



Date: 4<sup>th</sup> June 2021

## Global Tender Enquiry

### To Whom It May Concern

This order is being processed using Government of India funds. As such these funds are governed by GFR 2017 rules. The Government recently amended the GFR rules of global tender enquiry (GTE), and vendors must submit bids that are compliant with the latest rules.

This is an RFQ (Request for Quote) for procurement of a electrical characterisation bundle and attachments as part of a limited tender for the Centre for Nano Science and Engineering (CeNSE) at IISc, Bangalore. This would be used to characterize thin-film optoelectronics.

CeNSE is a multidisciplinary research department at IISc that houses a 14,000 sq. ft. cleanroom and characterisation facility used by 50 faculty members from various disciplines at IISc. CeNSE also runs a program called Indian Nanoelectronics Users Program (INUP) which has allowed 4200 participants from more than 700 universities and institutes all over India to use the facilities at CeNSE. Consequently, any tool in CeNSE receives significant exposure to scientific community at IISc and beyond. The vendors are requested to factor in the value of this exposure into their quotes. Details of existing facilities and INUP program can be gleaned from:

<http://nnfc.cense.iisc.ac.in/>

<http://www.mncf.cense.iisc.ac.in/>

### A. Procedure:

1. Vendors will be required to submit a technical proposal and a commercial proposal in **two separate sealed envelopes**. Only vendors who meet the technical requirement will be considered for the commercial negotiation.
2. The deadline for submission of proposals is **25<sup>th</sup> June 2021, 5:30 pm** Indian Standard Time. Bids should arrive at the office of **Prof. Aditya Sadhanala, FF-05, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012**, India, by the above deadline.
3. The technical proposal should contain a technical compliance table with 5 columns.
  - a. The first column must list the technical requirements, in the order that they are given in the technical requirement below.
  - b. The second column should provide specifications of the instrument against the requirement (please provide quantitative responses wherever possible).
  - c. The third column should describe your compliance with a “Yes” or “No” only. Ensure that the entries in column 2 and column 3 are consistent.



- d. The fourth column should state the reasons/explanations/context for deviations, if any.
  - e. The fifth column can contain additional remarks from the OEM. You can use this opportunity to highlight technical features, qualify response of previous columns.
4. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors
  5. If multiple systems can fulfil the requirements, vendors can submit multiple bids.
  6. In the commercial bid, please provide the itemised cost of the system and required accessories, such as software, power supply, etc.
  7. As an option, please provide itemised cost for any suggested accessories/add-ons that may enhance the usability, capability, accuracy or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.
  8. The quotes should be CIF Bangalore, India. So please include the cost of shipping. Customs can be extra.
  9. In the quote, you are requested to provide itemised cost for spares expected over 2 years of use.
  10. Please indicate the warranty provided with the tool.
  11. Any questions or clarifications can be directed to:  
Prof. Aditya Sadhanala,  
FF-05, Centre for Nano Science and Engineering,  
Indian Institute of Science, Bangalore 560012  
[sadhanala@iisc.ac.in](mailto:sadhanala@iisc.ac.in)

## B. Terms and Conditions

1. The decision of purchase committee will be final
2. The vendor is responsible for the installation of the system at the IISc campus.
3. The RFQ must include references of 5 previous installations, preferable in India. Please provide the names and contact addresses of the referees, so that the committee can contact them independently. Details of such systems with model numbers and users should be provided. The reference letters can be used to disqualify vendors with poor track record of service, build quality, system performance, or poor availability of spares.
4. The vendor must also submit a list of 50 customers where similar systems have been installed.
5. Clarify if periodic (preventive) maintenance be done by a trained on-site engineer or requires a specialist from the OEM. The vendor should have qualified technical service personnel for the equipment based in India and must assure a response time of <2 business days after receiving a service request.
6. The lead-time for the delivery of the equipment should not be more than 2 months from the date of receipt of our purchase order.



