SOW)</p>	<p>Section 5.2 ILS-5</p>	<p><i>Could the Purchaser please confirm whether the Racks will be stored when not in use in a purpose built or temporary storage solution with environmental control management, with the following facilities?</i></p> <ul style="list-style-type: none"> • <i>Grounding points to protect against ESD.</i> • <i>Suitable racking for rack protection</i> • <i>Smooth surface to remove the rack from the pallet.</i> 	<p>The racks will undergo the FSA process as soon as they are received in NCIA Brunssum facility. The original “packaging” as per requirements ILS-3 and ILS-5 (and subsequent) shall be suitable already for ESD protection therefore, if required, NCIA will simply connect the grounding points made available by the contractor in case of long term storage or during the installation of additional equipment. Stacking is covered by ILS-6, ILS-7 and ILS-9 and ILS-11: NCIA does not expect to stack the racks in order to be able to “work” on them when still on their original pallets. The removal of the racks from the pallets will occur after FSA and at racks final destination: the smooth surface for racks unloading from the pallets will be a NATO responsibility but the contractor shall make available what required in ILS-9.</p>	<p>No amendment to RFQ required</p>
<p>T.11</p>	<p>Book II, Part IV (SOW)</p>	<p>Section 5.2 ILS-9</p>	<p><i>Could the Purchaser please confirm how the NCI Agency personnel will remove the racks from the pallets i.e. purpose built wheel based system or standard manoeuvring wheels supplied with racks?</i></p>	<p>The Contractor can provide any solution that will allow the Purchaser to load/unload the racks from the pallets in accordance with the requirement ILS-9 (manual pushing/pulling by a crew of max 4).</p>	<p>No amendment to RFQ required</p>



NATO Communications and Information Agency
Agence OTAN d'information et de communication

**RFQ-CO-115172-RACKS
AMENDMENT 1**

**BOOK II
PART IV**

**STATEMENT OF WORK (SOW)
Annex A – Detailed System Requirements Specification
(SRS)**

This page is intentionally left blank

TABLE OF CONTENTS

Table of Contents i

Section 1 Introduction 1

Section 2 General Requirements 2

Section 3 Equipment Requirements 3

 3.1 Introduction 3

 3.2 19" Server Rack 3

 3.3 Rack Components 5

 3.3.1 Rackmount Console with Integrated KVM Switch 5

 3.3.2 Ethernet Switches 5

 3.3.3 Patch Panel 6

 3.3.4 Dual Channel RS530 DB25 A/B Switch 6

 3.3.5 UPS (Uninterruptable Power Supply) 7

 3.3.6 Pre-Installed Cables 8

 3.3.7 Pre-Installed accessories 8

 3.4 Ancillary Components 9

 3.4.1 Ancillary Cable Sets 9

 3.4.2 Accessories 10

Section 4 Integration Requirements 11

 4.1 Components placement 11

 4.2 Cabling 12

This page is intentionally left blank

Section 1 Introduction

[1] This Annex A is part of the generic Statement of Work (SoW) and provides detailed specifications for the Rack Mounted Network Equipment to be provided, with requirements arranged in the following three sections:

- 1) General Requirements;
- 2) Equipment Requirements;
- 3) Integration Requirements.

Section 2 General Requirements

- SRS-1 The Rack Mounted Network Equipment provided under this Contract shall meet or exceed the requirements identified herein for each respective Contract Line Item.
- SRS-2 All components in the Contractor's solution that perform the same functions shall be of the same brand and model.
- SRS-3 The small items (busbars, connection cables, power cables or any type of connectors used in the assembly) and additional elements which were not asked specifically by the Purchaser but are required for the consistency of the solution shall be provided by the Contractor.
- SRS-4 All physical interfaces shall be based on open industry standards.
- SRS-5 When 'include' is used in a requirement this shall be interpreted as 'include, but not be limited to'.
- SRS-6 When 'support' is used in a requirement this shall be interpreted as including everything (such as hardware, software, firmware, licenses, and configuration) needed to meet the requirement.
- SRS-7 Quantities in this SRS do not include spares, please refer to the Schedule of Supplies and Services (SSS) for quantities to be delivered including spares.

Section 3 Equipment Requirements

3.1 Introduction

SRS-8 The hardware delivery for the required Rack Mounted Network Equipment shall include the following components as further specified in the following paragraphs:

- 1) 22 times 19" Server Racks (para 3.2);
- 2) Rack Components for 22 racks (para 3.3) to include:
 - a) Single rack mounted console with integrated KVM switch;
 - b) Two Ethernet switches;
 - c) Single Ethernet and Fibre Optic patch panel;
 - d) Single dual-channel RS-530 A/B switch;
 - e) Two Uninterruptable Power Supplies (UPS);
 - f) Pre-Installed Cables.
 - g) Pre-installed Accessories
- 3) Ancillary Components for 22 racks to include:
 - a) Cable sets;
 - b) Accessories.

SRS-9 Environmental requirements:

- 1) The minimum environmental temperature range for continuous operation to be supported by all components as specified in this SRS shall be from 10 °C to 35 °C.
- 2) The minimum environmental storage temperature range to be supported by all components as specified in this SRS shall be from -15 °C to +50 °C.

SRS-10 Safety requirements:

All components as specified in this SRS, and the combination hereof if applicable, shall comply with IEC 60950-1 or IEC 62368-1 for electrical safety;

3.2 19" Server Rack

SRS-11 Twenty-two (22) 19" Server Racks will be required to accommodate the 19" rackmount equipment and each Server Rack shall meet the following requirements:

SRS-12 Dimensions:

- 1) The internal height for installation of equipment inside the rack shall be 24 or 25 RU (Rack Units);
- 2) Rack height: less than 1300 mm (excluding wheels or feet).

- 3) Rack width: 600 mm (excluding side panels);
- 4) Rack depth: 1000mm to 1075 mm (excluding doors).

SRS-13 Rack structure:

- 1) 4 post rack type;
- 2) The rack shall provide vertical mounting rails, two at the front and two at the rear, for mounting 19" equipment in the rack;
- 3) The rack rails shall have square mounting flange holes;
- 4) The rack shall have closed metal side panels and vented metal front and rear doors with at least 65% perforation;
- 5) The rack shall have a roof plate and a base plate enabling cable entry;
- 6) The rack shall support mounting equipment both at the front and rear;
- 7) The rack shall have levelling feet installed;
- 8) The rack shall have wheels installed that shall support a load of at least 750 kg per rack when rolling. Wheels shall either be removable, or shall be lifted off the floor by adjusting the extendable levelling feet when not in transport;
- 9) The rack shall have a static total load capacity of at least 700 kg.
- 10) The rack structure, with equipment as listed in this SRS installed, shall support without damage to the rack structure the use of a 2 men-lift using moving harnesses. The weight of the PFE shall be assumed to be 25 kg.

SRS-14 Conformance:

- 1) The rack and all accessories shall conform to the requirements and recommendations of EIA-310-E;

SRS-15 Power distribution:

- 1) The rack shall provide 2 vertical 0U (Zero U) Power Distribution Units (PDU) with at least 15 outlets per PDU;
- 2) The PDU shall feature IEC C13 sockets for providing power to the rack equipment, and IEC C14 for connecting the PDU to the UPS in the rack;
- 3) PDUs may be:
 - a) Attached to the right side inside of the rack at the rear,
or
 - b) Installed in Zero U space at the rear of the rack, with one PDU at the right side and one PDU at the left side. In this case two horizontal cable lacing bars with lacing points shall be provided in addition to accessories included in the SRS

SRS-16 Security

- 1) The rack doors shall be lockable, and two keys per lock shall be included. Keys for front and rear doors shall be the same.

SRS-17 Safety

- 1) All rack parts such as doors, sidewalls, rails, roof, etc. shall be interconnected for grounding in accordance with IEC 60950-1 or IEC 62368-1, and the rack shall provide a grounding point to connect to the grounding of the facility.
- 2) The rack shall provide bolt down hardware for securing the rack to a floor.

3.3 Rack Components

3.3.1 Rackmount Console with Integrated KVM Switch

SRS-18 A single rackmount console is required per rack that will be used to manage two servers that will be added by the Purchaser as Purchaser Furnished Equipment (PFE) after the delivery of the racks. The console shall consist of a monitor, keyboard, mouse and KVM (Keyboard Video Mouse) switch all integrated in a single unit, with the following specifications:

- 1) 1 RU rack mountable drawer construction. The monitor shall be able to be opened to at least 90 degrees while mounted in the rack;
- 2) Screen size between 17 and 19 inch;
- 3) Minimum resolution: 1280 x 1024 at 60 Hz;
- 4) US keyboard layout;
- 5) Mouse touch-board with at least two function keys;
- 6) Integrated KVM switch with at least two KVM ports to connect to the PFE servers;
- 7) The KVM ports shall support mouse and keyboard through USB, and video over VGA to the PFE servers;
- 8) TEMPEST level B certified in accordance with SDIP-27/2 (in combination with the KVM cables of SRS-26);
- 9) Power: 100V – 240V, 50/60Hz;
- 10) MTBF \geq 40000 hours (@ 25°C, Ground Fixed Controlled conditions, part count method of Telcordia SR-332 or equivalent);

3.3.2 Ethernet Switches

SRS-19 Two separate Ethernet switches will be required per rack and each shall meet the following specifications:

- 1) Internal power supply;
- 2) Power: 100V – 240V, 50/60Hz;
- 3) Rack mountable, max 1 RU high;

- 4) Ports: Simultaneously at least 8 x 10/100/1000 Mbps RJ45 and 2 x SFP 1Gbps (supporting 1000BASE-SX SFPs);
- 5) Include 2 x SFP 1000BASE-SX LC which are interoperable with the switch;
- 6) TEMPEST level B certified in accordance with SDIP-27/2;
- 7) The switch shall be delivered with the firmware as per the AFPL;
- 8) The switch and its firmware shall be supported by its manufacturer for at least 5 years after delivery under this contract;
- 9) Manageable via secure protocols (SSHv2);
- 10) Include a command line interface;
- 11) Listed on the NCI Agency Approved Fielded Product List (AFPL) for classified systems;
- 12) Recent product, defined as market introduction of the switch type in or after 2017.
- 13) MTBF \geq 300000 hours (@ 25°C, Ground Fixed Controlled conditions, part count method of Telcordia SR-332 or equivalent) including Power Supply and SFPs modules;

3.3.3 Patch Panel

SRS-20 A single Patch Panel per rack is required for fibre optic and Ethernet patching that shall meet the following specifications:

- 1) Rack mountable, 1 RU, at least 24 ports;
- 2) Includes a cable management panel in front (towards outside of rack);
- 3) Include at least the following ports (mounted on the patch panel):
 - a) 16 x RJ45 CAT6 feedthrough, shielded, mounted in positions 5 to 20;
 - b) 8 x LC-LC Duplex Adapters, each supporting both Singlemode and Multimode. Insertion Loss \leq 0.2dB, Return Loss \geq 50dB, mounted in positions 1 to 4 and 21 to 24.
 - c) All LC-LC Duplex Adapters shall have dust caps installed.

3.3.4 Dual Channel RS530 DB25 A/B Switch

SRS-21 A single Dual Channel RS530 DB25 A/B Switch is required per rack that shall meet the following specifications:

- 1) Passive switch;
- 2) Rack mountable max 1 RU;
- 3) Two independent switched channels;

- 4) Supports mechanical switching of connectivity of the common RS530 DB25 port of each channel between the two RS530 DB25 ports (A and B) of each channel;
- 5) The A/B switch shall be manually operated, with independent control per channel;
- 6) Control of the channels via the front;
- 7) All RS530 DB25 ports shall be on the back (6 ports in total);
- 8) All ports shall have a female DB25 connector;
- 9) EMI/RFI shielded metal case;
- 10) The switch shall only use self-wiping contacts;
- 11) The switch shall be sealed against the entrance of dust;
- 12) MTBF \geq 150000 hours (@ 25°C, Ground Fixed Controlled conditions, part count method of Telcordia SR-332 or equivalent) or at least 100000 failure free commutation cycles;

