

# यूजीसी-डीई वैज्ञानिक अनुसंधान संकुल

## UGC-DAE Consortium for Scientific Research

(विश्वविद्यालय अनुदान आयोग, एमएचआरडी, भारत सरकार के तहत एक स्वायत्त संस्थान)  
(An Autonomous institution under University Grants Commission, MHRD, Government of India)  
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Mumbai Centre, 246-C, CFB, B.A.R.C., Trombay, Mumbai - 400 085.

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Ref. No.UDCSR/MUM/601/AO/2023-24/565

Dated: 16<sup>th</sup> February, 2024

## NOTICE INVITING TENDER

UGC-DAE Consortium for Scientific Research, Mumbai Centre invites Bids in sealed cover, from eligible bidders for supply of the under mentioned:

Tender No.	Description of the Item	Quantity	Due date for Submission of Bid
NIT NO.01/2023-24 Dated : 16 <sup>th</sup> February, 2024	Ferroelectric PE loop tracer with High Voltage Amplifier	As per Annexure-I	07 <sup>th</sup> March, 2024

Details of the tender document i.e. Technical Specification and Commercial terms & conditions is mentioned at Annexure-I and Annexure-II respectively.

### ANNEXURE-I (TECHNICAL SPECIFICATION)

#### Important Notes

- The bidder must provide detailed specification of each equipment/item. Model numbers, data sheets and brochures must be included for each quoted equipment/accessories/item. Specifications corresponding to quoted model number must be available publicly via OEM's website for scrutiny. If not, the bid can be disqualified on technical grounds.
- The Institute reserves the right to ask for photographs/CAD drawings/ design proofs to satisfy themselves of the proven capabilities of the system being offered. The bidder must provide these details within two working days of receiving such a request via email. Decisions regarding technical compliance of the bidder can be taken on the basis of this information.
- Compliance sheet for the technical specification and OEM Brochure have to be attached along with the technical bid. Vendor has to fill the compliance sheet and mention page number or reference number in the OEM brochure. Unfilled / partially filled sheets lead to disqualification.
- It is mandatory for bidders to quote items having local content minimum 20%. Refer revised Public Procurement (Preference to Make in India), Order 2017, No. P-45021/2/2017-PP (B.EII) dated 16.09.2020 issued by DPIIT, Ministry of Commerce and Industry, Govt. of India. (Submit duly filled Annexure VII for the same).

SI No.	Item	Required Specification
<b>A. Measurement Capabilities</b>		
1	Voltage Range	$\pm 100$ V (with built-in internal amplifier), expandable up to $\pm 10,000$ V or $20,000$ V peak to peak with high voltage interface and external amplifier Note: 100V should be built-in to the system, no external amplifier will be allowed up to 100V
2	Number of ADC BIT	At least <b>18 BITS</b> (attach information in the compliance report from the main manufacturer of this ADC, the system cabinet will be opened

