Getting Started with the EOTS Software

JGR

Getting Started with the EOTS Software

This guide will go over the basics of how to set up the EOTS software. Please carefully read *Section 1* for important recommendations on optimizing your long term testing setup.

If you have any questions, please email *support@jgroptics.com*

Getting Started with the EOTS Software

1. Important Recommendations

1.1. General Information

A good setup for long term testing has additional challenges compared to standard IL/RL measurements.

The two most critical aspects are:

- connector contamination
- microcracks and fiber management

Before connecting any jumper to the instruments, inspect **both ends** with a microscope. A bench top ferrule inspection scope such as JGR's CS400K is recommended for inspecting jumpers and connectorized switch pigtails.

When connecting directly to an instrument bulkhead, a bulkhead inspection probe can facilitate the process.

Even dirt in the peripheral zones outside the core can affect long term IL stability. **Extra diligence is required.**

JGR's **CS400K-CM** inspection scope

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1. Important Recommendations

1.1. General Information

Fiber microcracks are difficult to detect and a slow IL drift over many hours or days is a common manifestation. If possible, replace any fibers that are suspected of having microcracks.

Microcracks are especially sensitive if the fiber is bending. It is recommended to have enough flat space to allow the fibers going from the instruments to the chamber to be as straight as possible. Avoid any crossed fibers.

Hanging fiber is another common source of drift. This is sometimes unavoidable between the bench and the environmental chamber but fiber should be supported as much as possible.

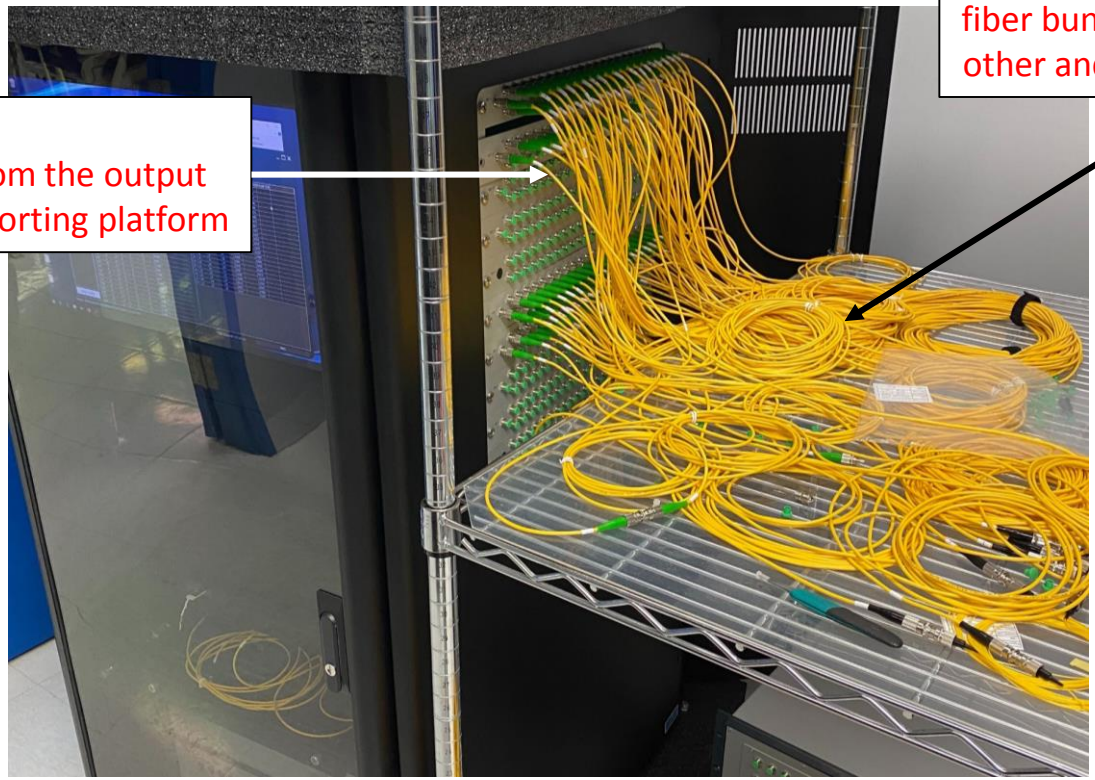
The lab conditions should be optimized for temperature and humidity control. For example, the Telcordia GR-326 standard defines ambient lab conditions for temperature = 23 ± 2 °C and RH < 75%.

The EOTS software can apply external fiber drift corrections from reference channels. It is recommended to manage the fiber in such a way that the reference channel is within the bundle of channels it is correcting as much as possible outside the chamber.

1.2. Examples of Fiber Management

✗
hanging fiber from the output panel to the supporting platform

✗
fiber bundles are on top of each other and a lot of crossed fibers



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1. Important Recommendations

1.2. Examples of Fiber Management

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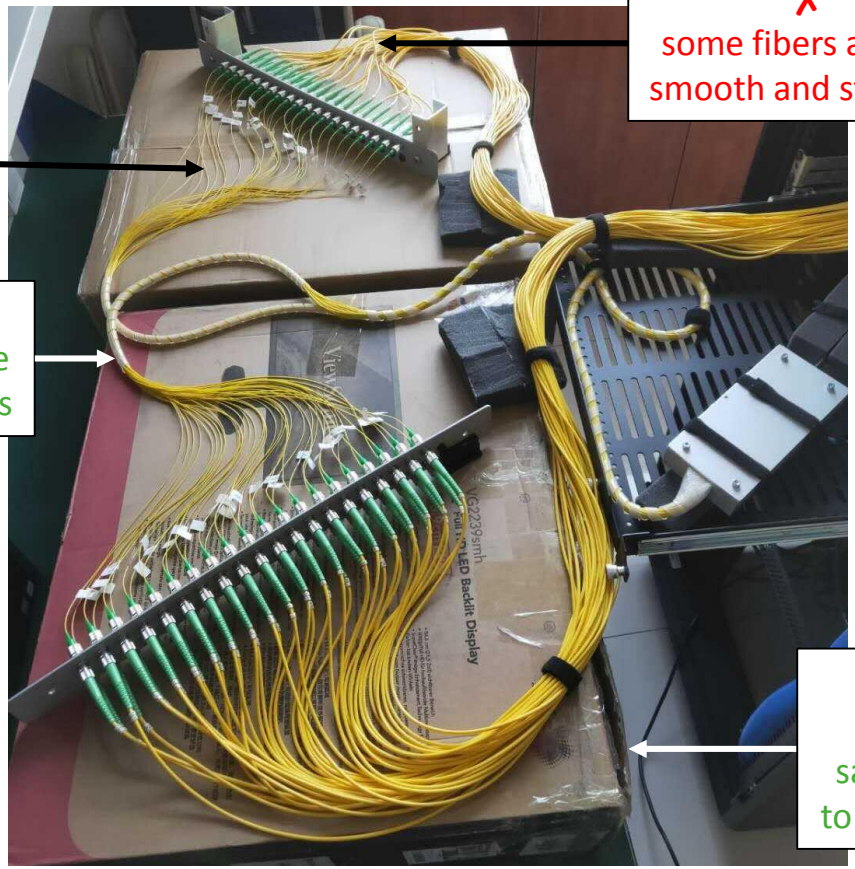
1. Important Recommendations

