LAB REPORT

OPTICAL FIBER COMMUNICATION SYSTEM

Unit 4

Optical Time Domain Reflectometer (OTDR)

Prepared by:

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APPLIED BACHELOR'S DEGREE PROGRAM
INTERNET ENGINEERING TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
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A. Practical Objectives

- To understand the OTDR instrument system
- To understand the functions and how to use the OTDR instrument
- Knowing the attenuation (decrease) graph of OTDR measurements
- Understand the characteristics of fiber optic channel attenuation graphs

B. Tools and Materials

- OTDR
- Fiber Optic Cable (60, 80, 100, 120, 200 Meters)
- 1:4 Splitter
- VFL
- OPM
- OLS
- OTDR Analyzer Software

C. Theoretical Basis

OTDR is a tool used to measure and analyze the characteristics of fiber optic cables. This instrument works by sending light signals through optical fibers and measuring the time it takes for the signal to return after being reflected by various elements in the fiber optic cable, such as connections, splices, and breaks. In this way, OTDR can describe signal attenuation graphs, providing information about distance, signal loss, and fiber optic channel quality (Sumarsono, 2021).

OTDR is used to measure distance and identify damage or interference in fiber optic networks. Its main function is to provide an in-depth picture of the quality of the fiber optic network, including attenuation and the location of interference. Operating an OTDR involves selecting the appropriate menu, setting the laser wavelength, and monitoring the attenuation graph generated on the monitor screen. These measurements are crucial for ensuring the sustainability and reliability of fiber optic networks (Haris, 2023). The attenuation graph generated by the OTDR shows a decrease in signal power as it travels. This attenuation can be caused by several factors, such as imperfect connections, splicing, or other external factors such as physical damage to the cable ( ).

By analyzing the attenuation graph, operators can determine the quality of the fiber optic channel and detect the location of interference in the system (Wibowo, 2022). This graph also provides valuable information about the distance to the point of damage and provides a basis for repairs.

Fiber optic lines have different attenuation characteristics depending on the wavelength of light used. In OTDR, attenuation graphs for wavelengths of 1310 nm or 1550 nm will show different results, with 1550 nm typically providing lower attenuation than 1310 nm. This affects distance measurements and the quality of the signal received. These attenuation characteristics are important for determining the performance of fiber optics under different conditions, such as when used in long-distance applications (Dewi, 2024).

In fiber optic channel measurements, OTDR not only provides results on attenuation, but can also detect the presence of splices or breaks that can affect network quality. This instrument can measure signal loss at various points along the fiber optic network, including on longer cables or those equipped with splitters. OTDR also allows measurement results to be stored in internal memory or downloaded to other devices for further analysis. These measurements are very important in ensuring stable and optimal fiber optic network performance (Indriani, 2023).

Understanding the functions and usage of OTDR is essential in fiber optic network maintenance. OTDR helps technicians detect and mitigate potential problems such as damage or signal degradation that can interfere with network performance. With accurate measurements, OTDR can detect the location of interference precisely, allowing for a more efficient repair process. This tool also allows for a more in-depth analysis of connection quality, preventing long-term performance degradation. In addition, OTDR can be used to verify the success of new network installations or repairs that have been carried out. The use of OTDR is also a step to ensure that fiber optic networks continue to function optimally, especially in applications that require high speed and reliability, such as data communication and high-speed internet.

D. Work Steps

a) Introduction to OTDR measuring instruments

1. Draw a detailed diagram of the OTDR instrument along with its menus and ports/interfaces.
2. Include the type, data/specifications, and features of the instrument.

b) Testing the condition of optical fiber using a Visual Fault Locator (VFL)

1. Connect the VFL port on the OTDR to the SC connector and a 60 m long optical fiber.
2. On the OTDR monitor screen, select the VFL function and turn on the 650 nm red laser beam.
3. Observe the red laser beam at the end of the fiber optic cable (do not look directly at the laser beam).
4. Repeat the observation for a length of 200 m, 60 m + 1:4 splitter

c) Measure the light power using the Optical Power Meter (OPM) function on the OTDR.

1. Connect the SC connector of the 5 m fiber optic input to the OLS device output.
2. Connect the SC output connector to port 4 (OPM) on the OTDR device.
3. Activate the OLS, set the beam to a wavelength of 1310 nm and a frequency of 1000 Hz.
4. On the OTDR monitor screen, select the OPM function, adjust the light wavelength to 1310 nm
5. Record the power level measurement results (in Watts and dBm) received by the OPM function
6. Repeat the measurement for fiber optic lengths of 60 m and 200 m.
7. Repeat the measurement for a wavelength of 1550 nm.

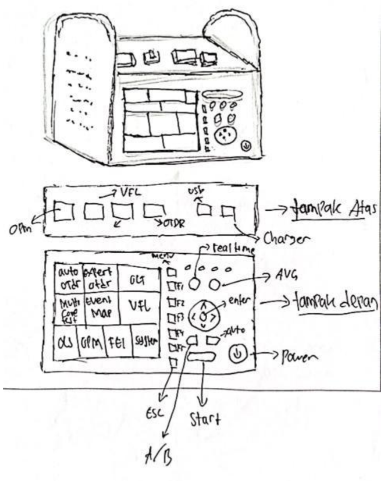
d) Optical fiber channel measurement using an Optical Time Domain Reflectometer (OTDR)

1. Connect the OTDR port on the OTDR device to the SC connector and the 60 m fiber optic cable
2. On the OTDR screen, select the OTDR function

3. Observe the graph image and parameters displayed on the monitor screen in the inactive state.
4. Activate the OTDR by selecting the TEST menu. Observe the graph and parameters displayed on the screen. Select the ANALYZE menu for more detailed measurement results.
5. Plot the OTDR measurement results and analyze them
6. Save the measurement results to the OTDR's internal memory or copy them to a USB drive
7. Using OTDR analyzer software, create a measurement result report form
8. Repeat the observation for several fiber optic cable length patterns, as follows:
   FO arrangement 1: 60 m + 60 m + 1:2 splitter + 200 m + 200 m;
   FO arrangement 2: 200 m + 60 m + 1:8 splitter + 200 m + 60 m;
   FO arrangement 3: 200 m + 200 m + 1:4 splitter + 60 m + 60 m;
   FO arrangement 4: 60 m + 200 m + 60 m + 1:4 splitter + 200 m;
   FO 5 configuration: 250 m + 60 m + 1:2 splitter + X m
   FO 6 configuration: 300 m + 50 m + 60 + X m

E. Results and Analysis

1. Introduction to OTDR measuring instruments

<table>
<tr><td>Specifications
OTDR</td><td>Type: JW330ZET-32/30dB
S/N: WMF00396
Date: June 23</td></tr>
<tr><td>Image
OTDR</td><td>
</td></tr>
</table>

Top	• **OTDR Port**: Main port for connecting to fiber optic cables for testing. • USB Port: For data transfer or connection to external devices. • **VFL Port:** Port for connecting a VFL device used to check for damage to the fiber optic cable. • **Charger Port:** For charging the instrument's battery.
Front Section	• **Menu Button**: There is a button to select various menus required for testing. • **Start Button**: To start measurements or tests. **ESC (Escape) Button**: Used to exit the menu or cancel an action. • **A/B Button**: Used to switch between two different modes or settings. **Power Button**: To turn the instrument on or off. • **Enter Button**: To select or confirm the options displayed on the screen.
OTDR Menu	• **Auto OTDR**: Automatic testing with pre-set settings. • **Expert OTDR**: Manual testing with full control over parameter settings. • **OLF**: Measures and analyzes optical loss or attenuation in optical fiber. • **Multicore Test**: Testing fiber optic cables with multiple cores or optical fibers. • **Event Map**: Displaying the location of events or faults in the fiber optic channel. • **VFL**: Activating the Visual Fault Locator to detect physical damage in optical fibers. • **OLS**: Sending light signals through optical fiber for power and attenuation testing. • **OPM**: Measuring the power level of the received signal through optical fiber. FEI: Marking and analyzing events or disturbances in optical fiber. • **System**: OTDR system settings, including device configuration and hardware information.

