

TENDER (E - PROCUREMENT MODE)

FOR

SUPPLY & INSTALLATION OF LOW & HIGH TEMPERATURE DC (C-V & I-V)

AND RF CHARACTERIZATION SYSTEM WITH PROBE STATION

IN SCHOOL OF COMPUTING & ELECTRICAL ENGINEERING AT IIT MANDI



Tender No.: IITMANDI/S&P/PUR-53/2019-20/2606-07

Tender date: 7th June, 2019

Last Date of Submission: 1st July, 2019

Store & Purchase Section
Indian Institute of Technology Mandi
2nd Floor, A7 Building, South Campus,
Kamand -175005 District – Mandi, Himachal Pradesh (H.P)

Tel.: 01905-267039

Email: satinder@iitmandi.ac.in & arsp@iitmandi.ac.in

Indian Institute of Technology Mandi, Kamand invites online Bids for supply, erection, installation, commissioning, testing, demonstration and training of “**Low & High Temperature DC (C-V & I-V) And RF Characterization System With Probe Station**” as per specifications given in the Annexure attached to the Tender form. All offers should be made in English and should be written in both figures and words. Tender forms can be downloaded from the CPP Portal (<http://eprocure.gov.in/eprocure/app>) & Institute website <http://iitmandi.ac.in/administration/tenderseoi.php>.

The bidders are requested to read the tender document carefully and ensure compliance with all specifications/instructions herein. Non-compliance with specifications/instructions in this document may disqualify the bidders from the tender exercise. The Director, IIT Mandi, Kamand reserves the right to select the item (in single or multiple units) or to reject any quotation wholly or partly without assigning any reason. Incomplete tenders, amendments and additions to tender after opening or late tenders are liable to be ignored and rejected.

Instruction to bidder:

1. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender publishing on the CPP Portal.
2. Bidder should take into account any corrigendum published on the tender document before submitting their bids.
3. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents – including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
4. The tenders will be received online through portal <http://eprocure.gov.in/eprocure/app>. In the Technical Bids, the bidders are required to upload all the documents in .pdf format. All quotation (**both Technical and Financial should be submitted in the E-procurement portal**).
5. Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through <http://eprocure.gov.in/eprocure/app>. Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available

in the web site <https://eprocure.gov.in/eprocure/app> under the link “Information about DSC”.

Instruction for Preparation & Submission of bids:

1. Technical & Financial Bids should be submitted in PDF format.
2. **In case of Financial bids**, a standard BOQ format has been provided in PDF format. Bidders are required to download the BoQ PDF file and fill their financial offer on the same BOQ format. After filling the same, submit it online in PDF format, without changing the financial template format. If the BoQ format file is found to be modified by the bidder, the bid will be rejected.
3. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF formats. Bid documents may be scanned with 100 dpi with black and white option.
4. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
5. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
6. **Kindly add scanned PDF of all relevant documents in a single PDF file like, compliance sheet, OEM/Principle Certificate etc.**
7. Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
8. Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
9. The technical and financial bids should be submitted online through portal <http://eprocure.gov.in/eprocure/app> in original. The financial bid should include the cost of main equipment/item and its accessories. If there is any separate cost for installation etc. that should be quoted separately.
10. Each bidder should be marked with the following reference on the top bids submitted online: **“IITMANDI/S&P/PUR-53/2019-20/2606-07/Low and High temperature DC (CVS I-V) and RF characterization system with probe station. dated 07th June, 2019”**.
11. The printed literature and catalogue/brochure giving full technical details should be included with the technical bid to verify the specifications quoted in the tender. The bidders should submit copies of suitable documents in support of their reputation, credentials and past performance in .pdf format.

12. The rates should be quoted in figures (typed or printed) and cutting should be avoided. The final amount should be in figures as well as in words. If there are cuttings, they should be duly initialed, failing which the bids are liable to be rejected.
13. **Tender Cost:** The bidder should submit a demand draft of **Rs. 1,180/- (Tender Fee inclusive GST) in Words Rupees One Thousand One Hundred & Eighty only** towards non-refundable **tender fee, drawn in favour of “The Registrar, IIT Mandi”** payable at Mandi in a sealed envelope super-scribed as **“Tender fee & NIT No. IITMANDI/S&P/PUR-53/2019-20/2606-07/Low and High temperature DC (CVS I-V) and RF characterization system with probe station. dated 07th June, 2019”** on or before last date & time of submission of bids. In the absence of tender cost, the tender will not be accepted.
14. **Earnest Money Deposit (EMD):**

