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From: Director, CSIR-NPL
No. 14-VI/SH(1186-OTE)26PB/T-20

Dated:13.07.2026

CORRIGENDUM

With reference to NPL's Global Tender ID: **2026_CSIR_282596_1** for "**Photocurrent Mapping System**". All the prospective bidders are hereby informed that some changes have been made in the technical specification of captioned tender. Revised specifications are as follows:

Original Specifications	Final Specifications
As tendered	Attached as Annexure C

Revised Technical specifications (Annexure-C) is also ATTACHED with this Corrigendum. Accordingly, all the interested bidders may submit their Offer as per revised technical specification.

Please also note that bids submitted without taking these changes into consideration will be rejected summarily.

All other terms will remain the same. The same is also available on CSIR-NPL official website <http://www.nplindia.in> under Tender link.


Sr. Controller of Stores and Purchase

FORM TO BE FILLED BY IO WHILE CONVENING PRE-BID MEETING OF TSC.

FileNo.- 14-VI/SH(1186-OTE)26PB T-20

Date:09-07-2026

Pre-bid Meeting (To be typed clearly by the I/O)

Name of Indentor _____ Dr. Sudhir Husale _____

Indent No. _____ PR0072242026 _____

Item Description _____ Photocurrent Mapping System _____

Project No. __ Photocurrent Mapping System (Digital Micromirror Device (DMD)) Based ____

(1) A pre-bid meeting of TSC was held on _____ **07-07-2026** _____

(2) Following bidders (**total numbers: 03**) participated in the Pre-bid Meeting:

Prospective Bidder

1. **Optimized Solutions Limited, Ahmedabad, India**
 - o Ms.Madhusmita Beura
 - o Mr.Nisarg Thacker
2. **SGN Controls**
 - o Representatives attended and submitted technical suggestions during the meeting.
3. **RK Advanced Optical Technologies Pvt. Ltd., Pune, India**
 - o Mr.RushikeshPawase, Director

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
M/S SGN Controls	The representative from SGN Controls submitted technical suggestions on certain tender specifications. The Technical Committee examined each point in detail.	Email copy attached for details
M/S Optimized Solutions Limited	The representatives did not seek any clarification or propose any modification to the tender specifications during the meeting.	Email copy attached for details

M/S RK Advanced Optical Technologies Pvt. Ltd.	The representative informed the committee that, after reviewing the tender specifications, terms, and conditions, the firm had no queries or requested modifications	Email copy attached for details
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Kindly Note : M/S Octagon Precision (India) Pvt. Ltd.

The representative of Octagon Precision (India) Pvt. Ltd. could not attend the pre-bid meeting. However, the firm communicated through email that it had carefully studied the tender specifications and did not require any clarification. The firm confirmed its understanding of the requirements and expressed its intention to participate in the tender by submitting its bid within the prescribed due date.

Indentor's recommendation

1. The comments, as received from bidders during PBC, and our response is as follows:

Tender Specification and its number	Comment of bidder M/S SGN Controls	Response of Indentor (Accepted/ Not accepted)	Revised specification (If any)	Justification for non-acceptance
Point 2.0	One laser at a time will be used.	Accepted	Specification modified in revised Annexure C	NIL
Point 4.1.2	Range to be modified for 400-700 nm range	Accepted	Specification modified in revised Annexure C	NIL
Point 4.2.1	Magnification range 0.5X 1 X wider is preferred	Accepted	No change No change required since specification already states "0.5× to 1× or wider."	NIL
Point 4.2.4	Focus adjustment by translating stage mount	Accepted	Specification modified in revised Annexure C	NIL
Point 5.1.1	Compatible sample size : 10x10 mm ² , 150X150 mm ² , and expandable to 1.7 X 2 m ²	Not Accepted	The tender specification shall remain unchanged.	The requirement of compatible sample size 10 × 10 mm², 200 × 200 mm², and 1.7 × 2 m² or larger is an essential minimum

				technical requirement for the intended applications and, therefore, cannot be relaxed.
Point 6.1.1	Single channel SMU	Accepted	Specification modified in revised Annexure C	NIL
Point 6.2.6	Single channel Lock-in Amplifier.	Accepted	Specification modified in revised Annexure C	NIL

Final recommended specifications are as attached at Annexure C

Recommended Date of Tender submission (if any) is 11.08.2026 up to 3.00 PM.
The specifications are generic and broad based.

