dBW & dB Levels made easy.

By G8MNY (Updated Jun 16)

Deci Bells "dB" & not "db" (Dolby audio system logo) are a 1/10 Mr Bell's unit, which are on a logarithmic scale are used when large ranges are used or many gain/loss terms have to be considerd. As these are logs the dB can just be added rather than using gain factors or loss fractions that have to be multiplied together.

dBW

The Formulae for POWER is 10log POut/1Watt, which gives this easy to remember 1dB step table based only on +/- 3, 6 & 10dB. Where Log = log base 10, not E or Natural Logs.

Note, dBW has "0" referenced to 1 Watt.
And dBm has "0" referenced to 1 mW, so 30dBm = 0dBW
So 1uW = -30dBm or -60dBW

+3dB is doubling the power, -3dB is only a half.
+6dB is quadrupling power, -6dB is only a quarter.
+10dB is 10 times the power, -10dB is only a tenth.

mW	dBW	Watts	dBW	Watts	dBW	Watts	dBW	Watts	dBW
10	-20	0.1	-10	1	0	10	10	100	20
12.5	-19	0.125	-9	1.25	1	12.5	11	125	21
15.65	-18	0.1565	-8	1.565	2	15.65	12	156.5	22
20	-17	0.2	-7	2	3	20	13	200	23
25	-16	0.25	-6	2.5	4	25	14	250	24
31.25	-15	0.3125	-5	3.125	5	31.25	15	312.5	25
40	-14	0.4	-4	4	6	40	16	400	26
50	-13	0.5	-3	5	7	50	17	500	27
62.5	-12	0.625	-2	6.25	8	62.5	18	625	28
80	-11	0.8	-1	8	9	80	19	800	29

dB

For Voltage & Currents the formulae is 20log out/in, which gives this easy to remember 2dB step table based only on +/- 6, 12 & 20dB. Where Log = log base 10 not E or Natural Logs.

+6dB is doubling "the level", -6dB is only a half.
+12dB is quadrupling "level", -12dB is only a quarter.
+20dB is 10 times "the level", -20dB is only a tenth.
(Level is Current or Voltage NOT POWER)
Note +1dB is about +11% (111%), & -1dB is about -9% (91%) of "the level".

Ratio	dB	Ratio	dB	Ratio	dB	Ratio	dB	Ratio	dB
0.01	-40	0.1	-20	1	0	10	+20	100	+40
0.0125	-38	0.125	-18	1.25	+2	12.5	+22	125	+42
0.01565	-36	0.1565	-16	1.565	+4	15.65	+24	156.5	+44
0.02	-34	0.2	-14	2	+6	20	+26	200	+46
0.025	-32	0.25	-12	2.5	+8	25	+28	250	+48
0.03125	-20	0.3125	-10	3.125	+10	31.25	+30	312.5	+50
0.04	-28	0.4	-8	4	+12	40	+32	400	+52
0.05	-26	0.5	-6	5	+14	50	+34	500	+54
0.0625	-24	0.625	-4	6.25	+16	62.5	+36	625	+56
0.08	-22	0.8	-2	8	+18	80	+38	800	+58

There are other dB standards in use not always measuring the same item!
e.g.

dB SINAD is a ratio of signal in noise & distortion.
dBm used much for 600Û AF where 1mW = 0.774V RMS which ¸ 2V peak to peak.
dBV where the "0" = 1V RMS about 2.5dB bigger than dBm in 600Û
dBuV where the "0" = 1uV of signal. e.g. 12dB sinad @ -6dBuV in 75 or 50Û!
dBvu as displayed on a Voltage Unit meter. 0dBvu=100% level etc.
dBc where the "0" = full carrier power. e.g. spurious = -60dBc.
Not to be confused with the sound dB"C" weighting standard.

In 50 Ohms this is usefull..

Peak Volts	PEP Watts	Peak Volts	PEP Watts
2.8	0.08	28	8
3.3	0.1	33	10
4	0.16	40	16
5	0.25	50	25
5.6	0.32	56	32
7	0.5	71	50
8	0.64	80	64
10	1	100	100
14	2	141	200
16	2.5	160	250
20	4	200	400

See my Buls "QRO 1kW HF Metered Dummy Load" & "QRP Power Meter & Dummy Load"

Why Don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP