We are given the electric field:

$$\vec{E} = E_0(\hat{x} + \hat{y}) \sin\left(\frac{2\pi}{\lambda}(z + ct)\right)$$

The corresponding magnetic field must satisfy Maxwell's equations. Using Faraday's Law, we find:

$$\vec{\nabla} \times \vec{E} = E_0(-\hat{x} + \hat{y}) \left(\frac{2\pi}{\lambda}\right) \cos\left(\frac{2\pi}{\lambda}(z + ct)\right) = -\frac{1}{c}\frac{\partial \vec{B}}{\partial t} \quad \rightarrow \quad \vec{B} = E_0(\hat{x} - \hat{y}) \sin\left(\frac{2\pi}{\lambda}(z + ct)\right)$$

where we have dropped a constant of integration (static magnetic field).