		during installation to check the same)
3	Minimum Charge Resolution using in-built-in electron counter circuit or electrometer	< <b>0.8 fC or lower</b> ( <i>femto coulombs range</i> )
4	Maximum Charge Resolution	<b>5.26 mC</b>
5	Maximum Number of Data Points required for highest accuracy	<b>At least 32000</b>
6	Minimum area resolution	<b>0.080 <math>\mu^2</math></b>
7	Minimum leakage current	<b>2pA or lower</b>
8	Internal Clock	(At most) <b>25 ns</b>
9	Hardware Ports Required  <i>Note: Detailed annotated pictures of front/back of instrument case demonstrating capability for (a), (b), (c), (d) needs to be attached with bid. Unclear information will lead to disqualification.</i>	(a) External Sensor Input port - Two independent channels. Should accept analog input in the $\pm 10V$ range with 18 BIT resolution. (b) Sync Port - should allow for triggering of charge measurement using an external trigger. The tester/setup must be capable of capturing external sensor data synchronously with polarization measurements (c) I2C (d) Electrometer/Electron counter port
10	Supported Capabilities (with basic system with no hardware configuration change or simultaneous measurement capability)	<b>Hysteresis, Remanent Hysteresis, Leakage, Charge, Retain, Resist, Fatigue, I-V, C-V, PUND, Imprint, Leakage Current, Poling, Dynamic Leakage Compensation/Time dependent compensation etc.</b>  The software operating the tester must be programmable and capable of executing all measurement types in an arbitrary order without configuration change ( <i>i.e. without changing the probes to the sample all measurements should be carried out simultaneously</i> ).  <ul style="list-style-type: none"> <li>• Captured data must be automatically stored and easily transferred to other testers using network protocols.</li> <li>• The tester software must be adaptable to future changes in the host computer operating system.</li> <li>• The tester/setup must be capable of capturing external sensor data synchronously with polarization measurements.</li> <li>• Computer and Ferroelectric Test System should be separate and connected through USB Cable, so that in future any advanced new computer can be utilized with Ferroelectric Test System.</li> <li>• System should not work with any dedicated sample holder. Any kind of sample should be connected with appropriate wirings and measured &amp; can be connected to any available cryogenic chamber or any available furnace.</li> </ul>

11	Software	<p>(a) The system should incorporate software for <b>Poling Studies</b> of samples (<b>AC+DC Poling facility</b>).</p> <p>(b) The system should incorporate software for <b>C(V)</b> measurement from 1 Hz to 1 MHz.</p> <p>(c) The system should incorporate software for <b>Time Dependent Compensation/ Dynamic Leakage Compensation</b>.</p>
<b>B. Charge and Current Hysteresis Capability</b>		
1	Minimum Hysteresis Frequency	At most 0.03 Hz
2	Maximum Hysteresis Frequency	At least 270 kHz at $\pm 100V$ (270 kHz@100V) (18 bit resolution at maximum measuring frequency: 2 MHz)
3	Waveforms  <i>Note: Detailed annotated screenshots of GUI demonstrating capability for (a) and (b) needs to be attached with bid. Unclear information will lead to disqualification.</i>	<p>(a) In-built waveforms: (At least) Triangular, Sinusoidal, Standard Monopolar, Double Bipolar, Inverse cosine, Double bipolar sine, Switched triangular, Unswitched triangular/ 10% pulse for charge decay characterization, Pulse, All zeros waveform for disturbance sensitivity measurement.</p> <p>(b) User defined: Capability to generate waveform from file with at least 32000 points.</p>
<b>C. Pulsed Measurement Capability</b>		
1	Minimum Pulse Width	At most <b>0.5<math>\mu</math>s</b>
2	Maximum Pulse Width	At least <b>1s</b>
3	Maximum Delay between Pulses	At least 10 hours
4	Waveforms  <i>Note: Detailed annotated screenshots of GUI demonstrating capability for (a), (b) needs to be attached with bid. Unclear information will lead to disqualification</i>	<p>(a) Inbuilt: PUND</p> <p>(b) User Defined: Capability to build pulse waveform incorporating (at least) four pulse periods. In each period, capability to set the:</p> <p>(i) Negative voltage value and time</p> <p>(ii) Two different positive values and times</p> <p>(iii) Zero voltage value and time</p>
<b>D. Capacitance Measurement Capability</b>		
1	Minimum Small Signal Capacitance Measurement Frequency	(At most) 1 Hz
2	Maximum Small Signal Capacitance Measurement Frequency	(At least) 1 MHz
3	Minimum Leakage Current that can be measured (assuming current integration period of at least 20 seconds)	< 1pA (the same will be checked during installation, mention level of accuracy)
4	Input Capacitance of Tester	< 6 fF (femto farads)
<b>E. High Voltage Capabilities</b>		
<i>Note : Items required for testing samples up to <math>\pm 10,000V</math> or ( 20,000V Peak to Peak).</i>		

