

dBm conversion....

This simple but useful sheet converts dBm to uV, dBuV and Vpp.

The dBuVemf is a parameter often used in approval specs and corresponds to the voltage from the signal generator under high output impedance conditions.

Chris Haji-Michael

<http://www.sunshadow.co.uk/chris.htm>

$\mu\text{V} := 10^{-6} \cdot \text{volt}$ Load := 50.ohm Source := 50.ohm

$$\text{Pin}_{\text{dBW}}(\text{Pin}_{\text{dBm}}) := \text{Pin}_{\text{dBm}} - 30$$

$$\text{Pin}_{\text{W}}(\text{Pin}_{\text{dBm}}) := 10^{\left(\frac{\text{Pin}_{\text{dBW}}(\text{Pin}_{\text{dBm}})}{10}\right)} \cdot \text{watt}$$

$$\text{V}_{\text{rms}}(\text{Pin}_{\text{dBm}}) := \sqrt[2]{\text{Pin}_{\text{W}}(\text{Pin}_{\text{dBm}}) \cdot \text{Load}}$$

$$\text{V}_{\text{pp}}(\text{Pin}_{\text{dBm}}) := 2 \cdot \sqrt{2} \text{V}_{\text{rms}}(\text{Pin}_{\text{dBm}})$$

$$\text{dBuV}(\text{Pin}_{\text{dBm}}) := 20 \cdot \log\left(\frac{\text{V}_{\text{rms}}(\text{Pin}_{\text{dBm}})}{1 \cdot \mu\text{V}}\right)$$

$$\text{dBuVemf}(\text{Pin}_{\text{dBm}}) := \text{dBuV}(\text{Pin}_{\text{dBm}}) + 20 \log\left(\frac{\text{Load} + \text{Source}}{\text{Load}}\right)$$

Pin_dBm := -110, -106.. -90

Pin_dBm =	V_rms (Pin_dBm) =	dBuV (Pin_dBm) =	dBuVemf (Pin_dBm) =
-110	0.707 μV	-3.010	3.010
-106	1.121	0.990	7.010
-102	1.776	4.990	11.010
-98	2.815	8.990	15.010
-94	4.462	12.990	19.010
-90	7.071	16.990	23.010

Pin_dBm := -4, -2.. 10

Pin_dBm =	V_pp (Pin_dBm) =
-4	399.052463 mV
-2	502.377286
0	632.455532
2	796.214341
4	1002.374467
6	1261.914689
8	1588.656469
10	2000.000000