



# INSTITUTE OF NANO SCIENCE AND TECHNOLOGY, MOHALI

(An autonomous Research Institute of Department of Science and Technology,  
Government of India)

Knowledge City, Sector 81, Mohali – 140306, PUNJAB

Phone No: 0172 – 2297000

Website: [www.inst.ac.in](http://www.inst.ac.in)

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F. No. INST/12(69)/2023-Pur

Date: 28.06.2023

To

## **NOTICE INVITING E-TENDER**

Online tenders are invited on behalf of the Director, INST Mohali in TWO BID SYSTEM for the Supply and installation of “**Semiconductor Parametric Analysis System with Accessories**” as per technical specification and details given below and BOQ list from the original manufacturer/supplier at CPPP i. e. <https://eprocure.gov.in/eprocure/app>. Tender documents may please be downloaded from the E-procurement portal website <https://eprocure.gov.in/eprocure/app> & Institute website [www.inst.ac.in](http://www.inst.ac.in).

Sd/-

**Chief Finance and Administrative Officer**

**NOTE: This is a domestic Tender according to the DPIIT Order dated 15/07/2017 and subsequent amendments to the order for Public Procurement Preference & PROVISION FOR LOCAL SUPPLIERS TOWARDS PREFERENCE TO MAKE IN INDIA. The bidder required to declare on the letter head the percentage of Local content for the quoted instrument and submit with the Technical Bid. Bidder should also give details of the location(s) at which the local value addition is made.**



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## INSTRUCTIONS

- The Quotation Should be addressed to the Director INST, Mohali.
- The Quantity mentioned in this inquiry shall be deemed to be only approximate and will not in any manner be binding on the Institute.
- Firms will quote separately for each article as per BOQ.
- The rates offered should be FOR Mohali in case of firms situated outside Chandigarh and free delivery at the Institute premises in case of local firms.
- GST: The Institute is not exempted from the payment of GST. The rate (i.e., percentage of taxes applicable should be clearly indicated, wherever chargeable.
- In case of Ex-godown terms the amount of packaging forwarding freight etc. should clearly be indicated by percentage or lump sum amount. Current rate of GST must be mentioned. The institute is exempted from Customs and Excise Duty.
- The delivery period should be specifically stated. Ex-Stock and earlier delivery may be preferred.
- The firms are requested to give detailed description and specifications together with the detailed drawings, printed leaflets and literature of the Article quoted.
- The name of the manufacturers and country of manufacture should also invariably be stated. In the absence of these particulars the quotation is liable for rejection.
- Quotation should have minimum validity of 120 days from the date of opening.
- The rates quoted should be for each item separately otherwise your quotation is liable to be ignored.
- Director has the right to reject to the quotations and to split up the requirements or change any or all the above conditions without assigning any reason.



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## **NOTICE INVITING TENDER**

INST invites online tender from the reputed manufacturers or their authorized dealers so as to reach this office on or before scheduled date and time for the instrument, 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 website ([www.inst.ac.in](http://www.inst.ac.in)) of the Institute.

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, INST 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.

## **EQUIPMENTS LIST**

S. No.	Item Description	Qty.	Tender Fee	EMD
1	<b>Semiconductor Parametric Analysis System with Accessories</b>	01	Rs. 590/- (Non-refundable)	Rs. 45,000/-

### **Critical Date Sections**

Sr. No.	Description	Date	Time
1	Tender Publishing Date and time	28.06.2023	12:00PM
2	Tender Document download start Date & Time	28.06.2023	1:00PM
3	Bid Submission start Date & Time	28.06.2023	2:00PM
4	Bid Submission End date and Time	19.07.2023	2:00PM
5	Tender opening Date and Time	20.07.2023	3:00PM

**Note: Non-receipt of EMD and Tender Fee will lead to rejection of tender.**

### **Instructions to bidders for submission of Bids**

- The e-tenders are being invited for Supply and installation of **“Semiconductor Parametric Analysis System with Accessories”** through e-procurement. All the instructions of e-procurement is applicable. Tender must be submitted through e-procurement website only. The bid received in physical mode shall not be considered at all. Detailed information regarding the items, application / tender forms, EMD details, specifications, terms and conditions can be downloaded from the following websites [www.inst.ac.in](http://www.inst.ac.in) or <https://eprocure.gov.in/eprocure/app>