7. The indenter reserves the right to withhold placement of final order. The right to reject all or any of the quotations and to split up the requirements or relax any or all of the above conditions without assigning any reason.
8. Wherever requested in this specifications sheet, data must be supplied along with technical compliance documents. Technical bids without supporting data will be deemed as technically non-compliant.
9. All guaranteed specifications will have to be demonstrated, upon request, in an active installation. Failure to demonstrate any promised specifications will be deemed as technical non-compliance.
10. Printed literature and published papers in support of all compliance to the prescribed specifications may be provided.
11. Technical evaluation by the institute may include demonstration to verify functionalities and capabilities of the system quoted. Any discrepancy between the promised specifications and demonstrated specifications will be deemed as technical non-compliance. If need arises, the vendor must be ready to physically visit IISc for a techno commercial discussion.
12. The **validity of commercial quotation should be at least 60 days** from the last date for the submission of tender documents.
13. The payments to non domestic vendors will be through a Letter of Credit and milestone of the payment will be determined after the mutual discussions with the successful bidder. As per GFR no advance payment can be made to domestic vendors, unless an equal amount of bank guarantee is provided.

## Technical Requirements:

1.	<p><b>System should have parametric testing and transient testing capability and should include key components as listed below:</b></p> <p><b>(A) Parametric test system:</b> Single box solution for current-voltage (IV), CV, pulse generation (Fast IV) capability with built in PC.</p> <ol style="list-style-type: none"><li>1. System should have two SMU with following capabilities:<ol style="list-style-type: none"><li>a) Voltage Source and measure range: 200 mV to 200V with Lowest measure resolution of 200 nV.</li><li>b) Current Source and measure ranges: 1 pA to 100mA with lowest measure resolution of 100 aA.</li><li>c) SMU should be able to offer captive load of at least 100 uF.</li></ol></li><li>2. System should have two SMU with following capabilities:<ol style="list-style-type: none"><li>a) Voltage Source and measure range: 200 mV to 200V with Lowest measure resolution of 200 nV.</li><li>b) Current Source and measure ranges: 1 pA to 1A with lowest measure resolution of 100 aA.</li><li>c) All SMU should provide voltage/current in Bias; Common; Sweep; List sweep (custom point-by-point user-defined sweep); Step mode.</li></ol></li><li>3. System should have Very Low Frequency CV capability. They key parameters needed are:<ol style="list-style-type: none"><li>a) Frequency range: 10 mHz to 10 Hz.</li><li>b) Voltage: up to 200 V.</li><li>c) VLF measurement models: CS-GS, CP-GP, Z theta, Cs-D, Cp-D, R+jX, Y-theta.</li><li>d) System should feature to perform spectrum analysis for 10 mHz to 10 Hz.</li></ol></li></ol>
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4. System should also have high frequency CV measurement capability fulfilling the following requirements:

- a) Frequency Range: 1 KHz to 10 MHz with Freq resolution of 1KHz.
- b) Voltage : DC drive level: -30 V to +30 V.
- c) AC drive voltage: 1V rms.
- d) Max measure point in one sweep: 4096 or better.

5. Pulse source and measurement capability

- a) Dual channel Pulse Generation & Measurement capability for voltage range of 40V.
- b) High Speed Voltage Outputs with Pulse widths ranging from 70 nanoseconds to DC.
- c) System should be able to generate +/- 40V amplitude pulse simultaneously on both channels.
- d) System should have current measurement feature supporting ranges 100 nA, 1 uA, 10 uA, 100 uA, 1 mA, 10 mA, 200 mA and 800 mA.

6. System should have built in Capability to switch the measurements from IV, CV to Pulsed IV from select menu without the need for changing the connections on the device under test.

