



Federal Board of Revenue
Revenue Division – Government of Pakistan

Addendum No. 02

to

Request for Bids

Goods

(Single Stage Two-Envelope Bidding Process)

**Establishment of Data Center Infrastructure at Islamabad
and Lahore**

(Supply and Installation along with related services)

Country:	Pakistan
Project Name:	Pakistan Raises Revenue Program
Implementing Agency:	Federal Board of Revenue (FBR)
Loan No:	Credit No. 6435-PK
Project ID No:	P165982
RFB No.	1(7)Addl.Dir(P&F)/PO/2023
STEP Ref. No	Activity No. (PK-FBR-402370-GO-RFB)
Date Issued	26th March, 2024

Sr #	Section	Section No /Page No	Initial Requirements/ Specifications of the RFB	Revised Requirements/ Specifications of the RFB
01	Section III - Evaluation and Qualification Criteria of the Published RFB	Qualification Criteria (ITB 32.1) para (a) Page 50 of RFB	<p><u>Existing Text</u></p> <p>Financial Capability: The Bidder shall submit audited Financial Statements, if not required by the law of the Bidder's country, other financial statements acceptable to the Purchaser, of the last five (05) years (2018, 2019, 2020, 2021, 2022) demonstrating the financial capacity of the bidder sufficient to complete the contract satisfactorily. These financial statements must include balance sheets, profit and loss accounts, assets and liabilities, investments and availability of financial resources to manage the contract. For a joint venture, this requirement shall be met by each member</p>	<p><u>Updated Text</u></p> <p>Financial Capability: Financial Capability: The Bidder shall submit audited Financial Statements, if not required by the law of the Bidder's country, other financial statements acceptable to the Purchaser, of the last five (05) years (2019, 2020, 2021, 2022, 2023) demonstrating the financial capacity of the bidder sufficient to complete the contract satisfactorily. These financial statements must include balance sheets, profit and loss accounts, assets and liabilities, investments and availability of financial resources to manage the contract. For a joint venture, these requirements shall be met by each member separately.</p>

Sr #	Section	Section No /Page No	Initial Requirements/ Specifications of the RFB	Revised Requirements/ Specifications of the RFB
02	Section III - Evaluation and Qualification Criteria of the Published RFB	Qualification Criteria (ITB 32.1) para (b) Page 50 of RFB	<p><u>Existing Text</u></p> <p>Specific Experience: The Bidder shall demonstrate that it has successfully completed at least two <i>contracts</i> within the last five years prior to bid submission deadline, each with a value of at least \$ 2 million equivalent in PKR; with a minimum of 10 racks per contract of Data Center that have been successfully and substantially completed and that are similar in nature and complexity to the Goods and Related Services under the Contract. For a joint venture, this requirement may be met by all members combined.</p>	<p><u>Updated Text</u></p> <p>Specific Experience: The Bidder shall demonstrate that it has successfully and substantially completed at least three contracts within the last seven (07) years, with a minimum of 10 racks per contract of Data Center. Of this one project contract should be of at least 2 million USD equivalent in PKR it should be similar in nature and complexity to the Goods and Related Services under the Contract. For a joint venture, this requirement may be met by all members combined.</p> <p>Additionally, please note that both civil works contractors and furniture suppliers cannot qualify as JV partners. The procurement is for data center build and civil contractors and furniture suppliers can only participate as sub-contractors and not JV members.</p>
03	Section II - Bid Data Sheet (BDS)	ITB 18.1 Of Published RFB and subsequent Corrigendum Issued on 12 th March, 2024	Bid Validity Period: 1 st August 2024	Bid Validity Period: 16 th August 2024
04	Section II - Bid Data Sheet (BDS)	ITB 22.1 Of Published RFB and subsequent Corrigendum Issued on 12 th March, 2024	Deadline for Submission of Bids: 2 nd April, 2024 at 1100 hours PST	Deadline for Submission of Bids: 17 th April, 2024 at 1100 hours PST
05	Section II - Bid Data Sheet (BDS)	ITB 25.1 Of Published RFB and subsequent Corrigendum Issued on 12 th March, 2024	Public Opening of Technical Parts of Bids: 2 nd April, 2024 Immediately after the deadline for submission of Bids.	Public Opening of Technical Parts of Bids: 17 th April, 2024 Immediately after the deadline for submission of Bids.
06	Section II - Bid Data Sheet (BDS) of Published RFB.	ITB 32.4	Existing Evaluation Table Evaluation of Technical Parts of Bids Scoring Table.	Existing Evaluation Table Evaluation of Technical Parts of Bids Scoring Table stands Deleted.

Sr #	Section	Section No /Page No	Initial Requirements/ Specifications of the RFB	Revised Requirements/ Specifications of the RFB
07	Section II – Bid Data Sheet of the Published RFB	Evaluation of Combined Technical and Financial Parts and Most Advantageous Bid (ITB 40.1)	Existing Text The weight for cost is: 70 %	Updated Text <ul style="list-style-type: none"> The weight for cost is: 100%
08	Section VII - Schedule of Requirements Page 126 & 191	Applicable Standards & Codes	<p>Existing Text</p> <p>The Diesel engine and generator shall conform to the following standards as applicable.</p> <p>BS 5514 - Reciprocating Internal Combustion Engine.</p> <p>BS 4999 - General Requirements for Rotating Electrical Machines.</p> <p>BS 5000-99 - Rotating Electrical Machines of particular types.</p> <p>For other equipment and materials related to the Diesel generator set, the Supplier shall follow relevant international standards, details of which shall be submitted to PURCHASER for approval.</p>	<p>Updated Text</p> <p>The Diesel engine and generator shall conform to the following standards as applicable.</p> <p>BS 5514 - Reciprocating Internal Combustion Engine.</p> <p>BS 4999 - General Requirements for Rotating Electrical Machines.</p> <p>BS 5000-99 - Rotating Electrical Machines of particular types.</p> <p>EN ISO 8528-13, EN 60034-1, EN 61000-6-1, EN61000-6-2, EN 61000-6-3, EN 55011, EN 1679-1 ET EN 60204-1 Machinery Directive 2006/42 EC</p> <p>EMC Directive 2014/30/UE Safety Objectives set out in the low voltage directive 2014/35/UE, Manufacturing Facilities certified to standards ISO 9001:2015 & ISO 14001:2015.</p> <p>For other equipment and materials related to the Diesel generator set, the Supplier shall follow relevant international standards, details of which shall be submitted to PURCHASER for approval.</p>

Sr #	Section	Section No /Page No	Initial Requirements/ Specifications of the RFB	Revised Requirements/ Specifications of the RFB
09	Section IX – Special Conditions of Contract of the Published RFB	GCC 16.1 page 278	<p><u>Existing Text</u></p> <p>Payment Terms:</p> <p>Ten (10) percent of the Contract Price shall be paid within thirty (30) days of signing of the Contract, and upon submission of claim and a bank guarantee for equivalent amount valid until the Goods are delivered and in the form provided in the bidding document or another form acceptable to the Purchaser.</p> <p>Fifty (50) percent on Data Centre execution on prorated basis</p> <p>Thirty (30) % Operational Acceptance</p> <p>Ten (10) % on quarterly basis in advance for SLA</p>	<p><u>Updated Text</u></p> <p>Payment Terms:</p> <p>Ten (10) percent of the Contract Price shall be paid within thirty (30) days of signing of the Contract, and upon submission of claim and a bank guarantee for equivalent amount valid until the Goods are delivered and in the form provided in the bidding document or another form acceptable to the Purchaser.</p> <p>Fifty (50) percent on Data Centre execution on prorated basis (In case 10% of Advance facility is not availed then this portion will be 60%)</p> <p>Forty (40) % on Final Acceptance Certificate</p>
10	Section VII - Schedule of Requirements, of the <u>published RFB</u>	Technical Specification – Page 94	<p><u>Existing Text</u></p> <p>Trainings & Product inspection</p> <ul style="list-style-type: none"> • Pre shipment inspection and training of critical physical infrastructure (Cooling, UPS, PDU, DCIM etc.) at factory and international training center. (Total 2 persons) • Pre shipment inspection of Diesel Generators at the manufacturing facility. (Total 2 person) • Local training + certification for CDCP for 3 Persons • Local training + certification for CDFOS for 3 persons • Local training + certification for CDFOM for 2 persons 	<p><u>Updated Text</u></p> <p>Trainings & Product inspection</p> <ul style="list-style-type: none"> • Inspection, testing and training of critical physical infrastructure (Cooling, UPS, Genset, PDU, Containment etc.) at factory /OEM certified facility. (Total 2 persons) • Training + certification for CDCP for 3 Persons • Training + certification for CDFOS for 3 persons • Training + certification for CDFOM for 2 persons
11	Section VII - Schedule of Requirements, of the published RFB	Technical Specification – Page 98	<p><u>Existing Text</u></p> <p>IT -Racks Physical Specifications External Height 1991mm</p>	<p><u>Updated Text</u></p> <p>IT -Racks Physical Specifications External Height 1991mm-2000mm</p>

Sr #	Section	Section No /Page No	Initial Requirements/ Specifications of the RFB	Revised Requirements/ Specifications of the RFB
12	Section VII - Schedule of Requirements, of the published RFB	Technical Specification – Page 100 & 164	Existing Text Hot / Cold Aisle Containment System Ceiling Panels Minimum Light Transmission 85% or greater.	Updated Text Hot / Cold Aisle Containment System Ceiling Panels Minimum Light Transmission 82-85%

This Addendum including Annexure forms an integral part of the Request for Bids and shall be read and executed so. All other terms and conditions and specifications of the RFB remain unchanged until and unless an addendum is issued separately. Drawings are there for reference purpose. Bids would be submitted in light of the bidding document and subsequent addendums.

(Kashif Younas)
Additional Director
(Procurement & Finance), PRRP
Ph: 051 921 5109

Section VII - Schedule of Requirements

3. Technical Specifications

2. General Scope of work

Operation and Maintenance phase

- Maintain the complete systems/Data Center facility (including Furniture/Civil work) with a defined (Warranties and maintenance support agreement) for 5 Five years.
- Bidder will also arrange multiple training programs consist on operation and maintenance skills of installed equipment.

The bidder shall carefully go through BOQs, Specifications, drawing/layouts, site conditions to determine complete requirement and to propose complete integrated solution. The bidder should also perform comprehensive site survey to get familiarized with site conditions and propose solution accordingly

Warranties & Maintenance Support

Following are requirements for warranty and support services apply to this RFB for this project. The selected Bidder shall be responsible for provisioning of comprehensive parts warranty of the following equipment and shall have a 24/7 call out facility.

Selected Bidder shall provide onsite Warranty/Services for the DC equipment & infrastructure, and Bidder shall ensure that DC solution and its parts supply to FBR offices at (Islamabad & Lahore) are new (non-refurbished and not reaching end of life in next 5-years and ensure the parts availability for next three years) and free from any sort of defects for the warranty period.

- Comprehensive Warranty/ services must be provided as per warranty period mentioned against each product.
- Preventive maintenance in the respect of system and its auxiliaries, (from inside and outside), of all deployed active components and allied accessories of the Data center.
- It will be the responsibility of the selected contractor to deploy the equipment related firmware, all applicable licenses and any IOS patch as an when released/upgrade (including licenses, if any) by product principle during warranty period without any additional Cost.
- Contactor will be responsible for maintaining the after sales support and ensure the uptime of all the equipment on sites. In case of fault in equipment, the bidders are required to provide the Backup equipment of equal capacity and ensure the service quality as per time mention in below table.
- Violation: Breach of agreement against activities will be considered as one violation and in case for further delay every subsequent interval equal maximum resolution time will be count as double of previous violation.

Level	Event	Description	Response time	Maximum time for resolution
L1	Severe	Complete Outage of Service / appliance due to malfunctioning of hardware components or software components, firmware, patch cords etc.	30 min	4 Hour
L2	Critical	Partial Outage of service / appliance due to malfunctioning of hardware components or software components, firmware, patch cords, spare parts etc.	One Hour	8 Hour
L3	High	Delay in commissioning of advance services / patches deployment / IOS up gradation / new configuration etc.	2 hours	2 days

L4	Moderate	Tagging, reports submission, delay in preventive maintenance etc. delay in deployment of new upcoming version and patches etc.	as per listed activities	as per listed activities
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Civil & Ancillary Work

1. The defect liability period for the Civil and ancillary work is 2 years effective from the date of sign-off the Project.
2. During the defect liability period, all necessary Civil and ancillary work must be carried out as and when required without additional Cost to the purchaser.

1. Section III - Evaluation and Qualification Criteria

Technical Evaluation (ITB 32.4)

Assessment of adequacy of Technical Part with the requirements, shall be made as follows, in accordance with BDS ITB 32.4:

Mandatory Qualification Criteria:

To be eligible for technical evaluation, it is required that the bidder meets the mandatory qualification criteria. Documents relating to mandatory qualification criteria must be included in the envelop in which technical bid is submitted. Failure to do so will result in disqualification. Submission of the required proof as outlined below is a mandatory component of the technical bid.

Sr. No.	Attributes	Criteria	Documentary proof Required (Please mention Reference Page #)
1	Organization Experience	The Bidder should be registered in similar business for the last ten years.	Copy of Certificate(s) of incorporation
2	Partnership Level	Must be Tier-1/ Highest level partnership by the OEM for data center critical physical infrastructure	Certificate of OEM showing the partnership level of the bidder
3	Product Compatibility	Bidder will ensure product compatibility, for solution being offered for major components (UPS, Power Distribution units, Rack and rack PDU, EMS, Precision cooling, DCIM D.G. Set & Row containment) and all allied infrastructure components.	Documentarily verifiable evidence to be submitted with bid

Technical Qualification Criteria:

Only bidders who meet the mandatory evaluation criteria will be further evaluated on the basis of their Items marked as M fall under the "mandatory criteria." In case of non-compliance or deviation, the bid shall be rejected on technical grounds.

Items marked as C fall under the category in which the bidder must make compliance as well. However, partial compliance or minor deviation may be accepted. In case of omission or major deviation, the bid shall be rejected on technical grounds.

The bidders must ensure that the offered solution is compliant as per TIA-942B Rated-III design. Purchaser reserves the right to reject bids that are found to be incomplete in any aspect.

Note: *The quantities of BOQ will prevail, in case variance/conflict of quantities/item with the uploaded design diagrams/SLDs.*

Sr · N o.	Attributes	Criteria	Documentary Proof
1	Specification and Deliverables Compliance (RTO-Islamabad)	Compliant	BOQ Compliance statement/Product Literature/brochure/Project Plan/SLA
		Partial compliant	
		Non-Compliant	
2	Specification and Deliverables Compliance (DOT-Lahore)	Compliant	BOQ Compliance statement/Product Literature/brochure/Project Plan/SLA
		Partial compliant	
		Non-Compliant	
3	i) Project References. ii) OEM local presence for support and parts availability.	At least 03 similar project references with complete scope, such as UPS, cooling, DCIM for Modular datacenter project.	Documentary evidences are required.
		Two (02) parts exchange center /warehouse by OEM in Lahore & Islamabad	
4	Product Compatibility	Solution major components (UPS, Power Distribution units, Rack & Rack PDU, EMS, Precision cooling, DCIM & Row containment) must be compatible with each other.	Letter from the OEM confirming that the overall solution fulfills the compatibility requirement.
5	Rated/Tier-III Compliance design(RTO Islamabad)	Compliance details for attaining Rated-III/Tier-III Certificate including High-Level & Low-Level Design.	The relevant document required to demonstrate design details.
6	Rated/Tier-III Compliance design(DOT Lahore)	Compliance details for attaining Rated-3/Tier-III Certificate including High-Level & Low-Level Design.	The relevant document required

			to demonstrate design details.																
7	Experience	The Bidder Should have deployed at least 01 Rated-3/Tier-III compliant Datacenter with similar scope	Documentary evidences are required.																
8	Civil Works Sub-Contractor or	<p>Civil work design and material proposed by the bidder must be certified and executed by a registered C4 firm Category of PEC with specialization codes C6, CE09, or CE10 or equivalent</p> <p>Sub-contractor/ JV partner for civil work must have completed at least two data center related civil or refurbishment projects of similar scale and scope in last 10 years</p> <p>Sub-contractor/ JV partner for civil work must have ISO Certification or equivalent in Quality Management, environment and occupational health and safety system</p>	<p>PEC registration certificate and ISO Certification</p> <p>Relevant documents related to experience.</p>																
9	Staff competence and relevance to the work	<table><tr><td>ATD / CDCS/ CDCE</td><td>1</td></tr><tr><td>CDCP/ CDFOS</td><td>2</td></tr><tr><td>OEM certified resource</td><td>2</td></tr><tr><td>PMP Certified</td><td>1</td></tr><tr><td>Civil Engineer</td><td>1</td></tr><tr><td>Architectural Engineer</td><td>1</td></tr><tr><td>PEC Certified Electrical Engineers or equivalent</td><td>3</td></tr><tr><td>PEC Certified Mechanical Engineer or equivalent</td><td>2</td></tr></table>	ATD / CDCS/ CDCE	1	CDCP/ CDFOS	2	OEM certified resource	2	PMP Certified	1	Civil Engineer	1	Architectural Engineer	1	PEC Certified Electrical Engineers or equivalent	3	PEC Certified Mechanical Engineer or equivalent	2	Resume of team members must be provided
ATD / CDCS/ CDCE	1																		
CDCP/ CDFOS	2																		
OEM certified resource	2																		
PMP Certified	1																		
Civil Engineer	1																		
Architectural Engineer	1																		
PEC Certified Electrical Engineers or equivalent	3																		
PEC Certified Mechanical Engineer or equivalent	2																		

TECHNICAL PART

2. Qualification

Qualification Criteria (ITB 32.1)

The Purchaser shall assess each Bid in accordance with the Evaluation and Qualification Criteria given as under:

DETAILED COMPLIANCE SHEET FOR RTO ISLAMABAD SITE.

