FORMULA 3.638.2

$$\int_0^{\pi/4} \frac{\sin^{\mu-1/2} 2x\, dx}{\cos^{\mu} 2x\, \cos x} = \frac{2}{\sqrt{\pi}(2\mu-1)}\Gamma(\mu+\tfrac{1}{2})\Gamma(1-\mu)\sin\left(\frac{(2\mu-1)\pi}{4}\right)$$