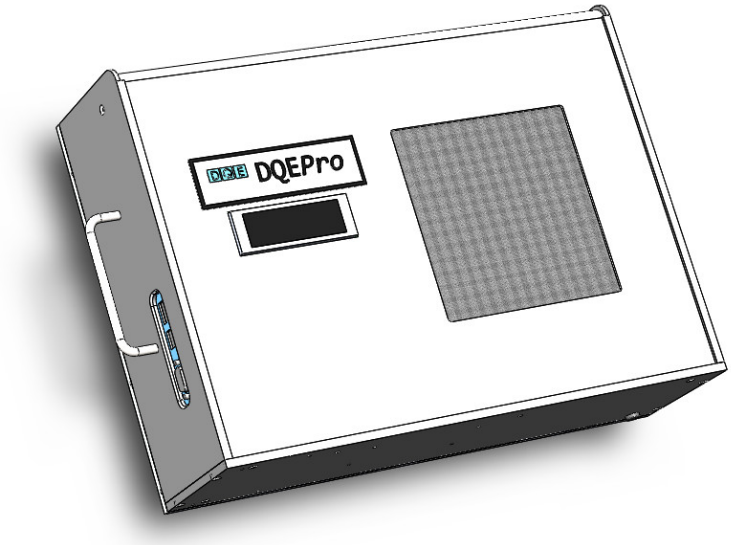
DQE*Pro*

Mammography DQE Sample Report

- Clinical-environment test



DQE Instruments Inc., London, Ontario, Canada N6G 4X8
www.dqeinstruments.com

This report summarizes the analysis of a new CsI-based flat-panel clinical mammography system using a RQA-M2 (28 kV) spectrum. It was completed in 15 min and required the acquisition of 16 images. The grid was not in place.

1. Both x and y presampling MTF curves show excellent spatial resolution. The MTF 10% frequencies are 9.0 and 9.5 cycles/mm in x and y directions (frequency at which MTF falls to a value of 0.1).
2. The two MTF curves have a slight difference in shape, suggesting slight differences in the shape of the detector element active regions in the x and y directions.
3. The two-dimensional NPS shows smooth circular symmetry with no unexpected noise structure.
4. The zero-frequency DQE value is approximately 0.80. There is a small difference in DQE shape due to differences in the x and y MTF.
5. All x-ray exposure pulses are nicely shaped with no evidence of arcing or cable capacitance.

