



VanGuard

Data



VanGuard Data
OTDR Emulator and Assessment Facility
Assessment Report
www.vanguarddata.com.au



VanGuard Data OTDR Test Assessment Report

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1.0 Introduction

This report is automatically generated from the VanGuard Data OTDR Emulator Report and Assessment Facility. It may be used by the student as a training aid or by instructors and other individuals interested in assessing the users skill and experience in testing and reporting on the quality and characteristics of an Optic Fibre. This includes their ability to take and analyse OTDR and Insertion loss measurements as well as identify the various events that are found on a trace.

The student has identified the Virtual Fibre Under Test, this may be a fibre created for practice or assigned to the user for the purpose of an assessment. Using the OTDR Emulator, the student has taken and analysed their selection of traces on the Virtual Fibre and measured characteristics such as Insertion and Link Loss as well as completing an event loss report. The purpose of the Assessment Facility is to provide a tool for the student to submit these results which simulates submitting results from a real fibre report. The Assessment Facility grades these results and produces this document to report on the outcome.

The assessment assumes perfect working conditions in that there are no time constraints that would prevent all wavelengths being tested and that a suitable trace acquisition time is achievable. The assessment is strict on achieving traces that present the maximum amount of usable information opposed to finishing the testing within a given time frame.

A maximum of 100 points can be achieved, the Assessment Facility awards marks where the submitted results are found to be correct, accurate and have been made without any omissions.

Marks are awarded in four main sections:

- Section 1) The Student / User has submitted the correct traces to support their results. (15 Points)
- Section 2) The Traces submitted are of a high quality with well selected parameters. (35 Points)
- Section 3) Fibre Insertion and Link Loss measurements are accurate (20 points)
- Section 4) All events were correctly identified and loss measurements were accurately taken and documented. (30 Points)

Marking Guide:

- 85-100: Excellent**
- 70-84: Very Good**
- 60-69: Average**
- 50-59: Below Average**
- < 49: Poor**



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2.0 Virtual Fibre Under Test

Throughout this document the Fibre Under Test (FUT) or just the fibre will be referenced. This is referring to the OTDR Emulator Virtual Fibre that was tested to create the traces which were submitted for analysis. Details of the Fibre Under Test are listed below.

Associated Cable: Instructor Metro Cable

Fibre Title: Fibre 01

Fibre Length: 13629 m

Fibre IOR: 1.475

Virtual Fibre Insertion Loss

	1310 nM	1550 nM	1625 nM
dB:	6.448 dB	4.922 dB	5.612 dB

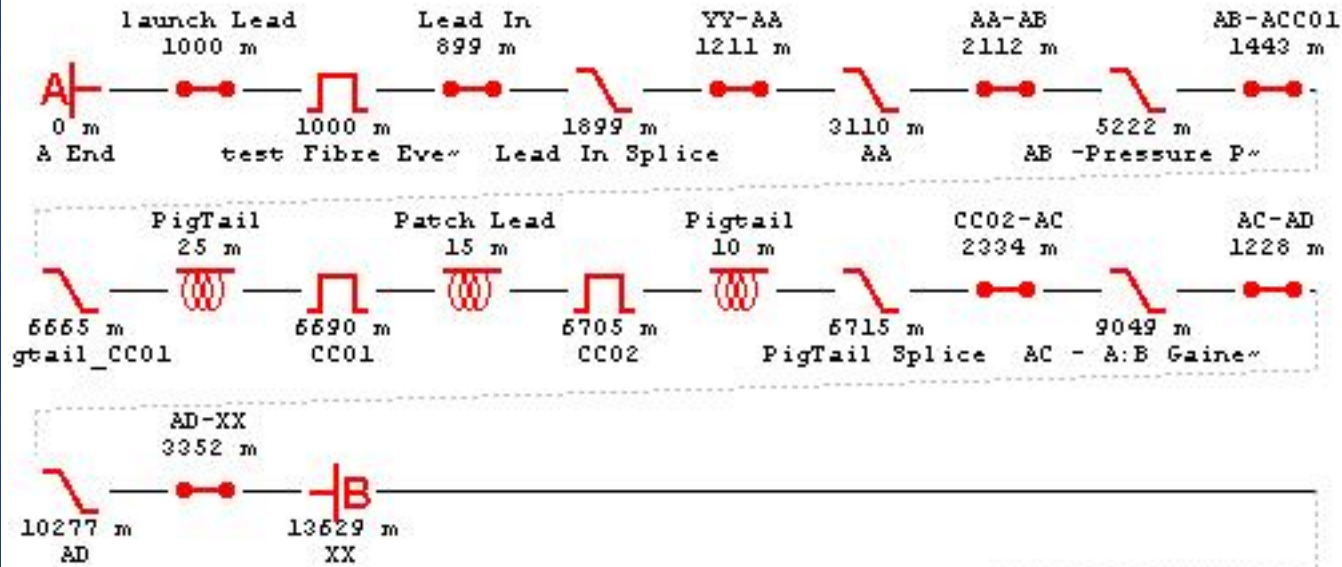
Virtual Fibre Link Loss

	1310 nM	1550 nM	1625 nM
A-B:	5.687 dB	4.144 dB	4.859 dB
B-A:	5.871 dB	4.386 dB	5.051 dB
Avg:	5.779 dB	4.265 dB	4.955 dB

Insertion Loss - Link Loss

	1310 nM	1550 nM	1625 nM
dB:	0.669 dB	0.657 dB	0.657 dB

Fibre Under Test Line Diagram





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Section 1: Correct Traces Submitted

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This section assesses if the Student/User has submitted suitable traces to support their results.

This section is pass / fail and also worth 15 points, to receive 100%:

- a) Traces submitted must have been taken on the correct Fibre (Pass / Fail)
- b) No changes were made to the Fibre Under Test between taking and submitting the traces for assessment (Pass / Fail)
- c) Traces should be:
 - i) Submitted for all available wavelengths (5 Points) and
 - ii) Taken from both ends of the fibre (5 Points)
- d) Bidirectional traces must use the same Pulse Width, Acquisition Time, Range, Resolution and IOR) (5 Points)



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3.0 Report Submission Analysis - Overview

This section checks that the correct traces were submitted to support the users results and that they were taken on the Fibre Under Test. If the traces submitted were taken on a different fibre or the fibre has been changed through (simulated) repairs or other alteration since the traces were taken then they are not valid to submit. For this reason any errors in this section are heavily penalised.

There were 6 traces Submitted With This Report:

Trace Title	Direction	Wavelength	Pulse Width	Trace Time
A-B.1310.50nS.25Km	A-B	1310 nM	50 nS	1Min-0Sec
A-B.1550.20nS.25Km	A-B	1550 nM	20 nS	30Sec
A-B.1625.20nS.25Km	A-B	1625 nM	10 nS	2Min-0Sec
B-A.1310.50nS.25Km	B-A	1310 nM	50 nS	1Min-0Sec
B-A.1550.20nS.25Km	B-A	1550 nM	20 nS	30Sec
B-A.1625.10nS.25Km	B-A	1625 nM	10 nS	2Min-0Sec

3.1 Traces Submitted Are Taken on Correct Fibre.

This section verifies that the traces submitted were taken on the actual test fibre identified for this report. Submitting traces that were taken on a different fibre is considered an instant fail as any further detail provided is invalid.