3.3.5 UPS (Uninterruptable Power Supply)

SRS-22 Per rack two UPS shall be provided which each shall meet the following specifications:

- 1) Safely support a redundant UPS configuration in which the PFE servers that have a dual PSU can be powered by both UPS simultaneously;
- 2) Use maintenance-free sealed lead-acid batteries;
- 3) Batteries shall be field replaceable;
- 4) Rack mountable, max 2 RU each;
- 5) Continuous Output Power Capacity minimal 1000 Watts / 1.5 kVA;
- 6) Output Connections: at least 4 x IEC 320 C13;
- 7) Input Connections: IEC-320 C20 or IEC 320 C14;
- 8) Nominal Output Voltage: 230V;
- 9) Input Voltage range to be supported while meeting Continuous Output Power Capacity requirements: 180 - 275V;
- 10) Waveform type: Sine wave;
- 11) Automatic and Manual bypass;
- 12) Input frequency: 50/60Hz +/- 3 Hz (auto sensing);
- 13) Runtime: minimum 20 minutes for a load of 500 Watt;
- 14) MTBF \geq 100000 hours (@ 25°C, Ground Fixed Controlled conditions, part count method of Telcordia SR-332 or equivalent) excluding batteries;

3.3.6 Pre-Installed Cables

SRS-23 Each rack shall include pre-installed cables, integrated as per para 4.2, that shall meet the following specifications:

- 1) Ethernet cable from the Ethernet ports of the Ethernet switches to the patch panel:
 - a) SF/UTP CAT6;
 - b) Colour red;
 - c) The wiring shall be straight;
 - d) Quantity 8, length as required;
- 2) Fibre Optic cable from the SFP ports of the Ethernet switches to the patch panel:
 - a) Multimode: 50/125 μ m, OM4, Duplex, Insertion Loss \leq 0.3 dB, Return Loss \geq 30 dB, Bend Insensitive, Attenuation at 850 nm \leq 3.0 dB/km;
 - b) Quantity 4, length as required;
- 3) Ethernet cable from the console ports of the Ethernet switches to the patch panel:
 - a) SF/UTP CAT6;
 - b) Colour blue;
 - c) The wiring shall be straight;
 - d) Quantity 2, length as required;
- 4) Power cable from the Ethernet switches, both UPS, and Console to the PDU:
 - a) C13-C14 10A 230V
 - b) Quantity 5, length as required;

SRS-24 All cabling shall be LSZH (Low Smoke Zero Halogen).

3.3.7 Pre-Installed accessories

SRS-25 The following accessories shall be included and mounted within each rack, and are part of the rack integration as defined in para 4.1:

- 1) 2 x Brush Strip;
- 2) 3 x L-Shaped Horizontal Cable Lacer Bar with cable tie slots. The bar shall have approximately 100 mm offset and fit with rack doors closed when installed at the front of the rack as defined in para 4.1.
- 3) Blind Panels:
 - a) 3 x 1 RU;

- b) 1 x 3 RU;
- c) As required for the integration of the UPS as defined in para 4.1.
- 4) A label holder, which shall be attached (e.g. self-adhesive) to the 3 RU Blind Panel (refer to para 4.1). The label holder shall be transparent, have a top opening and be 40 mm high x 451 mm wide.
- 5) 1 x Rack mount drawer 2 RU high, depth minimal 400 mm, the part of the drawer that is fixed to the rack shall have a closed upper side.
- 6) Mounting rails for UPSs.

