

## AbstractID: 11187 Title: Physical Characteristics of a New Flat-Panel Digital X-Ray Detector

**Purpose:** We have characterized a new flat-panel digital x-ray detector. Physical characteristics of new flat-panel detector has been measured and evaluated by using previous flat-panel detector as the reference method. **Method and Materials:** The new flat-panel detector has a pixel size of 0.168mm and detecting area of 17" × 17". The previous flat-panel detector has a pixel size of 0.139mm and detecting area of 14" × 17". The modulation transfer function (MTF), noise power spectrum (NPS), and detective quantum efficiency (DQE) of the two systems were measured. For these two detectors use RQA5 radiographic condition. The MTF of the detectors were evaluated using slit method. The NPS were measured by two-dimensional Fourier analysis of center portion of the averaged image. The DQE were assessed from the MTF, the NPS, given exposure and photons per mm<sup>2</sup>-mR. **Results:** For the new flat-panel detector, the MTF at 3cycles/mm which is Nyquist frequency of new detector was measured as 55%. The maximum DQE value at spatial frequencies between 0 and 1cycles/mm was 55% for the new flat-panel detector. For the previous flat-panel detector, the MTF at 3cycles/mm was measured as 59%. The maximum DQE value at spatial frequencies between 0 and 1cycles/mm was 50% for previous flat-panel detector. The MTF of a new flat-panel detector was slightly lower than that of a previous flat-panel detector. The NPS curves of the two detectors were generally similar at the wide range of the spatial frequencies. For the DQE of the new flat-panel detector was also similar with previous flat-panel detector at frequency above 1cycles/mm. However, in the frequencies below 1cycles/mm, new flat-panel detector was higher than previous flat-panel detector. **Conclusion:** The new flat-panel detector is able to provide good imaging performance in the detection of low contrast objects.