T-BERD/MTS 8000E Platform

Uni-Directional Fiber Characterization

Test Procedure

This document describes the procedure to configure and perform the characterization of an optical fiber link using a mated pair of T-BERD/MTS 8000 test platform and an OBS5x0 broadband source.

T-BRERD/MTS 8000 unit

OBS 5x0

TEST SET REVIEW AND PREPARATION

FIBER CHARACTERIZATION OVERVIEW

Fiber Characterization is a comprehensive suite of point-to-point physical layer optical tests that measures and determines the quality and potential transmission capability of a given optical fiber.

Fiber Characterization testing, prior to network element installation, provides a true picture of the network's physical characteristics and expected performance for various technologies (10/40/100Gb/s Ethernet, DWDM, CWDM)

It enables the equipment manufacturer to provide the operator with the most cost-optimized solution for a given bit rate.

A uni-directional fiber characterization suite of test includes:

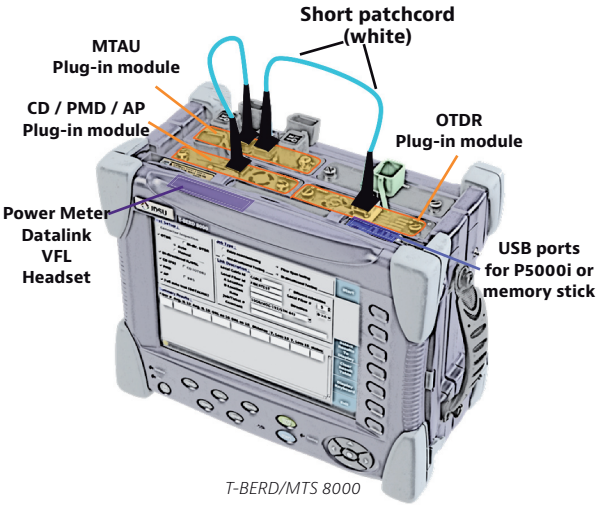
- Connector end face inspection
- Unii-directional OTDR testing
- Chromatic Dispersion (CD) testing
- Polarization Mode Dispersion (PMD) testing
- Attenuation Profile (AP)

RECOMMENDED TEST EQUIPMENT AND ACCESSORIES

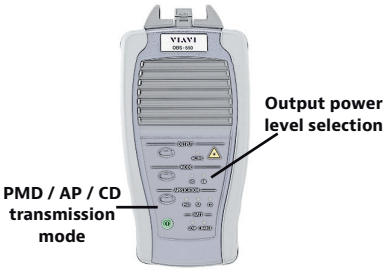
Prior to testing you will need to locate the following test equipment and accessories. Most of this equipment is found in the Fiber Characterization Test Kit you have purchased.

Test units

- 1xT-BERD 8000 unit equipped with 3 test modules, built-in Power meter, VFL and talkset.
- 1xOBS5x0 Broadband Source for PMD/AP/CD testing



T-BERD/MTS 8000



OBS 5x0

Accessories

- 2x inspection scopes P5000i - one for each site

It's recommended to equip the far end user with a stand-alone VIAVI P5000i unit attached to a handheld display

- 1x connector tip boxes for P5000i with 7 tips. one for each site

- 2 x 3m (10 inch) fiber patchcords 2 for each site

- Fiber optic cleaning tools (not included in the kit)

FIBER CHARACTERIZATION TEST CRITERIA

Shown below are the pertinent criteria, pass/fail thresholds and associated Standards for testing fiber. The Viavi fiber characterization test kit will measure all these parameters.

Parameter	JDSU	Relevant international standard
Fiber Slope	0.35 dB / km @ 1310nm 0.25 dB / km @ 1550nm	ITU-T G.650.3, IEC-60793-1-22, TIA-455-133-A-2003
Insertion Loss (IL)	Varies by span	ITU-T G.650.1, IEC 60793-1-40, TIA/EIA-455-78B
Optical Return Loss (ORL)	>30dB	IEC 61300-3-6, IEC 61300-3-7, EIA/TIA-455-107A
Splice Loss	<0.3 dB 1-way <0.15 bidir avg	ITU-T G.650, IEC 60874-1, IEC 61073-1, TIA/EIA-455-8
Connector Loss	<0.5 dB 1-way <0.3 bidir avg	ITU-T G.650, IEC 60874-1, IEC 61073-1, TIA/EIA-455-8
Connector Reflectance	<-35dB	ITU-T G.650, IEC 60874-1, IEC 61073-1, TIA/EIA-455-8
PMD	5ps for 10GE 10ps for 10Gb/s 2.5ps for 40G 25ps for 100GE (DP-QPSK)	ITU-T G.650.2, IEC 60793-1-48, TIA-455-113
CD	738 ps/nm for 10GE 1000 ps/nm for 10Gb/s 80ps/nm for 40G 30,000 ps/nm for 100GE (DP-QPSK)	ITU-T G.650.1, IEC 60793-1-42, ANSI/TIA-455-175-B (2003)
AP	0.25 dB:km at 1550 nm 0.25 dB/km at 1600 nm	TIA/EIA-455-61, TIA/EIA-455-78, IEC 61300-3-7, IEC 60793-1-1

