

University of Wisconsin – Madison
Contract Number F327972
Jenoptik Q15215



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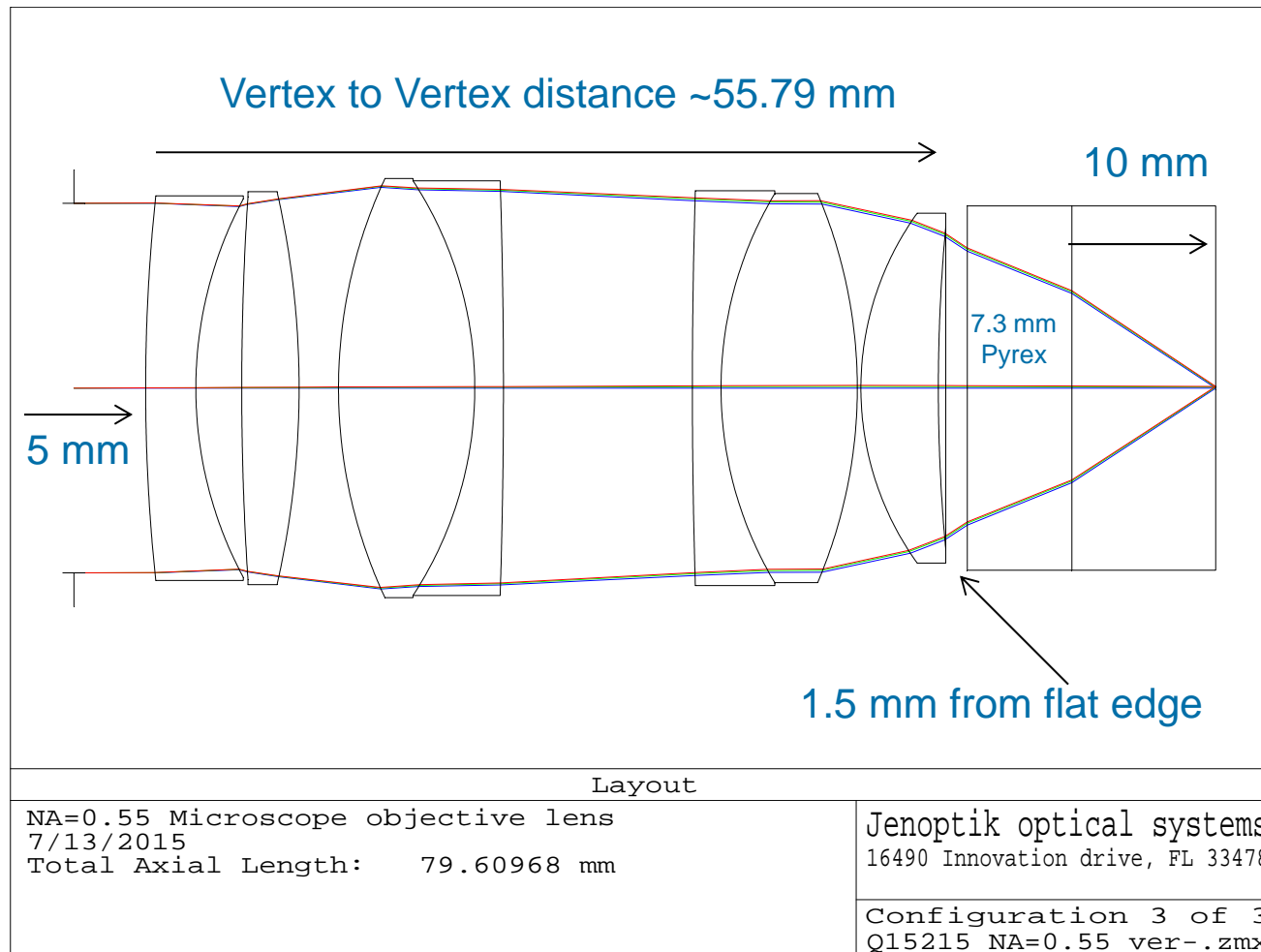
Tolis Deslis 13 July 2015

