

**Purpose:** To report the results of commissioning and to structure a quality assurance program for commercially available 3D treatment planning system (TPS) based on IAEA Technical Report Series 430.

**Method and Materials:** Eclipse v-7.3.1 TPS was commissioned for 6MV photons from Clinac-6EX linear accelerator. CT images of a phantom with various known in-homogeneities were acquired. The images were transferred to TPS and tested for orientation, correlation of CT number and density, image geometry, anatomical modeling, dose volume histogram, plan output and transfer. Accuracy of external beam dose calculation was checked by comparing various dosimetric parameters computed from TPS with measured data. These parameters includes depth dose, beam profiles and MU for square, rectangle, asymmetric, MLC shaped fields, hard and enhanced dynamic wedges. Representative clinical test cases were tested for MU calculation and point doses.

**Results:** Maximum variation of CT number observed was  $\pm 20$  HU. The results of anatomical modeling tests were within the tolerance limits, however 3.7% reduction in the absolute volume was found for a cylindrical object of volume 350cc due to distortion of object expansion at the sharp corners and edges. For PDD curves, variation of 2mm was observed in the buildup region. Maximum variation of  $\leq 1$ mm was observed in penumbra region for the profiles of square, rectangle, asymmetric, wedged, and MLC fields, except in the case where central axis was blocked (2.5mm). All tests for MU calculation had variation within  $\pm 2\%$ , meanwhile variation of 3.8% was observed when the central axis was blocked. Clinical test cases resulted in point doses within  $\pm 2\%$ .

**Conclusion:** The results of quality assurance tests are in agreement with the validation software of Eclipse, which improves the confidence levels of the physicists. Periodic QA protocol and a subset of the commissioning tests recommended by TRS-430 have been customized for an ongoing QA program.