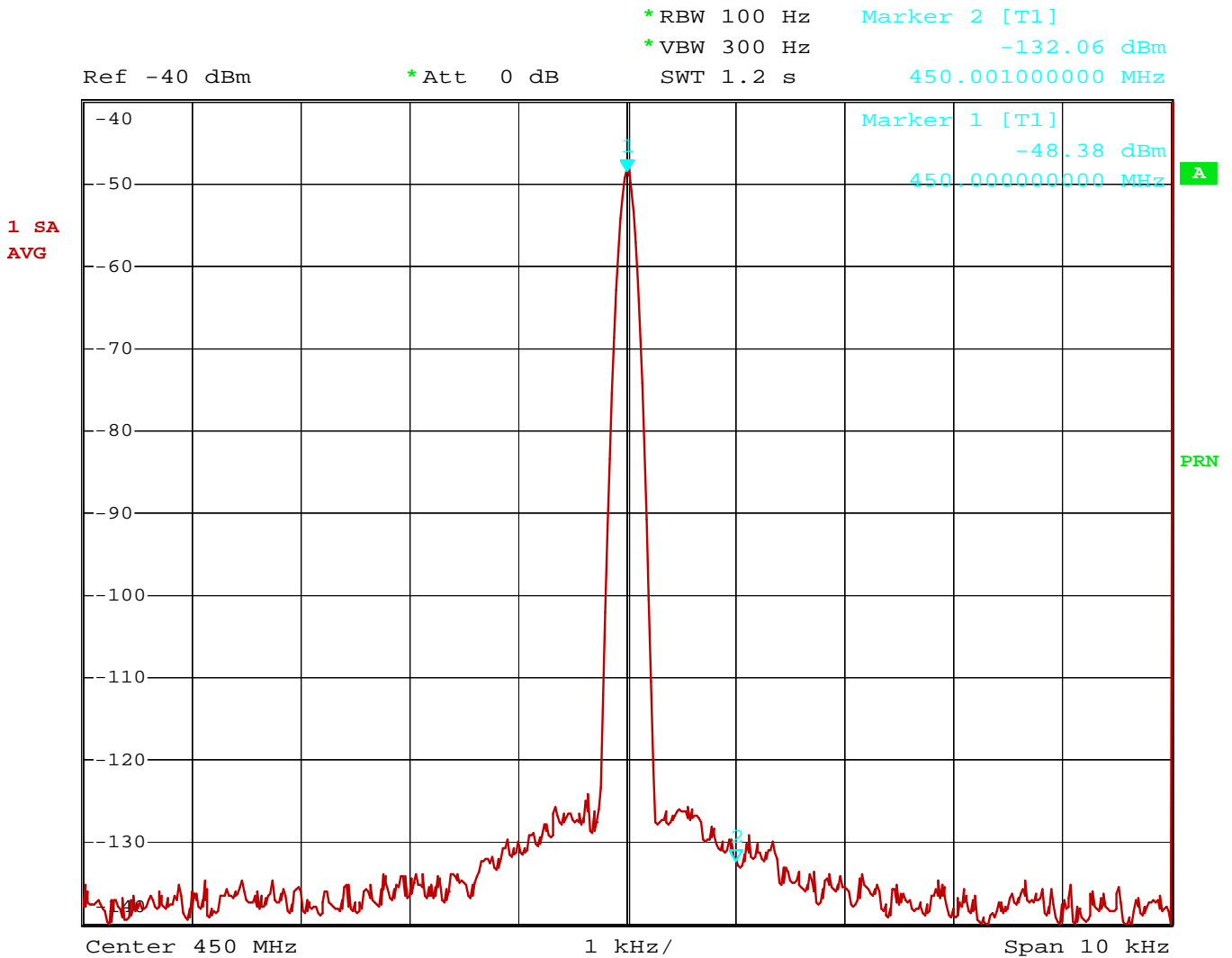


## How to measure Phase Noise with a Spectrum analyzer

The picture below is taken as an example for the phase noise measurement.



Ps (carrier level) : -48.4dBm  
 Pssb (Single Side band noise level @ offset) : -132dBm

Pssb has to be converted to a noise value in 1Hz bandwidth:

$$L(\text{Noise}/1\text{Hz}/\text{SSB}) = Pssb - 10\log(\text{RWB}) + C$$

RBW : Resolution bandwidth of the spectrum analyzer  
 C : constant value, depends on the detector. Practical value is 2.5dB

$$L(\text{Noise}/1\text{Hz}/\text{SSB}) = -132\text{dB} - 10\log(100) + 2.5\text{dB} = -149.5\text{dBm}$$

$$\begin{aligned} \text{PN}(1\text{kHz offset}) &= L(\text{Noise}/1\text{Hz}/\text{SSB}) - P_s \\ &= -149.5\text{dBm} - (-48.4\text{dBm}) \\ &= -101.1\text{dBc/Hz} \end{aligned}$$