



A RIPLEY® BRAND

# RP 460

How to Set a Reference  
and Perform an Insertion Loss Test



# Introduction

Performing a test for **Insertion Loss** (also commonly called **dB Loss** or **Attenuation**) on a fiber optic cable requires an Optical Power Meter (**OPM**) and an Optical Light Source (**OLS**). This document outlines the specific steps which must be taken with ODM's RP 460 optical power meter to perform insertion loss testing on a variety of fiber types and setups.

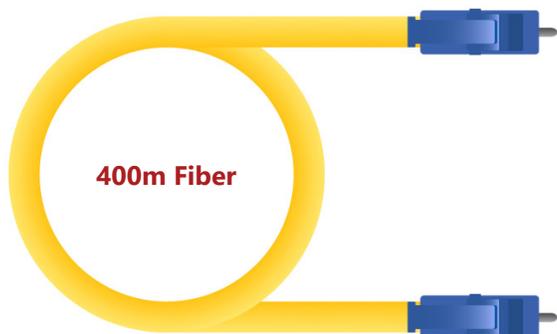
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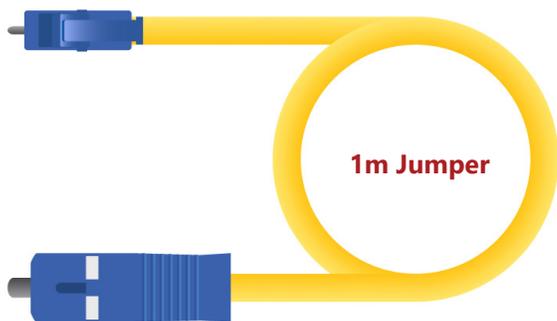
# Example 1: Singlemode Fiber, Point-to-Point, 1 Jumper

Fiber Type	Singlemode
Connectors Used	LC
Test Jumper Setup	Single
OPM Used	RP 460
OLS Used	DLS 355



## Fiber-Under-Test

The fiber-under-test is singlemode with LC connectors on each end. The fiber-under-test may be up to 250 kilometers long. In this example, the fiber-under-test is 400 meters long.



## Test Jumper

The test jumper is a one-meter singlemode fiber with SC and LC connectors. The SC connector will be plugged into the DLS 355 laser source and the LC connector will be used to interface with the fiber-under-test.



## Power Meter

The RP 460 power meter is set to the 1550nm wavelength. The 1310nm wavelength may also be used. Always match the wavelength on the RP 460 to the wavelength on the DLS 355. The adapter on the RP 460 is the AC 029 LC adapter.



## Light Source

The DLS 355 laser source is set to the 1550nm wavelength. The 1310nm wavelength may also be used. The adapter is the default AC 022B SC adapter.

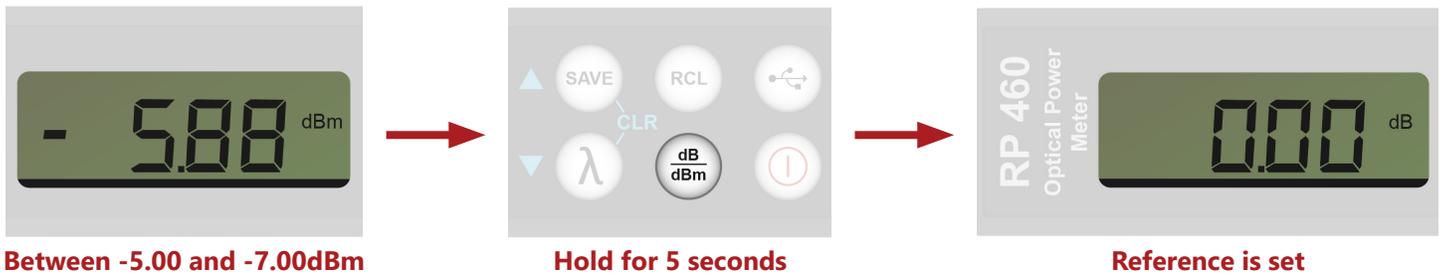
## Referencing Setup

The connectors on the Test Jumper should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the connectors on the Test Jumper into the RP 460 and DLS 355. The RP 460 should be in the dBm measurement mode. If it is not in the dBm mode, press the dB/dBm button once to put it into the dBm mode.



