

Testing Multifiber-to-Multifiber

Testing Multifiber-to-Multifiber

This document will outline how to do a bidirectional test of Multifiber-to-Multifiber DUTs using JGR's MS12001 system.

Both hybrid and non-hybrid cases will be explained.

In the examples shown, the DUT is a 12 fiber MTP-MTP cable.

Testing Multifiber-to-Multifiber

Go to *Config > Connector* to create the connector type with pass/fail limits.

The screenshot shows the 'MS12001 - Cable Assembly Test System' window. The title bar includes standard Windows window controls. The main area is titled 'Connector' and contains a descriptive text: 'This configuration window is used to identify connectors. From this window, you can add, delete or modify a specific connector profile.' Below this is a tabbed interface with tabs for 'Company', 'Customer', 'Connector' (selected), 'DUT', 'Test', and 'Polarity'. The 'Connector' tab is active, showing 'Connector Identification' and 'Connector Configuration' sections. The 'Connector Identification' section has two dropdown menus: 'Connector name' and 'Connector type', both set to 'MTP/PC - Female'. The 'Connector Configuration' section is divided into two columns: 'Insertion Loss Limits' and 'Reflectance Limits'. Under 'Insertion Loss Limits', there are input fields for 'Pass limit' and 'Warning limit', both set to '0.5 dB'. Under 'Reflectance Limits', there are input fields for 'Pass limit' and 'Warning limit', both set to '-55 dB'. At the bottom of the window, there is a status bar with 'Status : Ready', a 'Supervisor' field, a date field '28/06/2018', and a time field '10:01 AM'. A toolbar at the bottom contains buttons for 'Add' (green plus), 'Delete' (red X), 'Copy To' (yellow arrow), 'Apply' (checkmark), and 'Cancel' (curved arrow). On the right side of the window, there is a vertical sidebar with the JGR logo and several icons: 'Measure', 'Config', 'Browser', 'Settings', and 'About and Help'.

Connector

This configuration window is used to identify connectors. From this window, you can add, delete or modify a specific connector profile.

Company Customer **Connector** DUT Test Polarity

Connector Identification

Connector name: MTP/PC - Female

Connector type: MTP/PC - Female

Connector Configuration

Insertion Loss Limits

Pass limit: 0.5 dB

Warning limit: 0.5 dB

Reflectance Limits

Pass limit: -55 dB

Warning limit: -55 dB

Add Delete Copy To Apply Cancel

Status : Ready Supervisor 28/06/2018 10:01 AM

Testing Multifiber-to-Multifiber

Go to *Config > DUT* to create the DUT.

Select *Multifiber-to-Multifiber* as the *Assembly Type*.

The screenshot shows the 'DUT' configuration window in the MS12001 - Cable Assembly Test System. The window is titled 'DUT' and contains a description: 'This configuration window is used to identify devices under test (DUT). From this window, you can add, delete or modify a specific DUT.'

The window is divided into several sections:

- DUT Identification:** This section contains fields for 'Part number' (MF-12 MTP/PC-MTP/PC), 'Description' (Multifiber 12 Channel - MTP/PC-MTP/PC), 'Manufacturer' (empty), 'Maximum fiber length (m)' (2), and 'Fiber type' (Singlemode - 9um). The 'Assembly type' dropdown is set to 'Multifiber-to-Multifiber' and is highlighted with a red circle. The 'Number of fibers' is set to 12. There is a 'Mandrel Free' checkbox which is checked.
- DUT Configuration:** This section contains fields for 'End A' (MTP/PC - Female) and 'End B' (MTP/PC - Female). It also shows 'IL limits' (0.5 dB) and 'Ref. limits' (-55 dB) for both ends.
- Polarity Type:** This section contains a 'Defined Type' dropdown set to 'A'.

At the bottom of the window, there are buttons for 'Add', 'Delete', 'Copy To', 'Apply', and 'Cancel'. The status bar at the bottom shows 'Status:', 'Supervisor', '28/06/2018', and '11:31'.

Testing Multifiber-to-Multifiber

Setup a *Bidirectional* test with the multifiber DUT and click *Start*.

MS12001 - Cable Assembly Test System

Setup | Measurement | Connections | Switch Port(s) Configuration

Test Identification

Test Name: Refresh

Test Configuration

General

Custom: None

DUT: MF-12 MTP/PC-MTP/PC

Operator:

Labels

First: None

Second: None

Hardware Type

☒ Standard

☒ High Throughput

Singlemode Wavelength

☒ 1310 ☐ 1490 ☒ 1550 ☐ 1625

Multimode Wavelength

☐ 850 ☐ 1300

Test Type

☒ Unidirectional ☐ Bidirectional

Measurement

☒ Connector A ☐ Connector B

☒ Insertion Loss ☐ Reflectance

Custom Fields

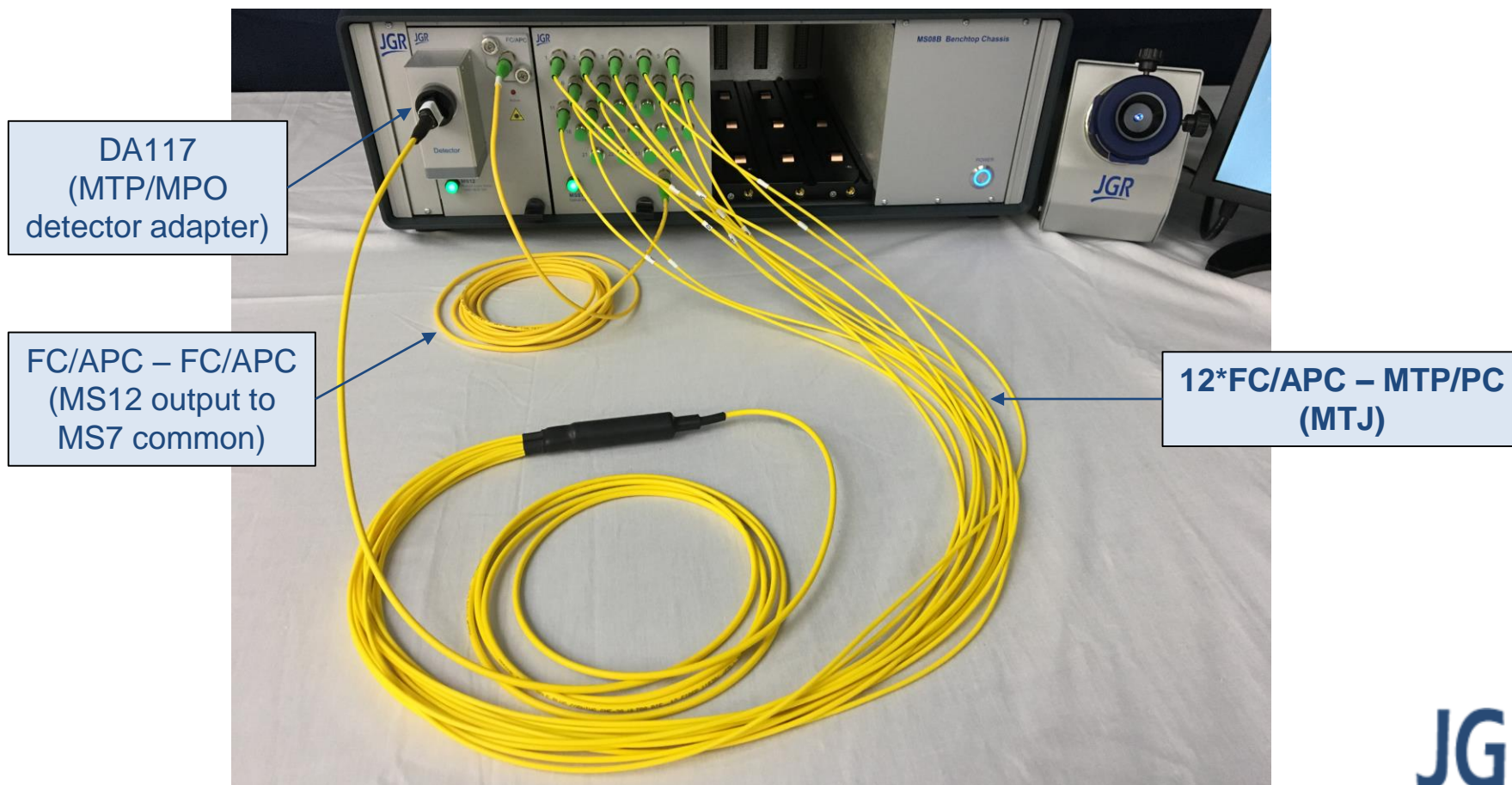
Status: Supervisor 28/06/2018 11:28

JGR
Measure
Config
Browser
Settings
About and Help

Testing Multifiber-to-Multifiber

Non-hybrid DUT

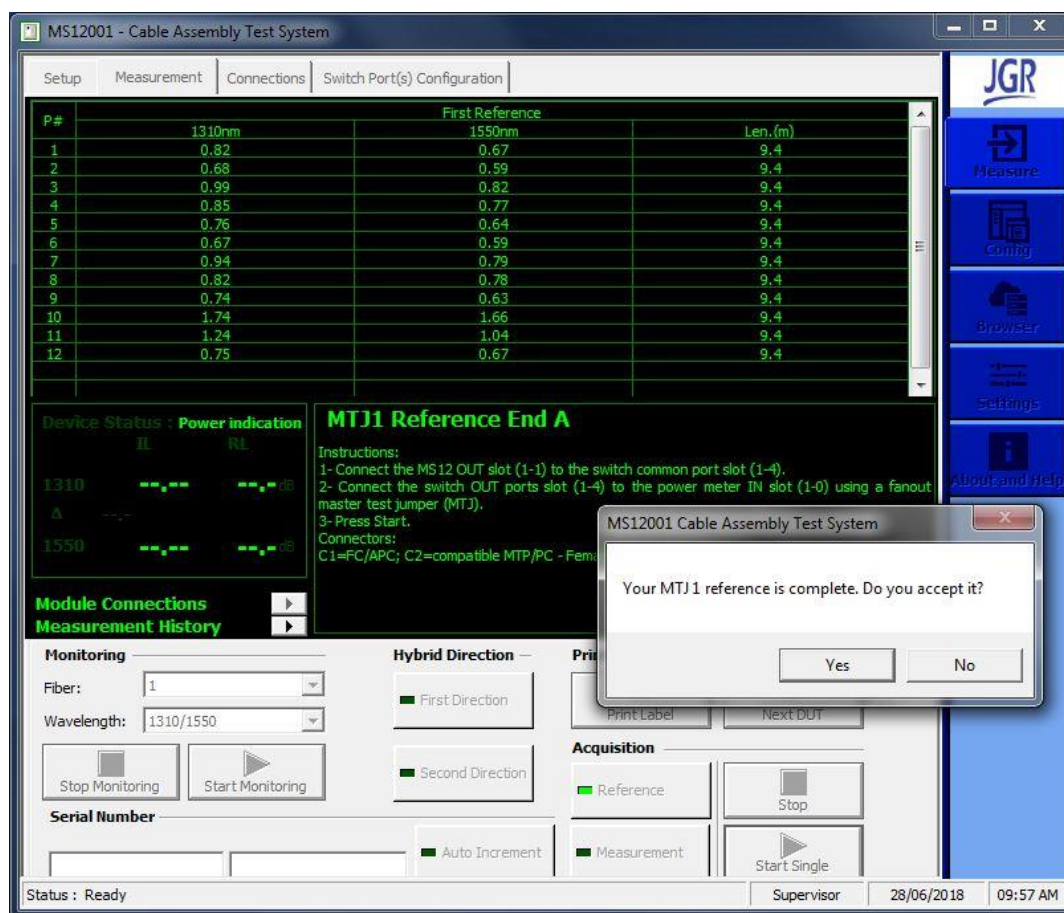
Connect as below for the reference.



Testing Multifiber-to-Multifiber

Non-hybrid DUT

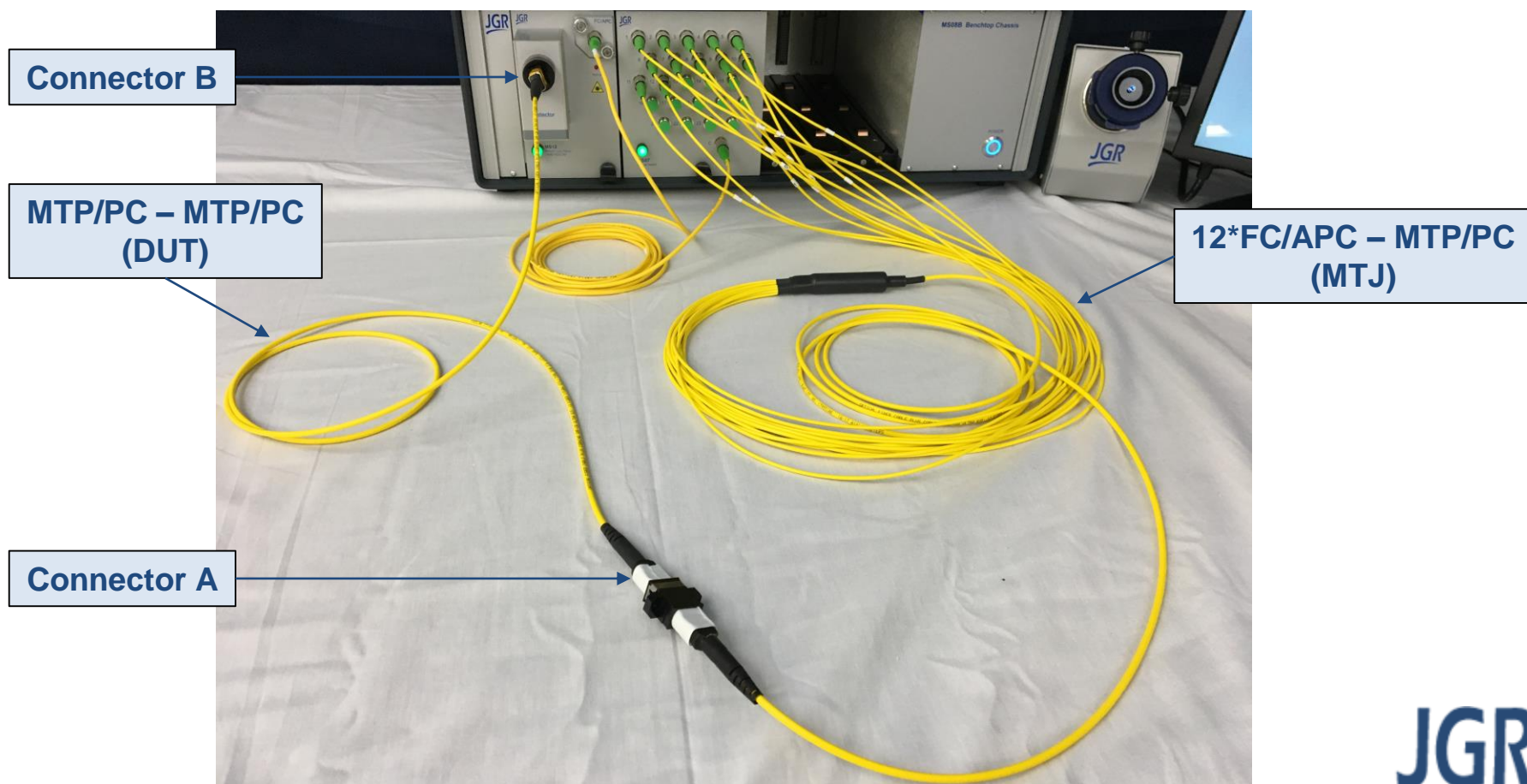
Click *Start Single* to take a reference.