1.2. Examples of Fiber Management

✗
some fibers are not smooth and stick out

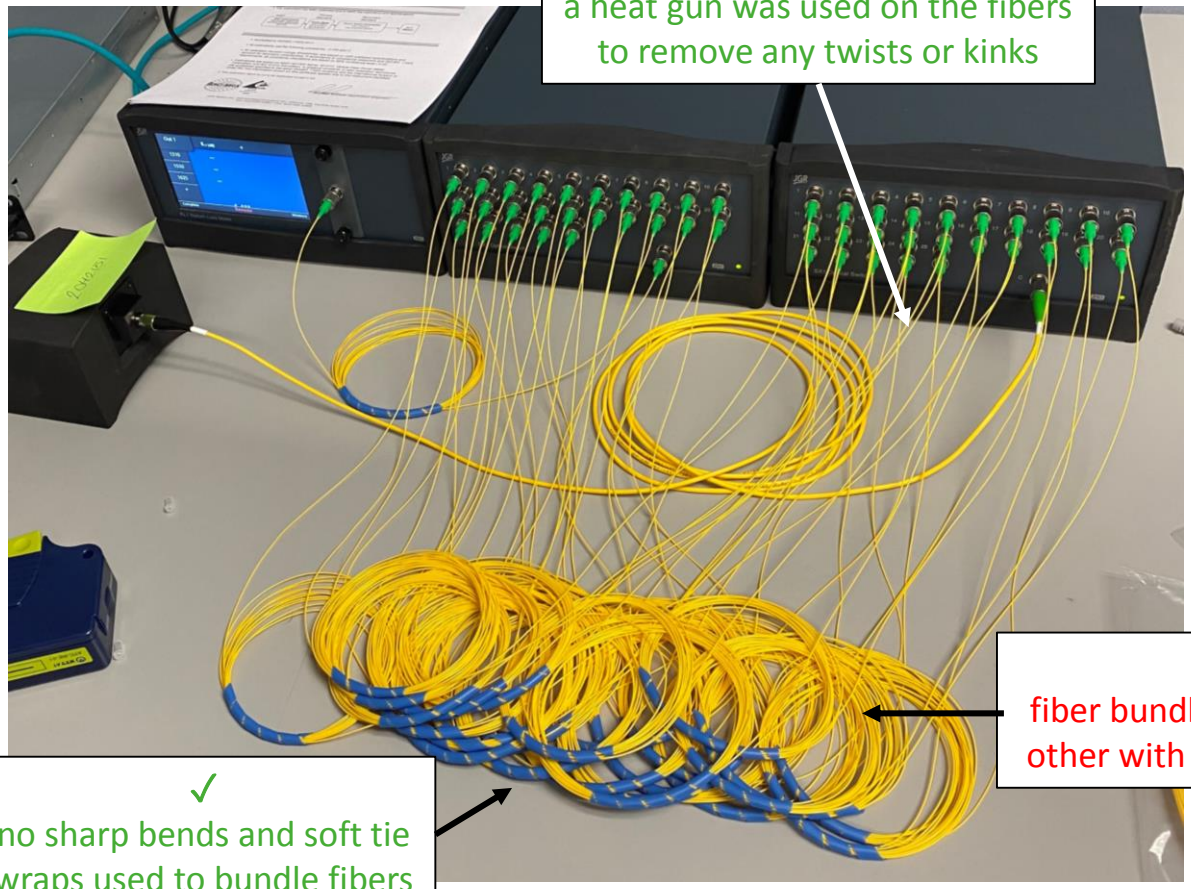
✗
crossed fibers can be better arranged and a heat gun used to further remove kinks

✓
no sharp bends and soft tie wraps used to bundle fibers

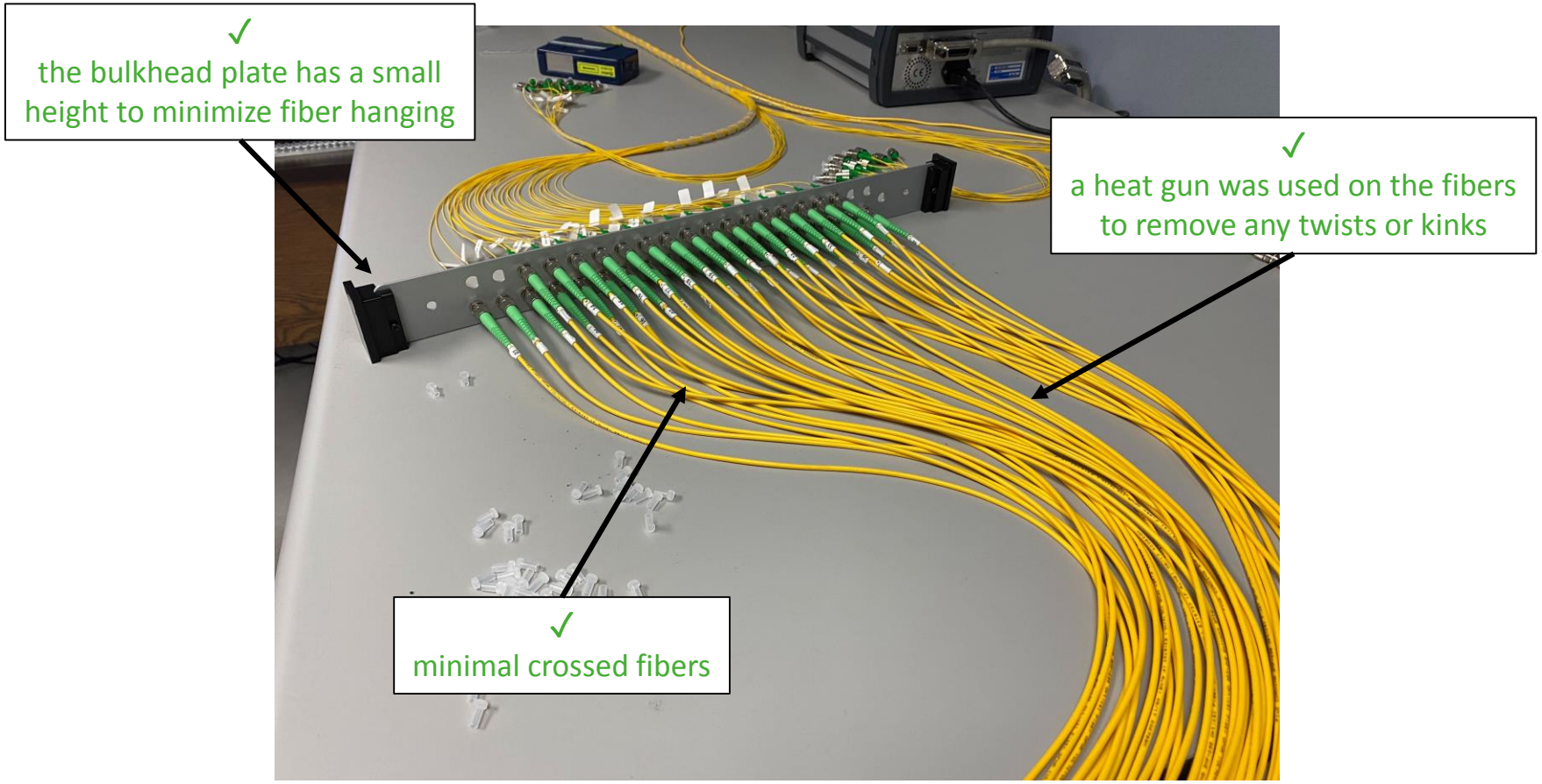


✓
the fiber support is at the same height as the fiber tray to minimize any hanging fibers

1.2. Examples of Fiber Management



1.2. Examples of Fiber Management



2.1. Software Installation

If you have purchased a complete EOTS in a rack with server PC included, the software and hardware have been pre-installed and you can skip section 2.

If you wish to use the EOTS software for an RL1 and SX1s purchased separately or need to set up a new computer, this section will cover the setup process.

Begin by running the *JGR Environmental Test Suite.exe* installer.

