ANNEXURE: I

TECHNICAL BID PROFORMA

Item Name: Sixteen Channel Battery Cycler

1.0 **Bidder Eligibility Criteria:**

I	**Bidder Eligibility Criteria-I (Public Procurement – Preference to Make in India)**	**Class I / Class II**	**Local Content value**	**Reference, Page No.**
I	Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16th September 2020 and other subsequent orders issued therein.			
2.0	**Bidder Eligibility Criteria-II**	**Compliance (Yes/No)**	**Reference Page No.**	**Remarks, If any**
1	The bidder/OEM should have supplied at least 1 similar items to IITs, NITs, IISERs, CSIR Labs or other Govt. R&D organizations in the last 2 years, PO copies or installation certificates along with contact details of end user need to be submitted as the proof of supply. IIT Madras reserves its right to verify the claims submitted by the bidder and the feedback from the previous customers will be part of technical evaluation.			

3.0 **Technical Compliance:**

SNo	Specification	**Complied or Not Complied**	**Ref.Page.NO**
1.	Technical Specifications		
	1. Number of channels required – 16		
2.	Voltage specifications		
	a. Voltage range: 0 V to ±5 V or better.		
	b. Measurement resolution should be 18 bit or better		
	c. Measurement precision should be 100 ppm or better.		
	d. Voltage control accuracy at 0.02% FSR.		
3.	Current specifications		
	a. Each channels should work at least between 10 μA and 1A		
	b. Should operate at more than three current ranges between 10 μA and 1A.		
	c. Measurement resolution should be 18 bit or better.		
	d. Current control accuracy should be 0.02% FSR or better		

	e. The switch over time between charge and discharge measurement should be less than 0.1 milliseconds.		
	f. Time precision should be 100 ppm or better		
	g. Each channels should possess dedicated microcontroller and should operate at 20 MHz or faster. Any unusual safety hazards while cycling batteries should be automatically detected by the microcontroller and the machine should be shut-off to avoid damage and by the microcontroller and the machine should be shut-off to avoid damage		
4. Electrochemical Impedance Setup.			
	a. The vendor should be provide and electrochemical impedance analyzer that can be used all the 16 channels		
	b. The impedance measurement setup should be an external electrochemical		
	workstation that can operate between 1 MHz and 1 mHz or better		
	c. The quoted impedance setup should be capable of operating independently without		
	battery cycler.		
	d. The integration module between the impedance setup and battery channels should be provided		
	e. Automatic queueing of channels to access impedance setup should be made.		
	This would enable channels to automatically wait for the impedance analyzer.		
	f. The setup should be accommodating more channels (at least upto a maximum of 32 channels) in future.		
5. Software			
	a. The software should be capable of operating all the sixteen channels along with the impedance measurement.		
	b. All channels should be able to operate in parallel and any of channels should be able		
	to operate at any current/voltage ranges simultaneously.		
	c. Should be able to operate in constant current, constant voltage, constant power and at any given C-rate.		
	d. Should be able to use user defined power profiles or current profiles to test batteries in real time conditions.		
	e. The instrument should have a provision to add/integrate more channels, in future, to the existing battery cyclers.		
	f. USB interface or ethernet should be provided to communicate with PC.		
	g. A data acquisition system with all the computing facilities for controlling and collecting data from the battery cycler should be provided.		
	h. Minimum two years onsite warranty from the date of installation of the products.		

	i. Optional components: Accessories including auxiliary voltage measurement, auxiliary temperature measurements, auto calibration options, and any additional accessories available for the quoted product shall be quoted under the optional category		
	k. Installation and training onsite is required.		