SOFTWARE DOWNLOADS

Verify your test equipment has the latest software update to ensure proper operation. This includes TBERD 6000A, TBERD 8000, FiberChek PRO inspection for P5000i fiber scopes. Software conflicts between P5000i scope and T-BERD/MTS units may impact the test process.

Make sure the 6000 and 8000 units have the same software version.

Use the following internet links to check for latest SW and follow upgrade procedure.

TBERD 8000

http://8k.updatemyunit.net/

T-BERD®/MTS-8000 V2 Platform

http://8k.updatemyunit.net

FiberChek PRO

http://fcpro.updatemyunit.net/

FiberChek™ PRO Software

http://fcpro.updatemyunit.net

The FiberCheck™Pro software is used to upgrade the P5000i inspection probe. It requires installation on a PC and direct connection of the P5000i probe.

CIRCUIT/LINK INFORMATION REQUIREMENTS

The following information is required before beginning testing. This information should be readily available from Transport Engineering, Service or Dark Fiber Provider.

- Schematic showing all sites on ring
- Span distance information between all sites on ring
- Fiber #s assigned to be used at each location
- Job information
- Required pass/Fail criteria for splice loss, connector loss and reflectance, total ORL
- Expected transmission speed for the tested link (e.g. 10Gb/s, 40Gb/s, 100Gb/s…)

Prior to starting a test sequence:

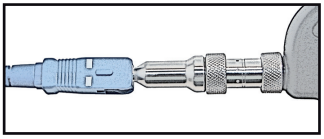
1. Locate all physical fiber ports on panel
2. Identify the fiber under test (FUT) and the fiber used for the datalink connection.

INSPECT AND CLEAN CONNECTORS

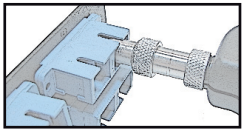
Before connecting a fiber into a test module or fiber panel, inspect and clean the bulkhead and the fiber jumper connectors.

1. Connect the P5000i video inspection scope to both units USB port (any)
2. Press the ON OFF hard key on the both units to turn-up.
3. Press the HOME hard key on the T-BERD/MTS 8000
4. Press the SYSTEM hard key on the T-BERD/MTS 6000A or HOME if 6000AV2
5. Activate the Microscope 

function on both units by touching twice with your finger or stylus.
6. Use the P5000i video inspection scope to verify the connector quality.



Patchcord inspection



Bulkhead and test port inspection

7 Use appropriate cleaning material (e.g. IBC™ cleaner, cotton swab, dust air sprays, etc...) and re-inspect to confirm.

ACTIVATING THE TEST FUNCTIONS – T-BERD/MTS 8000

1 Press the ON OFF hard key to turn-up.

2 Press the HOME hard key when unit is on.

3 Activate the test functions by touching twice with your finger or stylus

4 Activate 6 test functions: 

REFERENCING THE TEST FUNCTIONS

The following test functions require REFERENCING before performing field tests:

- Chromatic Dispersion (CD) and Attenuation Profile (AP)

If the references have already been performed, skip this step.

