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Converting dBm to dBuV in a 50 Ohm System

PDF

Value in dBm + 107dB = Value in dBuV

Equations and Sample Calculations:

Convert power in dBm (PdBm) to power in milliwatts (PmW) via the equation:

- PdBm = 10 ^ (PmW / 10)
- e.g. for PdBm = -20dBm, then PmW = 10 ^ (-20/10) = 0.01mW

Convert power in milliwatts (PmW) to power in watts (PW) via the equation:

- PW = PmW / 1000
- e.g. for PmW = 0.01mW, then PW = 0.01/1000 = 0.00001

Convert power in watts to voltage RMS (VRms) via the equation:

- VRms = Square Root (Power Watts * System Zo) where System Zo = 50 Ohms
- e.g. for PW = 0.00001W, then VRms = Square Root (0.00001 * 50) = 0.02236

Convert VRms to Power in dBuV (PdBuV) via the equation:

- PdBuV = 20 * Log (VRms / 1uV)
- e.g. for VRms = 0.02236, then PdBuV = 20 * Log (0.02236 / 1E-6) = 86.99dBuV

Therefore, in a 50 Ohm System, -20dBm = 86.99 dBuV, or equivalently PdBuV = PdBm + 107

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