ANSI N42.55 test results for Example system system using example x-ray source source

this is just example data

PDF generated 2018-01-03 at 16:38

Analyzed using Glover ANSI N42.55 Python code (version 0.13)

Main test object images:

- PARC/Parc 10107_Image_3.tif
- PARC/Parc 10107_Image_1.tif
- PARC/Parc 10107_Image_2.tif
- PARC/Parc 10107_Image_4.tif

Image extent image:

- PARC/Parc 10107_Image_5.tif

Noise images:

- PARC/Parc 10107_3_Blank.tif
- PARC/Parc 10107_2_Blank.tif
- PARC/Parc 10107_4_Blank.tif
- PARC/Parc 10107_5_Blank.tif
- PARC/Parc 10107_1_Blank.tif

ANSI N42.55 test results

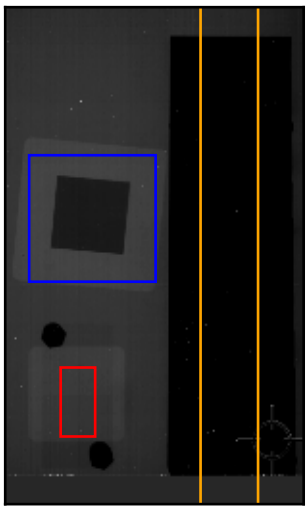
Metric name	Metric Value	Min. Performance Req.
Test 1: Penetration	None mm♣	≥ 6 mm
Test 2: Organic Material Detection	1.2♣	≥ 2.0
Test 3: Spatial Resolution		
MTF20x	1.36 lp/mm ± 0.07 lp/mm†	≥ 0.5 lp/mm
MTF20y	1.38 lp/mm ± 0.07 lp/mm†	≥ 0.5 lp/mm
Test 4: Dynamic Range	97.7 ± 68.2†	≥ 150
Test 5: Noise		
NEQx at 1 lp/mm	486 ± 342†	≥ 22,500
NEQy at 1 lp/mm	618 ± 533†	≥ 22,500
Test 6: Flatness of field	0.760 ± 0.02†	≥ 0.5
Test 7: Image extent	None	≤ 10 mm
Test 8: Image area	9999 by 9999 pixels	≥ 1000 by 1000 pixels
Test 9: Aspect Ratio	0.002 ± 0.002†	≤ 0.05

† These values represent the mean and one-sigma uncertainty in the quantity of interest. In some cases, the metric mean must be two sigma away from the min performance requirement in order to pass. See IEEE/ANSI N42.55 for full details.

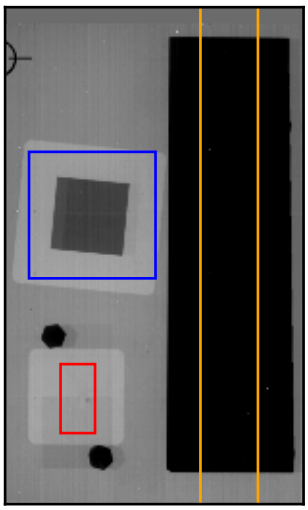
♣ These tests do not have uncertainty values defined in the standard.

Cropped and Rotated Images

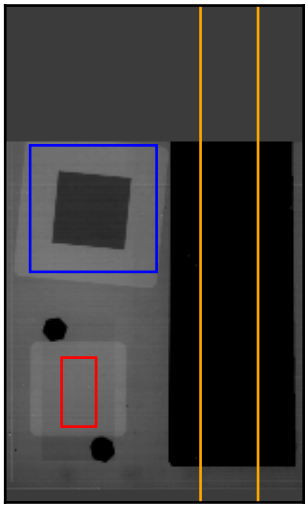
Orientation 3



Orientation 1



Orientation 2



Orientation 4

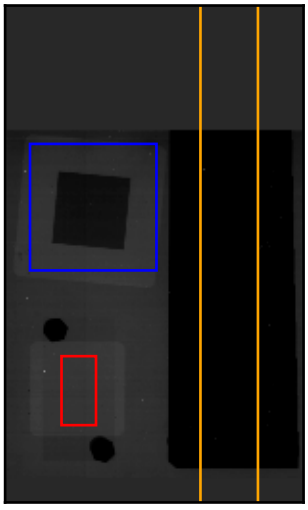
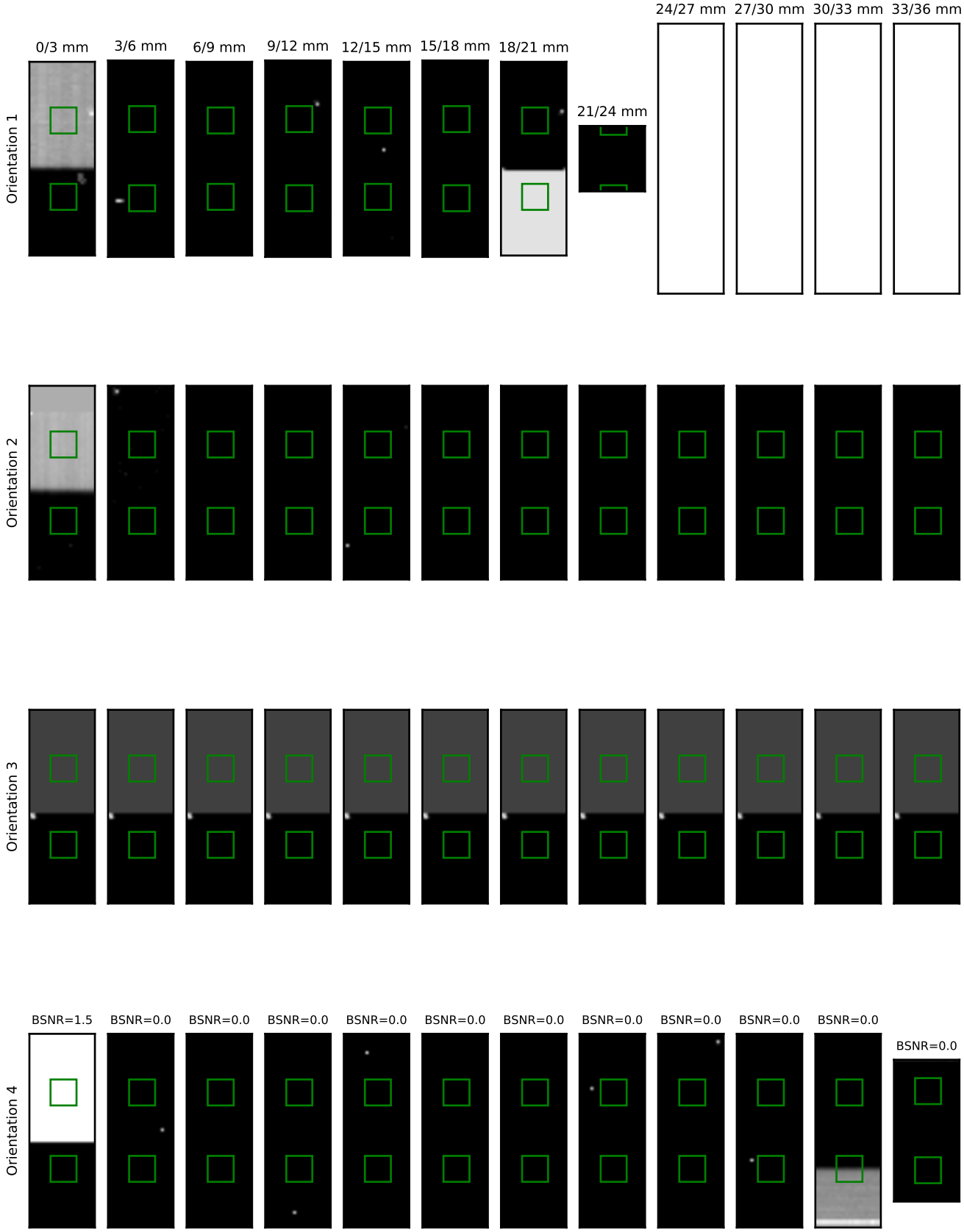


Image 1 is shown in its original orientation. The other three images have been rotated to be in the same orientation as image 1. Images 2, 3 and 4 were originally in an orientation that was rotated by 90, 180 and 270 degrees clockwise compared with image 1. This convention is continued throughout the document.

