

1. Introduction

Volumetric modulated arc therapy (VMAT) is in use to deliver conformal dose with the use of multileaf collimators (MLCs). Dose is delivered by the complex motion of the MLC. The magnitude of the complexity of the dynamic MLC motion depends on the location of the target and the organs at risk. The Eclipse treatment planning system (TPS) (Varian Medical Systems, Palo Alto, CA) calculates complex motions of the MLC to deliver the intended dose according to the prescribed dose constraints. It is important to compare calculated dose from the TPS and delivered dose on the LINAC.

The aim of this study was to compare dose delivery of radiotherapy plans using Portal Dosimetry (Varian Medical Systems, Palo Alto, CA) and ArcCheck (SunNuclear, Florida) detector.

2. Material and Methods

The values of gamma passing rate for 6 MV photon beam was measured on Varian TrueBeam linear accelerator (Varian Medical Systems, Palo Alto, CA) equipped with Millennium 120 MLC. Twenty modulated arc therapy (VMAT) plans were made in Eclipse Treatment Planning System (TPS) (Figure 1). Measurements were performed with a portal dosimetry (Varian Medical Systems, Palo Alto, CA) (Figure 2) and ArcCheck detector (SunNuclear, Florida) (Figure 3).

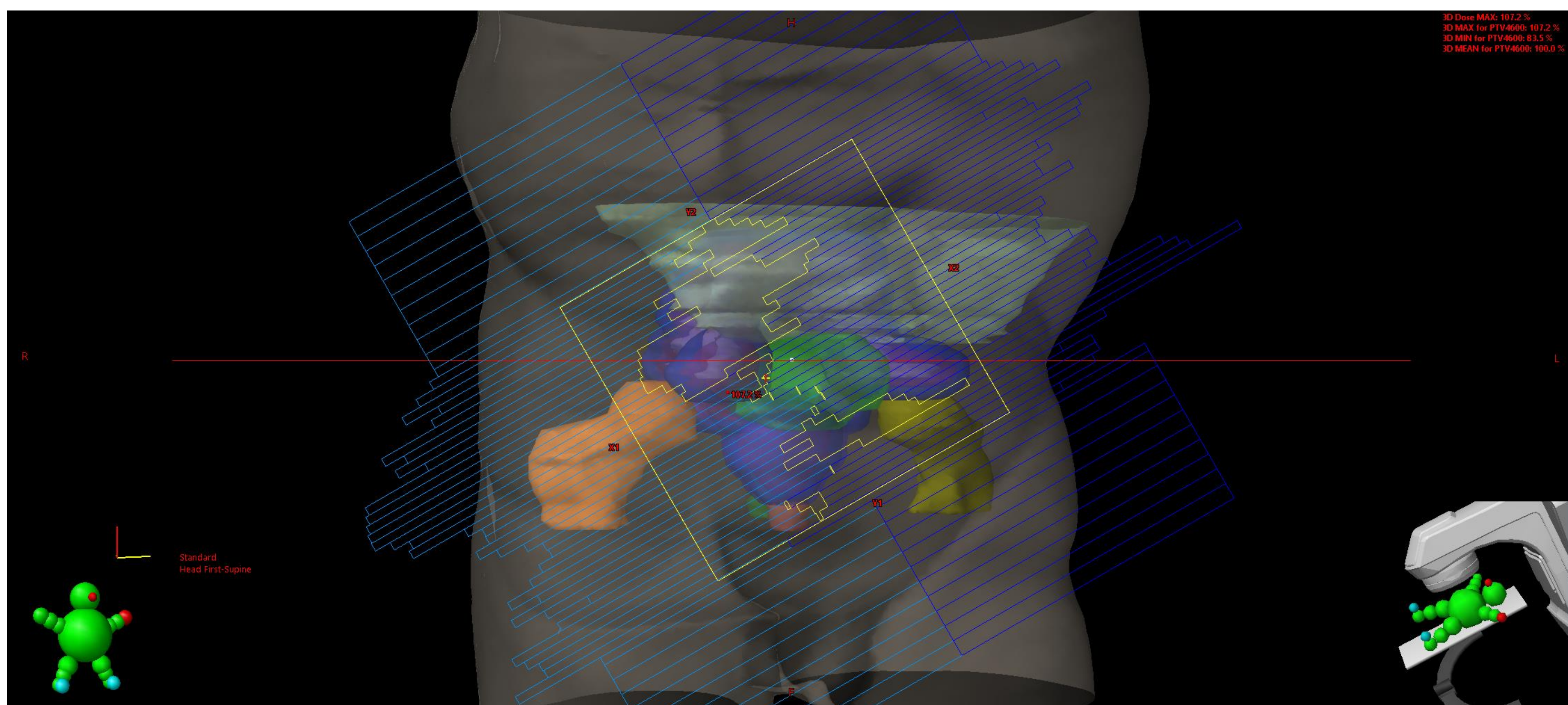


Figure 1 Dose modulation with multileaf collimator.

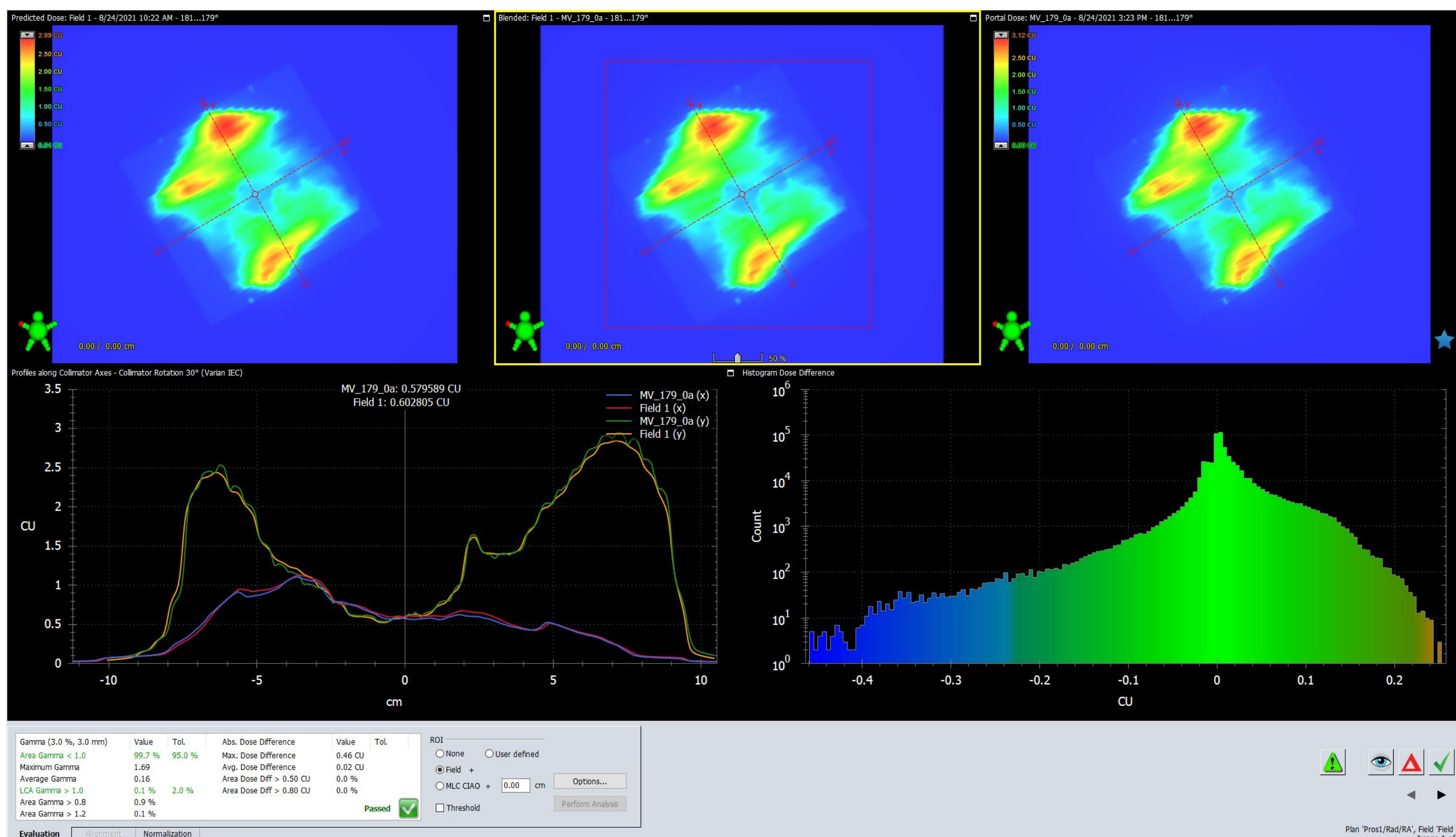


Figure 2 Portal dose measurement for single patient.

