## 7.5 AED Mode and Dose Rate Level

In Automatic Exposure Detection (AED) mode, the **XRpad** detector uses its full active area to sense incoming radiation and trigger signal integration once X-rays are detected. In this mode, the detector will automatically synchronize the readout with the X-ray exposure so that a physical interface between detector and X-ray generator is not required. The target minimum dose rate to trigger the detector is approximately 4μGy/s (or 4nGy/ms) at 70kVp with an RQA5 spectrum.

## 7.6 Grid Line Suppression

For **XRpad** detector series, the resolution is superior with 100 μm pixel pitch; therefore, the grid lines in general could be well resolved in the image and a grid suppression method could be necessary. There has been some standard method for grid removal [1, 2]. One example, using a Gaussian band-stop filter to suppress grid lines, is described in Ref.[1] the filter equation is similar to the following:

$$B(u) = \frac{1}{\sigma\sqrt{2\pi}}\left(1 - e^{-\frac{(u-\mu)^2}{2\sigma^2}}\right)$$

The process is first to do a Fourier Transform of the raw image (after offset/gain/bad pixel correction, before processing) then apply this filter line by line in the image moving vertically to the grid line direction. After that, do an inverse Fourier Transform to get image in spatial domain with grid lines removed.

With this method, the test with **XRpad** shows the grid lines could be effectively removed at different grid line frequencies. Figure 42 shows an example of the spectra and image crops before and after grid line removal. The grid used has frequency of a 40 ln/cm. The filter is applied to two peaks at 0.2 and 0.4, where 0.5 corresponds to 5 lp/mm, the Nyquist frequency of XRpad.

This method can be applied to any grid type used in DR application.

Released

1. C.Y. Lin and others, "A Study of Grid Artifacts Formation and Elimination in Computed Radiographic Images," Journal of Digital Imaging, Vol 19, No 4 (2006) pp 351-361.
2. D.S. Kim and S. Lee, "Grid artifact reduction for direct digital radiography detectors based on rotated stationary grids with homomorphic filtering," Med. Phys., 40(6) 061905.

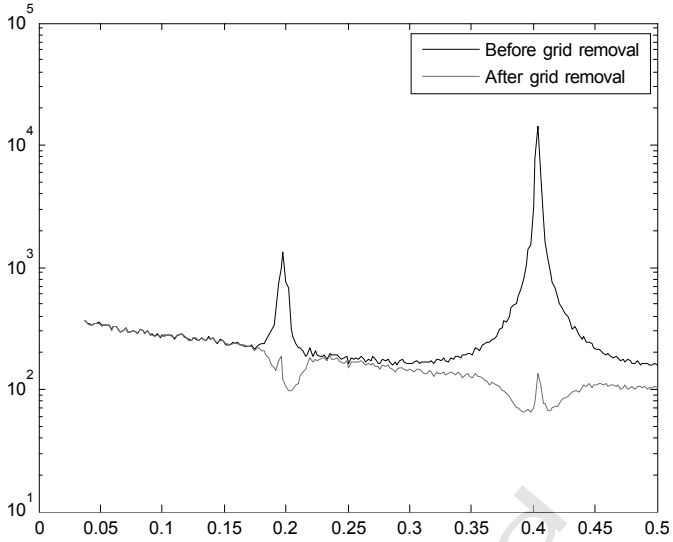


**Figure 42 Grid Line Removal Example, Grid Spectra**

Released

Figure 43 shows an example of the before and after grid line process.

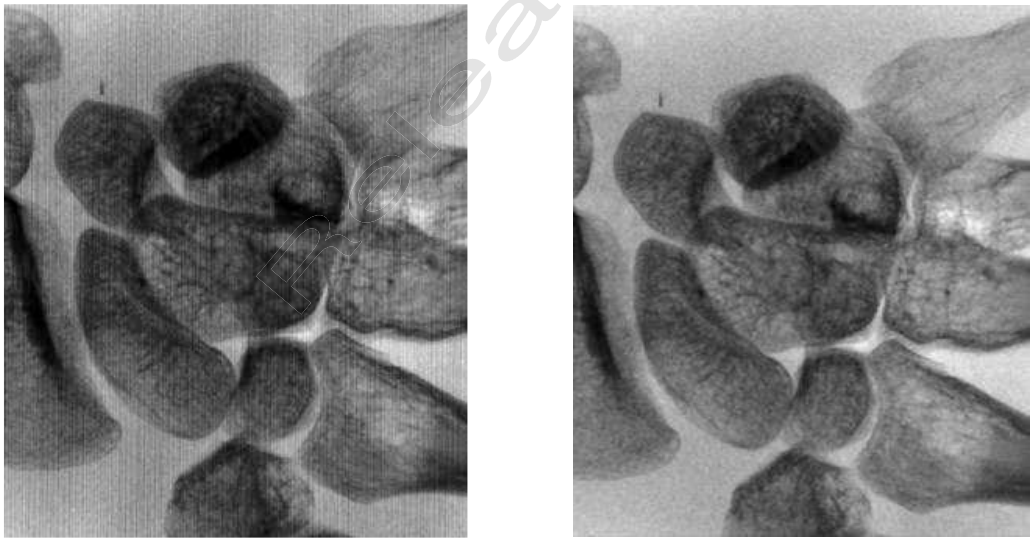

**Figure 43 Grid Line Removal Example, Image Crops Before and After Grid Removal**