Resonon Test Report – Wedge Window Realign

Identification Data		
Date	September, 2019	
Resonon SN	100114-1	
Instrument Name	BS01	
Andor Camera SN	CCD-17878	

Configuration	
Filters Installed	
1. There is no filter on the PGP, only an AR coating. See Figure	
1a	
2. Filter on rear tilted substrate: See Fig. 2b.	
Sensors Installed	
1. 10K Ohm Thermister: Digikey part # 615-1010-ND; 3 units.	
2. Humidity Sensor: Digikey part # 480-3294-1-ND	
Fiber bundle info: Leoni 800 µm core fibers. See Figure 2.	
Grating: Aug. 2016 batch.	

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Figure 1a: AR coating on front face of 1st prism

Figure 2b: Bandpass filter on rear tilted substrate



Figure 3: Leoni Fiber details

Test Summary Smile (Peak to Trough)		
@ 587 nm	0.2 pixel	
Keystone (Peak to Trough)		
Channel 1	1.5 pixels	
Channel 7	1.5 pixels	
Channel 14	2 pixels	

Spectral Resolution (FWHM)	
@ 587 nm	< 0.9 nm, See Figure 9
@ 387 nm	< 1.6 nm, See Figure 9



Figure 4: Smile at 387 nm. Horizontal axis is spatial channels and vertical axis is spectral.



Figure 5: Smile at 587 nm.



Figure 6: Channel 1 keystone. Horizontal axis is spectral channels and vertical axis is spatial.



Figure 7: Channel 7 tilt/keystone



Figure 8: Channel 14 keystone.



Figure 9: Spectral widths vs. spatial position



Figure 10: Cross section of fibers.



Figure 11: Cross section of channel 7.



Figure 12: Cross section of fibers, spatial pixels 425-525.



Figure 13: Sub-pixel correlation of post-shake all channel cross section to pre-shake all channel cross section showing a 1.0 +/- 0.1 pixel spatial shift.

Notes:

An approximately 5 pixel shift in spatial channel position was observed in this instrument during deployment.

Teardown and inspection revealed no causes for the shifting channel positions within the optical train, e.g., all optics were found to be tight and well seated in their mounts. Upon re-assembly it was noted that the four socket head cap screws that attach the camera housing were too long and had bottomed in their threaded holes. This prevented the camera housing from being fully secured to the optical train. This condition would have allowed the FPA to move in a direction parallel to the grating rulings and was likely the cause of the shifting channel position observed during deployment.

Re-assembly was completed by installing socket head cap screws of an appropriate length and repairing all four threaded holes in the camera housing with heli-coil inserts.

The assembled instrument was subjected to a 4-hour vibration test. Evaluation of the instrument pre- and post-vibe shown in the above plots. A 1.0+/-0.1 pixel shift

in spatial channel position was observed post vibe, detailed in Figures 12 and 13 above. No movement was detected along spectral axis, nor rotation of the FPA about the optical axis, as no significant change was observed post-vibe in the smile and tilt/keystone plots shown in Figures 4-8.