BiCMOS BJT Noise Voltage Test

```
*  
* ---------- 
* |         | I1 
* 1KOhm = 4nV/rt_Hz 
*  
* VB |->  
* VE  
* 
*  
* vin     VE  0  DC  0.0 ac 1.0u 
I1      0  VB  1uA 
ql      VB  VB  VE  BiCMOS_NPN 

.model BiCMOS_NPN npn kf=.3e-16 af=.75 bf=200 rb=1000 
.control 
setplot new 
let "V1u" = 0*vector(41) 
let "V10u" = 0*vector(41) 
let "V100u" = 0*vector(41) 
let "V1000u" = 0*vector(41) 

op noise v(vb) vin dec 10 10 100k 1 
destroy unknown.V1u = sqrt(v(onoise_spectrum)) 
alter I1 dc = 10u 
op noise v(vb) vin dec 10 10 100k 1 
destroy unknown.V10u = sqrt(v(onoise_spectrum)) 
alter I1 dc = 100u 
op noise v(vb) vin dec 10 10 100k 1 
destroy unknown.V100u = sqrt(v(onoise_spectrum)) 
alter I1 dc = 1000u 
op noise v(vb) vin dec 10 10 100k 1 
destroy unknown.V1000u = sqrt(v(onoise_spectrum)) 

set pensize = 2 
plot unknown.V1u unknown.V10u unknown.V100u unknown.V1000u vs frequency loglog title BiCMOS_NPN 

echo " ... done."
.endcontrol 
.end 

================================END================================
```
In this case the BiCMOS NPN Model is showing what to expect in a BiCMOS world. The base resistance has been set to 1kOhms such that at currents above 30uA, the flat band noise should be the same as a 1KOhm resistor (4nV_per_rt_Hz). At the higher currents, the 1/f noise corner should be expected to increase in frequency.

Spice likes to think in terms of power. Therefore a square root function needs to be applied to the output noise. In the output noise is onoise_spectrum. The referred to input noise is the should equal the output noise divided by the gain.