

AbstractID: 10964 Title: MapPhan with MapCHECK and Im'RT MatriXX for Real Gantry Angle IMRT QA

Purpose: A study was performed using two commercially available 2D detector array systems for IMRT patient specific QA by resetting all beam angles to gantry angle at zero degree and leaving all beam angles as planned to investigate and verify the dose delivery accuracy, limitation of the devices in the QA procedures.

Method and Materials: Calibration was established at 0 degree beam angle, with the beam normal to the array plane. This study utilized one complicated head and neck IMRT plan with 9 fields (18 spitted fields). The Varian Eclipse treatment planning system (TPS) with Anisotropic Analytical Algorithm and Varian 21Ex LINAC were used for this study. The 2D array systems tested were MapCHECK with MapPhan from Sun Nuclear Corporation, and Im'RT MatriXX from IBA. Two QA phantoms were constructed by (1) MapPhan with MapCHECK and (2) solid water with MatriXX. The summed dose measured was compared to calculated one using two phantoms.

Results: At gantry zero degree, 99.7% pass rate for MapPhan with MapCHECK was achieved using 3% and 3 mm DTA criteria in absolute mode and 99.2% for MatriXX. At true planned angle, 93.4% pass rate for MapPhan with MapCHECK and 93.0% for MatriXX.

Conclusions: Although all arrays performed reasonably well in the composite dose for real gantry angles, it may indicate the loss of QA information in the composite. Since with the beam normal to the detector plane of 2D array, all measurement points carry the same information weight. Whereas delivery angles between normal and parallel, measurement carries varying amounts of weight for each point samples or not sampled depending on field size and beam angles. The application of a 2D array to real gantry angle IMRT QA requires careful considerations.