DQE Report

DQEPro 4.2.0 123456
DQE Instruments
Thu 15 Jan 2015

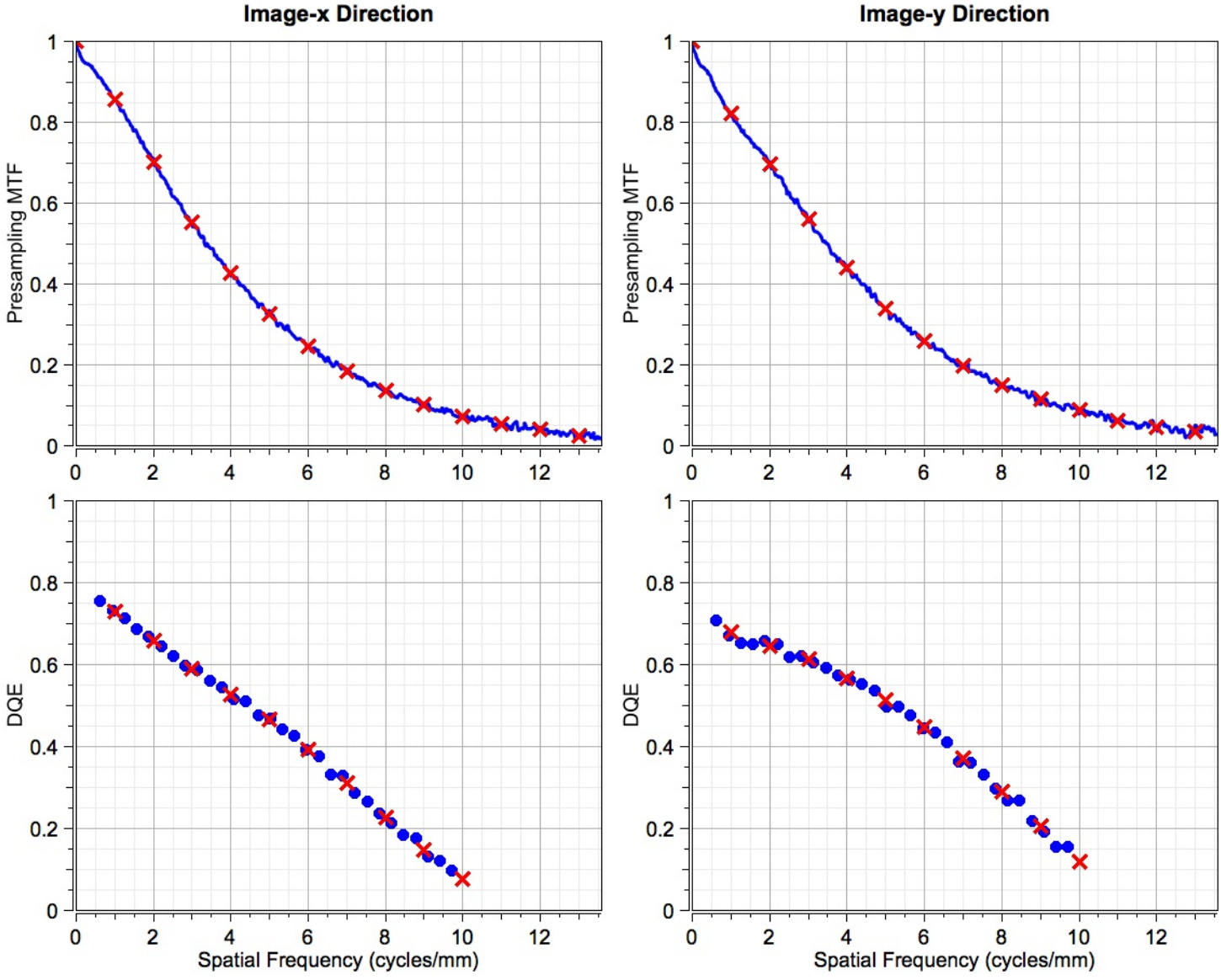
20150115-171205

Study comment: Sample study
Study date-time: Thu 15 Jan 2015 17:12:05
Grid:
X-ray spectrum: Mammography, RQA-M2 (28 kV)
Set technique: 28 kV, mA not specified, 60.0 mAs
Incident image-plane exposure, air KERMA: 16.933 mR, 148.41 uGy
Half-value layer: 0.60 mmAl
Q_o: 4.37e+07 q/mm2/R, 4.98e+09 q/mm2/Gy
Pixel size in image plane, x y: 49.8 x 49.9 um (measured by DQEPro)
Average dark and open image pixel values: 214.6 2495.1
Average system gain: 0.0031 DV/(q/mm2); 135 DV/mR; 1.24 DV/q

Warnings were generated that may affect accuracy of results. Please see Message Summary report for details.

Approximate MTF and DQE Values:

cy/mm	x-MTF	x-DQE	cy/mm	y-MTF	y-DQE
0.00	1.00		0.00	1.00	
1.00	0.86	0.73	1.00	0.82	0.68
2.00	0.70	0.66	2.00	0.70	0.64
3.00	0.55	0.59	3.00	0.56	0.61
4.00	0.43	0.53	4.00	0.44	0.57
5.00	0.33	0.47	5.00	0.34	0.51
6.00	0.25	0.39	6.00	0.26	0.45
7.00	0.18	0.31	7.00	0.20	0.37
8.00	0.14	0.23	8.00	0.15	0.29
9.00	0.10	0.15	9.00	0.11	0.20
10.00	0.07	0.08	10.00	0.09	0.12
11.00	0.05		11.00	0.06	
12.00	0.04		12.00	0.05	
13.00	0.02		13.00	0.04	