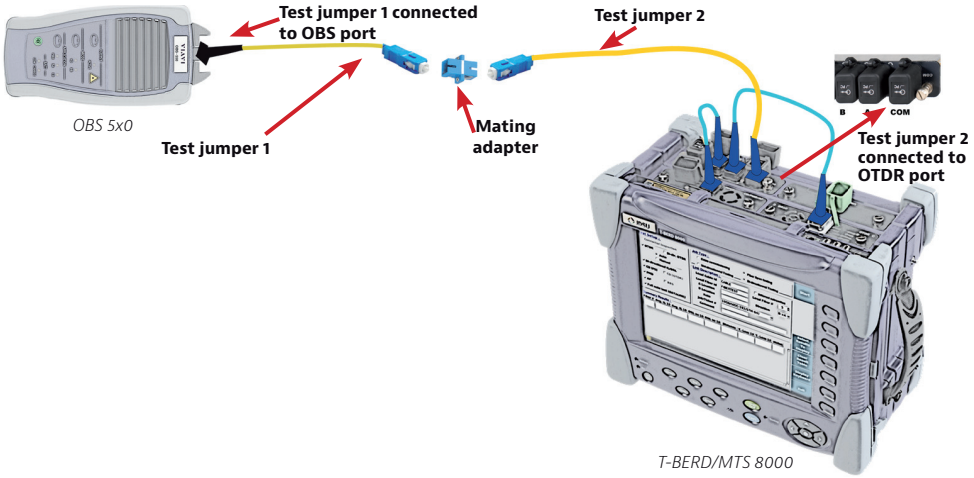
CHROMATIC DISPERSION (CD) REFERENCING PROCESS - IN THE OFFICE

CONNECTING BOTH UNITS

1 Inspect and clean connectors of the fiber jumpers, the COM port of the T-BERD/MTS 8000 and the OTDR port of the T-BERD/MTS 6000A using the P5000i inspection scope.

2 Connect the fiber jumper 1 to the T-BERD/MTS 8000 COM port of the MTAU module and to the mating adapter.

3 Connect the fiber jumper 2 to the OBS5x0 and to the mating adapter.



ACTIVATE THE OBS5X0 SOURCE

1. Press the ⏻ button to turn on the OBS5x0 handheld.
2. Press the **Application** hard key 

until the CD LED is on.
3. Press the **Output** hard key 

to activate the Source.

PERFORMING CD REFERENCING ON THE T-BERD/MTS 8000

1. Press the SETUP hard key.
2. Touch the 

tab.
3. Select 

4. Enter the BBS serial number under 

BBS serial number is displayed at the back of the OBS5x0

5. Press the START STOP key
6. Confirm by pressing YES when the message 

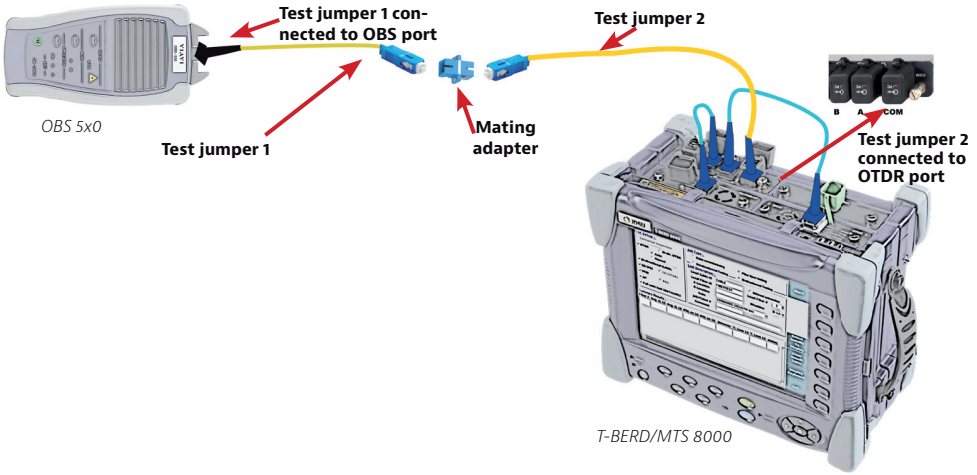
pops up.

A message Valid Reference is displayed in green. If not, verify proper connector cleanliness and interconnections then restart referencing process

ATTENUATION PROFILE (AP) REFERENCING PROCESS - IN THE OFFICE

CONNECTING BOTH TEST SETS (IF NOT ALREADY DONE)

1. Inspect and clean connectors of the fiber jumpers, the COM port of the T-BERD/MTS 8000 using the P5000i inspection scope.
2. Connect the fiber jumper 1 to the T-BERD/MTS 8000 COM port of the MTAU module and to the mating adapter.
3. Connect the fiber jumper 2 to the OBS5x0 and to the mating adapter.