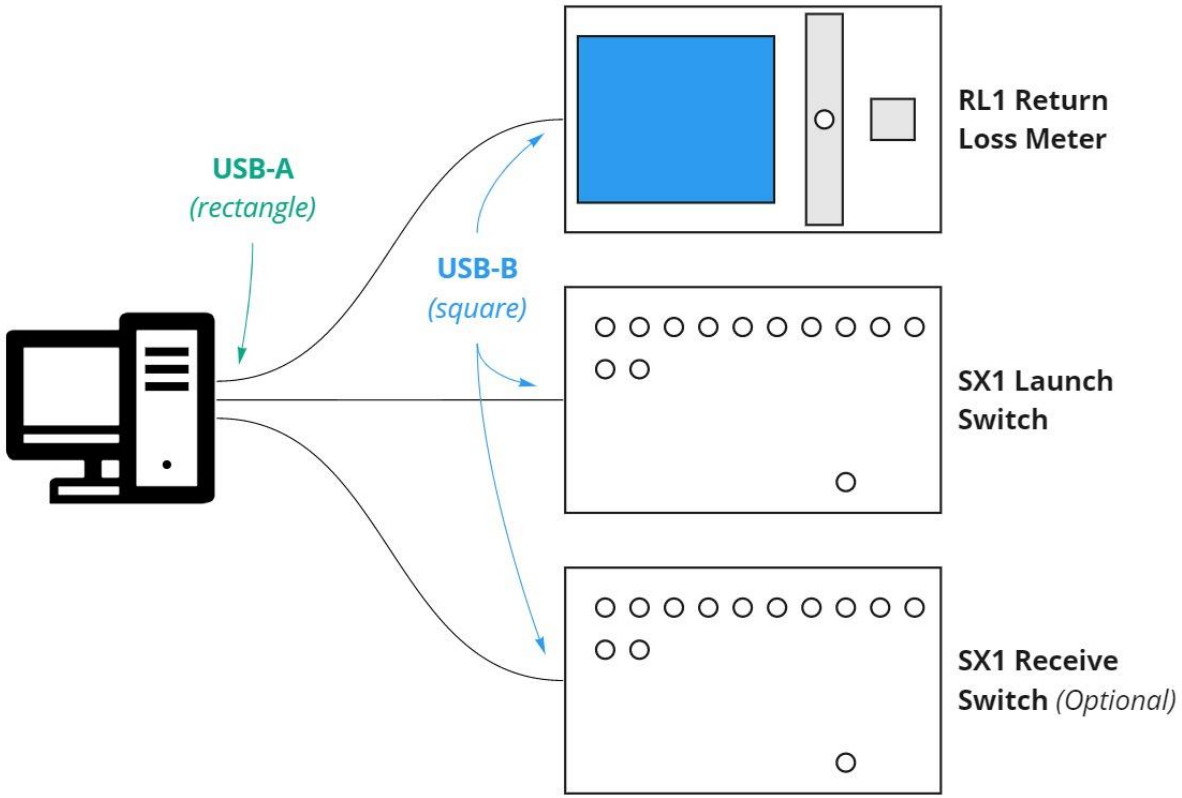
This will install the necessary VISA drivers to control the RL1 and SX1 and the following two applications:

- JGR EOTS – main software to run test sequences
- JGR Data Tools – software used to view data and export to Microsoft Excel

The EOTS software auto detects instruments on launch. If the application is running, close it before proceeding to the hardware connections.

2.2. Hardware Installation

- Power on and connect each instrument via USB to the controlling PC then launch the EOTS software.

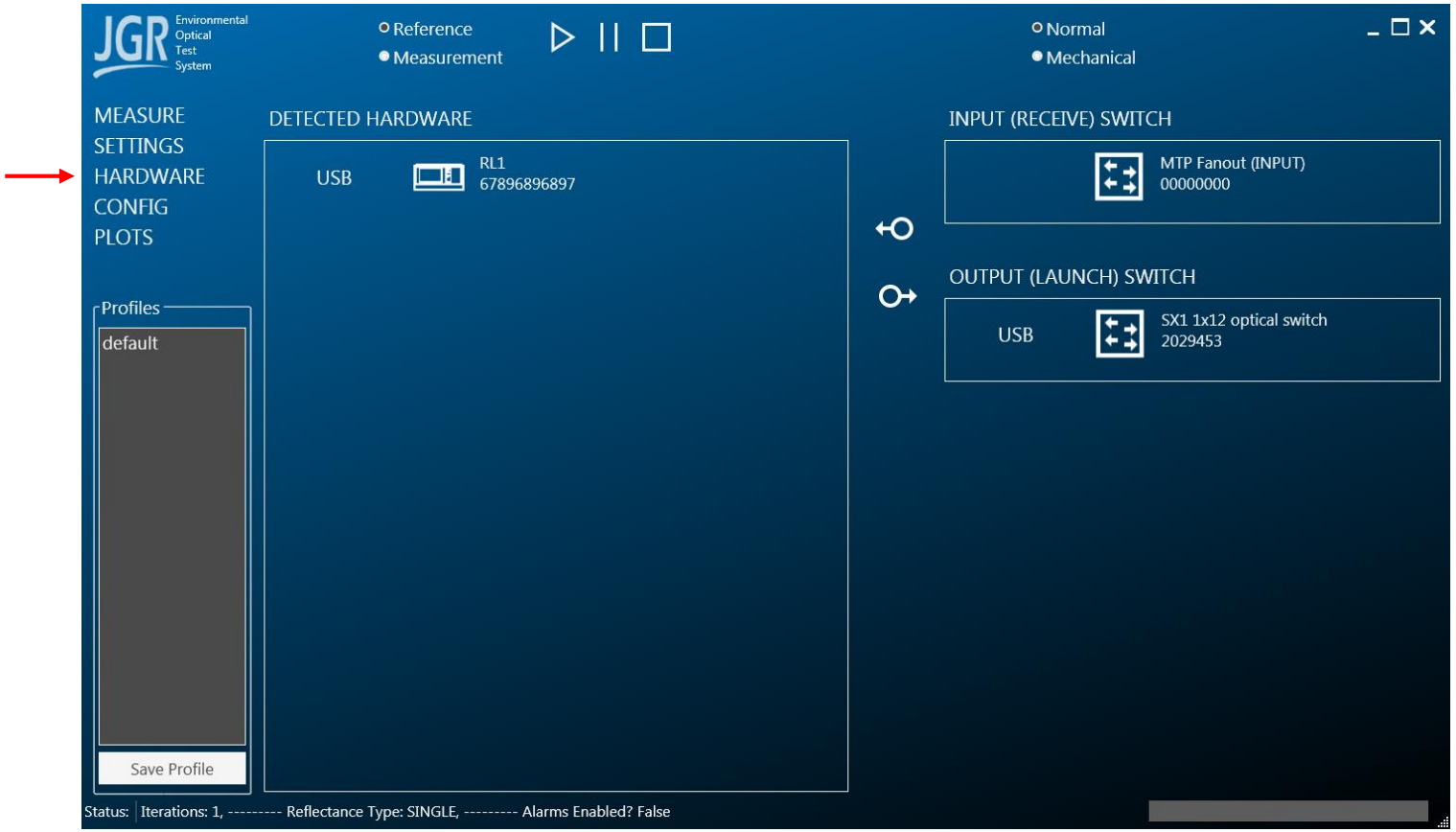


Getting Started with the EOTS Software

3. Software Initial Setup

3.1. Assigning Hardware

- Click on the *HARDWARE* tab then click and drag the switches to their appropriate positions.
- If using only one SX1 switch, drag the virtual hardware *MTJ Fanout (INPUT)* to the input position.