Bidder should furnish an EMD of a refundable amount of **Rs 3,40,000/-** in the shape of DD/FDR from a scheduled bank in India drawn in favour of **“The Registrar, IIT Mandi” payable at Mandi**. This EMD should be submitted in sealed envelop super-scribed as EMD & NIT No. **“IITMANDI/S&P/PUR-53/2019-20/2606-07/Low and High temperature DC (CVS I-V) and RF characterization system with probe station. dated 07th June, 2019”**. The bidders should enclose a pre-receipted bill for the EMD to enable us to return the EMD of unsuccessful bidders. **Failure to deposit Earnest Money will lead to rejection of tender.** In the event of the awardee bidder backing out, EMD of that bidder will be forfeited.

- **Note: Both (tender fee & EMD) envelops should be placed in another sealed envelope and address to:**

**“Assistant Registrar, Stores and Purchase”
Indian Institute of Technology Mandi (IIT Mandi),
S & P Section, A7 Building, Kamand Distt. Mandi – 175 005 (H.P), India”**

This envelop having tender fee & EMD should reach on or before last date & time of submission of bid.

15. **EMD Exemption:**

The Institute may accept bids without EMD from those bidders who are registered with the Central Purchase Organization, National Small Industries Corporation (NSIC) or the concern Ministry or Department **as Manufacturer**. To claim the exemption, the bidder must be offering goods manufactured by themselves. Exemption will not be granted in case the bidder is acting as an agent for some other vendor.

General Terms & Condition:

1. While sending rates, the firm shall give an undertaking to the effect that **“the terms/conditions mentioned in the enquiry letter/Tender Notice against which the rates are being given are acceptable to the firm.”** in .pdf format. In case the firms do not give this undertaking, their rates will not be considered.
2. If the supplier/firm is original equipment manufacturer (OEM)/authorized dealer/sole distributor of any item, the certificate to this effect should submit in .pdf format.
3. The quantity shown against the item is approximate and may vary as per demand of the Institute at the time of placing order.
4. Any bids received after **11:00 A.M. on 1st July, 2019** shall not be considered
5. The Technical Bids will be opened on **2nd July, 2019 at 11:00 A.M.** The date & time for opening of Financial Bids will be informed later on to the technically qualified bidders.
6. The tenders will be received online through portal <http://eprocure.gov.in/eprocure/app>. All tender documents received after the specified date and time shall not be considered.

For any correspondence regarding tenders is on below address:

“Assistant Registrar, Stores and Purchase”

Indian Institute of Technology Mandi (IIT Mandi),

S & P Section, A7 Building, Kamand Distt. Mandi – 175 005 (H.P), India”

7. **Arbitration Clause:** In the event of any dispute or difference(s) between the vendee Institute (IIT Mandi) and the vendor(s) arising out of non-supply of material or supplies not found according to specifications or any other cause whatsoever relating to the supply or purchase order before or after the supply has been executed, shall be referred to “The Director, IIT Mandi”, Kamand who may decide the matter himself or may appoint arbitrator(s) under the arbitration and conciliation Act,1996. The decision of the arbitrator shall be final and binding on both the parties.
 - a) In case of a dispute between the purchaser and a foreign supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause above. But if this is not acceptable to the supplier then dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
 - b) The venue of the arbitration shall be the place from where the order is issued.

- c) The place of arbitration and the language to be used in arbitral proceedings shall be decided by the arbitrator.
- d) All disputes shall be subject to Mandi Jurisdiction only.
8. All tenders in which any of the prescribed conditions is not fulfilled or any condition is put forth by the tenderer shall be summarily rejected.
9. The bidders or their authorized representatives may also be present during the opening of the Technical Bid, if they desire so, at their own expenses.

Note: Price bids of only those bidders will be opened whose technical bids are found suitable by the committee appointed for the purpose. Date and time of opening of price bids will be decided after technical bids have been evaluated by the committee. Information in this regard will be intimated only to the technically qualified bidders. In exceptional situation, an authorized committee may negotiate price with the qualified bidder quoting the lowest price before awarding the contract.

10. **Clarifications:**

In case the bidders requires any clarification regarding the tender document, they are requested to submit their queries on the e-mail i.e. satinder@iitmandi.ac.in & arsp@iitmandi.ac.in on or **before 25/06/2019**.