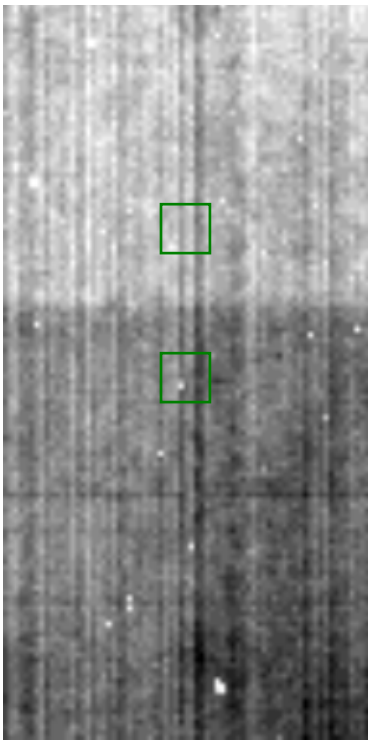
Colored boxes have been drawn around important regions of the image.
The blue ROI should surround the Pb foil test piece, leaving some room on all sides of it.
The red ROI should be placed on the POM test piece, between the two bolts.
The orange ROI should span the middle portion of the steel step wedge, running the entire vertical length of the image.

Test 1: Steel penetration (None mm)
boundary images shown below



Test 2: Organic Detection (1.2)