Compliance Sheet for RTO Islamabad

S. No	Required Specifications	U/M	QTY	Compliance
	Please refer to section of RFB document "Technical Specifications for RTO Islamabad" for better understanding of detailed required specifications of each item. Partial Compliance or Non-compliance to BOQ line items requiring Mandatory ("M") compliance will result in rejection of the technical proposal			
A	Core Components			
1	SERVER/COMMUNICATION RACKS & Containment			
a)	Supply of following items as per Drawings and Specifications including all accessories, complete in all respect should be from same OEM and fully compatible with DCIM Note: UPS, Inrow Cooling, DCIM , Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control and allied Infrastructure Components			
i)	EIA/TIA compliant Server Rack 600x1070mm/ 600x1100mm, 42U (Floor Mounted) for Server Room, complete with vertical and horizontal cable managers. Perforated doors, removable side panels, split rear door, EIA mounting rails, grounding/bonding kit, levelling feet, black color, IP 20, CE/UL Compliant 16+10 racks for server room, 4 racks for MMRs, 2 Racks for staging room	No.	32	M
ii)	EIA/TIA compliant Communication Rack 800x1070mm / 800x1100mm, 42U (Floor Mounted) for Telecom Room, complete with vertical and horizontal cable managers. Perforated doors, split side panels, split rear door, EIA mounting rails, grounding/bonding kit, levelling feet, black color, IP 20, CE/UL Compliant 2 racks for server room, 2 racks for MMRs	No.	4	M
iii)	OEM supplied adjustable metal shelves with same color / matching with rack	No.	36	C
iv)	1U Blanking Panel (pack of 10)	No.	540	C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
b)	Modular Fire Rated Hot Aisle Containment System for Server Room. Compatible with OEM and third-party racks. (For 20 Racks + 10 Racks)	No.	2	M
I	Automatic motorized sliding door with Proximity card based access control			C
II	Sliding Doors shall be provided with swing-open functionality in case of emergency inside the aisle			C
III	Automatic door closure system for sliding door			C
IV	Drop/revolving type resettable ceiling panels for penetration of fire suppression gas in case of a fire			C
V	LED lighting, Lumens per foot at hot aisle > 180			M
VI	Data Cables Trough/Partitions			M
VII	Aisle should be installed with the camera, temperature and humidity sensor, smoke detector, aisle lighting, infrared sensor, and reserved hole for fire extinguishing nozzles			C
VIII	The Ceiling System complies to UL484, EN 55022, EN 55024, EN 61000-3-2:2006, EN 61000-3-3:1995, EN 60950-1, CFR 47 FCC Part 15, ANSI C63.4, ICES-003, AS/NZS CISPR 22. At least 5 are mandatory			M
2	RACK POWER DISTRIBUTION UNITS			
a)	Supply of following items as per Specifications including all accessories, complete in all respect should be from same OEM and fully compatible with DCIM			
	Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control and allied Infrastructure Components			
i)	Zero U Metered & Monitored Smart Single Phase 32A Rack PDUs. C13≥ 16 and C19≥3 outlets. Should support per outlet monitoring of Energy (kWH), Real Power (W), Volts (V), Ampere (A), Volts (V), TCP IP/SNMP, EN 55022 Class A/EN 55032 , EN 55024 for CE or equivalent standard compliant	No.	52	M
ii)	Zero U Metered & Monitored Smart Single Phase 16A Rack PDUs. C13≥16 and C19≥2 outlets. Should support per outlet monitoring of Energy (kWH), Real Power (W), Volts (V), Ampere (A), Volts (V), TCP IP/SNMP, EN 55022 Class A/EN 55032 , EN 55024 for CE or equivalent standard compliant	No.	20	M
ii)	Zero U Metered & Monitored Smart Three Phase 32A Rack PDUs. C13≥16 and C19≥3 outlets. Should support per outlet monitoring of Energy (kWH), Real Power (W), Volts (V),	No.	4	M

S. No	Required Specifications	U/M	QTY	Compliance
	Ampere (A), Volts (V), TCP IP/SNMP, EN 55022 Class A/EN 55032 , EN 55024 for CE or equivalent standard compliant			
3	UNINTERRUPTIBLE POWER SUPPLY (UPS)			
a)	Supply of following UPS System as per Specifications including all accessories, complete in all respect. The proposed Make, Brand should have reference install base in Tier-III/ Rated-III Data Centers.			
	Note: UPS, InRow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			
I	Modular Hot/ Safe Swappable UPS	No.	2	C
II	3-Phase Modular UPS 25kW scalable to 250 kW			M
III	Rating : 160 kW Modular Type UPS plus one extra redundant power module			M
IV	True Online Double Conversion Pure sine wave Microcontroller based			M
V	IGBT based technology			C
VI	Input voltage : 304/485 V AC			C
VII	Input frequency : 50 Hz			M
VIII	Output voltage : 400 Volts			M
IX	Three Phase IN & Three Phase Out			M
X	Output p.f : 1			M
XI	User friendly LCD display/touch screen for real time UPS status			C
XII	Backup Time: The UPS support 30 min backup time @ 0.9PF			M
XIII	UPS RS-232/RJ-45 Integrateable with DCIM			M
XIV	Output voltage harmonic distortion: a. <3% at 100% linear load b. <3% at 100% non-linear load			C
XV	Overload capability: a. 150% for 1 minute (normal operation) b. 125% for 10 minutes (normal operation)			C
XIV	Audible noise at full load: < 75 dB			C
XV	Parallel capability for capacity and redundancy			C
XIV	Provision for external battery bank			M
XV	Battery Type: The Lithium battery shall be of LFP type			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
XIV	Batteries: Redundant and Concurrently Maintainable Battery Strings			M
XV	Battery management System: Module level monitoring and management, integrated with DCIM			M
XIV	RS-232/RJ-45 connectivity with DCIM			M
XV	Battery Design Life 10 years minimum			C
XIV	Battery Compliance: Meeting with the standards IEC60896-21/22 or BS6290-4 or approved equivalent			C
XV	The entire system complies with CE/CB/ROHS/REACH			C
XIV	The cells comply with UL1642, IEC62619, UN38.3 or equivalent and provides the certificate			C
XV	Built-in Maintenance bypass system			M
XIV	External Maintenance bypass system			M
XV	Static by-pass switch			M
XIV	Remote & local emergency power off function			C
XV	Note: UPS should be fully redundant, having no single point of failure, including Power and Control Modules			M
4	Modular Rack Based Power Distribution for UPS Output Will be placed inside containment (300mm or 600mm)			
a)	The PDU shall provide a mechanical means of complete isolation of the input source from the critical output distribution		2	M
I	The PDU shall contain the appropriate modular distribution panel within a Rack enclosure suitable for installation in a data center environment.			M
II	Factory assembled and tested			M
III	All system components are housed in a Rack			M
IV	The PDU and associated equipment shall operate in conjunction with a primary power supply to provide quality uninterrupted power for mission critical, electronic equipment load.			M
V	Input: AC Nominal Input Voltage: 400V/230V 3-phase, 3-Wire+N+G, 50/60Hz, Input Switch: MCCB			C
VI	Architecture and construct : Dual bus architecture, IP 20			C
VII	System Capacity: The PDU shall support provide 200-250 kW output			M
VIII	Testing and quality assurance: All circuit breakers shall be 100% factory tested to ensure the highest quality for the PDU. In addition, the PDU shall be tested with 100% load and all panel circuit breakers shall be 100% tested.			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
IX	Metered Data: The following data shall be available on the alphanumeric display: 1. Year, month, day, hour, minute, second of occurring events 2. Output voltage by phase 3. Branch circuit status			C
X	Web Monitoring: Remote monitoring shall be available via a web browser.			M
XI	RS232 Monitoring: Remote PDU monitoring shall be possible via RS232 serial port connection.			C
XII	Simple Network Management Protocol (SNMP) Management Card			M
XIII	A variety of Power Distribution options shall be available in the Power Distribution to serve installed rack PDUs			C
XIV	Minimum capability for cater single phase pole ≥ 40 , and three phase ≥ 10			M
5	UPS - For Facility Load			
a)	Rating : 3-Phase UPS 60 kW, 400 V, with bypass switch	No.	2	M
I	True Online Double Conversion Pure sine wave Microcontroller based.			M
II	Input voltage : 385/415 V AC, Input frequency : 50 Hz			M
III	External service bypass			M
IV	Nominal input voltage rating: 400 V 3-phase (adjustable for 380 V, and 415 V). Input voltage window: 304 V to 485			C
V	Three Phase In & Three Phase Out			M
VI	Input frequency range: 40-70 Hz.			C
VII	Input power factor: 0.99			M
VIII	Total harmonic distortion: $< 3\%$ (linear load) = 2 marks Total harmonic distortion: $> 3\%$ (linear load) = 1 mark			C
IX	Backup Time: The UPS battery shall be sized for 30mins backup @P.F 0.9			M
X	Provision for internal / external battery bank			M
XI	Batteries : VRLA/Dry Sealed Maintenance Free, Redundant and Concurrently Maintainable battery strings			C
XII	Battery Compliance: Meeting with the standards IEC60896-21/22 or BS6290-4 or approved equivalent			C
XIII	Nominal output voltage rating: 400 V 3-phase (adjustable for 380 V, and 415 V).			M
XIV	Output voltage tolerance: $\pm 2\%$ for symmetrical loads; $\pm 3\%$ for asymmetrical loads.			C

S. No	Required Specifications	U/M	QTY	Compliance
XV	Dynamic load response: +/- 5% after 2 ms; +/- 1% after 50 ms			C
XVI	Output frequency: Synchronized to mains over the range of 45-65Hz in normal operation, ± 0.5 Hz in battery operation			C
XVII	Operating Temp : 0 to 40 deg C			C
XVIII	User friendly LCD display for real time UPS status			C
XIX	Cold start of load during power failure			M
XX	Overload capability: 125% for 10 minutes (normal operation), • 125% for 1 minute (battery operation)			C
XXI	Maintenance bypass and static by-pass switch			M
XXII	Remote & local emergency power off function			C
XXIII	SNMP Management Card / Modbus Card, RS-232/RJ-45 connectivity with DCIM			M
XXIV	charging and battery testing on user defined time.			C
6	PRECISION COOLING SYSTEM			
	Supply of following items as per Specifications including all accessories, complete in all respect. The proposed Make, Brand should have reference install base in Tier-III/Rated-III Data Centers.			
	Note: Cooling Unit Net Sensible Capacities are after deduction of all tolerances and at minimum of 45 deg. C ambient condition			
	Note: UPS, InRow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control optional should be from same OEM and fully compatible with DCIM			
a)	DX Type Inrow Unit (without heater and humidifier) – 24-29KW Net Sensible Cooling Capacity	No.	5	M
	<u>Required Functionality and Features:</u>			
I	Native dual input (400V/400V)/3Ph/50Hz) or external changeover for dual input			M
II	Variable speed compressor and fans			M
III	Air Volume: ≥ 3300 -3600 CFM			M
IV	Cabinet width = 300mm			M
V	Complete CFD Analysis as per quoted cooling units			M
VI	High Return Air Temperature Capability			C
VII	The standard filters shall be 30% efficient per ASHRAE Standard 52.1 or 52.2,)			C