2. Testing the condition of optical fiber using a Visual Fault Locator (VFL)

Active VFL: 1. Normal 2. 1 Hz 3. 2 Hz 4. Close	Condition of the end of the 60 m FO: 1) The light will remain on continuously at the end (without blinking) 2) The light will blink approximately once every 2 seconds (slower than 2 Hz) 3) The light flashes approximately once every 1 second (faster than 1 Hz) 4) Light off
VFL Active: 1. Normal 2. 1 Hz 3. 2 Hz 4. Close	End state of the 200 m long FO: 1) The light will remain on continuously at the end (without blinking) 2) The light will blink approximately once every 2 seconds (slower than 2 Hz) 3) The light flashes approximately once every 1 second (faster than 1 Hz) 4) Light off
VFL Active: 1. Normal 2. 1 Hz 3. 2 Hz 4. Close	End state of FO 60 m long + 1:4 splitter 1) The light will remain on continuously at the end (without blinking) 2) The light will blink approximately once every 2 seconds (slower than 2 Hz) 3) Light flashes approximately once every 1 second (faster than 1 Hz) 4) Light off
Discussion:	VFL with a length of 200 m, the light is dimmer and smaller. VFL with a length of 60 m + splitter results in dimmer light due to the influence of the splitter so that the light output is evenly distributed. So, if the cable is longer, the light at the end is weaker and dimmer.

3. **Laser power transmission uses the (Light Source) LS function**

LS / OTDR			**Optical Fiber**	**OPM**		
Wavelength λ (nm)	Frequency (Hz)	Transmission power (dBm)	Fiber length (m)	Wavelength λ (nm)	Receive power (µW)	Receive power (dBm)
1310	CW	-7	5	1310	1,352	01.27
1310		-7	60	1310	01.17	1,309
1310		-7	200	1310	1,399	01.46
1550	CW	-7	5	1550	1,140	00.40
1550		-7	60	1550	1,667	02.24
1550		-7	200	1550	925.7	-00.21

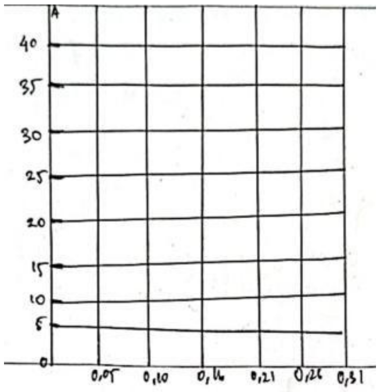
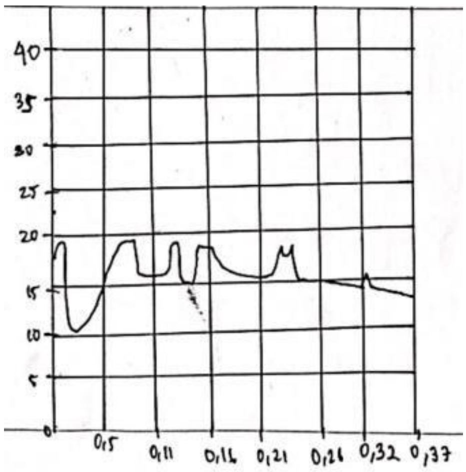
4. **Measurement of optical power using the Optical Power Meter (OPM) function**

OLS (type ....)			**Optical Fiber**	**OPM /OTDR**		
Wavelength λ (nm)	Frequency (Hz)	Transmit power (dBm)	Fiber length (m)	Wavelength λ (nm)	Receive power (µW)	Receive power (dBm)
1310	1000	-7	5	1310	28.0	-45.5
1310	1000	-7	60	1310	29.8	-45.3
1310	1000	-7	200	1310	29.2	-45.3
1550	1000	-7	5	1550	27.5	-45.6
1550	1000	-7	60	1550	28.9	-45.4
1550	1000	-7	200	1550	28.1	-45.5

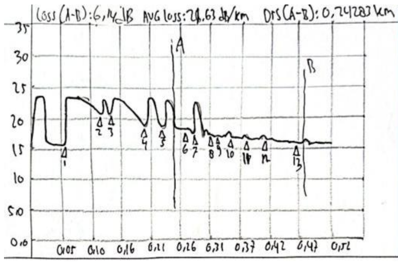
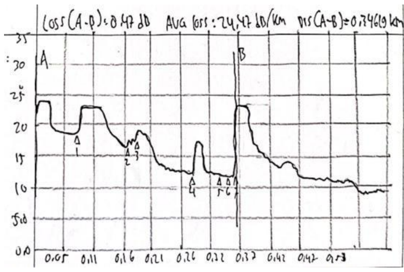
Discussion: Measurement of optical power using (LS) indicates that the transmit power is -7 dBm at wavelengths of 1310 nm and 1550 nm, with the tested optical fiber lengths ranging from 5 m to 200 m. Received power decreases with increasing fiber length, indicating signal attenuation. For example, for a 5 m fiber (1310 nm), the measured received power is 1.352 µW or 1.27 dBm, while for a 200 m fiber (1310 nm), the received power decreases to 1.399 µW or 1.46 dBm. The 1550 nm wavelength shows lower reception power compared to 1310 nm, indicating higher attenuation at this wavelength.

Power measurements using an Optical Power Meter (OPM) show lower received power compared to measurements using LS. For example, for a fiber length of 5 m (1310 nm), the received power measured using LS is 1.352 µW or 1.27 dBm ( ), while using OPM it is only 28.9 µW or -45.5 dBm. This indicates that OPM is more sensitive to signal power loss due to attenuation along the fiber.

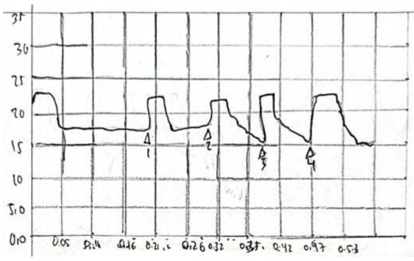
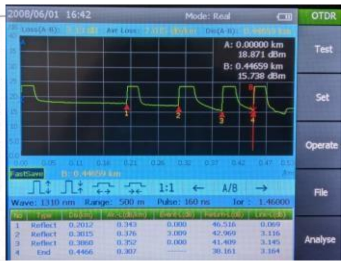
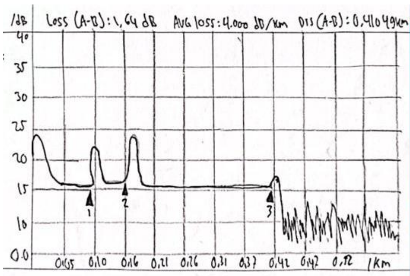
5. Fiber optic channel measurement using an Optical Time Domain Reflectometer (OTDR)

Measurement results graph:	OTDR display image: not active 
Measurement results graph:	OTDR display image: Test condition 

Discussion: Figure 1 shows the OTDR graph before activation, with no information or data displayed. Figure 2 shows the OTDR graph in Test mode, displaying a graph that shows the attenuation and interference detected along the fiber optic cable. This graph illustrates the signal loss (attenuation) that occurs at various points along the fiber optic cable.

Measurement result graph	Optical Fiber Configuration: 60 + 80 + 200 + Splitter (1:4) + 60 (Meters)  
Measurement result graph	Optical Fiber Arrangement: 80 + Splitter (1:4) + 100 + 100 + 60 (Meters)  

Discussion: The two images above show the attenuation (Loss) that occurs along the fiber optic channel, with a decrease in signal power at several points. The Splitter (1:4) divides the signal into several paths, which can be seen as a significant decrease in the graph, indicating power sharing. Loss (A-B) on the first graph is 6.16 dB, indicating power loss between points A and B, while AVG Loss is 29.63 dB/km, indicating average power loss per kilometer. In the second graph, Loss (A-B) is recorded at 0.87 dB, with AVG Loss at 24.42 dB/km, and the distance between points A and B is 0.73469 km. The numbers and triangle symbols on the graph indicate the location of important events such as connections or disturbances that affect signal quality.

