Step 2

$$\hat{F}_n(z) - F(z) \leq \hat{F}_n(z_{k+1}) - F(z_k) = \hat{F}_n(z_{k+n}) - F(z_{k+n}) + \frac{1}{r}$$

(*) (*)

Step 4 we have $|F_n(z_k, w) - F(z_k)| < \frac{1}{m}$ (*) $\forall\ n > n(w,w)$ and $k = 0, \dots, r$

This is true due to the definition of $A_{m,k}$ (and because we already showed pointwise almost sure convergence)

Now we plugin (*) in (*)(*) and this yields

$$\hat{F}_n(z) - F(z) \leq \underbrace{\hat{F}_n(z_{k+n}) - F(z_{k+1})}_{< 1/m \text{ due to } (*)} + \frac{1}{m}$$

$$\leq \frac{2}{m}$$