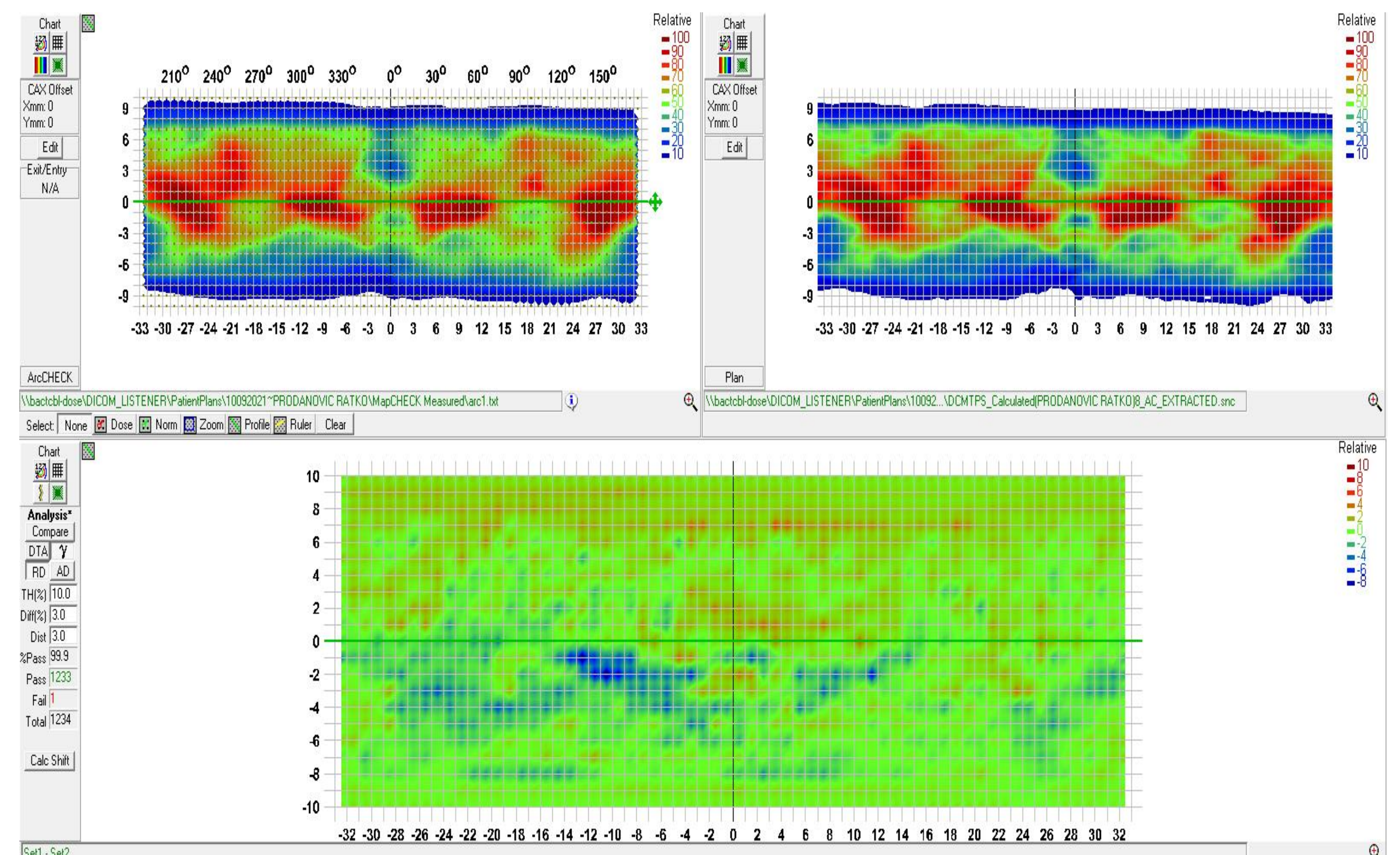


Figure 3 ArcCheck measurement for single patient.