## Setting Reference

The DLS 355 output power is calibrated to -5dBm. If the RP 460 screen displays between -5.00dBm and -7.00dBm, press and HOLD the dB/dBm button for 5 seconds. After 5 seconds, release the dB/dBm button. The RP 460 screen will display 0.00dB, with some minor variation. DO NOT switch the RP 460 back to the dBm mode.



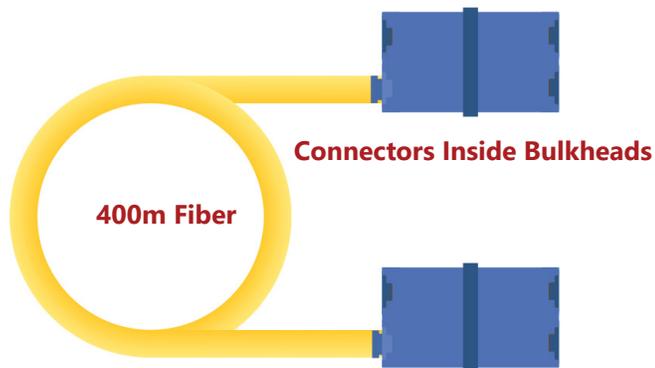
## Loss Test

The Test Jumper MUST remain attached to the DLS 355. Do not remove the Test Jumper from the optical link. The connectors on the Test Jumper and the Fiber-Under-Test should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the Test Jumper into one end of the Fiber-Under-Test using a bulkhead adapter as shown. Plug the other end of the Fiber-Under-Test into the LC adapter on the RP 460. The Insertion Loss of the Fiber-Under-Test will be shown on the RP 460 screen.



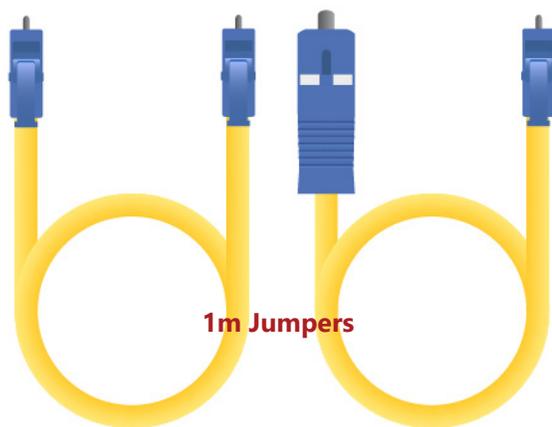
## Example 2: Singlemode Fiber, Point-to-Point, 2 Jumpers

Fiber Type	Singlemode
Connectors Used	LC
Test Jumper Setup	Double
OPM Used	RP 460
OLS Used	DLS 355



### Fiber-Under-Test

The fiber-under-test is singlemode with LC connectors on each end. This method allows testing of connectors inside bulkheads. One or both ends of this fiber-under-test may be inside bulkheads. The fiber-under-test may be up to 250 kilometers long. In this example, the fiber-under-test is 400 meters long.



### Test Jumpers

The test jumpers are both one-meter singlemode fiber. One has one SC and one LC connector, and the other has two LC connectors.



### Power Meter

The RP 460 power meter is set to the 1550nm wavelength. The 1310nm wavelength may also be used. Always match the wavelength on the RP 460 to the wavelength on the DLS 355. The adapter on the RP 460 is the AC 029 LC adapter.



### Light Source

The DLS 355 laser source is set to the 1550nm wavelength. The 1310nm wavelength may also be used. The adapter is the default AC 022B SC adapter.

