

	टेलीकम्युनिकेशन्स कंसलटेंट्स इंडिया लिमिटेड (भारत सरकार का उद्यम) Telecommunications Consultants India Ltd. (A Govt. of India Enterprise)	
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विभाग
DIVISION

टी.सी.आई.एल. भवन, ग्रेटर कैलाश-1, नई दिल्ली – 110048

TCIL Bhawan, Greater Kailash-1
New Delhi – 110048

No.: TCIL/15/1185/II/10-MM/08E /CO-3

20.06.2011

CORRIGENDUM NO. 3 TO TENDER

Tender No.: TCIL/15/1185/II/10-MM/08E dated 11.05.2011

Name of Item: Supply of Power Plant Comprising of Rectifier, Battery & UPS for Modernization, Expansion of Network and the Infrastructures of Sierra Leone Telecommunications Company Ltd, REPUBLIC OF SIERRA LEONE

The following amendments are issued to the above mentioned tender document:

The last date for sale of tender is here by extended upto 15:00 hrs. on 28.06.2011.

The last date for submission of offer is here by extended upto 15:00 hrs. on 28.06.2011.

The techno-commercial offers shall be opened at 16: 00 hrs. on 28.06.2011.

Section -5

BOQ has been revised and revised BOQ is attached to this Corrigendum from page no. 2 to 9.

Section -6

Revised Technical specification is attached to this Corrigendum from page no. 10 to 23. Additional information has been provided on "Specification Of Cables And Incoming Panel – Ups" and is on page no. 23.

Response to Queries

The response, to the queries as asked by vendors, is attached to this Corrigendum from page no. 24 to 28.

All other Terms & Conditions of the Tender No. TCIL/15/1185/II/10-MM/08E dated 11.05.2011 shall remain same & unchanged.

(D. Manna)
Group General Manager (MM)

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हिंदी देश की एकता की ऐसी कड़ी है जिसे मजबूत करना प्रत्येक भारतीय का कर्तव्य है।

SECTION – 5

Tender No.: TCIL/15/1185/II/10-MM/08E

11.05.2011

BILL OF QUANTITY & PRICE BID SCHEDULE

Item Code	Item Description	Make & Model	Unit	Qty.	Unit Ex-Works Price	Total Ex-Works Price
					USD	USD
1	2	3	4	5	6	7= 5 X 6
1	Rectifier For Telecom Equipment					
1.1.1	SMPS based Rectifier System in (1 + 1) configuration comprising of 50 A / 48 V modules and other associated systems / sub systems, housed in 19 inch rack with front door , class C surge & lightening protection with potential free contacts, AC and DC Power Distribution boxes as per technical specifications mentioned in the tender document.		No.	13		
1.1.2	Installation Accessories suitable for above Rectifier System:					
1.1.2.1	AC Input and Distribution Panel : Input and Out put MCBs for the above rating Rectifier System with two no. of MCBs as spare		No.	13		
1.1.2.2	DC Distribution Panel : DC Distribution panel with 32 A Incomer Dual Pole MCB and outgoing 4 nos of Dual Pole MCBs of 16 A rating for connecting various loads with bus bar arrangement between in comer and outgoing MCBs		No.	13		
1.1.2.3	Armoured Power Cable from LT panel to AC Input and Distribution Box		M	195		
1.1.2.4	Power Cable from AC Input and Distribution Box to Rectifier		M	130		
1.1.2.5	Power Cable (DC) - from Rectifier to Battery					
1.1.2.6	Blue / Black		M	260		
1.1.2.7	Red		M	260		
1.1.2.8	Power Cable (DC) from Rectifier to DC distribution Box					
1.1.2.9	Blue / Black		M	130		
1.1.2.10	Red		M	130		
1.1.2.11	Power Cable (DC) from DC distribution Box to Equipment					
1.1.2.12	Blue / Black (16 Sq mm)		M	520		
1.1.2.13	Red (16 Sq mm)		M	520		
1.1.2.14	Earthing Cable 35 Sq mm		M	390		
1.1.2.15	Other installlation accessories like, nuts and bolta, cable ties, rawl plugs, fixing screws, cable ties, glands, etc required for complete installation of the system.		Lot	1		
1.1.3	Spares for 5 year (Complete breakup to be provided)		Lot	1		

1.2.1	SMPS based Rectifier System in (2 + 1) configuration comprising of 50 A / 48 V modules and other associated systems / sub systems, housed in 19 inch rack with front door , class C surge & lightening protection with potential free contacts and other associated accessories		No.	8		
1.2.2	Installation Accessories suitable for above Rectifier System:					
1.2.2.1	AC Input and Distribution Panel : Input and Out put MCBs for the above rating Rectifier System with two no. of MCBs as spare		No.	8		
1.2.2.2	DC Distribution Panel : DC Distribution box with 120 A Incomer Dual Pole MCCB and Outgoing Dual Pole MCBs - 2 nos of 63 A, 4 nos of 32 A and 2 numbers of 16 A rating for connecting various loads with bus bar arrangement between in comer and outgoing MCBs		No.	8		
1.2.2.3	Armoured Power Cable from LT panel to AC Input and Distribution Box		M	160		
1.2.2.4	Power Cable from AC Input and Distribution Box to Rectifier		M	80		
1.2.2.5	Power Cable (DC) - from Rectifier to Battery					
1.2.2.6	Blue / Black		M	160		
1.2.2.7	Red		M	160		
1.2.2.8	Power Cable (DC) from Rectifier to DC distribution Box					
1.2.2.9	Blue / Black		M	160		
1.2.2.10	Red		M	160		
1.2.2.11	Power Cable (DC) from DC distribution Box to Equipment					
1.2.2.12	Blue / Black (16 Sq mm)		M	320		
1.2.2.13	Red (16 Sq mm)		M	320		
1.2.2.14	Earthing Cable 35 Sq mm		M	240		
1.2.2.15	Other installlation accessories like, nuts and bolta, cable ties, rawl plugs, fixing screws, cable ties, glands, etc required for complete installation of the system.		Lot	1		
1.2.3	Spares for 5 year (Complete breakup to be provided)		Lot	1		