ACTIVATE THE OBS5X0 SOURCE

1. Press the ⏻ button to turn on the OBS5x0 handheld.
2. Press the **Application** hard key 

until the CD LED is on.
3. Press the **Output** hard key 

to activate the Source.

PERFORMING AP REFERENCING ON THE T-BERD/MTS 8000

1. Press the SETUP hard key.
2. Touch the 

tab.
3. Select 

.
4. Enter the BBS serial number under 

.

BBS serial number is displayed on the T-BERD / MTS6000A Results page

5. Press the START STOP key
6. Confirm by pressing YES when the message 

pops up.

A message Valid Reference is displayed in green. If not, verify proper connector cleanliness and interconnections then restart referencing process

HIGH LEVEL DIRECTORY CREATION - IN THE OFFICE

CREATING THE HIGH LEVEL STORAGE DIRECTORY - T-BERD/MTS 8000

1. Press the FILE hard key.
2. Highlight desired main disk drive (prefer **Harddisk** drive) by touching with your finger or stylus. Press the soft key 

to create a master directory.

   A virtual keyboard will appear to allow you to input a new folder name. Alternatively, you can connect a USB keyboard to input the name.
3. Once the folder name is input, press to validate and create.
4. Press HOME or SYSTEM keys to go back to Home page.

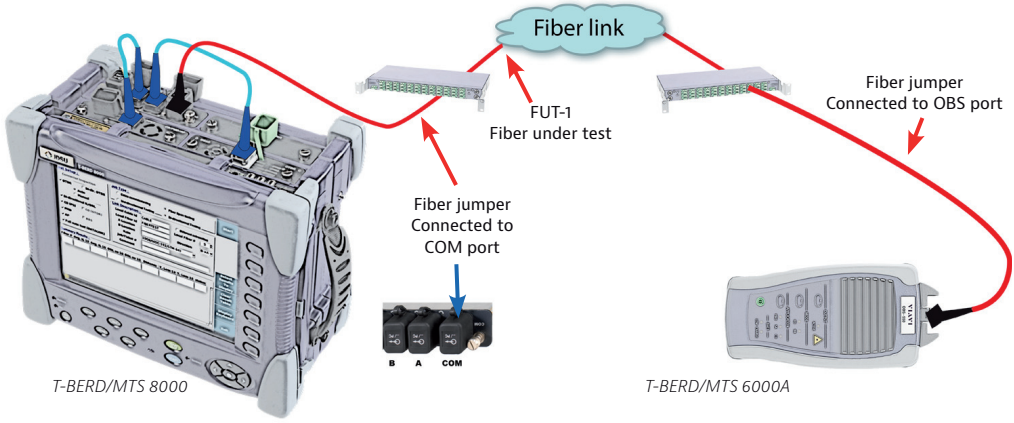
For each test, the unit will create a sub-directory containing all test results. All sub-directories will be saved into this master directory, unless a new one is created or the selection of the high level directory changes.

AUTOMATED LINK CHARACTERIZATION – TEST PROCESS IN THE FIELD

The following procedure describes the AUTOMATED METHOD to configure and perform Fiber Characterization using a mated pair of a T-BERD 8000 and an OBS5x0. Please read the entire procedure BEFORE starting.

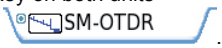
CONNECTING THE FIBER UNDER TEST

1. Inspect and clean connectors of the fiber jumpers, the fiber panel port of FUT-1, the COM port of the T-BERD/MTS 8000 and the OBS port using the P5000i inspection scope.
2. Connect the fiber jumper to the fiber panel port of the fiber under test FUT-1 and to the test set: one connected to the T-BERD/MTS 8000 COM port of the MTAU module and one connected the OBS5x0 source.



SETTING OTDR PASS/FAIL CRITERIA ON THE 8000 UNIT

You don't need to go through this step if the pass/fail criteria had previously been set up.

1. Press the SETUP Hard key on both units
5. Go to the SM-OTDR tab 

.
6. Press the soft key Alarms.
7. Select Alarm level to "Fail" 

.
8. Set the thresholds to 

or define your own criteria.

LAUNCHING THE LINK CHARACTERIZATION SCRIPT

1. Press the SCRIPT hard key on the 8000 unit.
2. Select the function 

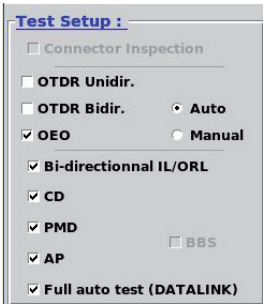
by touching with your finger or stylus.
3. Press the soft key Launch to enter the script configuration menu.

