AbstractID: 2829 Title: Study on MOSFET Sensitivity Characteristics as a Function of Frame Rate in Modern Interventional Digital Pulsed Angiography/Fluoroscopy

Purpose: Application of MOSFET technology in modern interventional pulsed digital angiography/fluoroscopy presents a new opportunity to measure organ dose in real-time using anthropomorphic phantoms. The purpose of this paper was to study MOSFET response characteristics to a series of short pulses (10 msec pulse width) at various frame rates. To the best of our knowledge, no data have been published on the response characteristics of high sensitivity diagnostic MOSFET using modern interventional pulsed fluoroscopy system.

Method and Materials: High sensitivity MOSFET detectors (model TN-1002RD, Thomson-Nielson, Ottawa, Canada) and an ion chamber (model 10x5-6 ion chamber and model 9015 monitor, Radcal, Monrovia, CA) were exposed to a series of pulsed x-ray beams (pulse width 10 msec) at different frame rates and MOSFET response characteristics were studied as a function of frame rate. To simulate patient, aluminum plate (total thickness 1.5”) was placed between the patient table and a flat panel detector. Philips Integris Allura 3-D rotational angiography system was employed. The frame rate was varied as follows: 0.5/s, 1/s, 2/s, 3/s, 7.5/s, 15/s, and 30/s. These frame rates cover entire spectrum of clinical applications; from interventional radiological procedures to cardiac catheterization applications.

Results: Normalized MOSFET responses (mV/Roentgen) were plotted as a function of frame rate and MOSFET responses were constant as a function of the frame rate.

Conclusions: Using state-of-the-art interventional radiology x-ray system, we observed that response characteristics of the MOSFET remained constant as a function of frame rate. This suggests that MOSFET technology may be used for interventional angiography and cardiac catheterization dosimetry.

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