Presampling x-MTF Report

DQEPro 4.2.0 123456
DQE Instruments
Thu 15 Jan 2015

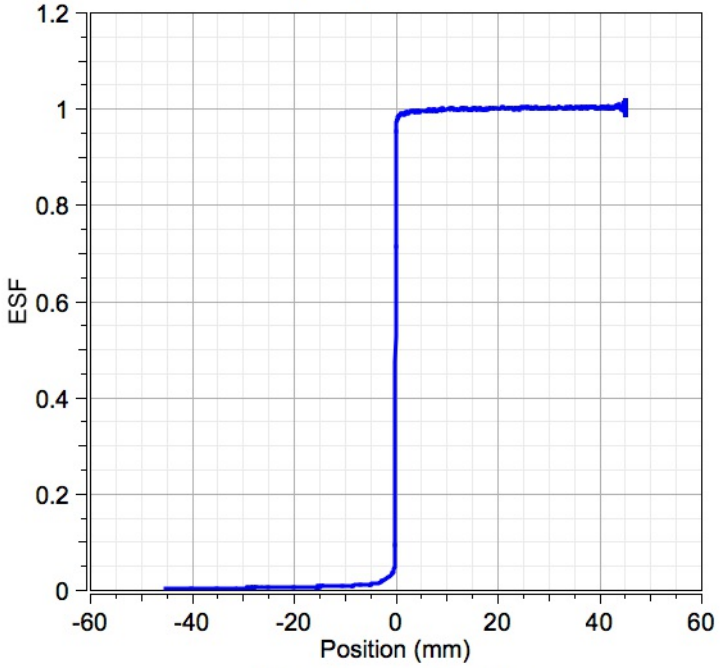
20150115-171205

Study comment: Sample study
Study date-time: Thu 15 Jan 2015 17:12:05
X-ray spectrum: Mammography, RQA-M2 (28 kV)
Incident image-plane exposure: 16.933 mR, 148.41 uGy
Window width: 50 mm
Pixel size in image plane: 49.8 um (measured by DQEPro)
Sampling cut-off frequency: 10.0 cycles/mm

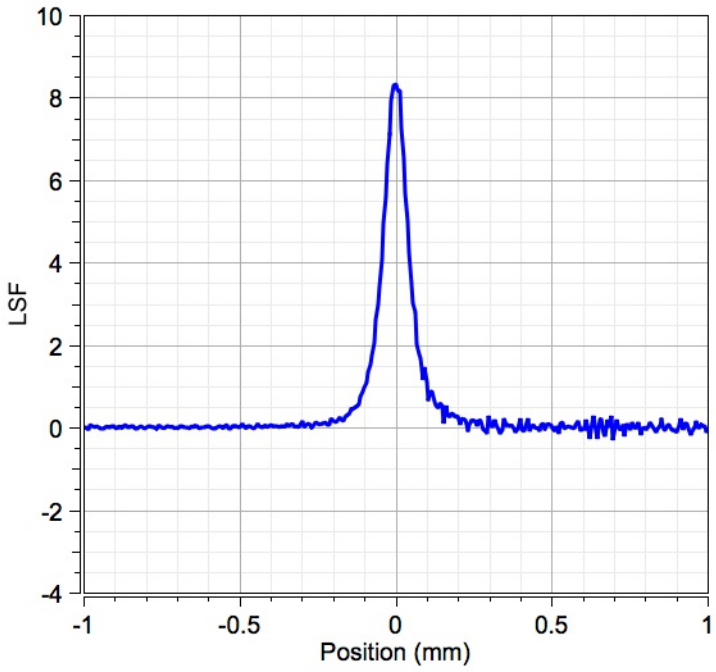
Approximate MTF Values:

cycles/mm	MTF
0.00	1.00
1.00	0.86
2.00	0.70
3.00	0.55
4.00	0.43
5.00	0.33
6.00	0.25
7.00	0.18
8.00	0.14
9.00	0.10
10.00	0.07
11.00	0.05
12.00	0.04
13.00	0.02
14.00	0.02
15.00	0.01
16.00	0.02
17.00	0.03
18.00	0.03
19.00	0.03
20.00	0.03
21.00	0.02
22.00	0.03
23.00	0.04
24.00	0.02
25.00	0.01

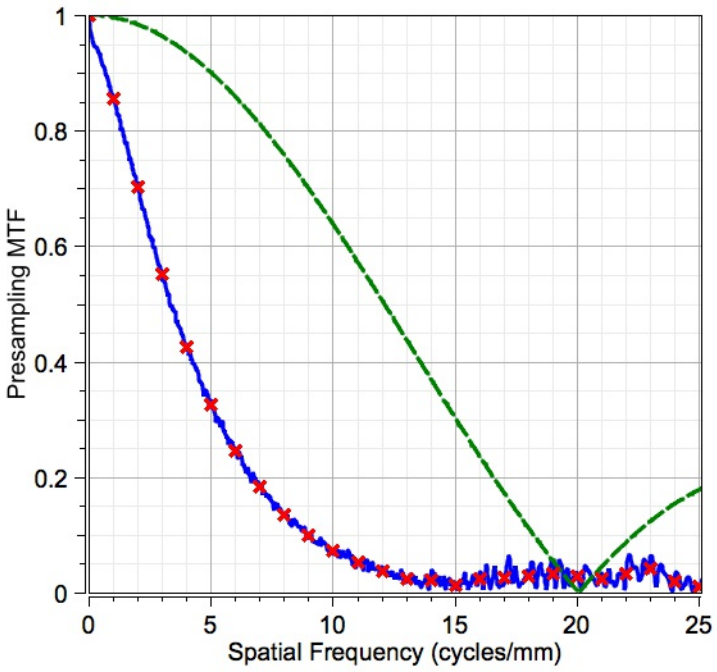
Edge-Spread Function



Line-Spread Function



Modulation Transfer Function



Presampling y-MTF Report

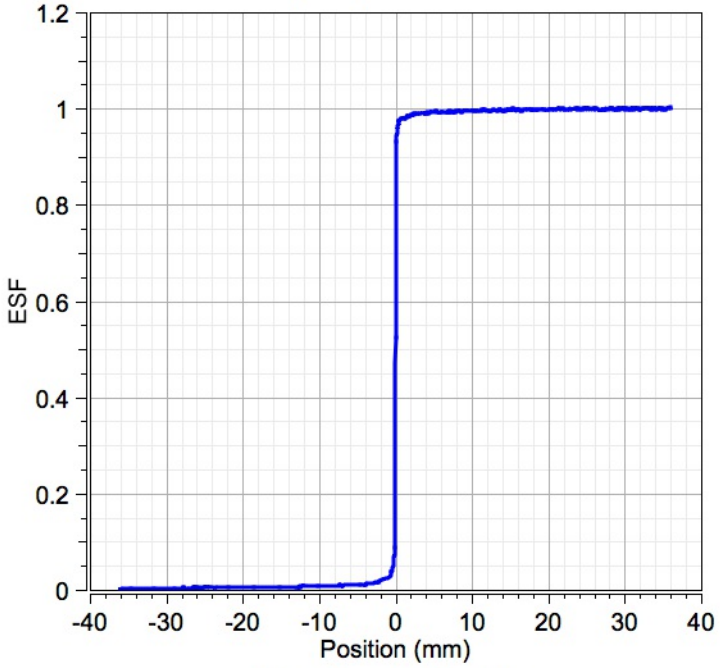
20150115-171205

Study comment: Sample study
Study date-time: Thu 15 Jan 2015 17:12:05
X-ray spectrum: Mammography, RQA-M2 (28 kV)
Incident image-plane exposure: 16.933 mR, 148.41 uGy
Window width: 50 mm
Pixel size in image plane: 49.9 um (measured by DQEPro)
Sampling cut-off frequency: 10.0 cycles/mm