1.3.1	SMPS based Rectifier System in (3 + 1) configuration comprising of 50 A / 48 V modules and other associated systems / sub systems, housed in 19 inch rack with front door , class C surge & lightening protection with potential free contacts, AC and DC Power Distribution boxes as per technical specifications mentioned in the tender document.	No.	4		
1.3.2	Installation Accessories suitable for above Rectifier System:				
1.3.2.1	AC Input and Distribution Panel : Input and Out put MCBs for the above rating Rectifier System with two no. of MCBs as spare	No.	4		
1.3.2.2	DC Distribution Panel : DC Distribution box with 120 A Incomer Dual Pole MCCB and Outgoing Dual Pole MCBs - 3 nos of 63 A, 4 nos of 32 A and 2 numbers of 16 A rating for connecting various loads with bus bar arrangement between in comer and outgoing MCBs	No.	4		
1.3.2.3	Armoured Power Cable from LT panel to AC Input and Distribution Box	M	120		
1.3.2.4	Power Cable from AC Input and Distribution Box to Rectifier	M	40		
1.3.2.5	Power Cable (DC) - from Rectifier to Battery				
1.3.2.6	Blue / Black	M	80		
1.3.2.7	Red	M	80		
1.3.2.8	Power Cable (DC) from Rectifier to DC distribution Box				
1.3.2.9	Blue / Black	M	120		
1.3.2.10	Red	M	120		
1.3.2.11	Power Cable (DC) from DC distribution Box to Equipment				
1.3.2.12	Blue / Black (16 Sq mm)	M	60		
1.3.2.13	Red (16 Sq mm)	M	60		
1.3.2.14	Blue / Black (25 Sq mm)	M	160		
1.3.2.15	Red (25 Sq mm)	M	160		
1.3.2.16	Earthing Cable 35 Sq mm	M	120		
1.3.2.17	Other installation accessories like, nuts and bolta, cable ties, rawl plugs, fixing screws, cable ties, glands, etc required for complete installation of the system.	Lot	1		
1.3.3	Spares for 5 year (Complete breakup to be provided)	Lot	1		

1.4.1	SMPS based Rectifier System in (4 + 1) configuration comprising of 50 A / 48 V modules and other associated systems / sub systems, housed in 19 inch rack with front door , class C surge & lightening protection with potential free contacts, AC and DC Power Distribution boxes as per technical specifications mentioned in the tender document.	No.	4		
1.4.2	Installation Accessories suitable for above Rectifier System:				
1.4.2.1	AC Input and Distribution Panel : Input and Out put MCBs for the above rating Rectifier System with two no. of MCBs as spare	No.	4		
1.4.2.2	DC Distribution Panel : DC Distribution box with 2 nos. of 120 A Incomer Dual Pole MCCB and Outgoing Dual Pole MCBs -4 nos of 63 A, 4 nos of 32 A and 2 numbers of 16 A rating for connecting various loads with bus bar arrangement between in comer and outgoing MCBs	No.	4		
1.4.2.3	Armoured Power Cable from LT panel to AC Input and Distribution Box	M	120		
1.4.2.4	Power Cable from AC Input and Distribution Box to Rectifier	M	40		
1.4.2.5	Power Cable (DC) - from Rectifier to Battery				
1.4.2.6	Blue / Black	M	80		
1.4.2.7	Red	M	80		
1.4.2.8	Power Cable (DC) from Rectifier to DC distribution Box				
1.4.2.9	Blue / Black	M	120		
1.4.2.10	Red	M	120		
1.4.2.11	Power Cable (DC) from DC distribution Box to Equipment				
1.4.2.12	Blue / Black (16 Sq mm)	M	60		
1.4.2.13	Red (16 Sq mm)	M	60		
1.4.2.14	Blue / Black (25 Sq mm)	M	160		
1.4.2.15	Red (25 Sq mm)	M	160		
1.4.2.16	Earthing Cable 35 Sq mm	M	120		
1.4.2.17	Other installation accessories like, nuts and bolts, cable ties, rawl plugs, fixing screws, cable ties, glands, etc required for complete installation of the system.	Lot	1		
1.4.3	Spares for 5 year (Complete breakup to be provided)	Lot	1		

1.5.1	SMPS based Rectifier System in (5 + 1) configuration comprising of 50 A / 48 V modules and other associated systems / sub systems, housed in 19 inch rack with front door , class C surge & lightening protection with potential free contacts, AC and DC Power Distribution boxes as per technical specifications mentioned in the tender document.	No.	1		
1.5.2	Installation Accessories suitable for above Rectifier System:				
1.5.2.1	AC Input and Distribution Panel : Input and Out put MCBs for the above rating Rectifier System with two no. of MCBs as spare	No.	1		
1.5.2.2	DC Distribution Panel : DC Distribution box with 2 nos. of 120 A Incomer Dual Pole MCCB and Outgoing Dual Pole MCBs -4 nos of 63 A, 4 nos of 32 A and 2 numbers of 16 A rating for connecting various loads with bus bar arrangement between in comer and outgoing MCBs	No.	1		
1.5.2.3	Armoured Power Cable from LT panel to AC Input and Distribution Box	M	30		
1.5.2.4	Power Cable from AC Input and Distribution Box to Rectifier	M	10		
1.5.2.5	Power Cable (DC) - from Rectifier to Battery				
1.5.2.6	Blue / Black	M	20		
1.5.2.7	Red	M	20		
1.5.2.8	Power Cable (DC) from Rectifier to DC distribution Box				
1.5.2.9	Blue / Black	M	30		
1.5.2.10	Red	M	30		
1.5.2.11	Power Cable (DC) from DC distribution Box to Equipment				
1.5.2.12	Blue / Black (16 Sq mm)	M	15		
1.5.2.13	Red (16 Sq mm)	M	15		
1.5.2.14	Blue / Black (25 Sq mm)	M	40		
1.5.2.15	Red (25 Sq mm)	M	40		
1.5.2.16	Earthing Cable 35 Sq mm	M	30		
1.5.2.17	Other installation accessories like, nuts and bolts, cable ties, rawl plugs, fixing screws, cable ties, glands, etc required for complete installation of the system.	Lot	1		
1.5.3	Spares for 5 year (Complete breakup to be provided)	Lot	1		