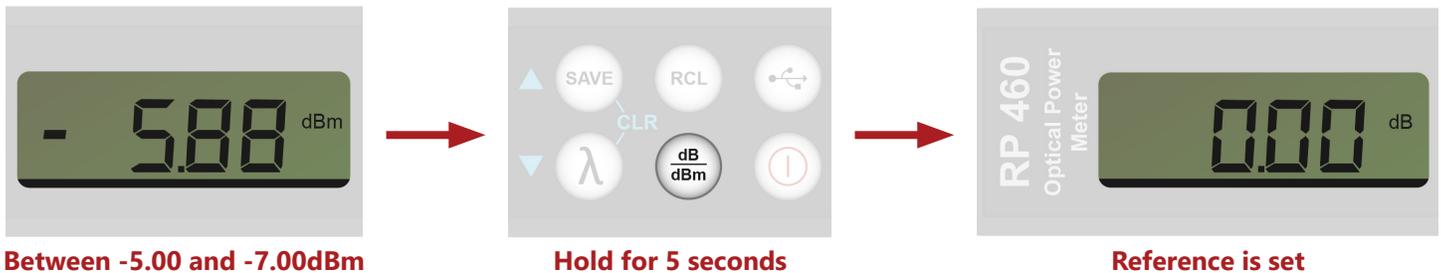
## Referencing Setup

The connectors on the Test Jumper should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the connectors on the Test Jumper into the RP 460 and DLS 355. The RP 460 should be in the dBm measurement mode. If it is not in the dBm mode, press the dB/dBm button once to put it into the dBm mode.



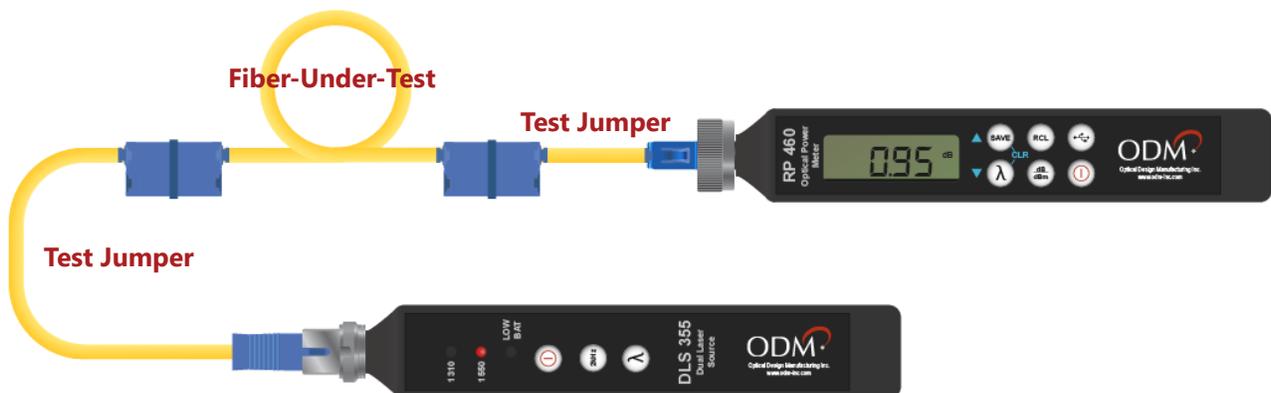
## Setting Reference

The DLS 355 output power is calibrated to -5dBm. If the RP 460 screen displays between -5.00dBm and -7.00dBm, press and HOLD the dB/dBm button for 5 seconds. After 5 seconds, release the dB/dBm button. The RP 460 screen will display 0.00dB, with some minor variation. DO NOT switch the RP 460 back to the dBm mode.



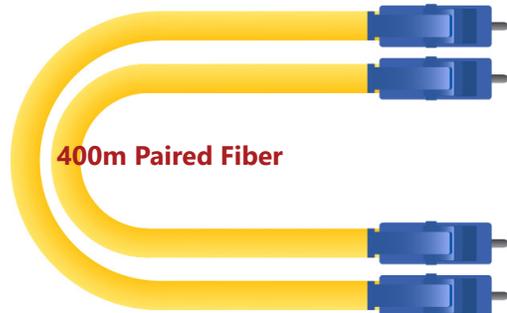
## Loss Test

The Test Jumpers MUST remain attached to the DLS 355 and RP 460. Do not remove the Test Jumpers from the optical link. The connectors on the Test Jumpers and the Fiber-Under-Test should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the Test Jumpers into each end of the Fiber-Under-Test using the bulkheads as shown. The Insertion Loss of the Fiber-Under-Test will be shown on the RP 460 screen.



