

Why is the dB value of the optical power meter negative



Overview

When there's loss in a fiber optic system, the measured power is less than the reference power, resulting in a negative logarithmic value and a negative dB reading on the meter. Despite the meter displaying a negative number, convention dictates referring to the loss as a positive. Fiber Optic Measurement Units: "dB" and "dBm"

Whenever tests are performed on fiber optic networks, the results are displayed on a power meter, OLTS or OTDR readout in units of "dB." Optical loss is measured in "dB" which is a relative measurement, while absolute optical power is measured in "dBm,". dB is a relative unit of measurement used to express the ratio between two values, typically power or intensity. For example, you might use dB to express the amount of signal loss over a certain length of. If the optical power injected was -20 dBm and the power received at the other end -21 dBm, then the optical loss of the link would be $-20 - (-21) = 1$ dB. Every time you double (or halve) the power level, you add (or subtract) 3 dB to the power level. For. The dB values can be positive or negative; they are positive when and negative when. Since dB is a ratio, it does not provide an absolute value of power.

Article Content

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How to Measure Fiber Loss with Optical Power Meter

In optical fiber networks, the units of optical power are often expressed in milliwatts (mw) and decibel milliwatts (dbm). The relationship is: $1\text{mw}=0\text{dbm}$,

Apr 02, 2026

The Difference Between dB and dBm in Fiber Optics

The difference between the transmitter power (dBm) and receiver power (dBm) in fiber optic cables gives the optical power loss, which is expressed in dB. Even though the loss is negative, we express

Jan 28, 2026

testing fiber optic power measurement

Whenever tests are performed on fiber optic networks, the results are displayed on the meter readout in dB. Optical loss is measured in dB while optical power is measured in dBm. Loss is displayed as a

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Understanding dB and dBm in Fiber Optic Communications

It is calculated using the formula: Notably, $0\text{ dBm} = 1\text{ mW}$, which means positive dBm values represent power levels greater than 1 mW, while

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How to read optical power meter?

How to Interpret an Optical Power Meter? The one thing most important thing to understand with optical power meter is knowing how to read the numbers on it. Negative

Nov 06, 2025

Fiber Optic Series: Understanding dB and dBm values

When there's loss in a fiber optic system, the measured power is less than the reference power, resulting in a negative logarithmic value

Sep 03, 2025

Optical and FTTH Measurement FUNdamentals!

An OSA performs measurements of wavelengths (channels), optical signal power distribution, WDM and noise power characteristics of light waves. In addition, an

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Measurement Units

The optical power meter usually reads in dBm for power measurements or dB with respect to a user-set reference value for loss. While most power meters have

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The Mysterious dB of Fiber Optics

The optical power meter usually reads in dBm for power measurements or dB with respect to a user-set reference value for loss. While most power meters have ranges of +3 to -50 dBm, most sources are

Jun 20, 2026

dB vs dBm

Small signals are negative. For example, typical LED power sources have an output power of -20 dBm where as Laser and VCSEL sources for fiber optic testing have an output power of -10 dBm.

Jul 17, 2025

dB vs dBm Explained for Fiber Optic Testing

This blog will break down the differences between dB and dBm, explaining what they mean, how they are used, and why they are critical for

Mar 30, 2026

The FOA Reference For Fiber Optics

The FOA has an explanation of dB on our online Guide and a couple of graphics that illustrate what happens with loss. More Power Meter Math An industry contact

Jan 02, 2026

Optical Power Meters: Understand Their Uses and Internals

Optical power meters are indispensable instruments for testing and maintaining modern fiber optic communication and other

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The FOA Reference For Fiber Optics

If we have loss in a fiber optic system, the measured power is less than the reference power, so the ratio of measured power to reference power is less than 1 and the

Oct 02, 2025

Understanding dBm vs mW in Fiber Optic Testing: A Complete Guide

In most fiber networks, the light signal is very weak — often weaker than a small flashlight. When this happens, the power meter shows a negative number in dBm. The signal has

Apr 16, 2026

The FOA Reference For Fiber Optics

The optical power meter usually reads in dBm for power measurements or dB with respect to a user-set reference value for loss. While most power meters have

Dec 01, 2025

Practical tips for testing fiber optic power measurement

Calculating loss The basic formula used to calculate dB is: $dB = 10 \log (\text{measured power} / \text{reference power})$. Whenever tests are performed on fiber optic networks, the results are displayed

Aug 25, 2025

Fiber Optic Testing FAQs

More on power measurements. What are the measurement units for power? Optical power is measured in linear units of milliwatts (mW), microwatts (uW - really the greek letter "mu"W), nanowatts (nW)

Nov 19, 2025

Fiber Optic Series: Understanding dB and dBm values

When conducting tests on fiber optic networks, the results are typically presented on a meter readout in dB. In this context, optical loss is quantified in dB, while optical

Oct 13, 2025

The FOA Reference For Fiber Optics

References: The method for calculation of attenuation in dB IEC uses in these fiber optic standards is definitely not how measurements are normally defined. In fact

Jun 06, 2026

Science News, Educational Articles, Expert Opinion

The Scientist offers independent, award-winning science journalism, covering the latest life science research, insights, and innovations.

Jun 05, 2026

Optical Power Meter

An optical power meter is defined as an instrument used to measure power or energy from narrow band sources, such as lasers, without a dispersing element and with broad band sensitivity. It

Nov 02, 2025

Optical power

The power output of a transmitter or the input to receiver are "absolute" optical power measurements, that is, you measure the actual value of the power. Loss is a "relative" power measurement, the

Jun 14, 2026

FOA Fiber U Quickstart Guide: Fiber Optic Testing

Fiber Optic Testing This is your "QuickStart" guide to testing optical power in fiber optic communications systems with a fiber optic power meter. We'll give you the

Sep 10, 2025

POF Measurement: Transmission Power

Based on these, positive dBm values indicate the measured power is greater than the reference value of 1 mW, while negative values are less than 1 mW. Further

Apr 05, 2026

Optical Power Meter Basics

An optical power meter measures the photon energy in the form of current or voltage from an optical detector such as a semiconductor, a thermopile, or a pyroelectric detector.

Oct 01, 2025

dB vs dBm Explained for Fiber Optic Testing

Confused about dB and dBm in fiber optic testing? Learn the key differences and how to use each to measure power and signal loss accurately.

Jun 13, 2026

Understanding dBm vs mW in Fiber Optic Testing: A Complete Guide

In fiber optic testing, you often see power levels given in dBm or mW. Understanding the difference between them is crucial. These two units measure optical power, but they operate differently.

Contact Us

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