Testing Multifiber-to-Multifiber

Non-hybrid DUT

Connect as below to measure the first connector.



Testing Multifiber-to-Multifiber

Non-hybrid DUT

Click *Start Single* to measure the first connector.

MS12001 - Cable Assembly Test System

Setup | Measurement | Connections | Switch Port(s) Configuration

F#	First Measurement				Second Measurement			
	IL (dB)		Refl (dB)		IL (dB)		Refl (dB)	
	1310	1550	1310	1550	1310	1550	1310	1550
1	0.16	0.15	-61.9	-62.2				
2	0.15	0.16	-59.5	-60.3				
3	0.11	0.07	-60.5	-61.2				
4	0.20	0.15	-59.3	-60.2				
5	0.07	0.06	-60.7	-61.0				
6	0.04	0.02	-61.9	-61.9				
7	0.09	0.10	-61.0	-61.4				
8	0.11	0.11	-61.7	-62.0				
9	0.41	0.33	-60.6	-61.1				
10	0.05	0.08	-57.9	-58.5				
11	0.36	0.32	-59.7	-60.2				
12	0.33	0.23	-67.5	-64.1				

Device Status :

	IL	RL
1310	0.08	-62.6 dB
Δ	0.01	
1550	0.07	-62.6 dB

Measurement End B

Instructions:
1- Insert the Device Under Test (DUT) between the master test jumper (MTJ) and the power meter detector IN slot (1-0).
2- Press Start.

Connectors:
End B=MTP/PC - Female; End A=MTP/PC - Female.

Module Connections | **Measurement History**

Monitoring

Fiber: 1
Wavelength: 1310/1550

Stop Monitoring | Start Monitoring

Serial Number

Auto Increment

Hybrid Direction

First Direction
Second Direction

Print Label/Next DUT

Print Label | Next DUT

Acquisition

Reference | Stop

Measurement | Start Single

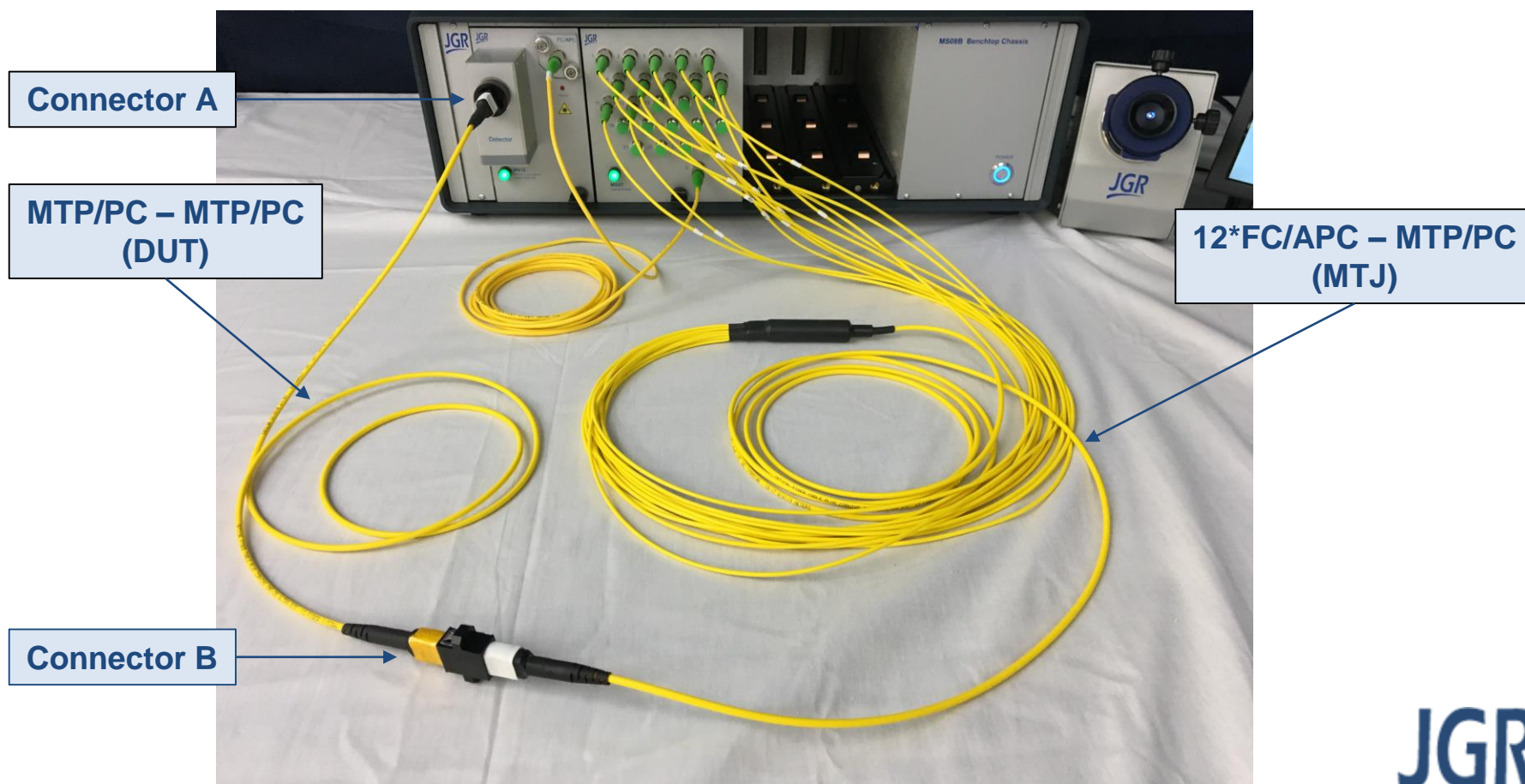
Status : Current dual wavelength IL and Reflectance monitoring

Supervisor 28/06/2018 10:03 AM

Testing Multifiber-to-Multifiber

Non-hybrid DUT

Flip the DUT around to measure the second connector.