Specifications - I



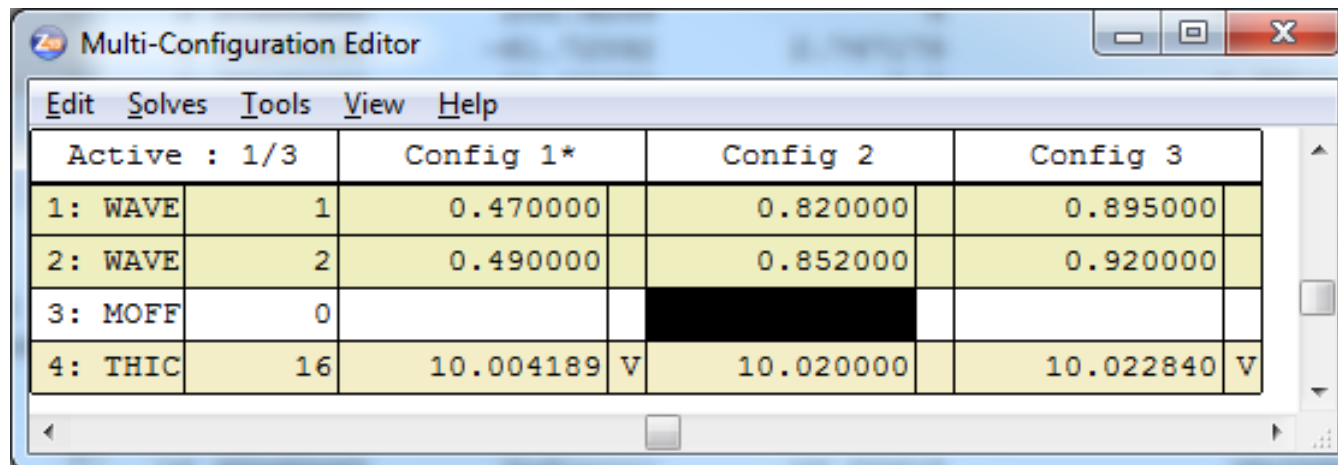
ITEM	DESCRIPTION	MEET SPECIFICATIONS	
		YES	NO
	Custom Objective Lens		
1	Designed for projection and imaging tasks with light of wavelengths 470, 490 820, 852, 852, 895 and 920 nm.	X	
2	NA 0.55	X	
3	Outside tube diameter < 45 mm	< 35 mm	
4	Working distance: 1 mm air + 7.3 mm pyrex + 10 mm vacuum	X	
5	Better than diffraction limited for a field of view of 230 micron diameter (margin included)	X	
6	Optical transmission >94% at above wavelengths		X
7	Lens assembly constructed from non-magnetic materials	X	
8	Total weight < 500 g	X	
9	Bid must include calculated rms wavefront error and chromatic focal shifts as a function of off-axis coordinate at focal plane	X	
10	Delivered items must include a measured verification of performance	X	
11	Quote for 2 units with an option for 2 more.		

Optical Layout



Multi-configuration data

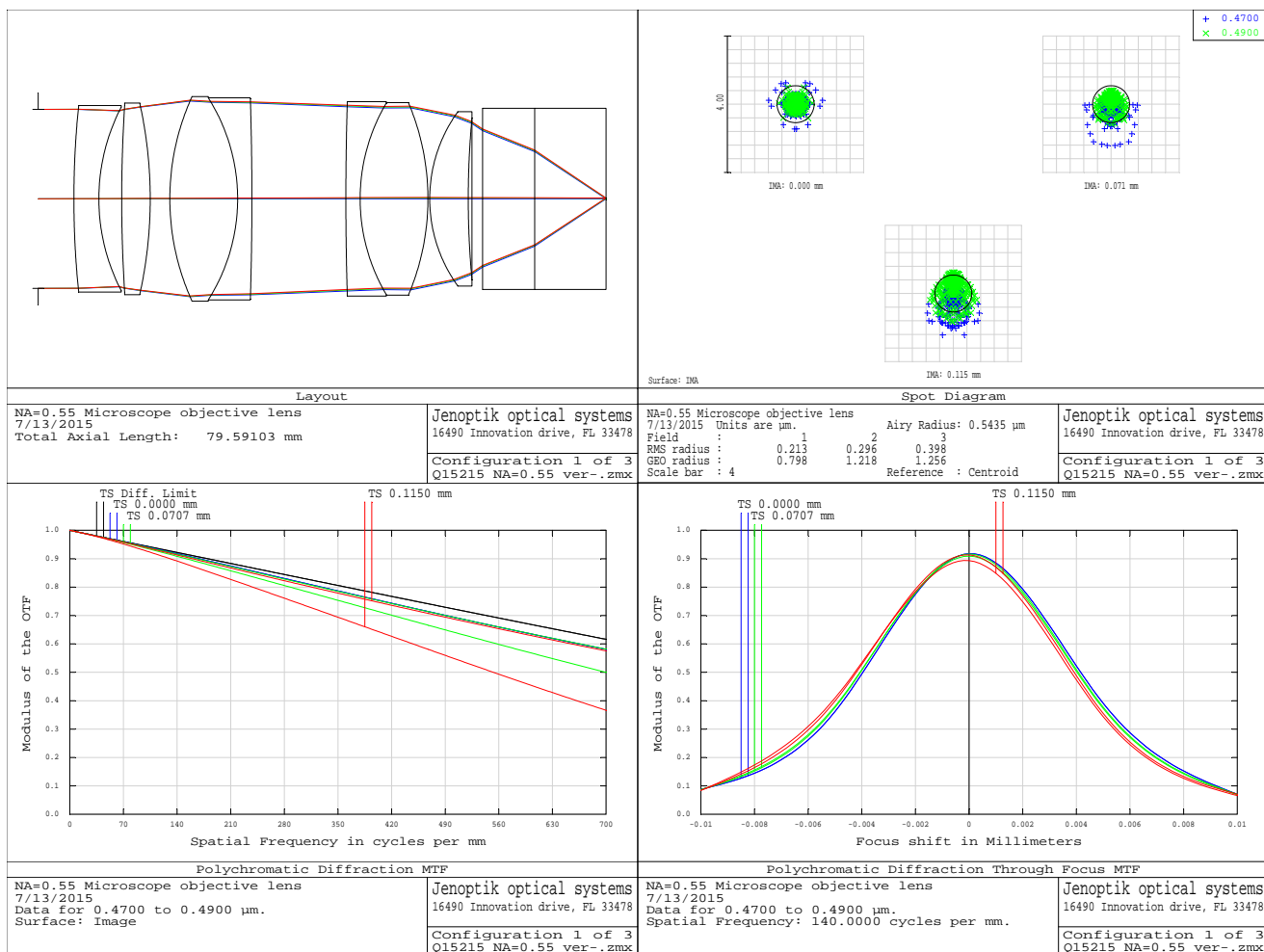
Working distance in vacuum at different wavelengths



The screenshot shows a software window titled "Multi-Configuration Editor" with a menu bar (Edit, Solves, Tools, View, Help) and a table of configuration data. The table has columns for "Active", "Config 1*", "Config 2", and "Config 3". The "Active" column shows "1/3" for the first three rows and "16" for the last row. The "Config 1*" column shows values 0.470000, 0.490000, and 10.004189 V. The "Config 2" column shows values 0.820000, 0.852000, and 10.020000. The "Config 3" column shows values 0.895000, 0.920000, and 10.022840 V. A black rectangular area obscures the data in the third row of the "Config 2" column.

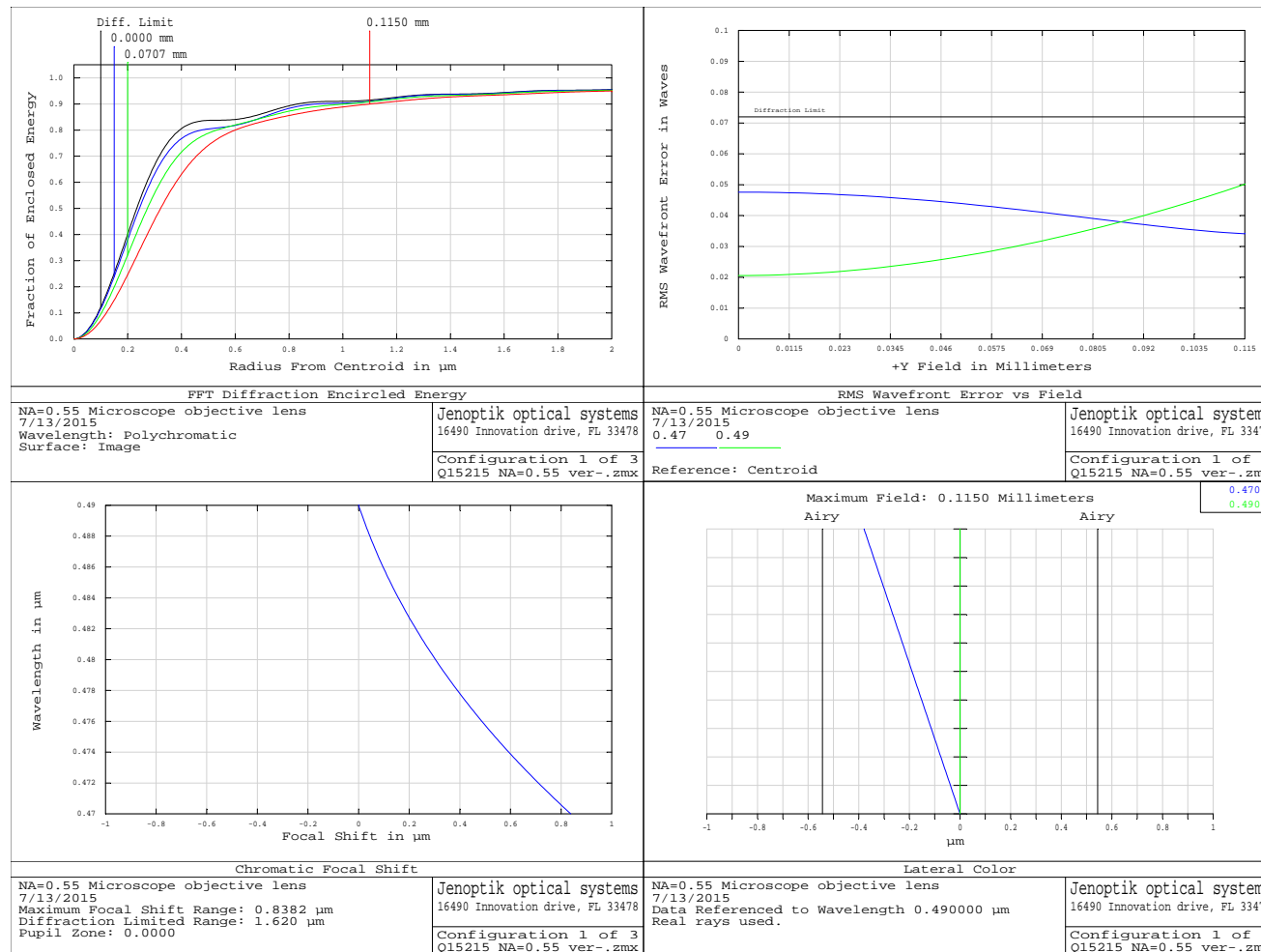
Active : 1/3	Config 1*	Config 2	Config 3
1: WAVE 1	0.470000	0.820000	0.895000
2: WAVE 2	0.490000	0.852000	0.920000
3: MOFF 0			
4: THIC 16	10.004189 V	10.020000	10.022840 V