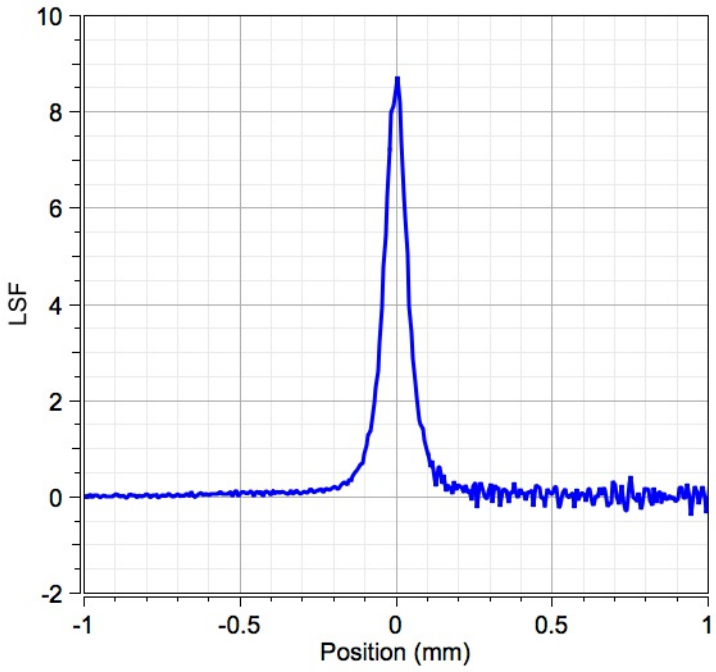
Approximate MTF Values:

cycles/mm	MTF
0.00	1.00
1.00	0.82
2.00	0.70
3.00	0.56
4.00	0.44
5.00	0.34
6.00	0.26
7.00	0.20
8.00	0.15
9.00	0.11
10.00	0.09
11.00	0.06
12.00	0.05
13.00	0.04
14.00	0.02
15.00	0.02
16.00	0.03
17.00	0.02
18.00	0.02
19.00	0.03
20.00	0.04
21.00	0.03
22.00	0.03
23.00	0.03
24.00	0.03
25.00	0.03

