Corrigendum

With reference to the Package No. TEQIP-III/2019/UP/mmug/145 Dated 6th Oct 2019 for Real Time Power Electronics Simulator technical specifications please find below revised specification as in **Annexure-A** and date of submission of this package (TEQIP-III/2019/UP/mmug/145) is extended up to **5th November 2019 by 3:00 PM**. Rest all terms and conditions will remains same as per earlier RFP.

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Annexure-A

Schedule of Requirement

S. No.	DESCRIPTION	QTY
1.	1) It should be a Real Time Simulation Platform using both CPU & FPGA Co-Simulation Technology for Plant & Controller Simulation on a Single Hardware Chassis for Power Electronic Simulations, Applications & Studies. If, it is matlab based than it is compatible with [MATLAB-Simulink based {Version 2019 (a)}]. 2) It Should have at least the mentioned or better* CPU Configuration: Intel Xeon E3, 4 Core CPU, 3.2 GHz. (for better configuration attached the comparative table between it and clearly mentioned attached justified practical literature) 3) It should have at least the mentioned or better* FPGA Configuration: Xilinx Kintex 7 325T, 326000 logic cells, - 840 DSP Slice. (for better configuration attached the comparative table between it and clearly mentioned attached justified practical literature) 4) It Should have at least the mentioned or better* memory Configuration: 8GB RAM, solid state hard Disk 128 GB. 5) It Should have at least Four I/O Cards in a Single Chasis – 16 AI, 16 AO, 32 DI, 32 DO 6) The I/O Cards should be Reconfigurable & FPGA Based to minimize latency in ADC, DAC, DI, and DO. 7) Should have at least the mentioned or better* I/O Cards Configuration: a. Analog input card (16 channels, 500 kS/s, 16 bits, ±20 V), short circuit protected & FPGA based control b. Analog output card (16 channels, 1MS/s, 16 bits, ±16 V, 10mA) short circuit protected &FPGA based control c. Digital input card (32 channels, optocouplers, 4.5 V to 50 V, 40 ns, 3.5mA) with minimum propagation delay, short circuit protection & galvanic isolation d. Digital output card (32 channels, push-pull, 5 V to 30 V, 200 ns to 65 ns, 50mA) with minimum propagation delay, short circuit Protection & galvanic isolation (for better configuration attached the comparative table between it and clearly mentioned attached justified literature) 8) It Should have Fast or better optical interface sockets for optional Small Form-factor Pluggable (SFP&SFP+) 1 to 5 Gbits/s optical cable pairs (Rx/Tx).	1No.

	(for better configuration attached the comparative table between it and clearly mentioned attached justified literature) 9) The Modelling & Programming Environment should be open available standard software. If, it is MATLAB based than it is compatible with [MATLAB-Simulink based {Version 2019 (a)}]. 10) It should be compatible with at least two standard software like PLECS, PSPICE, Multisim, [MATLAB & Simulink {Version 2019 (a)}] etc. 11) It should run in embedded mode option. ie. Once model is flashed on to the simulator it should run same functionalities, which is embedded on the simulator even after rebooting simulator. It should not require loading the same model. 12) It should have all connector to connect complete plant for HIL purpose a. Various Connectors like JTAG, USB, Ethernet Connectors, Synchronization Connectors, DB37 connectors for digital and analog I/O, DB9 connectors for RS422 differential signal inputs and outputs, Standard ATX computer connectors: mouse and keyboard, USB ports, network ports. b. All other connector, which is used to connect with computer for controlling purpose and hardware setup for connection purpose. 13) All supporting latest genuine (original) software to run a simulate the program should be required and provided (if needed). Real Time Power Electronic Simulator should support all the below mentioned capabilities on Single Simulator hardware Chassis with (Supporting executed simulation with verified output waveform document on HIL system): - • Scalable processing, Multi core CPU processing, Multi-processing, FPGA Processing. • CPU Simulation, FPGA Simulation and CPU + FPGA Co-simulation • Multi rate simulation • Hardware in Loop (HIL) Simulation, Rapid Control Prototyping (RCP) simulation and Model in Loop Simulation Techniques. • Controller Simulation, Plant Simulation and both plant and controller simulation • Generate PWM pulses • Simulate IEEE bus systems models like IEEE 39 or more than 39 bus System (Supporting executed simulation with verified output waveform document on HIL) • Simulate upto or more 32 Power Electronic Switches on FPGA (Supporting executed simulation with verified output waveform document on HIL) • Execute Models Built in Modelling & Programming Environment in Real time on Hardware. If, it is MATLAB based than it is compatible with [MATLAB-Simulink based {Version 2019 (a)}].	

	(Supporting executed simulation with verified output waveform document on HIL) • Simulate customized simulation Models of solar, wind and hybrid systems in addition to conventional power systems built in Modelling & Programming Environment. If, it is MATLAB based than it is compatible with [MATLAB-Simulink based {Version 2019 (a)}]. (Supporting executed simulation with verified output waveform document on HIL) • Simulate detailed Wind power plant using DFIG or PMSG (Supporting executed simulation with verified output waveform document on HIL) • Execute detailed model of multiple solar PV panels-based PV farm (Supporting executed simulation with verified output waveform document on HIL) • Simulate CIGRE benchmark two-terminal LCC-HVDC (Supporting executed simulation with verified output waveform document on HIL) • Simulate various FACTS devices like SVC, TCSC, STATCOM, UPFC and so on. (Supporting executed simulation with verified output waveform document on HIL) • Simulate power converters associated with Renewable source operating at High switching frequencies (Supporting executed simulation with verified output waveform document on HIL) • Send up to 16 CT/PT/CVT signals to actual protection relays, PMUs and other Intelligent Electronic Devices (IEDs) • Receive up to 32 status/command signals in the form of digital inputs from external controllers and components • Perform closed loop testing of low voltage interface protection relays for different contingencies in the power network • Detailed simulation of multilevel inverters / converters (up to or more than 32 switches) used in medium voltage industrial drives & power conversion applications (Supporting executed simulation with verified output waveform document on HIL) • Prototype control algorithms for laboratory scale converters used in renewable energy, power quality applications etc. (Supporting executed simulation with verified output waveform document on HIL) • Prototype control of wind energy systems using DFIG or PMSG (Supporting executed simulation with verified output waveform document on HIL) • Control a wind turbine emulator system using DC motor setup (Supporting executed simulation with verified output waveform document on HIL) • Prototype different control schemes associated with Solar PV inverters (Supporting executed simulation with verified output waveform document on HIL) • Validate control algorithms of Switched Mode Power Supply (SMPS) and UPS	

	(Supporting executed simulation with verified output waveform document on HIL) • Test industrial controls for drives such as Direct Torque Control, V/f etc. (Supporting executed simulation with verified output waveform document on HIL) • Models developed in Sim Power Systems/Sim Electrical for Power converter should be possible to run directly on the FPGA without VHDL/Verilog conversion : If, it is MATLAB based than it is compatible with [MATLAB-Simulink based {Version 2019 (a)}]. (Supporting executed simulation with verified output waveform document on HIL)	
2.	**HIL Controller Interface - High Voltage & High Current Measurement Box with Sensors for Hardware in Loop Applications compatible with RT Real time Simulator:** It consists of high current and high voltage probes with signal conditioning & cables. It can intake upto 600 V and give an output of 0-30V so that live voltage can be taken inside the simulator and provided to the model / controller logic being implemented inside the simulator hence facilitating Live voltages from DER Sources to a simulated Controller / Plant Model	1. No
3.	**Necessary Connectors and cables**	Yes
4.	**Hard copy / Soft copy installation / training manual**	yes