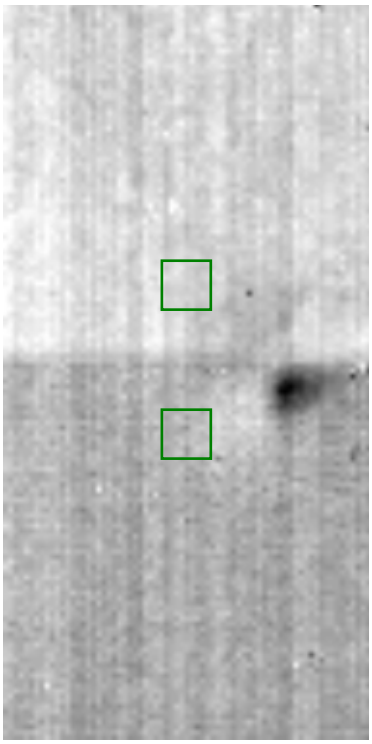
Bound. sig.=0.052



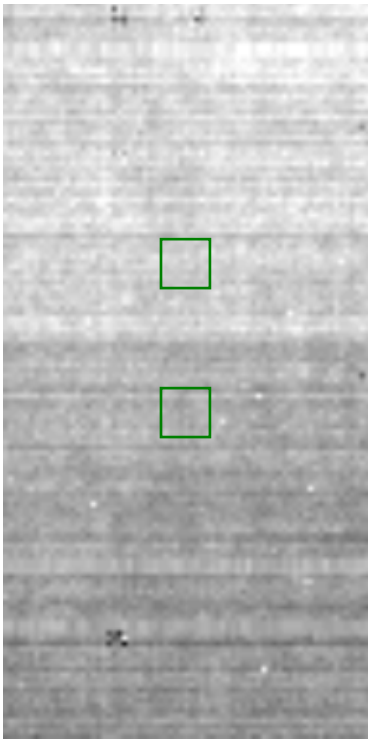
BSNR: 1.2

Ave sig 0.029
Stdev 0.025

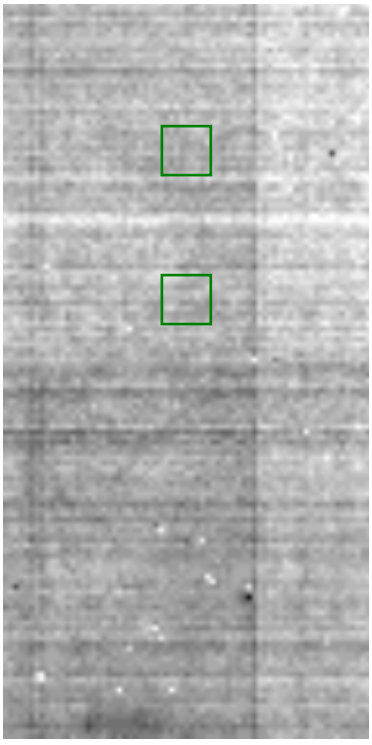
Bound. sig.=0.036



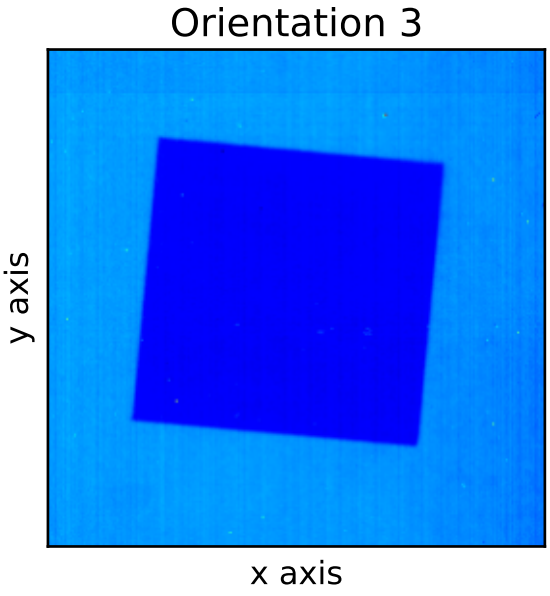
Bound. sig.=0.036

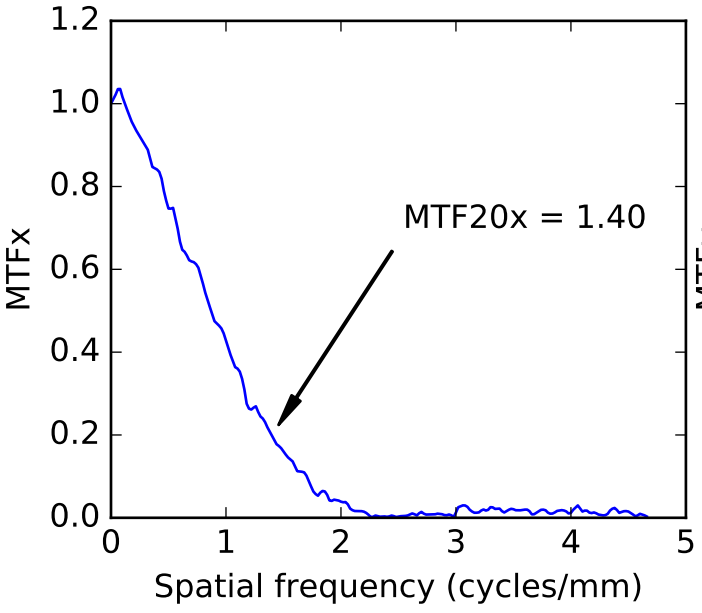


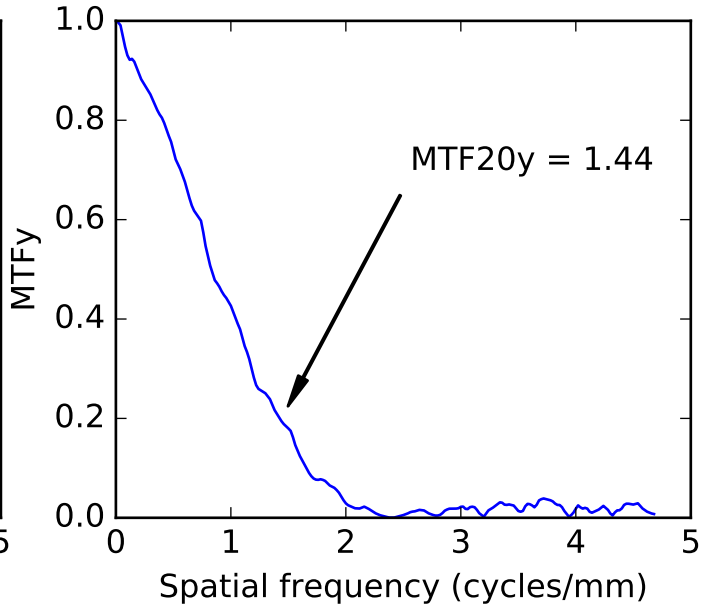
Bound. sig.=-0.007



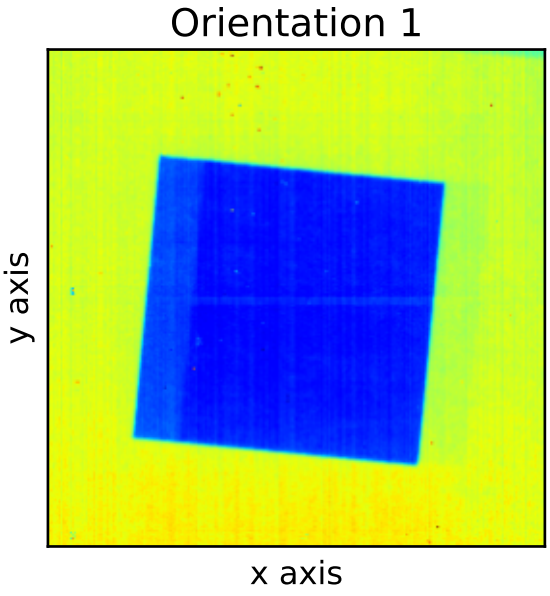
Test 3: Spatial Resolution
MTF20x = 1.36
MTF20y = 1.38

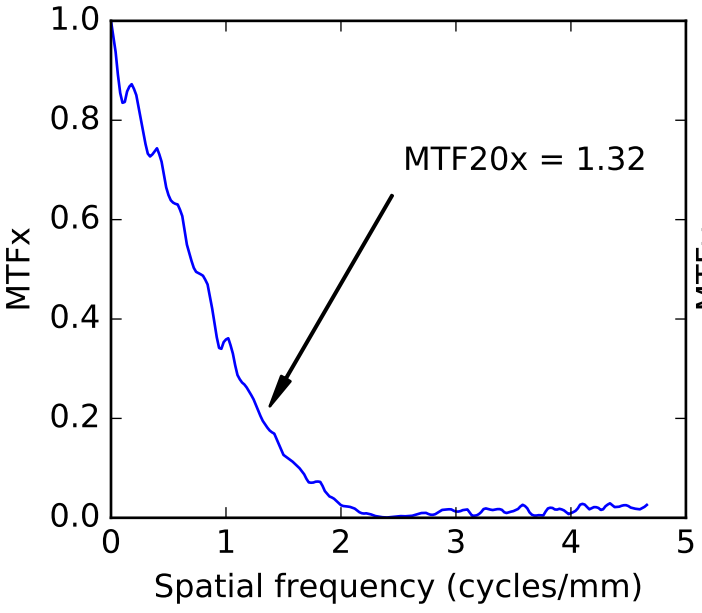


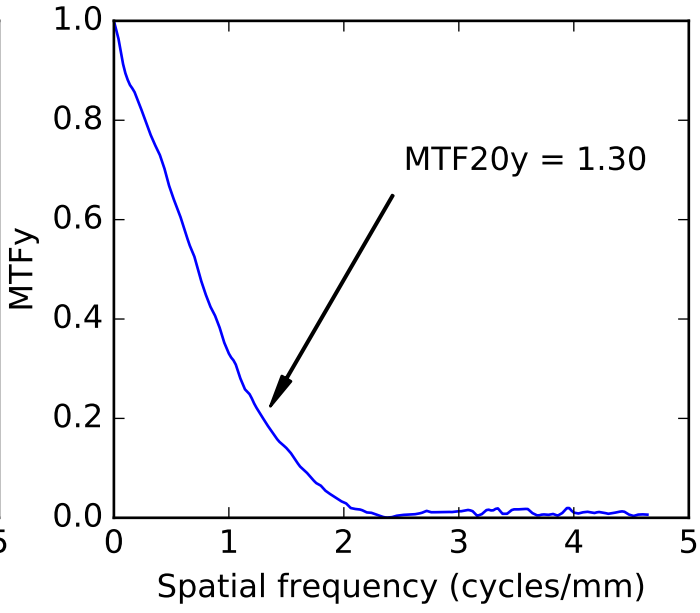




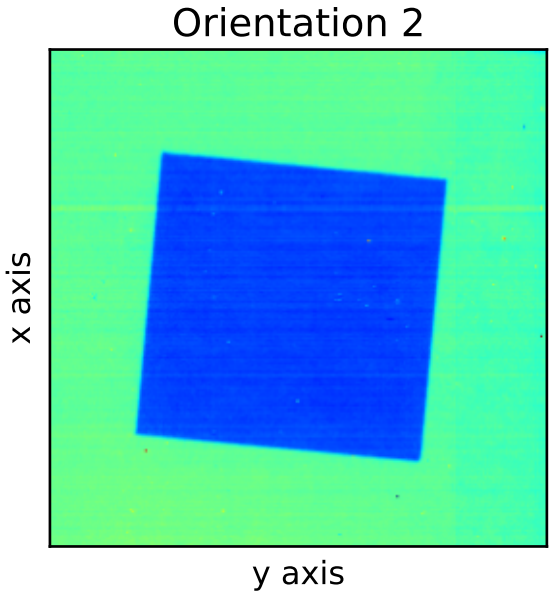
Test 3: Spatial Resolution
MTF20x = 1.36
MTF20y = 1.38