# Example 3: Singlemode Fiber, Paired, Loopback Jumper

Fiber Type	Singlemode
Connectors Used	LC
Test Jumper Setup	Loopback
OPM Used	RP 460
OLS Used	DLS 355



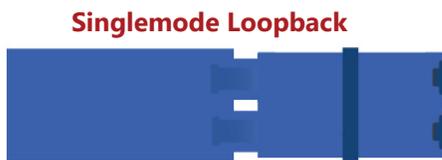
### Fiber-Under-Test

The fiber-under-test is paired singlemode with paired LC connectors on each end. The fiber-under-test may be up to 250 kilometers long. In this example, the fiber-under-test is 400 meters long.



### Test Jumper

The test jumper is paired for loopback testing. One end has an SC connector and an LC connector, and the other end has two LC connectors clipped together. This method also uses a singlemode loopback adapter. It should be blue and have a duplex bulkhead on the end.



### Power Meter

The RP 460 power meter is set to the 1550nm wavelength. The 1310nm wavelength may also be used. Always match the wavelength on the RP 460 to the wavelength on the DLS 355. The adapter on the RP 460 is the AC 029 LC adapter.



### Light Source

The DLS 355 laser source is set to the 1550nm wavelength. The 1310nm wavelength may also be used. The adapter is the default AC 022B SC adapter.

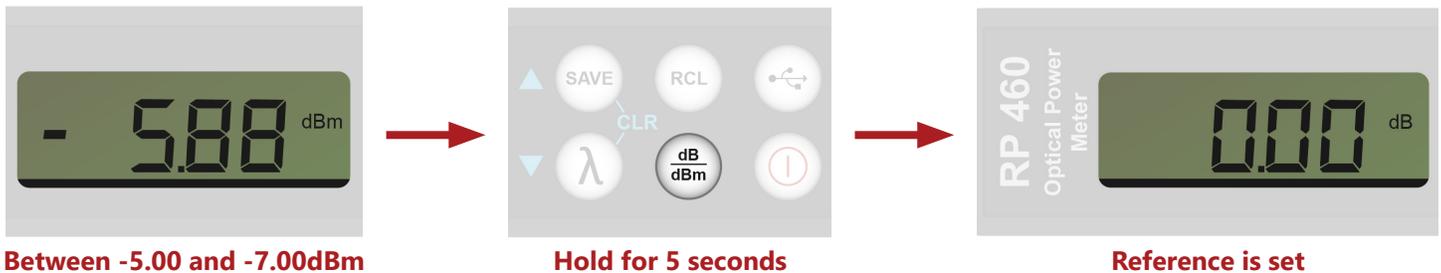
## Referencing Setup

The connectors on the Test Jumper and loopback should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the connectors on the Test Jumper into the RP 460 and DLS 355. Plug the loopback adapter on to the paired LC side of the Test Jumper. The RP 460 should be in the dBm measurement mode. If it is not in the dBm mode, press the dB/dBm button once to put it into the dBm mode.



## Setting Reference

The DLS 355 output power is calibrated to -5dBm. If the RP 460 screen displays between -5.00dBm and -7.00dBm, press and HOLD the dB/dBm button for 5 seconds. After 5 seconds, release the dB/dBm button. The RP 460 screen will display 0.00dB, with some minor variation. DO NOT switch the RP 460 back to the dBm mode.



