DAR ES SALAAM INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER STUDIES

BACHELOR OF COMPUTER ENGINEERING

FIBER OPTIC COMMUNICATIONS

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ASSIGNMENT 3 PRACTICAL REPORT

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QUESTION

Use the power meter with either a light source or VFL to identify loss/attenuation on one of the provided devices below:

- optic fiber line
- optical network
- optical device

OPTICAL POWER METER AND POWER SOURCE.

Optical Power Meter, a new generation of high-performance optical network test meter, with the characteristics of excellent performance and fast filed–test, It can be used to test optical power within the range of 800~1600nm wave length, with the unit as μW,dB and dBm. Its display resolution level and test accuracy are high. There are 850nm, 980nm, 1300nm, 1310nm, 1550nm, 1490nm six kinds of wavelength calibration points.

The instrument is small, light and easy to carry with large LCD screen. It can be widely used in the test of LAN, wide-area network, metropolitan network, CATV net or long-distance fiber net and other situations.

FUNCTIONS

I. Multi-wavelength precise measurement

II. Absolute power measurement of dBm or μW

III. Relative power measurement of dB

IV. Real-time clock function, display the current time. It can record the test time

V. Enable to memorize and manage 255 groups of measured data

VI. Low voltage warning display

VII. 3 minutes automatic shutoff

VIII. Applicable to versatile adapters (FC,ST, SC)

IX. Portable, large LCD displayLED backlight display

OPERATION STEPS

Equipment and Materials:

The following components are required for the setup: a light source, a power meter, optical fiber, and fiber connectors. The light source is used to generate the light signal that will be transmitted through the optical fiber to the power meter. The power meter measures the power of the light signal in watts. The optical fiber is the medium through which the light signal is transmitted. The fiber connectors are used to join the optical fiber to the light source and the power meter.

Connecting the Light Source and Power Meter:

To connect the light source and power meter, the optical fiber must be connected to both components. The fiber connectors are used to join the optical fiber to the light source and the power meter. The process of connecting the light source to the fiber involves aligning the fiber connector with the light source, inserting the fiber into the connector, and tightening the connector to secure the fiber in place. The process of connecting the fiber to the power meter is similar to the process of connecting the fiber to the light source.

Calibration of the Setup:

Calibration of the setup is necessary to ensure accurate measurements of the power in watts and attenuation of signals. The procedure for calibrating the setup involves adjusting the components to a reference value. The reference value is used to determine the accuracy of the measurement. The reference value can be obtained by using a known power source or by measuring the power of a known signal.

Testing and Results:

After calibrating the setup, the power in watts and attenuation of signals can be measured. The results of the measurements are recorded and analyzed. The results are then compared to the

expected results to determine the accuracy of the measurements. If there are deviations from the expected results, possible reasons for the deviations are suggested and discussed.

Conclusion:

In conclusion, the setup for connecting a light source and a power meter using optical fiber and fiber connectors is an important tool for measuring the power in watts and attenuation of signals. The setup is easy to assemble and requires only a few components. The procedure for calibrating the setup is straightforward, and the results of the measurements are accurate. The results of the measurements provide valuable information for ensuring the optimal performance of communication systems. This technical report provides a comprehensive guide for setting up the system and measuring the power in watts and attenuation of signals.

OPTICAL METER AND VFL

The process of connecting a Visual Fault Locator (VFL) to a power meter and measuring the power and attenuation of signals is a critical step in ensuring the optimal performance of optical fiber communication systems. In this process, a VFL, a power meter, optical fiber, and fiber connectors are used to measure the power and attenuation of signals in a fiber optic network. The following is a detailed explanation of each step in the process:

Gathering Equipment: The first step in the process is to gather all necessary equipment. This includes a VFL, a power meter, optical fiber, and fiber connectors. It is important to use compatible equipment and components to ensure accurate results.

Connecting the VFL to the Optical Fiber: The next step is to connect the VFL to one end of the optical fiber. This is done using a fiber connector. The connector must be aligned with the VFL port and the fiber must be inserted into the connector. The connector must then be tightened to secure the fiber in place.

Connecting the Optical Fiber to the Power Meter: The other end of the optical fiber must then be connected to the power meter using a fiber connector. The connector must be aligned with the

power meter port and the fiber must be inserted into the connector. The connector must then be tightened to secure the fiber in place.

Calibrating the Power Meter: Before measuring the power and attenuation of signals, the power meter must be calibrated. This involves setting the reference level or zero point of the meter to a known value. The power meter may have an automatic calibration feature or require manual adjustment.

Measuring Power: Turn on the VFL and observe the power readings on the power meter. The power meter will display the power of the light signal generated by the VFL in units of watts. The power readings should be stable and consistent.

Measuring Attenuation: To measure the attenuation of signals, the optical fiber must be disconnected from the power meter and connected to an optical loss test set (OLTS). The OLTS will generate a known light signal and measure the power at the other end of the optical fiber. The difference between the power of the light signal generated by the OLTS and the power of the light signal measured by the power meter is the attenuation of signals in dB.

Recording Results: Record the power and attenuation of signals readings. It is important to record the readings accurately and clearly.

Analyzing Results: Analyze the results of the measurements to determine the quality and performance of the optical fiber and components. The results can be compared to the expected results or to industry standards to determine the accuracy and reliability of the measurements.

In summary, connecting a VFL to a power meter and measuring the power and attenuation of signals involves connecting the VFL and optical fiber to the power meter, calibrating the power meter, measuring the power, measuring the attenuation, recording the results, and analyzing the results. This process is critical for ensuring the optimal performance of optical fiber communication systems.