Measurement results graph	Fiber Optic Configuration: 200 + 100 + Splitter (1:4) + 80 + 60 (Meters)  
Measurement results graph	Optical Fiber Configuration: 100 + 60 + Unknown (XM)  

Discussion: Both graphs show attenuation (loss) in the fiber optic channel, with a decrease in signal power at several points. In the 200 m + 100 m + Splitter (1:4) + 80 m + 60 m configuration, Loss (A-B) was recorded at 1.64 dB, with an AVG Loss of 24.42 dB/km, and the distance between points A and B was 0.73469 km. The sharp drop in power around the splitter indicates signal splitting. In the 100 m + 60 m + Unknown (XM) configuration, Loss (A-B) is 0.87 dB, with an AVG Loss of 4.000 dB/km, indicating lower power loss. Both graphs show that attenuation increases with fiber length and splitter usage, and detect the location of connections or disruptions that affect signal quality.

F. Conclusion

This practicum has successfully provided an understanding of the OTDR instrument system, which functions to analyze fiber optic channels. OTDR works by sending light signals through fiber optics and measuring the time and power of the returning signal. This tool is very useful in detecting and analyzing damage or interference in fiber optic networks.

The second objective of this practicum was to understand the function and use of OTDR instruments, which was achieved by operating this device in fiber optic measurements. OTDR instruments allow practitioners to select various settings as needed, such as wavelength and pulse width, to obtain optimal measurement results. By understanding the operation of this instrument, practitioners can easily perform analysis on the tested fiber optic network.

In this practicum, participants also studied the attenuation graph generated by the OTDR. This graph shows the decrease in signal power as the length of the optical fiber increases. A sharp decline in the graph usually indicates a disturbance or a poor connection, which can affect signal quality. This helps in identifying problems in the fiber optic channel.

The characteristics of the attenuation graph on optical fiber show that the longer the cable, the greater the signal loss. The use of splitters also affects the graph, where signal splitting causes a sharper decline in power. This practicum provides a deep understanding of how OTDR can be used to analyze the quality of fiber optic networks and efficiently detect damage or signal quality degradation.

G. References

Sumarsono, A. (2021). "Analysis of OTDR Performance in Fiber Optic Network Testing." *Indonesian Journal of Telecommunication Technology*, 5(2), 45-52.

Haris, M. (2023). "Optimization of OTDR Use in Fiber Optic Network Testing." *Journal of Electrical Engineering*, 7(1), 101-110.

Wibowo, S. (2022). "Application of OTDR for Fiber Optic Network Measurement and Maintenance." *Journal of Fiber Optic Technology*, 9(3), 121-130.

Dewi, R. (2024). "Study of Fiber Optic Network Attenuation at Various Wavelengths Using OTDR." *Journal of Telecommunications and Fiber Optic Networks*, 8(2), 92-99.

Indriani, D. (2023). "Analysis of Fiber Optic Network Measurements with OTDR." *Journal of Communication Technology*, 10(4), 200-210.

Appendix:

UNIT 4. OPTICAL TIME DOMAIN REFLECTOMETER (OTDR)

A. Tujuan :

1. Memahami sistem instrumen OTDR
2. Memahami fungsi dan cara pemakaian instrumen OTDR
3. Mengetahui grafik redaman(penurunan) pengukuran OTDR
4. Memahami karakteristik grafik redaman saluran fiber optik

B. Langkah kerja :

B.1. Pengenalan alat ukur OTDR:

1. Gambarlah lebih detil instrumen OTDR beserta menu dan port-port /interface yang ada.
2. Lengkapi dengan tipe, data / spesifikasi, fasilitas intrumen

B.2. Pengujian kondisi fiber optik menggunakan Visual Fault Locator (VFL) :

1. Hubungkan port VFL pada alat OTDR pada konektor SC dan fiber optik panjang 60 m
2. Pada layar monitor OTDR, pilih fungsi VFL, hidupkan sinar laser merah 650 nm
3. Amati sinar laser merah yang ada pada ujung fiber optik (jangan menatap langsung ke sinar laser)
4. Ulangi pengamatan untuk panjang 200 m, 60 m + splitter 1:4

B.3. Pengiriman daya sinar laser menggunakan fungsi (Light Source)LS pada OTDR:

1. Hidupkan alat ukur
2. Hubungkan port 1 (OTDR) pada alat OTDR pada konektor SC masukan fiber optik panjang 5 m.
3. Hubungkan konektor SC output dengan alat OPM
4. Pada layar monitor OTDR, pilih fungsi LS (OPT), atur panjang gelombang sinar pada 1310 nm (infra merah)
5. Catat hasil pengukuran level daya (dalam Watt dan dBm) yang diterima oleh alat OPM
6. Ulangi pengukuran untuk panjang fiber optik 60 m dan 200 m.
7. Ulangi pengukuran untuk sinar panjang gelombang 1550 nm.

B.4. Pengukuran daya sinar menggunakan fungsi (Optical Power Meter) OPM pada OTDR:

1. Hubungkan konektor SC masukan fiber optik panjang 5 m dengan output alat OLS
2. Hubungkan konektor SC output dengan port 4 (OPM) pada alat OTDR
3. Aktifkan OLS , atur sinar pada panjang gelombang 1310 nm, frekuensi 1000 Hz.
4. Pada layar monitor OTDR, pilih fungsi OPM, sesuaikan panjang gelombang sinar pada 1310 nm
5. Catat hasil pengukuran level daya (dalam Watt dan dBm) yang diterima oleh fungsi OPM
6. Ulangi pengukuran untuk panjang fiber optik 60 m dan 200 m.
7. Ulangi pengukuran untuk sinar panjang gelombang 1550 nm.

B.5. Pengukuran saluran fiber optik menggunakan Optical Time Domain Reflectometer (OTDR) :

1. Hubungkan port OTDR pada alat OTDR pada konektor SC dan fiber optik panjang 60 m
2. Pada layar OTDR, pilih fungsi OTDR
3. Amati gambar grafik dan parameter-parameter yang nampak pada layar monitor pada kondisi belum diaktifkan.
4. Aktifkan OTDR dengan memilih menu TEST. Amati gambar grafik dan parameter-parameter yang nampak pada layar. Pilih menu ANALYZE untuk lebih detil informasi hasil pengukuran.
5. Gambarlah hasil pengukuran OTDR, dan dianalisa hasilnya
6. Simpan hasil pengukuran tersebut pada memori internal OTDR atau copy ke USB
7. Menggunakan software OTDR analyzer, buatlah form laporan hasil pengukuran

8. Ulangi pengamatan untuk beberapa pola panjang susunan kabel FO, berikut:

   Kelompok 1 : 60 m + 60 m + splitter 1:2 + 200m + 200 m ;

   Kelompok 2 : 200 m + 60 m + splitter 1:4 + 200m + 60m;

   Kelompok 3 : 60 m + 200 m + splitter 1:8 + 200m + 60m;

   Kelompok 4 : 200 m + 200 m + splitter 1:16 + 60m + 60m;