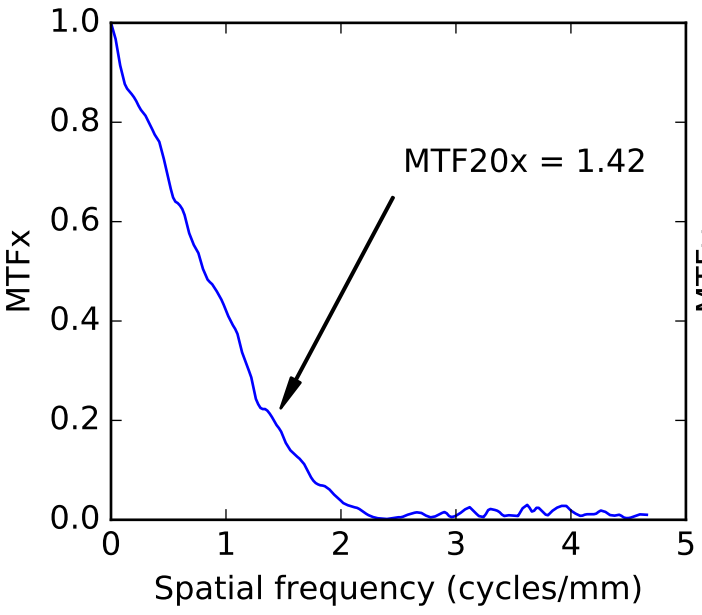


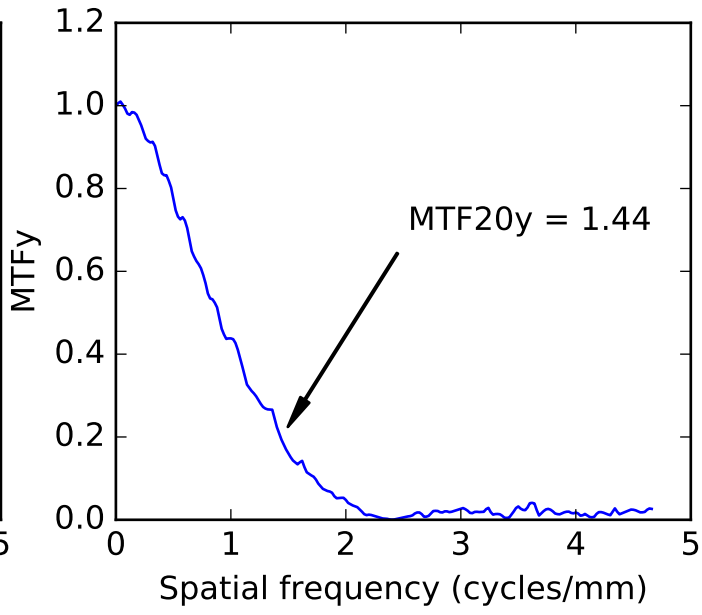




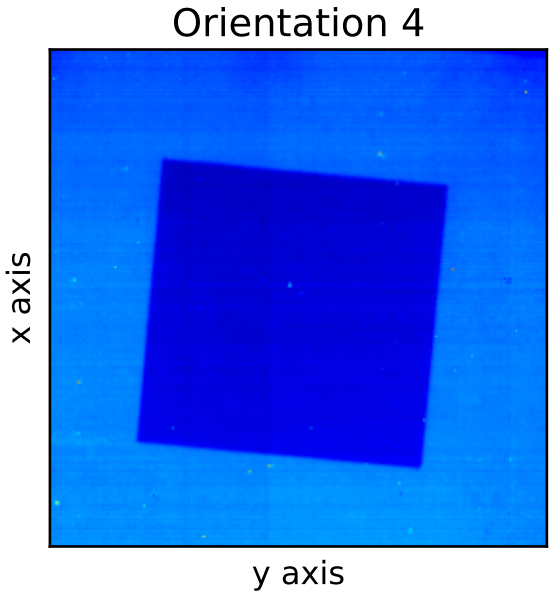
Test 3: Spatial Resolution
MTF20x = 1.36
MTF20y = 1.38