1.6.1	SMPS based Rectifier System in (15 + 1) configuration comprising of 50 A / 48 V modules and other associated systems / sub systems, housed in 19 inch rack with front door , class C surge & lightening protection with potential free contacts, AC and DC Power Distribution boxes as per technical specifications mentioned in the tender document.	No.	1		
1.6.2	Installation Accessories suitable for above Rectifier System:				
1.6.2.1	AC Input and Distribution Panel: Input and Out put MCBs for the above rating Rectifier System with two no. of MCBs as spare	No.	1		
1.6.2.2	DC Distribution Panel : DC Distribution box with 2 nos. of 625A Incomer Dual Pole MCCB and Outgoing Dual PoleMCCB -8 nos of 120A, MCBs - 8 nos of 63 A, 8 nos of 32 A and 8 numbers of 16 A rating for connecting various loads with bus bar arrangement between in comer and outgoing MCBs	No.	1		
1.6.2.3	Armoured Power Cable from LT panel to AC Input and Distribution Box	M	80		
1.6.2.4	Power Cable from AC Input and Distribution Box to Rectifier	M	25		
1.6.2.5	Power Cable (DC) - from Rectifier to Battery				
1.6.2.6	Blue / Black	M	30		
1.6.2.7	Red	M	30		
1.6.2.8	Power Cable (DC) from Rectifier to DC distribution Box				
1.6.2.9	Blue / Black	M	30		
1.6.2.10	Red	M	30		
1.6.2.11	Power Cable (DC) from DC distribution Box to Equipment				
1.6.2.12	Blue / Black (16 Sq mm)	M	300		
1.6.2.13	Red (16 Sq mm)	M	300		
1.6.2.14	Blue / Black (25 Sq mm)	M	100		
1.6.2.15	Red (25 Sq mm)	M	100		
1.6.2.16	Earthing Cable 35 Sq mm	M	50		
1.6.2.17	Other installation accessories like, nuts and bolts, cable ties, rawl plugs, fixing screws, cable ties, glands, etc required for complete installation of the system.	Lot	1		
1.6.3	Spares for 5 year (Complete breakup to be provided)	Lot	1		

2	Maintenance Free Battery (VRLA - 2V cell)				
2.1	VRLA 48 V 1 x 100 AH Battery		No.	4	
2.2	VRLA 48 V 2 x 100 AH Battery		No.	9	
2.3	VRLA 48 V 2 x 120 AH Battery		No.	1	
2.4	VRLA 48 V 2 x 200 AH Battery		No.	2	
2.5	VRLA 48 V 2 x 240 AH Battery		No.	5	
2.6	VRLA 48 V 2 x 300 AH Battery		No.	3	
2.7	VRLA 48 V 2 x 450 AH Battery		No.	4	
2.8	VRLA 48 V 2 x 600 AH Battery		No.	1	
2.9	VRLA 48 V 2x1800 AH Battery		No.	1	
2.10	Battery stand & Installation Accessories for complete installation of systems.		No.	1	
2.11	Spares for 5 year (Complete breakup to be provided)		No.	30	
3	Microprocessor based UPS				
3.1	Four no. of 25 KVA UPS operating in N+1 mode in Load Bus Synchronization (LBS) configuration to provide 75 KVA output. Battery backup of 5hrs to be provided with each UPS as per technical specifications mentioned in the tender document		System	1	
3.1	Installation Accessories				
3.1.1	UPS Distribution panel		No	1	
3.1.2	LT Distribution panel for server rooms		No	2	
3.1.3	Incoming Panel for input to UPS		No	1	
3.1.4	Armoured Power cable 200A (120 Sq mm) 3-1/2 core (from DG to incoming panel)		M	40	
3.1.5	Unarmoured power cable 50 A, (16 Sq mm) 3-1/2 core (from incoming panel to 5 UPS)		M	50	
3.1.6	Unarmoured power cable 50 A, (16 Sq mm) 3-1/2 core (from each UPS to UPS distribution panel)		M	50	
3.1.7	Unarmoured power cable 200 A, (120 Sq mm) 3-1/2 core (from UPS distribution panel to LT distribution panel)		M	160	
3.1.8	Unarmoured power cable 35 A, (16 Sq mm) 2 core (LT distribution panel to Server racks)		M	600	
3.1.9	Unarmoured power cable 20 A, (6 Sq mm) 2 core (LT distribution panel to Server racks)		M	600	
3.1.10	Glands, lugs, battery racks, mounting hardware, cables from UPS to battery etc		Lot	1	
3.1.11	25 KVA UPS with battery back up of 5 hrs as spare		No.	1	
3.1.12	Recommended consumable spares (if any)		Lot	1	

3.2	1 KVA Online along with battery bank of 5hrs. Backup		No.	19		
3.2.1	Installation accessories					
3.2.1.1	Flexible Copper cable 6 A (2.5 Sq mm), 3 Core		M	800		
3.2.1.2	Battery Rack and mounting hardware and other installation accessories		Lot	19		
3.2.2	1 KVA Online UPS with battey back up of 5 hrs as spare		No.	2		
3.2.3	Recommended consumable spares (if any)					
3.3	1 KVA Offline along with backup of 15-20 minutes		No.	33		
3.3.1	3 m cord for connecting UPS to mains and other installation accessories.		No.	33		
3.3.2	1 KVA Offline UPS with battey back up of 15-20 minutes as spare		No.	2		
3.3.3	Recommended consumable spares (if any)					
3.4	650 VA Offline along with backup of 15 - 20 minutes		No.	150		
3.4.1	Installation Accessories (Eathing Cable , Electrical cabling from UPS to LT panel etc. as required for complete installation)		No.	150		
3.4.2	650 VA UPS with battey back up of 15-20 minutes as spare		No.	7		
3.4.3	Recommended consumable spares (if any)					
Grand Total Amount Ex – works (In USD)						
Freight up to TCIL Stores in Free Town, Sierra Lone (In USD)						
Insurance up to TCIL Stores in Free Town, Sierra Lone (In USD)						
Total Amount CIF Free Town, Sierra Lone basis (In USD) A						
4	Services (OPTIONAL- BUT NECESSARY TO BE QUOTED)				Rate	Amount
4.1	Installation , Commoissioning of Power plant comprising of Rectifier & Battery		Site	1		
4.2	Installation & Commoissioning of four no. of 25 KVA UPS (configuration as mentioned in item no. 3.1)		Site	1		
Total Amount Sierra Lone basis (In USD) B						
Grand Total Amount (In USD) A+B						

Note:

1. For Supplies outside India, TCIL will provide Form 'H',
2. Excise Duty is not applicable on export. However, it will be the responsibility of the Supplier to execute bond/documents with Excise Department for release of goods without payment of Excise Duty.
3. Evaluation of bid will be carried out on the basis of total CIF Price, Free Town, Sierra Lone basis