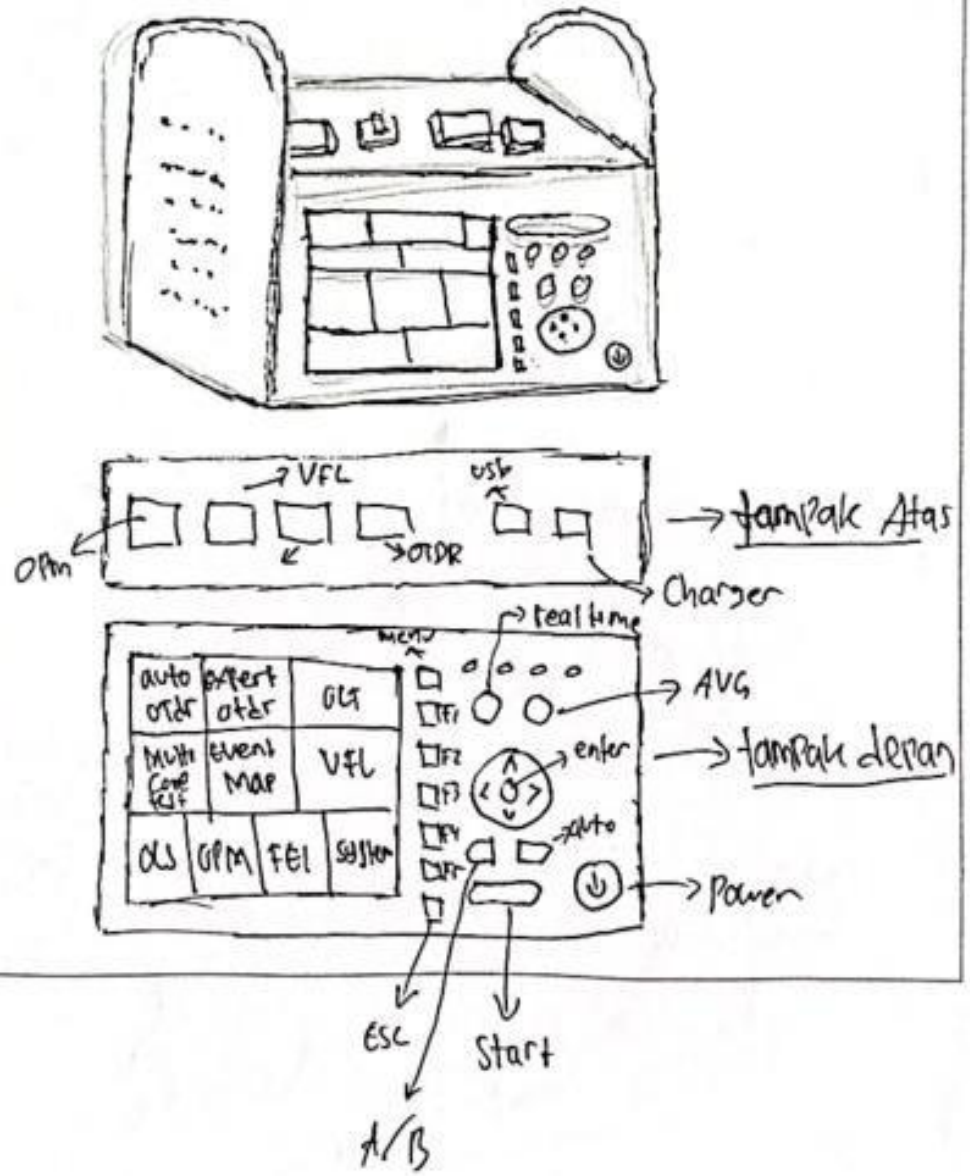
   Kelompok 5 : 60 m + 200 m + 60m + splitter 1:4 + 200 m;

   Kelompok 6 : 200m + 60m + X m

300 1
200 3
100 1
60
80 1
20 1

LEMBAR PENGAMATAN :

B.1. Pengenalan alat ukur OTDR:

<table>
<tr><td>Spesifikasi OTDR :</td><td>TYPE: JW3302ET-32/30 dB
S/N: WMF00396
Date : June 27</td></tr>
<tr><td>Gambar OTDR :</td><td>
</td></tr>
</table>

B.2. Pengujian kondisi fiber optik menggunakan Visual Fault Locator (VFL) :

VFL aktif : 1. Normal 2. 1 Hz 3. 2 Hz 4. Close	Keadaan ujung akhir FO panjang 60 m 1) Cahaya akan menyala terus diujung 2) Cahaya berkedip sekitar 2 detik sekali 3) Cahaya berkedip sekitar 1 detik sekali 4) Cahaya mati (tidak menyala)
VFL aktif : 1. Normal √ 2. 1 Hz 3. 2 Hz 4. Close	Keadaan ujung akhir FO panjang 200 m 1. Normal menyala diujung kabel 2. Berkedip diujung kabel namun lebih lambat dibandingkan 2 Hz 3. Berkedip lebih cepat dibandingkan 1 Hz 4. tidak menyala
VFL aktif : 1. Normal 2. 1 Hz 3. 2 Hz 4. Close	Keadaan ujung akhir FO panjang 60 m + splitter 1:4 1) Cahaya menyala terus (tanpa kedip) 2) berkedip namun lebih lambat dibanding 2 Hz 3) berkedip lebih cepat dibanding 1 Hz 4) Cahaya mati (tidak menyala)

Pembahasan : VFL dengan panjang 200 m, cahaya menyala lebih redup dan lebih kecil. VFL dengan panjang 60 m + splitter hasilnya cahaya akan lebih redup karena pengaruh oleh splitter sehingga output cahaya terbagi rata. Jadi, jika kabel lebih panjang maka cahaya di ujung lebih lemah dan redup.

B.3. Pengiriman daya sinar laser menggunakan fungsi (Light Source) LS

LS / OTDR			Fiber Optik	OPM		
Panjang gelombang λ (nm)	Frekuensi (Hz)	Daya kirim (dBm)	Panjang FO(m)	Panjang gelombang λ (nm)	Daya terima (uW)	Daya terima (dBm)
1310	CW continuous wave	-7	5	1310	1,352	01,27
1310		-7	60	1310	01,17	1309
1310		-7	200	1310	1.399	01.46
1550	CW	-7	5	1550	1,140	00.40
1550		-7	60	1550	1.667	02.24
1550		-7	200	1550	952.7	-0021

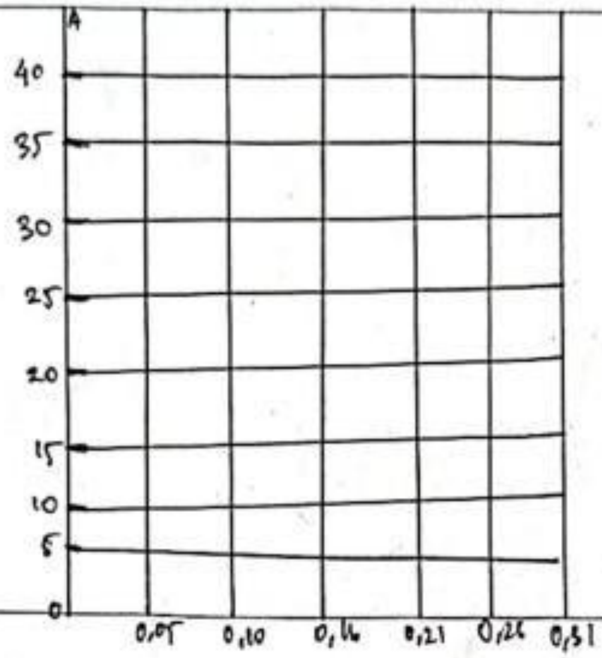
B.4. Pengukuran daya sinar menggunakan fungsi (Optical Power Meter) OPM

OLS (tipe : ....)			Fiber Optik	OPM /OTDR		
Panjang gelombang λ (nm)	Frekuensi (Hz)	Daya kirim (dBm)	Panjang FO(m)	Panjang gelombang λ (nm)	Daya terima (uW)	Daya terima (dBm)
1310	1000	-7	5	1310	28.0	45.5
1310	1000	-7	60	1310	29.8	-45.3
1310	1000	-7	200	1310	29.2	-45.3
1550	1000	-7	5	1550	27.5	-45.6
1550	1000	-7	60	1550	28.9	-45.5
1550	1000	-7	200	1550	28.1	-45.5

B.5. Pengukuran saluran fiber optik menggunakan Optical Time Domain Reflectometer (OTDR) :

Gambar tampilan OTDR : belum aktif

Grafik hasil pengukuran :