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- II. The interested bidders shall submit their tender(s) both Technical bid and financial bid through online mode in <https://eprocure.gov.in/eprocure/app>. The bidders shall upload all the documents as per NIT for Bidders.
  - III. Any corrigendum to this tender will be notified through the aforesaid websites only. INST reserves the right to accept or reject any or all the bids without assigning any reason at any stage.
  - IV. The Bidder is expected to examine all instructions, eligibility criteria/pre-qualification criteria, forms, terms and conditions in the tender document. Failure to furnish complete information as required with reference to the tender document shall result in rejection of the bid.
  - V. Bidders have to submit a EMD and tender fee. Bids received without EMD and tender will not be considered and summarily rejected.
  - VI. Any attempt to negotiate directly or indirectly on the part of the Bidder with authority competent to finally accept the Tender or influence the acceptance of the tender by any means will result his tender excluded from consideration.
  - VII. Conditional tender, illegible and ambiguous tender, partially filled tender, incomplete tender and tender without enclosing required documents will be summarily rejected.
  - VIII. This office reserves the right to accept or reject any bid without assigning any reason at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligations to inform the affected bidder or bidders of the grounds for this Office's action.
  - IX. Tenderers are requested that, before quoting their rates or filling tender, the tender form may please be read out thoroughly ( line by line), otherwise the Competent Authority of this office will not be held responsible for any error/oversight of his own.
  - X. Clarification regarding any ambiguity in eligibility criteria may be sought through e-mail at [purchase@inst.ac.in](mailto:purchase@inst.ac.in).
  - XI. Bidder/s quoting in currency other than Indian Rupee (INR) should explicitly mention the currency in which tender quoted wherever applicable in Technical Bid along the tender documents.
  - XII. The online Price BOQ is in INR format. If bidder want to quote other than INR please specify the quoted currency in the technical bid/part and fill the amount in same BOQ.
  - XIII. Please bifurcate the price on shipping terms i, e, Ex-works -> FCA/FOB -> CIP/CIF in price BOQ and specify the same in technical bid without price.



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## **REGISTRATION**

- 1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:<http://eprocure.gov.in/eprocure/app>) by clicking on the link “Click here to Enroll”. Enrolment on the CPP Portal is free of charge.
- 2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
- 5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.
- 6) Bidder then logs in to the site through the secured log-in by entering their userID / password and the password of the DSC / eToken.

## **SEARCHING FOR TENDER DOCUMENTS**

- 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 published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective „My Tenders“ folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

## **PREPARATION OF BIDS**

- 1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- 2) 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.
- 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 / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black and white option.
- 4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use “My Space” area available to them to upload such documents. These documents may be directly



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submitted from the “My Space” area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

## **SUBMISSION OF BIDS**

- 1) 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.
- 2) The bidder has to digitally sign the bid document and upload the required bid documents one by one as indicated in the tender document.
- 3) A standard BoQ format has been provided with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BoQ file, open it and complete the white colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.
- 4) The server time (which is displayed on the bidders’ dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- 5) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.
- 6) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 7) 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.
- 8) Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

## **ASSISTANCE TO BIDDERS**

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
- 2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is 1800 233 7315.

## **General Instructions to the Bidders**

- 1) 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.
- 2) 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 <https://eprocure.gov.in/eprocure/app>.



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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".

3) Tenderer are advised to follow the instructions provided in the „Instructions to the Tenderer the e-submission of the bids online through the Central Public Procurement Portal for e Procurement at <https://eprocure.gov.in/eprocure/app>.

## **TERMS AND CONDITIONS**

Important Conditions of the tender to be abide by the tenderer

1. **Due date:** The tender has to be submitted before the due date. The offers received after the due date and time will not be considered.
2. **Opening of the tender:** The offer/bid will be opened by a committee duly constituted for this purpose.
3. **Acceptance/Rejection of bids:** The INST reserves the right to reject any or all offers without assigning any reason.
4. **Tender Fee/EMD:** Tender fee/EMD is to be obtained from the bidders except those who are registered with the Central Purchase Organisation, National Small Industries Corporation (NSIC) or the concerned Ministry or Department. The tenderer should submit Tender Fee/EMD amount as per tender ref. no. through NEFT/RTGS in INST Account. Account Details are as follows:
  - a. Name of Beneficiary: Institute of Nano Science and Technology (INST)
  - b. Account No. **2452201001102**
  - c. Name of Bank: **Canara Bank, Phase 10, Mohali**
  - d. IFS Code: **CNRB0002919**
  - e. MICR Code: **160015003**
  - f. Swift Code: **CNRBINBBFFC**

The details of transaction for EMD/tender fee viz. Name of bidder firm, Tender Description, Transaction ID/No. of Transfer, Transaction date, Amount of Transaction, Name of Bank, Address of Bank shall be furnished by the tenderer on their letterhead separately along with their tender.