Performance Data for 470 and 490 nm

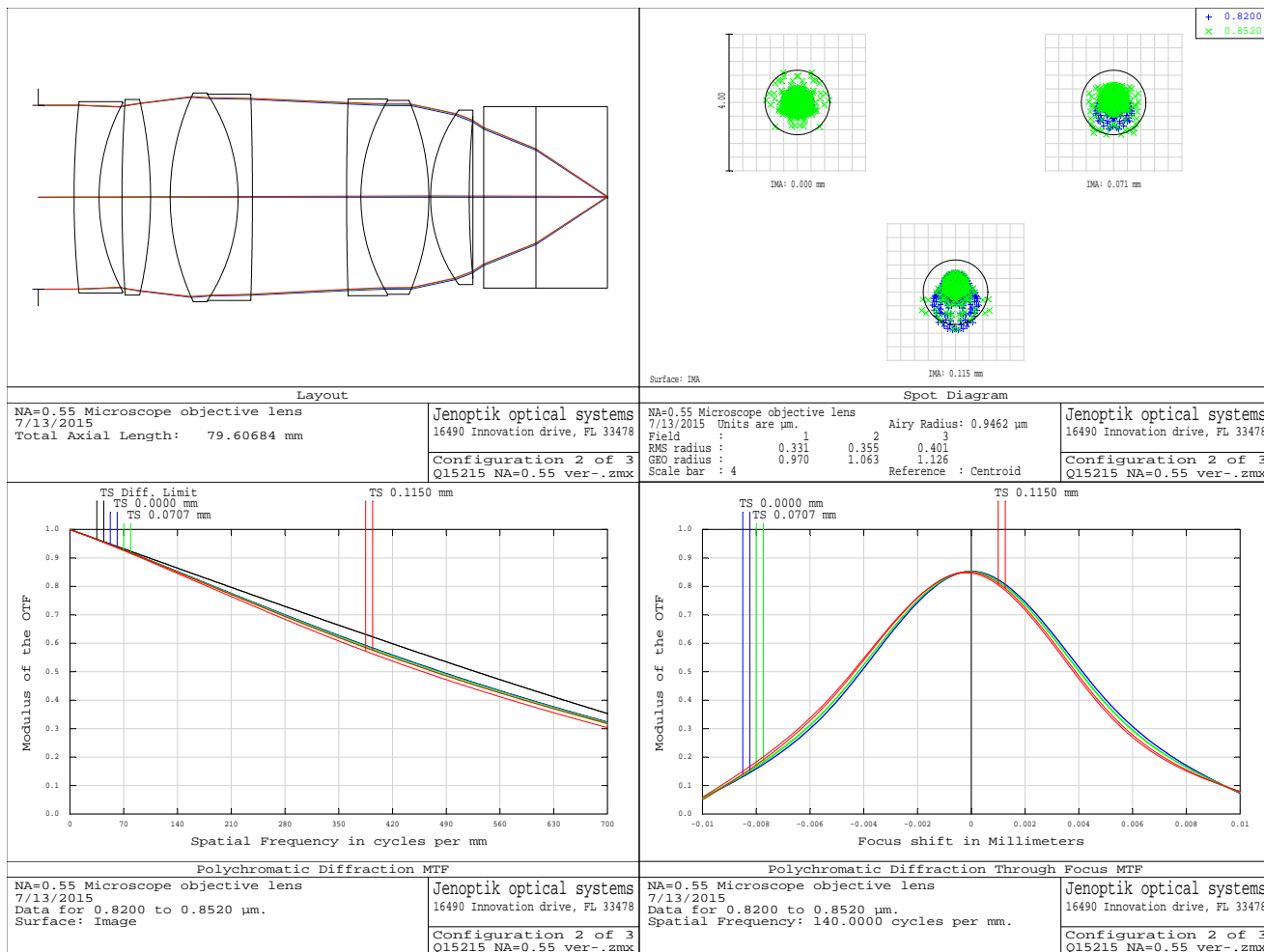


Performance with 470 and 490 nm

Encircled Energy – RMS Wavefront Error – Axial Color – Lateral Color

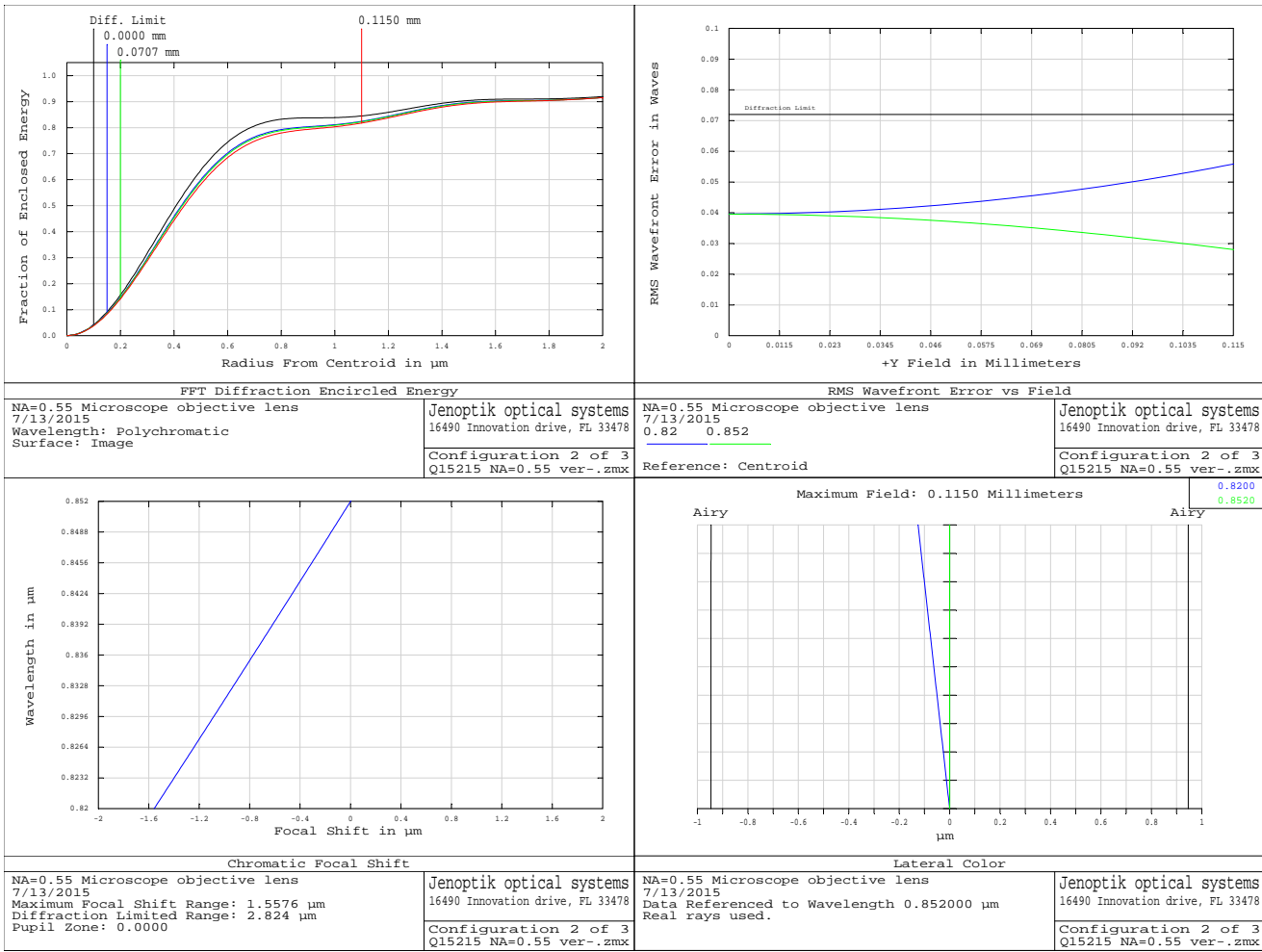


Performance Data for 820 and 852 nm