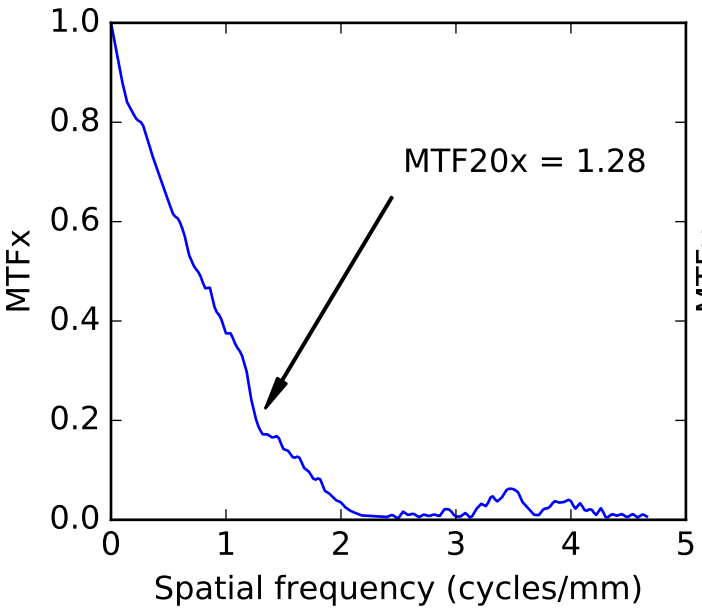


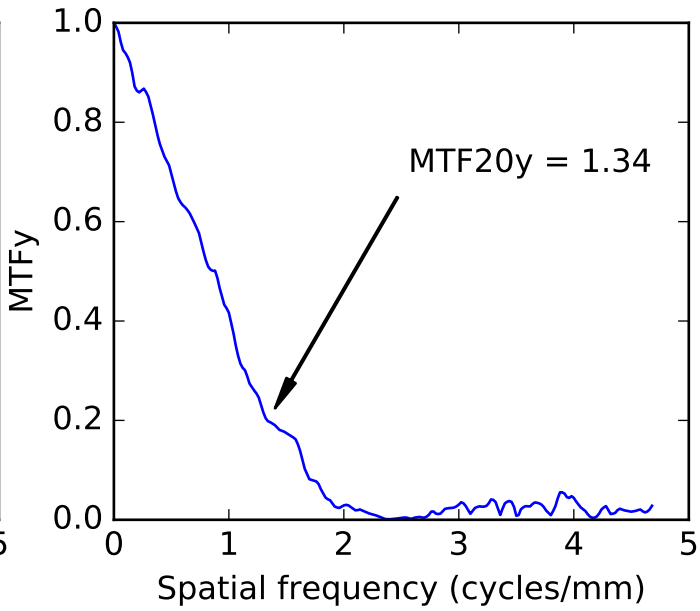




Test 3: Spatial Resolution
MTF20x = 1.36
MTF20y = 1.38

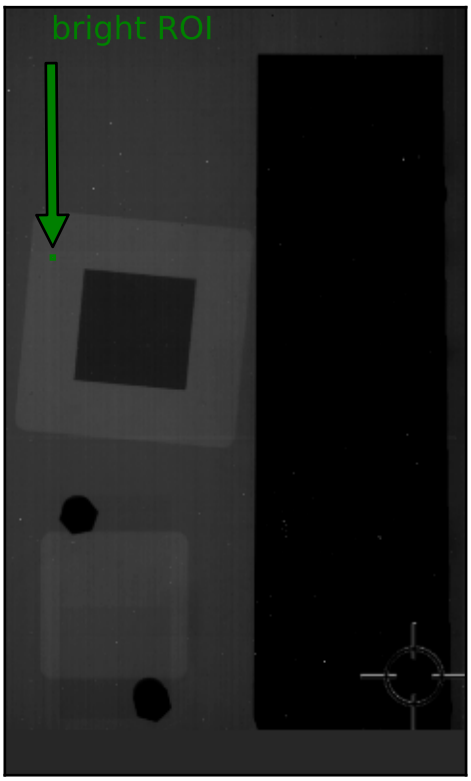




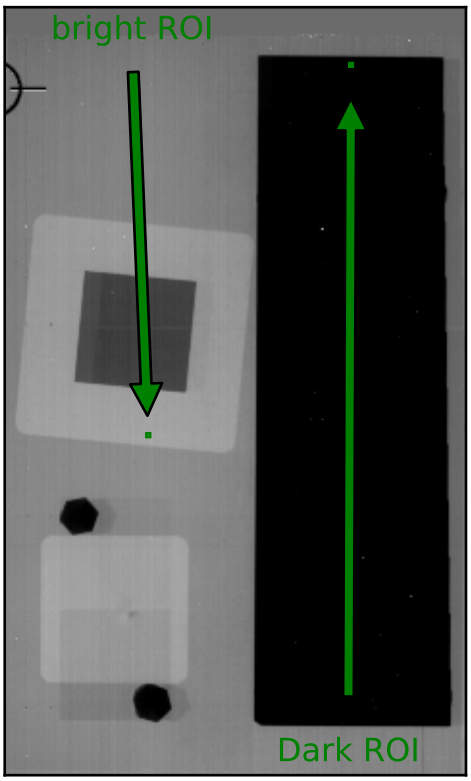


Test 4: Dynamic Range (97.7)

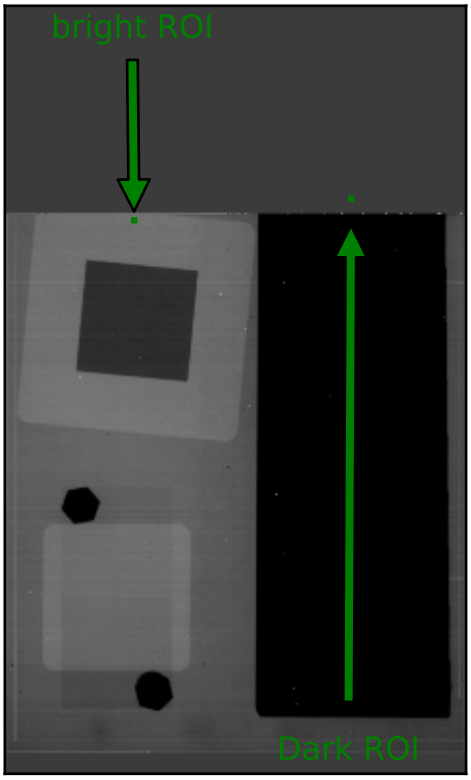
Orientation 3
dark stdev:nan
bright ave:70



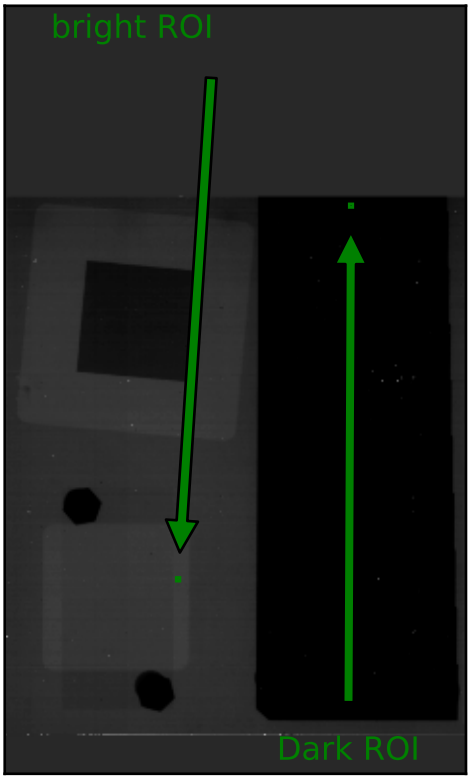
Orientation 1
dark stdev:0.0
bright ave:166



Orientation 2
dark stdev:0.0
bright ave:112



Orientation 4
dark stdev:0.0
bright ave:62



Test 5: Noise (NEQ_x at 1 lp/mm: 486)

