

FORM TO BE FILLED BY IO WHILE CONVENING PRE-BID MEETING OF TSC.**FileNo.- 14-VI/SH(1186-OTE)26PB T-20****Date:15-09-2026****Pre-bid Meeting (To be typed clearly by the I/O)**

Name of Indentor _____ Dr. Sudhir Husale _____

Indent No. _____ PR0072242026 / 35564 & 31/07/2026 _____

Item Description _____ Photocurrent Mapping System _____

No. of Budgetary Quotes _____ 02 (Two) _____

(1) A pre-bid meeting of TSC for re-tendering was held on _____ **15-09-2026** _____(2) Following bidders (**total numbers: 04**) participated in the Pre-bid Meeting:**Prospective Bidder**

1. **Octagon Precision (India) Pvt. Ltd. :** J-7 & J-8, S. NO. 15A/2, GKD IND. Estate , NANDEDGAON, Sinhgad Road, Pune 411041.
 - Mr. Nitin Dushi
2. **SGN Controls:** Chandigarh
 - Representatives attended and submitted technical suggestions during the meeting.
3. **RK Advanced Optical Technologies Pvt. Ltd., Pune, India**
 - Mr.RushikeshPawase, Director
4. **Satronics Enterprises, Pune**
 - Mr. Satyen

Proceedings of the Meeting

The Chair welcomed all participants and briefed them about the objective of the pre-bid meeting. The technical specifications, scope of supply, and other tender conditions were discussed. The prospective bidders were invited to seek clarifications and provide their comments on the tender specifications.

Name of the Firm	Queries Raised	Remarks, if any
Octagon Precision (India) Pvt. Ltd.	Do not have any queries	Email copy attached
M/S SGN Controls	Do not have any queries	Email copy attached
Satronics Enterprises, Pune	No queries	Email copy attached
M/S RK Advanced	No queries	Email copy

Optical Technologies Pvt. Ltd.		attached
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Indentor's recommendation

1. The comments, as received from bidders during PBC, and our response is as follows:
The technical specifications remain the same as no queries were raised by the bidders. Further, they have also ensured to participate in tender

Final recommended specifications are as attached at Annexure C and signed by I/O:

Corrigendum to Tender may be issued.

Recommended Date of Tender submission (if any) is till 13.10.2026 up to 3.00 PM.

The specifications are generic and broad based.

Submitted to TSC for necessary approvals.

FORM TO BE USED BY TSC FOR FINALISING PRE-BID MINUTES

File No. 14-VI/SH(1186-OTE)26PB T-20

Date: 16-09-2026

TSC Minutes (To be typed clearly by the I/O)

Based on the Pre-bid meeting and recommendation of I/O, no changes have been made in the technical specifications (Annexure C):

The file is forwarded to Purchase Section for uploading the final specifications and TSC minutes on the website and CPPP Portal.

Declaration: We hereby declare that we have no conflict of interest with any of the bidder in this tender.

Photocurrent Mapping System

Scope of supply

The bidder shall supply, install, commission, and demonstrate a complete Digital Micro mirror Device (DMD) -based or equivalent high speed optical photocurrent mapping system for spatially resolved electrical characterization of semiconductor, photovoltaic, and optoelectronic, and nano structured devices. The offered system should include all required optical, opto-mechanical, electronic, electrical, synchronization, control, safety, and software components necessary for immediate operation after installation and training.

The system shall support:

- a) High speed programmable optical excitation
- b) Spatially resolved photocurrent mapping
- c) Multi – wavelength excitation
- d) Synchronized electrical measurement
- e) Real time data visualization and storage
- f) Automated scanning and analysis

Technical Specifications

1. DMD – Based Structured Illumination / Fast Beam Scanning Module

The system shall include a Digital Micromirror Device (DMD) or equivalent high-speed spatial light modulation system suitable for programmable optical pattern projection and fast beam scanning.

Minimum specifications:

DMD active area: ≥ 0.7 inches
Resolution: $\geq 1024 \times 768$ micromirrors
Mirror pitch: $\leq 14 \mu\text{m}$
Pattern switching rate: ≥ 10 kHz
External trigger capability
Interface: USB / HDMI / Display Port / Ethernet
Software development kit (SDK) for pattern control
Spectral operating range: 400–700nm or wider
Optical power handling capability: $\geq 150 \text{ mW/cm}^2$
Capability for grayscale and binary pattern projection preferred

2.0 Laser Illumination Sources

The system shall include multiple continuous-wave (CW), single-mode laser sources for multi-wavelength excitation. System shall support sequential operation of one laser at a time.

