Alberto John Thornton

$$\partial^\alpha T_h(g) = (-1)^{|\alpha|} T_h(\partial^\alpha g) \quad \text{(by def. of derivatives of distributions)}$$

$$= (-1)^{|\alpha|} \int_{\mathbb{R}^n} h(x)[\partial^\alpha g](x)\,dx \quad \text{(by def. of } T_h\text{)}$$

$$= \int [\partial^\alpha h](x)\, g(x)\,dx \quad \text{(by applying the integration by parts several times)}$$

$$= T_{\partial^\alpha h}(g) \quad \text{(by def. of the regular distribution defined by } \partial^\alpha h\text{)}$$

$$\therefore \partial^\alpha T_h = T_{\partial^\alpha h} \quad \text{for } h \text{ sufficiently differentiable}$$