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RF Power Conversion Calculator

A tool designed to convert RF power from watts to decibels and vice versa

Input Note: Assumes 50 Ohm system. Input voltages are RMS values. **Select input type:** Watts (W) **Select Output type** Volts (V) Calculate Output **Converted Power** V_{rms} 27.39 V_{pp} 77.46

Overview

RF power can be presented in terms of watts or in terms of decibels. The decibel unit was invented because the human ear perceives sound intensity logarithmically. It is also much easier to calculate total gains or losses if the decibel unit is used. The watt is a much more convenient unit used by engineers when it is needed to know how much power an equipment is emitting or receiving.

This calculator is designed to convert RF power in watts to decibels and vice versa. To use this calculator, select the preferred units for the input and output power and press the calculate button.

Equations

 $P_{dBm} = 10log_{10}P_{mW}$ $P_{dBW} = 10log_{10}P_W$ $P_{mW}=10^{rac{P_{dB_m}}{10}}$ $P_W=10^{rac{P_{dBW}}{10}}$ $P_{dbW} = P_{dBm} - 30$ Where: P_{dBm} = power in decibel-milliwatts P_{dBW} = power in decibel-watts P_{mW} = power in milliwatts P_{mW} = power in watts

Applications

The terms watts and decibels are very common in RF technology. One particular example where these units are used extensively is in the calculation of link budget. A link budget accounts all the gains and losses an RF signal encounters from the transmitter to the receiver. The things that are included in a link budget are the gain of the transmitter antenna, the losses through the mediums (from cable to air) and the gain of the receiver. The gains and losses are often presented in decibels because the link budget calculations will be reduced to simple addition. Of course, the purpose of the link budget is to determine how much power reaches the receiver. This received power is usually converted back to watts for convenience.

Further Reading

Textbook - Decibels

Video Lectures - Decibels: Amplifier Basics Worksheet - Decibel Measurements

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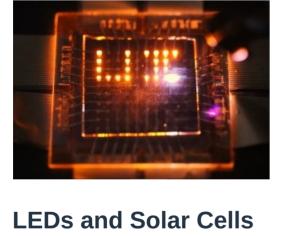
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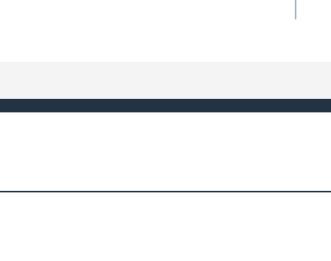


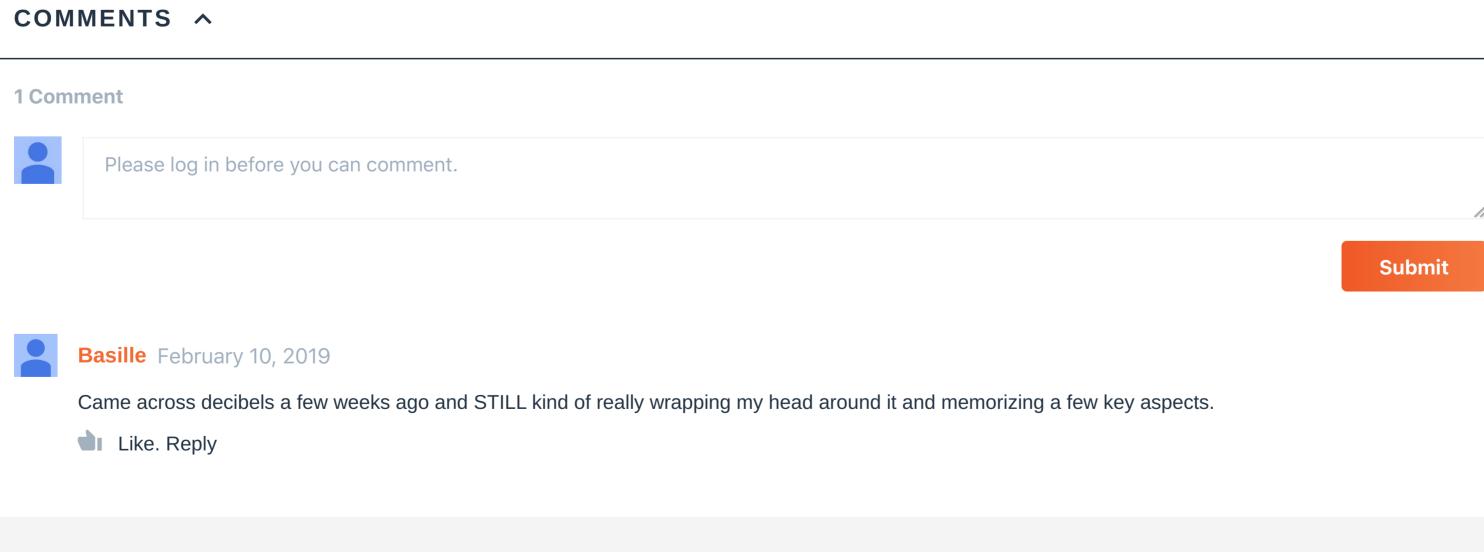
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