Testing Multifiber-to-Multifiber

Non-hybrid DUT

Click *Start Single* to measure the second connector. Enter a serial number and press *Next DUT* to save the results.

MS12001 - Cable Assembly Test System

Setup | Measurement | Connections | Switch Port(s) Configuration

F#	First Measurement				Second Measurement			
	IL (dB)		Ref (dB)		IL (dB)		Ref (dB)	
1	1310	1550	1310	1550	1310	1550	1310	1550
2	0.16	0.15	-61.9	-62.2	0.08	0.07	-62.4	-62.4
3	0.15	0.16	-59.5	-60.3	0.06	0.08	-60.3	-60.8
4	0.11	0.07	-60.5	-61.2	0.06	0.03	-61.0	-61.5
5	0.20	0.15	-59.3	-60.2	0.11	0.08	-60.4	-61.1
6	0.07	0.06	-60.7	-61.0	0.04	0.02	-61.0	-61.2
7	0.04	0.02	-61.9	-61.9	0.06	0.04	-61.6	-61.8
8	0.09	0.10	-61.0	-61.4	0.10	0.12	-62.2	-62.5
9	0.11	0.11	-61.7	-62.0	0.19	0.18	-61.8	-61.9
10	0.41	0.33	-60.6	-61.1	0.26	0.20	-60.9	-61.5
11	0.05	0.08	-57.9	-58.5	0.01	0.04	-58.2	-58.8
12	0.36	0.32	-59.7	-60.2	0.23	0.20	-60.0	-60.6
12	0.33	0.23	-67.5	-64.1	0.33	0.23	-63.1	-63.4

Device Status: Pass

Next DUT

Instructions:
Click on Next DUT to save the measurements and proceed with the next DUT.
Click on Print Label to save the measurements and print the specified label(s).

Module Connections
Measurement History

Monitoring
Fiber: 1
Wavelength: 1310/1550
Stop Monitoring Start Monitoring

Serial Number
ABC001 0001 Auto Increment

Hybrid Direction
First Direction
Second Direction

Print Label/Next DUT
Print Label Next DUT

Acquisition
Reference Stop
Measurement Start Single

Status: Ready Supervisor 28/06/2018 10:05 AM

Testing Multifiber-to-Multifiber

Hybrid DUT

You will need 2 master test jumpers:

- MTJ 1 will connect to end A of your DUT
- MTJ 2 will connect to end B of your DUT

Each MTJ will have to be referenced separately.

If your switch channel count is double your DUT fiber count, you can speed up testing by assigning connector types to switch ports. The end of this document will cover this in more detail.

Testing Multifiber-to-Multifiber

Hybrid DUT

Configure your DUT with different connectors for end A and B.

DUT

This configuration window is used to identify devices under test (DUT). From this window, you can add, delete or modify a specific DUT.

Company | Customer | Connector | **DUT** | Test | Polarity

DUT Identification

Part number: MF-12 MTP/PC-MTP/APC

Description: Multifiber 12 Channel - MTP/PC-MTP/APC

Manufacturer:

Maximum fiber length (m): 2

Fiber type: Singlemode - 9um

Assembly type: Multifiber-to-Multifiber

Number of fibers: 12

Mandrel Free

DUT Configuration

End A: MTP/PC - Female

IL limits: 0.5 dB

Ref. limits: -55 dB

End B: MTP/APC - Female

IL limits: 0.5 dB

Ref. limits: -60 dB

Polarity Type

Defined Type: A

Buttons: Add, Delete, Copy To, Apply, Cancel

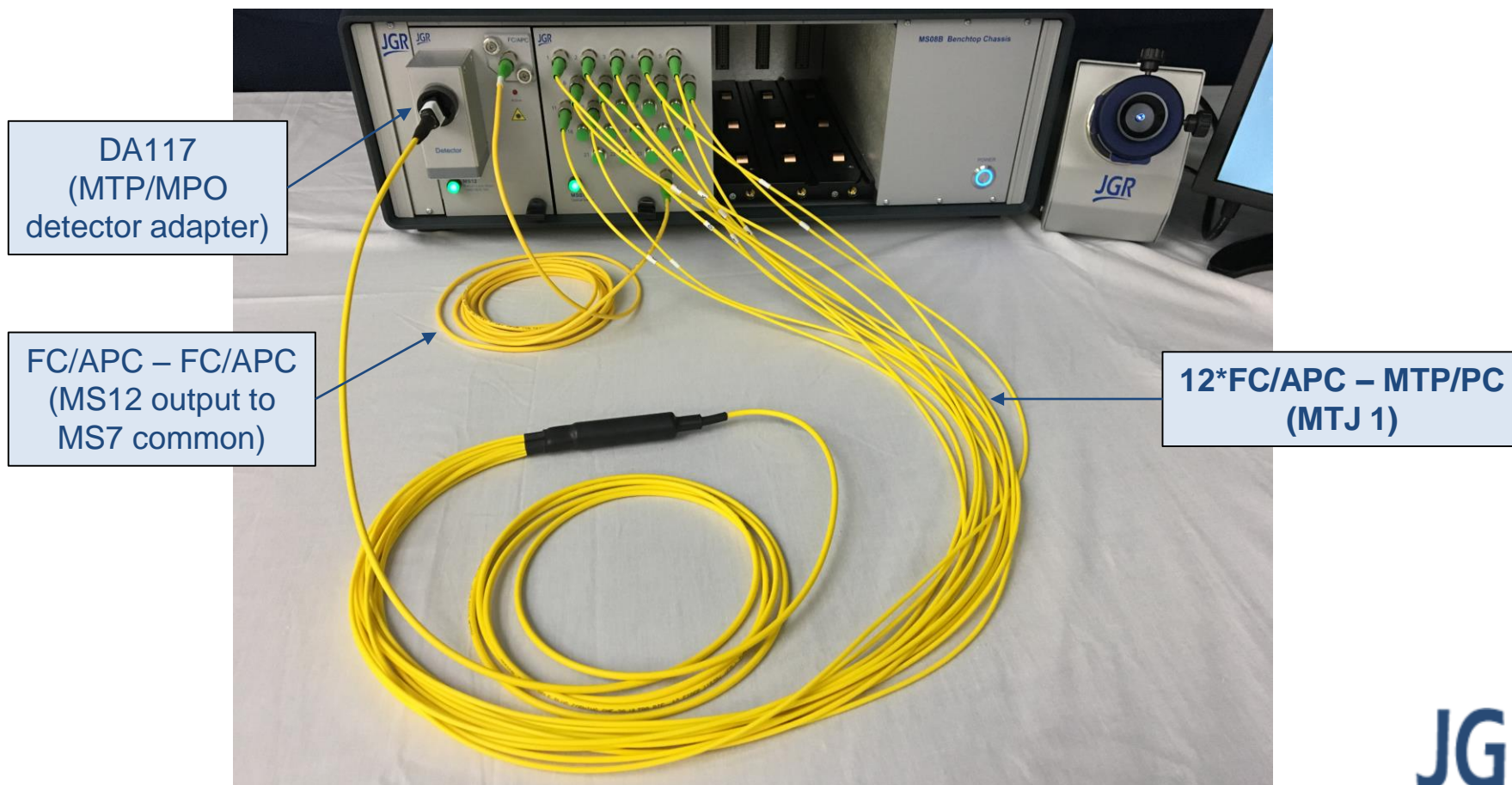
Status: Ready

Supervisor 28/06/2018 10:15 AM

Testing Multifiber-to-Multifiber

Hybrid DUT

Connect MTJ 1 for your end A reference.



