For readability let's define $f(\cdot) := -log(p_{\hat{\theta}}(\mathbf{x}|\cdot))$. Then for any $x^l \in \mathbb{R}^n$ the following holds true:

$$\mathbb{E}_{q_\psi(\mathbf{z}|x^l)}[f(\mathbf{z})] = \mathbb{E}_{p(\boldsymbol{\epsilon})}[f(g(\boldsymbol{\epsilon}, x^l; \psi))]$$