In-air Off-axis Ratio (*OAR(x,d)*), defined as the ratio of dose at depth, *d*, in a miniphantom at off-axis point, *x*, to that on the central-axis, can be used to determine the incident photon fluence distribution $\phi(x)$ as well as $\mu(x)/\mu(0)$, where μ is the attenuation coefficient. In our model, $OAR(x,d) = exp(-\mu(x)\cdot d)\cdot\phi(x)$, where $\phi(x)$ is the photon fluence at surface. We assumed that the contribution of phantom scatter in the miniphantom is constant. $\mu(x)/\mu(0)$ can be determined by the ratio $OAR(x,d)/OAR(x,d_{max})$, provided $\mu(0)$ is independently measured. That $\mu(x)$ increases with *x* is called off-axis beam softening. In this study, we compared *OAR* for different types of accelerators and a Cobalt-60 unit with and without wedges. $\phi(x)$ is determined by the shape of the flattening filter and the wedge filter, if a wedge is used. $\phi(x)$ for open beams from different accelerator type were different, even for the same nominal photon energy. $\phi(x)$ for wedge beams from different accelerator with the same nominal energy and wedge angle were similar. $\mu(x)/\mu(0)$ can be approximated as a linear function of off-axis distance x: $\mu(x)/\mu(0)=1+a\cdot x$. However, the slope *a* is a function of photon energy as well as the wedge type (internal or external).