

# TYPICAL CONVERSION FORMULAS

Collection of frequently used formulas for RF, Microwaves, Power, Voltage, Current and more

## FIELD STRENGTH & POWER DENSITY

dBμV/m to V/m	$V/m = 10^{((dB\mu V/m) - 120) / 20}$
V/m to dBμV/m	$dB\mu V/m = 20 \log(V/m) + 120$
dBμV/m to dBmW/m <sup>2</sup>	$dBmW/m^2 = dB\mu V/m - 115.8$
dBmW/m <sup>2</sup> to dBμV/m	$dB\mu V/m = dBmW/m^2 + 115.8$
dBμV/m to dBμA/m	$dB\mu A/m = dB\mu V/m - 51.5$
dBμA/m to dBμV/m	$dB\mu V/m = dB\mu A + 51.5$
dBμA/m to dBpT	$dBpT = dB\mu A/m + 2$
dBpT to dBμA/m	$dB\mu A/m = dBpT - 2$
W/m <sup>2</sup> to V/m	$V/m = \text{SQRT}(W/m^2 * 377)$
V/m to W/m <sup>2</sup>	$W/m^2 = (V/m)^2 / 377$
μT to A/m	$A/m = \mu T / 1.25$
A/m to μT	$\mu T = 1.25 * A/m$

## LOOP ANTENNAS (AARONIA MDF ANTENNAS)

Correction Factors	$dB\mu A/m = dB\mu V + AF$
E-field (take care about E-field suppression!)	$dB\mu V/m = dB\mu A/m + 51.5$

## FREQUENCY / BANDS WAVELENGTH

3Hz - 30Hz (ELF)	100000km - 10000km
30Hz - 300Hz (SLF)	10000km - 1000km
300Hz - 3kHz (ULF)	1000km - 100km
3kHz - 30kHz (VLF)	100km - 10km
30kHz - 300kHz (LF)	10km - 1km
300kHz - 3MHz (MF)	1km - 100m
3MHz - 30MHz (HF)	100m - 10m
30MHz - 300MHz (VHF)	10m - 1m
300MHz - 3GHz (UHF)	1m - 10cm
3GHz - 30GHz (SHF)	10cm - 1cm
30GHz - 300GHz (EHF)	1cm - 1mm

## POWER

dBm to Watts	$W = 10^{((dBm - 30)/10)}$
Watts to dBm	$dBm = 10\log(W) + 30$
dBW to Watts	$W = 10^{(dBW / 10)}$
Watts to dBW	$dBW = 10\log(W)$
dBW to dBm	$dBm = dBW + 30$
dBm to dBW	$dBW = dBm - 30$

## CURRENT

dBμA to μA	$\mu A = 10^{(dB\mu A / 20)}$
μA to dBμA	$dB\mu A = 20 \log(\mu A)$
dBA to A	$A = 10^{(dBA / 20)}$
A to dBA	$dBA = 20\log(A)$
dBA to dBμA	$dB\mu A = dBA + 120$
dBμA to dBA	$dBA = dB\mu A - 120$

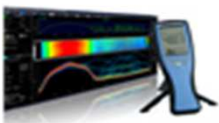
## VOLTAGE

dBμV to Volts	$V = 10^{((dB\mu V - 120) / 20)}$
Volts to dBμV	$dB\mu V = 20 \log(V) + 120$
dBV to Volts	$V = 10^{(dBV / 20)}$
Volts to dBV	$dBV = 20\log(V)$
dBV to dBμV	$dB\mu V = dBV + 120$
dBμV to dBV	$dBV = dB\mu V - 120$

## UNIT CONVERSIONS

dBm to dBμV	$dB\mu V = dBm + 107$	(50Ω)
dBμV to dBm	$dBm = dB\mu V - 107$	(50Ω)
dBm to dBμA	$dB\mu A = dBm + 73$	(50Ω)
dBμA to dBm	$dBm = dB\mu A - 73$	(50Ω)
dBμA to dBμV	$dB\mu V = dB\mu A + 34$	(50Ω)
dBμV to dBμA	$dB\mu A = dB\mu V - 34$	(50Ω)

### RF Analyzers



-170dBm (Hz)

### USB Spectrum Analyzers



1Hz - 20 GHz

### LPD-Antennas



380MHz - 35GHz

### EMC-Antennas



20MHz - 3GHz