Vector potential $\vec{A}$ in $d \ll \frac{w}{c} = \frac{\lambda}{2\pi} \ll r$ (4)

$$\bar{A}(r,\Theta,t) = \frac{-\mu_0}{4\pi} \int_{-\frac{d}{2}}^{\frac{d}{2}} dz \; \frac{q_0 w \sin\left(w\left(t+\frac{r}{c}\right)\right)}{r} \hat{z}$$

$$= \frac{-\mu_0}{4\pi} \int_{-\frac{d}{2}}^{\frac{d}{2}} dz \; q_0 w * \frac{1}{r} * \underbrace{\left(1 + \frac{d\cos\Theta}{2r}\right)}_{\approx 1} * \sin\left(w\left(t+\frac{r}{c}\right)\right) \hat{z}$$

$$= \frac{-\mu_0}{4\pi} \int_{-\frac{d}{2}}^{\frac{d}{2}} dz \; q_0 w \; \frac{1}{r} * \sin\left(w\left(t+\frac{r}{c}\right)\right) \hat{z}$$

$$= \frac{-\mu_0}{4\pi} * \left(z \Big|_{-\frac{d}{2}}^{\frac{d}{2}} \right) * \left(\frac{q_0 w}{r} \sin\left(w\left(t+\frac{r}{c}\right)\right) \right) \hat{z}$$

$$= -\frac{\mu_0}{4\pi} \left[\frac{d}{2} + \frac{d}{2} \right] * \left(\frac{q_0 w}{r} \sin\left(w\left(t+\frac{r}{c}\right)\right) \right) \hat{z}$$

$$= -\frac{\mu_0}{4\pi} d q_0 \frac{w}{r} \sin\left(w\left(t+\frac{r}{c}\right)\right) \hat{z}$$

$$\boxed{\bar{A}(r,\Theta,t) = -\frac{\mu_0}{4\pi} p_0 \frac{w}{r} \sin\left(w\left(t+\frac{r}{c}\right)\right) \hat{z}}$$