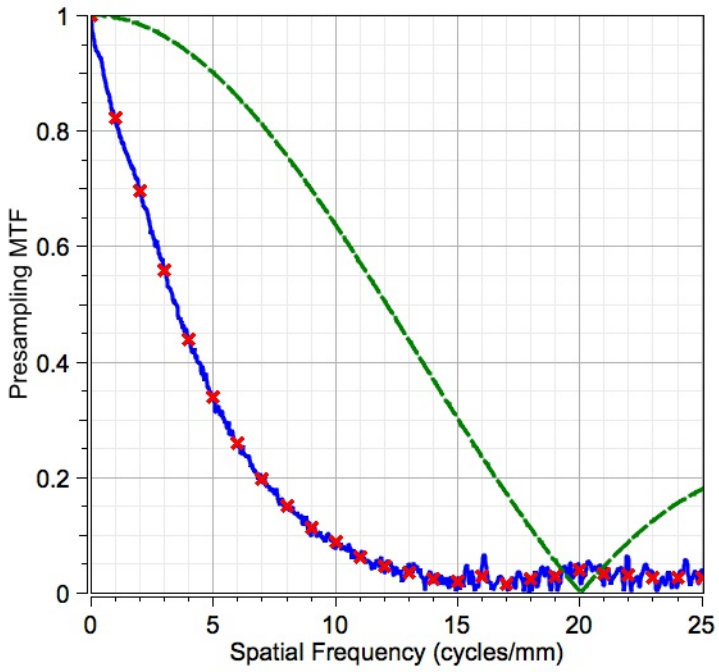
Edge-Spread Function



Line-Spread Function



Modulation Transfer Function



Wiener NPS Report

DQEPro 4.2.0 123456
DQE Instruments
Thu 15 Jan 2015

20150115-171205

Study comment: Sample study
Study date-time: Thu 15 Jan 2015 17:12:05
X-ray spectrum: Mammography, RQA-M2 (28 kV)
Incident image-plane exposure: 16.933 mR, 148.41 uGy
Pixel size in image plane: 49.8 x 49.9 um (measured by DQEPro)
Average dark and open pixel values: 214.6 2495.1
Average dark-subtracted open pixel value: 2280.4
Dynamic NPS quantum-correction factor: NA

Normalized NPS has been corrected for lag and scaled by (incident-q/mm2) / (mean-pixel-value)^2 such that an ideal detector has unity NPS.

In the NPS plots below, blue markers indicate total image noise while green markers indicate detector readout noise. Images are quantum-noise limited only when readout noise is a small fraction of total image noise.