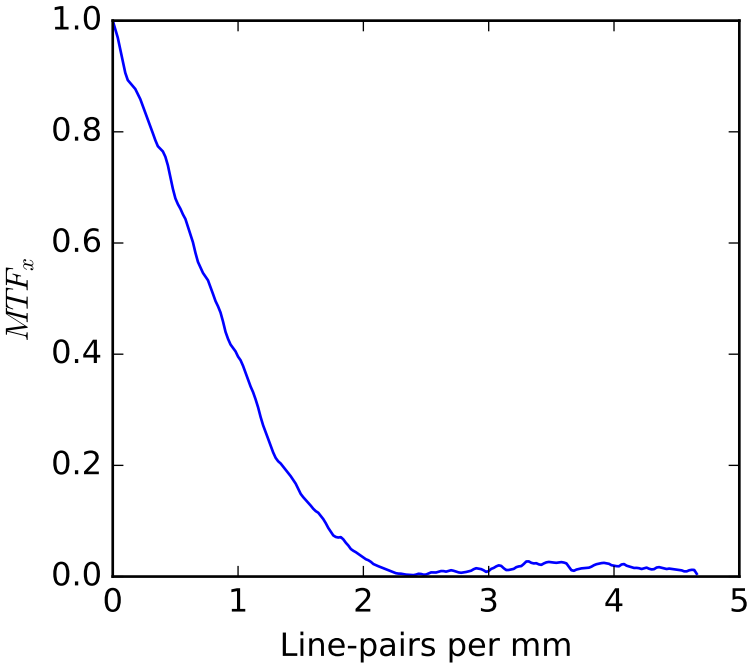
$$NEQ = \frac{S_{out}^2 MTF^2}{NPS}$$

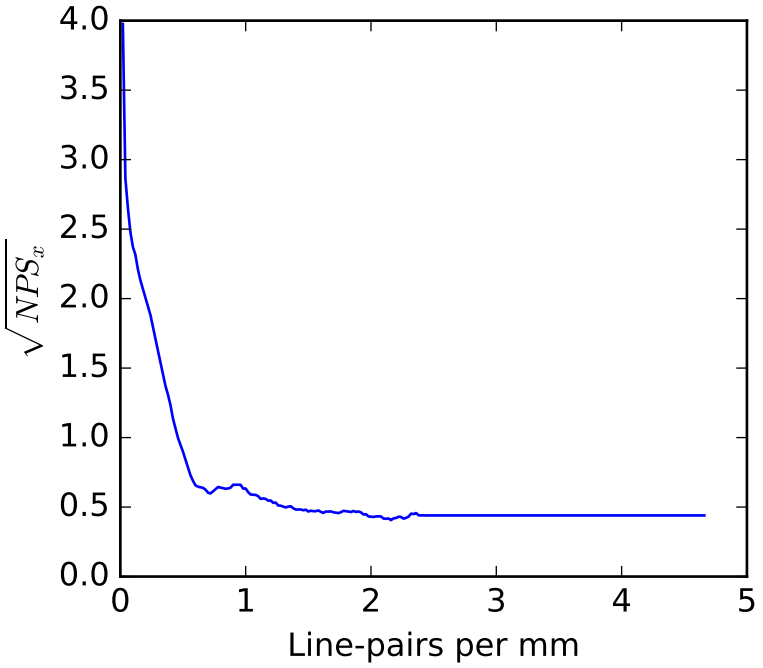
NPS_x (at 1 lp/mm) = 0.4

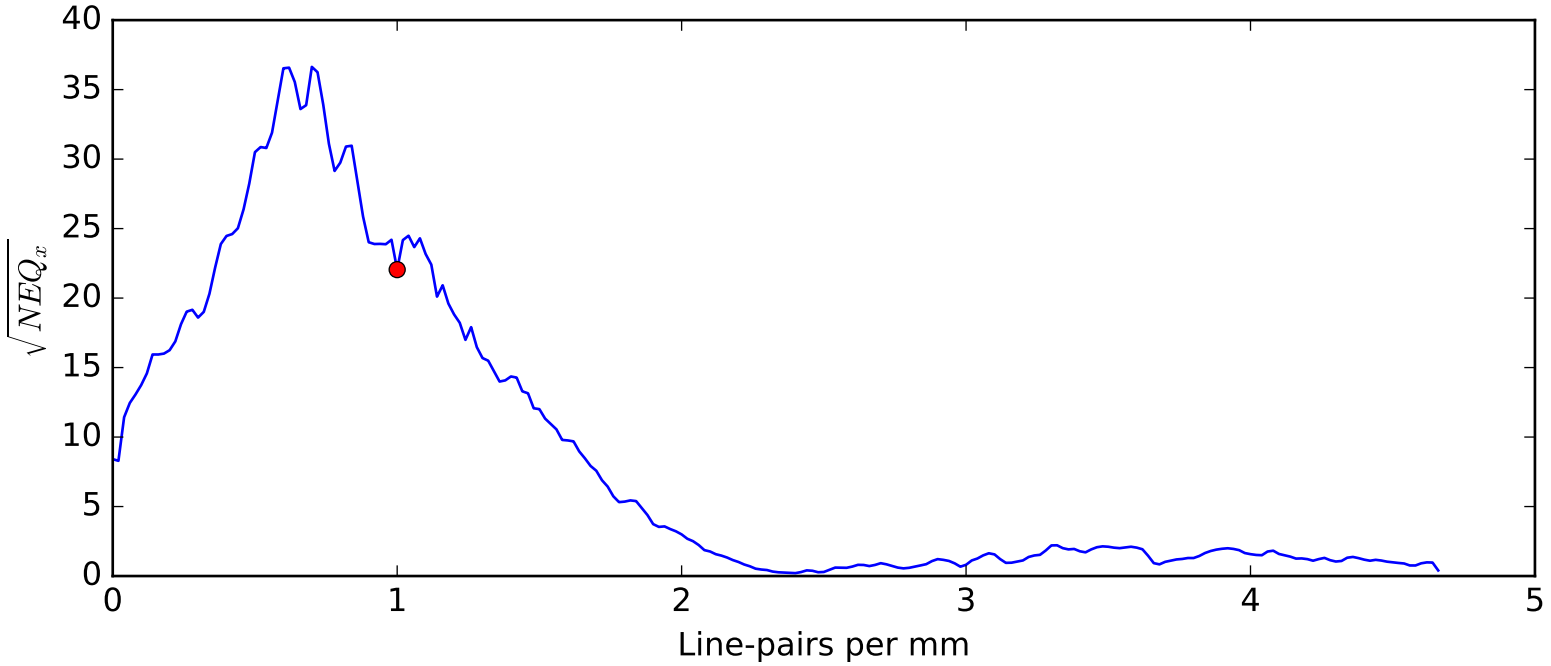
MTF_x (at 1 lp/mm) = 0.396

S_{out} (at 1 lp/mm) = 32

NEQ_x (at 1 lp/mm) = 486 $\pm$ 342







Test 5: Noise (NEQ_y at 1 lp/mm: 618)

