

AbstractID: 8238 Title: Performance optimization of the integrated acquisition mode of the Varian aS500-II EPID and investigation for measurement of enhanced dynamic wedge.

Purpose: To better understand the image acquisition operation of an EPID and to evaluate the dosimeter properties in treatments with enhanced dynamic wedges. **Method and Materials:** The Work presented rests on the study of the Varian EPID: aS500-II and the Image Acquisition system IAS3. We are interested in integrated image acquisition mode not synchronized to the accelerator beam pulses. We investigated the influence of the Frame Cycle Time "FCT" parameter on the gray level, the speed of acquisition and the noise in the image, according to the energy of the X-ray beams (6 and 15 MV) and the Clinac 2100 C/D dose rate. We also studied the performances, stability and the reproducibility of the EPID aS500-II in measurements of the wedge factors of the fields with enhanced dynamic wedges. **Results:** In this mode, only one parameter the "FCT" influences the pixel value. The pixel value is directly proportional to this parameter. When the $FCT \geq 55ms$, the speed of acquisition is inversely proportional to this parameter. The noise lies between 0.2% and 0.5%. We determined a rule to avoid saturation. EPID measurements were found to exhibit a dependence on the wedge direction and EPID position. An empirical correction function was developed to correct the wedge profiles. Due the reproducibility of the EPID measured EDW factors the device is highly suited in this mode of acquisition to regular measurement of EDW. **Conclusion:** The choice of the acquisition parameters is essential for the complete detection of radiations and especially to use this detector as a dosimeter.