Purpose: To investigate the effect of source to surface distance on treatment field lateral penumbra width and the consequence of setup error on the dose distribution in the junction between two spinal fields of double scattered proton beams. Methods: The CT images of the Spine Phantom from Radiological Physics Center was used to design a double scattered proton beam treatment plan using Varian Eclipse treatment planning system. PTV included spinal cord, vertebral body and part of spinous process. The PTV was divided into superior and inferior parts and two posterior fields were used to cover the targets with the prescribed dose. 2D dose was measured using IBA MatriXX and EBT2 film at a depth close to the center of SOBPs of both the fields located both at the nominal source to axis distance (SAD) of 270 cm and at an extended SAD. The field separation was changed by ±1 mm to study the effect of setup error. The measured and TPS calculated dose distributions in verification plans in a water phantom were compared. Results: The measured 2-D doses agreed very well with planned ones for individual fields. 99% of pixels pass 3%/3 mm dose/distance agreement criteria. The CAX dose differences are within 2%. The 80% to 20% penumbra widths at nominal SAD are 7.4/7.7/7.8 mm for planned/MatriXX/EBT2 film respectively, and about 1 mm wider for the extended SAD. The measured maximum dose was about 10% higher than that from the plan, and decreased/increased about 7% when the fields were separated by ±1 mm. Conclusions: The penumbra width is modestly affected by the extended SSD often used for patient treatment. Dose in the junction of two fields is very sensitive to the setup error and the accuracy of the TPS dose calculation in this region may be limited.