1	<p><b>High Voltage Amplifier.</b></p> <ul style="list-style-type: none"> <li>• Voltage Range (spec A.1) should be <math>\pm 10\text{kV}</math> or <math>20\text{kV}</math> peak to peak</li> <li>• Overload and over current protection</li> </ul>
2	<p><b>High Voltage Interface (HVI)</b></p> <p><b>For safety of the user from high voltage the following specifications should be met positively:</b></p> <ul style="list-style-type: none"> <li>• Maximum International Rating: 10 kV (AC) Voltage</li> <li>• High speed Protection current Rating: 10 Amps or better</li> <li>• High speed Protection Trigger Voltage- 2.0V or better</li> <li>• Low Speed Protection Delay Time- 14ms or better</li> <li>• Isolation Relay Switchable Voltage- 12kV or better</li> <li>• Maximum Charge Resolution using the HVI should be 25 Mc</li> </ul> <p>System should not work with any dedicated sample holder. Any kind of sample should be connected with appropriate wirings and measured &amp; can be connected to any available cryogenic chamber or any available furnace available in the laboratory.</p> <p>The manufacturer should supply 2 extra <b>High Voltage cables</b> to connect any available sample holder available in the lab with the <b>Ferroelectric Characterization Unit</b> so that the same can be used with any available Furnace and Cryogenic Chamber available in the lab.</p>
3	<p><b>Test Fixture with other accessories for Bulk Ceramic Samples</b></p>
<p><b>F. Future upgradation capabilities</b> (<i>Bidder must provide technical documents to prove that the quoted system can be extended for the listed capabilities. Unclear information will lead to disqualification</i>)</p>	
1	<p>The system in future must be upgradable for Piezoelectric Measurements such as d33, e31 using all 3 means i.e AFM's, Laser Doppler Vibrometer's or Photonic sensors.</p>
2	<p>The system should be compatible with Quantum design PPMS system for testing samples at 10K and 9 or 14 Tesla magnetic field simultaneously for Magnetoelectric and Pyroelectric measurements.</p>
3	<p>The system in future should be upgradable for Deep Level Transient Spectroscopy.</p>
4	<p>The system should be upgradable for Magnetoelectric coefficient measurements as followed:</p> <ol style="list-style-type: none"> <li>a. Magnetoelectric Charge Coefficient</li> <li>b. Magnetoelectric Voltage Coefficient</li> <li>c. Magnetoelectric Coupling Coefficient</li> </ol>

**Note: \*ALL INFORMATION REGARDING EACH AND EVERY SPECIFICATION/ MEASUREMENTS /CALCULATIONS SHOULD BE MENTIONED IN THE OFFICIAL COMPANY WEBSITE. DATA IN TYPED FORMAT ON COMPANY LETTERHEAD IS ALSO UNACCEPTABLE (DATA HAS TO BE SUPPORTED WITH EVIDENCE/ RESEARCH PAPERS ON OFFICIAL COMPANY WEBSITE ONLY). BIDS THAT ARE NOT SUPPORTED BY LITERATURE ON OFFICIAL COMPANY WEBSITE WILL BE REJECTED WITHOUT GIVING ANY NOTICE. ALL DATA WILL BE CHECKED/ CROSS CHECKED FROM THE OFFICIAL COMPAN**