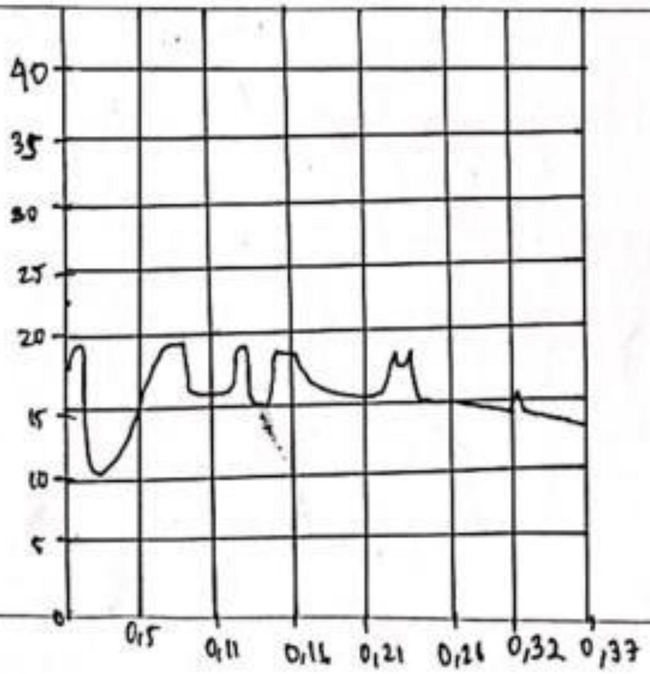


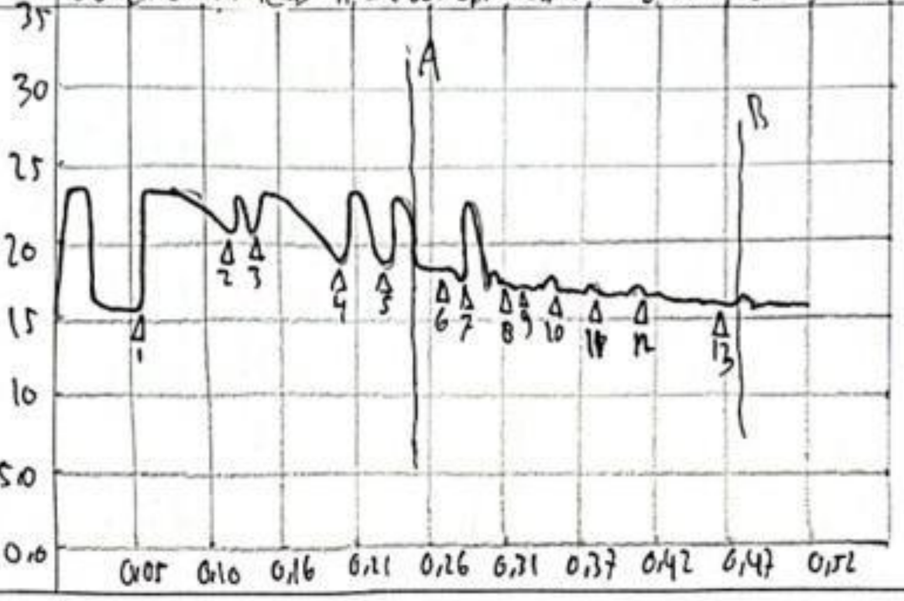
Gambar tampilan OTDR : kondisi TEST

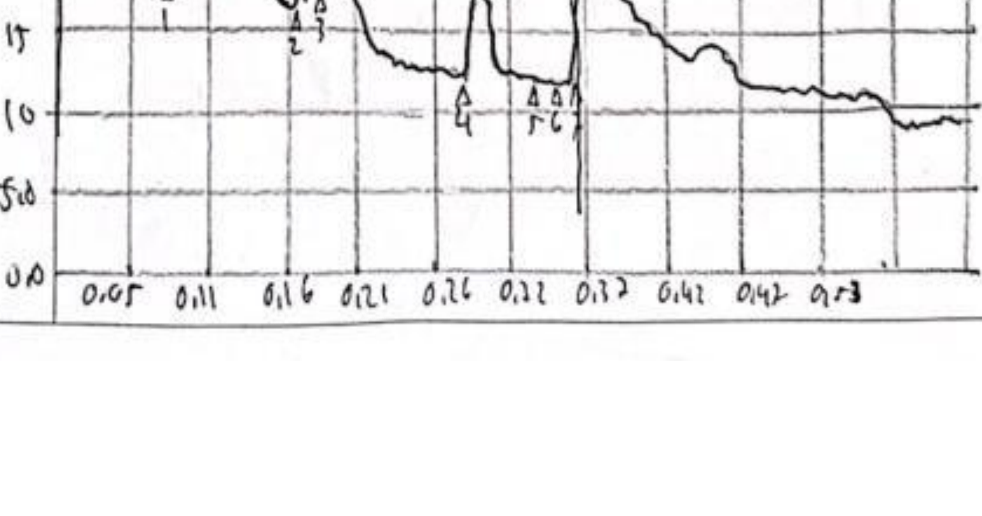
Susunan FO :

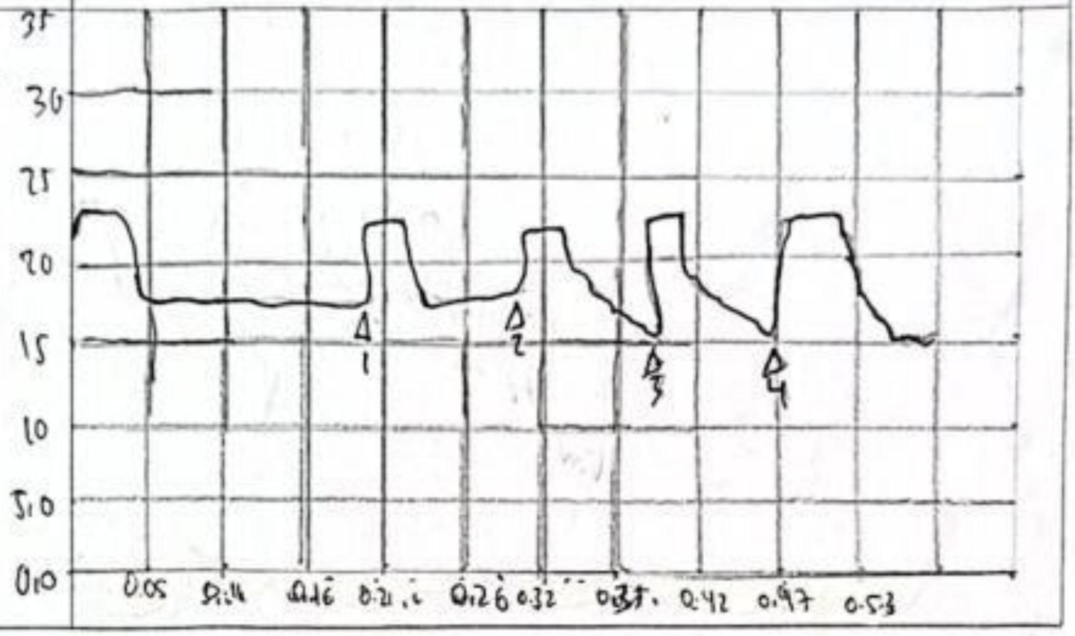
....

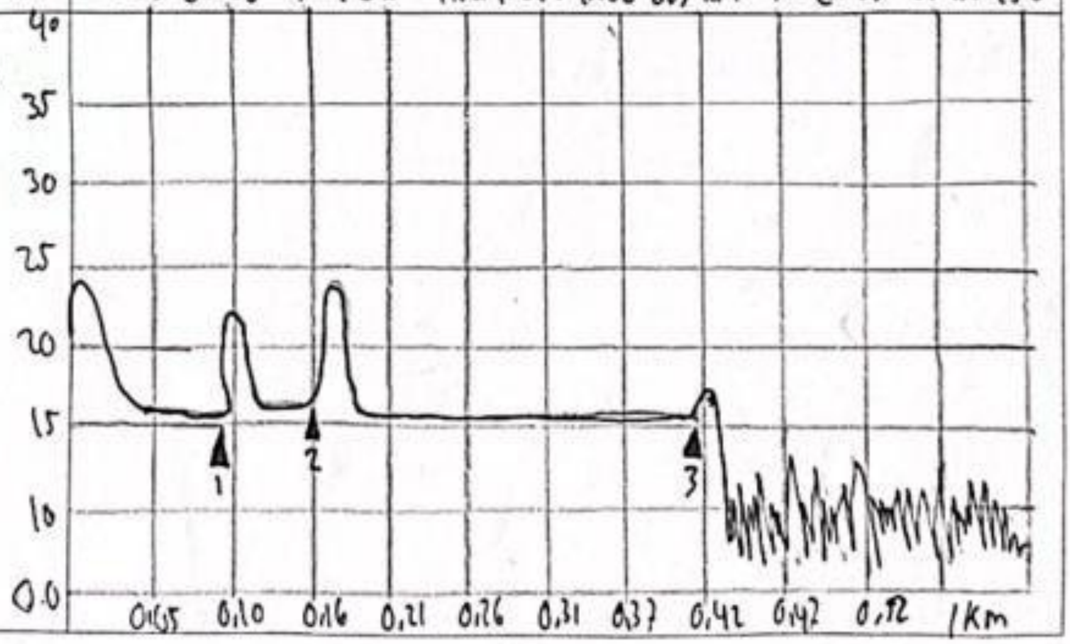
Grafik hasil pengukuran :