- END OF SECTION 5 -

SECTION – 6

Tender No.: TCIL/15/1185/II/10-MM/08E

11.05.2011

**TECHNICAL SPECIFICATIONS OF DC POWER SUPPLY SYSTEM COMPRISING
OF RECTIFIER, BATTERIES AND UPS**

GENERAL:

- a. The DC Power Supply System (Rectifier) shall be used for telecommunication equipment in Republic of Sierra Leone, West Africa for Sierra Leone Telecommunications Company Ltd.. The telecom equipment shall operate from a DC power supply system comprising of a rectifier and battery system, float charging a bank of storage batteries capable of supporting the required minimum autonomous operation time of five hours in the event of a mains supply outage. Offered system shall have the capability of charging battery without adding any extra hardware.
- b. The power supply system shall be modular power supply system for use with telecommunications load at nominal -48 VDC. The system shall be capable to provide a high quality (smooth) DC power supply and have a capability to automatically charge the battery.
- c. Construction : The modules, alarm and control module, AC and DC distribution and battery connection shall be housed in one rack. The rack shall have suitable ventilating arrangement. Also separate AC input / distribution box and DC distribution boxes shall be provided which can be installed on the walls.

The components of the rectifier shall be labeled. The description of the components should be consistent with what is described in the manual supplied.

The cabling within the rectifier shall be labeled with cable markers.
- d. All installation material like Power & Earth cables , nuts & bolts , cable glands, PVC ducts etc. required for complete installation , commissioning & operation of the Power plant shall be supplied by the bidder

- e. Quality Assurance : It is the responsibility of the manufacturer to establish quality assurance by means of quality control procedure , which will ensure that the product will meet the requirements of these specifications.
The manufacturer will be required to maintain a quality system that conforms to the requirement of ISO 9000 or latest.
- f. Any item not mentioned in the BOQ but required for installation , commissioning & operation of Power Plant shall be indicated and quoted by the bidder.
- g. Inspection: TCIL shall appoint an inspecting officer to carry out pre-delivery tests at the manufacturer works
- h. Bids received without compliance statement and all supporting technical brochures / literature shall be rejected.
- i. Make & Model No. of Offered Product / items to be specified by bidders along with technical parameters.
- j. Installation and Commissioning of one station shall be carried out by the bidder. However if needed the installation and commissioning works for remaining sites can also be given to the vendor at the rate finalized through the tender.

DC Power Supply System shall comprise the Following:

- (i) This system should have inbuilt intra-cabinet microprocessor controlled, intelligent, modular rectifier banks.
- (ii) Associated equipment and power cable

Batteries and rectifiers will be so dimensioned and constructed so as to allow the easy expansion of telecom equipment in the telecom shelters by adding more batteries and rectifiers.

It shall be possible to expand the system by adding rectifiers and cabinets according to requirements up to the specified ultimate capacity.

Rectifier and Charger

- The rectifier shall have the following Charging modes :

Float

Equalize

. The rectifier shall have the following features

Auto float to boost change

- a. Boost to float 3% of Rated Ah Capacity in Amps(Settable)
- b. Float to Boost 5% of Rated Ah Capacity in Amps(Settable)
- c. Boost Voltage shall be field settable
- d. Float voltage shall be field settable.

- Input Characteristics

Input voltage to charger : 90-270VAC , 50 Hz

Factor : 0.98 lag at full load

- Output Characteristics

Nominal output voltage : -48 Volts

Output voltage range : 40-60V. Should have provisions for variable voltage settings according to the battery requirements.

Regulation : < \pm 1 % no load to full load

Output power rating : 50 Amps SMPS Module

- Control panel and alarm

The control panel and alarm shall comprise the following:

LCD Display of output voltage and current.

Adjustment of charge mode.

Adjustment of charge voltage and battery charge current limit.

Audible and visible alarms for battery low voltage (adjustable), AC mains and charge failures

The system shall have remote health monitoring feature through the potential free relay contacts. A minimum of 8 alarms shall be extendable.

- Rectifier and charger redundancy :

THE TOTAL NUMBER OF RECTIFIERS SHALL BE ABLE TO FEED THE TOTAL PEAK HOUR LOAD AND BATTERY CHARGING SIMULTANEOUSLY BESIDES TAKING ACCOUNT OF REDUNDANCY.

The proposed rectifier shall be the modular designed with N+1 redundancy.

- Protection : AC input over/under voltage automatic shutdown, AC input and two level LVD requirements at DC side, Output short circuit protection, Surge protection class C type with potential free contacts for extension of surge failure alarms to central site, Radio interference suppresser, etc.
- Metering : System should be built with Microprocessor based controller with suitable for measuring DC & AC Voltages, currents other measurements
- Remote Management Function :The rectifier system shall be equipped with supervision unit which allows the user to remotely configure and monitor the power system via RS-232, RJ-45 interface for at least charge mode, DC output current and voltage, display system status and alarms.

The bidders are required to quote for the supply of all associated installation material like cables (power and earthing) , AC & DC Distribution boards including MCB's & protection devices.

TECHNICAL SPECIFICATIONS OF BATTERY

Battery:

Battery type: Shall be Stationary Sealed Lead Acid VRLA type. 48V, (2V cell) conforming to IEC 60896-21/22:2004 standards.

Bidder to provide the battery technical details.

This specification defines minimum construction, performance and environmental requirements for Lead Acid VRLA batteries to be used as standby power for telecommunication applications.

Design and Construction Requirements:

Design Consideration:

1. The VRLA cell containers and covers shall be constructed of PPCP component materials that shall have good strength & durability and fire resistant, shall have a minimum oxygen index of 28%, and shall be rated 94V-O in accordance with UL testing for flammability. The design shall have UL approval.
2. Each cell cover shall be provided with terminal posts identification and valve regulated self re-sealing gas vents. The method of bonding the cover to the container shall provide a strong, leak proof seal for the required life the battery.
3. When assembled, the terminal posts, covers, and associated seals shall be constructed to prevent leakage or creepage of electrolyte or gas between terminal posts, vent plugs and the cover.
4. The terminal post design shall be provided with threaded copper inserts suitable for bolted connections and better conductivity.
5. The inter cell connectors shall be of tin plated copper with suitable cross-section.
6. Each cell shall be equipped with a flame arrester to diffuse the hydrogen gas.
7. Each cell should be constructed using flat type positive electrodes and negative electrodes having 99.99% purity lead and permissive lead alloys to ensure low internal resistance of <1% per week and maintenance free characteristics like no topping up through its life and the plate design shall be suitable to meet float and cycling requirements.
8. AGM type separators with high compression shall be used between the electrodes and shall maximize recombination of hydrogen and oxygen during charging process to minimize thermal runaway.
9. The battery shall be with a design float life of 20 years at 27°C and cyclic life of 2000 cycles at 50% DOD.

