Radiation protection barrier calculation for public and radiation worker is directly related to the accuracy of available data that need periodic revision in the context of measurement procedure and the choice of measuring devices. Broad beam attenuation, BBA(E, t, x, Z, V) is dependent on the beam energy, E, thickness of attenuator, t, distance between chamber and material, x, atomic number, Z and the ion chamber volume, V. This study was undertaken to investigate the effect of x and V on the BBA. A Philips Super 80CP unit with 50kVp-125 kVp stations was used. Lead sheet ($30x30cm^2$) of high purity and precision thickness was used. Six different chambers (6 cm^3, 15 cm^3, 60 cm^3, 150 cm^3, 180 cm^3 and 600 cm^3) from various manufacturers were used. The source to chamber distance was kept constant (1 meter) and the distance between chamber and Pb sheet was varied in the distance range of 0-20 cm. Results show that BBA depends on distance, x for each station and ion chamber. Smaller distances provide higher transmission. The differences are more pronounced at lower transmission values ($>10^{-3}$). The choice of detector was shown not to be critical except for the 600 cm^3 volume chamber. In conclusions, broad beam attenuation measurements do not depend on the measuring devices except for a very large ion chamber. However, the distance between attenuator and chamber is critical for the accuracy of attenuation measurements for smaller transmission values where public exposure is most critical.