Susunan FO : No. 3	60 m + 80 m + 200 m + Splitter (1:4) + 60 m Loss (A-B): 6,14 dB AVG loss: 24,63 dB/km DIS (A-B): 0,24283 km
Grafik hasil pengukuran :	

Susunan FO : No. 4	80 m + splitter (1:4) + 100 m + 100 m + 60 m Loss (A-B): 8,47 dB AVG loss: 24,47 dB/Km DIS (A-B): 0,34619 km
Grafik hasil pengukuran :	

Susunan FO : No.5	200 m + 100 m + splitter (1:4) + 80 m + 60 m
Grafik hasil pengukuran :	

Susunan FO : No.7	100 m + 60 m + tidak diketahui (x m) /dB Loss (A-B) : 1,64 dB AVG loss : 4.000 dB/km DIS (A-B) : 0,41049 km
Grafik hasil pengukuran :	

Susunan FO :	
Grafik hasil pengukuran :	

- Buatlah form laporan hasil pengukuran OTDR menggunakan software AnalyseOTDR

Kelompok :

NAMA	NIM	Diperiksa Asisten
Baskoro Jatmiko Adi Raharjo	23/523200/SV/23869	
Titis Wahyudi Putro	23/521969/SV/23550	
Wahyu Fitriansyah	23/522607/SV/23731	

File

File :	1.sor	Device :	Num. 0	
Date :	6/1/2008 7:41:51 AM	Module :		

Configuration

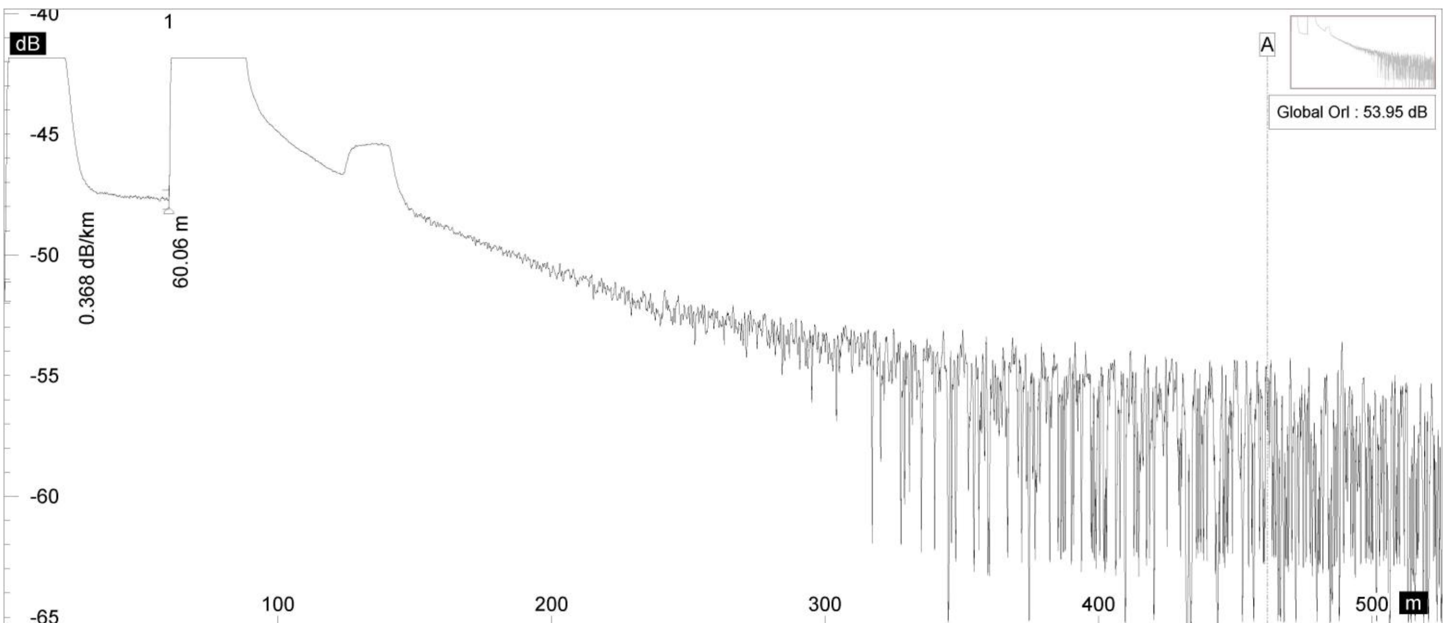
Operator :		Direction :	A-->B	Backscatter coeff.: -80.00 dB
LOCATION A		Location A :		
Cable :	0	Location B :		
Fiber :	0	Wavelength (nm) :	1310	
Color :	---	Index :	1.460000	
LOCATION B		Pulse (ns) :	160	
Cable :	0	Range (km) :	0.526	
Fiber :	0	Average :	1	
Color :	---	Resolution :	-	

Comment

Comment :

Job

OTDR Trace



A :	461.88	m	B :	0.00	m	B - A :	-461.88	m
	-57.365	dB		-51.516	dB		-5.849	dB
							12.663	dB/km

File

File :	1.sor	Device :	Num. 0
Date :	6/1/2008 7:41:51 AM	Module :	

Table

Event (1)	Distance (m)	Loss (dB)	Reflectance (dB)	Slope (dB/km)	Rel. Dist. (m)	Section loss (dB)	Total loss (OTDR) (dB)	Uncertainty
1	60.06		>-44.63	0.368	60.06	0.022	0.022	

File

File :	2b2.sor	Device :	Num. 0
Date :	6/1/2008 8:50:57 AM	Module :	

Configuration

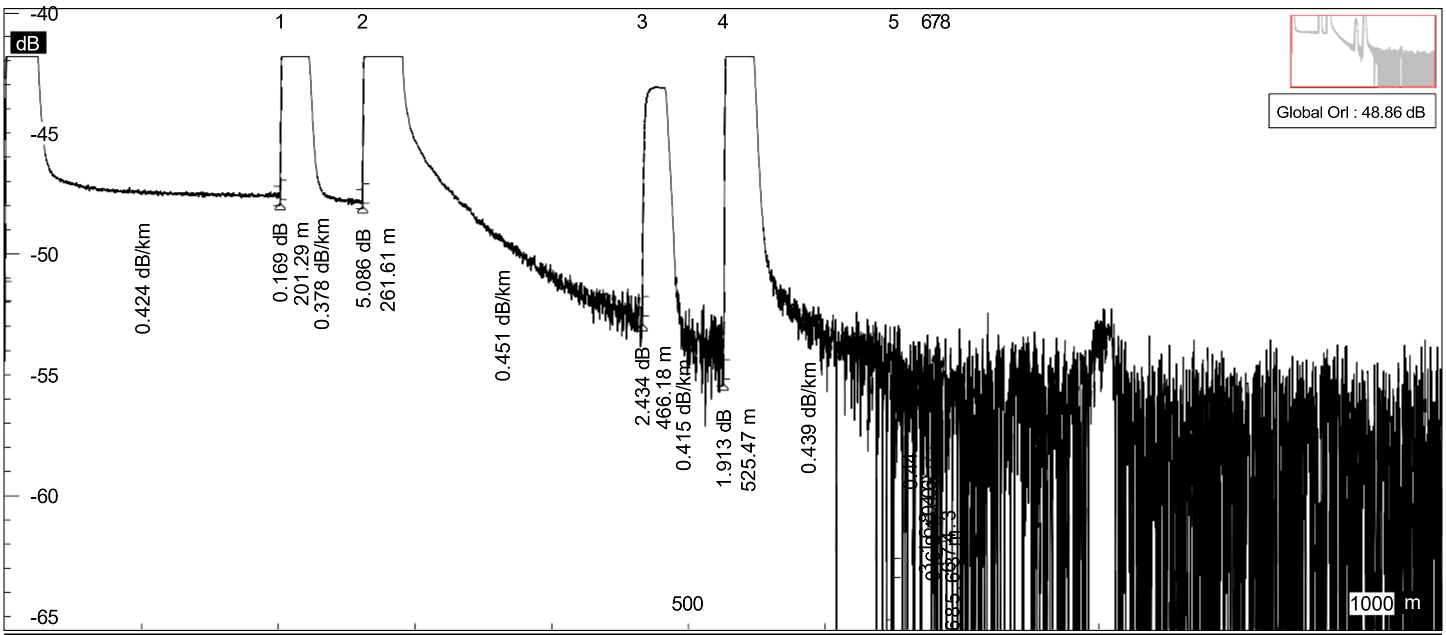
Operator :		Direction :	A-->B	Backscatter coeff.: -80.00 dB
LOCATION A		Location A :		
Cable :	0	Location B :		
Fiber :	0	Wavelength (nm) :	1310	
Color :	---	Index :	1.460000	
LOCATION B		Pulse (ns) :	160	
Cable :	0	Range (km) :	1.051	
Fiber :	0	Average :	1	
Color :	---	Resolution :	-	