Installation Considerations:

1. The battery shall be of modular design with the cells installed in acid resistant and self-stackable M.S. trays, the battery string and the battery modules/ cells should be positioned such that they are easily accessible for inspection, replacement and necessary tests. The steel parts shall be painted with an epoxy system which is resistant to the electrolyte.
2. The battery shall be of modular design with the cells installed in acid resistant and self-stackable M.S. trays, the battery string and the battery modules/ cells should be positioned such that they are easily accessible for inspection, replacement and necessary tests. The steel parts shall be painted with an epoxy system which is resistant to the electrolyte.
3. Ventilation: Battery area shall have adequate ventilation either by a natural or mechanical ventilation system, to prevent accumulation of any gases.
4. The rectifier system and main power distribution center should be as close as practical to the battery string. The cables between the battery and the rectifier and main power distribution center shall have copper cables of low internal resistance.

Electrical Requirements:

1. The rated capacity of the battery, when measured at ambient temperature of 27°C, shall be adequate to provide back up for 05 hours. The end voltage of 1.75V per cell after being charged per the manufacturer's recommendations
2. Each battery received from the supplier shall have a user verifiable capacity of not less than 100% of its rated capacity when discharged to 1.75 volt per cell at 27°C after being charged as required by the manufacturer's instructions.
3. The battery string shall be considered recharged after 24 hours at the manufacturer's recommended float and boost voltages and with available charge current of not less than 15 amperes per 100 Ah of the rated battery capacity.
4. The 24-hour recharge efficiency of a float-charged battery shall be at least 90% at 27°C through the life of the battery.
5. An external short circuit caused by a conductive object across the terminal of the battery shall not lead to a fire or an explosion of the battery.
6. The battery strings shall provide at least eight repetitive 100% depth of charge- discharge cycles before capacity degrades to 80%. This capacity loss shall be of temporary nature. Capacity shall be recovered to 100% after a reconditioning charge as recommended by the battery manufacturer.

7. The design life of a battery string shall be at least 20 years at 27°C. Battery life shall be reduced by 20% for each battery temperature rise of 10°C.
8. Battery strings shall be shipped in charged state. The batteries should be capable of storage in this state without causing damage to its internal structure or its chemistry and life and or performance for a period of 6months and should be capable of storing for a further period by providing a charge to the battery as per the manufacturer's recommendation.
9. Battery strings shall not exhibit any thermal runaway condition throughout its rated life when operated within manufacturer specified float voltage and temperature limits.
10. The battery string shall be compatible to work with international standards 48V telecom rectifiers having the battery manufacturer's recommended voltage and current settings.

Environmental Requirements

1. The battery strings shall maintain proper operation and 99% reliability when operated between a temperature range of -20°C to 50°C. The battery shall survive a short term exposure to -50°C to 70°C.
2. The battery shall remain operational in a relative humidity of 5% to 85%.
3. The battery string shall be qualified to withstand seismic shock of zone 4 as described in Uniform building code. Battery module shall remain operational after being subjected to a vibration and shock level during transportation.

Quality Requirements

1. The batteries shall be from reputed manufacturers having ISO:9001 and ISO:14001 certified manufacturing facilities.

Technical Specifications for Online Uninterruptible Power Supply (UPS)

General:

The Bidder shall provide UPS for running Telecommunication system to be used in Republic of Sierra Leone, West Africa for Sierra Leone telecommunications Company Ltd. , .. It is going to be installed between main supply and telecom equipment. During an electric power failure , the unit employs its internal maintenance free battery to supply continuous power for as long as the battery is capable.

UPS System must meet the following specifications and should be High Frequency Transformer less Microprocessor based technology using IGBTs and in dual configuration

1. Operation modes of 25 KVA UPS

There will be a total of 4 UPS systems each of 25 KVA operating in N+1 mode. All the four UPS systems would be connected in Load Bus Synchronization (LBS) configuration to provide 75 KVA output. Each of the 4 UPS systems will have its own battery bank for backup time of 5 hours at full load. In case of failure of any particular UPS or its battery bank, the standby UPS shall take over the load.

2. Distribution, Controls & Alarms:

2.a. Controls & Alarms

The UPS should offer Audio Visual alarms for all critical parameters such as Power Failure, UPS on battery, Under Voltage/ Over Voltage, low battery, etc. – UPS should have RS232 communication port and also SNMP compatibility for remote online monitoring of the critical parameters.

2.b Distribution

UPS should have multiple out put sockets on the back panel in case of Ratings up to 1 kVA. Incase of 25kVA single output should be available for connection to the users desired distribution board.

3. Battery:

3(a)The Batteries should be 12V SMF of suitable AH rating so as to provide desired backup for time period specified in specifications.

3(b) The UPS system batteries shall be of 2 volts, sealed Valve-regulated lead acid (VRLA) heavy duty type batteries having float life of 20 years. Sealed VRLA battery shall be sized considering end cell voltage of 1.75 volts.

3(c) UPS should offer protection from deep discharge, self discharge and over charging of the batteries. The battery bank should have DC circuit breaker for protection. A regulation system shall regulate the battery voltage and the charge current.Charging discharging should meet the battery manufacturers guideline.

4. Lightning & Surge protection:

The UPS system shall be adequately protected against lightning & surge at the input as given:

- ❖ Up to 2 KVA :
 - Protection shall be provided with a two pin GD tube in TT configuration backed by proper rating GI/GG type fuse. Protection shall consist of MOV backed by a suitable rated PTC also in TT configuration.

- ❖ 25 KVA :
 - Transient Voltage Surge and lightning electromagnetic impulse (LEMP)
 - Protection against lightning electromagnetic impulse (LEMP) & other high surge, shall be provided at the distribution panel for the UPS system as defined in the IEEE standard 1100(1999)..
 - The protective devices shall be sized per IEEE Std C62.41-1991 and IEEE Std C62.45-1992.
 - Surge protective devices used for three-phase, four-wire circuits shall be connected in all combinations of line-to-line, line-to-neutral, line-to-ground, and neutral-to-ground. (L-L, L-N, L-G, N-G)
 - The protective devices shall have a UL listing and labeled 1449-3 suppressed voltage rating of 1000V peak.
 - The unit shall have a maximum continuous operating voltage (MCOV) rating of minimum 320VRMS.
 - The Response time of TVSS shall be ≤ 0.5 nanoseconds.
 - This protection has to be supplied by the UPS vendor as part of UPS system in a separate enclosure with clear instruction of installation.
 - Surge Protection device to be provided with potential free contacts for extension of alarm to central site for monitoring purpose.