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S. No	Required Specifications	U/M	QTY	Compliance
VIII	Digital Scroll / Brushless VFD Scroll / DC inverter Compressors: Refrigeration system should contain a master controller for greater efficiency and accuracy.			M
IX	Fans: Variable speed DC fan with built in n+1 redundancy			C
X	The precision cooling units should be configured with built-in temperature sensors and built-in temperature & humidity sensor			M
XI	Leak detection sensing cable shall be shipped loose with the unit			M
XII	Alarms: Controller shall activate a visible and audible alarm in the occurrence of multiple events			C
XIII	The Cooling unit must be equipped with surge protection device.			C
XIV	The unit shall include a network management card, embedded inside the user interface, to provide management through a computer network through MODBUS or BACnet or TCP/IP SNMP			M
XV	Management through the network should include the ability to change set points as well as view and clear alarms			C
XVI	Group control shall automatically rotate units into standby mode based off run-hours when IT load is not high enough to require all units to be active			M
XVII	Auto sequencing of the unit for equal run time			M
b)	DX Type Inrow Unit (with heater and humidifier) – 24-29KW Net Sensible Cooling Capacity	No.	4	M
	<u>Required Functionality and Features:</u>			
I	Native dual input (400V/400V)/3Ph/50Hz) or external changeover for dual input			M
II	Variable speed compressor and fans			M
III	Air Volume: >= 3300-3600 CFM			M
IV	Cabinet width = 300mm			M
V	Humidifier capacity: 1.5-2 kg/hr.			C
VI	Reheat capacity: >=3-4 kW			C
VII	The humidifier shall be self-contained, steam generating type/ Infrared factory piped and wired, automatic solid-state control circuit			C
VIII	Complete CFD Analysis as per quoted cooling units			M
IX	High Return Air Temperature Capability			C
X	The standard filters shall be 30% efficient per ASHRAE Standard 52.1 or 52.2.)			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
XI	Digital Scroll / Brushless VFD Scroll / DC inverter Compressors: Refrigeration system should contain a master controller for greater efficiency and accuracy.			M
XII	Fans: Variable speed DC fan with built in n+1 redundancy			C
XIII	The precision cooling units should be configured with built-in temperature sensors and built-in temperature & humidity sensor, Leak sensor			M
XIV	Leak detection sensing cable shall be shipped loose with the unit			M
XV	Alarms: Controller shall activate a visible and audible alarm in the occurrence of multiple events			C
XVI	The Cooling unit must be equipped with surge protection device.			C
XVII	The unit shall include a network management card, embedded inside the user interface, to provide management through a computer network through MODBUS or BACnet or TCP/IP SNMP			M
XVIII	Management through the network should include the ability to change set points as well as view and clear alarms			C
XIX	Group control shall automatically rotate units into standby mode based off run-hours when IT load is not high enough to require all units to be active			M
XX	Auto sequencing of the unit for equal run time			M
c)	DX Type CRAC Unit (with heater and humidifier) – 20-25kW Net Sensible Cooling Capacity as per required need - For 2x Power Rooms	No.	4	M
	<u>Required Functionality and Features:</u>			
I	Native dual input (400V/400V)/3Ph/50Hz) or external changeover for dual input			M
II	Air Volume: 2400-2700 CFM			M
III	Humidifier capacity: 2-3 kg/hr.			C
IV	Reheat capacity: 3-6 kW			C
V	Electrical supply: 400 V, 50 Hz			C
VI	Air flow discharge: Front Flow			M
VII	Complete CFD Analysis as per quoted cooling units			M
VIII	High Return Air Temperature Capability			C
IX	standard filters shall have a EU4 filtering rating			C
X	Should contain a master controller for greater efficiency and accuracy.			C
XI	Suction and discharge pressures should be monitored and electronically controlled			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
XII	EC Centrifugal fans, The fans shall have high performance, very low power consumption and low noise level			C
XIII	High Energy Efficiency Ratio			C
XIV	The control system shall have a 4-7 inch touch-screen display interface			C
XV	The user interface touch screen display shall be externally mounted, password protected, and menu driven			C
XVI	provide management through a computer network through MODBUS or TCP/IP, SNMP			M
XVII	Management through the network should include the ability to change set points as well as view and clear alarms			C
XVIII	Group control shall automatically rotate units into standby mode based off run-hours when IT load is not high enough to require all units to be active			M
d)	Supply of manufacturer recommended Copper refrigerant piping in cable trays with valves, fittings, thick insulation Pipe and valve Insulation, specialties' etc. as per Specifications including all accessories, complete in all respect	Job	1	M
	Note: Supplier should verify and supply pipe sizes as per manufacturer recommendations & site conditions			M
	Supplier should prepare a piping schedule and submit to Purchaser for approval before placing order to manufacturer			M
e)	Indoor to outdoor control cabling, in cable tray, as per manufacturer specifications. Each outdoor unit should connect to respective indoor unit	Job	1	M
f)	NEMA compliant (locally manufactured) Hot dip galvanized Cable Trays for Refrigerant Piping	Job	1	M
g)	Plumbing system for humidifier water supply and condensate drain from cooling units including piping, U-traps, gate valves, solenoid valves, flow meters, flow switches, hangers etc.	Job	1	M
	Note: Drain pipe should be UPVC Sch. 40 type			M
7	ENVIRONMENTAL MONITORING SYSTEM (EMS)			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
	Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
i)	Integrated Environmental Monitoring Appliance	Job	1	M
ii)	Temperature Sensor	No.	36	M
iii)	Temperature & Humidity Sensor	No.	36	M
iv)	Water Leak Detection System (covering all potential areas of water leakages in Server room, Power Room, MMR Rooms & supporting automatic control of isolation valves/water supply incase of leak detection) Rope Cable /spot detector whichever is required at site	JOB	1	M
v)	EMS Alarm Beacon	No.	2	M
vi)	Temperature & Humidity Sensor with Display (Standalone type) 2x Server Room, 2x Power Rooms, 2x MMR	No.	6	M
vii)	Air Quality, Room Pressure, Temperature and Humidity Sensor with Electronic Corrosivity Monitor (ISA Standard) with Display. PoE and Wi-Fi support (Standalone type)	No.	2	M
8	INTEGRATED DATA CENTER INFRASTRUCTURE MANAGEMENT SYSTEM (DCIM)			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
	Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			
i)	Central DCIM Server including Controllers/Gateways (if required) and other allied equipment required to monitor, manage and integrate following systems with DCIM	No.	1	M
ii)	LV Distribution Boards (Digital Energy Analyzer and breaker status integrated with DCIM)			M
iii)	UPS, Batteries and PDU's			M
iv)	Rack PDUs			M
v)	Rack ATS			M
vi)	Access Control System			M
vii)	CCTV System			M
viii)	Environmental Monitoring System			M
	Fire Alarm and Suppression System			M
ix)	Precision Cooling Units			M
x)	Generators			M
xi)	VRF			M
b)	Licensing should be covered for all supplied and monitored equipment of project including the future deployments as per			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	full design capacity of the project. DCIM Server should have dual Power Supply to avoid single point of failure			
c)	DCIM Workstation	No.	1	M
d)	Configurable Audio Alarm System in NOC integrated with DCIM	No.	1	M
e)	Power, Communication & Control Wiring for complete DCIM system as per manufacturer recommendation in cable tray/EMT Conduit	Job	1	M
f)	Installation, testing, integration and commissioning of above items. Includes integration of DCIM with NOC, SOC Room Video Walls and Data Center Incharge LED Screens	Job	1	M
9	Fire Detection & Suppression System along with VESDA complied with requirements of NFPA 72/NFPA 75/ NFPA 2001 or Equivalent Standard			
a)	Supply of following UL/FM/VDS certified or EN 54 Listed Fire Alarm items as per Specifications including all accessories, complete in all respect. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			
i)	UL/FM/VDS/EN certified, Addressable Fire Alarm Control Panel. Fire Alarm Bell, Fire Alarm Sounder, Abort Switch, Gas Cylinder with actuator & accessories with Installation with open PVC Conduit (3/29) Cable, Sch. 40 pipe Network, Testing & Commissioning for 4 to 5 zones Complete floor including all rooms	No.	1	M
ii)	UL/FM/VDS/EN certified Supply, installation & commissioning of following Photo electronic heat and smoke detectors, low voltage, solid state, Non Radio Active type, uni-polar and chamber with LED alarm indication to be installed on RCC slab or on false ceiling	Job	1	M
iii)	Integration of Fire panel with DCIM	Job	1	M
iv)	Integration of Fire panel with cooling units	Job	1	M
v)	Integration of Fire panel with Access control system	Job	1	M
b)	Supply of UL listed, FM approved, or equivalent Automatic Novec1230 based Clean Agent Fire Suppression System @ 4.55% Design Concentration including piping, cylinders, controls, clean agent gas etc. For Server room, 2x MMR rooms, 2x power rooms and 1x staging room (Novec 1230)	Job	1	M
C)	VESDA - High Sensitivity smoke detector inclusive in all type piping, wiring, complete in all respects For Server room, 2x MMR, 2x Power Rooms, 1x Staging room	Job	1	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
d)	Personal Protective Equipment: Gas Mask, Gloves, Gum boots, Sledge hammer, flash lights, soft mask)	No.	10	M
e)	Portable Fire Extinguishers /Cylinders at designated locations at ground floor & first floor	Job	1	M
f)	Complete fire/ flame resistant paint on walls, roof as per EN-13501-1, EN 9001/2008 Server Room, MMRs, Power Rooms, Staging Room, 3x Stores	Job	1	M
10	Transformer Dry type - 630KVA			
a)	Supply Installation, testing and commissioning of 630 Kiva dry type transformers with enclosure	No.	2	M
I	Winding type = Copper			M
II	Core insulation = Cast resin			M
III	Vector group = Dyn11			C
IV	Primary Voltage =11Kv			C
V	Secondary Voltage = 415 V phase to phase, Frequency = 50 Hertz			M
VI	Impedance = 6% No Load Losses = 1650Watts Load Losses = 7600Watts HT Tapping range = $\pm 5\%$ Rated short time power frequency withstand voltage = 30Kv (RMS Peak). Rated lightening Impulse withstand voltage = 75Kv. (RMS Peak). The transformer shall be supplied with outdoor enclosure of IP65 rating. The applicable standard for dry type transformers is IEC 60076			C
b)	11Kv Protection/ Metering Panels		2	
I	Supply Installation testing and commissioning of two number 11Kv industrial metering panels and two number 11Kv Transformer Protection panels			
II	Enclosure should be fabricated from 14SWG sheet steel. After fabrication the panels should be cleaned and degreased before the application of Powder Paint			
III	Circuit Breaker rating and type = VCB, 630Ampere Three Pole			
IV	Circuit breaker shall be draw out type with rated voltage =17.5Kv, Breaking Capacity: 25KA, BIL: 36/95KV, Shunt Trip Coil: 110V DC secondary plug and socket with cover and complete bushing.			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
V	<p>CT Ratio 1000A/5A at rated 11Kv, Insulation level 36/95Kv for metering purpose, Burden 15VA, Class 5P20.</p> <p>CT Ratio 400:200A/5A at rated 11Kv, Insulation level 36/95Kv for protection purpose, Burden 15VA, Class 5P20.</p> <p>SP PT, Ratio 11000/√3 (110) V, rated 11Kv, Insulation level 36/95Kv for protection purpose, Burden 100VA, Class 0.5.</p> <p>The panel shall be provided with suitable Ammeters scale (0-1000A) class 1.5</p> <p>The panel shall be provided with Voltmeter scale (0-15Kv) and three position volt meter selection switch.</p> <p>The Industrial Metering panel shall be provided with KWH, MDI and KWH Meters.</p> <p>Clearance Phase to Phase and Phase to Earth = 160mm.</p> <p>Circuit Breaker pole to pole distance = 210mm.</p> <p>CT to CT distance from center line = 220mm (Protection) & 210mm (metering).</p> <p>PT to PT distance from center line = 245mm.</p> <p>Paint Thickness =.06mm Color =RAL7032.</p> <p>The panel shall be supplied with digital over current and earth fault relay suitable for 5A CT secondary current</p>			
11	Diesel Generator 630 kVA/500kW standby, 50Hz 1500 rpm 400 V with Factory fitted on integral Fuel tank base			
a)	Output Ratings: Genset Continuous Prime Power Rating 570 kVA or above	No.	2	
I	International renowned original brand/Manufacturer only. Supply and the manufacturing of Generators should be the same country as the original/actual OEM established in country of origin. No third party/country OEM is allowed in any case. Import documents will be required for inspection.			M
II	Factory should be established and manufacturing engines over 40 years			M
III	Engine = 6 cylinder turbo charged, water cooled			C
IV	Governor Type = Electronic			M
V	The Electronic module should be either "Deep Sea" or equivalent with all necessary protection of the Engine			C
VI	Generators should be able to configure scheduling cycle through control module for maintaining equal running hours			M
VII	Base Frame Type: Heavy Duty Fabricated Steel with Engine and alternator mounting on flexible rubber on a vibration absorbing steel frame			M
VIII	Circuit Breaker Type 3/4 Pole MCCB / ACB			C
IX	Protection Class IP 21 , Insulation Class H			C
X	Excitation System Self Excited Brushless			M
XI	Starting System of Engine: SLI/Sealed Battery & Charging System			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
XII	Protection Built in digital auto main failure (AMF)			M
XIII	Engine Speed: RPM 1500 RPM, Frequency 50 Hz			M
XIV	Fuel Tank piping to assist fuel tanker truck to reach the filling point			M
XV	Internal Fuel Tank Capacity for each Genset: should have 08-Hours or higher continuous running at 100% load			M
XVI	Engine 4 Cycle industrial diesel engine. Air cooled standard radiator. Industrial silencer, Electronics engine control system. Water pre-heater. High combustion efficiency High Fuel Efficiency. Engine control panel Electronic Governor			C
XVII	Performance: Must be G3 and verification required			M
XVIII	Engine Monitoring Coolant temperature Oil pressure			M
XIX	Imported Sound Proof Canopy Highly Corrosion Resistant Construction $\leq 75\text{dB}$ at 1 meter distance			M
XX	Excellent Access Large cable entry area for installation ease Accommodates rear mounted breaker and control panel Double doors on both sides			M
XXI	Security and Safety Lockable access doors, which give full access to control panel and breaker, Cooling fan and battery charging alternator fully guarded Fuel fill, oil fill and battery can only be reached via lockable access			M
XXII	Testing: load testing to prove the Prime Rating of the D.G Set			M
XXIII	25% of full load 2 hrs.			M
XXIV	50% of full load 5 hrs.			M
XXV	75% of full load 8 hrs.			C
XXVI	100% of full load 8 hrs.			M
XXVII	110% of full load 1 hr.			M
b)	Bulk Fuel tank shared for both generators for the storage of enough fuel for the consumption of any single D.G Set for 48hour operations at 100% load along with all required	No.	1	M
12	LOW VOLTAGE DISTRIBUTION BOARDS / SWITCHGEAR			
	Supply of following IEC Type Tested, form 3B, Free Standing Floor / Wall / Flush Mounted, totally Enclosed, Cubical type, Low Voltage Distribution Boards/Switchgear, including Incoming and Outgoing Circuit Breakers and other components as per SLD with cable terminations, incoming and outgoing cables/Bus Tie Duct from Top/Bottom as per Specifications including all accessories, complete in all respect The whole power supply system shall be Concurrent			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Maintainable in a way that any repair, maintenance, extension or retrofitting work on one path does not affect continuous operation of the second path to IT equipment and there shall be Zero Single Point of Failure in the system			
I	Note: Type testing limited to component level is not acceptable. Completely assembled DB's including components should be IEC Type Tested. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			M
II	All distribution boards shall manufacture according to the latest international standards IEC 61439-1:2011 and IEC 61439-2:2011; LV Switchgear and Control Gear Assemblies and supplied from manufacturer certified by the association of short circuit testing authorities (ASEFA).			M
III	Color Touch Screen Display is required with SLD display on Main LT Panel Door (for Breaker ON/OFF/Trip Status & energy analyzer should be installed for both main LV & MCC) the analyzer should have communication interface of appropriate protocol for integration with DCIM.			C
IV	All equipment supplied shall conform as a minimum to the following protection classes: Indoor IP.21			M
V	Bidder to share complete short circuit analysis and coordination study of the proposed system.			M
VI	Complete Single line diagram to be provided with proposal.			M
VII	Bidder to propose complete itemized & Quantified BOQ mentioning OEM and model of each proposed item.			M
VIII	Seamless integration of all the solution will be bidder responsibility.			M
IX	Phase Reversal Protection, Auto Phase correction			M
X	Main Panels shall have protection of under / Over-Voltage, Frequency, surge, Phase change			M
XI	20% space required in DBs / Panels for future provisioning			M
XII	Creepage and clearance distances must be as per IEC 61439			C
XIII	Switchboard withstands seismic vibrations (Standard EDF CRT91C11200, AS1170, EAK 2000, ENDESA 1986, RPA 99 2003, Gore GR 63, Turkish Seismic Code, GOST 17516.1-90).			C
XIV	Switchboards to comply Seismic tests are performed by an external laboratory and documents to be provided upon request without any additional cost.			C
XV	Electrical panels & components should be proposed latest of its family.			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
a)	<u>Incoming From Transformer (Type Tested, Form 3B)</u> 1250 Amps 4 Pole adjustable Air Circuit Breaker (ACB) 500-600 Volts, manual stored energy fixed mounting type with adjustable over current devices consisting of long time, short time and instantaneous magnetic short circuit protection devices having rupturing capacity not less than 65 KA at 415 V. with additional 4 copper bus bar of appropriate size for BTB connections on incoming side of ACB.	No.	2	M
I	All Breakers have energy Analyzers and LSIG enabled			M
II	SNMP/Modbus protocol enabled			M
III	integration with DCIM			M
IV	Panels shall have protection of under / Over-Voltage			M
V	Frequency, surge protection SPD			M
VI	Phase change / Phase Reversal			M
VII	Earth Leakage, Earth Fault Protection Relay (EFPR)			C
b)	<u>ATS Panels (Type Tested, Form 3B)</u> For ATS Panels ACB rating = 1250A 4P (Draw out type). Auto Manual Transfer Switch suitable for 1250 Amps 4 Pole capable to receive 2 separate supplies, ATS should be able to transfer to the 2nd supply automatically in case of failure of 1st supply. ATS should be able to transfer to 1st or 2nd supply by Manual means in case of Auto transfer system is out of order, type LKE-PC Malaysia/Equ, including cost of all necessary accessories and materials, complete in all respects.	No.	2	M
I	All Breakers have energy Analyzers and LSIG enabled			M
II	SNMP/Modbus protocol enabled			M
III	integration with DCIM			M
IV	Panels shall have protection of under / Over-Voltage			M
V	Surge protection SPD			M
VI	Phase change / Phase Reversal			M
VII	Earth Leakage, Earth Fault Protection Relay (EFPR)			C
VIII	Independent maintenance bypass panel of each ATS having adjustable ACBs of suitable rating with Electrical /mechanical interlocking,			M
IX	Auto Load switching between both Gensets on each ATS panel			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
c)	<u>LV Distribution Panels</u> 1250 Amps 4 Pole adjustable Motorized Air Circuit Breaker (ACB) 500-600 Volts, manual stored energy fixed mounting type with adjustable over current devices consisting of long time, short time and instantaneous magnetic short circuit protection devices having rupturing capacity not less than 75 KA at 415 V. with additional 4 copper bus bar of appropriate size for BTB connections on incoming side of ACB.	No.	2	M
I	All Breakers have energy Analyzers and LSIG enabled			M
II	SNMP/Modbus protocol enabled			M
III	integration with DCIM			M
IV	Panels shall have protection of under / Over-Voltage			M
V	Surge protection SPD			M
VI	Earth Leakage, Earth Fault Protection Relay (EFPR)			C
VII	Distribution			
VIII	400 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, for 160KVA UPS			M
IX	400 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, for Cooling			M
X	200 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, 60KVA facility UPS Output from this breaker will be routed through an additional DB, bidder is advised to propose DB as per requirement			M
XI	75 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, For facility Load- Non UPS Output from this breaker will be routed through an additional DB, bidder is advised to propose DB as per requirement			M
d)	Power factor improvement panel - 150KVAR			
I	Provision of indoor type Automatic Power factor Improvement Panel to be installed adjacent to Main Panel distribution panel consisting of 8x 12.5KVAR capacitors and 2x 25KVAR capacitors, suitable for 440 Volts, HRC fuses, bases and links, 12 steps automatic reactive relay digital type, "ON" indication lights, power factor meter, push buttons, auxiliary contactors, Hand - Off - Auto switch, discharging chokes, all other necessary materials	No.	2	M
e)	Detailed Electrical SLD as per Vendor proposed equipment	No.	1	M
13	BUSWAY TRUNKING DISTRIBUTION (BTB), ELECTRICAL LOW VOLTAGE CABLES , EPO			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
a)	Supply at site, installation, testing and commissioning of triple pole and neutral, insulated busway trunking distribution as per approved SLD, Made of electrolytic copper/Aluminum, including cost of M.S. sheet steel casing having louvers at sides, wire mesh, all other accessories required like tees, bends, right angle bends of original manufactured.			M
b)	Actual length of the BTB shall be measured at site by vendor before its manufacturer. BTB shall be connected on L.T side of Transformer, Gensets and Main distribution Panel and precision Cooling units from UPS distribution Panel to Racks			C
i)	1250 Amps three phase and neutral BTB from transformer 1&2 to ATS panel inclusive of all bends, Tee, Angles and installation material	Job	1	M
ii)	1250 Amps three phase and neutral BTB from Genset 1&2 to ATS panel inclusive of all bends, Tee, Angles	Job	1	M
iii)	1250 Amps three phase and neutral BTB from ATS panel-1&2 to Main distribution panel-1&2 inclusive of all bends, Tee, Angles and installation material	Job	1	M
iv)	400 Amps three phase and neutral BTB from Main distribution panel 1&2 to UPS1&2 PDM rack at server room	Job	1	M
v)	400 Amps three phase and neutral BTB from Main distribution panel 1&2 to Server Room and power room precision Cooling units including required number Tap offs/ PIUs with required rating size	Job	1	M
b)	Supply of following size of multi core / single core Cu/XLPE/LSZH ECC, armored / unarmored, 99.99% copper, 0.6 kV/1 kV grade copper cable in cable tray, ladder, raceways or underground conduits as per Specifications including all accessories, complete in all respect			M
i	Cable manufacturer should be ISO 9001 Certified, and in large scale cable manufacturing business for at least 20 years. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			M
ii	Supplier should take site measurements, prepare a cable schedule and submit a detailed specifications along with measurement to Purchaser for approval			M
c)	Single point of emergency equipment shutdown for multiple devices EPO inclusive of all allied components and wiring	Job	2	M
14	GROUNDING / EARTHING SYSTEM			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
a)	Supply of following items for complete Earthing system, including Excavation and backfilling, Bentonite chemical, other all required materials and accessories, Earthing test point, Inspection Chamber, Cad weld, boring, Telecom / Grounding Bonding Busbars, labor, tools, transportation etc. as per Specifications including all accessories, complete in all respects BS 7430 - Code of practice for Earthing BS 951 - Electrical Earthing. Clamps for Earthing and bonding specifications BS 6346 - PVC insulated cables	JOB	1	M
	Earth resistance not more than 1 ohm.			M
	Independent Earth pits for all type of equipment which included but not limited as below,			C
i)	Transformers			M
ii)	Generators			M
iii)	independent Power panels			M
iv)	UPS			M
v)	IT Racks			M
vi)	VRF			M
b)	Copper connecting points, copper test link, man hole for Earthing, testing complete in all respects			M
c)	Supply and installation of Identification, Tagging and Labelling Works of all electrical components complete in all respect as per BS standards	Job	1	M
15	Active Lightening /Surge Protection solution			
i)	Lightening /Surge Protection solution for Data Centre as per IEC62305, NF C 17-102, UNE 21186:2001 or equivalent	Job	1	C
ii)	Active capturing system to function in accordance with principle of early streamer emission (ESE)			M
iii)	100% efficacy in discharge capture			M
iv)	Lightning rod without electrical components			M
v)	Maximum accepted current 200kA or high			C
vi)	High resistance temperature upto: 125C			M
vii)	Should be able to provide lightning strike count			M
16	HVAC: VRF COMFORT COOLING SYSTEM FOR OPERATIONS AREA			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
a)	Supply of following items as per Drawings and Specifications including all accessories, complete in all respect			
	VRF manufacturer should be ISO 9001 Certified, in large scale commercial air-conditioning manufacturing business for at least 20 years and among world renowned leading brands			M
	Note: Each VRF Unit should have separate piping system			C
i)	VRF Outdoor Condensing Unit 150 - 170 kW Nominal Cooling Capacity with 3 outdoor units and N+1 Compressor configuration		1	C
ii)	Operation Range (Cooling): -15°C ~ 55°C			M
iii)	Operation Range (Heating): -30°C ~ 24°C			M
iv)	Compressor Type: Inverter Scroll			C
v)	Refrigerant Type: R-410			M
vi)	Power Supply(V/Ph./Hz): 380~415v/3N/50Hz			C
vii)	Sound Pressure Level(dB): 60			C
viii)	Indoor Unit Type: 360 Air Discharge Cassette			C
ix)	Power Supply(V/Ph./Hz): 220-240V ~ 50 Hz			C
x)	Air Flow Volume: 3 Speed			C
xi)	Sound Pressure Level(dB): 40			C
xii)	Drain Pipe Dia(mm): 25			C
xiii)	Manufacturer approved Copper Refrigerant Piping in cable trays, fittings, 19 mm thick Pre-molded Foam Pipe, tee, elbow, bends, flares, Y joint specialties etc.	Job	1	C
	Note: Supplier should submit piping design generated by manufacturer's software tool			C
xiv)	NEMA compliant (locally manufactured) Hot dip galvanized Cable Trays for Refrigerant Piping	Job	1	C
xv)	uPVC Class 'E' pipes and fittings for Condensate Water drainage including fittings, bends, cuttings, filling etc.	Job	1	C
xvi)	Premium full function wired remote controls for each zone	Job	1	M
xvii)	Communication/Control and Power Wiring in Conduit/Cable Tray as per manufacturer recommendations	Job	1	C
xviii)	Dual redundant units in MMR 1 & 2	Job	1	C
b)	Integration with DCIM and Fire panel			M
c)	4-Way Cassette 1 Ton or high	No.	3	C
d)	4-Way Cassette 1.5 Ton or high	No.	5	C
e)	4-Way Cassette 2 Ton or high	No.	10	C
f)	4-Way Cassette 2.2 Ton or high	No.	2	C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
g)	4-Way Cassette 2.5Ton or high	No.	3	C
h)	Fresh Air duct type indoor unit	Job	1	M
S. No	DESCRIPTION	U/M	QTY	
B	MISCELLANEOUS AND ANCILLARY WORK			
1	IP BASED ACCESS CONTROL SYSTEM			
	Supply of following items as per Specifications including all accessories, complete in all respect			
a)	Access Control manufacturer should be ISO 9001 Certified, and in large scale access control manufacturing business. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			C
	Access control and CCTV solution should be of same brand for centralized management from single software			M
i)	Biometric Access Control 4 in 1 Face/ Fingerprint/RFID Card/PIN Recognition, EM Lock (600Lbs), ZL Bracket, Exit Push Button, POWER Supply, installation and integration with DCIM	Job	15	M
	CE/FCC or equivalent certified Minimum Users Capacity = 1000			C
	Touch Screen size - 5-7 inch			C
ii)	Electromagnetic Door Lock with Magnetic Contact and matching power supply	No.	15	M
iii)	Contactless/Touch-free Exit Button with Beep sound & LED Status Indicator	No.	15	C
iv)	Door Panic / Push Bar	No.	3	C
v)	Manual Key Over-Ride	No.	15	C
vi)	Door Siren	No.	3	C
vii)	Emergency Door Release	No.	15	C
viii)	Remote door release switch at reception counter	No.	1	C
b)	Access Control and Time Management Server (Hardware + Software)			M
	<u>Required Functionality and Features:</u>			
	WEB Portal, Client Server Topology	No.	1	C
	Native Access, SQL Express, SQL, MySQL, Oracle			C
	Export Attendance data			C
	Unlimited Users, PUSH technology			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Message Broad Cast Facility, Emergency Alarm Action			C
	System integrated with CCTV			C
	Provides cardholder management, door force alarm, door too long open alarm, full alarm and event processing, alarms			C
	Alerting via email			C
	Detailed audit trail records			C
	Built-in flexible reports			C
	System Calendar (for sophisticated scheduling)			C
	Face template management			C
	Attendance Management			C
	Shift Management			C
c)	Visitor Management System integrated with Main Access Control:	No.	1	C
	<u>Required Functionality and Features:</u>			
	Visitor registration			C
	Web based preregistration by hosts			C
	Host notification on visitor arrival			C
	Print professional color visitor passes with expiration date, visit area, host, and purpose of visit			C
	Visitor sign out and notification to host			C
	Includes: Front desk workstation, camera, signature pad, business card/ID Card/Driving License scanner, visitor pass printer and software, Computer system as per required specs	Job	1	C
d)	Proximity Cards HID credit card standard size and thickness, thin, flexible polyvinyl chloride laminated, passive type, easy printable on both sides	No.	100	C
2	IP BASED CCTV SYSTEM			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
	CCTV manufacturer should be ISO 9001 Certified, and in large scale CCTV manufacturing business. The proposed Make, Brand should have reference install base in Tier-III Data Centers.			M
	Access control and CCTV solution should be of same brand for centralized management from single software			M
i)	Fixed HD Dome IP Camera Ceiling/Wall Mounted with motorized VF lens, 2.8- 12mm	No.	24	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Color 4 Megapixel Day/Night Vision, Motion Detection HD Dome Camera			C
	Resolution 2688×1520 , IR Illumination Range: 50m IR Night Vision			C
	True WDR 120dB, intrusion detection, motion detection, line crossing			C
	Camera shall have a horizontal and vertical 'Field Of View' wide enough to completely cover all areas			C
	128GB local memory for storage 802.1x authentication			C
ii)	Thermal Bullet Camera for Core Components 2x GenSets, 2x Transformer, 2x Cooling Outdoor	No.	6	M
	Image Sensor Vanadium Oxide Uncooled Focal Plane Arrays			C
	Thermal Resolution 256×192 or high			C
	Pixel Pitch $12 \mu\text{m}$			C
	Spectral Range $8 \mu\text{m}$ to $14 \mu\text{m}$			C
	Focal Length 3.6 mm or higher			C
	Min. Focusing Distance 0.4 m			C
	Heat detection and alarm, tripwire, intrusion, and target filtering.			C
	Optical Module, Image Sensor 1/2.7" Progressive Scan CMOS			C
	Resolution 2688×1520			C
	WDR 120 dB, Image Effect			C
	Target Coloration Yes. Supported in white hot and black hot mode.			C
	128GB local memory for storage			C
iii)	Thermal Dome Camera for Core Components 6x Server room, 2x Power Rooms, 2x MMR	No.	10	M
	Image Sensor Vanadium Oxide Uncooled Focal Plane Arrays			C
	Thermal Resolution 256×192 or high			C
	Pixel Pitch $12 \mu\text{m}$			C
	Spectral Range $8 \mu\text{m}$ to $14 \mu\text{m}$			C
	Focal Length 3.6 mm or higher			C
	Min. Focusing Distance 0.4 m			C
	Heat detection and alarm, tripwire, intrusion, and target filtering.			C
	Optical Module, Image Sensor 1/2.7" Progressive Scan CMOS			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Resolution 2688 × 1520			C
	WDR 120 dB, Image Effect			C
	Target Coloration Yes. Supported in white hot and black hot mode.			C
	128GB local memory for storage			C
iv)	64 Channel Network Video Recording solution Rack Mounted with SAN Storage & Redundant Power Supply	No.	1	M
	<u>Functionality and Features:</u>			C
	Simultaneous view, 25fps@ full resolution , playback, backup & remote monitoring			C
	Supports HD recording with cameras up to 5MP			C
	Video Compression: H.264 / H.265			C
	Storage Capacity: 90 days or higher			M
	HDD with RAID-5			C
	Automatic backup and storage on backup media			C
	Network Interface 10/100/1000-Base-TX, RJ-45			C
	VGA OUT & dual HDMI outputs with output resolution of 4K and 1080p			C
	Remote access via iOS, Android, PC / Mac Integrated with NOC & DOC Room Video Walls, Behavior analysis features : intrusion, area entry, area exit			C
v)	Complete solution for recording of all cameras on Cloud storage - upto 15 days	Job	1	M
	Including bandwidth and required storage 25fps@full resolution			C
vi)	CCTV Management Workstation (Core i7 13 th Gen Slim Branded Desktop PC with Windows 11 Prof 64bit, 16 GB RAM, 2TB SSD HDD including Wireless Keyboard & mouse . Display 23.8" or higher QHD with IPS, must have feature for high adjustment and forward/backward tilt and same color as the full tower	No.	1	C
vii)	24 Port Managed 10/100/1000 Layer 3 Stackable full POE switch, 2 x10G SFP ports, 40 Gbps forwarding bandwidth, enterprise class security features, SNMP support, Redundant Power Supply, stacking cable	No.	2	M
viii)	CAT-7 Structured Cabling for complete CCTV system as per manufacturer recommendation in cable tray/EMT Conduit	Job	1	M
3	VIDEO Wall DISPLAYS			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Supply of following items as per Specifications including all accessories, complete in all respect			
	Video Displays manufacturer should be ISO 9001 Certified, in large scale screen manufacturing business for at least 10 years, among world renowned leading brands			C
	Video controller can be from same manufacturer or third-party but fully compatible with Video Wall			C
a)	NOC Room 4K/UHD Video Wall 2 x 5 matrix LCD Screen with Video Controller	Job	1	M
	Nos. of LCD Screens: 10 Each LCD Size: 55 inches with wall mount frame brackets			M
	Industrial level IPS LCD panel, suitable for continuous 24h/7 operation			M
	Brightness: 500 cd/m2 or high			M
	Ultra-narrow 0.9mm bezel-to-bezel design or low · Anti-glare panel, vivid and memorable image quality			M
	Response Time: 8ms			C
	Input: Display Port, HDMI 2, DVI-D, Analog, USB, Audio			C
	Same OEM supplied Pop-up type wall brackets			C
	Sensor: IR/Ambient			C
	Video Controller should support: 10 multi input and 10x Multi output or high			C
	Including all allied components and accessories, complete in all respects			C
	Both single/split views and multiple inputs from different IT and Facility monitoring systems			C
b)	SOC Room 4K/UHD Video Wall 2 x 4 LCD Screen with Video Controller	Job	1	M
	Nos. of LCD Screens: 8 Each LCD Size: 55 inches with wall mount frame brackets			M
	Industrial level IPS LCD panel, suitable for continuous 24h/7 operation			M
	Brightness: 500 cd/m2 or high			M
	Ultra-narrow 0.9mm bezel-to-bezel design or low · Anti-glare panel, vivid and memorable image quality			M
	Response Time: 8ms			C
	Input: Display Port, HDMI 2, DVI-D, Analog, USB, Audio			C
	Same OEM supplied Pop-up type wall brackets			C
	Sensor: IR/Ambient			C