3. Results

Gamma passing rate for two different methods of verification are presented in the figure 4.

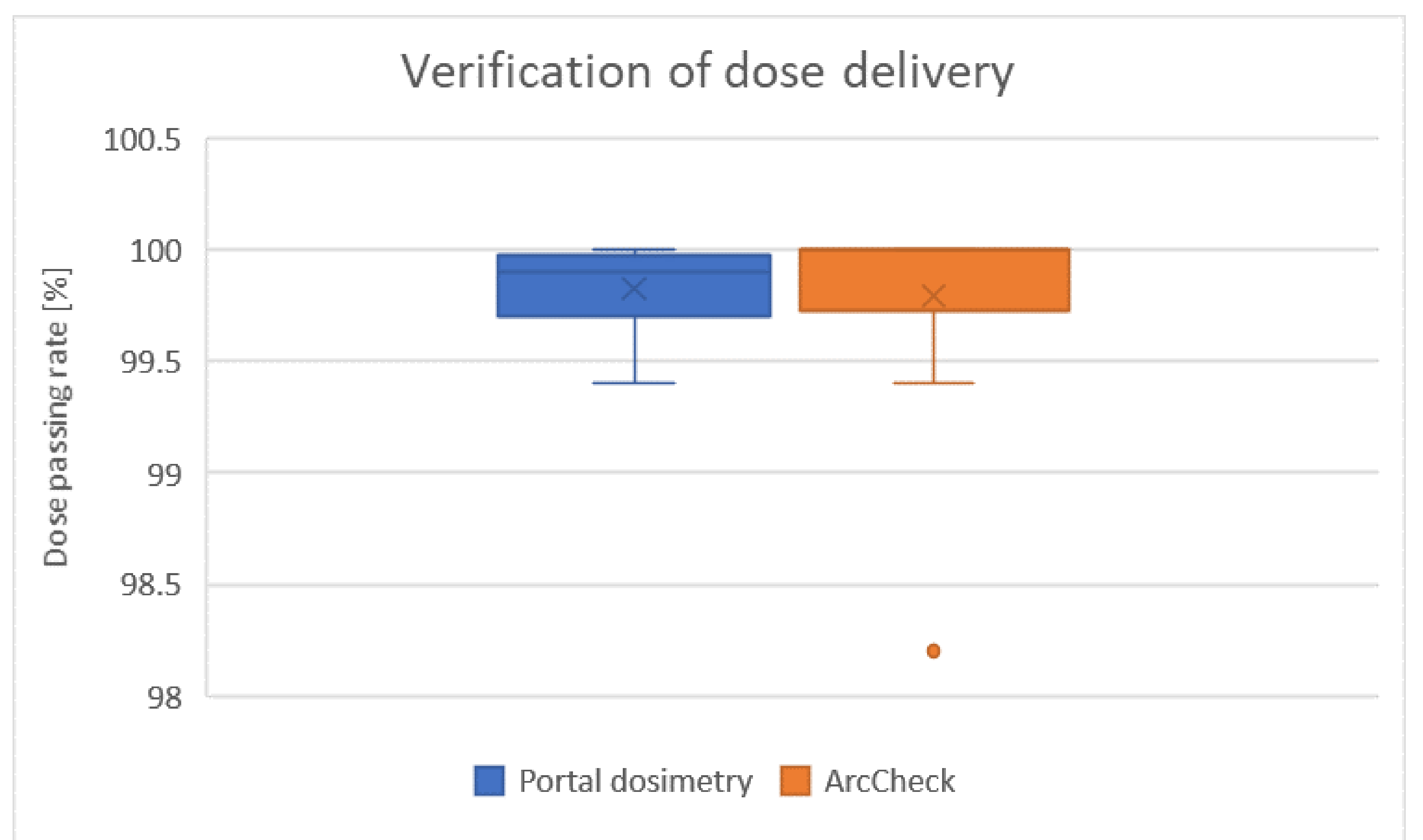


Figure 4 Results of dose delivery: Portal dosimetry and ArcCheck

4. Conclusion

Results of this study are showing the difference of 2% between measured dose with the two independent detectors and calculated dose on the TPS. Dose difference between measured and calculated dose is in accordance with the international recommendations.