 - low voltage surges
Protection against low voltage surges shall be provided at the UPS level. This protection shall be equipped with thermal disconnection and potential free contact for arrestor (s) connected between live and neutral .

5. UPS Distribution Panels

Panels shall be metal clad, totally enclosed, rigid, floor mounting, air insulated, cubical type for use on 415 volts, 3 phase, 4 Wire 50 cycles system. The equipment shall be designed for operation in high ambient temperature and high humidity tropical atmospheric conditions. All panels shall have enclosure protection of minimum IP-51/ NEMA-12. Panel shall be made up of the requisite vertical section. Cable chambers, bus bars, input from UPS, outgoing feeders, bus bar, etc shall be provisioned in vertical section.

- Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable glands and terminals such that cables can be easily and safely terminated.
- Input circuit path from each UPS shall have 50 A MCCB for isolation.
- The bus bars shall be color coded, air insulated and made of high conductivity, Electrolytic grade high strength copper alloy complying with the requirement of grade E91E of IS 5082. The main phase bus bars shall have continuous current rating throughout the length of each power control panel,

and the neutral bus bars shall have a continuous rating of at least 100% of the phase bus bars.

- There shall be two outgoing circuits, one for each of the two electrical paths to Server Room LT distribution panels. Each of the two circuits shall have phase indication lamps, Voltmeter, Ammeter, and 200 A MCCB to isolate all three phases and neutral (4 pole).
- Nameplates and Labels for each vertical section and a directory frame with cards (with transparent cover) shall be provided.

6. LT Input and Distribution Panels (meant for server rooms)

- Distribution boards shall be of totally enclosed dead front safety type and surface mounted. The enclosures shall be made of the best quality sheet steel of not less than 2 mm. Distribution boards shall be suitable for 415 volts, 3 phase A.C. supply of 230 volts single phase A.C. supply as required. Distribution board shall generally conform IS: 2675 or BS: 214.
- Suitable bus bars made of high conductivity, High Electrolytic grade, and Solid copper and mounted on non-hydroscopic insulating supports shall be provided. Separate earth line will be provided. Suitable insulating barrier made of arc resistant material shall be provided for phase separation. Ends of the bus structures shall also be shrouded.
- Distribution boards shall be provided with a terminal block of adequate size to receive mains and outgoing circuits. A neutral link having rating equal to that phase bus shall be provided.
- The distribution boards shall comprise of one MCCB (200 Amp) as incoming and 24 no 16 A / 32 A double pole MCB (8 for each phase) as out goings. The distribution board shall be provided with suitable earthing lug.
- Distribution boards shall be provided with a directory indicating the area or loads served by each MCB, the rating of breakers, size of conductors, etc. The directory shall be mounted in metal holder with a clear plastic sheet on inside surface of the front door.
- In addition to LT distribution board for distributing the output of UPS the vendor has to supply suitable input distribution board for extending AC supply to UPS .This shall at least comprise of MCCB (200 Amp) and MCBs of 63A – 4 nos. and 32 A – 4 nos.

Note : Any item not mentioned in the BOQ but required for complete installation , commissioning & operation of UPS shall be indicated and quoted by the bidder.

Specifications of 1KVA UPS - Online

S#	Features	1 KVA
	Technology	IGBT based Double Conversion True On-line UPS
1	Output Parameters	
	Output Power Capacity	1000VA
	Power Factor	0.8
	Nominal Output Voltage	230V +/- 1%
	Peak Efficiency	> 87%
	Output Frequency	50Hz ± 0.5Hz
	Output Voltage Distortion	Less than 3%
	Crest Factor	> 3:1
	Wave Type	Sine Wave
2	Input Parameters	
	Nominal Input Voltage	230V
	Input Frequency	50/60 Hz +/- 5 Hz (auto sensing)
	Input voltage range for main operations	175 - 275V
	Input Power Factor	0.9
3	Communications & Management	
	Interface Port(s)	RS 232 Server & Client
	Ethernet port	1 no Pre-Installed
	Remote Monitoring	Web Based
4	General	
	Control Panel	Information for Load / Battery / Input / Output and Operating Mode
	Audible Alarm	(a) low battery (b) overload continuous tone alarm (c) Mains Failure (d) Over Temperature
	Emergency Power Off	Yes
	Cold Start	UPS should start even without mains
5	Battery Parameter	
	Battery Type	Maintenance Free Sealed Lead Acid Battery
	Back Up Time	5 Hrs. at Full Load
	Accessories	Battery breaker, battery to UPS cable and battery stand base frame
	Protection	<ul style="list-style-type: none"> ▪ Deep discharge, self discharge, over charge, over temperature ▪ Overload, Short Circuit, Over DC Voltage, AC-source over voltages
6	Environmental	
	Operating Temperature	0 - 50 °C
	Operating Humidity	0 - 95%
	Audible noise at 1 meter from surface of unit	< 55 dB
7	ISO	ISO 9001

SPECIFICATIONS OF 25 KVA UPS

Ser No	Features	Requirement	
	Technology	IGBT based Double Conversion True On-line UPS	
1	Output Parameters		
	Output Power Capacity	20 kW / 25 kVA	
	Load Power Factor	0.8 lagging	
	Nominal Output Voltage	400 V + /- 1%	
	Peak Efficiency	> 90%	
	Output Frequency	50 Hz + /- 0.1%	
	Output Voltage Distortion	Less than 3%	
	Crest Factor	> 3:1	
	Wave Type	Pure Sine Wave	
	Overload	110% for 60 min, 125% for 10 min, 150% for 60 sec	
2	Input		
	Nominal Input Voltage	400V 3PH	
	Input Frequency	45 – 55 Hz (auto sensing)	
	Input voltage range for main operations	340 to 460 V	
	Input Power Factor	0.9	
3	Communications & Management		
	Interface Port(s)	RS 232 Server and Client	
	Ethernet port	1 no Pre-Installed	
	Remote Monitoring	Web Based	
4	General		
	Display	Multi-function LCD status Display for (a) Input voltage, current (b) Output Voltage, current, frequency (c) Active and Reactive Power (d) Remaining battery backup time (e) Charge / discharge current	
	Audible Alarm	(a) low battery (b) overload continuous tone alarm (c) Mains Failure (d) Over Temperature (e) UPS failure (f) Load on bypass	
	Emergency Power Off	Yes	
	Cold Start	UPS should start even without mains	
	5	Battery Parameter	
		Battery Type	Maintenance Free Sealed Lead Acid Battery
Back Up Time		5 Hrs.	
	Accessories	Battery breaker, battery to UPS cable and battery stand base frame	
6	Protection	<ul style="list-style-type: none"> ▪ Deep discharge, self discharge, over charge, over temperature ▪ Overload, Short Circuit, Over DC Voltage, AC-source over voltages 	
	7	Environmental	
Operating Environment		0 - 40 °C	
Operating Relative Humidity		0 - 95%	
	Audible noise at 1 meter from surface of unit	< 55 dB	
7	ISO	ISO 9001	