S. No	Required Specifications	U/M	QTY	Compliance
	Video Controller should support: 8 Multi input and 8x Multi output or high			C
	Including all allied components and accessories, complete in all respects			M
	Both single/split views and multiple inputs from different IT and Facility monitoring systems			C
c)	Network Room 4K/UHD Video Wall 2 x 3 matrix LCD Screen with Video Controller & External Speakers	Job	1	M
	Nos. of LCD Screens: 6 Each LCD Size: 55 inches with wall mount frame brackets			M
	Industrial level IPS LCD panel, suitable for continuous 24h/7 operation			M
	Brightness: 500 cd/m2 or high			M
	Ultra-narrow 0.9mm bezel-to-bezel design or low · Anti-glare panel, vivid and memorable image quality			M
	Response Time: 8ms			C
	Input: Display Port, HDMI 2, DVI-D, Analog, USB, Audio			C
	Same OEM supplied Pop-up type wall brackets			C
	Sensor: IR/Ambient			C
	Video Controller should support: 6x Multi input and 6x Multi output or high			C
	Including all allied components and accessories, complete in all respects			M
	Both single/split views and multiple inputs from different IT and Facility monitoring systems			C
d)	Systems Room 4K/UHD Video Wall 2 x 3 LCD Screen with Video Controller & External Speakers	Job	1	C
	Nos. of LCD Screens: 6 Each LCD Size: 55 inches with wall mount frame brackets			M
	Industrial level IPS LCD panel, suitable for continuous 24h/7 operation			M
	Brightness: 500 cd/m2 or high			M
	Ultra-narrow 0.9mm bezel-to-bezel design or low · Anti-glare panel, vivid and memorable image quality			M
	Response Time: 8ms			C
	Input: Display Port, HDMI 2, DVI-D, Analog, USB, Audio			C
	Same OEM supplied Pop-up type wall brackets			C
	Sensor: IR/Ambient			C
	Video Controller should support:			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	6x Multi input and 6x Multi output			
	Including all allied components and accessories, complete in all respects			M
	Both single/split views and multiple inputs from different IT and Facility monitoring systems			C
4	Video Conferencing System for Conference Rooms			
	Supply of following items including all accessories, complete in all respect,			
a)	Display For Conference Room	No.	1	M
	Required Functions and Features:			
	Display, digital QLED, 95" or higher			M
	Includes codec, camera, microphones, and speakers in a single device			M
	4K UHD Camera: 5 x zoom or high, face detection			M
	120 degree Field of View			M
	Wired or wireless content and presentation sharing			M
	Wireless sharing through App/Client			M
	Screen/display integration through HDMI CEC			M
	HDMI 4k input and output			M
	10/100/1000 Ethernet			M
	Conferencing capability with all devices (smart phones, tablets, laptop, PC's)			M
	Presentation Cable: 8m 4k certified			M
b)	Interactive touch display 1x Chief IT Room, 1x CISO Room, 1x Secretary Room, 4x Conference Room (for side walls)	No.	7	M
	Required Functions and Features:			
	Interactive touch display, digital flipchart and whiteboard, 65" or higher			M
	Includes codec, camera, microphones, and speakers in a single device			M
	4K UHD Camera: 5 x zoom, face detection			M
	120 degree Field of View			M
	Wired or wireless content and presentation sharing			M
	Wireless sharing through App/Client			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	screen/display integration through HDMI			M
	HDMI 4k input and output			M
	10/100/1000 Ethernet			M
	Conferencing capability with all devices (smart phones, tablets, laptop, PC's)			M
	Presentation Cable: 8m 4k certified			M
c)	Mini PC with 10th Gen or latest Intel Core i5, Intel Optane Memory/SSD + 500 GB HDD Storage, 16 GB RAM, UHD Graphic Processor, 6 x USB Ports Type A and C, integrated LAN, Wi-Fi and Bluetooth, Windows 11 64 bit or latest	No.	1	M
	Mini PC should be mounted on back of each Interactive display (95" and 65" for 1x Chief IT Room, 1x CISO Room, 1x Secretary Room)		4	M
d)	1 x Wireless Presentation Dongle	Job	1	M
	1 x Cable Cubby Retractable Type: 2 x Data, 2x USB, USB-C – HDMI, VGA USB-C – DisplayPort modules			M
5	CABLE TRAY AND LADDER for Cables distribution in complete Facility			
a)	Supply of following size of NEMA or equivalent standard compliant (locally manufactured) base perforated Cable Tray with cover, 16SWG, Hot Dip Galvanized, appropriate sizes and lengths of MS Rod / Angle Iron Supports, C-channel and anchor Bolts (HILTI/FISHER), including cutting, welding, jointing and necessary required hardware etc. for installation at ceiling, wall, or in floor screeding etc. as per Specifications, complete in all respect	Job	1	M
b)	Supply of following size of NEMA or equivalent standard compliant (locally manufactured) Cable Ladder, Hot dip Galvanized including all installation accessories such as appropriate sizes and lengths of MS Rod / Angle Iron Supports, C-channel and anchor Bolts (HILTI/FISHER), including cutting, welding, jointing and necessary required hardware etc. for installation at ceiling, wall, or in floor screeding etc. as per Specifications, complete in all respect	Job	1	M
c)	Bidder should prepare and submit cable tray and cable ladder schedule according to site requirement	Job	1	M
6	RACEWAYS AND BOXES			
a)	Supply following size (inner diameter) PVC/ UPVC Pipe, as race ways with all accessories including junction boxes etc., recessed / surface on wall / column Specifications, complete in all respect.	Job	1	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
b)	Bidder should prepare and submit pipes, raceways and junction boxes schedule according to site/solution requirement	Job	1	M
c)	Installation of raceways and boxes including civil works, complete in all respects	Job	1	M
7	WIRING FOR LIGHTING & POWER SOCKETS			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
i)	Circuit wiring from DB-LP to Switchboard including wiring between switch on the same circuit with 2x2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable + CPC 2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable in 25mm diameter EMT conduit, surface / recessed in wall, column, etc., including with all conduit accessories, connectors, ceiling rose, flexible wires, sheet steel boxes, tagging etc.	Job	1	M
ii)	Point wiring for light point from Switch Board to Light Point with 2x2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable + CPC 2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable in 25mm diameter EMT conduit, surface / recessed in wall, column, etc., including with all conduit accessories, connectors, ceiling rose, flexible wires, sheet steel boxes, tagging etc.	Job	1	M
iii)	Supply & install new lighting point's c/w light switches and using 2 x 1C/1.5mm sq. PVC cable in PVC pipe for Server room, NOC, MM, Lobby and Power rooms	Job	1	M
8	INTERNAL / EXTERNAL LIGHT FIXTURES			
a)	Supply of following specialized 24x7 type light fixtures complete with LED lamps/panels, compliant to IEC 60598, IEC 62031 or equivalent standard, Electronic Driver including all suspension, rated life 50,000 hours, standard white or day light white 5000k colors, mounting, fixing and hanging materials, brackets, chains, hooks etc. as per Specifications including all accessories, complete in all respect			
	Light manufacturer should be ISO 9001 Certified, and in large scale light manufacturing business for at least 20 years			C
i)	Supply, installation and fixing of data center special lights LED (min 500 LUX) antiglare size 2' x 2' with motion sensor for Server room, 2x MMR, 2x Power rooms, Staging room, 3x Stores	JOB	1	M
ii)	Pole mounted LED Flood Light, 100W, IP65 including Pole for Generators, Transformer area & Roof top	JOB	1	C
iii)	Stand Alone Motion/Occupancy Sensor (IP-40) having following specifications:		-	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Coverage Range: 360°			C
	Operating Voltage: 230V AC			M
	Timing Range: 5 sec to 20 minutes			C
iv)	Supply, installation and fixing of special lights LED (min 500 LUX) antiglare size according to proposed design for, NOC, SOC, Systems team room, Network team room, CISO Room, Chief IT Room, Secretary IT Room, Lobby	Job	1	M
9	EMERGENCY / EXIT LIGHTING			
a)	Supply of rechargeable NiCad battery-operated (3hrs backup) self test LED emergency lights, rated life 50,000 hours, compliant to BS5266/IEC598-2 or equivalent standard including all accessories, complete in all respect			M
	Light manufacturer should be ISO 9001 Certified, and in large scale emergency light manufacturing business for at least 10 years			C
i)	Supply & installation of Emergency Light c/w battery pack and accessories.	No.	-	M
10	STRUCTURED CABLING SYSTEM FOR DATA CENTER & OPERATIONS AREA			
a)	Supply of following Fiber items including all accessories, complete in all respect Note: Below items will be required to establish the fiber network connectivity of new main Data Center with MMRs	JOB	1	
i)	Fiber Patch Panel 48 Port - MMR 1&2			C
ii)	Fiber Optics Multimode OM-4 LC/LC Patch Cord MMR 1&2 to Server room distribution Racks			M
iii)	Cat 7 STP patch cord Cable with RJ-45 Connectors (Ready to use) Server room racks		-	M
iv)	Cable Management - Complete floor			M
v)	4"x4" Rigid PVC Fiber Raceway and Routing System	Job	1	M
b)	Supply and installation of CAT-7 Network cabling including faceplates and metal back boxes for NOC, SOC, Systems team room, networks team rooms, MMR, Power rooms Staging area, Lobby, security/reception area and few nodes in Server room and integration of DCIM.	Job	1	M
	Structured Cabling manufacturer should be ISO 9001 Certified, and in large scale cable manufacturing business for at least 10 years. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			M
i)	48 port shutter type Cat-7, RJ 45 UTP Patch Panel fully loaded with tool less jacks and cable manager			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Server room distribution racks, MMR Racks			
ii)	Dual shutter face plates including I/Os for all tables in NOC, SOC, Systems team room, Networks team room, CISO Room, Chief IT Room, Secretary room, conference room and allied facilities			C
10	MISCELLANEOUS ITEMS			
	Supply of following items including all accessories, complete in all respect			
a)	Electronic rodent repulsion system based on Ultra-sonic technology with sweep frequency outputs in all rooms, corridors and outside areas related to datacenter equipment with required cables, conduits (Standalone type), Ultrasonic rodent repellent solution of active multiple devices , Ability to configure Variable frequency			M
b)	Tools:	Job	1	
	2 x Computer Room Cart for laptop/consoles, adjustable height			M
	1 x Spot Thermal Camera, hot spot detection, 5 MP Camera, 3” auto-orientation touch screen, still images recording capability in local storage, Wi-Fi and USB interface. Suitable for inspection of electrical and cooling equipment			M
	2 x Commercial Grade HEPA Vacuum Cleaner			M
	1 x Thermal Automatic Shoe Cover Dispenser with LCD Display			M
c)	Air purifier as per room dimensions For: Server Room, NOC, SOC, Systems Team, Networks Team	Job	1	M
d)	Supply and installation of Identification, Tagging and Labelling Works of all ELV components complete in all respect as per TIA, BS and NFPA standards	Job	1	M
e)	Tool kit, (plier set, screw driver set, combination set spinner (6-32mm)-, digital multi meter, clamp meter AC & DC, Cable cutters, wire strippers, personal protective equipment, thimble presser, genset filter opener, hacksaw adjustable ladder, chargeable drill, chargeable blower, knife, hammer, leaser measuring tape, measuring tape, earth testing meter, digital network cable tester,L key set star and hexa, hydrolic wire crimping tool, angular disc electric grinder)		1	M
S. No	DESCRIPTION	U/M	QTY	
C	CIVIL AND INTERIOR WORKS			
1	Brick & Plaster Work			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
i)	Providing and laying first class burnt brick, straight or curved 9" & 4" thick wall as required	Job	1	C
ii)	Providing and laying 1/2" - 3/4" thick ordinary Portland cement & Sargodha sand plaster 1:4 on brick walls at any floor, any height	Job	1	C
iii)	Chicken wire mesh is to be provided at the junction of concrete and masonry work or wherever it is required before plastering work	Job	1	C
2	Dismantling works at Complete First floor			
if)	Dismantling existing wall paneling, partitions, false ceiling, electrical fixtures, any surplus items	Job	1	M
ii)	Extracting designated door frames along with their shutters, including fixtures and hardware			M
iii)	Eliminating all existing electrical fittings, encompassing wiring, cables, panels, distribution boards			M
iv)	Clearing out any other outdated materials or fixtures in the first-floor area that are no longer needed			M
v)	Properly disposing of all removed materials as needed while ensuring site cleanliness			M
3	Civil Structure Reinforcement			
if)	Reinforcement for the rear courtyard slab to endure the applied loads and vibrations of Generators	Job	1	M
ii)	Reinforcement for the First floor slab to endure the TIA-942B Rated-3 standards applied loads and vibrations of core components	Job	1	M
4	Modular Wall Partitioning			
a)	Supply of following imported Modular Dry Wall Partition System as per Drawings and Specifications including all accessories, complete in all respect			M
	Dry wall manufacturer should be ISO 9001 Certified, and in large scale drywall manufacturing business for at least 15 years. The proposed Make, Brand should have reference install base in Tier-III Data Centers or Telecom Sites.			C
i)	5"-to-6" thick 2 hour fire rated Modular Dry Wall partitions (imported), consisting of double layered 15mm or thicker fire resistant type C or X Gypsum boards on each side. Galvanized steel Metal Profile (frame studs/standing frame/steel channels) insulation, bolts, screws, fitting and finishing accessories etc., heavy weight anchoring where required, 4" PVC skirting, acoustic and noise control, moisture/liquid resistant. Includes painting three coats of matt enamel lead-free, dust/moisture resistant paint (on both sides of partition) of approved color	Job	1	M

