

AbstractID: 8338 Title: Use of I^mRT MatriXX for routine dynamic MLC QA and IMRT dose verification

Purpose: To investigate the utility of 2D ion chamber array, I^mRT MatriXXTM (Scanditronix Wellhofer, Sweden) for dynamic MLC QA and IMRT dose verification. **Method and Materials:** The MLC QA test patterns designed for millennium 80 multileaf collimator were chair, x-wedge, pyramid, peak, open swipe field, garden fence and picket fence. For IMRT verification, five prostate cancer patients were planned using dynamic IMRT technique on Eclipse treatment planning system using 6 MV photons. The MLC QA test patterns and IMRT plans were executed on 2D ion chamber array, I^mRT MatriXX (24x24 cm² active area, 1020 ventilated ion chambers) with equivalent 5 cm solid water buildup, keeping SSD 95. Planned and delivered dose delivery was compared using Gamma analysis (Δ dose 3% and Δ distance 3mm). **Results:** Dose response of MatriXX was linear in 0.2-10 Gy. Dose rate dependence was within 0.15% in range of 1-6 Gy/min. Dynamic MLC QA tests such as chair, x-wedge, pyramid, and open swipe field were successfully verified and passed the gamma analysis criterion with more than 95% pixels in defined field size. But because of less spatial resolution (7.62 mm), matrix was not able to recognize garden fence, picket fence, and 2.5 mm pattern in peak test. Mean and SD of difference between TPS calculated and measured CAX doses were 1.27% and 1.06 respectively for IMRT plans. Mean and SD of gamma analysis were 94.85% and 2.16 respectively. Dose differences were more than 3% along y direction in penumbra region because dose distribution can not be faithfully reflected by linear interpolation in high dose gradient region by MatriXX. Other than penumbra region, all pixels successfully passed the gamma analysis criterion. **Conclusion:** I^mRT MatriXX can be used for routine MLC and pretreatment IMRT QA. But care should be taken while taking measurements in penumbra region.