SPECIFICATIONS OF 650 VA UPS – Offline

Ser No	Features	Requirement
	Technology	PWM based Line-interactive with AVR
1	Output Parameters	
	Output Power Capacity	650VA
	Nominal Output Voltage	Mains: 230 V \pm 10% & freq (sync with main) Battery : 230 V \pm 5% & 50 Hz \pm 1%
2	Input Parameters	
	Nominal Input Voltage	230V +/- 20%
	Input Frequency	50 Hz +/- 5%
3	Communications & Management	
	Interface Port(s)	RS 232 Server & Client
4	General	
	Control Panel	Mains On, Inverter On, Over Load, Battery Low
	Audible Alarm	Main Fail, Over Load & Battery Low
	Cold Start	UPS should start even without mains
5	Battery Parameter	
	Battery Type	Maintenance Free Sealed Lead Acid Battery
	Back Up Time	20 min at 250 watt
	Protection	<ul style="list-style-type: none"> ▪ Mains Low & High Voltage Cut-off, Over Load Cut-off, & Short Circuit Protector ▪ Spike & Surge Suppressor
6	Environmental	
	Operating Environment	0 – 40 °C
	Operating Relative Humidity	0 – 90%
	Audible noise at 1 meter from surface of unit	< 50dB
7	ISO	ISO 9001

SPECIFICATIONS OF 1 KVA UPS - OFFLINE

Ser No	Features	Requirement
	Technology	PWM based Line-interactive with AVR
1	Output Parameters	
	Output Power Capacity	1000VA or more / 900 watt
	Nominal Output Voltage	Mains: 230 V \pm 10% & freq (sync with main) Battery : 230 V \pm 5% & 50 Hz \pm 1%
2	Input Parameters	
	Nominal Input Voltage	230V +/- 20%
	Input Frequency	50 Hz +/- 5%
3	Communications & Management	
	Interface Port(s)	RS 232 Server & Client
4	General	
	Control Panel	Mains On, Inverter On, Over Load, Battery Low
	Audible Alarm	Main Fail, Over Load & Battery Low
	Cold Start	UPS should start even without mains
5	Battery Parameter	
	Battery Type	Maintenance Free Sealed Lead Acid Battery
	Back Up Time	20 min at 850 watt load
	Protection	<ul style="list-style-type: none"> ▪ Mains Low & High Voltage Cut-off, Over Load Cut-off, & Short Circuit Protector ▪ Spike & Surge Suppressor

6	Environmental	
	Operating Environment	0 - 40 °C
	Operating Relative Humidity	0 - 90%
	Audible noise at 1 meter from surface of unit	< 50 dB
7	ISO	ISO 9001

SPECIFICATION OF CABLES AND INCOMING PANEL - UPS

1. Cable Specs

For cables of current ratings more than 16 Amp, cables shall be multi-core, armoured / unarmoured, PVC insulated and PVC sheathed / XLPE Copper Power Cable of 1.1 KV grade. Suitable size and no of brass compression on gland and Aluminium lugs etc are to be provided.

For LT cables of rating less than 16 amp, cables shall be made of electrolytic grade, plain, multi stranded, annealed copper conductor as per IS: 8130 – 1984. Cables shall have flame retardant PVC compound insulation.

2. UPS Incoming Panels

Panels shall be metal clad, totally enclosed, rigid, floor mounting, air insulated, cubical type for use on 415 volts, 3 phase, 4 Wire 50 cycles system. The equipment shall be designed for operation in high ambient temperature and high humidity tropical atmospheric conditions. All panels shall have enclosure protection of minimum IP-51/ NEMA-12. Panel shall be made up of the requisite vertical section. Cable chambers, bus bars, input from UPS, outgoing feeders, bus bar, etc shall be provisioned in vertical section.

- Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable glands and terminals such that cables can be easily and safely terminated.
- There shall be one incoming circuit from electrical mains. Incoming circuit shall have phase indication lamps, Voltmeter, Ammeter, and 200 A MCCB to isolate all three phases and neutral (4 pole).
- There shall be 4 no output circuit path for input to each UPS having 50 A MCCB for isolation.
- The bus bars shall be color coded, air insulated and made of high conductivity, Electrolytic grade high strength copper alloy complying with the requirement of grade E91E of IS 5082. The main phase bus bars shall have continuous current rating throughout the length of each power control panel, and the neutral bus bars shall have a continuous rating of at least 100% of the phase bus bars.
- Nameplates and Labels for each vertical section and a directory frame with cards (with transparent cover) shall be provided.

