AbstractID: 9218 Title: Characterization of the OneDosePlus^{TM} MOSFET detector and assessment of its suitability as an in vivo dosimeter

Purpose: To characterize the OneDosePlus™ MOSFET detector, compare its response to both that of a Thomson-Nielsen MOSFET detector and that of an ionization chamber, and assess its feasibility for use as an *in vivo* dosimeter.

Method and Materials: Using, alternately, a OneDosePlus™ MOSFET detector, a Thomson-Nielsen MOSFET detector and an ionization chamber—the gold standard, the output of a 6 MV photon beam from a clinical linear accelerator was measured at the depth of d_{max} = 1.5 cm in a water-equivalent plastic phantom (*i*) as a function of field size and SSD for a fixed 0° gantry angle, and (*ii*) as a function of gantry angle for a fixed field size of 10×10 cm^2 and SSD of 100 cm. Field sizes in the range 5×5–40×40 cm^2, SSDs in the range 80–120 cm, and gantry angles in the range 0–80° were studied. For each detector, a similar geometrical setup was employed and the same number of monitor units was delivered. MOSFET measurements were normalized to those obtained correspondingly with an ionization chamber, and then compared.

Results: The OneDosePlus™ detector exhibited a response to the delivered radiation dose that was consistent with the corresponding Thomson-Nielsen MOSFET and ionization chamber measurements for all SSDs and field sizes. As expected, the output increased with increasing field size and decreasing SSD. The OneDosePlus™ measurements demonstrated significant angular dependence with respect to gantry angle beyond ~40°, deviating by as much as 60% from the ion chamber reading at 80°.

Conclusion: The OneDosePlus™ detector is suitable for *in vivo* skin-dose determination. It provides a direct, reliable dose measurement for a range of field sizes, SSDs and gantry angles. Though significant angular-dependent corrections are required beyond ~40° incidence—owing to the detector's asymmetric construction—it is otherwise a highly convenient alternative to the Thomson-Nielsen MOSFET.