S. No	Required Specifications	U/M	QTY	Compliance
	and finish For Core Areas			
	Certified to BS 476 or ATSM E119 or DIN 4102-4 or equivalent standard			C
	Note: Gypsum Board, Metal Profile (frame studs/standing frame/steel channels) insulation, bolts, screws, fitting and finishing accessories etc. should be from same manufacturer. Fire Rated Drywall design, installation and commissioning should be validated and endorsed by manufacturer			C
ii)	5"-to-6" thick Modular Dry Wall partitions consisting of 12mm or thicker Gypsum boards, OEM supplied galvanized steel studs/standing frame/steel channels, fitting and finishing etc., heavy weight anchoring where required, 4" PVC skirting, acoustic and noise control, moisture/liquid resistant. Includes painting three coats of matt enamel lead-free, dust/moisture resistant paint (on both sides of partition) of approved color and finish For Office areas	Job	1	M
4.1	GLASS PARTITION			
a)	Supply of following Glass Partitions as per Site Requirement	Job	1	C
5	DOORS			
a)	Supply of following Doors as per Drawings and Specifications, complete in all respect. Finishing with high-quality aesthetics Server room-3x, Power rooms-2x, MMRs-2x, Stores-3x, Staging room-1x			C
i.e.)	Imported 2 Hour Fire Rated powder coated G.I./Steel door, UL Listed with automatic closer & vision panel and acoustic control. Min 40mm thick leaf, 1.2mm face/back/frame steel, gasket, Hinges: 3 – 4 stainless steel, shrouded or concealed bearing type fitted to each leaf. Lever bolt: one each fitted on top and bottom. Tested according to NFPA 252 or EN 1634-1 or UL 10C or BS 476 Part 22 equivalent standard and installation conforming to NFPA 80. 3x Server room, 2x Power Rooms, 2x MMR, 3x Stores, 1x Staging Room	No.	11	M
	Size: 3'-6"X7'-6" / 4" x 7'6"			C
	Frame should be specialized type for Dry Wall installation			M
	Customizable with wide selection of RAL colors			C
	Panic bar on 1 x Emergency Exit doors only			C
ii)	Commercial Bullet proof glass door including Stainless steel frame on top and bottom, floor spring, bottom patch lock, SS handles, frosting	No.	2	C
	Door Size: 5' x 7'6" + 6' x 7'6" (Two Leaf)			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
iii)	Commercial Office grade wooden door including steady wooden frame, floor spring, SS handles and lock NOC, SOC, Systems room, Networks team, CISO, Chief IT room, Secretary Room, Conference room, Kitchen	No.	9	M
	Size: 3'6" x 7'			C
	Wooden Door manufacturer should have fully automated manufacturing facility			M
6	PAINT WORKS of Office Areas			
a)	Supply of following Paint Works, complete in all respect			M
i)	Painting two coats of matt enamel lead-free, dust/water/moisture resistant paint, on all type of walls of approved color and shade and preparation of surfaces with priming, putty/under coat	Job	1	C
ii)	Painting two coats of matt enamel lead-free, dust/water/moisture resistant paint, on ceiling of approved color and shade and preparation of surfaces with priming, putty/under coat	Job	1	C
7	FURNITURE AND FIXTURE WORKS			
a)	Supply of following high quality branded Furniture items as per vendor provided Drawings including all accessories, complete in all respect			M
	Note: The dimensions of furniture and fixtures are flexible as per approval and as best suited for site conditions. All furniture items shall be of high quality and as per approved design and finish			M
	Furniture manufacturer should have fully automated manufacturing facility			M
i)	Meeting Room:	Job	1	
	1 x Meeting Table with Cable Cubby fixed on top			C
	34 x Ergonomic imported Meeting Chair 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclinable, adjustable seat height, tilt locking			C
	2 x Matching Credenza, two sliding doors lockable			C
ii)	Chief IT Room	Job	1	C
	1 x Manager Desk, structure in solid wood/Oak Veneer durable non scratch laminated top, with integrated cable management system & cubby			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	1 x Matching Side Rack, two top drawers lockable and bottom two filling, keyboard/CPU Tray			C
	1 x Matching Credenza, two sliding doors lockable			C
	1 x Ergonomic imported High back Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclinable, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Visitor Chair, cushioned seat and back, leatherite covered with arms and M.S legs			C
	1 x 2-Seater Sofa, cushioned seat and back, leatherite covered with arms			C
iii)	Secretory IT Room	Job	1	C
	1 x Manager Desk, structure in solid wood/Oak Veneer durable non scratch laminated top, with integrated cable management system & cubby			C
	1 x Matching Side Rack, two top drawers lockable and bottom two filling, keyboard/CPU Tray			C
	1 x Matching Credenza, two sliding doors lockable			C
	1 x Ergonomic imported High back Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclinable, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Visitor Chair, cushioned seat and back, leatherite covered with arms and M.S legs			C
	1 x 2-Seater Sofa, cushioned seat and back, leatherite covered with arms			C
iv)	CISO Room	Job	1	C
	1 x Manager Desk, structure in solid wood/Oak Veneer durable non scratch laminated top, with integrated cable management system & cubby			C
	1 x Matching Side Rack, two top drawers lockable and bottom two filling, keyboard/CPU Tray			C
	1 x Matching Credenza, two sliding doors lockable			C
	1 x Ergonomic imported High back Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclinable, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Visitor Chair, cushioned seat and back, leatherite covered with arms and M.S legs			C
	1 x 2-Seater Sofa, cushioned seat and back, leatherite covered with arms			C

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S. No	Required Specifications	U/M	QTY	Compliance
v)	NOC Room:	Job	1	C
	14 x purpose designed imported NOC Console for Command and Control Centers			C
	14 x Ergonomic imported Operator Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclining, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Matching Credenza, two sliding doors lockable			C
vi)	SOC Room:	Job	1	C
	15 x purpose designed Workstations with partitions, CPU Trolley, Keyboard Tray. Integrated Cable management system and cubby			C
	15 x Ergonomic imported Operator Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, re-clining, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Matching Credenza, two sliding doors lockable			C
vii)	Networks Team Room:	Job	1	C
	10 x purpose designed Workstations with partitions, CPU Trolley, Keyboard Tray. Integrated Cable management system and cubby			C
	10 x Ergonomic imported Operator Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, re-clining, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Matching Credenza, two sliding doors lockable			C
viii)	Systems Team Room:	Job	1	C
	14 x purpose designed Workstations with partitions, CPU Trolley, Keyboard Tray. Integrated Cable management system and cubby			C
	14 x Ergonomic imported Operator Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, re-clining, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Matching Credenza, two sliding doors lockable			C
ix)	Kitchen Area	1	1	C
	Wall Cabinet Providing and fixing in position hanging type open shelves; cabinet frame made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, cabinet shutter made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, approved, on top, front and side with grooves; 3/8" thick lacquered deodar wood			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	lipping on all edges; including divider, shelves; imported magnetic hinges, lock, stainless steel handles. (Interwood, workman or equivalent)			
	Floor Cabinet Providing and fixing in position low height type cabinets; cabinet frame made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, cabinet shutter made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, approved, on top, front and side with grooves; 3/8" thick lacquered deodar wood lipping on all edges; including divider, shelves; imported magnetic hinges, lock, stainless steel handles with polish finish as per approved samples. (Interwood, workman or equivalent)			C
	20x Kitchen chairs along with 4x kitchen tables			C
	2x Full size refrigerators High quality			M
	2x Water dispensers High quality			M
	2x Ovens high quality			M
x)	Spares equipment Room: 3 Rooms	Job	1	
	MS Storage Rack modular/adjustable			C
	Dimension 5' L x 3.5' D x 7' H with 2 shelves & 2 columns 5' L x 3.5' D x 7' H with 3 shelves & 2 columns 5' L x 3.5' D x 7' H with 1 shelves & 1 column			C
	Heavy duty metal steel shelving, made of 18-gauge steel, powder coated and self-supporting structure. 4 x Shelves, adjustable rack position at different height/ levels (for Store Room)			C
	Fixing and commissioning of above items			M
xi)	Reception Area:	Job	1	
	1 x Manager Desk, structure in solid wood/Oak Veneer durable non scratch laminated top, with integrated cable management system & cubby			C
	1 x Matching Side Rack, two top drawers lockable and bottom two filling, keyboard/CPU Tray			C
b)	Fixing and commissioning of above items	Job	1	M
8	SIGNAGE WORKS			
a)	Supply and fixing of following Signage Works, complete in all respect			M
i)	Main Signage on Reception/Waiting Area with 3D Printed FBR Logo	Job	1	C
ii)	Flush mounted engraved Room Signs & Name Plates. Signages in corridors shall be mounted on right angled brackets	Job	1	C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
9	FALSE CEILING AND FLOOR TILING WORKS			
a)	Supply and fixing items as per approved design and finish, complete in all respect			M
	Note: False Ceiling shall be as per approved size and in accordance with interior designing works			M
i)	Complete Corridors, Chief IT Room, Secretary IT Room, CISO Room, Conference Room, Kitchen, NOC, SOC, Networks Team Room, Systems Team Room, meeting room	Job	1	C
b)	Supply and fixing of FLOOR tiles as per approved design and finish, complete in all respect	Job	1	C
i)	Commercial office grade full body Porcelain 2'x2' scratch resistant floor tiles with 4" skirting Management rooms, Meeting room, corridors	JOB	1	C
c)	Antistatic Floor tiles, High quality inclusive of complete Allied material For Server Room, Power Rooms, MMRs, Staging Room, NOC Room, SOC Room, Systems Team Room, Networks Team Room, 3x Stores	Job	1	M
10	INTERIOR DESIGN WORKS			
a)	Design and Supply High Quality interior design works, including material such as cladding, wall finishes etc. and services, for Reception, Huddle Room, NOC, SOC, DOC, Incharge Office, Breakout Area, corridors etc. in accordance with international IT Offices trends, complete in all respect:	Job	1	M
i)	Supplier should submit following design documents (printed form 4x Copies , PDF and editable softcopy) to PURCHASER for approval prior to commencement of works:	Job	1	M
ii)	Furniture and Fixture Details and Layouts	Job	1	M
iii)	MEP and Lighting Details and Layouts	Job	1	M
iv)	Floor and Wall Finish Details and Layouts	Job	1	M
v)	Reflected Ceiling Plan Details and Layouts	Job	1	M
vi)	3D render imaging of all individual rooms	Job	1	M
vii)	Professional should design layout	Job	1	M
11	Project Implementation Plan (PIP)	Job	1	M
12	Service Level Agreement – 5 years	Job	1	M
13	Local Trainings + Certifications Foreign Inspection of Equipment	Job	1	M

DETAILED COMPLIANCE SHEET FOR DOT LAHORE.

S. No	Required Specifications	U/M	QTY	Compliance
	Please refer to section of RFP document "Technical Specifications for DOT Lahore" for better understanding of detailed required specifications of each item. Partial Compliance or Non-compliance to BOQ line items requiring Mandatory ("M") compliance will result in rejection of the technical proposal			
A	Core Components			
1	SERVER/COMMUNICATION RACKS & Containment			
a)	Supply of following items as per Drawings and Specifications including all accessories, complete in all respect Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			C
i)	EIA/TIA compliant Server Rack 600x1070mm 42U (Floor Mounted) for Server Room, complete with vertical and horizontal cable managers. Perforated doors, removable side panels, split rear door, EIA mounting rails, grounding/bonding kit, levelling feet, black color, IP 20, CE/UL Compliant 18 Racks for Server Room, 2 Rack for MMR, 1 Rack for Staging room	No.	21	
ii)	EIA/TIA compliant Communication Rack 800x1070mm 42U (Floor Mounted) for Telecom Room, complete with vertical and horizontal cable managers. Perforated doors, split side panels, split rear door, EIA mounting rails, grounding/bonding kit, levelling feet, black color, IP 20, CE/UL Compliant 2 Racks for Server Room, 1 Rack for MMR	No.	3	M
iii)	OEM supplied adjustable metal shelves with same color / matching with rack	No.	24	C
iv)	1U Blanking Panel (pack of 10)	No.	240	C
b)	Modular Fire Rated Hot Aisle Containment System for Server Room. Compatible with OEM and third-party racks. Includes:	No.	1	M
I	Automatic motorized sliding door with Proximity card based access control			C
II	Sliding Doors shall be provided with swing-open functionality in case of emergency inside the aisle			C
III	Automatic door closure system for sliding door			C
IV	Drop/revolving type resettable ceiling panels for penetration of fire suppression gas in case of a fire			C
V	LED lighting, Lumens per foot at hot aisle > 180			M
VI	Data Cables Trough/Partitions			M

S. No	Required Specifications	U/M	QTY	Compliance
VII	Aisle should be installed with the camera, temperature and humidity sensor, smoke detector, aisle lighting, infrared sensor, and reserved hole for fire extinguishing nozzles			C
VIII	The Ceiling System complies to UL484, EN 55022, EN 55024, EN 61000-3-2:2006, EN 61000-3-3:1995, EN 60950-1, CFR 47 FCC Part 15, ANSI C63.4, ICES-003, AS/NZS CISPR 22. At least 5 are mandatory			M
2	RACK POWER DISTRIBUTION UNITS			
a)	Supply of following items as per Specifications including all accessories, complete in all respect Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			
i)	Zero U Metered & Monitored Smart Single Phase 32A Rack PDUs. C13 \geq 12 and C19 \geq 3 outlets. Should support per outlet monitoring of Energy (kWH), Real Power (W), Volts (V), Ampere (A), Volts (V), TCP IP/SNMP, EN 55022 Class A/EN 55032 , EN 55024 for CE or equivalent standard compliant 40x for Server room	No.	40	M
ii)	Zero U Metered & Monitored Smart Single Phase 16A Rack PDUs. 18 x C13 and 2 x C19 outlets. Should support per outlet monitoring of Energy (kWH), Real Power (W), Volts (V), Ampere (A), Volts (V), TCP IP/SNMP, EN 55022 Class A/EN 55032 , EN 55024 for CE or equivalent standard compliant 6x For MMR, 2x for Staging room, 2x spares	No.	10	M
iii)	Zero U Metered & Monitored Smart Three Phase 32A Rack PDUs. 20 x C13 and 3 x C19 outlets. Should support per outlet monitoring of Energy (kWH), Real Power (W), Volts (V), Ampere (A), Volts (V), TCP IP/SNMP, EN 55022 Class A/EN 55032 , EN 55024 for CE or equivalent standard compliant For: Server Room Exadata – Spares	No.	4	M
3	UNINTERRUPTIBLE POWER SUPPLY (UPS)			
a)	Supply of following UPS System as per Specifications including all accessories, complete in all respect. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers. Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			
I	Modular Hot/ Safe Swappable UPS as per following specifications:	No.	2	C
II	3-Phase Modular UPS 25kW scalable to 250 kW			M
III	Rating : 120 kW Modular Type UPS plus one extra redundant power module			M
IV	True Online Double Conversion Pure sine wave Microcontroller based			M
V	IGBT based technology			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
VI	Input voltage : 304/485 V AC			C
VII	Input frequency : 50 Hz			M
VIII	Output voltage : 400 Volts			M
IX	Three Phase IN & Three Phase Out			M
X	Output p.f : 1			M
XI	User friendly LCD display for real time UPS status			C
XII	Backup Time: The UPS support 30 min backup time @ 0.9PF			M
XIII	UPS RS-232/RJ-45 Integrateable with DCIM			M
XIV	Output voltage harmonic distortion: a. <3% at 100% linear load b. <3% at 100% non-linear load			C
XV	Overload capability: a. 150% for 1 minute (normal operation) b. 125% for 10 minutes (normal operation)			C
XIV	Audible noise at full load: < 75 dB			C
XV	Parallel capability for capacity and redundancy			C
XIV	Provision for external battery bank			M
XV	Battery Type: The Lithium battery shall be of LFP type			M
XIV	Batteries: Li-Ion Sealed Maintenance Free, Redundant and Concurrently Maintainable Battery Strings			M
XV	Battery management System: Module level monitoring and management, integrated with DCIM			M
XIV	RS-232/RJ-45 connectivity with DCIM			M
XV	Battery Design Life 10 years minimum			C
XIV	Battery Compliance: Meeting with the standards IEC60896-21/22 or BS6290-4 or approved equivalent			C
XV	The entire system complies with CE/CB/ROHS/REACH			C
XIV	The cells comply with UL1642, IEC62619, UN38.3 or equivalent and provides the certificate			C
XV	Built-in Maintenance bypass system			M
XIV	External Maintenance bypass system			M
XV	Static by-pass switch			M
XIV	Remote & local emergency power off function			C
XV	Note: UPS should be fully redundant, having no single point of failure, including Power and Control Modules			M
4	Modular Rack Based Power Distribution for UPS Output			
a)	The PDU shall provide a mechanical means of complete isolation of the input source from the critical output distribution		2	M
I	The PDU shall contain the appropriate modular distribution panel within a Rack enclosure suitable for installation in a data center environment.			M
II	Factory assembled and tested			M
III	All system components are housed in a Rack			M
IV	The PDU and associated equipment shall operate in conjunction with a primary power supply to provide quality uninterrupted power for mission critical, electronic equipment load.			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
V	Input: AC Nominal Input Voltage: 400V/230V 3-phase, 3-Wire+N+G, 50/60Hz, Input Switch: MCCB			C
VI	Architecture and construct : Dual bus architecture, IP 20			C
VII	System Capacity: The PDU shall support provide 200-250 kW output			M
VIII	Testing and quality assurance: All circuit breakers shall be 100% factory tested to ensure the highest quality for the PDU. In addition, the PDU shall be tested with 100% load and all panel circuit breakers shall be 100% tested.			C
IX	Metered Data: The following data shall be available on the alphanumeric display: 1. Year, month, day, hour, minute, second of occurring events 2. Output voltage by phase 3. Branch circuit status			C
X	Web Monitoring: Remote monitoring shall be available via a web browser.			M
XI	RS232 Monitoring: Remote PDU monitoring shall be possible via RS232 serial port connection.			C
XII	Simple Network Management Protocol (SNMP) Management Card			M
XIII	A variety of Power Distribution options shall be available in the Power Distribution to serve installed rack PDUs			C
XIV	Event log: The display unit shall provide a time and date stamped logs.			M
5	UPS - For Facility Load			
a)	Rating : 3-Phase UPS 30 kW, 400 V, with bypass switch	No.	2	M
I	True Online Double Conversion Pure sine wave Microcontroller based.			M
II	Input voltage : 385/415 V AC, Input frequency : 50 Hz			M
III	External service bypass			M
IV	Nominal input voltage rating: 400 V 3-phase (adjustable for 380 V, and 415 V). Input voltage window: 304 V to 485			C
V	Three Phase In & Three Phase Out			M
VI	Input frequency range: 40-70 Hz.			C
VII	Input power factor: 0.99			M
VIII	Total harmonic distortion: < 3 % (linear load) = 2 marks Total harmonic distortion: > 3 % (linear load) = 1 mark			C
IX	Backup Time: The UPS battery shall be sized for 30mins backup @P.F 0.9			M
X	Provision for internal / external battery bank			M
XI	Batteries : VRLA/Dry Sealed Maintenance Free, Redundant and Concurrently Maintainable battery strings			C
XII	Battery Compliance: Meeting with the standards IEC60896-21/22 or BS6290-4 or approved equivalent			C
XIII	Nominal output voltage rating: 400 V 3-phase (adjustable for 380 V, and 415 V).			M
XIV	Output voltage tolerance: +/- 2% for symmetrical loads; +/- 3% for asymmetrical loads.			C