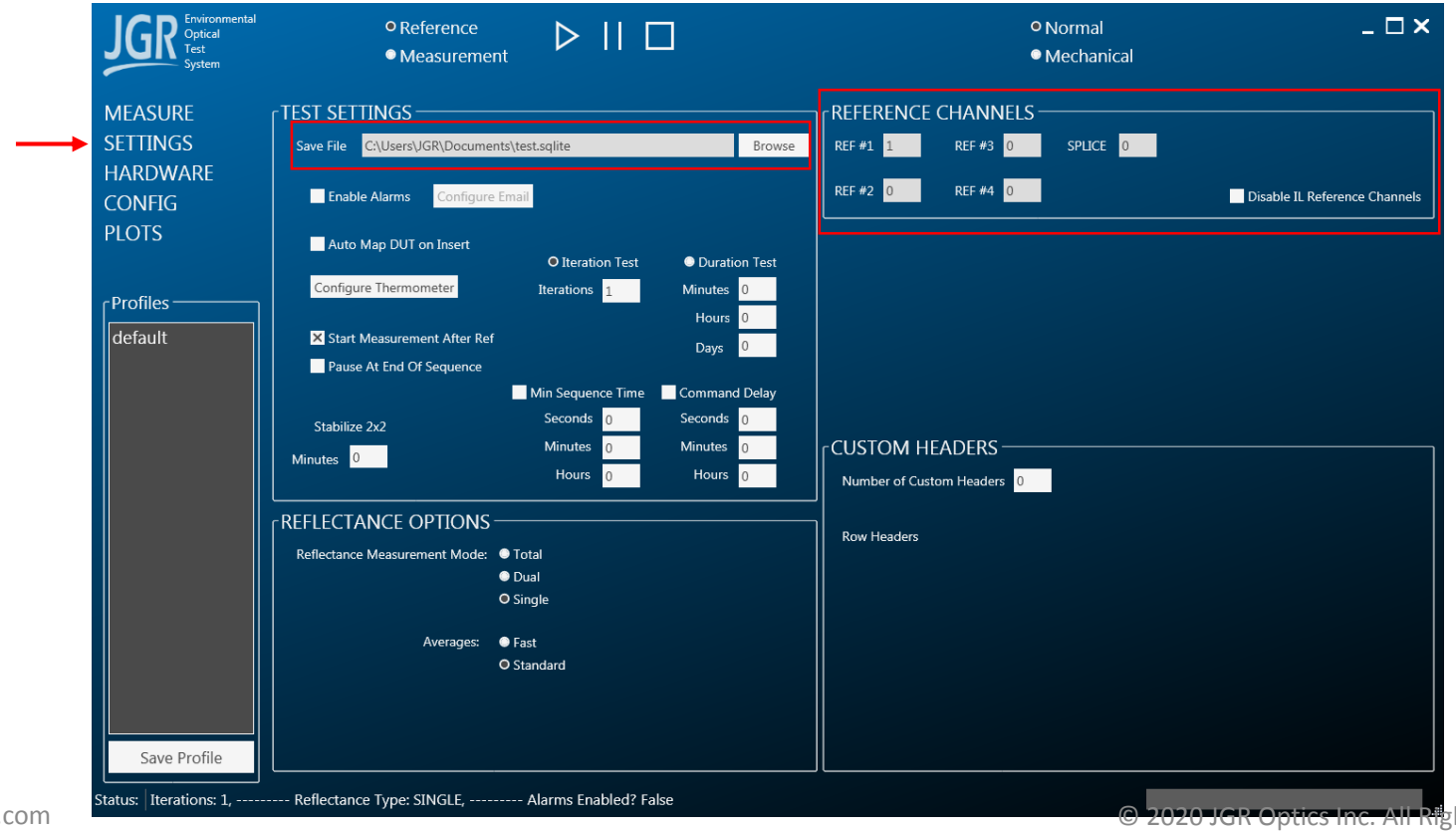


Getting Started with the EOTS Software

3. Software Initial Setup

3.2. Setting Reference Channels

- Click on the *SETTINGS* tab.
- To assign a reference channel, press ALT + S to go into supervisor mode then modify the cells. Pressing ALT + S again locks the reference channels.
- Exiting this page without an assigned save file will prompt an error message.



3.2. Setting Reference Channels

The reference channels compensate for external fiber IL drift. It is suggested to bundle the fibers together as much as possible and include each reference channel within its corresponding group.

The reference channels are the physical channels on the switches. All other EOTS channel numbering will be adjusted accordingly.

For example, a 100 channel EOTS comes with 2 reference channels:

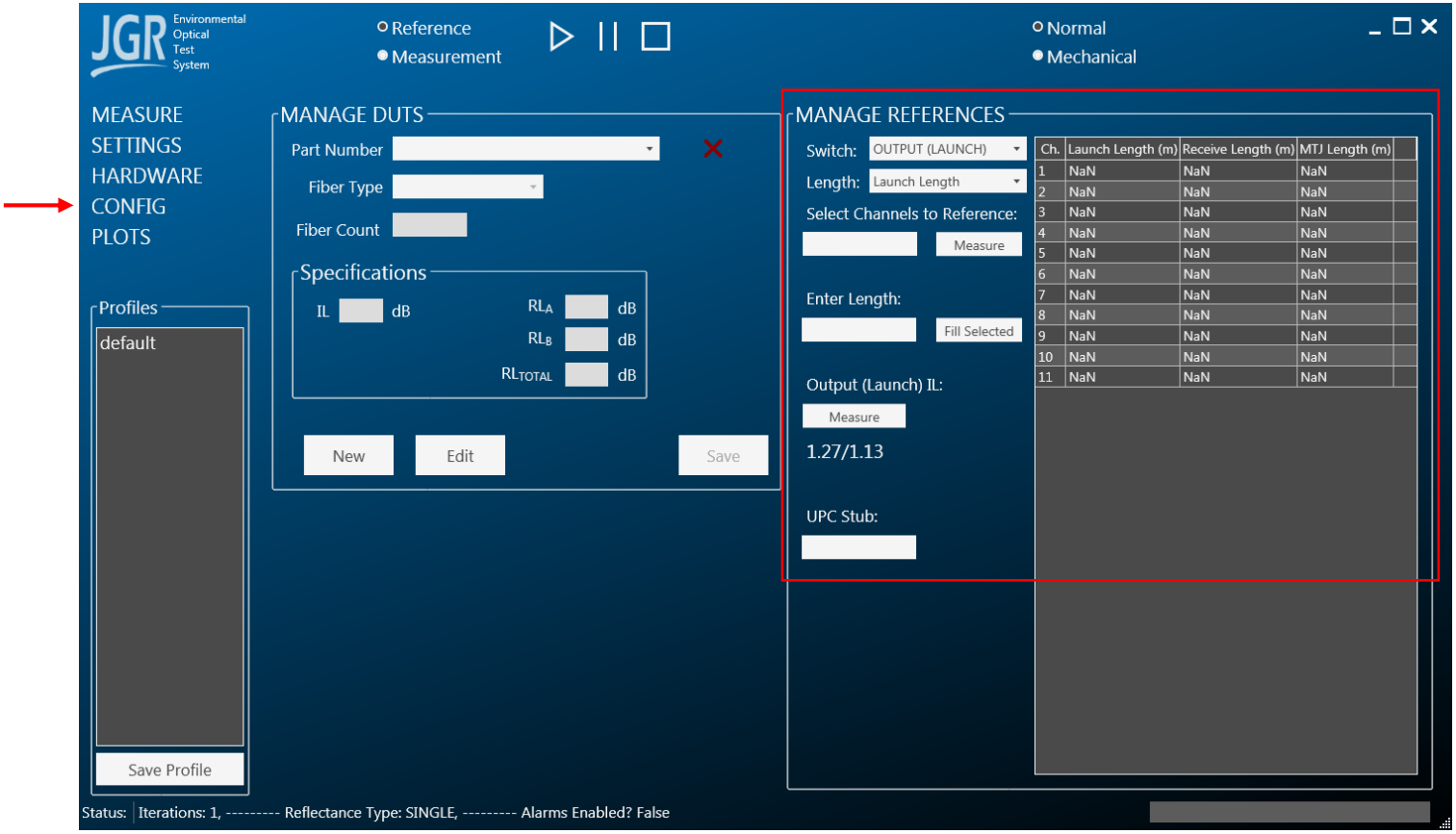
- each switch has 102 physical channels
- REF #1 is assigned to physical ch 1
- REF #2 is assigned to physical ch 52
- the displayed channels in the *MEASURE*, *CONFIG* and *PLOTS* are adjusted accordingly
    - EOTS ch 1 = physical ch 2
    - EOTS ch 2 = physical ch 3
    - ..
    - EOTS ch 51 = physical ch 53
    - ..
- REF #1 compensates for EOTS ch 1-50
- REF #2 compensates for EOTS ch 51-100

Getting Started with the EOTS Software

3. Software Initial Setup

3.3. Managing Reference Lengths and System IL

- Click on the *CONFIG* tab to set the lengths of each switch and measure the system IL.

