INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076.

Ref. PR No. 1000040674 **RFx. No. 6100001870**

Item Description: **Light Sources for Bi-facial & Stability Measurement (Quantity - 1)**

Sr. No	Item Description	Detailed Technical Specification	Qty.	Technical Compliance (Yes / No)	Additional Information (if any)
1.	**Class AAA LED Solar Simulator**	a. Source: LED b. Output Beam Size should be ≥ 50 mm x 50 mm. c. Working Distance ≥ 200 mm. with proper mounting at the base. d. Variable output adjustment from 0.1 Sun to 1.1 Sun e. Wavelength Range 400 nm - 1100 nm f. Fast turn on time <100 ms g. Independent Band Control 6 Bands h. 400 - 500 nm, 500 - 600 nm, 600 - 700 nm, 700 - 800 nm, 800 - 900 nm, 900 - 1100 nm. i. Factory-certified IEC, ASTM, JIS AAA rated. j. The individual LED output should be adjustable through computer control. k. The simulator head should be turned by 0, 90 and 180 degrees with the appropriate adaptor as required. l. Height Adjustment should be possible. m. Power Requirements: As per Indian standard. n. Computer for operation and analysis.	1		
2.	**Class ABA LED Solar Simulator**	a. Class: ABA b. Source: LED c. Output Beam Size should be ≥ 50 mm x 50 mm d. Should have Variable output adjustment from 0.1 to 1.1 SUN. e. Source spectral range should be 400nm - 1100nm f. Working Distance ≥ 300 mm	1		

		g. Should have Head Rotation 0 - 360º h. Laser Diode based optical alignment should be available. i. TTL Turn On/Off Transition Time ≤ 10ms j. LED Lifetime should be 10,000 hours or better. k. Should have PV cell placement indicator l. Should have Factory certified IEC and JIS Rated m. Should be CE and ROHS complied. n. Power Requirements 100-240 VAC o. Computer for operation and analysis.			
3.	**Class AAA Solar Simulator 6 x 6-inch 1000-Watt Xenon (downward facing beam)**	a. Source: Xenon Arc Lamp, 1000 W, Ozone Free b. Calibration certificate validating Class AAA performance for all 3 standards: IEC, ASTM and JIS c. Output Beam Size should be ≥ 6x6 inch d. Should have <±2 % non-uniformity e. Spectral range 400 to 1100nm as per IEC Standard for Class A with AM 1.5G Filter f. Working Distance ≥ 20 cm g. Lamp Life > 1000 hrs h. Housing design allows the head orientation to produce **downward facing beam** i. For better and black spot-free light illumination at sample and better uniformity in the long run, the solar simulator should be a fiber-free and diffuser-free optical system. j. Should have temperature sensors and interlocks to ensure operator safety. k. Cooling system should be included for Solar Simulator safety and interlock should be there to ensure safety of the instrument. l. The beam intensity should be controlled from 100mW.cm^{-2} to ~ 10mW.cm^{-2} preferably in stepwise control. m. Beam feedback for high uniformity is needed. n. Power requirements: as per Indian standard o. Computer for operation and analysis	1		
4	**Class AAA Solar Simulator 6 x 6-inch 1000-Watt Xenon (upwards facing beam)**	a. Source: Xenon Arc Lamp, 1000 W, Ozone Free b. Calibration certificate validating Class AAA performance for all 3 standards: IEC, ASTM and JIS c. Output Beam Size should be ≥ 6x6 inch d. Should have <±2 % non-uniformity e. Spectral range 400 to 1100nm as per IEC Standard for Class A with AM 1.5G Filter f. Working Distance ≥ 20 cm g. Lamp Life > 1000 hrs	1		

		h. Housing design allows the head orientation to produce downward facing beam i. For better and black spot-free light illumination at sample and better uniformity in the long run, the solar simulator should be a fiber-free and diffuser-free optical system. j. Should have temperature sensors and interlocks to ensure operator safety. k. Cooling system should be included for Solar Simulator safety and interlock should be there to ensure safety of the instrument. l. The beam intensity should be controlled from 100mW.cm^{-2} to ~ 10mW.cm^{-2} preferably in stepwise control. m. Beam feedback for high uniformity is needed n. Power requirements: as per Indian standard o. Computer for operation and analysis			
5	**Spectral Measurement System**	a. Measurement Spectral Range ≥ 300-1800 nm b. Detector Type: Si/Ge c. System can do Simultaneous IQE, and EQE measurements d. Source: Xenon Arc Lamp, 100 W e. Working Distance ≥ 3 inch f. System includes all necessary components with integrated light source, monochromator, detectors, electronics, software, and computer g. Integrated beam chopper with virtual digital lock-in amplifier capable of 4 Hz for signal-to-noise. h. Sturdy 3-axis (Z, tip, tilt) optical mounting is required i. Specular Reflectance Uncertainty ≥ +/- 2.1 % of measured value, 350 – 1100 nm j. Spectral Bandwidth (FWHM) 1 - 40 nm k. Wavelength Accuracy ~ ± 0.5 nm l. Nominal Spot Size: ~ 1mm^2 m. Optical Chopper Frequency: 4.0 Hz – 100.0Hz (with 0.5Hz resolution) n. Sample DC Gain Settings: 7 10, 100, 1k, 10k, 100k, 1M, 10M o. AC Gain Settings: 1, 10, 100, 1000 p. Sample Current Range: 10nA – 1.0A q. Bias Voltage: +/- 10V r. External light bias: QTH s. Light tight shielding t. Software controlled operation and analysis u. Power requirements: as per Indian standard v. Computer for operation and analysis	1		

6	**Computer Specifications**	Desktop Computer for operation with adequate software should be provided with the following configurations: a. DELL, HP or substantially equivalent b. FHD, 1 TB SSD, DDR 5 c. RAM 16 GB, Graphic card (Compatible with configuration) d. Intel i7, 13th Generation Processor e. PCI Express 16x slot, DVD Burner, Windows 11. f. Display Size: 32 inches, FHD LED Monitor with display port g. Wireless Mouse and Keyboard h. Compatible connectors to connect to the laptop for data extraction.	1		
7	**General**	a. The system should be delivered and installed at user's premises within 8-10 weeks. b. Factory acceptance test: The manufacturer should be able to demonstrate the system's capabilities to perfection at the factory floor before transporting it to the users' facility. c. The supplier should be supporting with no cost if the there is any Software upgradation required in the computer and in the systems. d. All the power cable and connectors are as per the Indian Norms and should be compatible/adjustable to Indian Sockets. e. 1-year warranty after successful installation of the system.			