We present a technique to estimate the X-ray scatter and veiling glare (scatter-glare) by sampling primary intensity using a lead sheet with an array of apertures mounted on the X-ray collimator (aperture diameter = 2.4 mm, interspace = 7.62 mm). The open area fraction in the aperture technique is only 7.8% which results in a significant dose reduction as compared to the beam-stop technique. A Lucite step phantom (4.5 cm – 15.5 cm) was used to evaluate this technique. The scatter-glare image can be estimated using both an interpolation technique and convolution filtration technique based on the sampled scatter-glare signal. The detected image of the Lucite step phantom was convolved with a 75x75 Gaussian kernel. The ratio of the sampled scatter-glare to the convolved image gray level (scatter fraction) was computed. A third degree polynomial was used to fit the scatter fraction with respect to the convolved gray level. The root mean square (rms) error in estimating the scatter-glare intensity was calculated to be 9.27%. A comparison between the estimated scatter-glare intensity using the aperture technique and the sampled scatter-glare intensity using a beam-stop technique resulted in a rms error of 11.2%. In conclusion, the aperture technique can be used to accurately sample the scatter-glare intensity with minimal patient exposure.