## ANNEXURE-II

Sl. No.	General Terms and Conditions	Remarks
1.	<ul style="list-style-type: none"> <li>• The bidder must have GST Registration Number,</li> <li>• Income tax returns for the latest two (02) assessment years and PAN Card.</li> <li>• You are requested to attach the authorized dealership certificate along with the quotation.</li> </ul> <p><b>Note : Necessary proof of documents shall be submitted along with the BID.</b></p>	
2	The Bidder should be the manufacturer/authorized dealer. Letter of Authorization from Original Equipment Manufacturer (OEM) specific to the tender should be enclosed.	
3	An undertaking from OEM is required stating that they would facilitate the tendered on a regular basis with technology/product updates & extend support for the warranty as well.	
4	Non-compliance of tender terms, non-submission of required documents, and lack of clarity of the specification, contradiction between tenderer specification agent on behalf of the Principal/OEM/ or Principal /OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.	
5	Bidder should have registered office and/or authorized Service Centre and/or authorized dealer in India.	
6	Tender document shall be available at <a href="http://www.csr.res.in">www.csr.res.in</a> . The Cost of the Tender Document <b>Rs. 200/- (Two Hundred Only) (Non-refundable)</b> , to be paid by means of Demand Draft payable at Mumbai in favour of “ <b>UGC-DAE CSR – Non-Plan</b> ” along with the bid.	
7	All firms who are not specifically registered with NSIC or DGS&D are required to deposit EARNEST money equivalent to the amount as mentioned in the Tender Schedule, failing which their offer will be summarily rejected. Earnest Money Deposit (EMD) of <b>Rs.10000/- (Rupees Ten Thousand only)</b> shall be submitted by means of Demand Draft payable at Mumbai in favour of <b>UGC-DAE CSR – Non-Plan</b> along with the bid. The EMD will stand forfeited if the successful bidder withdraws or on notifying the rates, refused to accept the tender or violate any other terms and conditions of the tender.	
8	<b>Bid Validity:</b> Bid should be valid <b>90 (Ninety) days</b> from the date of last date of submission of Offer. The validity may be extended with mutual consent of Buyer and Seller.	
9	<b>No advance payment in part or full shall be made.</b> Payment shall be made only after receiving complete articles in good and satisfactory condition after installation, testing, commissioning at site along with invoice in Duplicate and successful installation report. Necessary Bank particulars of the seller to be provided.	
10	Offer without meeting the technical and commercial criteria & requirements may bear the risk of not being considered.	

11	The tendered should furnish Brochure detailing technical specification and performance as well as the users list where similar equipment/items has been supplied recently.	
12	Offer should be accompanied with product catalogue, brochure and relevant pamphlets etc.	
13	The decision of the Centre shall be final in all the cases.	
14	The delivery period must be mentioned in the Offer. Any charges that may arise due to extension of delivery schedule, etc. shall have to be borne by the Seller.	
15	UGC-DAE CSR reserves the right to reject any or all the tenders fully or partially without assigning any reason whatsoever, and the decision of the Centre-Director, Mumbai Centre in this regard will be binding on all the bidders. Tenders not complying with any of the provision stated in the tender document are liable to be rejected.	
16	Rate(s) quoted shall Prices should be quoted in <b>INR (₹) only</b> and of all inclusive i.e. inclusive of materials, loading, unloading, packing, unpacking, delivery, transportation, supply, installation, testing, commissioning, labour, toll, parking, incidental & any other charges and should be in Indian Rupees. However, all the pricing components to be shown separately in the Offer. Charges of GST shall be shown separately. Quoted Rate shall be fixed and price escalation shall not be accepted under any circumstances.	
17	<b><u>GUARANTEE/WARRANTY</u></b> : Should be clearly mentioned in the Offer. Warranty/guarantee/test certificates needs to be submitted along with supply of goods.	
18	In case of Dispute or difference arising out of or in connection with the tender, the same shall be settled amicably by mutual consultation. If such resolution is not possible then the unresolved disputes or differences shall be referred to Arbitration as per the Indian Arbitration and conciliation Act, 1996. It shall be subject to Mumbai Jurisdiction only.	
19	The sealed Offer within a cover envelope and super-scribed as ‘Offer against NIT No. and Due Date’ should be send by Speed/Register Post Only ( <b>No private/local couriers are permitted</b> ) to the following address latest by <b>07<sup>th</sup> March, 2024:-</b>  <b>To</b> <b>The Administrative Officer,</b> <b>UGC-DAE CSR, Mumbai Centre, CFB,</b> <b>246-C, 2<sup>nd</sup> Floor, BARC,</b> <b>Trombay, Mumbai – 400085</b>	