Findings:

- 1) A-B.1310.50nS.25Km was taken on the correct fibre
- 2) A-B.1550.20nS.25Km was taken on the correct fibre
- 3) A-B.1625.20nS.25Km was taken on the correct fibre
- 4) B-A.1310.50nS.25Km was taken on the correct fibre
- 5) B-A.1550.20nS.25Km was taken on the correct fibre
- 6) B-A.1625.10nS.25Km was taken on the correct fibre

Results:

As can be identified in the above table, all of the submitted traces were taken on the Fibre Under Test. As a pass / Fail criteria no marks were awarded but the assessment will continue to assess the remaining sections.

3.2 Traces Taken Represent Fibre in its Current State

When a Fibre has been repaired or otherwise altered any existing traces are no longer valid. This section checks if the Fibre Under Test has been altered since the submitted traces were taken. If they were the submitted results are invalid and the report will be failed

Findings:

- 1) A-B.1310.50nS.25Km was taken on the Fibre Under Test exactly as it was submitted
- 2) A-B.1550.20nS.25Km was taken on the Fibre Under Test exactly as it was submitted
- 3) A-B.1625.20nS.25Km was taken on the Fibre Under Test exactly as it was submitted
- 4) B-A.1310.50nS.25Km was taken on the Fibre Under Test exactly as it was submitted
- 5) B-A.1550.20nS.25Km was taken on the Fibre Under Test exactly as it was submitted
- 6) B-A.1625.10nS.25Km was taken on the Fibre Under Test exactly as it was submitted

Results:

As can be identified in the above table, all of the submitted traces were taken with identical events as the submitted Fibre Under Test so the traces are a valid representation of the fibre being reported on. As a pass / Fail criteria no marks were awarded but the assessment will continue to assess the remaining sections.



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3.3 Suitable Traces Submitted

3.3.1 Wavelength and Direction Tested and Submitted

To identify loss across the optical spectrum and to best identify pressure points the fibre should be tested with all available wavelengths. To enable Bidirectional analysis of individual events and to identify gainers traces should be taken and submitted from both ends of the fibre.

It is not always possible or required in the real world but under the assessment conditions of this report full marks are only awarded for submitting traces at all available wavelengths taken from both ends the fibre. The OTDR Emulator supports three wavelengths (1310nM, 1550nM and 1625nM) so three wavelengths must be submitted from each end of the fibre (a total of six traces) to achieve full marks for this section.

There are 10 points available in this section, they are awarded as follows:

- 1) 5 points are given for submitting the correct wavelengths:
 - i) 5 Points if three Wavelengths are submitted in either direction
 - ii) 2.5 Points if two wavelengths are submitted in either direction
 - iii) 0 points is there is one or less wavelengths in both direction
- 2) 5 points are given for Bidirectional traces submitted:
 - i) 5 Points if three wavelengths have traces from both ends of the fibre
 - ii) 3 Points if two wavelengths have traces from both ends of the fibre
 - ii) 1 Points if one wavelength has traces from both ends of the fibre
 - iii) 0 Points if traces are only submitted in a single direction or bi-directional traces do not have matching wavelengths.

Findings:

- 1) There were 3 wavelengths Submitted for the A-B Direction traces
- 2) A-B direction Wavelengths submitted were: 1310nM 1550nM 1625nM
- 3) There were 3 wavelengths Submitted for the B-A Direction traces
- 4) A-B direction Wavelengths submitted were: 1310nM 1550nM 1625nM

Results:

Three wavelengths were submitted in at least one direction.
+5 of 5 Points
Three wavelengths were tested from both ends of the fibre.
+5 of 5 Points



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3.3.3 Bidirectional parameters Selected are an Exact Match

For maximum accuracy in the analysis of the results, traces taken from either end of the fibre need to use the same parameters (i.e: Pulse Width, Trace Time, Range, Resolution and IOR) for each wavelength submitted

For wavelengths that have Bidirectional traces the parameters are compared to ensure they are identical.

There are 5 points available in this section, they are awarded as follows:

- 1) 5 points are given if all bi-directional traces use identical parameters
- 2) 2 points are given if at least one pair of bi-directional traces use identical parameters
- 3) 0 points are given if no bi-directional traces use identical parameters or no bi-directional traces were submitted

Findings:

Trace ID: A-B.1310.50nS.25Km taken in the A-B Direction has exact matching parameters with the Bidirectional Trace ID: B-A.1310.50nS.25Km taken in the B-A direction

Trace ID: A-B.1550.20nS.25Km taken in the A-B Direction has exact matching parameters with the Bidirectional Trace ID: B-A.1550.20nS.25Km taken in the B-A direction

Trace ID: A-B.1625.20nS.25Km taken in the A-B Direction has exact matching parameters with the Bidirectional Trace ID: B-A.1625.10nS.25Km taken in the B-A direction

Results:

All traces that had Bidirectional wavelengths submitted were found to have an exact match of the trace parameters used in the opposite direction.

+5 of 5 Points



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4.0 Section 1: Correct Traces Submitted Summary

All traces submitted were verified to belong to the identified Fibre Under Test and no alterations had been made to the fibre after the traces were taken. This means that any analysis of the results will be valid for the Fibre Under test.

Section	Points Awarded	Points available
Traces Belong To Fibre Under Test:	PASS	PASS/FAIL
Fibre Hasn't Changed Since Taking Traces:	PASS	PASS/FAIL
Submitted WaveLengths:	5.0	5
Bidirectional Traces Submitted:	5.0	5
Matching Bidirectional parameters Submitted:	5.0	5
Section Total:	15.0	15





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Section 2: Trace Quality Assessment

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This section assesses that the Traces submitted are of a high quality with well selected parameters.

This section is worth 35 points, to receive 100%:

- a) Noise measured at the end event must not be greater than 0.15dB (7 Points)
- b) Trace acquisition time must be at least 1 Second for every Km of the Fibre Under Test limited to 180Kms and no trace must be taken under 20 seconds.(7 points)
- c) When setting the minimum acquisition time permitted, reducing the selected pulse width by one will produce a trace with excessive noise (7 points) (i.e.: the next lowest pulse width should not have been used)
- d) The range setting must be the lowest available that is greater than 1.5 x the fibre length. (7 Points)
- e) The IOR of the trace must match the Virtual Fibre being tested (5 points)
- f) The resolution setting must be the lowest that the range and pulse width combination supports (2 Points)



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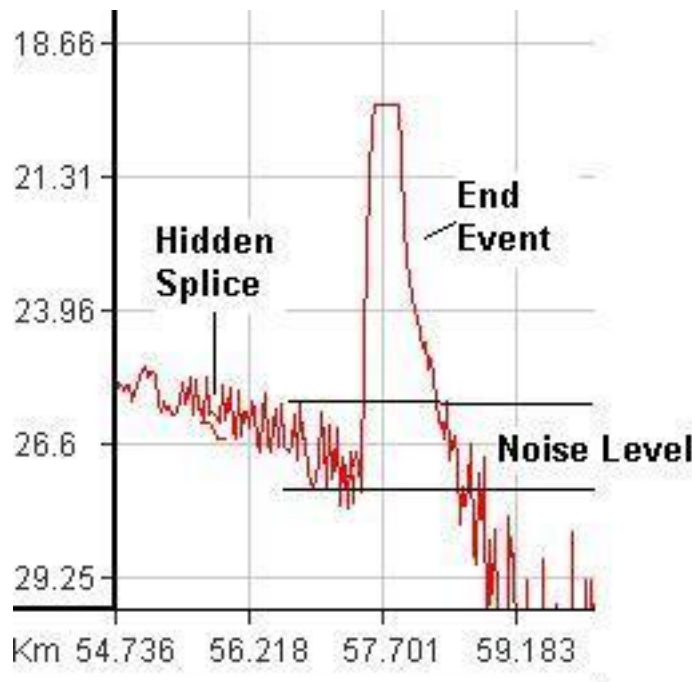
5.0 Trace Parameter Selection - Overview