3.4 Ancillary Components

3.4.1 Ancillary Cable Sets

SRS-26 Each rack shall include an ancillary cable set with quantities of cables additional to the installed cables as specified in SRS-23. The ancillary cables shall meet the following specifications,:

- 1) Ethernet:
 - a) CAT6 SF/UTP;
 - b) Quantities and lengths: 2 x 20 cm, 2 x 50 cm, 8 x 100 cm, 8 x 150 cm plus 2 reels of 20m cable;
 - c) The wiring shall be straight;
 - d) All cables shall be terminated with RJ45 connectors, with exception of the 2 x 20m reels for which separate connectors shall be provided;
 - e) Cable colour: red.
- 2) Serial:
 - a) All serial cabling shall be shielded, including the connectors;
 - b) The wiring shall be straight-through;
 - c) The cables shall have DB25 male connectors;
 - d) Quantities and lengths: 3 x 50 cm.
- 3) Fibre Optic:
 - a) Multimode: 50/125 μ m, OM4, Duplex, Insertion Loss \leq 0.3 dB, Return Loss \geq 30 dB, Bend Insensitive, Attenuation at 850 nm \leq 3.0 dB/km;
 - (i) 2 x 150 cm with LC-LC;
 - (ii) 2 x 150 cm with ST-LC;
 - (iii) 2 x 20 m with LC-LC.
 - b) Singlemode: 9/125 μ m, OS2, Duplex, Insertion Loss \leq 0.3 dB, Return Loss \geq 50 dB, Bend Insensitive, Attenuation at 1310 nm \leq 0.36 dB/km.

- (i) 3 x 150 cm with LC-LC;
- (ii) 2 x 150 cm with ST-LC.
- c) All Fibre Optic cables shall have dust caps installed.
- 4) KVM;
 - a) Two shielded KVM cables with length between 90 and 120 cm for use with the Rackmount Console With Integrated KVM Switch (para 3.3.1);
- 5) Power:
 - a) 5 x C13-C14 10A 230V, 1 meter, coloured black;
 - b) 5 x C13-C14 10A 230V, 1 meter, coloured blue;
 - c) 5 x C13-C14 10A 230V, 0,5 meter, coloured black;
 - d) 5 x C13-C14 10A 230V, 0.5 meter, coloured blue.

SRS-27 All cabling shall be LSZH.

3.4.2 Accessories

SRS-28 The following accessories, to be used by the Purchaser as spares and generic tools, shall be included with each rack, and will be stored in the rack drawer:

- 1) 10 x Cable fingers, mountable to the 19" vertical mounting rails, for cable routing;
- 2) 2 x Horizontal cable organizer, 1U, with cable fingers and cover;
- 3) 2 x Cable strain relief bar, rack mountable, max 1U, bar recessed 10 to 12 cm into the rack;
- 4) 1 x Velcro cable binder, roll 2 meter;
- 5) 20 x Velcro one-wrap double sided straps 20mm x 200mm;
- 6) 20 x Front mounting cage nut, washer, and screw sets for fastening equipment into the rack, including a matching screwdriver;
- 7) Two x Label holder, self-adhesive. The label holder shall be transparent, have a top opening and be 40 mm high x 451 mm wide.

Section 4 Integration Requirements

4.1 Components placement

SRS-29 The racks shall be delivered with equipment horizontally installed as detailed below, in which position 1 is the top (upper) position in the rack for a rack dimension of 24 RU. For 25 RU racks the top position shall be left empty and covered with a Blind Panel at the front.