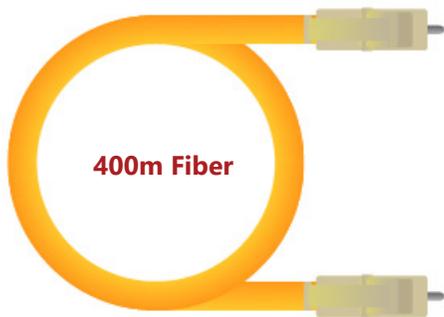
## Loss Test

The paired Test Jumper MUST remain attached to the DLS 355 and RP 460. Do not remove the Test Jumper from the optical link. The connectors on the Test Jumper and the Fiber-Under-Test should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the clipped LC end of the Test Jumper into one end of the Fiber-Under-Test using the bulkhead as shown. Plug the loopback on to the other end of the Fiber-Under-Test. The Insertion Loss of the Fiber-Under-Test will be shown on the RP 460 screen.



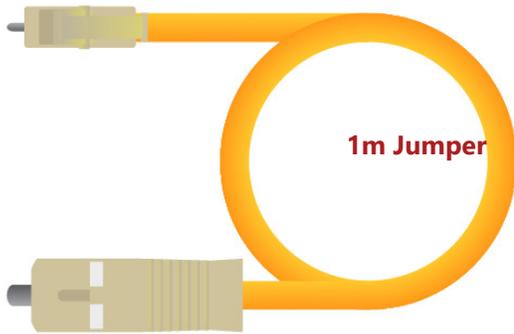
## Example 4: Multimode Fiber, Point-to-Point, 1 Jumper

Fiber Type	Multimode
Connectors Used	LC
Test Jumper Setup	Single
OPM Used	RP 460
OLS Used	DLS 350



### Fiber-Under-Test

The fiber-under-test is multimode with LC connectors on each end. In this example, the fiber-under-test is 400 meters long.



### Test Jumper

The test jumper is a one-meter multimode fiber with SC and LC connectors. The SC connector will be plugged into the DLS 350 LED source and the LC connector will be used to interface with the fiber-under-test.



### Power Meter

The RP 460 power meter is set to the 850nm wavelength. The 1300nm wavelength may also be used. Always match the wavelength on the RP 460 to the wavelength on the DLS 350. The adapter on the RP 460 is the AC 029 LC adapter.



### Light Source

The DLS 350 LED source is set to the 850nm wavelength. The 1300nm wavelength may also be used. The adapter is the default AC 022B SC adapter.

## Referencing Setup

The connectors on the Test Jumper should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the connectors on the Test Jumper into the RP 460 and DLS 350. The RP 460 should be in the dBm measurement mode. If it is not in the dBm mode, press the dB/dBm button once to put it into the dBm mode.



## Setting Reference

The DLS 350 output power is calibrated to -22dBm. If the RP 460 screen displays between -22.00dBm and -25.00dBm, press and HOLD the dB/dBm button for 5 seconds. After 5 seconds, release the dB/dBm button. The RP 460 screen will display 0.00dB, with some minor variation. DO NOT switch the RP 460 back to the dBm mode.



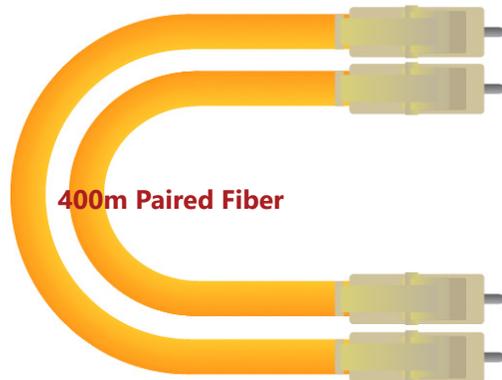
## Loss Test

The Test Jumper MUST remain attached to the DLS 350. Do not remove the Test Jumper from the optical link. The connectors on the Test Jumper and the Fiber-Under-Test should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the Test Jumper into one end of the Fiber-Under-Test using a bulkhead adapter as shown. Plug the other end of the Fiber-Under-Test into the LC adapter on the RP 460. The Insertion Loss of the Fiber-Under-Test will be shown on the RP 460 screen.