This section grades the parameters that were selected by the user on the submitted traces. It validates Pulse Width, Acquisition Time, Range, Resolution and the IOR selected. As discussed in the introduction and other previous sections it assumes that being under assessment conditions the traces are of the highest quality and all efforts have been made to select the most appropriate parameters opposed to getting the traces completed quickly. This means that results are expected to exceed all of the key requirements of a high quality trace such as low noise, suitable Acquisition Time and a well selected range, resolution and IOR according to the Fibre Under Test.

Each trace has been evaluated for a number of characteristics that have been selected to provide an indication of the quality of the trace. Each characteristic is given a portion of the 35 marks available for this section and each trace contributes a percentage of the marks depending on the number of traces submitted. A more complete description of the marking criteria is given in the below sections.

5.0.1 Trace Noise is less than 0.15dB (7 Points)

A key indicator used to verify the pulse width and acquisition time selected is the amount of noise that is measured just in front of the end event on the trace. Excessive noise can hide smaller events and indicates a lack of Optical Power due to insufficient pulse width and / or insufficient acquisition time. A demonstration of how to measure the noise on the trace is given in the below diagram.



There are 7 points available for trace noise levels awarded evenly across the number of submitted traces. There were 6 trace/s submitted so each trace will have 1.17 points available for this section. Marking per trace is as follows:

- 1) Noise $\leq 0.15\text{dB}$ - 1.17 points per trace
- 2) Noise $> 0.15\text{dB}$ and $\leq 0.25\text{dB}$ - 0.585 points per trace
- 3) Noise $> 0.25\text{dB}$ and $\leq 0.35\text{dB}$ - 0.2925 points per trace
- 4) Noise $> 0.35\text{dB}$ - 0 points per trace



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5.0.2 Trace Acquisition Time (7 Points)

Noise level alone is not adequate to assess the pulse width and acquisition time as a trace with insufficient acquisition time can still present low noise if a large pulse width is selected. This has the effect of creating large dead zones which is also undesirable.

To ensure a suitable Acquisition Time is selected the following rule is enforced:

Trace acquisition time must be at least 1 Second for every Km of the Fibre Under test limited to 180Kms and no trace must be taken under 20 seconds.

Example:

- i) 150Km Test Fibre trace must be taken for 150 Seconds (2Min 30Sec)
- ii) 200Km Test Fibre trace must be tested for a minimum of 180 Seconds (3Min) as the rule is limited to 180 Seconds regardless of fibre length for any trace
- iii) 10Km Test Fibre must be tested for at least 20 Seconds as no trace should be under 20 Seconds regardless of distance

The above formula is very specific but it is a good guide for both the real world as well as when under assessment conditions. It is also clearly documented in the Marking Guide available while submitting results. If the formula is not correctly applied then the points for acquisition time will not be awarded.

There are 7 points available for trace acquisition time awarded evenly across the number of submitted traces. There were 6 trace/s submitted so each trace will have 1.17 points available for this section.

Marking per trace is as follows:

- 1) Acquisition Time \geq Specification - 1.17 points per trace
- 2) Acquisition Time $<$ Specification - 0 points per trace

5.0.3 Lowest Suitable Pulse Width has been Selected (7 Points)

To ensure that the dead zones are as small as possible the selected pulse width must be the lowest that will not cause the noise to exceed specification. This section automatically re-takes the trace with the selected pulse width reduced by one setting. If the noise is still within specification (i.e: $<0.15\text{dB}$) then the selected pulse width could have been reduced. This means that the dead zone could have been minimised while staying in specification for noise resulting in a better over all trace.

There are 7 points available for minimum suitable pulse width selected awarded evenly across the number of submitted traces. There were 6 traces submitted so each trace will have 1.17 points available for this section.

Marking per trace is as follows:

- 1) No lower Pulse Width is available for given Range / Resolution - 1.17 points per trace
- 2) Selected Pulse Width is lowest to remain in specification - 1.17 points per trace
- 3) Selected Pulse Width is not the lowest to remain in specification - 0 points per trace
- 4) If three Pulse widths lower than that selected is within noise specification then zero points will be awarded for the entire trace regardless of other results.



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5.0.4 Suitable Range Setting (7 Points)

OTDRs are not perfect in their operation and setting the range close to the fibre end can cause a number of unexpected results. It is required that the range setting be the lowest available that is no less than $1.5 \times$ the length of the Fibre Under Test.

Example:

A 100Km Test Fibre trace must have a minimum range of 150Kms but on the ODTR Emulator 150Kms is not a valid range setting so the next highest range of 250Kms must be used. This is true even though a setting of 125Km is available and much closer to the 150Km required but it is less than the $1.5 \times$ length formula and must not be used.

OTDRs have a limited number of data points that can be displayed to draw a given trace. If the range setting is higher than is required to meet the $1.5 \times$ Fibre length requirement then data points are wasted drawing the area of the trace that is after the end event. This causes the resolution and therefore the quality of the trace to be reduced.

Example:

A 50Km Test Fibre trace must have a range setting of a minimum of 75Kms which is available on the OTDR Emulator. If 250Kms was selected the $1.5 \times$ fibre length requirement will be achieved but a large amount of the available trace data points will be used drawing noise after the end event. This will result in a reduced resolution and poorer accuracy in event analysis.

There are 7 points available for suitable range setting selected awarded evenly across the number of submitted traces. There were 6 traces submitted so each trace will have 1.17 points available for this section.

Marking per trace is as follows:

- 1) Range is the lowest setting that is $1.5 \times$ the fibre length - 1.17 points per trace
- 2) Range is greater than the fibre length but less than $1.5 \times$ fibre length - 0.585 points per trace
- 3) Range is greater than the fibre length but not the lowest setting to achieve $1.5 \times$ fibre length - 0.585 points per trace
- 4) Range is less than fibre length, this will result in an instant 0 points for the entire trace

5.0.5 Suitable IOR Setting (5 Points)

IOR is used by the OTDR to calculate the speed of light in the Fibre Under Test which varies in different fibre types. To calculate distance the OTDR uses time for reflected light to return \times the speed of light in the fibre. If the IOR is incorrectly set the OTDR will estimate the speed of light in the fibre incorrectly and all distance measurements on the trace will be inaccurate.

There are 5 points available for the correct IOR being selected awarded evenly across the number of submitted traces. There were 6 traces submitted so each trace will have 0.83 points available for this section.