Two-Dimensional NPS

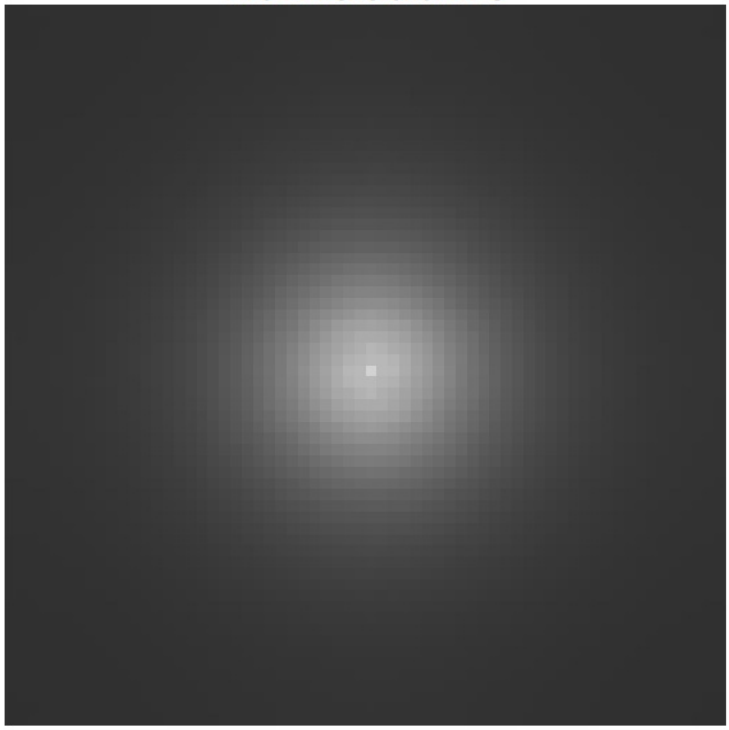


Image-x Direction

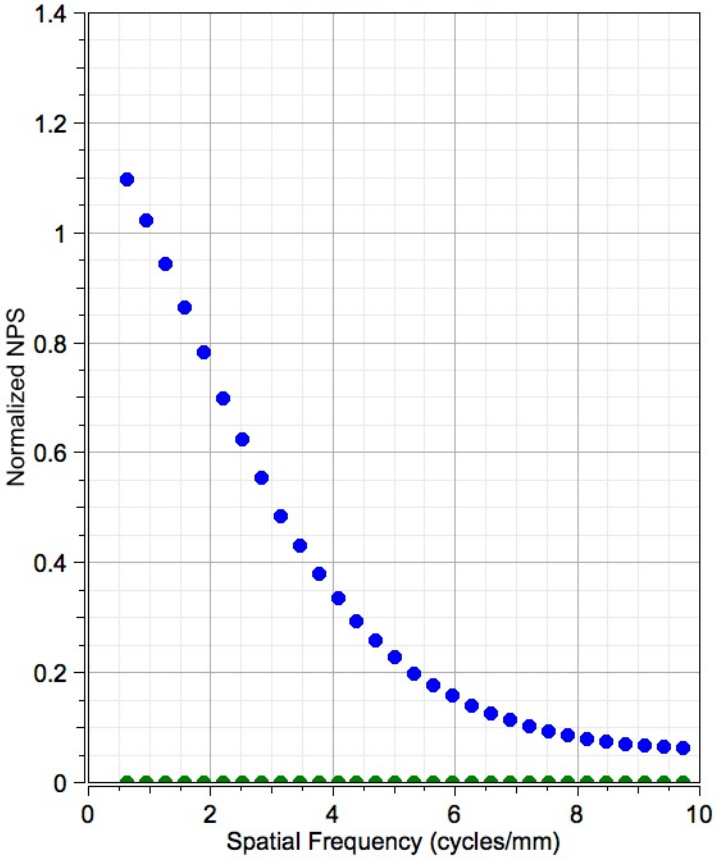
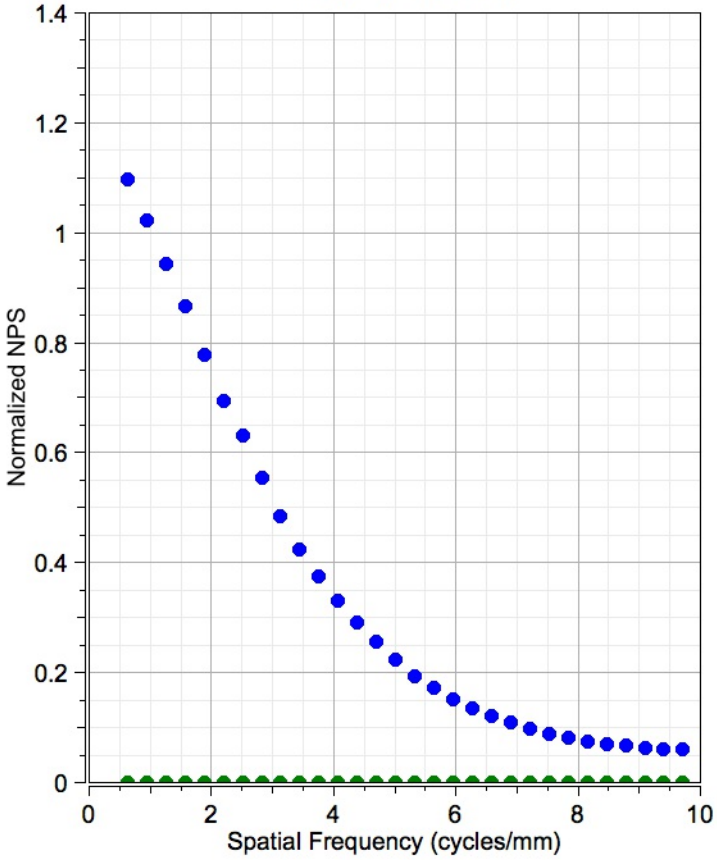


Image-y Direction



Waveform Report

DQEPro 4.2.0 123456
DQE Instruments
Thu 15 Jan 2015

20150115-171205

Data folder: /Users/DQE/data

These waveforms show relative x-ray intensity profiles measured by DQEPro for each exposure. Green line segments correspond to identified exposure pulses. Leading and trailing baselines are shown as dark blue segments. The first pulse should start at 0 sec. Ensure pulses are correctly identified and free of undesirable artifacts that may indicate problems with the x-ray generator or tube. Double-click on any waveform to open a review window.