$$\log p(g \mid x, v, z) \sim -\frac{1}{2} \left[ \log \left( \det \left( \sum_{k=1}^{K} g_j C_j \right) \right) + v^T \left( \sum_{k=1}^{K} g_j C_j \right)^{-1} v \right] + \log p(g)$$