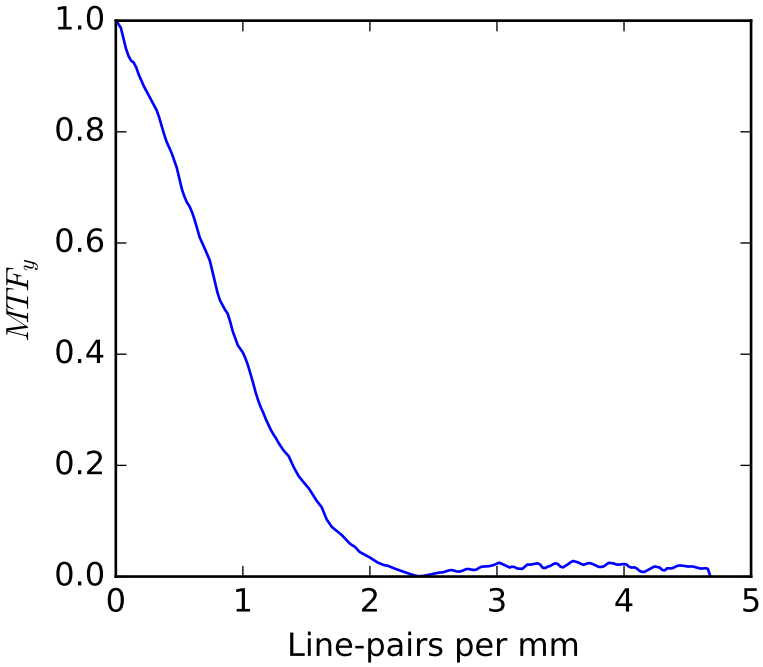
$$NEQ = \frac{S_{out}^2 MTF^2}{NPS}$$

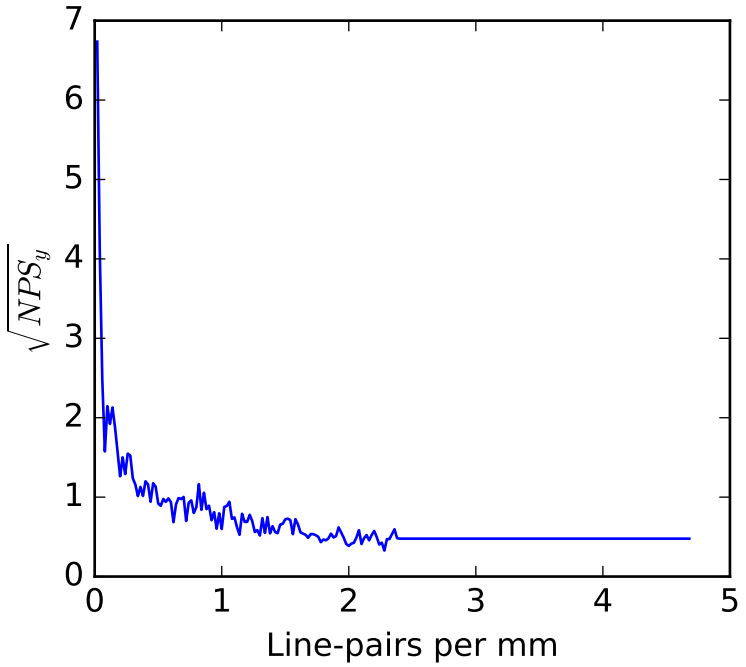
NPS_y (at 1 lp/mm) = 0.4

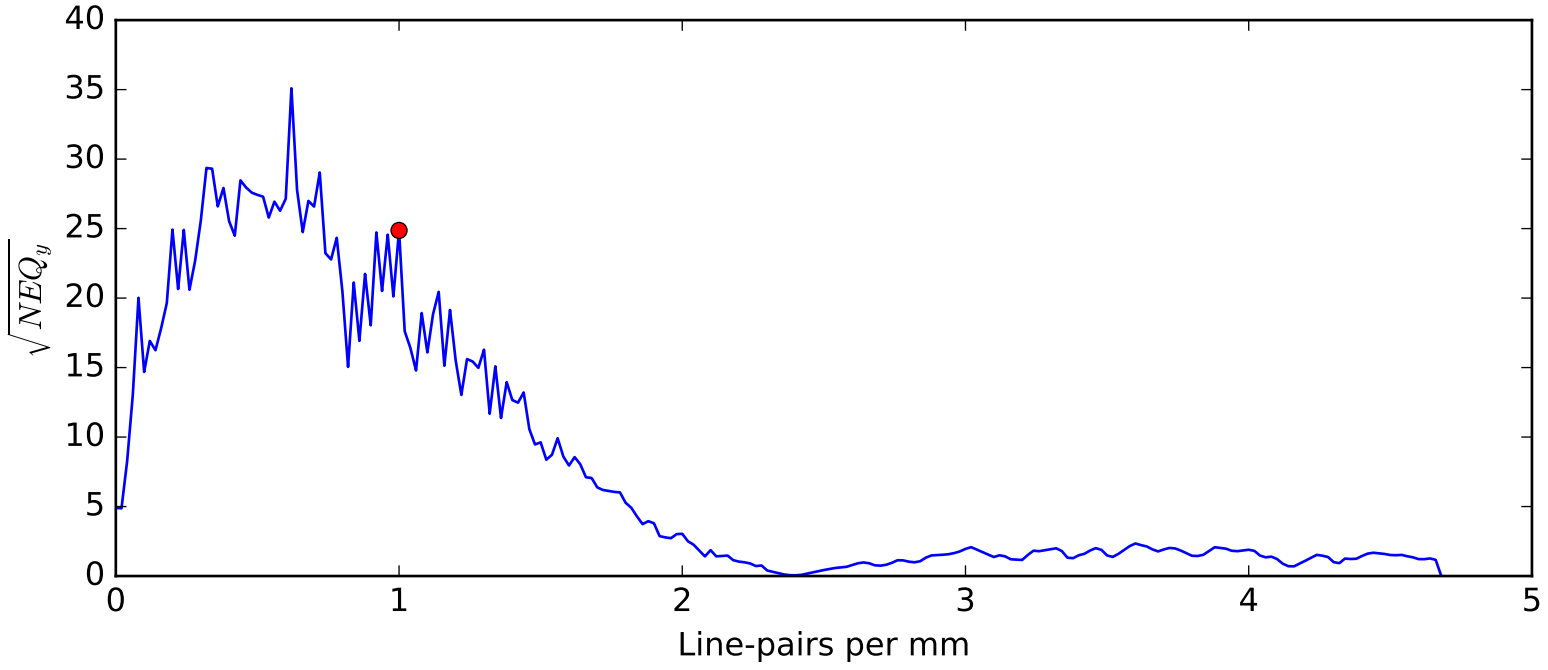
MTF_y (at 1 lp/mm) = 0.403

S_{out} (at 1 lp/mm) = 32

NEQ_y (at 1 lp/mm) = 618 $\pm$ 533

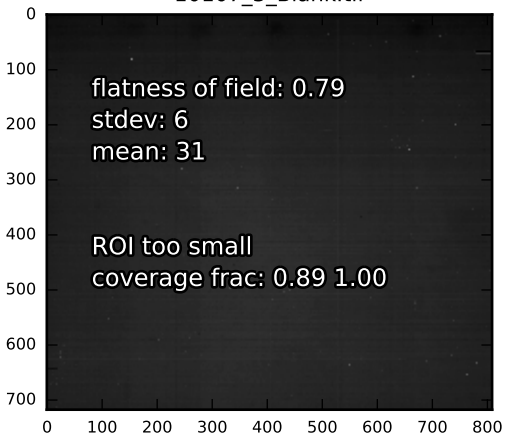




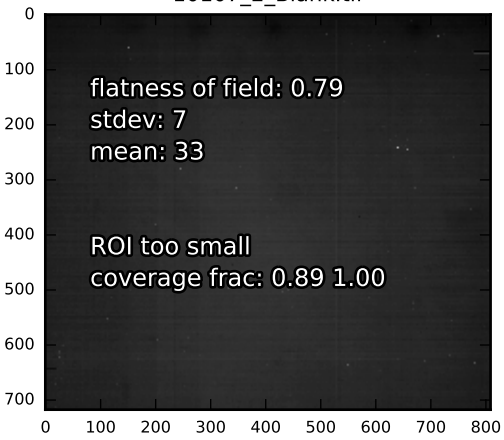


Test 6: Flatness of Field (0.76)