Marking per trace is as follows:

- 1) Correct IOR selected - 0.83 points per trace
- 2) Incorrect IOR selected - 0 points per trace

5.0.6 Lowest Resolution Setting (2 Points)

The resolution setting dictates the distance between data points on the trace and therefore the minimum distance that can identify a change in the fibre characteristic. Different Range and Pulse Width combinations allow for different resolutions to be available. The selected resolution must be the lowest that supports the range and pulse width selected

There are 2 points available for the lowest possible resolution being selected awarded evenly across the number of submitted traces. There were 6 traces submitted so each trace will have 0.33 points available for this section.

Marking per trace is as follows:

- 1) Lowest Possible Resolution Selected - 0.33 points per trace
- 2) Lowest Possible Resolution Not Selected - 0 points per trace



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5.0.6 Instant Failure Of Trace

Some characteristics of a trace can make it impossible to obtain any useful information or represents a significant failing in the parameter selection which results in the trace receiving no points regardless of other parameters being within specification.

This includes:

- 1) Noise on the trace greater than 1 dB
- 2) Range is less than the fibre length
- 3) Trace acquisition time is less than 1/2 that recommended
- 4) If the selected pulse width could be reduced by 3 settings and the trace noise is still within specification.





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5.1 Trace # 1 of 6 Trace ID: A-B.1310.50nS.25Km



Trace Details:

Title: A-B.1310.50nS.25Km
Direction: A-B
Wavelength: 1310 nM
Pulse Width: 50 nS
Trace Time: 1Min-0Sec
Range: 25000 m
Resolution: 0.125 m
IOR: 1.475

Virtual Fibre Details:

Virtual Fibre Title: Fibre 01
Fibre Length: 13629 m
IOR: 1.475

This Trace will be assessed according to the marking criteria detailed in the above sections (4.0.1 - 4.0.6)

Section	Points Awarded	Points available
1) Maximum Noise Level: The noise on this trace was measured to be 0.088 dB	1.17	1.17
2) Trace Acquisition Time: The acquisition time on this trace was 1Min-0Sec (60 Sec)	1.17	1.17
3) Minimum Pulse Width Selected: Noise on reduced Pulse Width trace was 0.21 dB	1.17	1.17
4) Selected Range Setting: The range selected on this trace was 25 Kms	1.17	1.17
5) Trace IOR: The IOR on this trace was 1.475	0.83	0.83
6) Trace Resolution Setting: The resolution setting on this trace was 0.125 m	0.33	0.33
7) Trace Total:	5.83	5.83

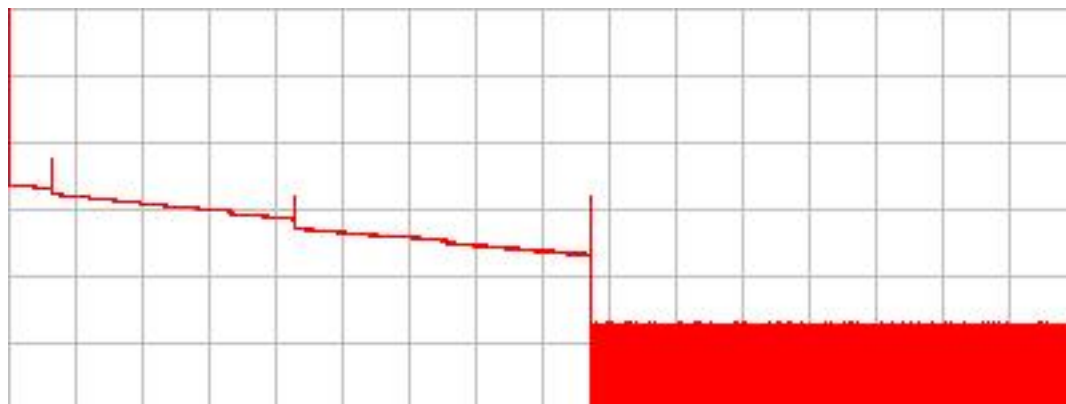
Comments:

Noise on the trace was below the specification of 0.15dB. Trace acquisition was adequate according to the formula given in section 4.0.2. As required, the selected pulse width was the lowest that would provide a suitable trace. The range was the lowest available to achieve the 1.5 x fibre length rule. The IOR matched the Fibre Under Test. The resolution was the lowest possible. The result of 100% indicated that over all the trace is of an exceptional quality.



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5.2 Trace # 2 of 6 Trace ID: A-B.1550.20nS.25Km



Trace Details:

Title: A-B.1550.20nS.25Km
Direction: A-B
Wavelength: 1550 nM
Pulse Width: 20 nS
Trace Time: 30Sec
Range: 25000 m
Resolution: 0.125 m
IOR: 1.475

Virtual Fibre Details:

Virtual Fibre Title: Fibre 01
Fibre Length: 13629 m
IOR: 1.475

This Trace will be assessed according to the marking criteria detailed in the above sections (4.0.1 - 4.0.6)

Section	Points Awarded	Points available
1) Maximum Noise Level: The noise on this trace was measured to be 0.109 dB	1.17	1.17
2) Trace Acquisition Time: The acquisition time on this trace was 30Sec (30 Sec)	1.17	1.17
3) Minimum Pulse Width Selected: Noise on reduced Pulse Width trace was 0.348 dB	1.17	1.17
4) Selected Range Setting: The range selected on this trace was 25 Kms	1.17	1.17
5) Trace IOR: The IOR on this trace was 1.475	0.83	0.83
6) Trace Resolution Setting: The resolution setting on this trace was 0.125 m	0.33	0.33
7) Trace Total:	5.83	5.83

Comments:

Noise on the trace was below the specification of 0.15dB. Trace acquisition was adequate according to the formula given in section 4.0.2. As required, the selected pulse width was the lowest that would provide a suitable trace. The range was the lowest available to achieve the 1.5 x fibre length rule. The IOR matched the Fibre Under Test. The resolution was the lowest possible. The result of 100% indicated that over all the trace is of an exceptional quality.



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5.3 Trace # 3 of 6 Trace ID: A-B.1625.20nS.25Km



Trace Details:

Title: A-B.1625.20nS.25Km
Direction: A-B
Wavelength: 1625 nM
Pulse Width: 10 nS
Trace Time: 2Min-0Sec
Range: 25000 m
Resolution: 0.125 m
IOR: 1.475

Virtual Fibre Details:

Virtual Fibre Title: Fibre 01
Fibre Length: 13629 m
IOR: 1.475

This Trace will be assessed according to the marking criteria detailed in the above sections (4.0.1 - 4.0.6)

Section	Points Awarded	Points available
1) Maximum Noise Level: The noise on this trace was measured to be 0.069 dB	1.17	1.17
2) Trace Acquisition Time: The acquisition time on this trace was 2Min-0Sec (120 Sec)	1.17	1.17
3) Minimum Pulse Width Selected: Noise on reduced Pulse Width trace was 0.204 dB	1.17	1.17
4) Selected Range Setting: The range selected on this trace was 25 Kms	1.17	1.17
5) Trace IOR: The IOR on this trace was 1.475	0.83	0.83
6) Trace Resolution Setting: The resolution setting on this trace was 0.125 m	0.33	0.33
7) Trace Total:	5.83	5.83

Comments:

Noise on the trace was below the specification of 0.15dB. Trace acquisition was adequate according to the formula given in section 4.0.2. As required, the selected pulse width was the lowest that would provide a suitable trace. The range was the lowest available to achieve the 1.5 x fibre length rule. The IOR matched the Fibre Under Test. The resolution was the lowest possible. The result of 100% indicated that over all the trace is of an exceptional quality.