5. **Performance Security:** The supplier shall be required to submit the performance security in the form of irrevocable bank guarantee issued by any Indian Nationalized Bank for an amount which is equal to the 3% of Purchase value at the time of the installation of the equipment covering warranty period of the equipment and should be kept valid for a period of 60 days beyond the date of completion of warranty period.
6. **REASONABILITY OF PRICES :**

Please quote best minimum prices applicable for a premier Research Institution, **leaving no scope for any further negotiations on prices.** The quoting party should give a certificate to the effect that the quoted prices are the minimum and they have not quoted the same item on lesser rates than those being offered to INST to any other customer nor they will do so till the validity of offer or execution of the purchase order, whichever is later. We request you to fill the price reasonability certificate format in the enclosed file (Annexure "1")

The party must give details of identical or similar equipment, if any, supplied to any CSIR labs/DBT Institutes during last three years along with the final price paid and Performance certificate from them.
7. **Force Majeure:** The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.



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- For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
  - If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
8. **Risk Purchase Clause:** In event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from the other source on the total risk of the supplier under risk purchase clause.
  9. **Packing Instructions:** Each package will be marked on three sides with proper paint/indelible ink, the following:
    - i. Item Nomenclature
    - ii. Order/Contract No.
    - iii. Country of Origin of Goods
    - iv. Supplier's Name and Address
    - v. Consignee details
    - vi. Packing list reference number
    - vii.
  10. **Delivery of Goods:**

Delivery should be given at **Institute of Nano Science and Technology, Knowledge City, Sector 81, Adjacent to IISER, Mohali - 140306, Punjab** within a maximum of one month's time from the date of placement of purchase order.
  11. **Delayed delivery:** If the delivery is not made within the due date for any reason, INST will have the right to impose penalty @ 0.5% per week and the maximum deduction is 10% of the contract value / price.
  12. **Prices:** The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of taxes & duties shall be clearly indicated. The price should be quoted without custom duty and excise duty, since INST is exempted from payment of Excise Duty and is eligible for concessional rate of custom duty. Necessary certificate will be issued on demand. **(Please refer Annexure – 2 for the price to be quoted).**
  13. **Notices:** For the purpose of all notices, the following shall be the address of the Purchaser and Supplier.
    - i. **Purchaser:** The Director,  
Institute of Nano Science and Technology,  
**Knowledge City, Sector 81, Adjacent to IISER, Mohali – 140306, Punjab**
    - ii. **Supplier:** (To be filled in by the supplier)  
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  14. **Resolution of Disputes:** The dispute resolution mechanism to be applied pursuant shall be as follows:



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- i. In case of Dispute or difference arising between the Purchaser and the supplier relating to any matter arising out of or connected with this contract, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director, Institute of Nano Science and Technology (INST) Mohali and if he is unable or unwilling to act, to some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
15. **Applicable Law:** The place of jurisdiction would be Mohali (Punjab) INDIA.
16. **Right to Use Defective Goods**  
If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.
17. **Training**  
The Supplier is required to train the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.
18. **Installation & Demonstration**  
The supplier is required to do the installation and demonstration of the equipment within one month of the arrival of materials at the INST site of installation, otherwise the penalty clause will be the same as per the supply of materials.
19. **Warranty:** Minimum One Year Warranty shall have to be provided by the firm..
20. **Taxes and Duties**  
Suppliers shall be entirely responsible for all taxes, duties, license fees, octroi, road permits, etc., incurred until delivery of the contracted Goods to the Purchaser. However, GST in respect of the transaction between the Purchaser and the Supplier shall be payable extra, if so stipulated in the order.
21. **PAYMENT:** 100% payment shall be made to bidder after receipt of equipment, installation and the demonstration of the equipment and submission of performance bank guarantee.
22. **User list:** Brochure detailing technical specifications and performance, list of industrial and educational establishments where the items enquired have been supplied must be provided.
23. **Manuals and Drawings**
- Before the goods and equipments are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals. These shall be in such details as will enable the Purchaser to operate, maintain, adjust and repair all parts of the works as stated in the specifications.
  - The Manuals shall be in the ruling language (English) in such form and numbers as stated in the contract.
  - Unless and otherwise agreed, the goods equipment shall not be considered to be completed for the purposes of taking over until such manuals and drawing have been supplied to the Purchaser.
24. **Site Preparation:** The supplier shall inform to the Institute about the site preparation, if any, needed for the installation of equipment, immediately after the receipt of the purchase order. The supplier must provide complete details regarding space and all the other infrastructural requirements needed for the equipment, which the Institute should arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter.



