

## AbstractID: 9129 Title: An Easy Method to Implement the Portal Dosimetry for IMRT Validation

**Purpose:** The aim of this study was to develop a convenient method for IMRT validation with an amorphous silicon electronic portal imaging device (EPID). Instead of using Monte Carlo simulation or custom-built proprietary software, a commercial treatment planning software(TPS) was utilized to calculate the dose response of the imager.

**Method and Materials:** To calculate the dose response of the EPID, a series of images were acquired for the commissioning of TPS. A new machine was created in the TPS for modeling the scattering properties of the detectors. Each pixel of the portal image was first converted to dose and followed by the off-center correction. The pixel value at field center was used to project the absolute dose delivered to the EPID.

**Results:** The accuracy of this method was investigated with several IMRT plans for different sites(prostate, head & neck and breast). The corrected portal images and calculated dose maps were compared by isodose lines, percent dose difference and gamma ( $\gamma$ ) function. Both the absolute dose level and relative dose distribution show excellent agreement. For all the test cases, the passing rates of  $\gamma$  function with 3 % and 3 mm criteria are more than 90 % of the area enclosed by 20% isodose lines, and the passing rates with 5 % and 5 mm criteria are higher than 99 %.

**Conclusion:** There are many challenging problems when the EPID is used for dosimetric applications. The proposed method applied necessary corrections to the portal images and they showed excellent agreement with the calculated dose maps. The pencil-beam algorithm in the TPS successfully modeled the dose kernels of the detectors. Most importantly, the simplicity of this method make it very easy to be implemented for most of the users of EPID.

**Conflict of Interest (only if applicable):** None