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5.4 Trace # 4 of 6 Trace ID: B-A.1310.50nS.25Km



Trace Details:

Title: B-A.1310.50nS.25Km
Direction: B-A
Wavelength: 1310 nM
Pulse Width: 50 nS
Trace Time: 1Min-0Sec
Range: 25000 m
Resolution: 0.125 m
IOR: 1.475

Virtual Fibre Details:

Virtual Fibre Title: Fibre 01
Fibre Length: 13629 m
IOR: 1.475

This Trace will be assessed according to the marking criteria detailed in the above sections (4.0.1 - 4.0.6)

Section	Points Awarded	Points available
1) Maximum Noise Level: The noise on this trace was measured to be 0.103 dB	1.17	1.17
2) Trace Acquisition Time: The acquisition time on this trace was 1Min-0Sec (60 Sec)	1.17	1.17
3) Minimum Pulse Width Selected: Noise on reduced Pulse Width trace was 0.248 dB	1.17	1.17
4) Selected Range Setting: The range selected on this trace was 25 Kms	1.17	1.17
5) Trace IOR: The IOR on this trace was 1.475	0.83	0.83
6) Trace Resolution Setting: The resolution setting on this trace was 0.125 m	0.33	0.33
7) Trace Total:	5.83	5.83

Comments:

Noise on the trace was below the specification of 0.15dB. Trace acquisition was adequate according to the formula given in section 4.0.2. As required, the selected pulse width was the lowest that would provide a suitable trace. The range was the lowest available to achieve the 1.5 x fibre length rule. The IOR matched the Fibre Under Test. The resolution was the lowest possible. The result of 100% indicated that over all the trace is of an exceptional quality.



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5.5 Trace # 5 of 6 Trace ID: B-A.1550.20nS.25Km



Trace Details:

Title: B-A.1550.20nS.25Km
Direction: B-A
Wavelength: 1550 nM
Pulse Width: 20 nS
Trace Time: 30Sec
Range: 25000 m
Resolution: 0.125 m
IOR: 1.475

Virtual Fibre Details:

Virtual Fibre Title: Fibre 01
Fibre Length: 13629 m
IOR: 1.475

This Trace will be assessed according to the marking criteria detailed in the above sections (4.0.1 - 4.0.6)

Section	Points Awarded	Points available
1) Maximum Noise Level: The noise on this trace was measured to be 0.123 dB	1.17	1.17
2) Trace Acquisition Time: The acquisition time on this trace was 30Sec (30 Sec)	1.17	1.17
3) Minimum Pulse Width Selected: Noise on reduced Pulse Width trace was 0.39 dB	1.17	1.17
4) Selected Range Setting: The range selected on this trace was 25 Kms	1.17	1.17
5) Trace IOR: The IOR on this trace was 1.475	0.83	0.83
6) Trace Resolution Setting: The resolution setting on this trace was 0.125 m	0.33	0.33
7) Trace Total:	5.83	5.83

Comments:

Noise on the trace was below the specification of 0.15dB. Trace acquisition was adequate according to the formula given in section 4.0.2. As required, the selected pulse width was the lowest that would provide a suitable trace. The range was the lowest available to achieve the 1.5 x fibre length rule. The IOR matched the Fibre Under Test. The resolution was the lowest possible. The result of 100% indicated that over all the trace is of an exceptional quality.



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5.6 Trace # 6 of 6 Trace ID: B-A.1625.10nS.25Km



Trace Details:

Title: B-A.1625.10nS.25Km
Direction: B-A
Wavelength: 1625 nM
Pulse Width: 10 nS
Trace Time: 2Min-0Sec
Range: 25000 m
Resolution: 0.125 m
IOR: 1.475

Virtual Fibre Details:

Virtual Fibre Title: Fibre 01
Fibre Length: 13629 m
IOR: 1.475

This Trace will be assessed according to the marking criteria detailed in the above sections (4.0.1 - 4.0.6)

Section	Points Awarded	Points available
1) Maximum Noise Level: The noise on this trace was measured to be 0.078 dB	1.17	1.17
2) Trace Acquisition Time: The acquisition time on this trace was 2Min-0Sec (120 Sec)	1.17	1.17
3) Minimum Pulse Width Selected: Noise on reduced Pulse Width trace was 0.238 dB	1.17	1.17
4) Selected Range Setting: The range selected on this trace was 25 Kms	1.17	1.17
5) Trace IOR: The IOR on this trace was 1.475	0.83	0.83
6) Trace Resolution Setting: The resolution setting on this trace was 0.125 m	0.33	0.33
7) Trace Total:	5.83	5.83

Comments:

Noise on the trace was below the specification of 0.15dB. Trace acquisition was adequate according to the formula given in section 4.0.2. As required, the selected pulse width was the lowest that would provide a suitable trace. The range was the lowest available to achieve the 1.5 x fibre length rule. The IOR matched the Fibre Under Test. The resolution was the lowest possible. The result of 100% indicated that over all the trace is of an exceptional quality.



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6.0 Section 2: Trace Quality Summary

Per Characteristic Summary	Points Awarded	Points available
1) Maximum Noise Level:	7.0	7
2) Trace Acquisition Time:	7.0	7
3) Minimum Pulse Width Selected:	7.0	7
4) Selected Range Setting:	7.0	7
5) Trace IOR:	5.0	5
6) Trace Resolution Setting:	2.0	2
Per Trace Summary	Points Awarded	Points available
1) A-B.1310.50nS.25Km	5.83	5.83
2) A-B.1550.20nS.25Km	5.83	5.83
3) A-B.1625.20nS.25Km	5.83	5.83
4) B-A.1310.50nS.25Km	5.83	5.83
5) B-A.1550.20nS.25Km	5.83	5.83
6) B-A.1625.10nS.25Km	5.83	5.83
Section Total Summary	Points Awarded	Points Available
TOTAL:	35.0	35

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Section 3: Fibre Loss Measurements Assessment

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This section assesses that the Link and Insertion Loss values were accurately measured and submitted with this report.

This section is worth 20 points, to receive 100%:

- a) Bidirectional Insertion Loss measurements must be submitted for each wavelength with an error margin of no greater than 0.25dB (5 Points)
- b) The Bidirectional Insertion Loss average must be correctly calculated and have an error margin of less than 0.25dB (5 Points)
- c) Bidirectional Link Loss measurements must be submitted for each wavelength with an error margin of no greater than 0.25dB (5 Points)
- d) Bidirectional Link Loss average must be correctly calculated and have an error margin of less than 0.25dB (5 Points)



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7.0 Link Loss / Insertion Loss Measurements Selection - Overview

This section grades the values that were submitted for the Link Loss and Insertion Loss of the Fibre Under Test. It is expected that the fibre has been tested at all available wavelengths for both measurements and that the Bidirectional averages have been accurately calculated and submitted.

7.0.1 Insertion Loss (10 Points)

The Insertion Loss results must be taken from both end of the fibre. Unlike OTDR measurements, Loss Test Sets are not affected by gainers and Insertion Loss measured in either direction are expected to be exactly the same. The reason Insertion Loss is taken from both ends of the fibre is the average of the two measurements is more accurate than a single result. A vast variation in the A-B end Insertion Loss results compared to the B-A direction Insertion Loss results indicates that the measurement was poorly taken. This is often due to incorrect referencing techniques or dirty patch leads.