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The supplier shall visit the Institute and see the site where the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other pre-installation requirements.

25. **Acknowledgement:** It is hereby acknowledged that we have gone through all the conditions mentioned above and we agree to abide by them.

SIGNATURE OF TENDERER

ALONG WITH SEAL OF THE COMPANY WITH DATE



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## 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
5. Online EMD submission information enclosed : Yes / No if Yes

Transaction ID/No. of Transfer\_\_\_\_\_

Transaction date: \_\_\_\_\_

Amount of Transaction\_\_\_\_\_

Name of Bank\_\_\_\_\_

Address of Bank\_\_\_\_\_

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

Name:

Address:

Ph:

Fax:

Mobile:

Email:

Web:



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**Compliance statement for the tender specifications**

Tender Ref No.: **INST/12(69)/2023-Pur**

S.No.	Check list of documents/Undertakings	Yes/No	Remarks (give explanation if the answer is No)
1.	Is EMD details attached and tender fee details? (if applicable)		
2.	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
3.	If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
4.	Undertaking from OEM regarding technical support & extended warranty period		
5.	Validity of 120 days or not?		
6.	Price Reasonability Certificate enclosed as per format??		
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.	Does the instrument comply with all the specifications detailed? Attach a separate sheet showing compliance with the specifications and explanations thereto if the equipment varies from the requested specifications.		
10.	Whether free Installation, Commissioning and Application Training offered?		
11.	Whether comprehensive onsite warranty offered?		
12.	Whether Annual maintenance after expiry of comprehensive onsite warranty quoted separately?		



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## Annexure – 1

### PRICE REASONABILITY CERTIFICATE

This is to certify that we have offered the maximum possible discount to you in our Quotation No. \_\_\_\_\_ dated \_\_\_\_\_ .

We would like to certify that the quoted price are the minimum and we have not quoted the same item on lesser rates than those being offered to INST to any other customer nor we will do so till the validity of offer or execution of purchase order, whichever is later.

Seal and Signature of the tenderer



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## Annexure 2

### Local Content Certificate (To be submitted in Technical bid envelop)

This is to certify that the %age of Local content for the quoted tendered item is\_\_\_\_\_.

Seal and signature of the tenderer

Note:

1. As per revised Public Procurement order 2017 D.O. No. P – 45021/2/2017-PP(BE-II) dated June 4, 2020 Local content means Amount of value added in India which shall be total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item(including all customs duties)as a proportion of the total value, in percent.



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## **Specifications for Semiconductor Parametric Analysis System**

A semiconductor Parametric Analysis System capable of I-V, C-V measurements and Function generation is required at INST Mohali and it should adhere to the following minimum requirements:

### **(A) Specifications for I-V measurement capability**

1. Should be able to Source and Measure voltages in range 50 mV (minimum) to 200 V
2. Should be able to Source and Measure voltages with resolution  $\leq 500$  nV and  $\leq 20$  nV, respectively.
3. Should be capable of Sourcing and Measuring current in range  $\leq 50$  nA to  $\geq 1$  A.
4. Should be able to Source and Measure current with resolution  $\leq 500$  fA and  $\leq 50$  fA, respectively.
5. Basic Accuracy should be 0.02% or better.
6. Should have following Sweep types: Linear, Log, Dual Linear, Dual Log, Custom, Source Memory Mode.
7. Should support USB, GPIB, Ethernet, and TSP interfacing.
8. Signal supported connectors types should be: Front panel = Banana Jacks; Rear panel = 3 lug Triax
9. Measurement speed should be 3000 readings/sec or higher.
10. Voltage, Current, Resistance, Power measurement modes should be there.
11. Should have capacitive touch screen display and controls.
12. Memory Buffer should be  $>200000$  points
13. Option of storage and export of measurement data through USB pen drive slot should be there.
14. Software for I-V Characterization must be provided with all licensing (if applicable).
15. Banana High Performance Test Leads, USB-B-1 USB Cable, Type A to Type B, Ethernet cable should be provided.

