

- (1) Must use a Maintenance Free such as Sealed Lead Acid or better battery
- (2) The battery must be flame resistant.
- (3) The battery must be able to provide backup for not less than 10 minutes while operating on full load throughout the lifetime of the battery.
- (4) The battery pack must be installed within a battery cabinet which must be strong, rust-free or installed as a built-in within the UPS
- (5) Must have battery protection system such as individually fused or Circuit Breaker or better.
- (6) Other accessories, such as terminals connections between rows and between layers of batteries.

2.3 1500 kVA Uninterruptable Power Supply (3 phase)

2.3.1 Input Features

- (1) Input voltage: 250 to 600, 3 Phases
- (2) Input frequency: 40 to 70 Hz (or better)
- (3) THDI (Total current harmonic distortion): less than 3% at full load or better
- (4) Input Power Factor: 0.98 or better

2.3.2 Output characteristics

- (1) Output voltage: 380/400/415V, 3 Phases
- (2) Output frequency: 50 Hz \pm 0.1% (or better)
- (3) Total voltage harmonic distortion (THDV): Less than 3% for non-linear load or better
- (4) Overload capacity: 10 minutes for 125% overload or better
- (5) Output Power Factor: 0.9 or better

2.3.3 Display Unit: The proposed UPS system

- (1) Must have a LCD Display for displaying the status and anomalous conditions of the UPS.
- (2) Must have a LCD displays for displaying information such as voltage, current, power, backup time, etc.

- (3) Must have a communication port (Potential-free contact) that supports connection to a computer.

2.3.4 Performance and Standards:

- (1) Must meet these following international standard:

EMC/EMI/RFI: : IEC 62040-2 or EN 62040-2

Safety: : IEC 62040-1 or EN 62040-1

Other (Option): : CE or TUV

2.3.5 Environmental conditions

- (1) Operating Temperature Range: 0 - 40 ° C (or better)
- (2) Relative humidity: less than 90 (non-condensing) (or better)

2.3.6 Spare Power System (Battery)

- (1) Must use a Maintenance Free such as Sealed Lead Acid or better battery
- (2) The battery must be flame resistant.
- (3) The battery must be able to provide backup for not less than 10 minutes while operating on full load throughout the lifetime of the battery.
- (4) The battery pack must be installed within a battery cabinet which must be strong, rust-free or installed as a built-in within the UPS
- (5) Must have battery protection system such as individually fused or Circuit Breaker or better.
- (6) Other accessories, such as terminals connections between rows and between layers of batteries.

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The letter 'R' in the middle.
A signature at the bottom right.

