This problem focuses on Case 2 (Signal+Interferer+Noise) described in the lecture notes. You are trying to detect a planewave source at broadside using a conventional beamforming of data from a 50-element half-wavelength linear array. The planewave source has a variance of $\sigma^2_0 = 0.5$. The sensor noise is spatially white with a variance of 1 ($\sigma^2_n = 1$). In addition to the source signal and the noise, the array receives the signal from loud interferer located at the angle $\theta$, where $\cos(\theta) = 0.06$. The interferer variance is $\sigma^2_1 = 10,000$.

The plots below show the beampattern for a conventional beamformer (CBF) steered to broadside (the left plot shows the whole beampattern; the right plot zooms in around broadside).

Your task is to predict whether the source signal will be visible in the output or whether it will be masked by the interfering signal. Choose one of the answers from below and provide a brief justification for your answer.

(a) Since the beamformer is steered towards the source, the interferer will have no effect. Thus the source signal will be visible in the output.

(b) Although the interferer can have an effect on the output, this interferer is not loud enough to prevent the source from being seen. Thus, the source signal will be visible in the output.

(c) The interferer will mask the source signal in the output.