S. No	Required Specifications	U/M	QTY	Compliance
XV	Dynamic load response: +/- 5% after 2 ms; +/- 1% after 50 ms			C
XVI	Output frequency: Synchronized to mains over the range of 45-65Hz in normal operation, ± 0.5 Hz in battery operation			C
XVII	Operating Temp : 0 to 40 deg C			C
XVIII	User friendly LCD display for real time UPS status			C
XIX	Cold start of load during power failure			M
XX	Overload capability: 125% for 10 minutes (normal operation), • 125% for 1 minute (battery operation)			C
XXI	Maintenance bypass and static by-pass switch			M
XXII	Remote & local emergency power off function			C
XXIII	SNMP Management Card / Modbus Card, RS-232/RJ-45 connectivity with DCIM			M
XXIV	charging and battery testing on user defined time.			C
6	PRECISION COOLING SYSTEM			
	Supply of following items as per Specifications including all accessories, complete in all respect. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			
	Note: Cooling Unit Net Sensible Capacities are after deduction of all tolerances and at minimum of 45 deg. C ambient condition			
	Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control optional should be from same OEM and fully compatible with DCIM			
a)	DX Type Inrow Unit (without heater and humidifier) – 24-29KW Net Sensible Cooling Capacity	No.	4	M
	<u>Required Functionality and Features:</u>			
I	Native dual input (400V/400V)/3Ph/50Hz) or external changeover for dual input			M
II	Variable speed compressor and fans			M
III	Air Volume: ≥ 3300 -3600 CFM			M
IV	Cabinet width = 300mm			M
V	Complete CFD Analysis as per quoted cooling units			M
VI	High Return Air Temperature Capability			C
VII	The standard filters shall be 30% efficient per ASHRAE Standard 52.1 or 52.2.)			C
VIII	Digital Scroll / Brushless VFD Scroll / DC inverter Compressors: Refrigeration system should contain a master controller for greater efficiency and accuracy.			M
IX	Fans: Variable speed DC fan with built in n+1 redundancy			C
X	The precision cooling units should be configured with built-in temperature sensors and built-in temperature & humidity sensor			M
XI	Leak detection sensing cable shall be shipped loose with the unit			M
XII	Alarms: Controller shall activate a visible and audible alarm in the occurrence of multiple events			C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
XIII	The Cooling unit must be equipped with surge protection device.			C
XIV	The unit shall include a network management card, embedded inside the user interface, to provide management through a computer network through MODBUS or BACnet or TCP/IP SNMP			M
XV	Management through the network should include the ability to change set points as well as view and clear alarms			C
XVI	Group control shall automatically rotate units into standby mode based off run-hours when IT load is not high enough to require all units to be active			M
XVII	Auto sequencing of the unit for equal run time			M
b)	DX Type Inrow Unit (with heater and humidifier) – 24kW Net Sensible Cooling Capacity	No.	2	M
	<u>Required Functionality and Features:</u>			
I	Native dual input (400V/400V)/3Ph/50Hz) or external changeover for dual input			M
II	Variable speed compressor and fans			M
III	Air Volume: >= 3300-3600 CFM			M
IV	Cabinet width = 300mm			M
V	Humidifier capacity: 1.5-2 kg/hr.			C
VI	Reheat capacity: 3-4 kW			C
VII	The humidifier shall be self-contained, steam generating type/ Infrared factory piped and wired, automatic solid-state control circuit			C
VIII	Complete CFD Analysis as per quoted cooling units			M
IX	High Return Air Temperature Capability			C
X	The standard filters shall be 30% efficient per ASHRAE Standard 52.1 or 52.2,)			C
XI	Digital Scroll / Brushless VFD Scroll / DC inverter Compressors: Refrigeration system should contain a master controller for greater efficiency and accuracy.			M
XII	Fans: Variable speed DC fan with built in n+1 redundancy			C
XIII	The precision cooling units should be configured with built-in temperature sensors and built-in temperature & humidity sensor, Leak sensor			M
XIV	Leak detection sensing cable shall be shipped loose with the unit			M
XV	Alarms: Controller shall activate a visible and audible alarm in the occurrence of multiple events			C
XVI	The Cooling unit must be equipped with surge protection device.			C
XVII	The unit shall include a network management card, embedded inside the user interface, to provide management through a computer network through MODBUS or BACnet or TCP/IP SNMP			M
XVIII	Management through the network should include the ability to change set points as well as view and clear alarms			C
XIX	Group control shall automatically rotate units into standby mode based off run-hours when IT load is not high enough to require all units to be active			M
XX	Auto sequencing of the unit for equal run time			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
c)	DX Type CRAC Unit (with heater and humidifier) – 20-25kW Net Sensible Cooling Capacity as per required need - For 2x Power Rooms	No.	4	M
	<u>Required Functionality and Features:</u>			
I	Native dual input (400V/400V)/3Ph/50Hz) or external changeover for dual input			M
II	Air Volume: 2400-2700 CFM			M
III	Humidifier capacity: 2-3 kg/hr.			C
IV	Reheat capacity: 3-6 kW			C
V	Electrical supply: 400 V, 50 Hz			C
VI	Air flow discharge: Front Flow			M
VII	Complete CFD Analysis as per quoted cooling units			M
VIII	High Return Air Temperature Capability			C
IX	standard filters shall have a EU4 filtering rating			C
X	should contain a master controller for greater efficiency and accuracy.			C
XI	Suction and discharge pressures should be monitored and electronically controlled			M
XII	EC Centrifugal fans, The fans shall have high performance, very low power consumption and low noise level			C
XIII	High Energy Efficiency Ratio			C
XIV	The control system shall have a 4-7 inch touch-screen display interface			C
XV	The user interface touch screen display shall be externally mounted, password protected, and menu driven			C
XVI	Provide management through a computer network through MODBUS or TCP/IP, SNMP			M
XVII	Management through the network should include the ability to change set points as well as view and clear alarms			C
XVIII	Group control shall automatically rotate units into standby mode based off run-hours when IT load is not high enough to require all units to be active			M
d)	Supply of manufacturer recommended Copper refrigerant piping in cable trays with valves, fittings, thick insulation Pipe and valve Insulation, specialties' etc. as per Specifications including all accessories, complete in all respect	JOB	1	M
	Note: Supplier should verify and supply pipe sizes as per manufacturer recommendations & site conditions			M
	Supplier should prepare a piping schedule and submit to PURCHASER for approval before placing order to manufacturer			M
c)	Indoor to outdoor control cabling, in cable tray, as per manufacturer specifications. Each outdoor unit should connect to respective indoor unit	Job	1	M
d)	NEMA compliant (locally manufactured) Hot dip galvanized Cable Trays for Refrigerant Piping	Job	1	M
e)	Plumbing system for humidifier water supply and condensate drain from cooling units including piping,	Job	1	M

S. No	Required Specifications	U/M	QTY	Compliance
	U-traps, gate valves, solenoid valves, flow meters, flow switches, hangers etc.			
	Note: Drain pipe should be UPVC Sch. 40 type			M
7	ENVIRONMENTAL MONITORING SYSTEM (EMS) AND RACK ACCESS CONTROL			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
	Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			
i)	Integrated Environmental Monitoring Appliance	Job	1	M
ii)	Temperature Sensor	No.	24	M
iii)	Temperature & Humidity Sensor	No.	24	M
iv)	Water Leak Detection System (covering all potential areas of water leakages in Server room, Power Room, MMR Rooms & supporting automatic control of isolation valves/water supply incase of leak detection) Rope Cable /spot detector whichever is required at site	JOB	1	M
v)	EMS Alarm Beacon	No.	2	M
vi)	Temperature & Humidity Sensor with Display (Standalone type) 2x Server Room, 2x Power Rooms, 1x MMR, 1x Staging	No.	6	M
vii)	Air Quality, Room Pressure, Temperature and Humidity Sensor with Electronic Corrosivity Monitor (ISA Standard) with Display. PoE and Wi-Fi support (Standalone type)	No.	2	M
8	INTEGRATED DATA CENTER INFRASTRUCTURE MANAGEMENT SYSTEM (DCIM)			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
	Note: UPS, Inrow Cooling, DCIM, Environmental Monitoring, Racks, Aisle Containment, Rack PDU's and Rack Level Access Control should be from same OEM and fully compatible with DCIM			
i)	Central DCIM Server including Controllers/Gateways (if required) and other allied equipment required to monitor, manage and integrate following systems with DCIM	No.	1	M
ii)	LV Distribution Boards (Digital Energy Analyzer and breaker status integrated with DCIM)			M
iii)	UPS, Batteries and PDU's			M
iv)	Rack PDUs			M
v)	Rack ATS			M
vi)	Access Control System			M
vii)	CCTV System			M
viii)	Environmental Monitoring System			M
	Fire Alarm and Suppression System			M
ix)	Precision Cooling Units			M

S. No	Required Specifications	U/M	QTY	Compliance
x)	Generators			M
xi)	VRF			M
b)	Licensing should be covered for all supplied and monitored equipment of project including the future deployments as per full design capacity of the project. DCIM Server should have dual Power Supply to avoid single point of failure			M
c)	DCIM Workstation	No.	1	M
d)	Configurable Audio Alarm System in NOC integrated with DCIM	No.	1	M
e)	Power, Communication & Control Wiring for complete DCIM system as per manufacturer recommendation in cable tray/EMT Conduit	Job	1	M
f)	Installation, testing, integration and commissioning of above items. Includes integration of DCIM with NOC, SOC Room Video Walls and Data Center Incharge LED Screens	No.	1	M
9	Fire Detection & Suppression System along with VESDA complied with requirements of NFPA 72/NFPA 75/ NFPA 2001 or Equivalent Standard			
a)	Supply of following UL/FM/VDS certified or EN 54 Listed Fire Alarm items as per Specifications including all accessories, complete in all respect. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			
i)	UL/FM/VDS/EN certified, Addressable Fire Alarm Control Panel. Fire Alarm Bell, Fire Alarm Sounder, Abort Switch, Gas Cylinder with actuator & accessories with Installation with open PVC Conduit (3/29) Cable, Sch. 40 pipe Network, Testing & Commissioning for 4 to 5 zones Complete floor including all rooms	No.	1	M
ii)	Supply, installation & commissioning of following Photo electronic heat and smoke detectors, low voltage, solid state, Non Radio Active type, unit-polar and chamber with LED alarm indication to be installed on RCC slab or on false ceiling	Job	1	M
iii)	Integration of Fire panel with DCIM	Job	1	M
iv)	Integration of Fire panel with cooling units	Job	1	M
v)	Integration of Fire panel with Access control system	Job	1	M
b)	Supply of UL listed and FM approved , or equivalent Automatic Novec1230 based Clean Agent Fire Suppression System @ 4.55% Design Concentration including piping, cylinders, controls, clean agent gas etc. For Server room, 1x MMR rooms, 2x power rooms and 1x staging room (Novec 1230)	Job	1	M
C)	VESDA - High Sensitivity smoke detector inclusive in all type piping, wiring, complete in all respects For Server room, 1x MMR, 2x Power Rooms, 1x Staging room	Job	1	M
d)	Personal Protective Equipment: Gas Mask, Gloves, Gum boots, Sledge hammer, flash lights, soft mask)	No.	8	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
e)	Portable Fire Extinguishers /Cylinders at designated locations at ground floor & first floor	Job	1	M
f)	Complete fire/ flame resistant paint on walls, roof as per EN-13501-1, EN 9001/2008	Job	1	M
10	Transformer Dry type - 400KVA			
a)	Supply Installation, testing and commissioning of 400 Kva dry type transformers with enclosure	No.	2	M
I	Winding type = Copper			M
II	Core insulation = Cast resin			M
III	Vector group = Dyn11			C
IV	Primary Voltage = 11Kv			C
V	Secondary Voltage = 415 V phase to phase, Frequency = 50 Hertz			M
VI	Impedance = 6% No Load Losses = 1650Watts Load Losses = 7600Watts HT Tapping range = $\pm 5\%$ Rated short time power frequency withstand voltage = 30Kv (RMS Peak). Rated lightning Impulse withstand voltage = 75Kv. (RMS Peak). The transformer shall be supplied with outdoor enclosure of IP65 rating. The applicable standard for dry type transformers is IEC 60076			C
b)	11Kv Protection/ Metering Panels		2	
I	Supply Installation testing and commissioning of two number 11Kv industrial metering panels and two number 11Kv Transformer Protection panels			
II	Enclosure should be fabricated from 14SWG sheet steel. After fabrication the panels should be cleaned and degreased before the application of Powder Paint			
III	Circuit Breaker rating and type = VCB, 630Ampere Three Pole			
IV	Circuit breaker shall be draw out type with rated voltage = 17.5Kv, Breaking Capacity: 25KA, BIL: 36/95KV, Shunt Trip Coil: 110V DC secondary plug and socket with cover and complete bushing.			
V	CT Ratio 1000A/5A at rated 11Kv, Insulation level 36/95Kv for metering purpose, Burden 15VA, Class 5P20. CT Ratio 400:200A/5A at rated 11Kv, Insulation level 36/95Kv for protection purpose, Burden 15VA, Class 5P20. SP PT, Ratio 11000/ $\sqrt{3}$ (110) V, rated 11Kv, Insulation level 36/95Kv for protection purpose, Burden 100VA, Class 0.5. The panel shall be provided with suitable Ammeters scale (0-1000A) class 1.5 The panel shall be provided with Voltmeter scale (0-15Kv) and three position volt meter selection switch. The Industrial Metering panel shall be provided with KWH, MDI and KWH Meters. Clearance Phase to Phase and Phase to Earth = 160mm. Circuit Breaker pole to pole distance = 210mm.			

S. No	Required Specifications	U/M	QTY	Compliance
	CT to CT distance from center line = 220mm (Protection) & 210mm (metering). PT to PT distance from center line = 245mm. Paint Thickness =.06mm Color =RAL7032. The panel shall be supplied with digital over current and earth fault relay suitable for 5A CT secondary current			
11	Diesel Generator 400 kVA/320kW standby, 50Hz 1500 rpm 400 V with Factory fitted on integral Fuel tank base			
a)	Output Ratings: Genset Prime Power Rating 360 kVA or above	No.	2	
I	International renowned original brand/Manufacturer only. Supply and the manufacturing of Generators should be the same country as the original/actual OEM established in country of origin. No third party/country OEM is allowed in any case. Import documents will be required for inspection.			M
II	Factory should be established and manufacturing engines over 40 years			C
III	Engine = 6 cylinder turbo charged, water cooled			C
IV	Governor Type = Electronic			M
V	The Electronic module should be either "Deep Sea" or equivalent with all necessary protection of the Engine			C
VI	Generators should be able to configure scheduling cycle through control module for maintaining equal running hours			M
VII	Base Frame Type: Heavy Duty Fabricated Steel with Engine and alternator mounting on flexible rubber on a vibration absorbing steel frame			M
VIII	Circuit Breaker Type 3/4 Pole MCCB /ACB			C
IX	Protection Class IP 21 , Insulation Class H			C
X	Excitation System Self Excited Brushless			M
XI	Starting System of Engine Sealed Type Suitable DC Battery & Charging System			M
XII	Protection Built in digital auto main failure (AMF)			M
XIII	Engine Speed: RPM 1500 RPM, Frequency 50 Hz			M
XIV	Fuel Tank piping to assist fuel tanker truck to reach the filling point			M
XV	Internal Fuel Tank Capacity for each Genset: should have 08-Hours or higher continuous running at 100% load			M
XVI	Engine 4 Cycle industrial diesel engine. Air cooled standard radiator. Industrial silencer, Electronics engine control system. Water pre-heater. High combustion efficiency High Fuel Efficiency. Engine control panel Electronic Governor			C
XVII	Performance: Must be G3 and verification required			M
XVIII	Engine Monitoring Coolant temperature Oil pressure			M
XIX	Imported Sound Proof Canopy Highly Corrosion Resistant Construction $\leq 75\text{dB}$ at 1 meter distance			M
XX	Excellent Access Large cable entry area for installation ease Accommodates rear mounted breaker and control panel Double doors on both sides			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
XXI	Security and Safety Lockable access doors, which give full access to control panel and breaker, Cooling fan and battery charging alternator fully guarded Fuel fill, oil fill and battery can only be reached via lockable access			M
XXII	Testing: load testing to prove the Prime Rating of the D.G Set			M
XXIII	25% of full load 2 hrs.			M
XXIV	50% of full load 5 hrs.			M
XXV	75% of full load 8 hrs.			C
XXVI	100% of full load 8 hrs.			M
XXVII	110% of full load 1 hr.			M
b)	Bulk Fuel tank shared for both generators for the storage of enough fuel for the consumption of any single D.G Set for 48hour operations at 100% load along with all required	No.	1	M
12	LOW VOLTAGE DISTRIBUTION BOARDS / SWITCHGEAR			
	Supply of following IEC Type Tested, form 2A, Free Standing Floor / Wall / Flush Mounted, totally Enclosed, Cubical type, Low Voltage Distribution Boards/Switchgear, including Incoming and Outgoing Circuit Breakers and other components as per SLD with cable terminations, incoming and outgoing cables/Bus Tie Duct from Top/Bottom as per Specifications including all accessories, complete in all respect The whole power supply system shall be Concurrent Maintainable in a way that any repair, maintenance, extension or retrofitting work on one path does not affect continuous operation of the second path to IT equipment and there shall be Zero Single Point of Failure in the system			M
I	Note: Type testing limited to component level is not acceptable. Completely assembled DB's including components should be IEC Type Tested. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			M
II	All distribution boards shall manufacture according to the latest international standards IEC 61439-1:2011 and IEC 61439-2:2011; LV Switchgear and Control Gear Assemblies and supplied from manufacturer certified by the association of short circuit testing authorities (ASEFA).			M
III	Color Touch Screen Display is required with SLD display on Main LT Panel Door (for Breaker ON/OFF/Trip Status & energy analyzer should be installed for both main LV & MCC) the analyzer should have communication interface of appropriate protocol for integration with DCIM.			C
IV	Unless otherwise stated all equipment supplied shall conform as a minimum to the following protection classes: Indoor IP.21			M
V	Bidder to share complete short circuit analysis and coordination study of the proposed system.			M
VI	Complete Single line diagram to be provided with proposal.			M