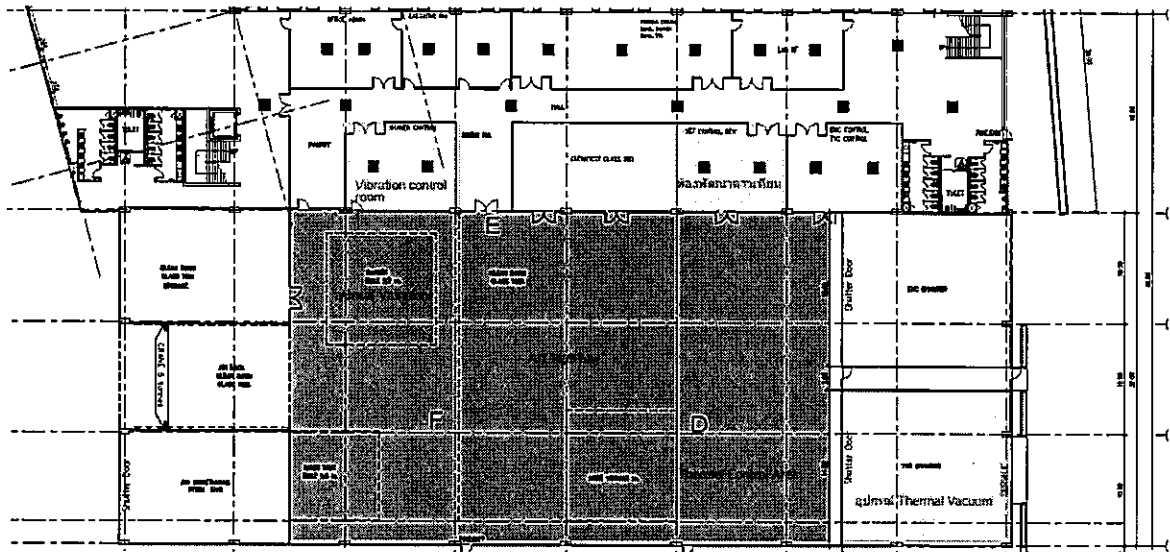


Figure 28: Layout and location of equipment that must be connected to the Uninterrupted Power Supply

3. Transformers with complete installation

- 3.1 The Transformers must not be less than 2,000 kVA or the full power requirement of the satellite AIT facility including all the equipment as per the scope of this work. As well as the air conditioning and office lighting including all internal power supply.
- 3.2 The transformers must be hermetically Sealed Fully Oil with Transformer
- 3.3 Must have copper coils
- 3.4 The input voltage must be 33,000 volts or according to the Provincial Electricity Authority
- 3.5 The output voltage must be 400/230 Volt
- 3.6 The frequency must be 50 Hz
- 3.7 The no-load power loss must be no more than 3300 watts
- 3.8 The power loss when loaded and at 75 ° C must not exceed 24,000 watts
- 3.9 Must meet IEC 60076 standard
- 3.10 The warranty must be no less than 2 years
- 3.11 Must include two inspections year already included in the price
- 3.12 The transformers proposed must have been tested and approved by the Provincial Electricity Authority.

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Appendix E.

Scoring Rubric for proposal consideration.

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Appendix E - Scoring Rubric for proposal consideration.

Table 2: Scoring Rubric for technical evaluation

Item no.	Details	Weight	Full Score	Received Score	Scoring Details	Note
1	Vibration Test		50			
	Sine $\geq 160\text{Kn}$		4		4 points $\geq 170\text{kn}$, 3 points $\geq 165\text{kn}$, 2 points $\geq 160\text{kn}$	
	Random $\geq 160\text{Kn}$		4		4 points $\geq 170\text{kn}$, 3 points $\geq 165\text{kn}$, 2 points $\geq 160\text{kn}$	
	Shock $\geq 300\text{Kn}$		4		4 points $\geq 500\text{kn}$, 3 points $\geq 400\text{kn}$, 2 points $\geq 300\text{kn}$	
	Maximum Displacement $\geq 30\text{ mm (P-p)}$		4		4 points $\geq 70\text{mm}$, 3 points $\geq 50\text{mm}$, 2 points $\geq 30\text{mm}$	
	Maximum load capacity $\geq 500\text{ kg}$		4		4 points $\geq 1500\text{kg}$, 3 points $\geq 1000\text{kg}$, 2 points $\geq 500\text{kg}$	
	Minimum frequency $\leq 5\text{ Hz}$		4		4 points $\leq 3\text{Hz}$, 3 points $\leq 4\text{Hz}$, 2 points $\leq 5\text{Hz}$	
	Acquisition data $\geq 64\text{ channel}$		4		4 points $\geq 100\text{Ch}$, 3 points $\geq 80\text{Ch}$, 2 points $\geq 64\text{Ch}$	
	sampling rate $\geq 51\text{kHz}$		4		4 points $\geq 100\text{kHz}$, 3 points $\geq 70\text{kHz}$, 2 points $\geq 51\text{kHz}$	
	The average weight of the 1-axis accelerometer		2		2 points $\leq 30\text{g}$, 1 points $\geq 30\text{g}$	
	The average weight of the 3-axis accelerometer		2		2 points $\leq 30\text{g}$, 1 points $\geq 30\text{g}$	
	Lowest ambient temperature of sensor		3		3 points $\leq -20\text{C}$, 2 points $\geq -20\text{C}$	
	Highest ambient temperature of sensor		3		3 points $\geq 150\text{C}$, 2 points $\leq 150\text{C}$	
	Amplitude sine error smaller than $\pm 10\%$		4		4 points $\leq 0\%$, 3 points $\leq \pm 2\%$, 2 points $\leq \pm 5\%$, else 1 points	
	Frequency sine error smaller than $\pm 2\%$		4		4 points $\leq 0\%$, 3 points $\leq \pm 1\%$, 2 points $\leq \pm 2\%$, else 1 points	
	Warranty		10			

