AbstractID: 8604 Title: Evaluation of two-dimensional diode array dosimeter for an application of exit dosimetry

**Purpose:** To characterize and evaluate the performance of MapCHECK$^{TM}$ two-dimensional diode array dosimeter for accurate measurement of exit fluence at an extended source-to-surface distance (SSD) for the application of *in vivo* dosimetry based on dose reconstruction.

**Method and Materials:** Dose profile measurements of open field for varying field sizes ($3\times3cm^2$, $5\times5cm^2$, $7\times7cm^2$ and $10\times10cm^2$), air gaps (30cm, 40cm, 50cm and 60cm) and thicknesses of primary beam attenuator (10cm and 20cm of solid water) using MapCHECK$^{TM}$, CC04 ionization chamber and GafChromic® EBT radiochromic film were carried out. For clinical measurements, the 2D dosimetry measurements for five IMRT boost fields were carried out at an air gap of 50 cm with MapCHECK$^{TM}$, and compared with GafChromic® EBT radiochromic film, which served as the gold standard.

**Results:** With increasing air gap, the difference between MapCHECK$^{TM}$ system and CC04 increased slightly for both primary beam attenuator thicknesses. For air gaps of 0cm, 30cm, 40cm, 50cm and 60cm, the overall agreement between MapCHECK$^{TM}$ and CC04 was ±1.25%, ±1%, ±2%, ±2.5% and ±4, respectively. The overall agreement averaged over all air gaps between MapCHECK$^{TM}$ system and CC04 was within ±2% while agreement between GafChromic® EBT radiochromic film and CC04 was ±3.5%. For the clinical IMRT fields and using the gamma test, the comparison between MapCHECK$^{TM}$ and GafChromic EBT radiochromic film yielded a mean passing rate of 91.9%,wit h a minimum and maximum passing rate of 87.6% and 97.2% respectively.

**Conclusion:** MapCHECK$^{TM}$ yielded to have an accurate dose distribution (profile and 2D dose distribution) at an extended SSD (> 130cm). It can be considered a suitable candidate for exit dosimetry.