- END OF SECTION 6 -

Clarification to Queries received on Tender No TCIL/15/1185/II/10-MM/08E dated 11.05.2011 for Supply of Power Plant Comprising of Rectifier, Battery & UPS for Modernization, Expansion of Network and the Infrastructures of Sierratel

Sl. No	section# / page#)	Content of RFP requiring Clarification	Points of clarification required	TCIL's Reply
		<u>1KVA Online UPS</u>		
1	40	1KVA Online UPS: Nominal Output Voltage 230V +/-1%	It should be removed as output voltage 230V +/-2%	Accepted. Nominal Output Voltage 230V +/-2%
2	40	Operating Temperature 0 to 50 deg C	It should read as operating temperature 0 to 40 deg C as most of the digital circuits & microprocessor are designed to operate at 40 deg C . Operating at 50 deg C shortens the life of the microprocessors	Accepted. Operating temperature is amended to 0-40 deg C.
3	40		Can we offer the 1 KVA Online UPS with Power Factor 0.7 instead of 0.8?.	No change
4	40		Can we offer the 1 KVA Online UPS with Peak Efficiency >85% instead of 87%?.	Accepted. Peak Efficiency >85%
5	40		Our System support input frequency 50/60 Hz \pm 4 Hz instead of \pm 5 Hz.	No change

Sl. No	section# / page#)	Content of RFP requiring Clarification	Points of clarification required	TCIL's Reply
6	40		Ethernet port for communication is mandatory?	Cost of Ethernet port is to be given separately. This would be used in evaluation but TCIL reserves the right to place the order.
7	40		Our system does not support for audible alarm for Over Temperature.	Accepted. Over temperature alarm can also be in form of visual indication.
8	40		Can we offer the system without emergency power off switch as we have already providing MCB for Battery Disconnection? Normally this feature is provided in higher capacity UPS	Accepted.
9	40		Our system support 0 to 45 Deg C Operating Temperature and the requirement of tender is 0 to 50 Deg C.	Operating temperature is amended to 0-40 deg C.
10	42	<u>650VA Offline UPS</u>	It should read as 650/600VA offline UPS	No change
11	42	20 min at 250 W load	It should read as 20 min at 250VA load	Requirement amended as "20 min at 200 W load".
12	42	20 min at 250 W load	Can we offer 650 VA UPS at 250W with 12 min backup?	No change
13		<u>1KVA offline UPS</u>		
14	42	1000VA/900W	It should read as 1000VA/800W online UPS as none of the line interactive UPS are designed to operate generally at 0.6 power factor	No change

Sl. No	section# / page#)	Content of RFP requiring Clarification	Points of clarification required	TCIL's Reply
15	42		Our system supports 840W load. Please confirm can we offer the system instead of 850W?	No change
16		25 KVA Online UPS:		
17	41		Can we offer Modular UPS with Two Battery Bank for 5 Hrs backup?.	Modular UPS can also be quoted provided each module is of minimum 25 KVA. There shall be individual battery bank for each module giving 5 hours backup at 25 KVA.
18	41		Please confirm if the deliveries would happen in India	Material needs to be delivered in Freetown, Sierra Leone. PI refer clause 4.1 of Special conditions and Note at the end of Section 5.
19	29		Please confirm who shall take care of the installations of UPS & Power plants	Please refer Item 4 of BILL OF QUANTITY & PRICE BID SCHEDULE at page 29 of tender document.
20	GCC Clause 3.7	GCC Warranty Terms	Whether Bidder should depute engineer in case if required, if so, kindly advice whether we should quote those charges please.	No change. It is upto the bidder to make arrangements for providing warranty.
21	GCC Clause 3.20	GCC Additional Order	Kindly Advice upto what time period this clause is varied, as battery prices are highly volatile due to LME Lead price changes.	No change. TCIL shall exercise this right up to the end of warranty period as defined in Section – 4 of the Tender Document.
22			Services : Bidders are advised to quote for cost of engineer at Sierra Leone a. Kindly advice whether the visa and travel charges will be borne by TCIL /Bidder	Clarified vide corrigendum #1 dated 26.05.2011

Sl. No	section# / page#)	Content of RFP requiring Clarification	Points of clarification required	TCIL's Reply
			b. Whether Accommodation and Boarding charges will be borne by TCIL /Bidder	
23			What would be the minimum number of days required for Engineer to be at Sierra Leone	Clarified vide corrigendum #1 dated 26.05.2011
24			Bidders are advised to quote CIF prices . We understand that TCIL will take care of customs clearance at Sierra Leone , kindly advice.	Clarified vide corrigendum #1 dated 26.05.2011
25	Item 3.1.1 of BILL OF QUANTITY & PRICE BID SCHEDULE	Installation Accessories (Earthing Cable , Electrical cabling from UPS to LT panel etc. as required for complete installation)	Kindly Provide the length of cables	<ul style="list-style-type: none"> ▪ UPS Distribution Panel - 1 No ▪ LT Distribution panel for server rooms - 2 No ▪ Incoming Panel for input to UPS - 1 No ▪ Armoured Power Cable 200 Amp (120 sq mm), 3-1/2 core - 40 mts (from DG Set to incoming panel) ▪ Unarmoured Power Cable 50 Amp (16 sq mm), 3-1/2 core - 50 mts (from incoming panel to each of 5 no UPS) ▪ Unarmoured Power Cable 50 Amp (16 sq mm), 3-1/2 core - 50 mts (from each UPS to UPS distribution Panel) ▪ Unarmoured Power Cable 200 Amp (120 sq mm), 3-1/2 core - 160 mts (from UPS distribution Panel to LT Distribution panel) ▪ Unarmoured Power Cable 35 Amp (10 sq mm) , 2 core - 600 mts (LT Distribution panel to server racks)

Sl. No	section# / page#)	Content of RFP requiring Clarification	Points of clarification required	TCIL's Reply
				<ul style="list-style-type: none"> ▪ Unarmoured Power Cable 20 Amp (6 sq mm), 2 core - 600 mts (LT Distribution panel to server racks) ▪ Glands and Lugs – As per above ▪ Battery Racks and mounting Hardware – As per design of bidder ▪ Cables from UPS to Battery – As per design of bidder
26	Item 3.2.1 of BILL OF QUANTITY & PRICE BID SCHEDULE	Installation Accessories (Earthing Cable , Electrical cabling from UPS to LT panel etc. as required for complete installation)	Kindly Provide the length of cables for 1 KVA Online UPS.	<ul style="list-style-type: none"> ▪ Flexible Copper conductor cable 6 amp (2.5 Sq mm), 3 core – 800 mts for all UPSes. ▪ Battery Rack and mounting Hardware – As per design of bidder
27	Item 3.3.1 and 3.4.1 of BILL OF QUANTITY & PRICE BID SCHEDULE	Installation Accessories (Earthing Cable , Electrical cabling from UPS to LT panel etc. as required for complete installation)	Kindly Provide the length of cables for 1 KVA Offline and 650 offline UPS.	3 meters Cord for connecting the UPS to mains for each offline UPS.
28	SCC Clause 4.7	Warranty shall be 30 months from dt of B/L	Design life of 12 V UPS batteries is 3-4 years, hence seeking advice on warranty of 30 months on same.	25 KVA UPS batteries shall be 2 V VRLA and for UPS < 2 KVA, it shall be 12 V SMF.