There are 5 points available for Bidirectional Insertion Loss measurements. To achieve full marks the results must be accurate for all wavelengths measured from both directions.

Marking is as follows:

- 1) Error Margin $\leq 0.25\text{dB}$: - 5 Points (0.834 per Wavelength, per direction)
- 2) Error Margin $> 0.25\text{dB}$ and $\leq 0.5\text{dB}$ - 2.5 Points (0.417 per Wavelength, per direction)
- 4) Error Margin $> 0.5\text{dB}$ - 0 for the measurement

There are a further 5 points available for submitting the correct bidirectional average Insertion Loss. For full marks the bidirectional average must be accurate for all wavelengths

Marking is as follows:

- 1) Error Margin $\leq 0.25\text{dB}$: - 5 Points (1.67 per Wavelength)
- 2) Error Margin $> 0.25\text{dB}$ and $\leq 0.5\text{dB}$ - 2.5 Points (0.834 per Wavelength)
- 4) Error Margin $> 0.5\text{dB}$ - 0 for the measurement

7.0.2 Link Loss Measurements (10 Points)

Link Loss results must be taken from both ends of the fibre as traces can present gainers that vary loss measurements when taken from either direction. This means that the actual Link Loss is only accurate when measured from both end of the Fibre Under Test and then averaged.

Link Loss is measured from the point on the trace that the launch normalizes to the point before the End Event reflection. The launch is dependent on the pulse width used and is therefore different for each trace. Points are awarded for Link Loss in both directions and at all available wavelengths, to calculate the actual link loss the assessment facility must have a trace for each direction and each wavelength. If no trace is submitted for a specific wavelength or direction then the Link Loss will be simply calculated as the loss of the fibre minus the first and last event attenuation. This technique does not account for launch dead zones and may cause inaccurate results and lost points for the assessment.

There are 5 points available for Bidirectional Link Loss measurements. To achieve full marks the results must be accurate for all wavelengths measured from both directions.

Marking is as follows:

- 1) Error Margin $\leq 0.25\text{dB}$: - 5 Points (0.834 per Wavelength, per direction)
- 2) Error Margin $> 0.25\text{dB}$ and $\leq 0.5\text{dB}$ - 2.5 Points (0.417 per Wavelength, per direction)
- 4) Error Margin $> 0.5\text{dB}$ - 0 for the measurement

There are a further 5 points available for submitting the correct bidirectional average Link Loss. For full marks the bidirectional average must be accurate for all wavelengths

Marking is as follows:

- 1) Error Margin $\leq 0.25\text{dB}$: - 5 Points (1.67 per Wavelength)
- 2) Error Margin $> 0.25\text{dB}$ and $\leq 0.5\text{dB}$ - 2.5 Points (0.834 per Wavelength)
- 4) Error Margin $> 0.5\text{dB}$ - 0 for the measurement



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7.0.3 Insertion Loss - Link Loss (0 Points)

Insertion Loss - Link Loss is an important measurement that can be used to characterise the First and Last connectors on the fibre. The result itself is important but it is only a subtraction of the measurements that have already been graded so no points are awarded for IL-LL.





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8.0 Fibre Under Test Correct Loss Values

	1310 nM	1550 nM	1625 nM
Insertion Loss			
dB:	6.448 dB	4.922 dB	5.612 dB
Link Loss			
A-B:	5.687 dB	4.144 dB	4.859 dB
B-A:	5.871 dB	4.386 dB	5.051 dB
Avg:	5.779 dB	4.265 dB	4.955 dB
Insertion Loss - Link Loss			
A-B:	0.669 dB	0.657 dB	0.657 dB

8.1 User Submitted Loss Values

	1310 nM	1550 nM	1625 nM
Insertion Loss			
A-B:	6.45 dB	4.92 dB	5.61 dB
B-A:	6.45 dB	4.92 dB	5.61 dB
Avg:	6.45 dB	4.92 dB	5.61 dB
Link Loss			
A-B:	5.581 dB	3.989 dB	4.768 dB
B-A:	5.732 dB	4.404 dB	4.921 dB
Avg:	5.6565 dB	4.2465 dB	4.8445 dB
Insertion Loss - Link Loss			
dB:	0.7935 dB	0.7735 dB	0.7655 dB

8.3 Error Margin Per Result

	1310 nM	1550 nM	1625 nM
Insertion Loss			
A-B:	-0.0020 dB	0.0020 dB	0.0020 dB
B-A:	-0.0020 dB	0.0020 dB	0.0020 dB
Avg:	-0.0020 dB	0.0020 dB	0.0020 dB
Link Loss			
A-B:	0.106 dB	0.155 dB	0.091 dB
B-A:	0.139 dB	-0.018 dB	0.13 dB
Avg:	0.122 dB	0.018 dB	0.111 dB
Insertion Loss - Link Loss			
dB:	-0.124 dB	-0.116 dB	-0.108 dB



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9.0 Section 3: Insertion Loss / Link Loss Summary

9.1 Awarded Marks Per Submitted Result

	1310 nM	1550 nM	1625 nM
Points For A-B Accuracy:	0.833	0.833	0.833
Points For B-A Accuracy:	0.833	0.833	0.833
Points For Avg Accuracy:	1.667	1.667	1.667

Insertion Loss

	1310 nM	1550 nM	1625 nM
Points For A-B Accuracy:	0.833	0.833	0.833
Points For B-A Accuracy:	0.833	0.833	0.833
points For Avg Accuracy:	1.667	1.667	1.667

Link Loss

Insertion Loss Summary	Points Awarded	Points Available
1)A - B:	2.5	2.5
2)B - A:	2.5	2.5
3)Avg:	5.0	5
Insertion Loss Total:	10.0	10
Link Loss Summary	Points Awarded	Points Available
1)A - B:	2.5	2.5
2)B - A:	2.5	2.5
3)Avg:	5.0	5
Link Loss Total:	10.0	10

Section Total Summary	Points Awarded	Points Available
TOTAL:	20.0	20

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Section 4: Event Analysis Assessment

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This section assesses that all events on the Fibre Under test have been identified and that their distance and loss in each direction has been accurately measured and reported.

This section is worth 30 points, to receive 100%:

- a) All events must be correctly identified for their type i.e: Reflective, Non-Reflective, Gainer, Pressure Point. (5 Points)
- b) The event distance must be given accurate to 25 Meters (10 points)
- c) Event Loss and Bidirectional Average must be given accurate to 0.025dB in both directions (15 Points)



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10.0 Event Measurements Selection - Overview

This section grades the users ability to identify and accurately measure individual events on the Fibre Under Test. The user submits the results of their analysis of the events including distance, loss and event type. The submitted distance is used to identify the closest event on the Fibre under Test. The closest event is then compared to the submitted results for accuracy of the remaining event characteristics such as loss and type. If event distance is inaccurate it may cause the incorrect event to be selected for comparison and result in additional lost points.

It is not possible to identify event loss on the first or last connector. For this reason no analysis of these events will be included in this report.

10.0.1 Event Distance Accuracy (10 Points)

The user must locate all events on the trace and accurately measure the distance from both the A direction and B direction traces. This requires the user to be able to flip the trace and match the event from both ends of the fibre.