Testing Multifiber-to-Multifiber

Hybrid DUT

Click *Start Single* to take your first reference.

The screenshot displays the MS12001 Cable Assembly Test System software interface. The main window has tabs for Setup, Measurement, Connections, and Switch Port(s) Configuration. The Measurement tab is active, showing a table of test results for 12 ports (P# 1-12) at 1310nm and 1550nm wavelengths. The table includes columns for P#, 1310nm, 1550nm, and Len.(m). Below the table, there is a section for Device Status (Power indication) and MTJ1 Reference End A. A dialog box titled "MS12001 Cable Assembly Test System" is open, asking "Your MTJ 1 reference is complete. Do you accept it?" with "Yes" and "No" buttons. The bottom status bar shows "Status : Ready", "Supervisor", "28/06/2018", and "09:57 AM".

P#	1310nm	1550nm	Len.(m)
1	0.82	0.67	9.4
2	0.68	0.59	9.4
3	0.99	0.82	9.4
4	0.85	0.77	9.4
5	0.76	0.64	9.4
6	0.67	0.59	9.4
7	0.94	0.79	9.4
8	0.82	0.78	9.4
9	0.74	0.63	9.4
10	1.74	1.66	9.4
11	1.24	1.04	9.4
12	0.75	0.67	9.4

Device Status : Power indication

	IL	RL
1310	---	---
1550	---	---

MTJ1 Reference End A

Instructions:
1- Connect the MS12 OUT slot (1-1) to the switch common port slot (1-4).
2- Connect the switch OUT ports slot (1-4) to the power meter IN slot (1-0) using a fanout master test jumper (MTJ).
3- Press Start.

Connectors:
C1=FC/APC; C2=compatible MTP/PC - Fem.

Module Connections
Measurement History

Monitoring
Fiber: 1
Wavelength: 1310/1550
Stop Monitoring Start Monitoring

Hybrid Direction
First Direction
Second Direction
Auto Increment

Acquisition
Reference
Measurement
Stop
Start Single

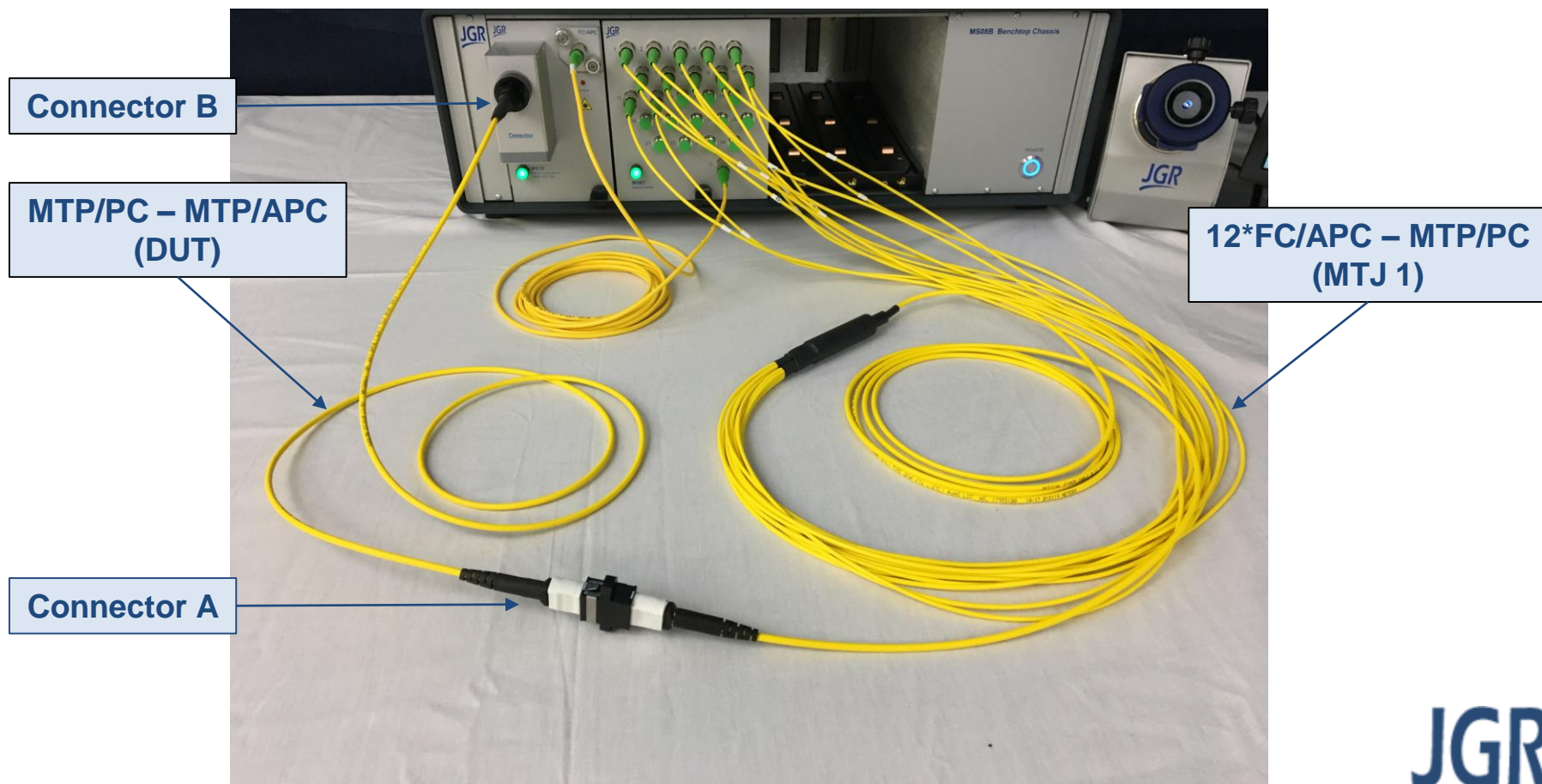
Serial Number

Status : Ready Supervisor 28/06/2018 09:57 AM

Testing Multifiber-to-Multifiber

Hybrid DUT

Connect your DUT to measure end A.



Testing Multifiber-to-Multifiber

Hybrid DUT

Click *Start Single* to measure the first connector. Enter a serial number and press *Next DUT* to measure the next DUT.