Required wavelengths

405 nm power 100mW or better
450nm power 100mW or better

488 nm; power 60mW or better
520 nm; power 50mW or better
635 nm; power 100mW or better
670 nm; power 100mW or better
700 nm; power 30mW or better

Wavelength Tolerance: Each laser shall have a centre wavelength within ± 10 nm of the specified nominal wavelength, as certified by the manufacturer. The exact operating wavelength and tolerance shall be stated in the vendor's technical bid.

Calibrated Optical Power Meter:

Spectral range: 300–1100 nm
Measurement range: 100 nW to 500 mW or more
Accuracy: $\leq 3\%$ or better

The optical power meter shall be supplied with a valid calibration certificate traceable to a National Metrology Institute (NMI) or an accredited calibration laboratory with NMI traceability.

3.0 Optical Beam Conditioning

The system shall include all required optical beam conditioning components for uniform DMD illumination such as

- 3.1.1 Beam expanders, Spatial filter assembly (Objective + Pinhole)
- 3.1.2 Collimation optics and Neutral density filter or motorized attenuator
- 3.1.3 Beam steering mirrors and Beam dump for unused diffraction orders
- 3.1.4 Fourier plane spatial filtering arrangement

The system shall ensure uniform illumination of the entire DMD active area

4.0 Projection Optics and Imaging System

The system shall include high quality diffraction – limited projection optical system for imaging DMD patterns onto sample.

4.1 Required features:

- 4.1.1 High quality 4f projection optical system and Telecentric optical design preferred
- 4.1.2. Adjustable projection magnification, Achromatic lenses and / or off-axis parabolic mirrors and AR-coating for 400–700 nm range
- 4.1.3 Fourier plane spatial filter for suppression of higher diffraction orders, Precision optical alignment mounts with micrometer adjustment and Z-focus optimization capability

4.2 Performance Requirements:

- 4.2.1. Magnification range: $0.5\times$ to $1\times$ or wider
- 4.2.2. Spatial resolution on sample : $\leq 30 - 40 \mu\text{m}$
- 4.2.3. Mapping area without stage movement : $\geq 20 \text{ mm}$
- 4.2.4. Depth-of-focus adjustment of $\pm 1 \text{ mm}$ or better through translating stage mount or equivalent mechanism
- 4.2.5. Minimal field distortion over full scan area

5.0 Sample Stage and Multi – Scale Mapping Capability

The system shall include a precision motorised XYZ positioning stages with closed loop feedback control for automated photocurrent mapping and device characterization.

5.1 Sample holder requirements:

- 5.1.1. Compatible sample size range : $10 \times 10 \text{ mm}^2$, $200 \times 200 \text{ mm}^2$ and $1.7 \times 2 \text{ m}^2$ or larger
- 5.1.2. Electrical probe using Kelvin probes, pogo pins, spring contacts, or equivalent low contact resistance probing arrangements.

5.2 Multi – Scale Mapping Capability

The offered system shall support three independent photocurrent mapping configurations optimized for different spatial resolution and scan-area requirements.

5.2.1 Micro-Scale High-Resolution Mapping Mode

For the Micro-Scale High-Resolution Mapping Mode, the laboratory's existing research-grade optical microscope shall be utilized.

The supplier shall provide the required motorized stage and all necessary integration hardware/software to achieve

- 5.2.1.1. Minimum mapping area of **10 mm × 10 mm**
- 5.2.1.2. Spatial resolution / laser spot size of **$\leq 1 \mu\text{m}$** .
- 5.2.1.3. DMD-based illumination is not mandatory for this mode, and alternative high-resolution laser scanning approaches shall be acceptable.

5.2.2 Medium-Area Fast Mapping Mode

The system shall support high-speed photocurrent mapping over medium-area samples using DMD-based or equivalent programmable structured illumination.

