BMO AND FAIRNESS ESTIMATES FOR POISSON

Fix an integer N; our goal is to determine an N depending on the dimension d and the associated A_2 weight ν so that if $\varphi \in \mathrm{BMO}_\nu$, then we have

$$\int_{\mathbb{R}^d} \frac{|\varphi(x)|}{1 + |x|^N} \, dx \lesssim \|\varphi\|_{\mathrm{BMO}_\nu}.$$

Rather than applying the doubling property of $\nu \in A_2$, we will use the fairness property: since $\nu \in A_\infty$, there exists a $\delta > 0$ for which we have

$$\frac{\nu(A)}{\nu(B)} \lesssim \left(\frac{|A|}{|B|} \right)^\delta$$

for sets $A \subseteq B$.