



Islesboro Fiber Testing

February 5th, 2016

Required Equipment	<ul style="list-style-type: none">● OTDR (Optical Time Domain Reflectometer)<ul style="list-style-type: none">○ Current calibration from the manufacturer or a certified service center○ Supports Chromatic Dispersion (CD) testing○ Supports Polarization Mode Dispersion (PMD) testing● 1Km OTDR Launch Cable (Pulse Suppressor)● Fiber Optic Scope, capable of capturing images● Optical Power Meter● Fiber optic cleaning supplies. Examples include but are not limited to Cletop and one-click
OTDR General Guidelines	<ul style="list-style-type: none">● All tests run using 1310nm, 1490nm and 1550nm● Bi-directional testing is required for each strand● OTDR pulse width should be set to capture all fiber jumpers and connections● All test results shall be stored in a .sor file format <u>and</u> as a .pdf● Results need to include A & Z Location name, Port, Fiber ID, and Cable ID. Along with Date, Wavelength, Pulse Width, and End to End Loss.● All test results will be recorded on a spreadsheet or similar format. A sample spreadsheet called "Islesboro Fiber Testing Results" with the minimum required information is included as an example.● Results (.sor files and .pdf files) will be provided on a USB storage drive● Pulse Suppressor is required for all OTDR testing
OLS/OPM Requirements	<ul style="list-style-type: none">● All tests run using 1310nm, 1490nm and 1550nm and bi-directional● All test results will be recorded on a spreadsheet or similar format. A sample spreadsheet called "Islesboro Fiber Testing Results" with the minimum required information is included as an example.
Optical Scope Requirements	<ul style="list-style-type: none">● All connectors must be scoped before a connection is made.● All scoped connections must be captured as a digital image or PDF● Results (.jpg or .pdf files) will be provided on a USB storage drive
Specifications	<p>Maximum Loss Values (Bi-directional average¹):</p> <ul style="list-style-type: none">.20db = Fusion splice.30db = Fiber loss per Km @1550nm.38db = Fiber loss per Km @1490nm.40db = Fiber loss per Km @1310nm.50db = SC/APC Connector16.8db = 1x32 PLC splitter loss <p>Chromatic Dispersion (CD):</p> <ul style="list-style-type: none">1310nm: $\leq 3.2\text{ps/nm*km}$1550nm: $\leq 18.0\text{ps/nm*km}$ <p>Polarization Mode Dispersion (PMD):</p> <ul style="list-style-type: none">Max individual fiber: $\leq 0.1\text{ps/square root(km)}$PMD Link Design Value (LDV): $\leq 0.06\text{ps/square root(km)}$

¹ Each fiber path will be tested in an A-to-Z, then Z-to-A manner with results added together and divided by two to calculate a bi-directional average.

Testing Scenarios Scope A - Outside Plant Fiber and Wireless Construction

If instructions, guidelines and/or specifications defined in this document conflict with the testing requirements published in the Islesboro RFP (2016-01-07), this document is to be considered authoritative.

OTDR Testing Scenarios

All scenarios listed below reference Diagram #1. The diagram serves as a reference only and does not include all sites. The scenarios depicted represent the desire to capture test results for every segment, fiber strand and complete circuit on the network. To fulfill the testing requirements, bi-directional tests must be conducted using the guidelines provided above and include all scenarios defined as well as any additional scenarios identified by bidder as necessary to deliver a fully functional network. OTDR results must be provided for every optical port and circuit in the network.

Terminal (opti-tap port) to Fiber Distribution Hut (FDH)

(diagram #1 port 1 to port 2)

Terminal (opti-tap port) to POP

(diagram #1 port 12 to port 11)

Terminal (opti-tap port) to POP through FDH PLC Splitter -- ****Uni-directional Only****

(diagram #1 port 1 to port 4)

POP to FDH (feeder fiber to splitters @FDH)

(diagram #1 port 3 to port 4)

POP to Mainland MFC splice case

(diagram #1 port 5 to port 8)

POP to Islesboro/CMP interconnection splice case**

(diagram #1 port 5 to port 6)

Islesboro/CMP interconnection splice case to Mainland MFC splice case**

(diagram #1 port 7 to port 8)

***These tests must be performed before splicing is completed in the Islesboro/CMP interconnection splice case*

OLS/OPM Testing Scenarios

Optical loss for each splitter port is calculated by taking the difference between the TX power of the OLS and the RX power of the OPM. The test is conducted in the opposite direction and averaged with the first result to generate a bi-directional average loss. A sample connection is illustrated in Diagram #2.

