AbstractID: 8201 Title: Effects of anti-scatter grid on measurement of detector characteristics

Purpose: Although the detector characteristics should be measured without the anti-scatter grid, it is sometimes hard or unfeasible to remove the grid for such measurements. It is also more clinically relevant to measure the detector characteristics with the presence of the grid as this is how the detector is used clinically. This paper presents and compares measurements of MTF, NPS, NEQ and DQE with and without an anti-scatter grid.

Methods: MTF, NPS and NEQ for an aSi:H/CsI(Tl) flat-panel based digital chest unit have been measured with and without a 12:1 78 lps/cm stationary anti-scatter grid in place. Both pre-sampling and phase averaged MTFs were measured using the tilted slit method. NPSs were measured using uniform exposure image data. Low frequency structures were removed by de-trending or subtraction of identically exposed images. DQEs were computed using regular exposure measurements (extrapolated from measurements made halfway between the detector/grid and tube) and those corrected for grid attenuation.

Results and Discussion: It was found that with scatter correction, MTF measurements remained unchanged with addition of the grid. Normalized NPSs increased and NEQs decreased substantially with addition of the grid, reflecting the attenuation of x-rays by the grid. When regular exposure measurement (made between the grid and tube) were used, the computed DQEs decreased accordingly. When exposures corrected for grid attenuation were used, the computed DQEs were close to but slightly lower than those measured without the grid.