AbstractID: 9076 Title: Evaluation of accuracy of field size measurements using Profiler 2 and EPID

Purpose: To evaluate the performance of two digital devices, a diode array and an EPID, for routine field size checks (normally performed by using films) by comparing with measurements using an ionization chamber.

Method and Materials: Field sizes ranging from 5 x 5 cm^2 to 25 x 25 cm^2 for 6 and 18 MV photon beams were measured using the Profiler 2 (Sunnuclear) and EPID (iViewGT, Elekta) and compared with those measured with an ionization chamber in a scanning water tank. The Profiler 2 is made up of 83 diode detectors in one direction and 57 diodes in the orthogonal direction with 4 mm spacing, covering lengths of 30 cm and 20 cm in the respective two directions. The physical area of the EPID is 41 x 41 cm^2 with 1024 x 1024 pixels, resulting in a resolution of 0.25 mm projected at the isocenter. A QA jig with embedded pins was used to determine the scaling of the EPID. For each measured profile, the width at 50% of the central axis intensity was taken to be the measured field size.

Results: The field sizes measured with both detectors agreed to within 1.5% of those measured with the ion chamber for both the 6 MV and 18 MV photon beams. The results for Profiler 2 are slightly better than those of the EPID although the Profiler 2 has a limited spatial resolution of 4 mm. The ratios of field sizes measured with the Profiler 2 and the EPID to those of the ion chamber are almost constant with respect to the field sizes.

Conclusion: The field sizes measured with the Profiler 2 and the EPID were comparable to those using the ion chamber. They can be used for routine field size checks in place of films.