1. POP 1x32 splitters **(diagram #1 port 9 to port 10)**
2. FDH 1x32 splitters **(diagram #1 port 9 to port 10)**

Testing Scenarios Scope C - Inside Wiring and Customer Premise

RFP Section 7.1.7 includes the following:

- Measurement of optical receive power and confirmation that optical signal is within manufacturer specification.
- Connect Contractor laptop directly to ONT RJ-45 port
 - Obtain public IP address
- Speed test using a testing service provided by the Network Operator
 - Contractor should utilize a laptop that is capable of a minimum 800 Mb/s symmetrical speed test results
 - Laptops should be calibrated at the POP Shelter prior to testing in the field
- Test results will be recorded electronically by the Contractor.

All test results will be recorded on a spreadsheet or similar format. A sample spreadsheet called “Islesboro Fiber Testing Results” with the minimum required information is included as an example.

Diagram #1

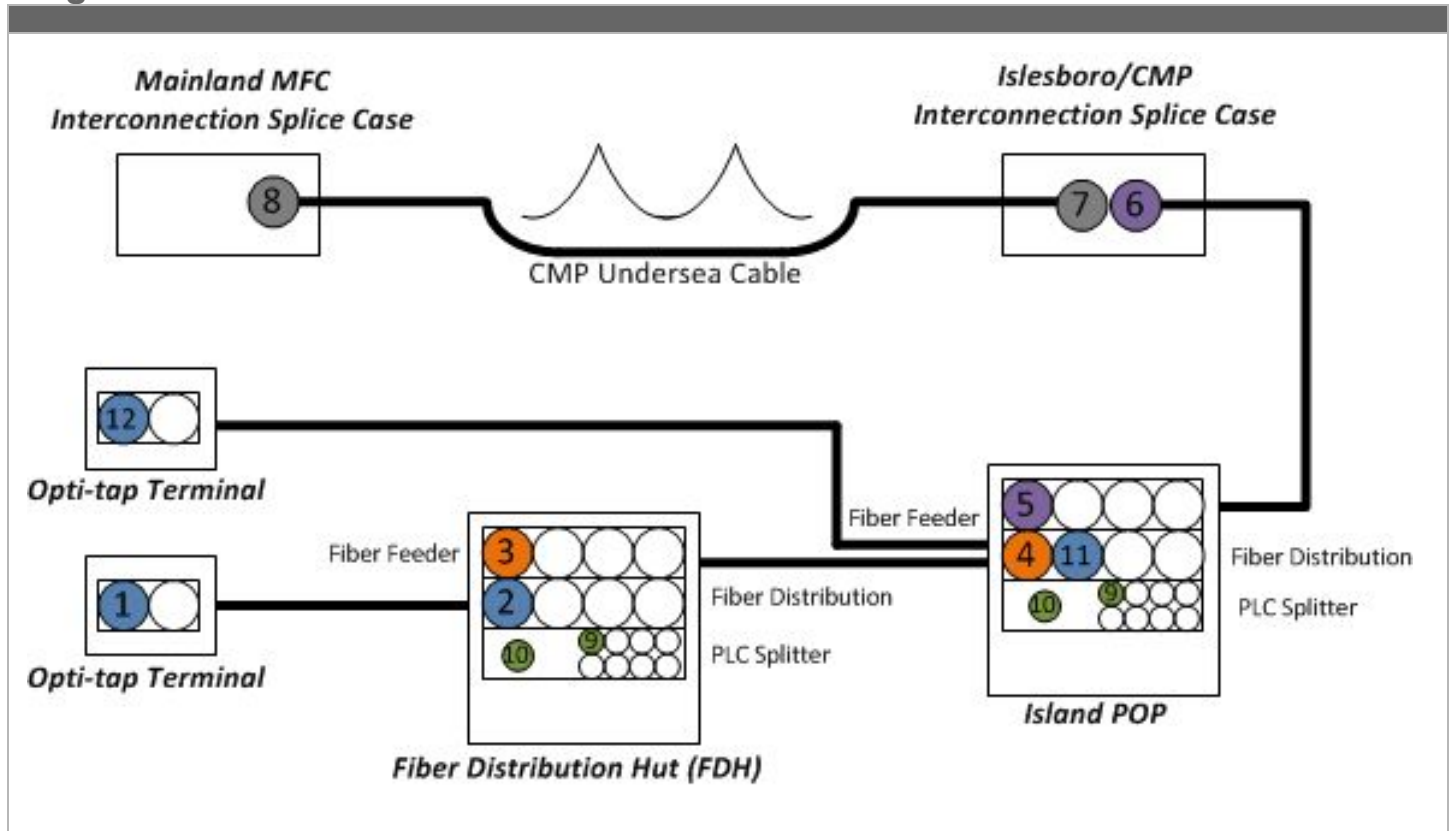


Diagram #2