S. No	Required Specifications	U/M	QTY	Compliance
VII	Bidder to propose complete itemized & Quantified BOQ mentioning OEM and model of each proposed item.			M
VIII	Seamless integration of all the solution will be bidder responsibility.			M
IX	Phase Reversal Protection, Auto Phase correction			M
X	Main Panels shall have protection of under / Over-Voltage, Frequency, surge, Phase change			M
XI	20% space required in DBs / Panels for future provisioning			M
XII	Creepage and clearance distances must be as per IEC 61439			C
XIII	Switchboard withstands seismic vibrations (Standard EDF CRT91C11200, AS1170, EAK 2000, ENDESA 1986, RPA 99 2003, Gore GR 63, Turkish Seismic Code, GOST 17516.1-90).			C
XIV	Switchboards to comply Seismic tests are performed by an external laboratory and documents to be provided upon request without any additional cost.			C
XV	Electrical panels & components should be proposed latest of its family.			C
a)	<u>Incoming From Transformer (Type Tested, Form 2A)</u> 1000 Amps 4 Pole adjustable Air Circuit Breaker (ACB) 500-600 Volts, manual stored energy fixed mounting type with adjustable over current devices consisting of long time, short time and instantaneous magnetic short circuit protection devices having rupturing capacity not less than 65 KA at 415 V. with additional 4 copper bus bar of appropriate size for BTB connections on incoming side of ACB.	No.	2	M
II	All Breakers have energy Analyzers and LSIG enabled			M
III	SNMP/Modbus protocol enabled			M
IV	integration with DCIM			M
V	Panels shall have protection of under / Over-Voltage			M
VI	Frequency, surge protection SPD			M
VII	Phase change / Phase Reversal			M
VIII	Earth Leakage, Earth Fault Protection Relay (EFPR)			C
b)	<u>ATS Panels (Type Tested, Form 2A)</u> For ATS Panels ACB rating = 1000A 4P (Draw out type). Auto Manual Transfer Switch suitable for 1000 Amps 4 Pole capable to receive 2 separate supplies, ATS should be able to transfer to the 2nd supply automatically in case of failure of 1st supply. ATS should be able to transfer to 1st or 2nd supply by Manual means in case of Auto transfer system is out of order, type LKE-PC Malaysia/Equ, including cost of all necessary accessories and materials, complete in all respects..	No.	2	M
I	All Breakers have energy Analyzers and LSIG enabled			M
II	SNMP/Modbus protocol enabled			M
III	Integration with DCIM			M
IV	Panels shall have protection of under / Over-Voltage			M
V	Frequency, surge protection SPD			M
VI	Phase change / Phase Reversal			M

S. No	Required Specifications	U/M	QTY	Compliance
VII	Earth Leakage, Earth Fault Protection Relay (EFPR)			C
VIII	Independent maintenance bypass panel of each ATS having adjustable ACBs of suitable rating with mechanical interlocking,			M
	Auto Load switching between both Gensets on each ATS panels			M
c)	LV Distribution Panels 1000 Amps 4 Pole adjustable Motorized Air Circuit Breaker (ACB) 500-600 Volts, manual stored energy fixed mounting type with adjustable over current devices consisting of long time, short time and instantaneous magnetic short circuit protection devices having rupturing capacity not less than 75 KA at 415 V. with additional 4 copper bus bar of appropriate size for BTB connections on incoming side of ACB.	No.	2	M
I	All Breakers have energy Analyzers and LSIG enabled			M
II	SNMP/Modbus protocol enabled			M
III	integration with DCIM			M
IV	Panels shall have protection of under / Over-Voltage			M
V	Surge protection SPD			M
VI	Earth Leakage, Earth Fault Protection Relay (EFPR)			C
VII	Distribution			
VIII	320 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, for 160KVA UPS			M
IX	320 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, for Cooling			M
X	200 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, 60KVA UPS			M
XI	75 Amps 4 pole adjustable Molded Case Circuit Breaker (MCCB) with overload and short circuit protection, For facility Load- Non UPS Output from this breaker will be routed through an additional DB, bidder is advised to propose DB as per requirement			M
d)	Power factor improvement panel – 75KVAR			
I	Provision of indoor type Automatic Power factor Improvement Panel as per solution design to be installed adjacent to Main Panel distribution panel consisting of 6x capacitors of 12.5KVAR, suitable for 440 Volts, HRC fuses, bases and links, 12 steps automatic reactive relay digital type, “ON” indication lights, power factor meter, push buttons, auxiliary contactors, Hand - Off - Auto switch, discharging chokes, all other necessary materials	No.	2	M
e)	Detailed Electrical SLD as per Vendor proposed equipment	No.	1	M
13	BUSWAY TRUNKING DISTRIBUTION (BTD) AND ELECTRICAL LOW VOLTAGE CABLES, EPO			

S. No	Required Specifications	U/M	QTY	Compliance
a)	<p>Supply at site, installation, testing and commissioning of triple pole and neutral, insulated busway trunking distribution as per approved SLD, Made of electrolytic copper 99.9%/Aluminum, housed in aluminum casing which act as an earth having louvers at sides, wire mesh, all other accessories required like tees, bends, right angle bends. ASTA and KEMA accredited laboratories to ensure the products supplied meet the international requirement</p> <p>Ingress protection ratings should available IP55 for Indoor and IP66/IP68 CAST Resin for outdoor. Configuration shall be TP/N as 100% Phase and 100% Neutral.</p> <p>Manufactured in accordance with IEC61439-1 and IEC61439-6. Type Tests 10.2.2 Resistance to Corrosion, 10.2.3.2 Resistance to Abnormal Heat and Fire Due to Internal Electric Effects, 10.2.4 Resistance to Ultraviolet (UV) Radiation.</p> <p>Seismic Compliance shall have a qualification level - high (Zone-4&5) in accordance to IEEE standard 693-2005.60068-2-3 (Damp Heat Cyclic) and UL Classified E+I Engineering completed extensive testing at UL accredited laboratories to ensure the products supplied meet UL requirements.</p>			M
b)	Actual length of the BTB shall be measured at site by vendor before its manufacturer. BTB shall be connected on L.T side of Transformer, Gensets and Main distribution Panel and precision Cooling units.			C
i)	1000 Amps three phase and neutral BTB from transformer 1&2 to ATS panel inclusive of all bends, Tee, Angles and installation material	Job	1	M
ii)	1000 Amps three phase and neutral BTB from Genset 1&2 to ATS panel inclusive of all bends, Tee, Angles	Job	1	M
iii)	1000 Amps three phase and neutral BTB from ATS panel-1&2 to Main distribution panel-1&2 inclusive of all bends, Tee, Angles and installation material	Job	1	M
iv)	320 Amps three phase and neutral BTB from Main distribution panel 1&2 to UPS1&2 PDM rack at server room	Job	1	M
v)	320 Amps three phase and neutral BTB from Main distribution panel 1&2 to Server Room and power room precision Cooling units including required number Tap offs/ PIUs with required rating size	Job	1	M
				M
b)	Supply of following size of multi core / single core Cu/XLPE/LSZH ECC, armored / unarmored, 99.99% copper, 0.6 kV/1 kV grade copper cable in cable tray, ladder, raceways or underground conduits as per Specifications including all accessories, complete in all respect			M
I	Cable manufacturer should be ISO 9001 Certified, and in large scale cable manufacturing business for at least 20 years. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			M

S. No	Required Specifications	U/M	QTY	Compliance
II	Supplier should take site measurements, prepare a cable schedule and submit to PURCHASER for approval before placing order to manufacturer			M
c)	Single point of emergency equipment shutdown for multiple devices EPO inclusive of all allied components and wiring	Job	2	M
14	GROUNDING / EARTHING SYSTEM			
a)	Supply of following items for complete Earthing system, including Excavation and backfilling, Bentonite chemical, other all required materials and accessories, Earthing test point, Inspection Chamber, Cad weld, boring, Telecom / Grounding Bonding Busbars, labor, tools, transportation etc. as per Specifications including all accessories, complete in all respects BS 7430 - Code of practice for Earthing BS 951 - Electrical Earthing. Clamps for Earthing and bonding specifications BS 6346 - PVC insulated cables	JOB	1	M
	Note: Earth resistance not more than 1 ohm.			C
	Independent Earth pits for all type of equipment which included but not limited as below,			M
i)	Transformers			M
ii)	Generators			M
iii)	independent Power panels			M
iv)	UPS			M
v)	IT Racks			M
vi)	VRF			M
b)	Copper connecting points, copper test link, man hole for Earthing, testing complete in all respects			M
d)	Supply and installation of Identification, Tagging and Labelling Works of all electrical components complete in all respect as per BS standards	Job	1	M
15	Active Lightening /Surge Protection solution			
i)	Lightening /Surge Protection solution for Data Centre as per IEC62305, NF C 17-102, UNE 21186:2001 or equivalent	Job	1	C
ii)	Active capturing system to function in accordance with principle of early streamer emission (ESE)			M
iii)	100% efficacy in discharge capture			M
iv)	Lightning rod without electrical components			M
v)	Maximum accepted current 200kA or high			C
vi)	High resistance temperature upto: 125C			M
vii)	Should be able to provide lightning strike count			M
16	HVAC: VRF COMFORT COOLING SYSTEM FOR OPERATIONS AREA			
a)	Supply of following items as per Drawings and Specifications including all accessories, complete in all respect			
	VRF manufacturer should be ISO 9001 Certified, in large scale commercial air-conditioning manufacturing business for at least 20 years and among world renowned leading brands			M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	Each VRF Unit should have separate piping system			C
i)	VRF Outdoor Condensing Unit 60 - 70 kW Nominal Cooling Capacity with 2- 3 outdoor units and N+1 Compressor configuration		1	C
ii)	Operation Range (Cooling): -15°C ~ 55°C			M
iii)	Operation Range (Heating): -30°C ~ 24°C			M
iv)	Compressor Type: Inverter Scroll			C
v)	Refrigerant Type: R-410			M
vi)	Power Supply(V/Ph./Hz): 380~415v/3N/50Hz			C
vii)	Sound Pressure Level(dB): 60			C
viii)	Indoor Unit Type: 360 Air Discharge Cassette			C
ix)	Power Supply(V/Ph./Hz): 220-240V ~ 50 Hz			C
x)	Air Flow Volume: 3 Speed			C
xi)	Sound Pressure Level(dB): 40			C
xii)	Drain Pipe Dia(mm): 25			C
xiii)	Manufacturer approved Copper Refrigerant Piping in cable trays, fittings, 19 mm thick Pre-molded Foam Pipe, tee, elbow, bends, flares, Y joint specialties etc. Note: Supplier should submit piping design generated by manufacturer's software tool	Job	1	C
xiv)	NEMA compliant (locally manufactured) Hot dip galvanized Cable Trays for Refrigerant Piping	Job	1	C
xv)	uPVC Class 'E' pipes and fittings for Condensate Water drainage including fittings, bends, cuttings, filling etc.	Job	1	C
xvi)	Premium full function wired remote controls for each zone	Job	1	C
xvii)	Communication/Control and Power Wiring in Conduit/Cable Tray as per manufacturer recommendations	Job	1	M
xviii)	Dual redundant indoor units in MMR			C
b)	Integration with DCIM and Fire panel	Job	1	M
c)	4-Way Cassette 4 Ton	No.	2	C
d)	4-Way Cassette 1.5 Ton	No.	3	C
e)	4-Way Cassette 2.5Ton	No.	1	C
f)	Fresh Air duct type indoor unit	Job	1	M
S. No	DESCRIPTION	U/M	QTY	
B	MISCELLANEOUS AND ANCILLARY WORK			
1	IP BASED ACCESS CONTROL SYSTEM			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
	Access Control manufacturer should be ISO 9001 Certified, and in large scale access control manufacturing business. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			C
	Access control and CCTV solution should be of same brand for centralized management from single software			M
i)	Biometric Access Control 4 in 1 Face/ Fingerprint/RFID Card/PIN Recognition, EM Lock (600Lbs), ZL Bracket, Exit Push Button, POWER Supply, installation and integration with DCIM	Job	9	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	CE/FCC or equivalent certified Minimum Users Capacity = 1000			C
	Touch Screen size - 5-7 inch			C
ii)	Electromagnetic Door Lock with Magnetic Contact and matching power supply	No.	9	M
iii)	Contactless/Touch-free Exit Button with Beep sound & LED Status Indicator	No.	9	C
iv)	Door Panic / Push Bar	No.	2	C
v)	Manual Key Over-Ride	No.	9	C
vi)	Door Siren	No.	2	C
vii)	Emergency Door Release	No.	9	C
viii)	Remote door release switch at reception counter	No.	1	C
b)	Access Control and Time Management Server (Hardware + Software)			M
	<u>Required Functionality and Features:</u>			
	WEB Portal, Client Server Topology			C
	Native Access, SQL Express, SQL, MySQL, Oracle			C
	Export Attendance data			C
	Unlimited Users, PUSH technology			C
	Message Broad Cast Facility, Emergency Alarm Action			C
	System integrated with CCTV			C
	Provides cardholder management, door force alarm, door too long open alarm, full alarm and event processing, alarms	No.	1	C
	Alerting via email			C
	Detailed audit trail records			C
	Built-in flexible reports			C
	System Calendar (for sophisticated scheduling)			C
	Face template management			C
	Attendance Management			C
	Shift Management			C
c)	Visitor Management System integrated with Main Access Control:	No.	1	C
	<u>Required Functionality and Features:</u>			C
	Visitor registration			C
	Web based preregistration by hosts			C
	Host notification on visitor arrival			C
	Print professional color visitor passes with expiration date, visit area, host, and purpose of visit			C
	Visitor sign out and notification to host			C
	Includes: Front desk workstation, camera, signature pad, business card/ID Card/Driving License scanner, visitor pass printer and software, Computer system as per required specs			C
d)	Proximity Cards HID credit card standard size and thickness, thin, flexible polyvinyl chloride laminated, passive type, easy printable on both sides	No.	50	C
2	IP BASED CCTV SYSTEM			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	CCTV manufacturer should be ISO 9001 Certified, and in large scale CCTV manufacturing business. The proposed Make, Brand should have reference install base in Tier-III Data Centers.			M
	Access control and CCTV solution should be of same brand for centralized management from single software			M
i)	Fixed Type Bullet IP Camera- for building outside	No.	4	M
	4 Megapixel, VF 2.8-12mm, 1/2.7" Progressive Scan CMOS , Color: 0.001 Lux @ (F1.0, AGC ON) Day/Night Vision, Motion Detection HD Bullet Camera			C
	Resolution 2688 × 1520, IR Illumination Range: 50m IR Night Vision			C
	True WDR 120dB, intrusion detection, motion detection, line crossing			C
	Camera shall have a horizontal and vertical 'Field Of View' wide enough to completely cover all areas			C
	128GB local memory for storage			C
	802.1x authentication			
ii)	Fixed Dome IP Camera Ceiling/Wall Mounted - indoor	No.	8	M
	Color 4 Megapixel, VF 2.8-12mm, Day/Night Vision, Motion Detection HD Dome Camera			C
	Resolution 2688 × 1520, IR Illumination Range: 50m IR Night Vision			C
	True WDR 120dB, intrusion detection, motion detection, line crossing			C
	Camera shall have a horizontal and vertical 'Field Of View' wide enough to completely cover all areas			C
	128GB local memory for storage			C
	802.1x authentication			
iii)	Thermal Bullet Camera for Core Components 2x Genset, 2x Transformer, 2x Cooling Outdoor	No.	6	M
	Image Sensor Vanadium Oxide Uncooled Focal Plane Arrays			C
	Thermal Resolution 256 × 192 or high			C
	Pixel Pitch 12 μm			C
	Spectral Range 8 μm to 14 μm			C
	Focal Length 3.6 mm or higher			C
	Min. Focusing Distance 0.4 m			C
	Heat detection and alarm, tripwire, intrusion, and target filtering.			C
	Optical Module, Image Sensor 1/2.7" Progressive Scan CMOS			C
	Resolution 2688 × 1520			C
	WDR 120 dB, Image Effect			C
	Target Coloration Yes. Supported in white hot and black hot mode.			C
	128GB local memory for storage			C
iv)	Thermal Dome Camera for Core Components 4x Server room, 2x Power Rooms, 1x MMR	No.	7	M
	Image Sensor Vanadium Oxide Uncooled Focal Plane Arrays			C
	Thermal Resolution 256 × 192 or high			C
	Pixel Pitch 12 μm			C

S. No	Required Specifications	U/M	QTY	Compliance
	Spectral Range 8 µm to 14 µm			C
	Focal Length 3.6 mm or higher			C
	Min. Focusing Distance 0.4 m			C
	Heat detection and alarm, tripwire, intrusion, and target filtering.			C
	Optical Module, Image Sensor 1/2.7" Progressive Scan CMOS			C
	Resolution 2688 × 1520			C
	WDR 120 dB, Image Effect			C
	Target Coloration Yes. Supported in white hot and black hot mode.			C
	128GB local memory for storage			C
v)	64 Channel Network Video Recording solution Rack Mounted with SAN Storage and redundant power supply.	No.	1	M
	<u>Functionality and Features:</u>			C
	Simultaneous view 25fps@ full resolution , playback, backup & remote monitoring			C
	Supports HD recording with cameras up to 5MP			C
	Video Compression: H.264 / H.265			C
	Storage Capacity: 90 days or higher			M
	HDD with RAID-5			C
	Automatic backup and storage on backup media			C
	Network Interface 10/100/1000-Base-TX, RJ-45			C
	VGA OUT & dual HDMI outputs with output resolution of 4K and 1080p			C
	Remote access via iOS, Android, PC / Mac Integrated with NOC & DOC Room Video Walls, Behavior analysis features : intrusion, area entry, area exit			C
vi)	Complete solution for recording of all cameras on Cloud storage - 15 days	Job	1	M
	Including bandwidth and required storage 25fps@full resolution			C
vii)	CCTV Management Workstation (Core i7 13 th GEN Slim Branded Desktop PC with Windows 11 Prof 64bit, 16 GB RAM, 2TB SSD HDD including Wireless Keyboard & mouse. Display 23.8" or higher QHD with IPS, must have feature for high adjustment and forward/backward tilt and same color as the full tower.	No.	1	M
viii)	24 Port Managed 10/100/1000 Layer 3 Stackable full POE switch, 2 x10G SFP ports, 40 Gbps forwarding bandwidth, enterprise class security features, SNMP support, Redundant Power Supply, stacking cable	No.	2	M
ix)	CAT-7 Structured Cabling for complete CCTV system as per manufacturer recommendation in cable tray/EMT Conduit	Job	1	M
3	VIDEO Wall DISPLAYS			
	Supply of following items as per Specifications including all accessories, complete in all respect			
	Video Displays manufacturer should be ISO 9001 Certified, in large scale screen manufacturing business			C