Comment

Comment :

Job

OTDR Trace



A :	0.00	m	B :	0.00	m	B - A :	0.00	m
	-54.443	dB		-54.443	dB		0.000	dB
							- - -	dB/km

File

File :	2b2.sor	Device :	Num. 0
Date :	6/1/2008 8:50:57 AM	Module :	

Table

	Event (8)	Distance (m)	Loss (dB)	Reflectance (dB)	Slope (dB/km)	Rel. Dist. (m)	Section loss (dB)	Total loss (OTDR) (dB)	Uncertainty
1		201.29	0.169	>-48.47	0.424	201.29	0.085	0.085	
2		261.61	5.086	>-48.18	0.378	60.32	0.023	0.278	Two points
3		466.18	2.434	>-38.18	0.451	204.57	0.092	5.456	Two points
4		525.47	1.913	>-33.22	0.415	59.29	0.025	7.914	Two points
5		650.21	2.110	>-33.51	0.439	124.74	0.055	9.882	
6		674.34	3.168	>-47.16	0.449	24.13	0.011	12.003	Two points
7		680.24	0.684	>-46.95	0.406	5.90	0.002	15.173	Two points
8		685.63		>-42.02	0.376	5.39	0.002	15.859	

File

File :	4b2.sor	Device :	Num. 0
Date :	6/1/2008 8:58:34 AM	Module :	

Configuration

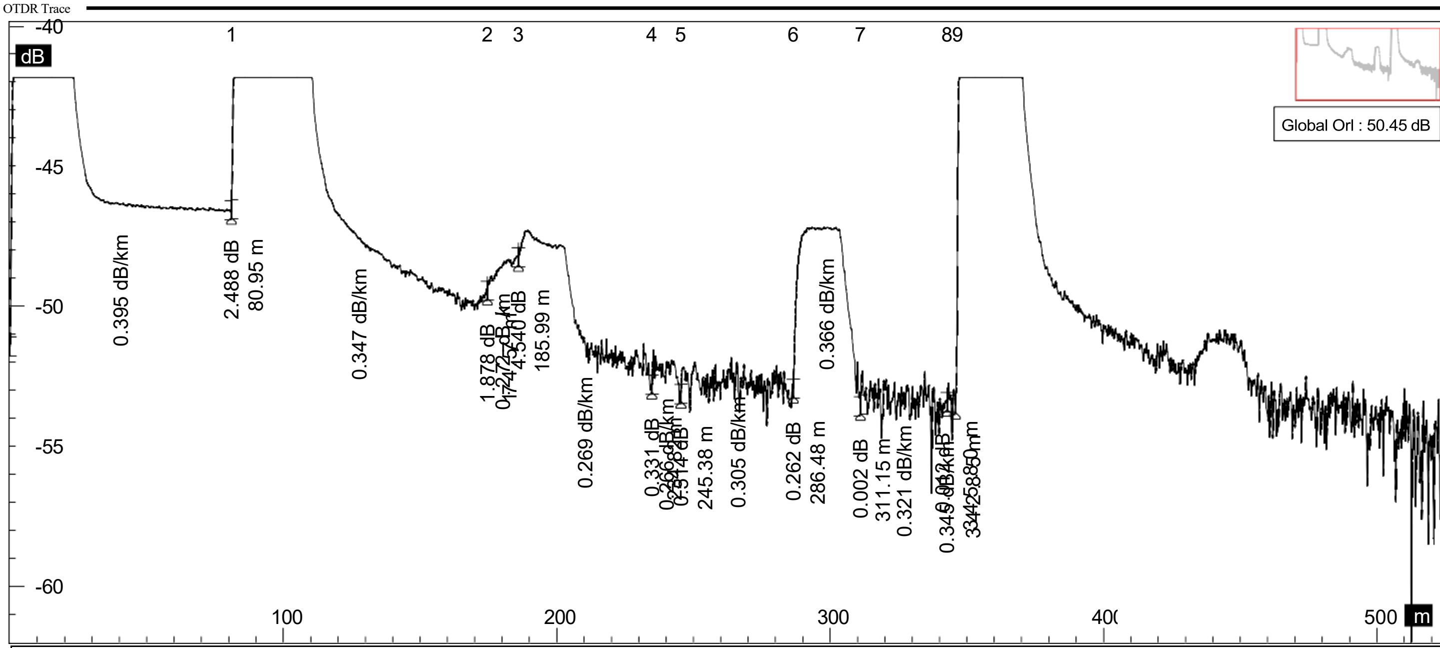
Operator :		Direction :	A-->B	Backscatter coeff.: -80.00 dB
LOCATION A		Location A :		
Cable :	0	Location B :		
Fiber :	0	Wavelength (nm) :	1310	
Color :	---	Index :	1.460000	
LOCATION B		Pulse (ns) :	160	
Cable :	0	Range (km) :	0.526	
Fiber :	0	Average :	1	
Color :	---	Resolution :	-	

Comment

Comment :

Job

OTDR Trace



A :	0.00 m		B :	0.00 m		B - A :	0.00 m
	-51.438 dB			-51.438 dB			0.000 dB
							--- dB/km

File

File :	4b2.sor	Device :	Num. 0
Date :	6/1/2008 8:58:34 AM	Module :	

Table

Event (9)	Distance (m)	Loss (dB)	Reflectance (dB)	Slope (dB/km)	Rel. Dist. (m)	Section loss (dB)	Total loss (OTDR) (dB)	Uncertainty
1	80.95	2.488	>-43.13	0.395	80.95	0.032	0.032	
2	174.57	1.878	>-45.89	0.347	93.62	0.032	2.552	Two points
3	185.99	4.540	>-45.63	0.272	11.42	0.003	4.433	Two points
4	234.82	0.331	>-40.68	0.269	48.83	0.013	8.986	Two points
5	245.38	0.514	>-29.96	0.266	10.56	0.003	9.320	
6	286.48	0.262	>-29.96	0.305	41.10	0.013	9.846	Two points
7	311.15	0.002	>-29.96	0.366	24.67	0.009	10.118	Two points
8	342.85	0.012	>-33.77	0.321	31.70	0.010	10.130	Two points
9	345.80		>-35.06	0.345	2.95	0.001	10.143	

File

File :	5b2new.sor	Device :	Num. 0	
Date :	6/1/2008 8:43:36 AM	Module :		