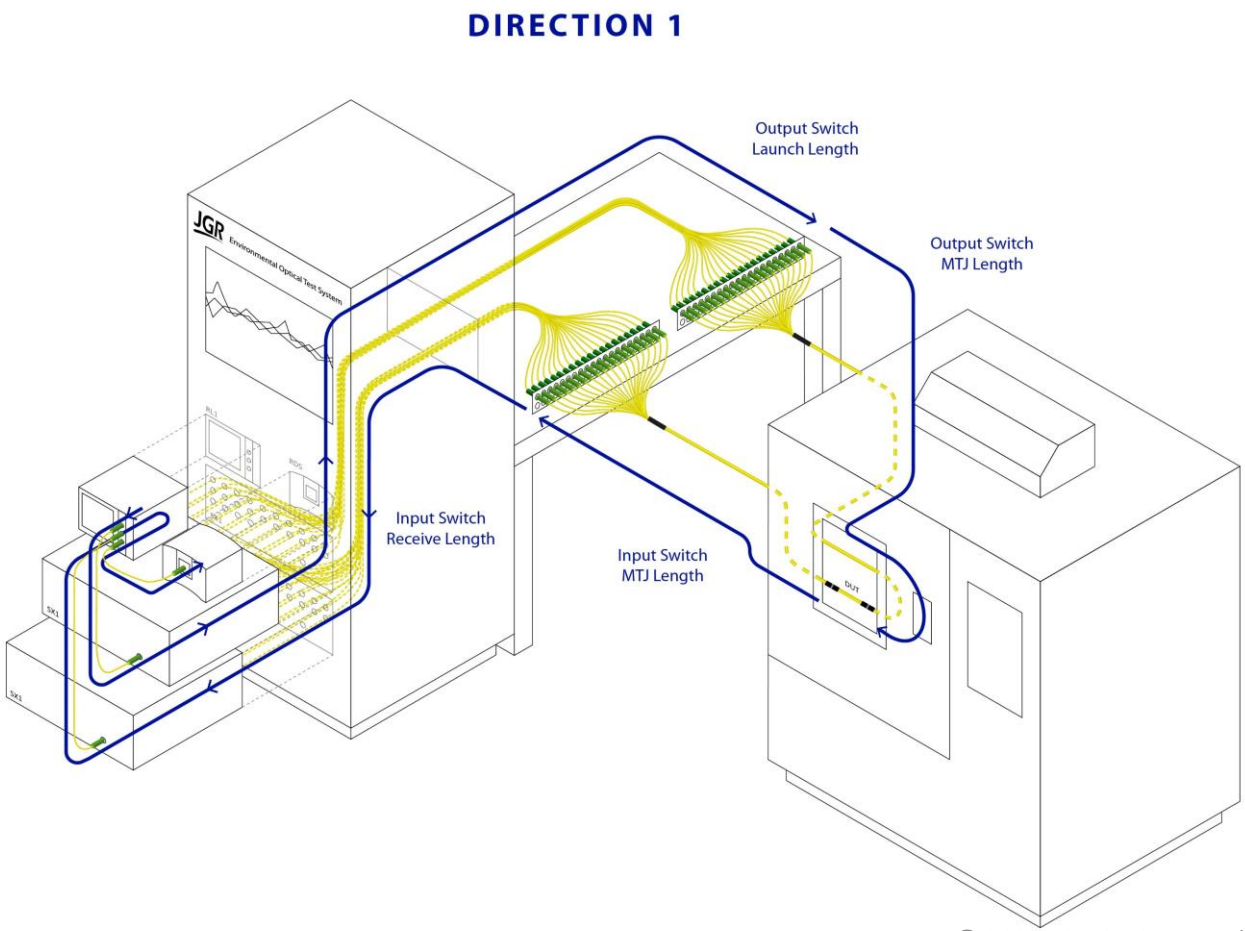


3.3. Managing Reference Lengths and System IL

- The definition of the different lengths are shown in the following pages. They are the reference lengths for RL_A and RL_B.
- In the case of a bidirectional RL1 (ex: RL1-**2X**-3050-S-09FA):
  - each switch must have defined launch and receive lengths
- In the case of a single output RL1 (ex: RL1-**01**-3050-S-09FA):
  - the launch switch must have a defined launch length
  - the receive switch (or fanout) must have a defined receive length
- Each switch must have a defined MTJ length.

