

AbstractID: 13694 Title: Evaluation of effects of cable exposure on the scanning data for MV linear accelerator

Purpose: To evaluate the effects of cable exposure on the scanning data for MV linear accelerators

Method and Materials: Profiles and PDDs from $10 \times 10 \text{ cm}^2$ to $30 \times 30 \text{ cm}^2$ field sizes for 6 and 18 MV photons were measured using a 3D automated scanning system (IBA, blue tank and OmniPro 6.5 Accept, Tennessee) and CC04 and CC13 ion chambers (IBA, Tennessee) of volume 0.04 and 0.13 cm^3 . The measurements were made at $\pm 300\text{V}$ for each detector

Results: The cable effect induced a positive change in the measured signal resulting in a reduction in the measured signal for negative polarity measurements and an increase with a positive polarity. The effect is significant for low energy, deep depth and large field size. Although it makes the difference in the GT profiles, the measured field sizes agreed within 0.13% and 0.07% for CC04 and CC13 ion chambers. For PDD measurements, the data with a $+300\text{V}$ was found to be elevated at the shallow depth ($d < d_{\text{max}}$) due to the small amount of the cable length in the field. This is consistent with the results of the profile measurements. Although the effect does not change the location of d_{max} , the measured PDDs of 10×10 and $30 \times 30 \text{ cm}^2$ with both voltage, which are normalized at 10cm depth, have 0.3% and 1.2% differences at the d_{max} , respectively.

Conclusion: The effect of cable exposure is significant for low energy, deep depth and large field size measured with the small volume chamber. Ideally, profile and PDD measurements should be acquired as an average of positive and negative bias to remove the effects of cable effects on the measurements.