If we take $\kappa = \frac{3}{4}$ we get

$$\varphi_{\frac{3}{4},\frac{2}{3}}(x,y,z) = \frac{1}{60}\frac{\Gamma(\frac{7}{4})}{\sqrt{2\pi}\Gamma(\frac{5}{4})}\frac{\{[(|x|^{\frac{1}{3}} + |y|^{\frac{1}{3}})^2 - |z|^{\frac{2}{3}}][|z|^{\frac{2}{3}} - (|x|^{\frac{1}{3}} - |y|^{\frac{1}{3}})^2]\}^{\frac{1}{4}}}{|xyz|^{\frac{1}{2}}}$$
$$\left\{10 + 66(\cos\phi)^3 - 36\cos\phi\right\}.$$

and

$$\varphi_{\frac{3}{4},\frac{1}{2}}(x,y,z) = \frac{1}{80\sqrt{\pi}\Gamma(\frac{3}{2})}\frac{\{[(|x|^{\frac{1}{4}} + |y|^{\frac{1}{4}})^2 - |z|^{\frac{1}{2}}][|z|^{\frac{1}{2}} - (|x|^{\frac{1}{4}} - |y|^{\frac{1}{4}})^2]\}^{\frac{1}{2}}}{|xyz|^{\frac{1}{2}}}$$
$$\left\{64(\cos\phi)^4 - 48(\cos\phi)^2 + 9\right\}.$$