- 1) Positions 1 and 2 are reserved for Purchaser Furnished Equipment (PFE).
- 2) At position 3 the 'Rackmount console with integrated KVM switch' shall be installed, opening towards the front of the rack.
- 3) At positions 4 and 6 at the front of the rack the two Ethernet Switches shall be installed, and with the data ports facing outwards (to the front). Two L-Shaped Horizontal Cable Lacer Bars shall be installed in front of the Ethernet switches.
- 4) At position 5 and 7 at the front of the rack a Brush Strip shall be installed.
- 5) At position 8 at the front of the rack the Patch Panel shall be installed. An L-Shaped Horizontal Cable Lacer Bar shall be installed in front of the Patch Panel.
- 6) At position 9 to 11 at the front of the rack the 3 RU Blind Panel shall be installed.
- 7) The label holder (refer to SRS-25) shall be attached to the 3 RU Blind Panel and be located just below the Patch Panel.
- 8) Positions 12 to 13 are reserved for PFE.
- 9) At position 14 and 15 at the front of the rack the 2 RU drawer shall be installed.
- 10) At position 16, 17, and 18 at the front of the rack 1 RU Blind Panels shall be installed.
- 11) At position 19 at the front of the rack the Dual Channel RS530 DB25 A/B Switch shall be installed, with the ports directed towards the rear of the rack.
- 12) Position 20 is reserved for PFE.
- 13) The two UPS shall be installed at the lowest positions of the rack, supported by rails attached to both the front and rear rails, and have the power inlets and outlets at the rear of the rack.
- 14) If the UPSs each only occupy only 1 RU then 1 RU Blind Panels shall be installed positions 21 and 22 at the front of the rack.
- 15) The two 0U (Zero U) Power Distribution Units (PDU) shall be installed at the right side of the rear, with the top sockets at position 1.
- 16) The cable sets and unused accessories shall be placed in the drawer.

- SRS-30 Each rack position shall be numbered at the front and the rear of the rack, numbering may start from the bottom or from the top of the rack.
- SRS-31 Cage nuts used shall be of the same type as provided as accessories.
- SRS-32 All components shall be installed to the rack such that they can be removed, re-inserted and fixed to the rack using only standard tools, and reusable installation materials.

4.2 Cabling

- SRS-33 The racks shall be delivered with cabling installed as described in the sections below.
- SRS-34 The power and grounding cabling shall be installed inside the rack for all the components that are provided as part of this Contract.
- SRS-35 Cables shall be placed and protected as to prevent contact with rough irregular surfaces and sharp edges. Cables shall be protected so that no possibility of damage arises during opening and closing of doors or panels.
- SRS-36 No wire or cable connection shall be in tension.
- SRS-37 One of the UPSs shall have power cabling to one of the PDUs, the other UPS shall have power cabling to the other PDU.
- SRS-38 All power cabling going to one of the PDUs shall be coloured blue, all power cabling related to the other UPS shall be coloured black.
- SRS-39 One of the Ethernet switches shall have power cabling to one of the PDUs, the other Ethernet switch shall have power cabling to the other PDU.
- SRS-40 Ethernet cabling shall be installed between each Ethernet switch and the Patch Panel for the 4 lowest numbered RJ45 ports of each switch. The Ethernet switch in the upper position in the rack shall be patched to ports 5 to 8 of the Patch Panel, and the Ethernet switch in the lower position in the rack shall be patched to ports 9 to 12 (counted from the left of the Patch Panel). All patches shall be made towards the back of the patch panel (inwards facing).
- SRS-41 OM4 cabling shall be installed between the two lowest numbered SFP ports of each Ethernet switch and the Patch Panel. The Ethernet switch in the upper position in the rack shall be patched to ports 1 and 2 of the Patch Panel, and the Ethernet switch in the lower position in the rack shall be patched to ports 3 and 4. All patches shall be made towards the back of the patch panel (inwards facing).
- SRS-42 SF/UTP CAT6 Ethernet cabling, colour blue, shall be installed between the console port of each Ethernet switch and the Patch Panel ports 17 and 18. All patches shall be made towards the back of the patch panel (inwards facing).
- SRS-43 All data cabling installed at the switches shall have a label at both end of the cable with text as follows (without quotation marks):
- 1) 'SW' followed by the switch number ('1' for the switch in rack position 4, and '2' for the switch in rack position 6);

- 2) ':' followed by the port number;
- 3) '-PP:' followed by the port number of the patch panel.
- 4) For example for cabling between port 1 of switch 1 to port 5 of the patch panel: SW1:1-PP:5.

SRS-44 At least 10 cm separation shall be kept between power cabling and SF/UTP CAT6 Ethernet cabling.

SRS-45 Cabling shall be installed such that removal of any component is possible without requiring removal or disconnection of other components.

This page is intentionally left blank