11. **Assistance To Bidders:** Any queries relating to the tender document and the terms & conditions contained therein should be addressed to tender Inviting Authority for a tender or relevant contact person indicated in the tender.

12. **Pre – Qualification Criteria:**

- Ñ Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed.
- Ñ An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well.
- Ñ OEM should be internationally reputed Branded Company.
- Ñ Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid.

- Ñ The Vendors who have earlier supplied the equipment to any of the IITs, IISc, IISERs and other Scientific Institute of National Repute may only tender. The details of such institutions and the cost with name of equipment may also be supplied with the bids.
- Ñ **In the tender, either the Indian 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.**
- Ñ **If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf another Principal/OEM in the same tender for the same item/product.**
- Ñ **Furnishing of wrong/ambiguous information in the compliance statement may lead to rejection of bid and further black listing of the bidder, if prima-facie it appears that the information in the compliance statement was given with a malafide/fraudulent intent.**

13. Prices:

- The Prices quoted should be inclusive of all taxes or duties, packing, forwarding, freight, insurance, delivery and commissioning etc. at destination site (IIT Mandi, Mandi/Kamand). IIT Mandi is registered with DSIR, Govt. of India and is exempted from Custom / Excise Duty. Exemption Certificate to this effect will be issued by IIT Mandi. **Hence, Customs/Excise Duty exempted price should be quoted.** The rates shall be firm and final. Nothing extra shall be paid on any account.
- **In case of imports/foreign supplier, the price should be quoted on ex-work price/FOB/FCA basis only. Under special circumstance (e.g. perishable chemicals), when the item is imported on CIP/CIF, please indicate CIF/CIP charges separately upto Delhi indicating the mode of shipment. IIT Mandi will make necessary arrangements for the clearance of imported goods at the Airport/Seaport.**
- In case of imported equipment(s)/item(s), the agency commission, if any, payable in Indian rupees should be mentioned separately. **IAC shall be paid after satisfactory installation & commissioning of the goods at the destination.** For imported equipment, the Letter of Credit will be opened for the amount excluding agency commission in Indian Rupees. The firm should clearly mention the address of foreign bank in the financial bid.
- **In case of indigenous item, the vendor should clearly mention the final FOR IIT Mandi, Kamand Campus Price, as applicable in their bid.**

14. **Validity:**

The bid should be valid for acceptance up to a period of 180 Days. The Bidders should be ready to extend the validity, if required without any additional financial implications.

15. **Delivery:**

The Equipment should be delivered and installed within the period as specified in the purchase order and be ready for use within **4-6 weeks** of the issue of purchase order unless otherwise prescribed. If the bidder fails to deliver and place any or all the Equipments or perform the service by the specified date, penalty at the rate of 1% per week of the total order value subject to the maximum of 10% of total order value will be deducted.

16. **Installation, Training & Demonstration:**

Bidders need to provide adequate training (2-3 days) to the nominated persons of IIT Mandi at their cost. IIT Mandi will not bear any training expenditure. The supplier is required to do the installation and demonstration of the equipment within **one month** of arrival of materials at the IIT Mandi site of installation, otherwise the penalty clause will be the same as per the supply of material.

In case of any mishappening/damage to equipment and suppliers during the carriage of suppliers from the origin of equipment to the installation site, the supplier has to replace to it with new equipment/supplies immediately at his own risk. Supplier will settle his claim with the insurance company as per his convenience. IIT Mandi will not be liable to any type of losses in any form.

17. **Insurance:** For delivery of goods at the purchaser's premises, the Insurance shall be obtained by the supplier on **"All Risk"** basis. The insurance shall be valid for a period of not less than 3 months after installation and commissioning. **In case of order placed on FOB/FCA basis, the purchaser shall arrange insurance. If order placed on CIF/CIP basis, the insurance should be up to New Delhi.**

18. **Warranty Declaration:**

Bidders must give the comprehensive on-site warranty as required from the date of successful installation of Equipment against any manufacturing defects and also give the warranty declaration that *"everything to be supplied by us hereunder shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document."*

Any deviation in the material, and the specifications from the accepted terms may liable to be rejected and the bidders need to supply all the goods in the specified form to the satisfaction/specifications specified in the order / contract and demonstrate at their own cost.