### **(B) Specifications for C-V measurement capability**

1. Should be able to measure the following parameters: Z, Y,  $\theta$ , X, G, B, Q,  $R_{dc}$  (DC resistance),  $R_s$  (ESR),  $R_p$ ,  $L_s$ ,  $L_p$ ,  $C_s$ ,  $C_p$ , D ( $\tan \delta$ ),  $\sigma$ ,  $\epsilon$
2. Measurement range  $\leq 100$  m $\Omega$  to  $\geq 100$  M $\Omega$ .
3. Display range for various parameters should be as follows:  
Z: 0.00 m to 9.99999 G $\Omega$ ,  
Y: 0.000 n to 9.99999 GS,

$\theta: \pm (0.000^\circ \text{ to } 180.000^\circ)$

$Q: \pm (0.00 \text{ to } 9999.99)$

$R_{dc}: \pm (0.00 \text{ m to } 9.99999 \text{ G}\Omega)$

$D: \pm (0.00000 \text{ to } 9.99999)$

$\Delta\%: \pm (0.000 \% \text{ to } 999.999 \%)$

4. Basic accuracy should be  $Z \pm 0.05\%$  rdg.  $\theta: \pm 0.03^\circ$  (Measurable range: 1 m $\Omega$  to 200 M $\Omega$ )

5. Measurement frequency range should be  $\leq 5 \text{ Hz}$  to  $\geq 5 \text{ MHz}$  with resolution  $\leq 10 \text{ mHz}$ .

6. Measurement signal level should satisfy the following conditions in various modes and ranges:

*Normal mode: V mode/CV mode*

5 Hz to 1.0000 MHz: 10 mV to 5 V<sub>rms</sub> (maximum 50 mArms)

1.0001 MHz to 5 MHz: 10 mV to 1 V<sub>rms</sub> (maximum 10mArms)

*Low impedance high accuracy mode: V mode/CV mode*

5 Hz to 1.0000 MHz: 10 mV to 1 V<sub>rms</sub> (maximum 100 mArms)

*Normal mode: CC mode*

5 Hz to 1.0000 MHz: 10  $\mu\text{A}$  to 50 mArms (maximum 5 V<sub>rms</sub>)

1.0001 MHz to 5 MHz: 10  $\mu\text{A}$  to 10 mArms (maximum 1 V<sub>rms</sub>)

*Low impedance high accuracy mode: CC mode*

5 Hz to 1.0000 MHz: 10  $\mu\text{A}$  to 100 mArms (maximum 1 V<sub>rms</sub>)

*DC resistance measurement*

Measurement signal level: Fixed at 1 V

7. DC bias measurement Generating range should be 0 V to 2.50 V and minimum resolution should be  $\leq 10 \text{ mV}$ .

8. Output impedance should be 100  $\Omega$  in Normal mode and 10  $\Omega$  in low impedance high accuracy mode.

9. Interfacing options should include the following: USB, USB flash drive, LAN, GP-IB, RS-232C and display via TFT touch panel.

### **(C) Specifications for Arbitrary Function Generator**

1. Number of Channels should be 2.



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2. Sampling rate should be 125MS/s or better.
  3. Frequency Ranges should be as follows:
    - Sine Wave: 1  $\mu$ Hz to 20 MHz or better
    - Square wave: 1  $\mu$ Hz to 10MHz or better
    - Triangular wave: 1  $\mu$ Hz to 1MHz
  4. Amplitude should be 1 mV<sub>pp</sub> to 10 V<sub>pp</sub> on each channel.
  5. There should be a built-in counter of 200 MHz.
  6. Arbitrary Waveforms Storage: 64MB or better.
  7. Square Wave Jitter(rms) should be <1ns.
  8. Following modes should be there: AM, FM, PM, FSK, Burst, sweeping modes
  9. Load impedance should be selectable and variable.
  10. Color display with 480p or better.
  11. USB interfacing and Waveform editing software should be there.
- (D) Warranty 1 year
- (E) Besides the above-mentioned technical specifications, OEM should have NABL accredited calibration lab and service centre in India and should provide 10-year support on the equipment.
- (F) Supplier must have provided similar systems in at least 5 reputed national labs like IITS, IISERs.