Appendix

IPR Proposed tests for the acceptance of the integrated system: Imaging spectrograph, CCD detector and fiber bundle.

The acceptance tests are to be demonstrated using 1800 lines/mm (Grating#1), 1200 lines/mm (Grating# 2) and 600 lines/mm (Grating# 3).

1) Test for the imaging performance

At the entrance of the spectrograph	Fiber array coupled and aligned using imaging fiber adapter.
Light sources	1) Integrating sphere and a Quartz Tungsten lamp 2) Low pressure spectral calibration lamp
Spectrograph Settings	Configuration : Slit width : As same as pixel size of CCD Slit height : As same as height of CCD
Test procedure	Configuration : a) Scan spectra in the range 500–800 nm using light source.1 or any suitable light source b) Record standard lines using light source. 2 or any suitable light source
Configuration	Expected test result
Configuration	a) A dispersed spectrum consisting of distinct, spatially well resolved and uniformly illuminated tracks with the track to track separation remaining nearly same across the focal plane of the CCD. b) No distortion (full resolution) within 10 mm × 10 mm of the image plane. Less than 25% distortion on rest of the image plane.

2) Test for average wavelength coverage and average wavelength dispersion

At the entrance of the spectrograph	Fiber array coupled and aligned using fiber adapter.
Light source	Low pressure Mercury lamp/Argon lamp/Neon lamp
Spectrograph Settings	Slit width : Same as pixel size of CCD Slit height : As same as height of CCD
Test procedure	Scan nearby wavelengths: λ_1 and λ_2 Dispersion = $(\lambda_2 - \lambda_1)/W$ Where, W= No of pixels covered*pixel width(mm)
Spectral lines	Scan standard emissions lines in 250–800 nm for 1800 lines/mm and lines in 250–1000 nm range for 1200 lines/mm and 600 lines/mm.
	Expected test result
Wavelength dispersion	1.0 to 0.8 nm/mm for Grating no.1 1.5 to 1.3 nm/mm for Grating no .2 3.5 to 2.8 nm/mm for Grating no.3
Wavelength coverage	13–10 nm for Grating no.1 20–17 nm for Grating no.2 45–35nm for Grating no.3

3) Test for wavelength resolution

At the entrance of the spectrograph	Fiber array coupled and aligned using fiber adapter.
Light source	Low pressure Mercury lamp/Argon lamp/Neon lamp
Spectrograph Settings	Slit width : As same as pixel size of CCD Slit height : As same as height of CCD
Test procedure	
Spectral lines	Scan standard emissions lines in 250–800 nm for 1800 lines/mm and lines in 250–1000 nm range for 1200 lines/mm and 600 lines/mm.
	Expected test result
Wavelength Resolution	For all the recordings *i.e. center, right and left edges of CCD* ≤ 0.06nm across the focal plane for Grating no.1 ≤ 0.08nm across the focal plane for Grating no.2 ≤ 0.15 nm across the focal plane for Grating no.3

Additional points:

1) Frame rate should be demonstrated.
2) Dark current should be measured and demonstrated at best achievable cooling temperature of CCD.
3) Demonstration of external trigger mode.
4) Demonstration of acquisition of image using quoted frame rate.

Date:- **Bidder's Sign and Stmp**