Identifying cubes under the radical, you find $\sqrt[3]{512a^9b^5c^{14}} = \sqrt[3]{8^3 \cdot \left(a^3\right)^3 \cdot b^3 \cdot b^2 \cdot \left(c^4\right)^3 \cdot c^2}$. This simplifies to $8a^3bc^4\sqrt[3]{b^2c^2}$.