

AbstractID: 13345 Title: Comprehensive Clinical Commissioning and Quality Assurance Procedures of a Big Bore CT Simulator in a Radiation Oncology Department

**Purpose:** To perform acceptance testing and clinical commissioning of a 16-slice big bore CT-simulator (85 cm) and comprehensive quality assurance (QA) procedures for radiation treatment planning using several phantoms.

**Method and Materials:** This study focused on the performance evaluation of this CT simulator in a radiation oncology environment through the acceptance testing and commissioning for clinical use. Parameters derived from commissioning were used as reference values for a comprehensive QA program. Several phantoms were used in this project to evaluate the CT simulator image quality, like ACR phantom, Vendor (Philips) provided phantom and CATPHAN 504. CTDI phantom was used to evaluate the radiation dose to patients during scans. RMI phantom was used to evaluate the CT number linearity for use in the treatment planning system for density correction.

**Results:** For clinical commissioning, the radiation dose reported in this study is lower compared to published data based on CTDI measurements. The results from ACR phantom showed that image quality specifications were met. The highest spatial frequency for two parts of the ACR phantom; abdomen and chest, there were 8 and 9 lp/cm; respectively visualized. The manufacture specification is 5 lp/cm. CT number linearity and low contrast resolution tests were also within acceptance requirements. Image quality evaluation parameters from different phantoms were compared. These showed good self consistency using this CT simulator.

**Conclusion:** A comprehensive analysis of the test results indicates consistent and reproducible operation of the big bore CT-simulator. This big bore CT simulator is well suited for use in a radiation oncology setting.