If both test sets have the latest version loaded, touch the 

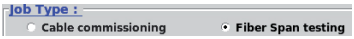
from the home page to be directed to the script main page immediately

CONFIGURING THE TEST SEQUENCE

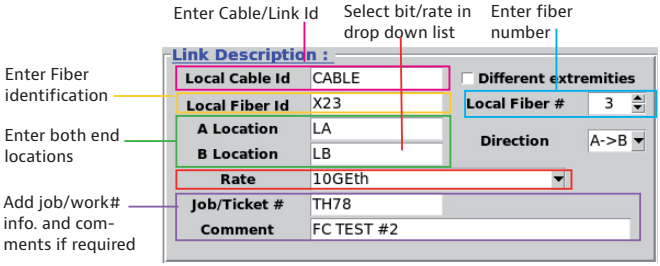
1. Checkmark the desired test functions to include in the characterization sequence
2. Make sure “Full auto test” is checked.



CONFIGURING THE JOB TYPE AND LINK DESCRIPTION ON BOTH UNITS

1. Check “Fiber Span testing” as Job Type 

2. Enter Link information.



All test files will be saved into the directory automatically created as per [Local Fiber Id] [Local Fiber #].

CONFIGURING THE “RESULTS” SUMMARY TABLE

This summary table, located at the bottom of the script main page, enables to review selected values at the end of the script test sequence. A Pass/Fail status is associated to the table.

You don’t need to go through this step if the table has previously been configured.

1. Press the **Select Results To Display** to access the selection list.
2. Highlight one parameter in the column **Available results** .
3. Press the soft key **Add Result** in order to select the parameter and see it in the column **Results to display** .
4. Repeat steps 1 to 3 until you have selected all the parameters. Maximum 7.

5 Press the soft key Validate in order to acknowledge the selection.

ACTIVATE THE OBS5X0 SOURCE

1 Press the button to turn on the OBS5x0 handheld.

2 Press the **Application** hard key 

until the PMD LED is on.

3 Press the **Output** hard key 

to activate the Source.

STARTING A TEST SEQUENCE

On the T-BERD/MTS 8000

1 Press the Start soft key or the button on both units

2 When message Start SM-OTDR measurement? appears, press Yes to start OTDR test

3 Notify far end user when the following prompt appears Check source. Start PMD measurement? but **DO NOT** press until far end user confirmed PMD source function is activated.

On the OBS 5x0 side

4 When notified by the 8000 user, press the Output hard key 

to activate the Source

5 Notify the far end user

On the T-BERD/MTS 8000

6 Press Yes to start PMD measurement.

7 Notify the far end user when the following prompt appears Check source. Start AP measurement? but **DO NOT** press Yes until far end user confirmed AP source function is activated.

On the OBS 5x0 side

8 When notified by the 8000 user, press the Application hard key 

until the AP LED is on

9 Notify the far end user

On the T-BERD/MTS 8000

10 Press Yes to start AP measurement

11 Notify far user when the following prompt Check source. Start CD measurement? appears but **DO NOT press** Yes until far end user confirmed CD source function is activated.

On the T-BERD/MTS 6000A OBS5x0

12 When notified by the 8000 user, press the Application hard key 

until the AP LED is on

13 Notify the far end user

On the T-BERD/MTS 8000

14 Press Yes to start CD measurement

15 Notify the far end user when measurement completed

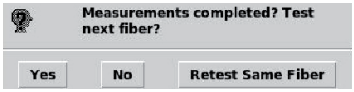
On the OBS5x0 side

16 When notified by the 8000 user, Press the Output hard key 

to de-activate the Source

17 Notify the far end user.

TEST NEXT FIBER

Once test completes, a message will appear : 

1 Verify results in RESULTS SUMMARY table

2 If results are satisfactory Swap FUT-1 and FUT-2 at fiber panel (at each site) and press 

on TB8000. Fiber number will automatically increment and a new results folder will be created

Before testing next fiber, make sure the fiber description (fiber number, location…) has been correctly setup in the Link Characterization Script setup page.

3 Notify the far end user to do the same

4 If results are un-satisfactory, perform steps to remedy problem(s) and press 

5 Notify the far end user to do the same

6 If no further testing is required at site, press 

and EXIT script.

7 Move To Next Site For Testing

Viavi Solutions

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