This section is worth 10 points across all events that are on the Fibre Under Test. There were 10 events on the Fibre Under Test (Not including first and last connectors) so each event is worth 1.0 Points

The sum of the A and B Meter results should equal the fibre length. If not, the difference is the total error in the distance measurement. If the event distance from the A and B ends have an error they will not point to exactly the same point on the trace from either end. The averaged event distance is the center of the difference between the the A end and B end measurements.

To achieve full marks the averaged event distance measurement must be accurate for all events. Marking is as follows:

- 1) A - B Averaged Error Margin \leq 25 Meters - 10 Points (1.0 per Event)
- 2) A - B Averaged Error Margin $>$ 25 Meters and \leq 50 Meters - 5 Points (0.5 per Event)
- 3) A - B Averaged Error Margin $>$ 50 Meters and \leq 100 Meters - 2.5 Points (0.25 per Event)
- 4) A - B Averaged Error Margin $>$ 100 Meters - 0 for the measurement
- 5) 0 Points if the event is not identified



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10.0.2 Event Type (5 Points)

Once the reported event distance has been determined the nearest event on the Fibre Under Test is taken as the one under investigation. The user has identified their analysis of the event type i.e.: Reflective, Non-Reflective, Gainer or a Pressure Point.

The actual events on the Fibre Under Test can either be Reflective or Non-Reflective. The event will be deemed a gainer if the loss in any direction at any wavelength is negative (i.e. a gain) and the event is a Non-Reflective type. The event will be deemed a pressure point if there is greater than 50% additional attenuation at 1625nm than 1550nm or 1550nm than at 1310nm in either direction.

e.g: If an event was measured to be 0.5dB at 1310nm and 0.75dB at 1550nm it would be considered a pressure point. It is important to consider this specification when testing small loss events as 0.05 at 1310nm and 0.075 at 1550nm is only 0.025dB difference but still identified as a pressure point.

On real fibre there is often a pressure point at or near a Reflective event. While it is still a Reflective event, the pressure point is the more important feature to report on and as such must be labeled as a pressure point. This is a difficult condition to analyse but is common in the real world and needs to be addressed in training as well.

This section is worth 5 points across all events that are on the Fibre Under Test. There were 10 events on the Fibre Under Test so each event is worth 0.5 Points

To achieve full marks all events on the Fibre Under Test must be listed and their type correctly identified
Marking is as follows:

- 1) Event Type Correctly Identified: 5 Points (0.5 per Event)
- 2) Event Type Not Correctly Identified: 0 Points
- 3) 0 Points if the event is not identified

10.0.3 Event Loss Analysis (15 Points)

Event Loss measurements need to be taken from both the A and B end traces and a Bi-directional average needs to be provided.

It is assumed that the user fully understands the operation of 2 Point, LSA and 2 Point Corrected modes for loss measurement and that in all event loss measurements the most appropriate mode was used to provide the highest accuracy in the result.

This section is worth 15 points across all events that are on the Fibre Under Test. There were 10 events not including the first and last connectors on the Fibre Under Test so each event is worth 1.5 Points Points are split evenly between the A-B, B-A and Average Loss Results per wavelength

To achieve full marks the loss measurements must be accurate for all events measured from both directions.

Marking is as follows:

- 1) Error Margin ≤ 0.025 dB: - 15 Points (1.5 Per Event divided between wavelength and direction)
- 2) Error Margin > 0.025 dB and ≤ 0.05 dB - 7.5 Points (0.75 Per Event divided between wavelength and direction)
- 3) Error Margin > 0.1 dB - 0 Points for the measurement
- 4) 0 Points if the event is not identified



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11.0 Submitted Event Analysis and Assessment

This section lists each of the events on the Fibre Under Test. Results are associated with an event by the distance submitted. If the user accurately identified the event distance then the analysis of the submitted event loss with points awarded for accuracy is listed below the event details.

Event Number: 1

Event Type: Reflective Event
Event Label: test Fibre Event
Meters From A End: 1000 M
Meters From B End: 12629 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.35 dB	0.35 dB	0.35 dB
B-A:	0.35 dB	0.35 dB	0.35 dB
Avg:	0.35 dB	0.35 dB	0.35 dB

Associated Event 1

Distance Measurement Result
Submitted Meters From A End: 1000.0 M
Submitted Meters From B End: 12630.0 M
Meters From A Averaged: 999.5 M (A and B Meters corrected to Fibre Length)
Averaged Distance Error: -0.5 M
Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: Reflective Event
The event was submitted as: Reflective
Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.345 dB	0.349 dB	0.356 dB
B-A:	0.35 dB	0.35 dB	0.35 dB
Avg:	0.3475 dB	0.3495 dB	0.353 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	0.0050 dB	0.0010 dB	-0.0060 dB
B-A:	0.0 dB	0.0 dB	0.0 dB
Avg:	0.0030 dB	0.0010 dB	-0.0030 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 2

Event Type: NonReflective Event
Event Label: Lead In Splice
Meters From A End: 1899 M
Meters From B End: 11730 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.05 dB	0.05 dB	0.05 dB
B-A:	0.05 dB	0.05 dB	0.05 dB
Avg:	0.05 dB	0.05 dB	0.05 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 1900.0 M
 Submitted Meters From B End: 11732.0 M
 Meters From A Averaged: 1898.5 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: -0.5 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result
 The actual event type is: NonReflective Event
 The event was submitted as: Non-Reflective
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.046 dB	0.045 dB	0.047 dB
B-A:	0.052 dB	0.047 dB	0.06 dB
Avg:	0.049 dB	0.046 dB	0.0535 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	0.0040 dB	0.0050 dB	0.0030 dB
B-A:	-0.0020 dB	0.0030 dB	-0.01 dB
Avg:	0.0010 dB	0.0040 dB	-0.0030 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 3

Event Type: NonReflective Event
Event Label: AA
Meters From A End: 3110 M
Meters From B End: 10519 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.06 dB	0.07 dB	0.05 dB
B-A:	0.05 dB	0.07 dB	0.06 dB
Avg:	0.055 dB	0.07 dB	0.055 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 3111.0 M
 Submitted Meters From B End: 10521.0 M
 Meters From A Averaged: 3109.5 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: -0.5 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: NonReflective Event
 The event was submitted as: Non-Reflective
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.059 dB	0.069 dB	0.049 dB
B-A:	0.047 dB	0.06 dB	0.055 dB
Avg:	0.0506 dB	0.6045 dB	0.0535 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	0.0010 dB	0.0010 dB	0.0010 dB
B-A:	0.0030 dB	0.01 dB	0.0050 dB
Avg:	0.0040 dB	-0.534 dB	0.0020 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 4

Event Type: NonReflective Event
Event Label: AB -Pressure Point
Meters From A End: 5222 M
Meters From B End: 8407 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.05 dB	0.15 dB	0.3 dB
B-A:	0.05 dB	0.15 dB	0.3 dB
Avg:	0.05 dB	0.15 dB	0.3 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 5222.0 M
 Submitted Meters From B End: 8408.0 M
 Meters From A Averaged: 5221.5 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: -0.5 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: NonReflective Event but the loss characteristics of the event indicates that it is a Pressure Point.
 The event was submitted as: Pressure Point
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.05 dB	0.147 dB	0.3 dB
B-A:	0.05 dB	0.15 dB	0.309 dB
Avg:	0.05 dB	0.1485 dB	0.30045 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	0.0 dB	0.0030 dB	0.0 dB
B-A:	0.0 dB	0.0 dB	-0.0090 dB
Avg:	0.0 dB	0.0020 dB	0.0 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 5