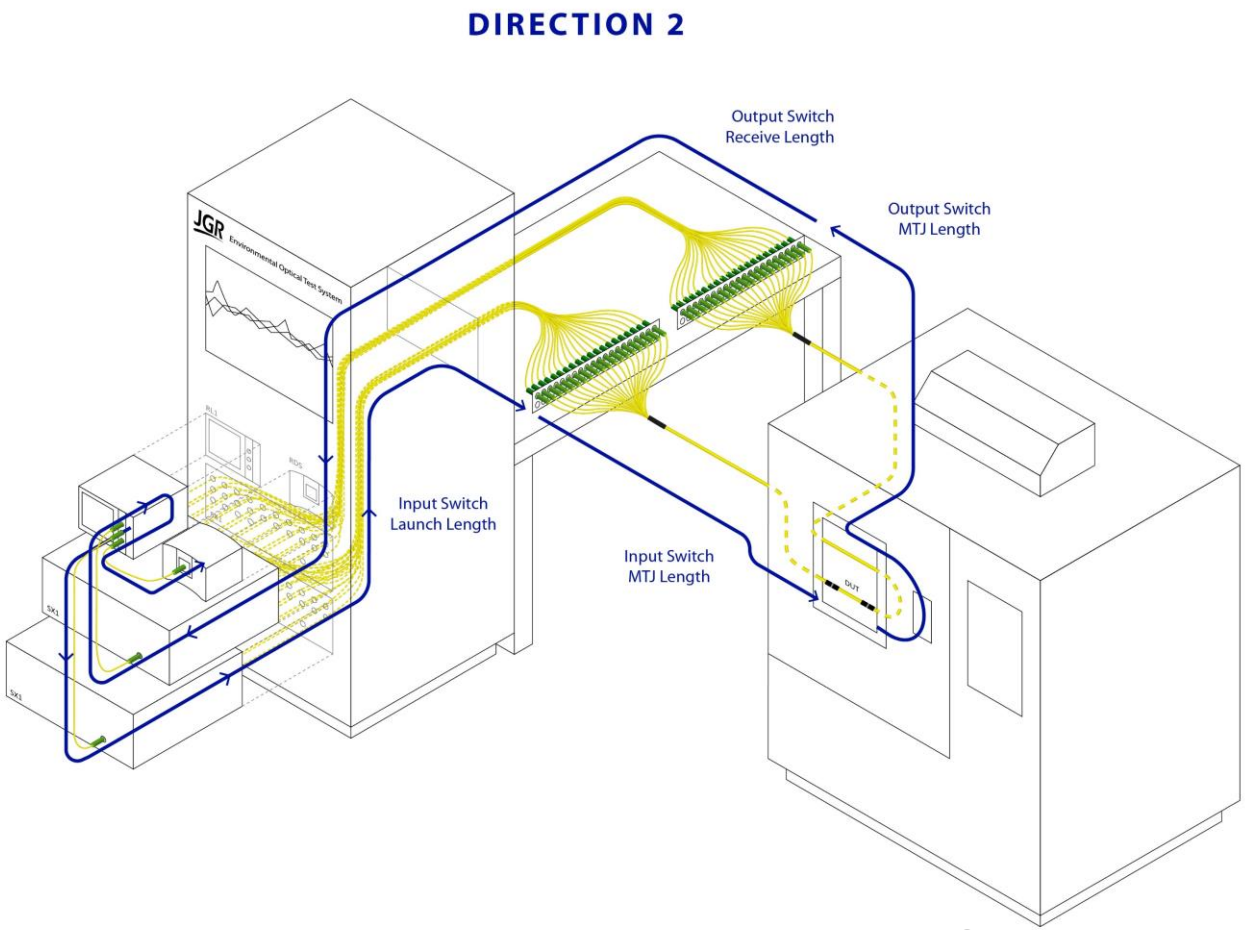
3.4. Length Definitions

Pigtail configuration:



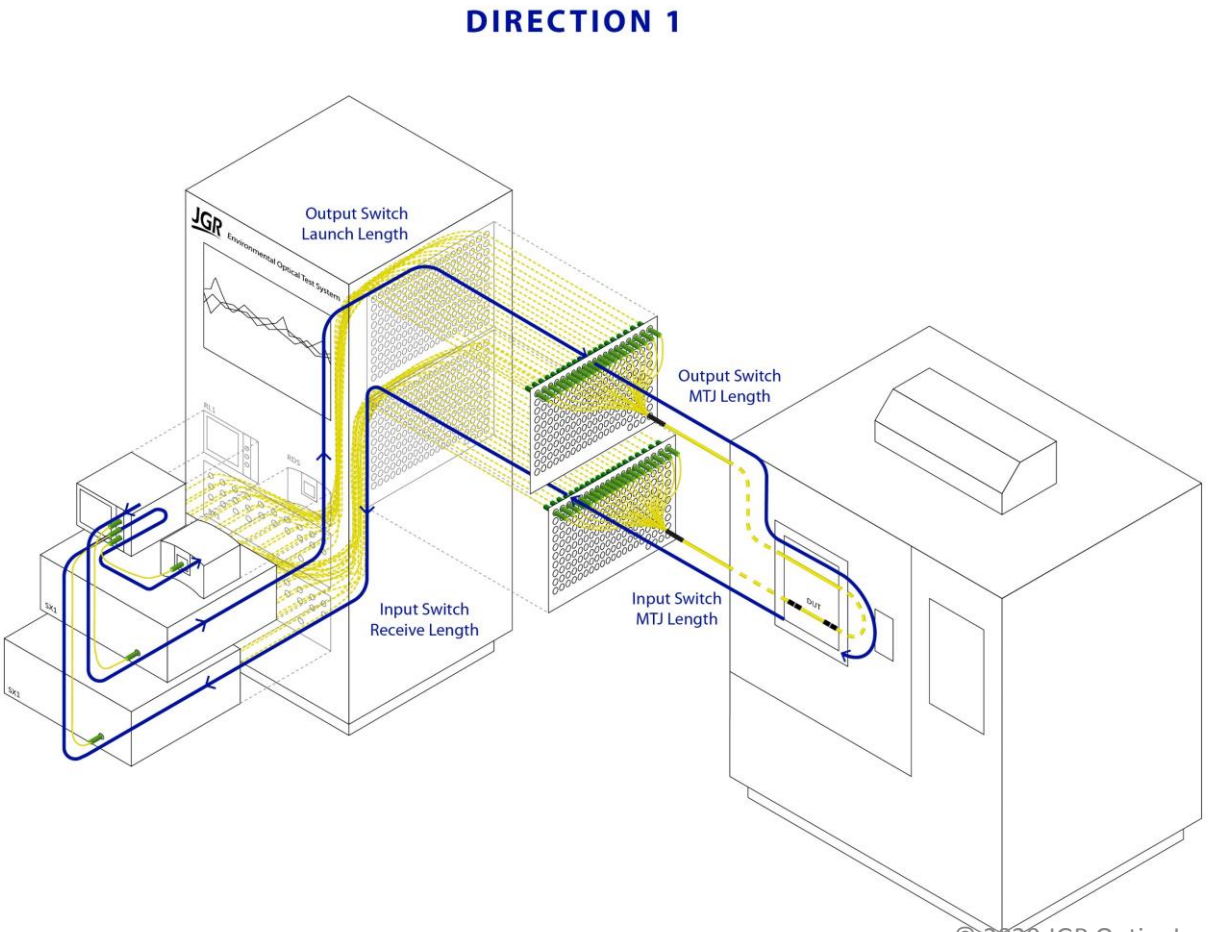
3.4. Length Definitions

Pigtail configuration:



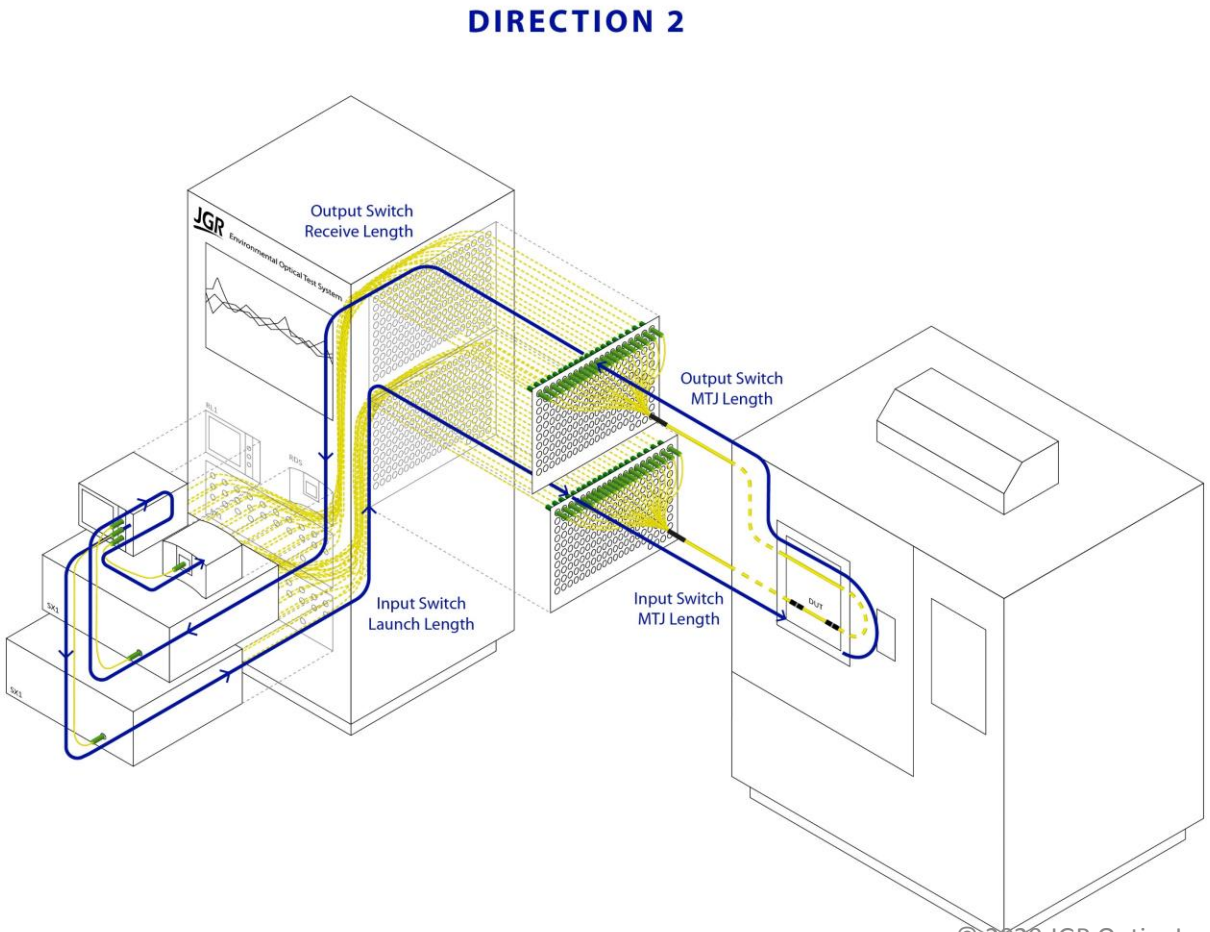
3.4. Length Definitions

Side panel configuration:



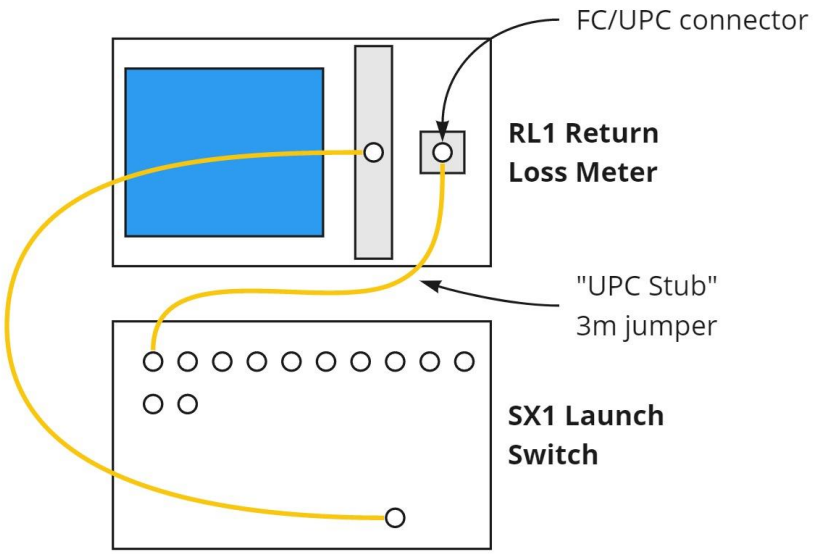
3.4. Length Definitions

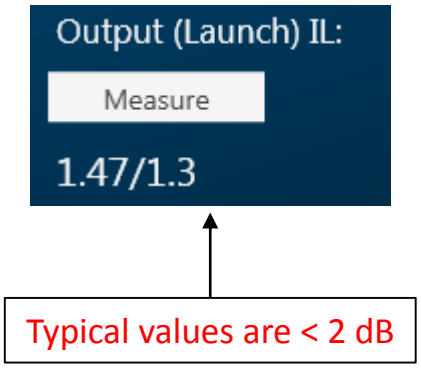
Side panel configuration:



3.5. Direction 1 Length References and System IL

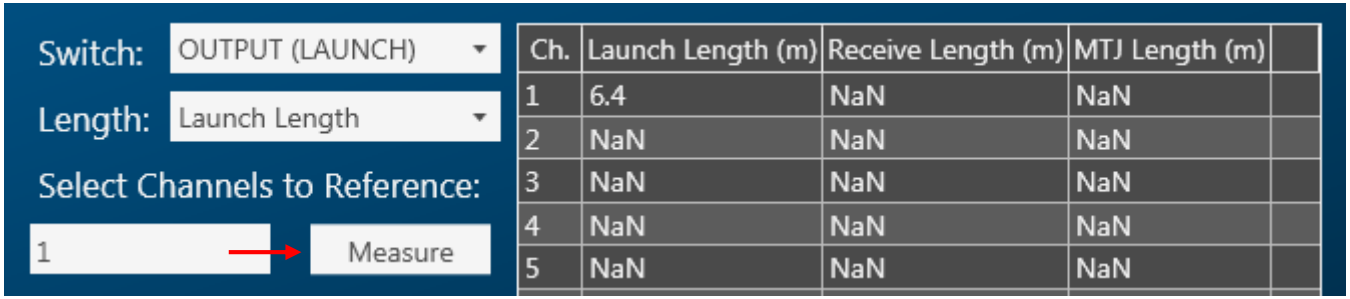
- It is recommended to use a 3m jumper with a flat polish (PC) connector for the length referencing.
- Alternatively, an APC jumper can be used. Putting on a dust cap will increase the reflection and may help in cases where there is some uncertainty.
- Inspect and connect the UPC stub from launch ch 1 to the detector and measure the *Output (Launch) IL*.





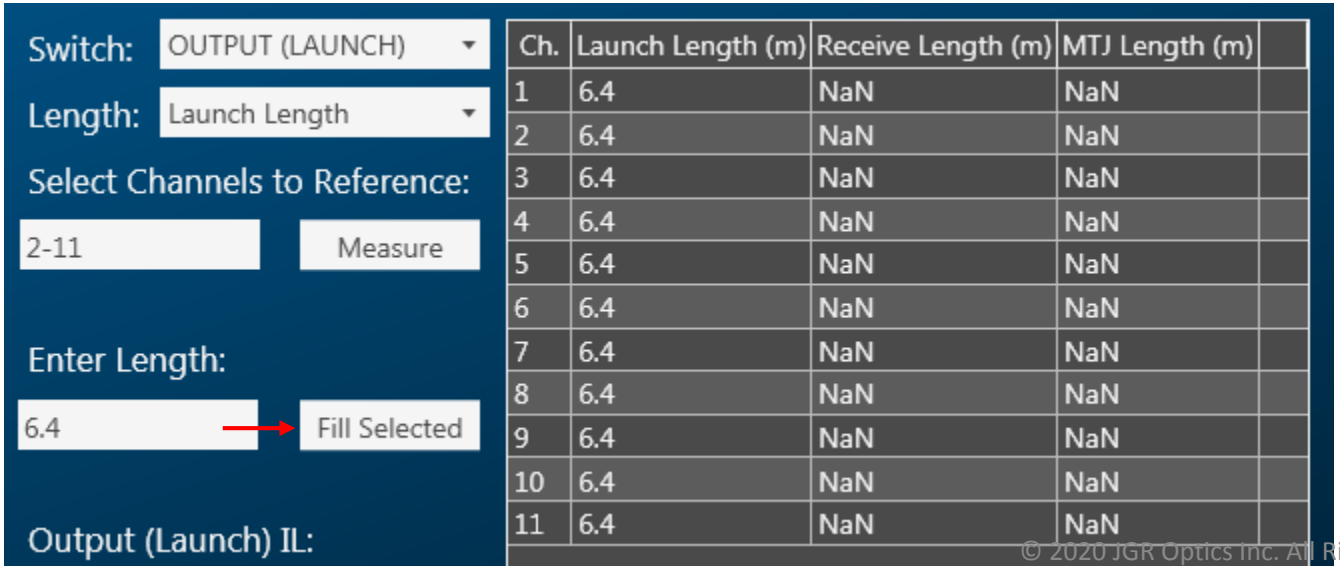
3.5. Direction 1 Length References and System IL

- Without changing the optical connections measure the launch length of the output switch on ch 1.