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Item no.	Details	Weight	Full Score	Received Score	Scoring Details	Note
	Warranty ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	After sales service		15			
	Maintenance services ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Calibration services ≥ 1 year		5		5 points ≥ 5 years, 4 points ≥ 3 years, 3 points ≥ 1 years	
	Experience		20			
	Installation Experience (years)		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Installation Experience (in Space sector)		5		5 points = Have relevant experience, 2.5 points = No relevant experience	
	Contract value (baht)		5		5 points ≥ 20 million baht, 4 points ≥ 15 million baht, 3 points ≥ 5 million baht	
	Distributor		5			
	Authorized distributor		5		5 points = possess authorized distributor letter, 2.5 points = does not possess authorized distributor letter	
	Total points (100)	20%	100	A1		
2	Thermal Vacuum Chamber		50			
	internal diameter ≥ 1.8 m		7		7 points ≥ 2m, 6 points ≥ 1.9mm, 5 points ≥ 1.8m	
	length ≥ 1.5 m		7		7 points ≥ 2m, 6 points ≥ 1.8mm, 5 points ≥ 1.5m	
	Minimum Temperature ≤ -150 C		6		6 points ≤ -170C, 5 points ≤ -160C, 4 points ≤ -150C	
	Maximum Temperature ≥ +150 C		6		6 points ≥ +170C, 5 points ≥ +160C, 4 points ≥ +150C	

Item no.	Details	Weight	Full Score	Received Score	Scoring Details	Note
	Heating rate ≥ 2.0 C/min		6		6 points ≥ 4.0 C/min, 5 points ≥ 3.0 C/min, 4 points ≥ 2.0 C/min	
	Cooling rate ≥ 2.0 C/min		6		6 points ≥ 4.0 C/min, 5 points ≥ 3.0 C/min, 4 points ≥ 2.0 C/min	
	(Vacuum pressure $\leq 10^{-6}$ mbar		6		6 points $\leq 10^{-8}$ mbar, 5 points $\leq 10^{-7}$ mbar, 4 points $\leq 10^{-6}$ mbar	
	Acquisition data ≥ 128 channels		6		6 points ≥ 200 Ch, 5 points ≥ 150 Ch, 4 points ≥ 128 Ch	
	Warranty		10			
	Warranty ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	After sales services		15			
	Maintenance services ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Calibration services ≥ 1 year		5		5 points ≥ 5 years, 4 points ≥ 3 years, 3 points ≥ 1 years	
	Experience		20			
	Installation Experience (years)		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Installation Experience (in Space sector)		5		5 points = Have relevant experience, 2.5 points = No relevant experience	
	Contract value (baht)		5		5 points ≥ 20 million baht, 4 points ≥ 15 million baht, 3 points ≥ 5 million baht	
	Distributor		5			
	Authorized distributor		5		5 points = possess authorized distributor letter, 2.5 points = does not possess authorized distributor letter	

Item no.	Details	Weight	Full Score	Received Score	Scoring Details	Note
	Total points (100)	20%	100	A2		
3	Mass properties measurement		40			
	Highest spin rate		10		10 points ≥ 300 RPM, 9 points > 270 RPM, 8 points ≥ 250 RPM	
	Total dynamic unbalance measuring error < ± 5%		10		10 points ≤ ± 3%, 9 points ≤ ± 4%, 8 points ≤ ± 5%	
	CG accuracy < +0.1%		10		10 points ≤ +0.01%, 9 points ≤ +0.05%, 8 points ≤ +0.1%	
	MOI accuracy < ± 0.1%		10		10 points ≤ ± 0.01%, 9 points ≤ ± 0.05%, 8 points ≤ ± 0.1%	
	Warranty		10			
	Warranty ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	After sales services		15			
	Maintenance services ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Calibration services ≥ 1 year		5		5 points ≥ 5 years, 4 points ≥ 3 years, 3 points ≥ 1 years	
	ประสบการณ์		25			
	Installation Experience (years)		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Installation Experience (in Space sector)		10		5 points = Have relevant experience, 2.5 points = No relevant experience	
	Contract value (baht)		5		5 points ≥ 20 million baht, 4 points ≥ 15 million baht, 3 points ≥ 5 million baht	
	Distributor		10			
	Authorized Distributor		10		5 points = possess authorized distributor letter, 2.5 points = does not possess authorized distributor letter	