Minimum Requirements:

- 5.2.2.1. Scan area: $\geq 200 \text{ mm} \times 200 \text{ mm}$
 - 5.2.2.2. Spatial resolution: $\leq 40 \mu\text{m}$
 - 5.2.2.3. DMD-based structured or equivalent illumination preferred
 - 5.2.2.4. High-speed synchronized mapping capability
- Suitable for semiconductor wafers, photovoltaic devices, and optoelectronic samples

5.2.3 Large-Area Mapping Mode

The system shall support large-area photocurrent mapping for photovoltaic panels and large-area optoelectronic devices.

Minimum Requirements:

- 5.2.3.1. Scan area: $\geq 2 \text{ m} \times 1.7 \text{ m}$
 - 5.2.3.2. Spatial resolution: $\leq 100 \mu\text{m}$
 - 5.2.3.3. Automated synchronized scanning capability
- Suitable for solar panel and large-area device characterization

6. Electrical Measurement and Synchronization System

The system shall include synchronized low-noise electrical measurement instrumentation for photocurrent acquisition.

6.1 Source Measure Unit (SMU): Minimum Specifications

- 6.1.1. Dual or Single-channel SMU
- 6.1.2. Voltage sourcing range: ± 1 mV to 100 V or higher
- 6.1.3. Current measurement range: pA to mA or higher
- 6.1.4. Noise floor: ≤ 10 fA RMS
- 6.1.5. Sampling rate: ≥ 50 kS/s
- 6.1.6. External trigger synchronization capability

6.2 Lock-In Amplifier: Minimum Specifications

- 6.2.1. Frequency range: 1 Hz to ≥ 200 kHz
- 6.2.2. Time constant: ≤ 10 μ s
- 6.2.3. Input noise: ≤ 5 nV/ $\sqrt{\text{Hz}}$
- 6.2.4. Dynamic reserve: ≥ 80 dB
- 6.2.5. FFT and synchronous detection capability
- 6.2.6. Dual or Single-channel measurement capability.

6.3 Additional Instrumentation: Oscilloscope: ≥ 100 MHz bandwidth, Bias-T and/or preamplifier for transient measurements

7. Alignment and Monitoring System

The system shall include an integrated imaging and alignment subsystem.

Minimum Specifications:

- 7.1 High-resolution CCD/CMOS camera
- 7.2 Resolution: ≥ 5 MP, Pixel size: ≤ 5 μ m and Frame rate: ≥ 30 fps
- 7.3 Real-time sample visualization
- 7.4 DMD pattern visualization on sample and Calibration pattern display capability
- 7.5 Shared field-of-view for projected pattern and sample

8. Optical Table and Mechanical Infrastructure

The supplier shall provide:

- 8.1 Vibration-isolated optical table or breadboard
- 8.2 optical cage/tube system, Optical posts and mounts and Kinematic mounts
- 8.3 Cable management system and EMI shielding provisions
- 8.4 Overhead shelf and Electronic extension board

9. Computer Workstation

The supplier shall provide a dedicated high-performance workstation.

Minimum Specifications:

- 9.1 Processor: ≥ 8 -core CPU, RAM: ≥ 32 GB, Storage: ≥ 2 TB SSD
- 9.2 GPU: ≥ 8 GB VRAM, Dual-monitor support
- 9.3 USB 3.0/3.2, Ethernet, PCIe, GPIB interfaces
- 9.4 Compatible operating system

10. Software and Control System

The supplier shall provide fully integrated software for:

- 10.1 DMD control, Laser control, SMU control and Lock-in amplifier control
- 10.2 Camera acquisition and Timing synchronization
- 10.3 Automated photocurrent mapping and Real-time visualization
- 10.4 FFT/DFT analysis and SNR optimization

10.5 Data export

11. Installation, Integration, and Commissioning

The supplier shall provide:

- 11.1 Complete installation and System integration
- 11.2 User training
- 11.3 Functional demonstration

Acceptance shall be based on successful demonstration of the specified performance using a reference sample traceable to national or international standards.

12. Warranty and Support

- 12.1 Minimum comprehensive warranty: 1 year after commissioning
- 12.2 Technical support availability: minimum 10 years
- 12.3 Remote and onsite support capability

13. Compliance Statement

The bidder shall submit a detailed point-by-point compliance statement against all specifications