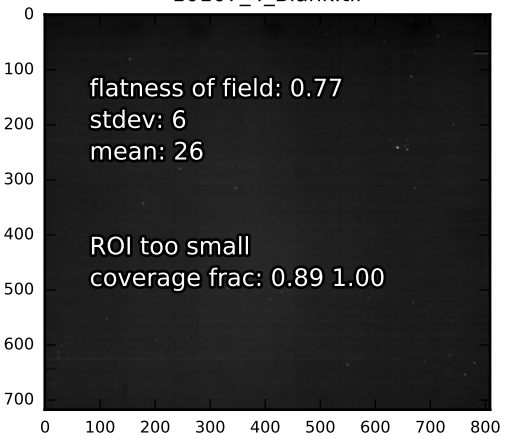
10107_3_Blank.tif



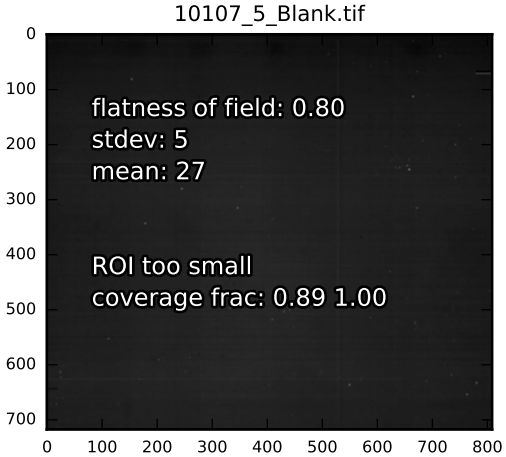
10107_2_Blank.tif



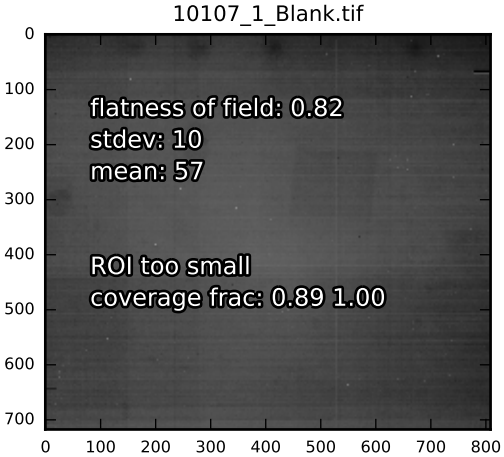
10107_4_Blank.tif



10107_5_Blank.tif

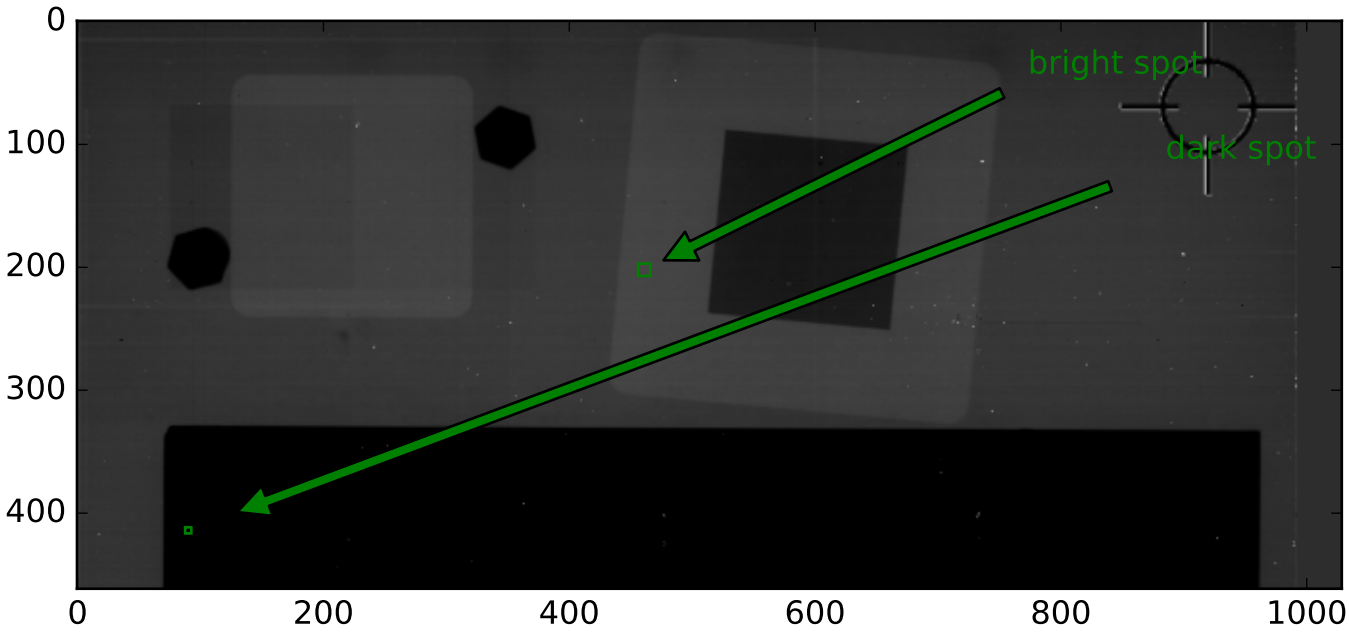


10107_1_Blank.tif



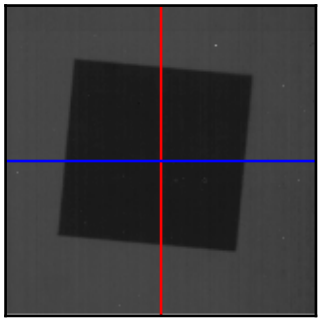
Test 7: Image Extent (None)

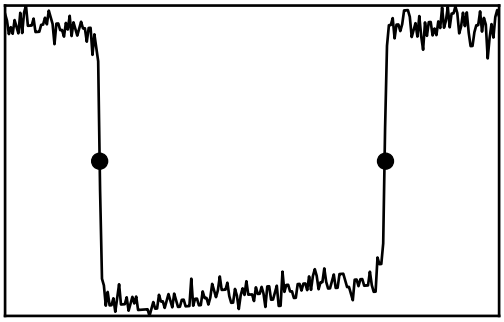
distance 1 mm dynamic range 0.0
distance 5 mm dynamic range 0.0
distance 10 mm dynamic range 0.0



Test 9: Aspect Ratio (0.002)

Image 3 Aspect Ratio: 0.002





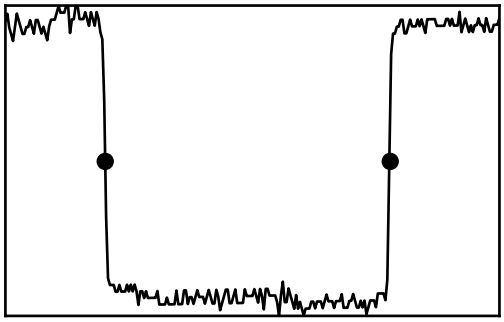
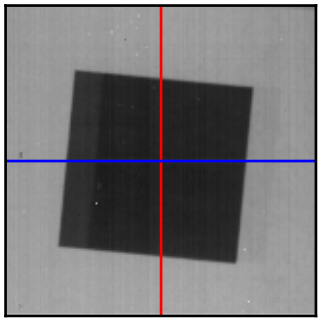
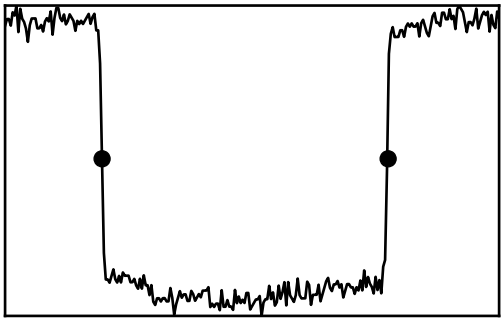


Image 1 Aspect Ratio: 0.005





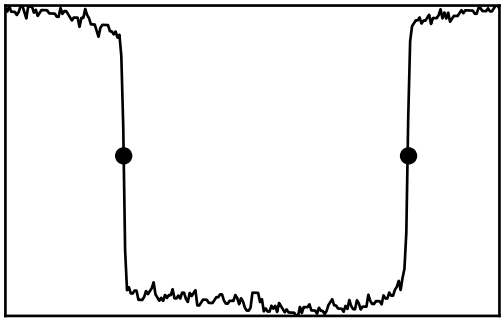
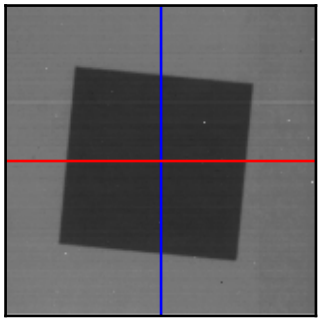
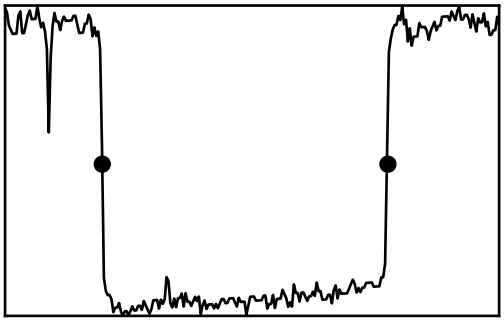


Image 2 Aspect Ratio: 0.003





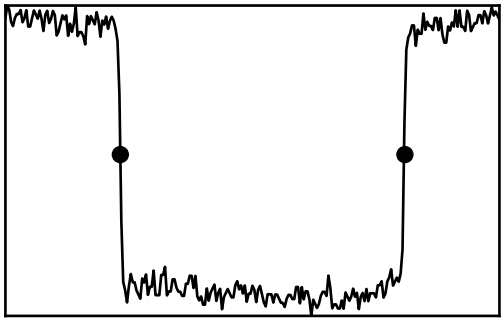


Image 4 Aspect Ratio: 0.002