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

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

Date: 10-07-2026

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

Based on the Pre-bid meeting and recommendation of I/O, following changes have been made in the technical specifications (Annexure C):

Original Specification	Final specification
2.0 Laser Illumination Sources The system shall include multiple continuous-wave (CW), single-mode laser sources for multi-wavelength excitation. One laser at a time will be used	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.
4.1.2. Adjustable projection magnification, Achromatic lenses and / or off-axis parabolic mirrors and AR-coating for 400–900 nm range	4.1.2. Adjustable projection magnification, Achromatic lenses and / or off-axis parabolic mirrors and AR-coating for 400–700 nm range
4.2.4 Depth – of – focus adjustment : ± 1 mm or better	4.2.4 Depth-of-focus adjustment of ± 1 mm or better through translating stage mount or equivalent mechanism.
6.1.1. Dual-channel SMU	6.1.1 Dual or Single-channel SMU
6.2.6 Dual-channel measurement capability	6.2.6Dual or Single-channel measurement capability.

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.

Scope of supply

The bidder shall supply, install, commission, and demonstrate a complete Digital Micromirror Device (DMD) -based or equivalent high speed optical photocurrent mapping system for spatially resolved electrical characterization of semiconductor, photovoltaic, and optoelectronic, and nanostructured 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:

- 1.1 DMD active area: ≥ 0.7 inches
- 1.2 Resolution: $\geq 1024 \times 768$ micromirrors
- 1.3 Mirror pitch: $\leq 14 \mu\text{m}$
- 1.4 Pattern switching rate: ≥ 10 kHz
- 1.5 External trigger capability
- 1.6 Interface: USB / HDMI / Display Port / Ethernet
- 1.7 Software development kit (SDK) for pattern control
- 1.8 Spectral operating range: 400–700nm or wider
- 1.9 Optical power handling capability: $\geq 150 \text{ mW/cm}^2$
- 1.10 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.

2.1 Required wavelengths

- 2.1.1 405 nm power 100mW or better
- 2.1.2 450nm power 100mW or better
- 2.1.3 488 nm; power 60mW or better
- 2.1.4 520 nm; power 50mW or better
- 2.1.5 635 nm; power 100mW or better
- 2.1.6 670 nm; power 100mW or better
- 2.1.7 700 nm; power 30mW or better

Wavelength Tolerance: Each laser shall have a center 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.

2.2 Calibrated Optical Power Meter:

- 2.2.1 Spectral range: 300–1100 nm
- 2.2.2 Measurement range: 100 nW to 500 mW or more
- 2.2.3 Accuracy: $\leq 3\%$ or better
- 2.2.4 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 **≤ 1 μm**.
- 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: $\leq 40 \text{ μm}$
 - 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: $\leq 100 \text{ μm}$
 - 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: $\pm 1 \text{ mV}$ to 100 V or higher
- 6.1.3. Current measurement range: pA to mA or higher
- 6.1.4. Noise floor: $\leq 10 \text{ fA RMS}$
- 6.1.5. Sampling rate: $\geq 50 \text{ kS/s}$
- 6.1.6. External trigger synchronization capability

6.2 Lock-In Amplifier: Minimum Specifications

- 6.2.1. Frequency range: 1 Hz to $\geq 200 \text{ kHz}$
- 6.2.2. Time constant: $\leq 10 \text{ μs}$
- 6.2.3. Input noise: $\leq 5 \text{ nV}/\sqrt{\text{Hz}}$
- 6.2.4. Dynamic reserve: $\geq 80 \text{ dB}$
- 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: $\leq 5 \mu\text{m}$ 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