S. No	Required Specifications	U/M	QTY	Compliance
	for at least 10 years, among world renowned leading brands			
	Video controller can be from same manufacturer or third-party but fully compatible with Video Wall			C
a)	NOC /SOC Room 4K/UHD Video Wall 2x3 + 2x3 LCD Screen with Video Controller	Job	1	M
	Nos. of LCD Screens: (6+6) 12 Each LCD Size: 55 inches with wall mount brackets			M
	Industrial level IPS LCD panel, suitable for continuous 24h/7 operation			M
	Brightness: 500 cd/m2 or high			M
	Ultra-narrow 0.9mm bezel-to-bezel design or low · Anti-glare panel, vivid and memorable image quality			M
	Response Time: 8ms			C
	Input: Display Port, HDMI 2, DVI-D, Analog, USB, Audio			C
	Same OEM supplied Pop-up type wall brackets			C
	Sensor: IR/Ambient			C
	Video Controller should support: 12x Multi input and 12x Multi output			C
	Including all allied components and accessories, complete in all respects			C
4	Video Conferencing System for Conference Room/s			
a)	Supply of following items including all accessories, complete in all respect,			
i)	Display For Conference Room	No.	1	M
	Required Functions and Features:			
	Display, digital QLED, 95" or higher			M
	Includes codec, camera, microphones, and speakers in a single device			M
	4K UHD Camera: 5 x zoom or high, face detection			M
	120 degree Field of View			M
	Wired or wireless content and presentation sharing			M
	Wireless sharing through App/Client			M
	Screen/display integration through HDMI CEC			M
	HDMI 4k input and output			M
	10/100/1000 Ethernet			M
	Conferencing capability with all devices (smart phones, tablets, laptop, PC's)			M
	Presentation Cable: 8m 4k certified			M
b)	Mini PC with 10th Gen or latest Intel Core i5, Intel Optane Memory/SSD + 1 TB HDD Storage, 16 GB RAM, UHD Graphic Processor, 6 x USB Ports Type A and C, integrated LAN, Wi-Fi and Bluetooth, Windows 11 64 bit or latest	No.	1	M
	Mini PC should be mounted on back of LCD Screen			M
c)	1 x Wireless Presentation Dongle	Job	1	M

S. No	Required Specifications	U/M	QTY	Compliance
	1 x Cable Cubby Retractable Type: 2 x Data, 2x USB, USB-C – HDMI, VGA USB-C – DisplayPort modules			M
5	CABLE TRAY AND LADDER for Cables distribution in complete Facility rooms			
a)	Supply of following size of NEMA or equivalent standard compliant (locally manufactured) base perforated Cable Tray with cover, 16SWG, Hot Dip Galvanized, appropriate sizes and lengths of MS Rod / Angle Iron Supports, C-channel and anchor Bolts (HILTI/FISHER), including cutting, welding, jointing and necessary required hardware etc. for installation at ceiling, wall, or in floor screeding etc. as per Specifications, complete in all respect	Job	1	M
b)	Supply of following size of NEMA or equivalent standard compliant (locally manufactured) Cable Ladder, Hot dip Galvanized including all installation accessories such as appropriate sizes and lengths of MS Rod / Angle Iron Supports, C-channel and anchor Bolts (HILTI/FISHER), including cutting, welding, jointing and necessary required hardware etc. for installation at ceiling, wall, or in floor screeding etc. as per Specifications, complete in all respect	Job	1	M
c)	Bidder should prepare and submit cable tray and cable ladder schedule according to site requirement	Job	1	M
6	RACEWAYS AND BOXES			
a)	Supply following size (inner diameter) PVC/ UPVC Pipe, as race ways with all accessories including junction boxes etc., recessed / surface on wall / column Specifications, complete in all respect.	Job	1	M
b)	Bidder should prepare and submit pipes, raceways and junction boxes schedule according to site/solution requirement	Job	1	M
c)	Installation of raceways and boxes including civil works, complete in all respects	Job	1	M
7	WIRING FOR LIGHTING & POWER SOCKETS			
a)	Supply of following items as per Specifications including all accessories, complete in all respect			
i)	Circuit wiring from DB-LP to Switchboard including wiring between switch on the same circuit with 2x2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable + CPC 2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable in 25mm diameter EMT conduit, surface / recessed in wall, column, etc., including with all conduit accessories, connectors, ceiling rose, flexible wires, sheet steel boxes, tagging etc.	Job	1	M
ii)	Point wiring for light point from Switch Board to Light Point with 2x2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable + CPC 2.5 sq.mm 1 core Cu/XLPE/LSZH insulated cable in 25mm diameter EMT conduit, surface / recessed in wall, column, etc., including with all conduit accessories, connectors,	Job	1	M

S. No	Required Specifications	U/M	QTY	Compliance
	ceiling rose, flexible wires, sheet steel boxes, tagging etc.			
iii)	Supply & install new lighting point's c/w light switches and using 2 x 1C/1.5mm sq. PVC cable in PVC pipe for Server room, NOC, MM, Lobby and Power rooms	Job	1	M
8	INTERNAL / EXTERNAL LIGHT FIXTURES			
a)	Supply of following specialized 24x7 type light fixtures complete with LED lamps/panels, compliant to IEC 60598, IEC 62031 or equivalent standard, Electronic Driver including all suspension, rated life 50,000 hours, standard white or day light white 5000k colors, mounting, fixing and hanging materials, brackets, chains, hooks etc. as per Specifications including all accessories, complete in all respect			
	Light manufacturer should be ISO 9001 Certified, and in large scale light manufacturing business for at least 20 years			C
i)	Supply, installation and fixing of data center special lights LED (min 500 LUX) antiglare size 2' x 2' for Server room, with motions sensors, NOC, SOC, Systems team room, Network team room, MMR, Lobby and Power rooms,	JOB	1	M
ii)	Pole mounted LED Flood Light, 100W, IP65 including Pole for boundary walls	JOB	1	C
iii)	Stand Alone Motion/Occupancy Sensor (IP-40)for Corridor Lights having following specifications:			C
	Coverage Range: 360°			C
	Operating Voltage: 230V AC		-	C
	Timing Range: 5 sec to 20 minutes			C
	Connection: Parallel Switching Mode			C
iv)	Supply, installation and fixing of special lights LED (min 500 LUX) antiglare size according to proposed design for, NOC, SOC, Lobby			M
9	EMERGENCY / EXIT LIGHTING			
a)	Supply following rechargeable NiCad battery-operated (3hrs backup) self test LED emergency lights, rated life 50,000 hours, compliant to BS5266/IEC598-2 or equivalent standard as per Specifications including all accessories, complete in all respect			M
	Light manufacturer should be ISO 9001 Certified, and in large scale emergency light manufacturing business for at least 10 years			C
i)	Supply & installation of Emergency Light c/w battery pack and accessories.	No.	-	M

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
10	STRUCTURED CABLING SYSTEM FOR DATA CENTER & OPERATIONS AREA			
a)	Supply of following Fiber items including all accessories, complete in all respect Note: Below items will be required to establish the fiber network connectivity of server room with MMR	JOB	1	
i)	Fiber Patch Panel 48 Port - MMR 1&2			C
ii)	Fiber Optics Multimode OM-4 LC/LC Patch Cord MMR 1&2 to Server room distribution Racks			M
iii)	Cat 7 STP patch cord Cable with RJ-45 Connectors (Ready to use) Server room racks		-	M
iv)	Cable Management - Complete floor			M
v)	4"x4" Rigid PVC Fiber Raceway and Routing System	Job	1	C
b)	Supply and installation of CAT-6 Network cabling including faceplates and metal back boxes for NOC, SOC, Systems team room, networks team rooms, MMR, Power rooms Staging area, Lobby, security/reception area and few nodes in Server room and integration of DCIM.	Job	1	M
	Structured Cabling manufacturer should be ISO 9001 Certified, and in large scale cable manufacturing business for at least 10 years. The proposed Make, Brand should have reference install base in Tier/Rated-III Data Centers.			M
i)	48 port shutter type Cat-7, RJ 45 UTP Patch Panel fully loaded with tool less jacks and cable manager			C
ii)	Dual shutter face plates including I/Os for all tables in NOC, SOC, Systems team room, Networks team room, CISO Room, Chief IT Room, Secretary room, conference room and allied facilities			C
11	MISCELLANEOUS ITEMS			
a)	Supply of following items including all accessories, complete in all respect			
a)	Electronic rodent repulsion system based on Ultra-sonic technology with sweep frequency outputs in all rooms, corridors and outside areas related to datacenter equipment with required cables, conduits (Standalone type), Ultrasonic rodent repellent solution of active multiple devices , Ability to configure Variable frequency			M
b)	Tools:	Job	1	
	2 x Computer Room Cart for laptop/consoles, adjustable height			M
	1 x Spot Thermal Camera, hot spot detection, 5 MP Camera, 3" auto-orientation touch screen, still images recording capability in local storage, Wi-Fi and USB interface. Suitable for inspection of electrical and cooling equipment			M
	12x Commercial Grade HEPA Vacuum Cleaner			M
	1 x Thermal Automatic Shoe Cover Dispenser with LCD Display			M

S. No	Required Specifications	U/M	QTY	Compliance
c)	Air purifier as per room dimensions For: Server Room, NOC	Job	1	M
d)	Supply and installation of Identification, Tagging and Labelling Works of all ELV components complete in all respect as per TIA, BS and NFPA standards	Job	1	M
e)	Tool kit, (plier set, screw driver set, combination set spinner (6-32mm)-, digital multi meter, clamp meter AC & DC, Cable cutters, wire strippers, personal protective equipment, thimble presser, genset filter opener, hacksaw adjustable ladder, chargeable drill, chargeable blower, knife, hammer, leaser measuring tape, measuring tape, earth testing meter, digital network cable tester, L key set star and hexa, hydraulic wire crimping tool, angular disc electric grinder)		1	M
S. No	DESCRIPTION	U/M	QTY	
C	CIVIL AND INTERIOR WORKS			
1	Brick & Plaster Work			
i)	Providing and laying first class burnt brick, straight or curved 9" & 4" thick wall as required	Job	1	C
ii)	Providing and laying 1/2" - 3/4" thick ordinary Portland cement & Sargodha sand plaster 1:4 on brick walls at any floor, any height	Job	1	C
iii)	Chicken wire mesh is to be provided at the junction of concrete and masonry work or wherever it is required before plastering work	Job	1	C
2	Dismantling works at Complete First floor			
i)	Dismantling existing wall paneling, partitions, false ceiling, electrical fixtures, any surplus items	Job	1	M
ii)	Extracting designated door frames along with their shutters, including fixtures and hardware			M
iii)	Eliminating all existing electrical fittings, encompassing wiring, cables, panels, distribution boards			M
iv)	Clearing out any other outdated materials or fixtures in the first-floor area that are no longer needed			M
v)	Properly disposing of all removed materials as needed while ensuring site cleanliness			M
3	Modular Wall Partitioning			
a)	Supply of following imported Modular Dry Wall Partition System as per Drawings and Specifications including all accessories, complete in all respect			M
	Dry wall manufacturer should be ISO 9001 Certified, and in large scale drywall manufacturing business for at least 15 years. The proposed Make, Brand should have reference install base in Tier-III Data Centers or Telecom Sites.			C
i)	5"-to-6" thick 2 hour fire rated Modular Dry Wall partitions (imported), consisting of double layered 15mm or thicker fire resistant type C or X Gypsum boards on each side. Galvanized steel Metal Profile (frame studs/standing frame/steel channels) insulation, bolts, screws, fitting and finishing accessories etc.,	Job	1	M

S. No	Required Specifications	U/M	QTY	Compliance
	heavy weight anchoring where required, 4" PVC skirting, acoustic and noise control, moisture/liquid resistant. Includes painting three coats of matt enamel lead-free, dust/moisture resistant paint (on both sides of partition) of approved color and finish			
	Certified to BS 476 or ATSM E119 or DIN 4102-4 or equivalent standard			C
	Note: Gypsum Board, Metal Profile (frame studs/standing frame/steel channels) insulation, bolts, screws, fitting and finishing accessories etc. should be from same manufacturer. Fire Rated Drywall design, installation and commissioning should be validated and endorsed by manufacturer			C
ii)	5"-to-6" thick Modular Dry Wall partitions consisting of 12mm or thicker Gypsum boards, OEM supplied galvanized steel studs/standing frame/steel channels, fitting and finishing etc., heavy weight anchoring where required, 4" PVC skirting, acoustic and noise control, moisture/liquid resistant. Includes painting three coats of matt enamel lead-free, dust/moisture resistant paint (on both sides of partition) of approved color and finish	Job	1	M
3.1	GLASS PARTITION			
a)	Supply of following Glass Partitions as per Site Requirement	Job	1	C
4	DOORS			
a)	Supply of following Doors and Windows as per Drawings and Specifications, complete in all respect. Finishing with high-quality aesthetics Server room-2x, Power rooms-2x, MMRs-1x, Stores-1x, Staging room-1x			C
i)	Imported 2 Hour Fire Rated powder coated G.I./Steel door, UL Listed with automatic closer & vision panel and acoustic control. Min 40mm thick leaf, 1.2mm face/back/frame steel, gasket, Hinges: 3 – 4 stainless steel, shrouded or concealed bearing type fitted to each leaf. Lever bolt: one each fitted on top and bottom. Tested according to NFPA 252 or EN 1634-1 or UL 10C or BS 476 Part 22 equivalent standard and installation conforming to NFPA 80. 2x Server room, 2x Power Rooms, 1x MMR, 1x Stores, 1x Staging Room	No.	7	M
	Size: 3'-6"X7'-6" / 4'x7'6"			C
	Frame should be specialized type for Dry Wall installation			M
	Customizable with wide selection of RAL colors			C
	Panic bar on 1 x Emergency Exit doors only			C
ii)	Commercial Bullet proof glass door including Stainless steel frame on top and bottom, floor spring, bottom patch lock, SS handles, frosting	No.	1	C
	Door Size: 6' x 7'6" (Two Leaf)			C

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S. No	Required Specifications	U/M	QTY	Compliance
iii)	Commercial Office grade wooden door including steady wooden frame, floor spring, SS handles and lock NOC, Conference room, Kitchen	No.	3	M
	Size: 3'6" x 7'			C
	Wooden Door manufacturer should have fully automated manufacturing facility			M
5	PAINT WORKS of Office Areas			
a)	Supply of following Paint Works as per Drawings, complete in all respect			M
i)	Painting two coats of matt enamel lead-free, dust/water/moisture resistant paint, on existing concrete/brick walls of approved color and shade and preparation of surfaces with priming, putty/under coat	Job	1	C
ii)	Painting two coats of matt enamel lead-free, dust/water/moisture resistant paint, on existing ceiling of approved color and shade and preparation of surfaces with priming, putty/under coat	Job	1	C
6	FURNITURE AND FIXTURE WORKS			
a)	Supply of following high quality branded Furniture items as per vendor provided Drawings including all accessories, complete in all respect			M
	Note: The dimensions of furniture and fixtures are flexible as per approval and as best suited for site conditions. All furniture items shall be of high quality and as per approved design and finish			M
	Furniture manufacturer should have fully automated manufacturing facility			M
i)	Conference Room:	Job	1	
	1 x Conference room Table with Cable Cubby fixed on top			C
	27 x Ergonomic imported Meeting Chair 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclinable, adjustable seat height, tilt locking			C
	2 x Matching Credenza, two sliding doors lockable			C
ii)	NOC + SOC Team Room:	Job	1	C
	16 x purpose designed imported NOC Console for Command and Control Centers			C
	16 x Ergonomic imported Operator Chair, 4-dimensional padded arm rest, lumbar support, adjustable backrest & headrest, flex mesh breathable tensile fabric, hydraulic wheel base, reclinable, adjustable seat height, tilt locking BIFMA Compliant			C
	2 x Matching Credenza, two sliding doors lockable			C
iii)	Kitchen Area	1	1	C

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
	• Wall Cabinet Providing and fixing in position hanging type open shelves; cabinet frame made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, cabinet shutter made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, approved, on top, front and side with grooves; 3/8" thick lacquered deodar wood lipping on all edges; including divider, shelves; imported magnetic hinges, lock, stainless steel handles. (Interwood, workman or equivalent)			C
	• Floor Cabinet Providing and fixing in position low height type cabinets; cabinet frame made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, cabinet shutter made up of 20mm thick mdf board pressed on both sides with A Grade Lamination, approved, on top, front and side with grooves; 3/8" thick lacquered deodar wood lipping on all edges; including divider, shelves; imported magnetic hinges, lock, stainless steel handles with polish finish as per approved samples. (Interwood, workman or equivalent)			C
	8x Kitchen chairs along with 1x kitchen table			1
	1x Full size refrigerator			M
	1x Water dispensers High quality			M
	1x Ovens high quality			M
iv)	Spares equipment Room: 1 Rooms	Job	1	
	MS Storage Rack modular/adjustable			C
	Dimension 5' L x 3.5' D x 7' H with 2 shelves & 2 columns 5' L x 3.5' D x 7' H with 3 shelves & 2 columns 5' L x 3.5' D x 7' H with 1 shelves & 1 column			C
	Heavy duty metal steel shelving, made of 18-gauge steel, powder coated and self-supporting structure. 4 x Shelves, adjustable rack position at different height/ levels (for Store Room)			C
	Fixing and commissioning of above items			M
v)	Reception Area:	Job	1	
	1 x Manager Desk, structure in solid wood/Oak Veneer durable non scratch laminated top, with integrated cable management system & cubby			C
	1 x Matching Side Rack, two top drawers lockable and bottom two filling, keyboard/CPU Tray			C
b)	Fixing and commissioning of above items	Job	1	M
7	SIGNAGE WORKS			
a)	Supply and fixing of following Signage Works as per Drawings, complete in all respect			M
i)	Main Signage on Reception/Waiting Area with 3D Printed FBR Logo	Job	1	C
ii)	Flush mounted engraved Room Signs & Name Plates. Signages in corridors shall be mounted on right angled brackets	Job	1	C
8	FALSE CEILING AND FLOOR TILING WORKS			

ANNEX-A

S. No	Required Specifications	U/M	QTY	Compliance
a)	Supply and fixing of following items as per approved design and finish, complete in all respect			M
	Note: False Ceiling shall be as per approved size and in accordance with interior designing works			M
i)	Complete Corridors, NOC, Conference Room, Kitchen	Job	1	C
b)	Supply and fixing of FLOOR tiles as per approved design and finish, complete in all respect			C
i)	Commercial office grade full body Porcelain 2'x2' scratch resistant floor tiles with 4" skirting For: Conference room, Kitchen	Job	1	C
c)	Antistatic Floor tiles, High quality inclusive of complete Allied material For Server Room, Power Rooms, MMR, Staging Room, NOC, Store	Job	1	M
9	INTERIOR DESIGN WORKS			
a)	Design and Supply High Quality interior design works, including material such as cladding, wall finishes etc. and services, for Reception, Huddle Room, NOC, SOC, DOC, Incharge Office, Breakout Area, corridors etc. in accordance with international IT Offices trends, complete in all respect:	Job	1	M
i)	Design and Supply High Quality interior design works, including material such as cladding, wall finishes etc. and services, for Reception, Huddle Room, NOC, SOC, DOC, Incharge Office, Breakout Area, corridors etc. in accordance with international IT Offices trends, complete in all respect:	Job	1	M
ii)	Furniture and Fixture Details and Layouts	Job	1	M
iii)	MEP and Lighting Details and Layouts	Job	1	M
iv)	Floor and Wall Finish Details and Layouts	Job	1	M
v)	Reflected Ceiling Plan Details and Layouts	Job	1	M
vi)	3D render imaging of all individual rooms	Job	1	M
vii)	Note: The Supplier should appoint a professional interior designer for this job	Job	1	M
11	Project Implementation Plan (PIP)	Job	1	M
12	Service Level Agreement	Job	1	M