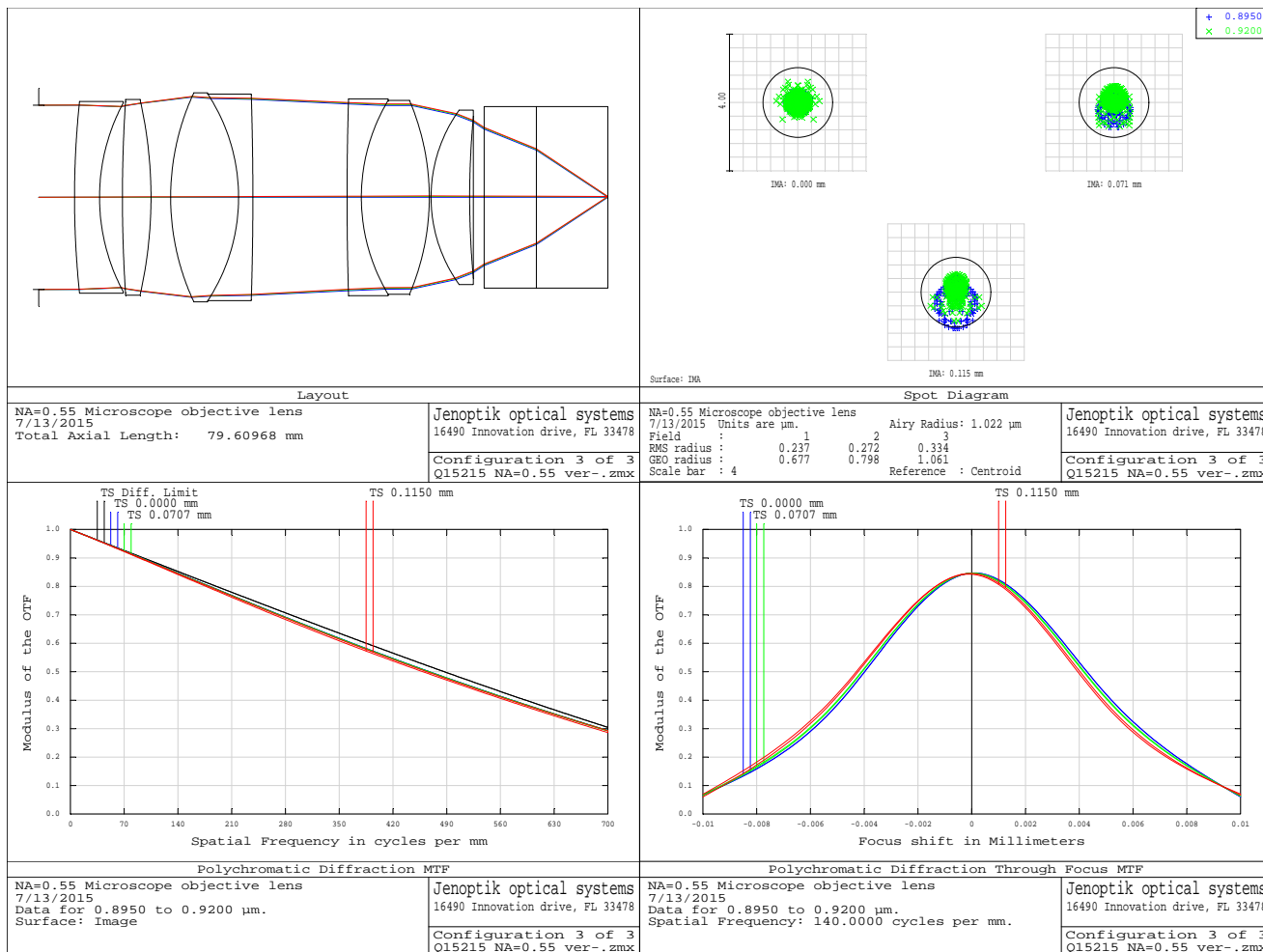


Performance with 820 and 852 nm

Encircled Energy – RMS Wavefront Error – Axial Color – Lateral Color

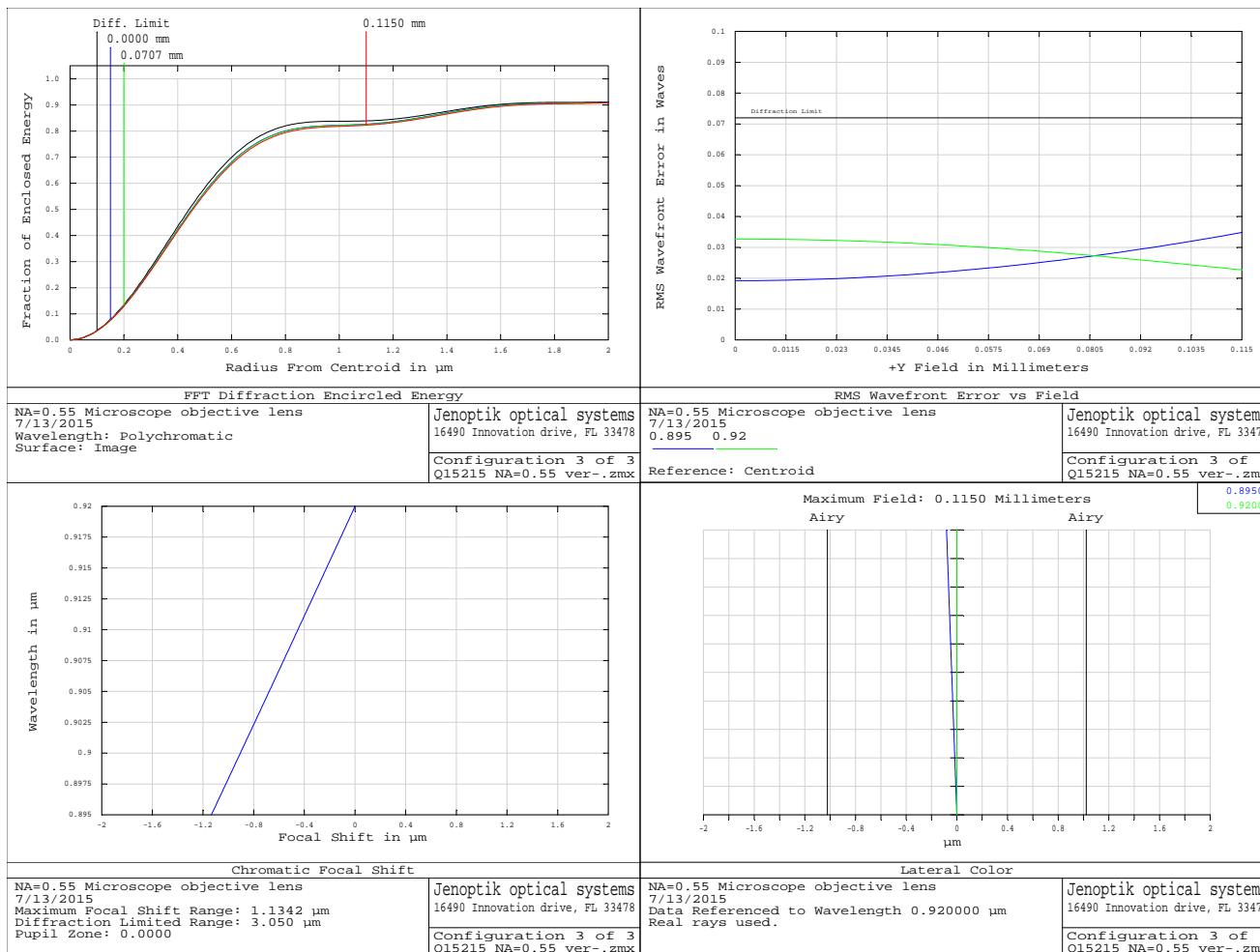


Performance Data for 895 and 920 nm

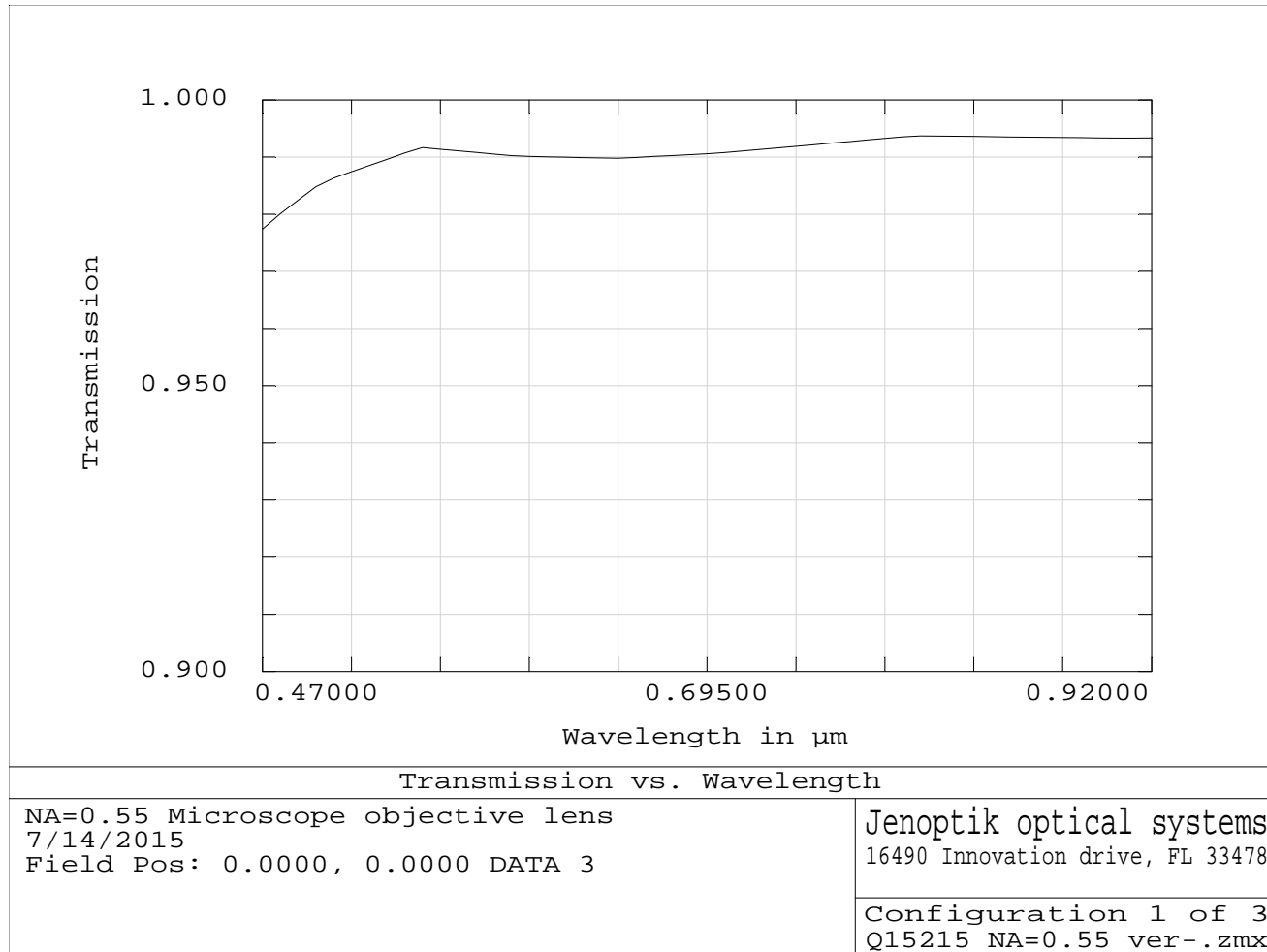


