# **NASA STANDARD TEST REPORT**

## *TEST REPORT DOCUMENT:* ***RSP.001***

Test Title: Raman Spectrometer Performance Evaluation  
Test Identifier: RSP-001  
Test Date: [Insert Date]  
Test Location: [Insert Location]  
Test Engineer: Madison J. Newell

Quality Engineer: Berhane

# 1. TEST OBJECTIVE

*To document the performance evaluation of a Raman spectrometer using a 527 nm excitation laser, including spectral accuracy, resolution, and efficiency based on the test procedure RSP-001.*

# 2. TEST CONDITIONS

* Environmental Conditions: [Temperature, Humidity, Pressure]
* Instrument Calibration: Verified using a silicon wafer as a reference sample.
* Alignment Checks: Ensured proper positioning of collimating and focusing mirrors.

# 3. DATA COLLECTION

## 3.1 Measurement Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Measured Value | Expected Value | Deviation |
| Raman Peak (Si) | [XX] nm | 520.7 nm | [XX] nm |
| Spectral Range | [XX] nm | 530-630 nm | [XX] nm |
| Resolution (FWHM) | [XX] nm | ≤ 0.5 nm | [XX] nm |
| MTF @ 10 cycles/mm | [XX] | ≥ 0.8 | [XX] |
| Signal-to-Noise Ratio | [XX] dB | ≥ [XX] dB | [XX] dB |

# 4. RESULTS & ANALYSIS

## 4.1 Spectral Accuracy

* The Raman peaks were identified at [XX] nm, within [XX] nm of the expected values.
* Calibration confirmed using a silicon wafer reference spectrum.

## 4.2 Resolution & Image Quality

* The spot diagram analysis shows well-separated wavelengths at different positions.
* MTF results indicate an optical transfer function above the threshold at 10 cycles/mm.

## 4.3 Intensity & Irradiance Distribution

* The intensity distribution was analyzed at multiple wavelengths.
* The CCD detected sufficient illumination across the spectral range with minimal noise.

# 5. DEVIATIONS & CORRECTIVE ACTIONS

|  |  |  |  |
| --- | --- | --- | --- |
| Observation | Cause | Corrective Action | Status |
| [Issue] | [Cause] | [Action Taken] | [Resolved/Pending] |

## 6. CONCLUSION

* The Raman spectrometer met/not met the acceptance criteria.
* Improvements in [XX] may enhance future performance.
* Further optimization in slit width, mirror alignment, or grating selection may be necessary.

### End of Document