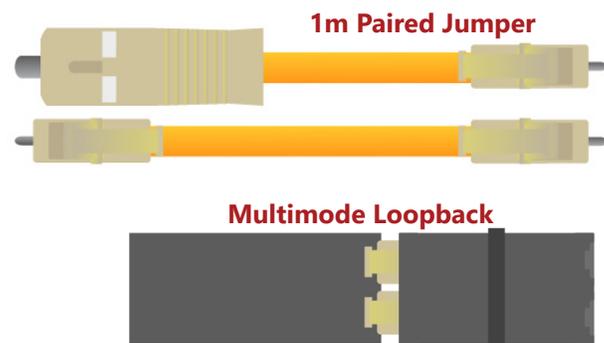
## Example 5: Multimode Fiber, Paired, Loopback Jumper

Fiber Type	Multimode
Connectors Used	LC
Test Jumper Setup	Loopback
OPM Used	RP 460
OLS Used	DLS 350



### Fiber-Under-Test

The fiber-under-test is paired multimode with paired LC connectors on each end. The fiber-under-test may be up to 250 kilometers long. In this example, the fiber-under-test is 400 meters long.



### Test Jumper

The test jumper is paired for loopback testing. One end has an SC connector and an LC connector, and the other end has two LC connectors clipped together. This method also uses a multimode loopback adapter. It should be black and have a duplex bulkhead on the end.



### Power Meter

The RP 460 power meter is set to the 850nm wavelength. The 1300nm wavelength may also be used. Always match the wavelength on the RP 460 to the wavelength on the DLS 350. The adapter on the RP 460 is the AC 029 LC adapter.



### Light Source

The DLS 350 LED source is set to the 850nm wavelength. The 1300nm wavelength may also be used. The adapter is the default AC 022B SC adapter.

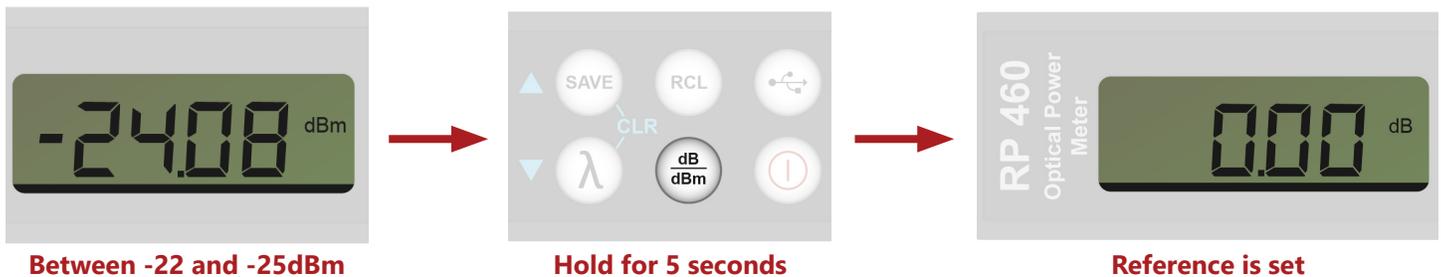
## Referencing Setup

The connectors on the Test Jumper and loopback should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the connectors on the Test Jumper into the RP 460 and DLS 350. Plug the loopback adapter on to the paired LC side of the Test Jumper. The RP 460 should be in the dBm measurement mode. If it is not in the dBm mode, press the dB/dBm button once to put it into the dBm mode.



## Setting Reference

The DLS 350 output power is calibrated to -22dBm. If the RP 460 screen displays between -22.00dBm and -25.00dBm, press and HOLD the dB/dBm button for 5 seconds. After 5 seconds, release the dB/dBm button. The RP 460 screen will display 0.00dB, with some minor variation. DO NOT switch the RP 460 back to the dBm mode.



## Loss Test

The paired Test Jumper MUST remain attached to the DLS 350 and RP 460. Do not remove the Test Jumper from the optical link. The connectors on the Test Jumper and the Fiber-Under-Test should be cleaned to appropriate standards. Use an inspection scope to verify fiber cleanliness. Plug the clipped LC end of the Test Jumper into one end of the Fiber-Under-Test using the bulkhead as shown. Plug the loopback on to the other end of the Fiber-Under-Test. The Insertion Loss of the Fiber-Under-Test will be shown on the RP 460 screen.