Performance with 895 and 920 nm

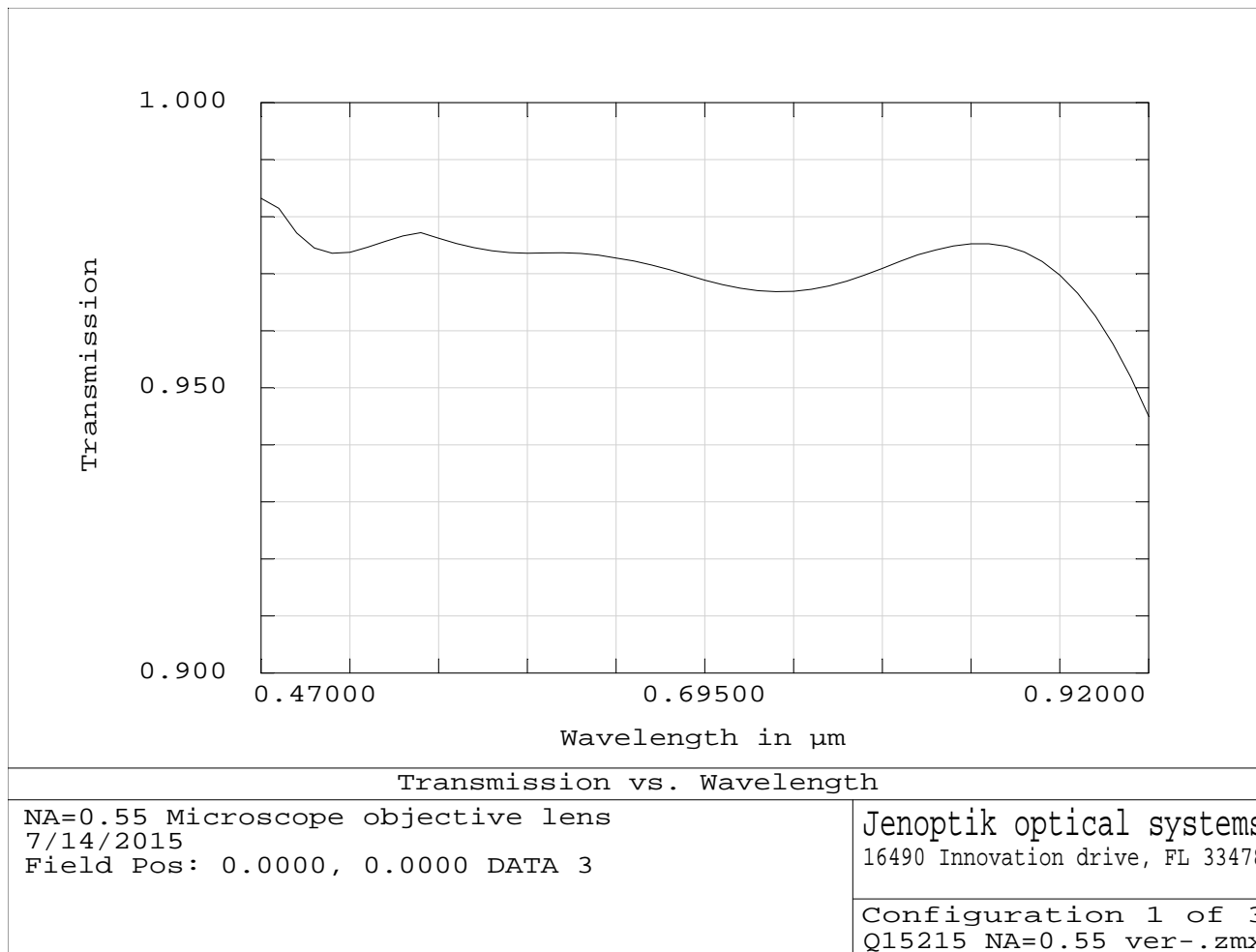
Encircled Energy – RMS Wavefront Error – Axial Color – Lateral Color



Transmittance of lens and Pyrex Window with perfect coatings



Transmittance with Pyrex window and nominal coatings



Summary



The optical design meets or exceeds all optical design requirements. In particular

1. It is diffraction limited for each waveband .
2. System meets all the working distance requirements.
3. Currently the glass only for each system, excluding the Pyrex window weighs 62 grams.
4. The current NA is 0.55
5. Transmittance > 94% with nominal coatings including the Pyrex window. For this analysis we have assumed perfect coatings for the Pyrex windows. The transmittance values will be slightly less due to coating manufacturing tolerances.