MS12001 - Cable Assembly Test System

Setup Measurement Connections Switch Port(s) Configuration

F#	First Measurement				Second Measurement			
	IL (dB)		Ref (dB)		IL (dB)		Ref (dB)	
	1310	1550	1310	1550	1310	1550	1310	1550
1	0.25	0.25	-59.9	-60.2				
2	0.24	0.26	-61.2	-61.7				
3	0.11	0.11	-61.2	-61.7				
4	0.19	0.17	-60.7	-61.3				
5	0.20	0.19	-61.6	-61.5				
6	0.16	0.13	-62.4	-62.2				
7	0.17	0.16	-63.1	-63.1				
8	0.02	0.05	-60.9	-61.5				
9	0.37	0.33	-75.6	-68.4				
10	0.13	0.12	-58.4	-59.0				
11	0.30	0.30	-66.7	-82.6				
12	0.09	0.09	-63.9	-63.8				

Device Status : Pass

Next DUT

Instructions:
Click on Next DUT to save the measurements and proceed with the next DUT.
Click on Print Label to save the measurements and print the specified label(s).

Module Connections
Measurement History

Monitoring
Fiber: 12
Wavelength: 1310/1550
Stop Monitoring Start Monitoring

Serial Number
ABC002 0001 Auto Increment

Hybrid Direction
First Direction Second Direction

Print Label/Next DUT
Print Label Next DUT

Acquisition
Reference Stop
Measurement Start Single

Status : Ready Supervisor 28/06/2018 10:24 AM

Testing Multifiber-to-Multifiber

Hybrid DUT

Keep measuring end A of all your DUTs until you are done. After the last one, click *Next DUT* then *Second Direction* to measure end B.

MS12001 - Cable Assembly Test System

Setup | Measurement | Connections | Switch Port(s) Configuration

F#	First Measurement				Second Measurement			
	IL (dB)		Ref (dB)		IL (dB)		Ref (dB)	
	1310	1550	1310	1550	1310	1550	1310	1550
1	0.36	0.34	-62.0	-62.0				
2	0.35	0.35	-61.2	-61.6				
3	0.24	0.21	-62.0	-62.4				
4	0.39	0.34	-60.6	-61.2				
5	0.18	0.20	-61.7	-61.8				
6	0.10	0.07	-62.7	-62.7				
7	0.20	0.16	-85.4	-71.7				
8	0.05	0.05	-61.1	-61.6				
9	0.42	0.37	-61.2	-61.5				
10	0.22	0.20	-58.5	-59.0				
11	0.37	0.37	-61.1	-61.5				
12	0.09	0.09	-63.2	-63.3				

Device Status: Pass

Next DUT

Instructions:
Click on Next DUT to save the measurements and proceed with the next DUT.
Click on Print Label to save the measurements and print the specified label(s).

Module Connections | **Measurement History**

Monitoring

Fiber: 7
Wavelength: 1310/1550

Stop Monitoring | Start Monitoring

Serial Number

ABC002 | 0002

Hybrid Direction

☒ First Direction
☒ Second Direction
☒ Auto Increment

Print Label/Next DUT

Print Label | Next DUT

Acquisition

☒ Reference
☒ Measurement

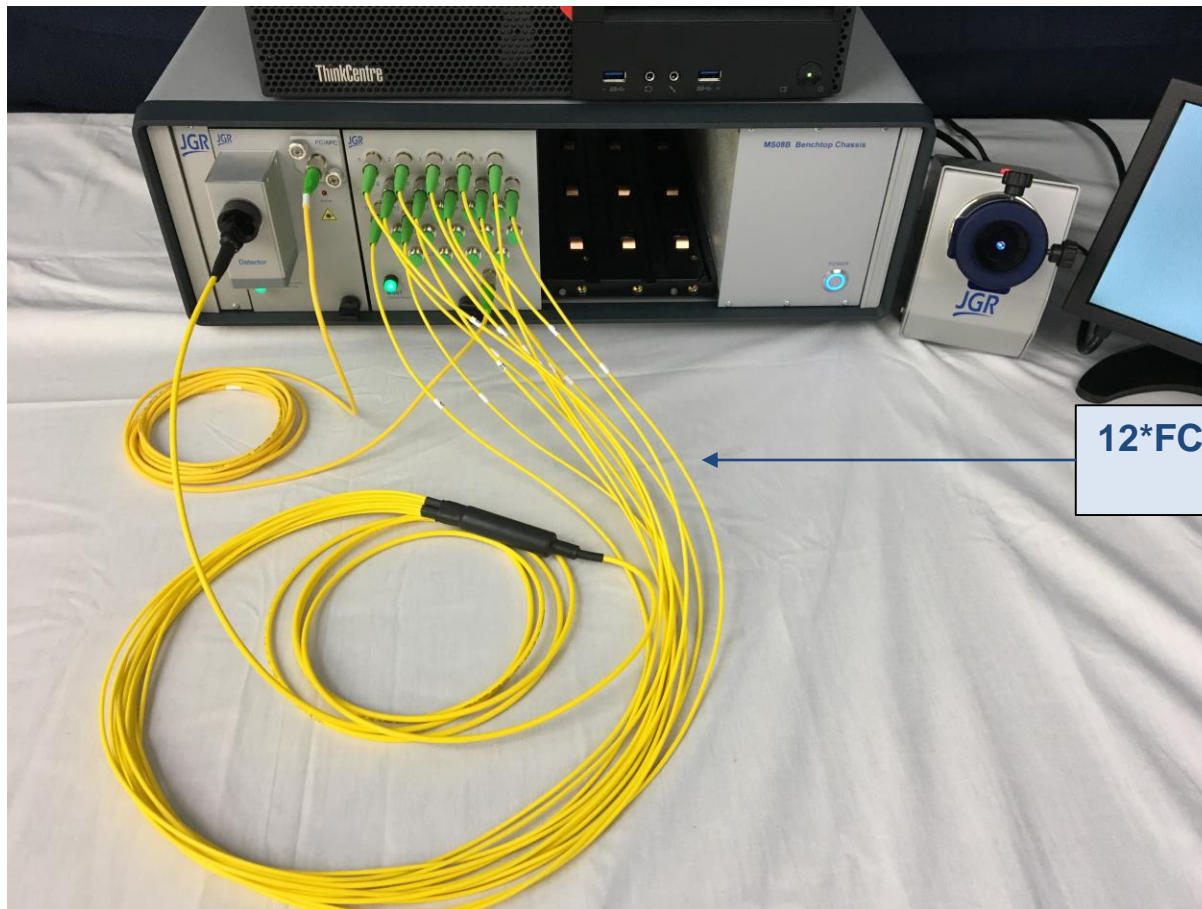
Stop | Start Single

Status: Ready | Supervisor | 28/06/2018 | 10:28 AM

Testing Multifiber-to-Multifiber

Hybrid DUT

Connect MTJ 2 for your second reference.

