

We report on the use of a-Si EPID (aS500 Varian Medical) for dosimetric verification of open and IMRT fields. A dosimetry mode for the EPID is implemented by placing additional build up on the surface of the detector, and using frame averaging scanning mode. To account for scattering effects in the material overlying the detection matrix and the presence of noise, image restoration is performed. The EPID's response kernel consists of two components: a dose scatter component and an optical glare component. The 2D convolution kernel is obtained from the EPID response to a step function signal while the noise component is extracted from the power spectrum of the open field images. The response kernel and noise spectrum are used to build a Weiner filter. The standard EPID image is converted to portal dose image, PDI, using the following steps: i) Standard EPID images are first corrected for detector's dead time, field size dependence, and beam uniformity. ii) The image is then de-convolved using the Weiner filter. iii) The image is next convolved with a measured water kernel and iv) a calibration factor (pixel_value/cGy) is applied to every pixel in the image. The PDI's are compared with EDR film dose matrices using gamma comparison methods. Results show that PDI's obtained using this method are in close agreement with film measurements. We conclude that using the proposed calibration procedure and proper corrections the EPID is a feasible alternative to film dosimetry for open and IMRT fields.