Item no.	Details	Weight	Full Score	Received Score	Scoring Details	Note
	Total points (100)	20%	100	A3		
4	Clean room					
	Warranty		20			
	Warranty ≥ 1 year		20		20 points ≥ 5 years, 18 points ≥ 3 years, 16 points ≥ 1 years	
	After sales services		20			
	Maintenance services ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Calibration services ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Experience		60			
	Installation Experience (years)		20		20 points ≥ 5 years, 18 points ≥ 3 years, 16 points ≥ 1 years	
	Installation Experience (in Space sector)		10		10 points = Have relevant experience, 5 points = No relevant experience	
	Contract value (baht)		30		30 points ≥ 20 million baht, 20 points ≥ 15 million baht, 10 points ≥ 10 million baht, 5 points ≥ 5 million baht	
	Total points (100)	5%	100	A4		
5	UPS 1,500 KVA		40			
	Overload capacity		20		20 points ≥ 20 minutes, 18 points ≥ 15 minutes, 16 points ≥ 10 minutes	
	output power factor		20		20 points ≥ 1.0, 18 points ≥ 0.9, 16 points ≥ 0.8	
	Warranty		10			
	Warranty ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	

Item no.	Details	Weight	Full Score	Received Score	Scoring Details	Note
	After sales services		15			
	Maintenance services ≥ 1 year		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Calibration services ≥ 1 year		5		5 points ≥ 5 years, 4 points ≥ 3 years, 3 points ≥ 1 years	
	ประสบการณ์		25			
	Installation Experience (years)		10		10 points ≥ 5 years, 9 points ≥ 3 years, 8 points ≥ 1 years	
	Installation Experience (in Space sector)		10		5 points = Have relevant experience, 2.5 points = No relevant experience	
	Contract value (baht)		5		5 points ≥ 20 million baht, 4 points ≥ 15 million baht, 3 points ≥ 5 million baht	
	Distributor		10			
	Authorized Distributor		10		5 points = possess authorized distributor letter, 2.5 points = does not possess authorized distributor letter	
	Total Points (100)	5%	100	A5		

Technical Evaluation Scoring (70) = (0.2*A1) + (0.2*A2) + (0.2*A3) + (0.05*A4) + (0.05*A5)

Financial proposal score (30) is scored whereby the lowest bidder shall receive a full score and the score shall be adjusted accordingly based on the ratio of price differences according to the following formula:

Financial proposal score (30) = 30 * (price of the lowest proposal / price of the proposal under consideration)

The overall score = Technical Evaluation Scoring + Financial proposal score

Therefore, the successful bidder shall be whom evaluated the highest overall score.

List of Deliverables

No.	Lists	Specifications	Amount	Unit	Milestone	Note
Appendix A. the characteristics of the equipment and measurement for satellite test and integration						
1.1	Vibration Test	≥ 160 KN	1	Set	5	
1.2	data acquisition	(64 CH) or more than				
2	Thermal Vacuum Chamber	-work space diameter ≥ 1.8 m and L ≥ 1.5 m temp ≤-150c to ≥150c	1	Set	7	
3	Thermal Cycling	-work space 1.5x1.5x1.5 m -temp ≤-70c to ≥150c	1	set	3	
4	Mass Properties Measurement	-maximum load 3500 kg (exclude L fixture)	1	set	6	
5	Theodolite	Total station	3	set	2	
Appendix B the characteristics of supporting equipment and facility						
1	Installation clean room Class 100k	30x50x12 m	1	room	8	
	Installation clean room Class 100k	10x15x12 m	2	room	8	
	Accessories					