Event Type: NonReflective Event
Event Label: Pigtail_CC01
Meters From A End: 6665 M
Meters From B End: 6964 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.05 dB	0.05 dB	0.05 dB
B-A:	0.05 dB	0.05 dB	0.05 dB
Avg:	0.05 dB	0.05 dB	0.05 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 6665.0 M
 Submitted Meters From B End: 6964.0 M
 Meters From A Averaged: 6665.0 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: 0.0 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: NonReflective Event
 The event was submitted as: Non-Reflective
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.058 dB	0.046 dB	0.057 dB
B-A:	0.05 dB	0.05 dB	0.05 dB
Avg:	0.054 dB	0.048 dB	0.0535 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	-0.0080 dB	0.0040 dB	-0.0070 dB
B-A:	0.0 dB	0.0 dB	0.0 dB
Avg:	-0.0040 dB	0.0020 dB	-0.0030 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 6

Event Type: Reflective Event
Event Label: CC01
Meters From A End: 6690 M
Meters From B End: 6939 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.35 dB	0.35 dB	0.35 dB
B-A:	0.35 dB	0.35 dB	0.35 dB
Avg:	0.35 dB	0.35 dB	0.35 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 6690.0 M
 Submitted Meters From B End: 6939.0 M
 Meters From A Averaged: 6690.0 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: 0.0 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: Reflective Event
 The event was submitted as: Reflective
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.35 dB	0.35 dB	0.35 dB
B-A:	0.35 dB	0.35 dB	0.35 dB
Avg:	0.35 dB	0.35 dB	0.35 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	0.0 dB	0.0 dB	0.0 dB
B-A:	0.0 dB	0.0 dB	0.0 dB
Avg:	0.0 dB	0.0 dB	0.0 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 7

Event Type: Reflective Event
Event Label: CC02
Meters From A End: 6705 M
Meters From B End: 6924 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.13 dB	0.12 dB	0.14 dB
B-A:	0.13 dB	0.14 dB	0.14 dB
Avg:	0.13 dB	0.13 dB	0.14 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 6706.0 M
 Submitted Meters From B End: 6924.0 M
 Meters From A Averaged: 6705.5 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: 0.5 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: Reflective Event
 The event was submitted as: Reflective
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.18 dB	0.18 dB	0.18 dB
B-A:	0.18 dB	0.18 dB	0.18 dB
Avg:	0.18 dB	0.18 dB	0.18 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	-0.05 dB	-0.06 dB	-0.04 dB
B-A:	-0.05 dB	-0.04 dB	-0.04 dB
Avg:	-0.05 dB	-0.05 dB	-0.04 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0



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Event Number: 8

Event Type: NonReflective Event
Event Label: PigTail Splice
Meters From A End: 6715 M
Meters From B End: 6914 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.05 dB	0.05 dB	0.05 dB
B-A:	0.05 dB	0.05 dB	0.05 dB
Avg:	0.05 dB	0.05 dB	0.05 dB

There were no results submitted with a distance that was closest to this event
 Zero points were awarded for this Event.

Event Number: 9

Event Type: NonReflective Event
Event Label: AC - A:B Gainer
Meters From A End: 9049 M
Meters From B End: 4580 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	-0.05 dB	-0.05 dB	-0.05 dB
B-A:	0.15 dB	0.15 dB	0.15 dB
Avg:	0.05 dB	0.05 dB	0.05 dB

Associated Event 1

Distance Measurement Result
 Submitted Meters From A End: 9048.0 M
 Submitted Meters From B End: 4580.0 M
 Meters From A Averaged: 9048.5 M (A and B Meters corrected to Fibre Length)
 Averaged Distance Error: -0.5 M
 Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result
 The actual event type is: NonReflective Event but the loss characteristics of the event indicates that is is a gainer.
 The event was submitted as: Gainer
 Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	-0.05 dB	-0.05 dB	-0.05 dB
B-A:	0.15 dB	0.15 dB	0.15 dB
Avg:	0.05 dB	0.05 dB	0.05 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	0.0 dB	0.0 dB	0.0 dB
B-A:	0.0 dB	0.0 dB	0.0 dB
Avg:	0.0 dB	0.0 dB	0.0 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5



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Points for 1550nM 0.5

Points for 1310nM 0.5

Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0

Event Number: 10

Event Type: NonReflective Event
Event Label: AD
Meters From A End: 10277 M
Meters From B End: 3352 M

Correct Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.17 dB	0.15 dB	0.17 dB
B-A:	0.16 dB	0.17 dB	0.15 dB
Avg:	0.165 dB	0.16 dB	0.16 dB

Associated Event 1

Distance Measurement Result
Submitted Meters From A End: 10278.0 M
Submitted Meters From B End: 3352.0 M
Meters From A Averaged: 10277.5 M (A and B Meters corrected to Fibre Length)
Averaged Distance Error: 0.5 M
Points Awarded for Distance Accuracy: 1.0 out of 1.0

Event Type Result

The actual event type is: NonReflective Event
The event was submitted as: Non-Reflective
Points Awarded for Event Type Selection: 0.5 out of 0.5

Submitted Event Loss Result

Submitted Loss Values For Event

	1310 nM	1550 nM	1625 nM
A-B:	0.175 dB	0.164 dB	0.16 dB
B-A:	0.16 dB	0.171 dB	0.154 dB
Avg:	0.1675 dB	0.168 dB	0.157 dB

Submitted Loss Error Margin

	1310 nM	1550 nM	1625 nM
A-B:	-0.0050 dB	-0.014 dB	0.01 dB
B-A:	0.0 dB	-0.0010 dB	-0.0040 dB
Avg:	-0.0030 dB	-0.0080 dB	0.0030 dB

Awarded Points Per Measurement

	1310 nM	1550 nM	1625 nM
A-B:	0.167	0.167	0.167
B-A:	0.167	0.167	0.167
Avg:	0.167	0.167	0.167

Points for 1310nM 0.5

Points for 1550nM 0.5

Points for 1310nM 0.5



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Total Points For Event Loss Analysis: 1.5 out of 1.5

This submitted result set scored 3.0

There was one submitted result associated with this event. The points awarded for this event is: 3.0





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12.0 Section 4: Event Analysis Summary

12.1 Awarded Marks Per Event

Event 1 awarded : 3.0 out of 2.0
Event 2 awarded : 3.0 out of 2.0
Event 3 awarded : 3.0 out of 2.0
Event 4 awarded : 3.0 out of 2.0
Event 5 awarded : 3.0 out of 2.0
Event 6 awarded : 3.0 out of 2.0
Event 7 awarded : 3.0 out of 2.0
Event 8 awarded : 0.0 out of 2.0
Event 9 awarded : 3.0 out of 2.0
Event 10 awarded : 3.0 out of 2.0

13.0 Report Summary

13.1 Awarded Marks Per Section

Section 1: Correct Traces Submitted: 15.0 awarded out of 15
Section 2: Traces Quality: 35.0 awarded out of 35
Section 3: Link Loss / Insertion Loss: 20.0 awarded out of 20
Section 4: Trace Event Analysis: 27.0 awarded out of 30

Report Total: 97.0 of 100