**(B) Transient test system: This system should be having below sourcing and measurement capabilities**

**Source unit:**

- 1. No of channels: 2
- 2. Frequency Range : 1  $\mu$ Hz to 100 MHz
- 3. Sampling rate: 1GSa/s
- 4. Rise time /fall time : <3.5 nS for < 5 Vpp
- 5. Resolution: 14 bit

	<p><b>6. Amplitude:</b></p> <ul style="list-style-type: none"><li>a. <math>\leq 60</math> MHz: 1 mVP-P to 10 VP-P</li><li>b. 60 MHz to <math>\leq 80</math> MHz: 1 mVP-P to 8 VP-P</li><li>c. 80 MHz to <math>\leq 100</math> MHz: 1 mVP-P to 6 VP-P</li></ul> <p>7. Supported waveform: Sine, Square, Pulse, Ramp, Noise, DC, Sin(x)/x, Gaussian, Lorentz, Exponential Rise, Exponential Decay, Haversine.</p> <p>8. Display: At least a 8-inch touch screen</p> <p>9. Features: System should have feature to show actual waveform at the device under test in real time.</p> <p><b>Measurement unit:</b></p> <ul style="list-style-type: none"><li>1. Measurement Channels: minimum 4 Analog Channels</li><li>2. Bandwidth: 2 GHz Analog on all channels</li><li>3. Sample Rate : <math>&gt;6</math> GSa/s on all channels</li><li>4. Record Length per channel: <math>&gt; 60</math> M points on all channels</li><li>5. Vertical Resolution: 12 bit Analog to Digital Convertor, 16 bits with high resolution mode</li><li>6. Input Impedance: 1 M<math>\Omega</math> , 50<math>\Omega</math></li><li>7. Input Sensitivity ( 1M<math>\Omega</math>): 500 <math>\mu</math>V/div to 10 V/div</li><li>8. Time base range: 200 ps/div to 1,000 s/div</li><li>9. Maximum input voltage: 1 M<math>\Omega</math>: 300 VRMS</li><li>10. Analysis: Histogram, Spectrum, Time Trend, TIE and Phase Noise</li><li>11. Trigger: Edge, Pulse Width, Runt, Logic, Rise/ Fall Time</li><li>12. Connectivity: USB, LAN ( LXI Compliant), Display Port</li><li>13. Probes: 1GHz passive or active probe, one probe for each channel</li><li>14. Display: <math>&gt; 15</math> inch HD capacitive touch screen</li><li>15. Operating System: Embedded OS (Non-Windows)</li><li>16. Input voltage: 100 - 240 V, 50 Hz</li></ul>
4.	<p><b>Utilities:</b> Please mention all the non-electrical utilities required to use the system, including cooling water, compressed air, inert gas, etc., along with their consumption. <b>Systems with minimal consumption of non-electrical utilities would be preferred.</b></p>



5.	<b>Footprint:</b> Preferably fit on movable stacked racks and occupy minimal area. Please mention the system dimensions that you intend to supply.
6.	<b>User Interface:</b> The system should be highly automated and preferably be in a plug-and-play condition at delivery. Additionally, the system should be controllable by a generic external computer via USB, or RS232, or RS485, or ethernet or any such interface. Command set for this control must be included with the system.
7.	<b>Regular Maintenance:</b> The system should require minimal maintenance. Any regular maintenance (optical alignment, calibration, cleaning, etc.) needed to keep the instrument in good working conditions should be clearly mentioned. The cost of this regular maintenance (if requiring additional consumables or spare parts) for 2 years should be quoted separately as “maintenance contract”.
8.	<b>Power:</b> The instrument should work at 220-240V 50 Hz AC power. If the system runs on DC power, please include the price of a suitable AC-DC power adapter. <b>Please mention AC power consumption.</b>
9.	<b>Operating Conditions:</b> The system must function year-round in Bangalore conditions, i.e. the ambient temperature of 10-40 °C and relative humidity of 30-95%.
10.	<b>Local Support:</b> Please mention if the system will be supported by a local distributor. <b>A Bangalore based vendor who can quickly respond to issues will be preferred.</b>
11.	<b>References:</b> Please provide a list of up to 3 references of users in India. Include contact numbers so that the purchase committee can contact the referees directly. The referees must be customers of the same or very similar electrical characterisation bundle or individual items included in this tender. These referees must be able to comment on the system's capability, robustness, and usability. They will also be asked about the quality of service support. Poor reviews by referees may result in disqualification of the bid.

Thank you,

Aditya Sadhanala