Purpose: In Gamma Knife (GK) stereotactic radio-surgery, highest accuracy of dose calculation is important .The attenuation of each single beam in GK is determined by their paths. The path, where each beam passes through the skull to the tumor, is determined by the measurement of skull radius. To estimate the path attenuation effect on the dose calculation is important for clinicians in deciding selection of the gamma angle, blocking beam and helmet size, etc. The purpose of this study was to design and test a new method to assess the beam path attenuation effects on dose computation in GK. **Method and Materials:** A simulation of GK C-model was employed for this study. The skull was initially assumed to be a spherical bulb. Shot locations in the center and in the periphery of the bulb were tested. Shot center dose and each beam's contribution was calculated using the tissue maximum ratio (TMR) formula for each path. The simulation of the inhomogeneity calculation is an approach similar the procedure of finding the different paths from different beams. The dose point at different beam contribution is quantitatively calculated with variation difference. **Results:** The data from several typical plug locations showed that the path length difference could be over 50% and ensuring TMR changes could be as much as 20% of the average value. The single beam profiles at the shot center were variable; however, the composite profiles from the total beams did not show significant changes. **Conclusion:** Our method to calculate the different path length of single beam from GK treatment planning simulation model shows that the beam path parameters affect GK treatment planning. The beam profile changes based on path length variations. These findings suggest the necessity of considering dose contributions to the normal tissue from different beam paths.