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No.	Lists	Specifications	Amount	Unit	Milestone	Note
	shutter door electrical type for loading room	- w 8 x h 6 m	2	set	8	
	shutter door electrical type for EMC room	- w 5 x h 6 m	1	set	8	
	Passed box		1	set	8	
	Air shower box		1	set	8	
	Locker for Ground coat		1	set	8	
	Ground coats, clean room shoes, cleanroom gloves and hair caps		500	set	8	
	Safety goggles and earplugs		50	set	8	
2	Installation - clean tent class 100	10 x 20 m	1	set	8	
3	Foundation Isolator		1	set	4	
4	Furniture					
	4.1 Stainless steel working table	≥ 0.81 x 1.5 x 0.7 m.	10	set	4	

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No.	Lists	Specifications	Amount	Unit	Milestone	Note
	4.2 Table for holding satellite	≥ 1.2 x 2 x 0.7 m. (supports 500 kg)	2	set	4	
	4.3 Chair with ESD-Safe standard		20	set	4	
	4.4 ESD-Safe Parts Storage Cabinets with Drawers		2	set	4	
	4.5 Standard Tool Storage Cupboard		2	set	4	
	4.6 Corrosive Safety Cabinet		1	set	2	
5	Materials Handling Equipment					
	5.1 ESD-Safe Stackable Super Tek-Tray	size 18"x11-3/8"x1-3/4" – 10 sets and size 22-3/4"x17-1/2"x2-1/2" – 10 sets	20 (10/size)	set	4	

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No.	Lists	Specifications	Amount	Unit	Milestone	Note
	5.2 ESD-Safe Steel mobile shelving system		4	set	4	
	5.3 Two-tier stainless-steel trolley	(Wire-Shelving System 2 levels)	3	set	4	
	5.4 Mobile Instruments Cart	(Mobile Instruments Carts Optional Steel Cabinet)	5	set	4	
	5.5 Utility Carts with Pneumatic Wheel	(Utility Carts) PNEUMATIC WHEELS	3	set	4	
	5.6 Single-tier Stainless steel cart		2	set	4	
	5.7 Plastic Pallet	Plastic Pallet	5	set	4	
	5.8 Stainless steel trash bin		5	set	4	
	5.9 A-shape Aluminum ladder	Height is not less than 1100 millimeter (Ladder aluminum type A ≥ 1100mm)	1	set	4	

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No.	Lists	Specifications	Amount	Unit	Milestone	Note
	5.10 A-shape Aluminum ladder	Height is not less than 2075 millimeter (Ladder aluminum type A ≥ 2075mm)	1	set	4	
	5.11 Mobile Stainless-Steel ladder	(Ladder stainless with wheels)	1	set	4	
	5.12 Anti-electrostatic Adjustable Wrist Strap	(Adjustable Wrist Strap with 6ft. Coil Cord)	20	set	4	
6	Forklift for Clean room		1	set	4	
Appendix C Hand tools equipment						
1	Screwdriver / hex wrench	(Screwdriver / hex wrench)	3	set	2	
2	Torque Wrench / Screwdriver	(Torque Wrench)	3	set	2	
3	Screwdrivers / nuts / screws	(Screwdrivers / nuts / screws)	3	set	2	
4	Socket Sets	(Socket Sets)	3	set	2	

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No.	Lists	Specifications	Amount	Unit	Milestone	Note
5	Spanner sets	(Spanner sets)	3	set	2	
6	Tool cart with toolbox		1	set	2	
7	Pliers and Cutters	(Pliers and Cutters)	3	set	2	
8	Inspection/Marking up	(Inspection/Marking up)	3	set	2	
9	General tools		3	set	2	
10	Hammers	(Hammers)	3	set	2	
11	IR Thermometers	(IR Thermometers)	1	set	2	
Appendix D Security System and Electrical Supply						
1	CCTV camera	≥ 24 CH	1	set	5	
2	UPS	(120Kva,1500Kva)	2	set	4	
3	Transformer	2000 KVA	1	set	3	

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