Configuration

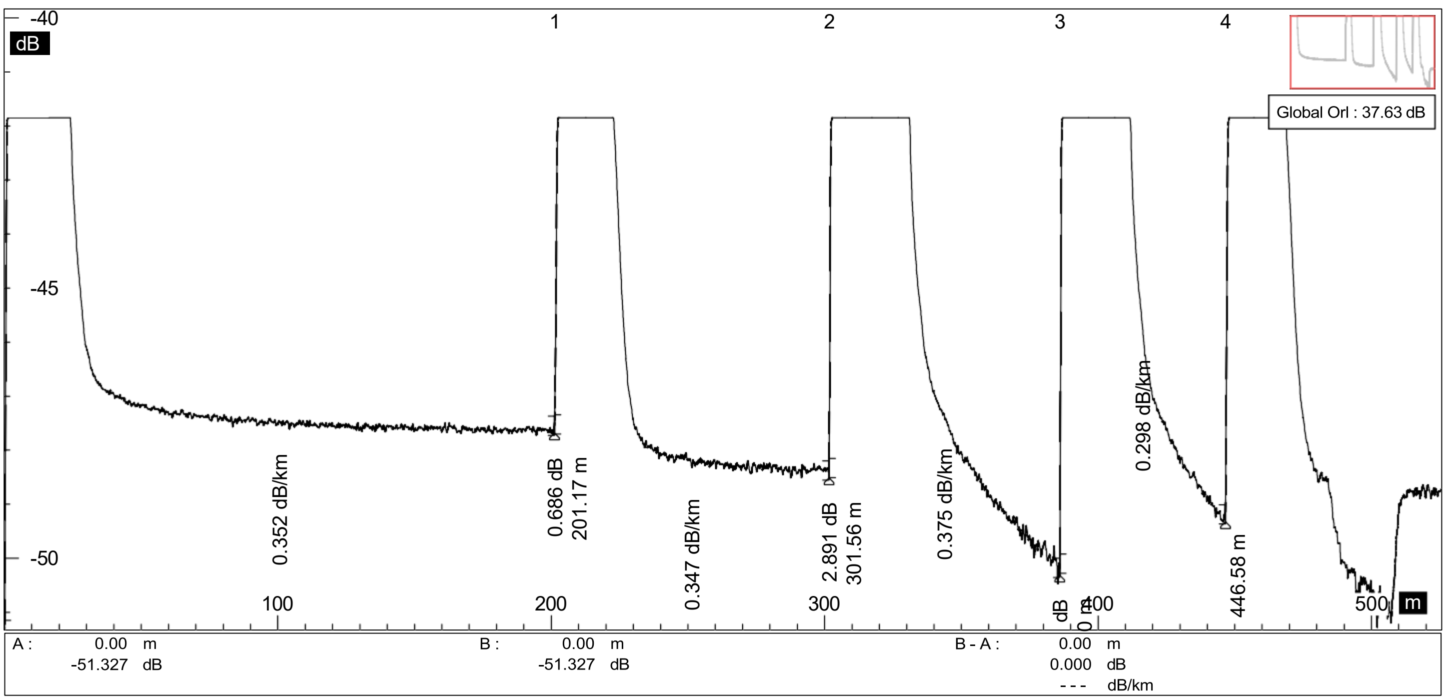
Operator :		Direction :	A-->B	Backscatter coeff.: -80.00 dB
LOCATION A		Location A :		
Cable :	0	Location B :		
Fiber :	0	Wavelength (nm) :	1310	
Color :	---	Index :	1.460000	
LOCATION B		Pulse (ns) :	160	
Cable :	0	Range (km) :	0.526	
Fiber :	0	Average :	1	
Color :	---	Resolution :	-	

Comment

Comment :

Job

OTDR Trace



File

File :	5b2new.sor	Device :	Num. 0
Date :	6/1/2008 8:43:36 AM	Module :	

Table

	Event (4)	Distance (m)	Loss (dB)	Reflectance (dB)	Slope (dB/km)	Rel. Dist. (m)	Section loss (dB)	Total loss (OTDR) (dB)	Uncertainty
1		201.17	0.686	>-46.53	0.352	201.17	0.071	0.071	
2		301.56	2.891	>-42.48	0.347	100.39	0.035	0.792	Two points
3		386.00	-0.937	>-41.72	0.375	84.44	0.032	3.715	
4		446.58		>-38.16	0.298	60.57	0.018	2.795	

File

File :	6b2.sor	Device :	Num. 0	
Date :	6/1/2008 8:08:43 AM	Module :		

Configuration

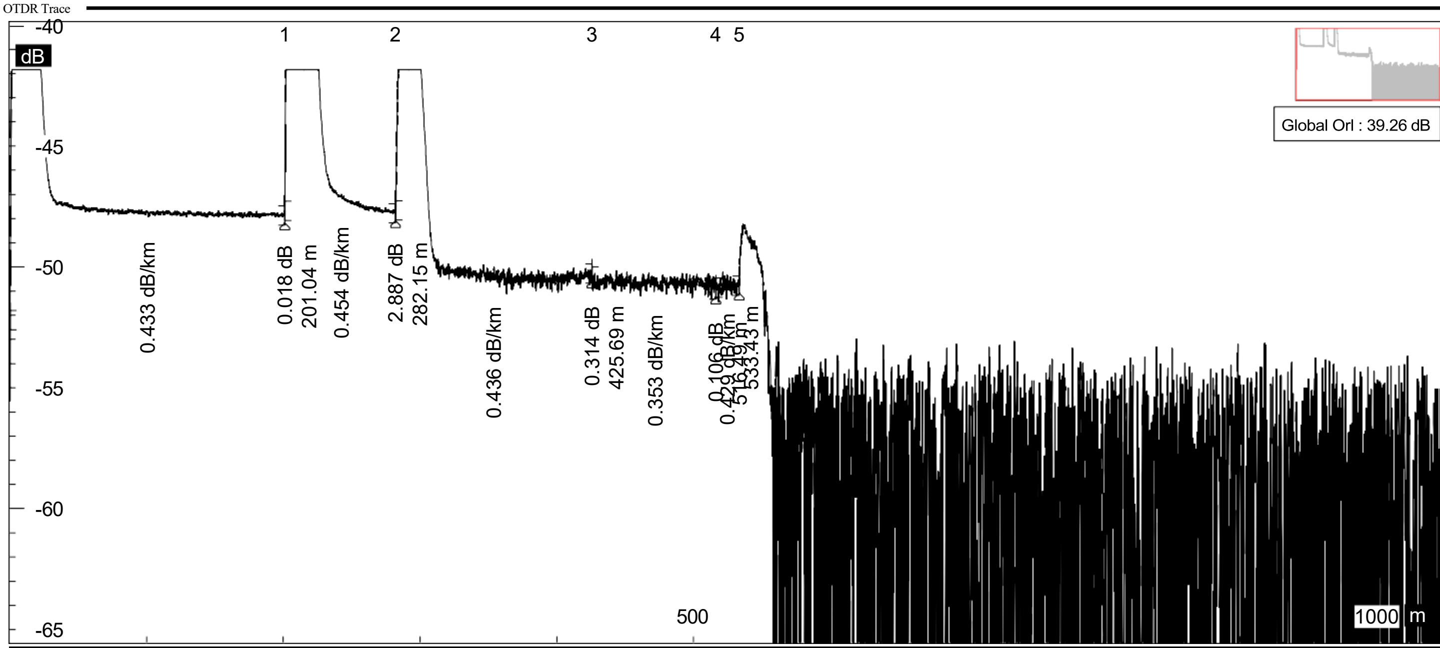
Operator :		Direction :	A-->B	Backscatter coeff.: -80.00 dB
LOCATION A		Location A :		
Cable :	0	Location B :		
Fiber :	0	Wavelength (nm) :	1310	
Color :	---	Index :	1.460000	
LOCATION B		Pulse (ns) :	160	
Cable :	0	Range (km) :	1.051	
Fiber :	0	Average :	1	
Color :	---	Resolution :	-	

Comment

Comment :

Job

OTDR Trace



A :	0.00	m	B :	0.00	m	B - A :	0.00	m
	-55.536	dB		-55.536	dB		0.000	dB
							- - -	dB/km

File

File :	6b2.sor	Device :	Num. 0
Date :	6/1/2008 8:08:43 AM	Module :	

Table

Event (5)	Distance (m)	Loss (dB)	Reflectance (dB)	Slope (dB/km)	Rel. Dist. (m)	Section loss (dB)	Total loss (OTDR) (dB)	Uncertainty
1	201.04	0.018	>-47.87	0.433	201.04	0.087	0.087	Two points
2	282.15	2.887	>-48.07	0.454	81.11	0.037	0.142	
3	425.69	0.314		0.436	143.54	0.063	3.091	Two points
4	516.49	0.106		0.353	90.80	0.032	3.437	Two points
5	533.43		>-56.18	0.429	16.94	0.007	3.550	