- The Purchaser Shall Promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately within **Two weeks** arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the replaced parts/goods at the time of their replacement. No claim whatsoever shall lie to the Purchaser for the replacement parts/goods thereafter. The period for correction of defects in the warranty period is **Two week**. If the supplier having been notified fails to remedy the defects within **Two week**, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses without prejudice to any other rights, which the purchase may have against supplier under the contract.
 - The warranty period should be clearly mentioned. The maintenance charges (AMC) under different schemes after the expiry of the warranty should also be mentioned. The comprehensive warranty will commence from the date of the satisfactory installation/commissioning of the equipment against the defect of any manufacturing, workmanship and poor quality of the components.
 - After the warranty period is over, Annual Maintenance Contract (AMC)/Comprehensive Maintenance Contract (CMC) should be started. The AMC/CMC Charges will not be included in computing the total cost of the equipment.
19. **Performance Bank Guarantee:** A performance bank guarantee from a scheduled bank in India for an amount equal to 10% of the price for duration of two months beyond the expiry of warranty period will be taken from the supplier or Indian agent.
20. **Terms of Payment:** Payment will generally be made only after delivery and satisfactory installation, testing, commissioning etc. **This must be specified in the tender/quotation.**
- In case of imported supplies, payment (excluding Indian agency commission, if any) will be made through irrecoverable Letter of Credit in two installments. 80 % of the money will be released on submission of shipping of documents. Remaining 20 % will be released after successful installation of the instrument and submission of a performance bank guarantee for 10% of the order value from a nationalized bank, valid for 2 months beyond the expiry of the warranty.

All the bank charges within India will be borne by the Institute and outside India will be borne by the Supplier.

- In case of required item quoted in INR, 80% payment will be made through E-payment after receipt of material in good condition and Remaining 20% will be released on successful installation of the instrument and on submission of a performance bank guarantee for 10% of the order value from a nationalized bank, valid for 2 months beyond the expiry of the warranty.

21. **Tender expenses and documents:** All costs incurred by the bidder in the preparation of the tender shall be at the entire expense of the bidder.

22. **Tender Evaluation Criteria:** The technical bids will be opened and evaluated by a duly constituted committee. After evaluation of the technical bid, the financial bid for only those offers which have qualified in the evaluation of technical bid will be opened.

23. **Return of EMD:**

- The earnest money of unsuccessful bidders will be returned to them without any interest within 15 working days after awarding the contract.
- The earnest money of the successful bidder will be returned to them without any interest within 15 Days after supply of material.

24. **Manual and documentation:** All the manuals necessary for operating and servicing the equipment (including details of electronic circuits) will have to be provided along with the instrument.

25. The IIT Mandi reserves the right to cancel the tender at any stage (point of time) without assigning any reason.

26. Bidders should go through the tender terms, conditions and specifications carefully and fill in the attached compliance statement accurately and unambiguously. They should ensure that all the required documents are furnished along with the bid.

Sd/-
**Assistant Registrar
Stores & Purchase**

BID PARTICULARS

1. Name of the Supplier :

2. Address of the Supplier :

3. Availability of demonstration of equipment : Yes / No

4. Tender cost enclosed: : Yes/No if yes

D.D. No. _____ Bank _____ Amount _____

5. EMD enclosed : Yes / No if Yes

D.D. No. _____ Bank _____

6. Name and address of the Officer/contact person to whom all references shall be made regarding this tender enquiry.

Name :

Address :

Telephone No. :

Fax No. :

Mobile No :

e-Mail :

Web :

< Organization Letter Head >>
DECLARATION SHEET

We, _____ hereby certify that all the information and data furnished by our organization with regard to this tender specification are true and complete to the best of our knowledge. I have gone through the specification, conditions and stipulations in details and agree to comply with the requirements and intent of specification. This is certified that our organization has been authorized (Copy attached) by the OEM to participate in Tender. We further certified that our organization meets all the conditions of eligibility criteria laid down in this tender document. Moreover, OEM has agreed to support on regular basis with technology / product updates and extend support for the warranty.