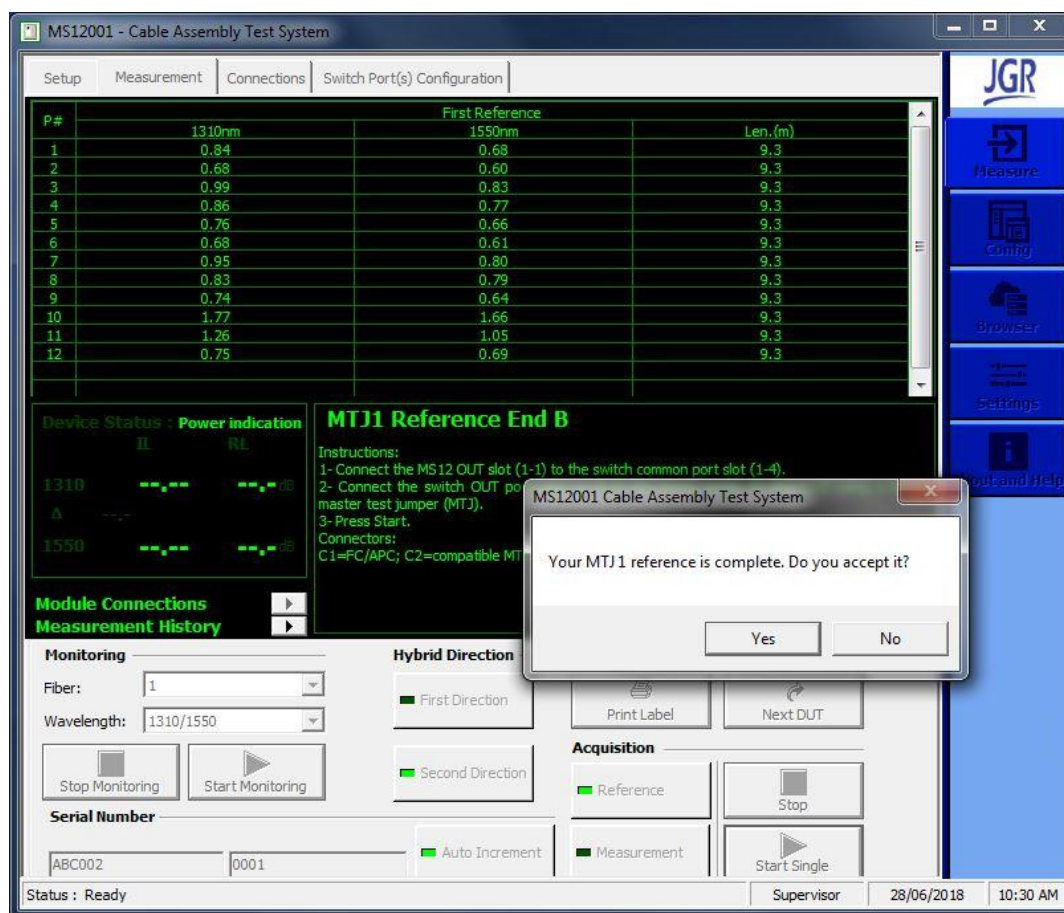


12*FC/APC – MTP/APC
(MTJ 2)

Testing Multifiber-to-Multifiber

Hybrid DUT

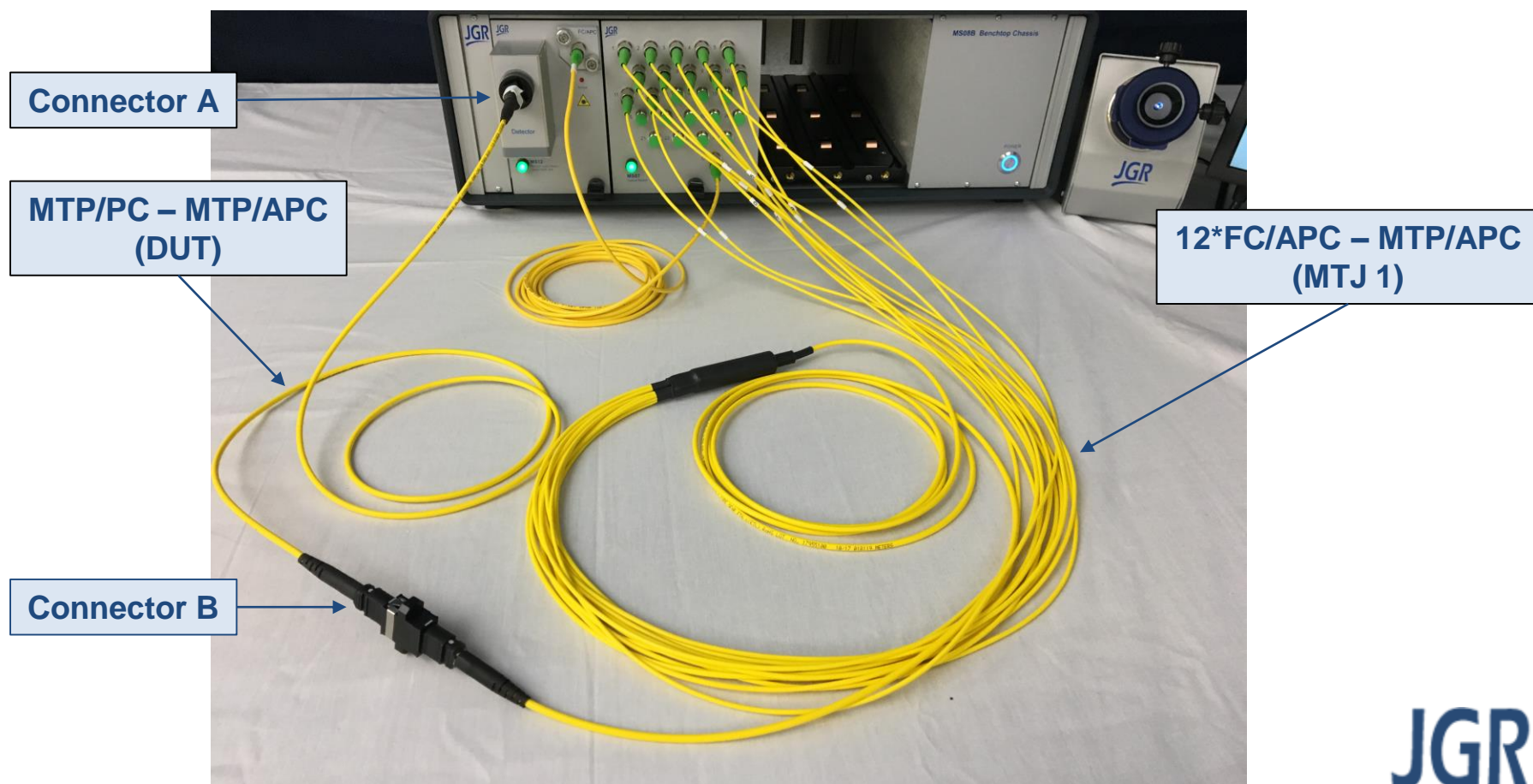
Click *Start Single* to take your end B reference.



Testing Multifiber-to-Multifiber

Hybrid DUT

Connect your DUT to measure end B.



Testing Multifiber-to-Multifiber

Hybrid DUT

MS12001 will display the previous test results of end A for each serial number. Click *Start Single* to measure end B of all your DUTs then *Next DUT* to save and move on to the next.

