

With the development of electron calculation algorithms and the computer technology, a 3D-electron beam planning system is available in many commercial treatment planning systems. It is very important to perform a rigorous evaluation of the system before its clinical use. In this study, we describe our procedure of commissioning the electron beams in the CADPLAN 3D planning system and present our test results of dose calculation verifications. A series of measured dose distributions in a homogeneous water phantom and in 3D inhomogeneous phantoms were used to compare with those calculated by the CADPLAN. The material of the inhomogeneity consists of air, bones and aluminum. A 9 MeV and a 20 MeV electron beam from a Siemens KD2 were used in the comparison. For the homogeneous water phantom, there was an excellent agreement between the CADPLAN calculations and the measurements in both depth-dose curves and dose profiles at various depths, d_{\max} , R_{85} , R_{50} and R_{20} , except for the 9 MeV electron beam where the CADPLAN calculation underestimated doses in horns of the dose profile at d_{\max} by 3-4%. However the surface dose was not correctly predicted by the CADPLAN. For the inhomogeneous phantoms, the agreement between the CADPLAN calculations and the measurements was remarkable considering the magnitude of dose changes due to the inhomogeneity. For example, the CADPLAN calculation successfully predicted 40% dose increases due to a small air cavity inhomogeneity in a 20 MeV electron beam.