We, further specifically certify that our organization has not been Black Listed/De Listed or put to any Holiday by any Institutional Agency/ Govt. Department/ Public Sector Undertaking in the last three years.	NAME & ADDRESS OF THE Vendor/ Manufacturer / Agent
1 Phone	
2 Fax	
3 E – mail	
4 Contact Person Name	
5 Mobile Number	
6 TIN Number	
7 PAN Number	
8 GST Number	
9 Kindly provide bank details of the bidder in the following format:	
a) Name of the Bank	
b) Account Number	
c) Kindly attach scanned copy of one Cheque book page to enable us to return the EMD to unsuccessful bidder	

Ref:-ENQUIRYNO:- IITMANDI/S&P/PUR-53/2019-20/2606-07

Technical Specifications of Low & High Temperature DC (C-V & I-V) And RF Characterization System With Probe Station

Specification for Low & High Temperature (C-V) & (I-V) System:

IIT Mandi, VLSI lab requires electrical parametric analyzer for Capacitance voltage (C-V) & Current Voltage (I-V) measurements and RF measurements setup for electronic devices with probe station capable to probe and characterize the devices from low to high temperature of various electrical parameters like quasi static, low frequency & high frequency C-V, I-V, C-t & I-t, bulk doping, fatigue and small signal analysis of MOSFET etc. and so on (Higher capability preferable).

The detailed specifications of various modules/items are given as following:

- a) Item A: Electrical parametric analyzer(*C-V and I-V characterization system from low to high temperature*)
- b) Item B: Probe station with thermal chuck capable to measure the electrical parameters from low to high temperature (-60°C to 300°C) [Lower to higher temperature limits are preferable]

APPLICATIONS:

1. Very low frequency C-V, I-V and Quasi static C-V measurements
2. DC- C-V and I-V measurements
3. Pulse C-V and I-V measurements
4. C-t and I-t measurements for duration of more than 10⁵seconds.
5. P-E measurements for ferroelectric materials (preferable).
6. All mentioned measurements from low to high temperature range. (*Maxima of lower end and higher end preferable*)
7. The analyzer should be capable of measuring low current of the order of 10 fA (*lower range preferable*)
8. Triaxial and biaxial cables connectors and probe arms with very low leakage current including shielding guard should be capable for high end electrical parameters characterization (*less than 1fA,lower preferable*)

***Note:**

Vendors can quote together item A and item B subject to the condition that they should meet all the following specifications. Alternatively, they can also quote separately for item A or item B as per specifications given for each type and subject to the integration of all items (A and B).

However, the decision of the technical and financial committee will be considered final regarding the procurement of item A or item B individually, two of them together or none of them.

The committee is free to take any decision for procurement on the basis of compatibility and integration of above stated all items as per IIT Mandi research requirements.

Specifications:

Item A:Electrical parametric analyzer (C-V and I-V characterization system)

SI. No.	Detailed Specifications
1.	<p>The DC channels Triaxial SMU's must be capable of sourcing and measuring in the following range:</p> <p>Voltage Voltage Source: $\pm 5 \mu\text{V}$ (lower preferable) to $\pm 200 \text{ V}$ (<i>higher preferable</i>) Voltage Measure: $\pm 0.2 \mu\text{V}$ or low (<i>lower preferable</i>) to $\pm 200 \text{ V}$ or high (<i>higher preferable</i>)</p> <p>Current Current Source: $\pm 2 \text{ fA}$ (<i>lower preferable</i>) to $\pm 1\text{A}$(<i>higher preferable</i>) Current Measure: $\pm 100 \text{ aA}$(<i>lower preferable</i>)to $\pm 1\text{A}$(<i>higher preferable</i>)</p> <p>High voltage source meter Max voltage: $\geq 3\text{KV}$. source or sink up to $3000\text{V} @ \geq 4\text{mA}$ or $1500\text{V} @ \geq 8\text{mA}$ Voltage resolution: $\leq 200 \text{ uV}$ Current resolution: $\leq 10 \text{ fA}$</p> <p>High current source meter Current: $\geq 20 \text{ A}$ (DC) and $\geq 20 \text{ A}$ (Pulse) Max voltage: $\geq 40 \text{ V}$ Voltage resolution: $\leq 1 \text{ uV}$ Minimum Current resolution: $\leq 10 \text{ pA}$</p> <p>System should be provided with High voltage and high current standard devices test fixture for $\geq 50 \text{ A}$, $\geq 3 \text{ kV}$ measurements.</p> <p>System should have Kelvin connection at GND unit.</p> <p>C-V measurements test Signal Frequency: 1 Hz to 10 MHz (<i>Higher preferable</i>), with option of varying the measurement frequency step size.</p> <p>The SMUs must provide the following forcing and measuring functions:</p> <p>Bias; Common; Sweep; list sweep (<i>custom point-by-point user-defined sweep</i>); Step Source read back single & double staircase sweep, Pulsed sweep, staircase sweep with pulsed bias, IV sampling, CV sweep, C-t sweep, C-f sweep, list sweep linear interval, log interval, stop condition, bias hold and negative hold time. (<i>When programmed to sweep voltage, the system must report back actual measured voltage values, instead of programmed.</i>)</p>