MS12001 - Cable Assembly Test System

Setup Measurement Connections Switch Port(s) Configuration

F#	First Measurement				Second Measurement			
	IL (dB)		Ref (dB)		IL (dB)		Ref (dB)	
	1310	1550	1310	1550	1310	1550	1310	1550
1	0.25	0.25	-59.9	-60.2				
2	0.24	0.26	-61.2	-61.7				
3	0.11	0.11	-61.2	-61.7				
4	0.19	0.17	-60.7	-61.3				
5	0.20	0.19	-61.6	-61.5				
6	0.16	0.13	-62.4	-62.2				
7	0.17	0.16	-63.1	-63.1				
8	0.02	0.05	-60.9	-61.5				
9	0.37	0.33	-75.6	-68.4				
10	0.13	0.12	-58.4	-59.0				
11	0.30	0.30	-66.7	-82.6				
12	0.09	0.09	-63.9	-63.8				

Device Status :

	IL	RL
1310	0.17	-69.3 dB
Δ	0.01	
1550	0.18	-71.1 dB

Measurement End B

Instructions:
1- Insert the Device Under Test (DUT) between the master test jumper (MTJ) and the power meter detector IN slot (1-0).
2- Press Start.

Connectors:
End B=MTP/APC - Female; End A=MTP/PC - Female.

Module Connections
Measurement History

Monitoring

Fiber: 1
Wavelength: 1310/1550

Stop Monitoring Start Monitoring

Serial Number

ABC002 0001

Hybrid Direction

First Direction
Second Direction
Auto Increment

Print Label/Next DUT

Print Label Next DUT

Acquisition

Reference Stop
Measurement Start Single

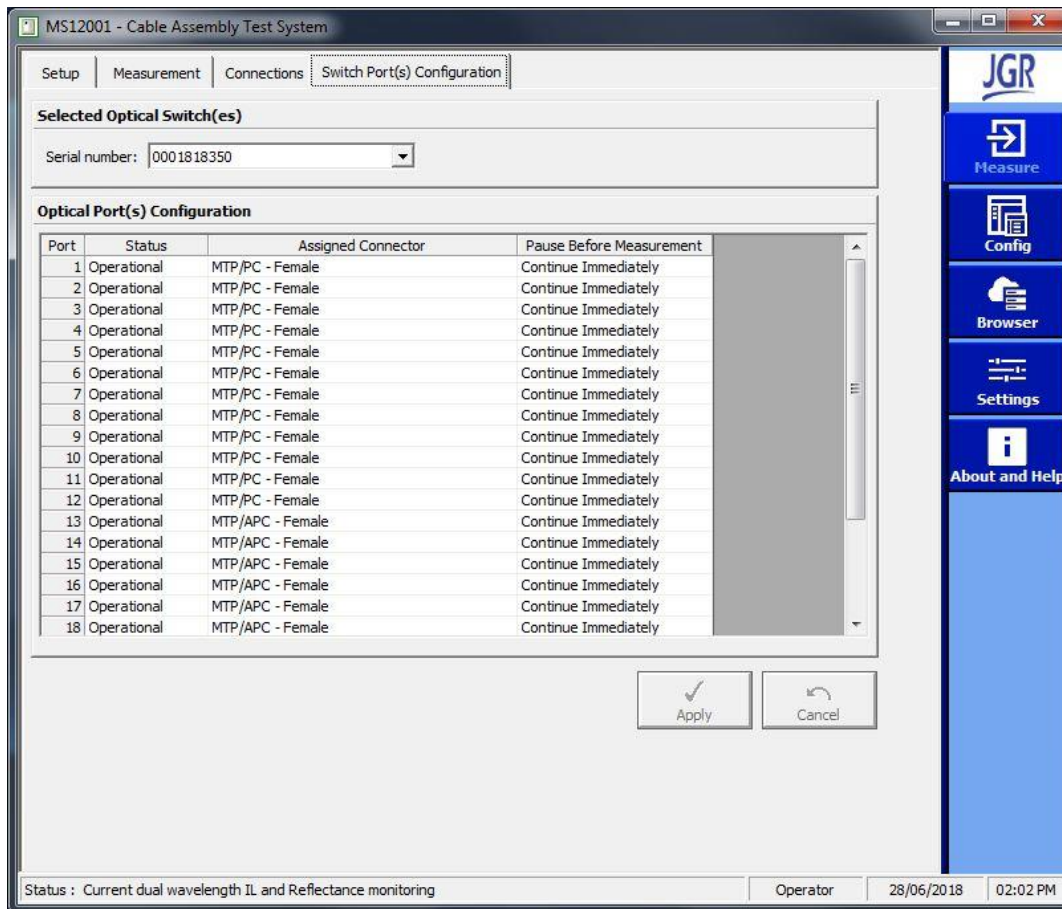
Status: Current dual wavelength IL and Reflectance Monitoring

Supervisor 28/06/2018 10:31 AM

Testing Multifiber-to-Multifiber

Switch Port(s) Configuration

You can assign connector types to your switch ports to leave different MTJs connected.



When doing the reference or measurements, the software will go to the appropriate port.

Here, when testing end A, the switch will go to channels 1-12.

When testing end B, the switch will go to channels 13-24.

Testing Multifiber-to-Multifiber

Switch Port(s) Configuration

To speed up testing select *Settings > Measurement Options > Require New Reference > No*.

MS12001 - Cable Assembly Test System

Measurement Settings

From this window, you can customize reference and measurement options.

Access Level

☒ Operator ☒ Supervisor

System | **Measurement Options** | Acquisition | Database | User Access | Display | Switch Config | Power-Level

Require New Reference

☒ Yes Perform a new reference before each series of tests.

☒ No Use existing (saved) reference when available.

Unidirectional IL Reference Method

☒ MTJ1 IL reference on MTJ1 only (DUT IL will include the MTJ2 IL).

☐ MTJ2 IL reference on MTJ1 and MTJ2.

Unidirectional RL Method

☐ RL total The Reflectance value given will represent the RL of connectors A and B combined (total RL).

☒ RLa, RLb Two separate Reflectance values will be given; they represent the individual RL of each connector (RLa and RLb).

Multiple RM Configuration

☒ One RM Tests made with one RM module (up to two wavelengths).

☐ Two RMs Tests made with two RM modules (up to four wavelengths).

Measure Length

☐ Yes Show DUT Length.

☒ No Hide DUT Length.

Save All DUT Results

☒ Yes Save all results.

☐ No Save Pass results only.

Repeat Tests

☒ Yes Retry measurements for failed results.

Max. number of repetitions: 10

☐ No Continue measurements regardless of result status (Pass, Warning or Fail).

MTJ1 Length Mode

☐ Manual MTJ1 length entered manually.

☒ Automatic MTJ1 length detected automatically.

☐ Pause before length reference

Negative IL Limit Configuration

☐ Yes Warning for IL values lower than : -0.03 dB

☒ No

Apply Cancel

Status : Ready Supervisor 28/06/2018 02:03 PM

Note: if you disconnect your MTJ, you **MUST** redo the reference.

It is advisable to redo the reference at least once a day.