The multi-frequency CV module must support:

- Measuring parameters: Cp-G, Cp-D, Cs-Rs, Cs-D, R-jX, Z-theta etc. (Like Cp-G, Cp-D, Cp-Q, Cp-Rp, Cs-Rs, Cs-D, Cs-Q, Lp-G, Lp-D, Lp-Q, Lp-Rp, Ls-Rs, Ls-D, Ls-Q, R-X, G-B, Z- θ , Y- θ)
- Frequency range: 1 Hz (lower preferable) to 10 MHz (Higher preferable),with option of varying the measurement frequency step size.
- Programmable DC output modes: Bias, Sweep, List Sweep
- Pulse Measurements with ≤ 20 ns pulse width (lower preferable)
- AC drive level: 10 mV (lower preferable) to 100 mV (higher preferable)
- DC drive level: -30 V (lower preferable) to +30 V (higher preferable)

Sweep Mode

- Single & double Staircase sweep,
- Pulsed sweep,
- staircase sweep with pulsed bias,
- IV sampling,
- CV sweep, C-t Sweep, C-f Sweep,
- List sweep linear interval, log interval, stop condition, bias hold and negative hold time.

Sampling Capability: 1ms and 100 μ S in Fast sampling, linear and log sampling.

The software must include libraries for automatic IV, I_{sd} V_g , CV parameter extraction for :

- Bulk Doping and Bulk Potential, Debye Length, Oxide Thickness
- Series Resistance, Flatband C and V, Threshold Voltage
- Average Doping, Interface Trap Density, Effective Oxide Charge Density
- Fatigue of MOSFET devices, DLCP Measurement of Solar Cells
- Switching from CV to IV measurements through software
- Hardware should support device modeling software like IC-CAP

The System must include PC operating capabilities as follows:

- High-resolution LCD screen, Keyboard and mouse control
- Built-in large capacity hard drive, CD/DVD drive
- Standard windows operating system
- User interface and data storage functionality
- Interactive point-and-click software for device characterization
- Built-in GPIB, Ethernet, USB and RS-232 ports

Item B: Probe station with thermal chuck capable to measure the electrical parameters from low to high temperature(-60 °C to 300 °C)[Lower to higher temperature preferable]

SI. No.	Detailed Specifications
1.	<p>WAFER CHUCK</p> <ol style="list-style-type: none"> 1. Diameter ≥150mm (Higher Preferable) 2. Vacuum <ol style="list-style-type: none"> a. To hold wafer and small pieces b. Micro hole vacuum pattern for thin wafers c. Multi zone vacuum control through software d. Capable of holding both 10mmx10mm and 4” wafer (provide option for blocking outer holes while using smaller wafers.) 3. Material Gold plated 4. DUT supported Small wafer pieces of 5x5 mm² to 150mm round Wafers 5. Thermal Chuck -60°C to 300°C [Lower to higher temperature preferable] with air/water cooling (controllable via software) 6. It should work in vacuum environment when thermal conditions are ON 7. Triaxial Guard for low noise. 8. Chuck Leakage ≤ 4 to 6 fA (thermal conditions ON), ≤ 1 to 3 fA(thermal conditions OFF) (Better preferable) 9. Residual Capacitance ≤ 5 pF 10. Capacitance Variation across chuck ≤ 5 pF 11. The chuck should be able to be connected to ground if required.
2.	<p>STAGE</p> <ol style="list-style-type: none"> 1. Wafer loading should be easy and safe. (roll out stage is preferable) 2. XY movement <ol style="list-style-type: none"> i. Travel 200mm x 200mm ii. Resolution ≤ 1µm iii. Motorized Stepper motor with preferable high speed iv. Remotely controlled through joystick and/or software 3. Z movement <ol style="list-style-type: none"> i. Travel 5-10 mm ii. Resolution ≤1µm iii. Motorized Stepper motor iv. Remotely controlled through joystick and/or software
3.	<p>PLATEN</p> <ol style="list-style-type: none"> 1. Without forced cooling for thermal expansion control. 2. Stainless Steel platen with capability to Interface with Shield Enclosure. 3. Low Noise, Fully grounded and guarded.
4.	<p>SHIELDING</p> <ol style="list-style-type: none"> 1. Light Shielding (≥120dB light attenuation) 2. EMI shielding ≥ 20 dB 0.5-7 GHz or better preferable 3. Shield enclosure size should be small enough to ensure fast reach to required temperature. 4. Frost Free Environment. 5. Should work without vacuum environment/need when using in room

	temperature conditions i.e. when thermal conditions are off.
5.	<p>MICROSCOPE</p> <ol style="list-style-type: none"> 1. Highly Stable 2. Travel 50mmx50mm 3. Motorized Stepper motor with preferable high speed 4. Resolution XY $\leq 1 \mu\text{m}$ (better preferable) 5. Z Movement Pneumatic up/down for easy probe access 6. Accessible through software 7. High Zoom objective for easily viewing of pads $<0.5 \mu\text{m}$ 8. Zoom and focus adjustable through software
6.	<p>SOFTWARE</p> <ol style="list-style-type: none"> 1. Full Thermal and Microscope control (zoom, focus, XYZ movement, Light on/off) 2. Video system for display of probing area without any time lag to make sure probe is getting connected to wafer properly without any harm to probes 3. On-wafer calibration software should be facilitated.
7.	<p>PROBES AND POSITIONERS</p> <ol style="list-style-type: none"> 1. Low noise probes with leakage $\leq 5\text{fA}$ (lower preferable) 2. Probes for the application of DC CV, IV, Quasi CV, Very low frequency CV, C-t, I-t, Pulsed measurements, etc. 3. Probe should be compatible for measurements as per specifications mentioned in Item A section. 4. Should have high current ($>40\text{A}$) and voltage ($>3\text{kV}$) measurement capability and safety. 5. Triaxial cables compatible with Triaxial SMUs of characterization system. 6. Probe arms and cables should be of low noise well-grounded and guarded. 7. Positioners should be well grounded and guarded for low noise and fA current range measurements. 8. The micromanipulators and probes should be magnetically fixed on the stage.
8.	<p>Optional ACCESSORIES</p> <ol style="list-style-type: none"> 1. Vacuum Pump, Compressed Air, Active Vibration Isolation table and other things needed for smooth and enhanced operation of system should be quoted separately if not included. 2. Tools, Tweezers and all accessories should be provided with system

Other requirements:

- Standard warranty: 12 months from the date of Installation.
- Vendor has to confirm Repair & Calibration support facilities from India. The up-gradation of tools and software must be possible in India, preferably free of cost.
- Vendor should support one week training at IIT Mandi.

**COMPLIANCE STATEMENT FOR THE TENDER SPECIFICATIONS
INDIAN INSTITUTE OF TECHNOLOGY MANDI
KAMAND – 175 005, DISTRICT – MANDI, HIMACHAL PRADESH**

Ref:- ENQUIRYNO:- IITMANDI/S&P/PUR-53/2019-20/2606-07

Sr. No.	Check list of documents/ Undertakings?	YES/ NO	Remarks (Give explanation if answer is No)
1	Is Tender fees attached?		
2	Is EMD attached? (if applicable)		
3	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
4	If authorised dealer, recent dated Certificate to this effect from OEM, attached or not?		
5	Undertaking from OEM regarding technical support & extended warranty period		
6	Validity of 180 days or not?		
7	Undertaking from bidder regarding acceptance of tender terms & conditions		
8	Whether list of reputed users (along with telephone numbers of contact persons) for the past three years specific to the instrument attached.		
9	Whether special educational discount for Indian Institute of Technology (IIT) Mandi (H.P) given.		
10	Whether two weeks training of operator and research students without any charges offered.		
11	Does the instrument comply with all the required specifications as per annexure 1. IMPORTANT: Attach a separate sheet highlighting compliances with the specifications and explanations thereto if the equipments vary from the requested specifications.		
12	Whether free Installation, Commissioning and Application Training offered.		
13	Whether warranty as per requirement offered.		
14	Whether Annual maintenance after expiry of comprehensive onsite warranty quoted separately as optional.		