Ch.	Launch Length (m)	Receive Length (m)	MTJ Length (m)
1	6.4	NaN	NaN
2	NaN	NaN	NaN
3	NaN	NaN	NaN
4	NaN	NaN	NaN
5	NaN	NaN	NaN

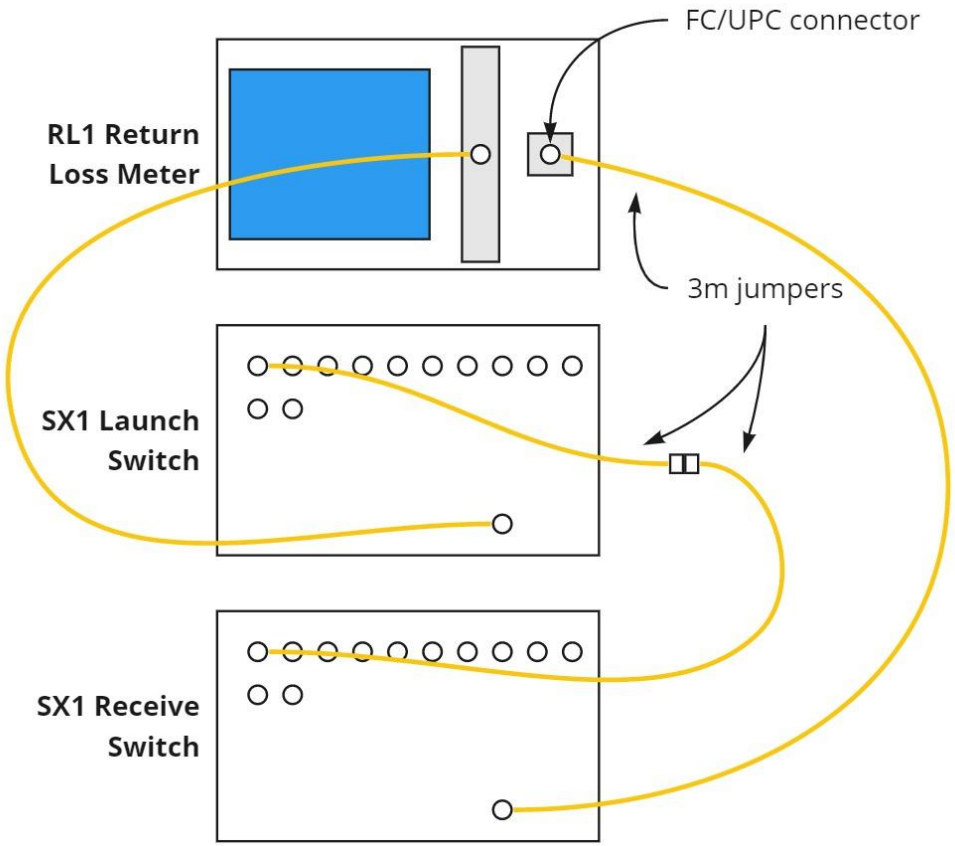
- Repeat the previous point for each channel or enter manually if the lengths are known.



Ch.	Launch Length (m)	Receive Length (m)	MTJ Length (m)
1	6.4	NaN	NaN
2	6.4	NaN	NaN
3	6.4	NaN	NaN
4	6.4	NaN	NaN
5	6.4	NaN	NaN
6	6.4	NaN	NaN
7	6.4	NaN	NaN
8	6.4	NaN	NaN
9	6.4	NaN	NaN
10	6.4	NaN	NaN
11	6.4	NaN	NaN

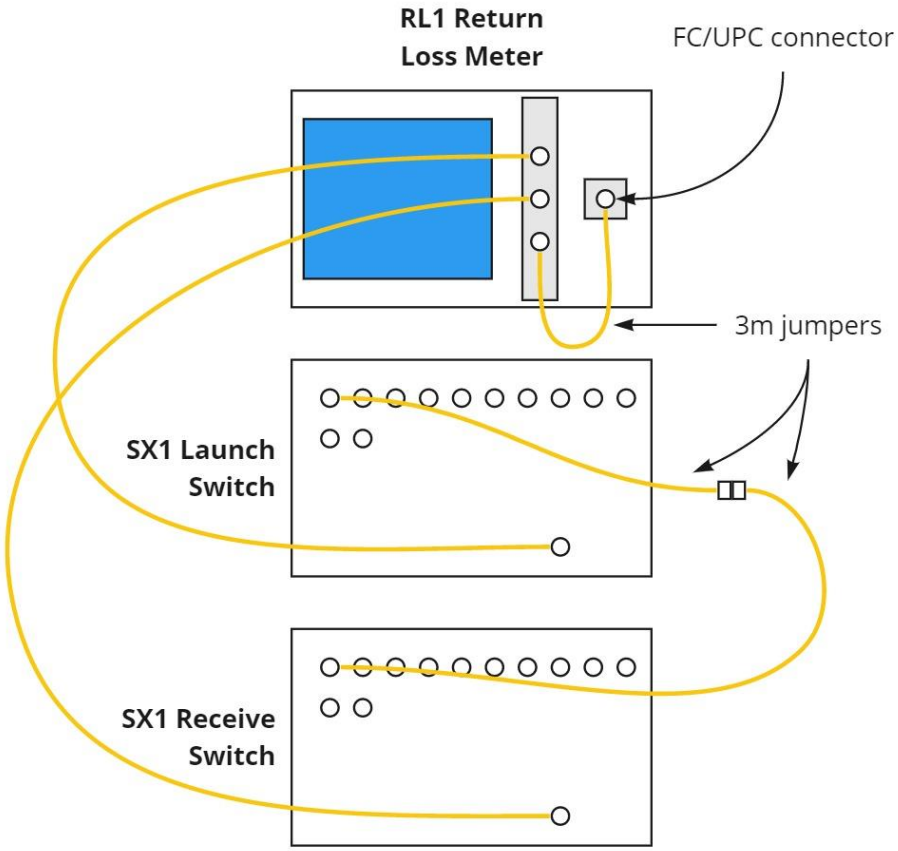
3.5. Direction 1 Length References and System IL

- If using a receive switch, inspect and connect two 3m jumpers between the launch switch ch 1 and receive switch ch 1.



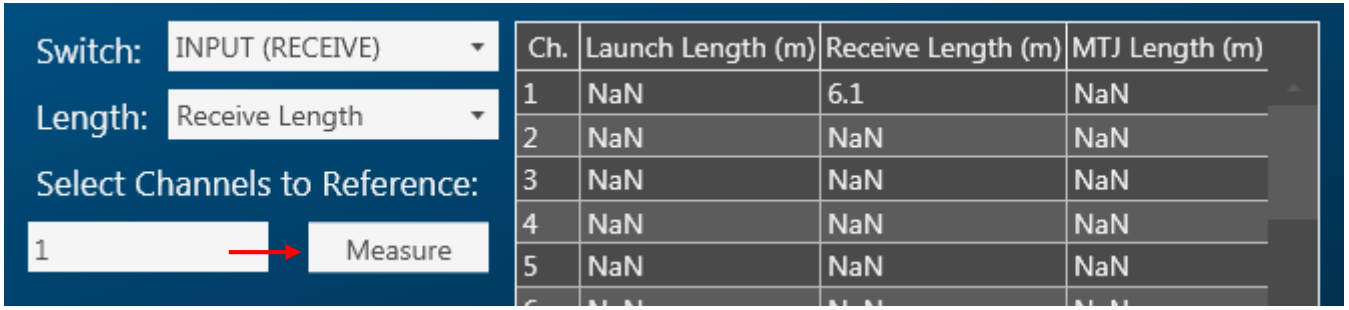
3.5. Direction 1 Length References and System IL

- Connection diagram for a 2X RL1:

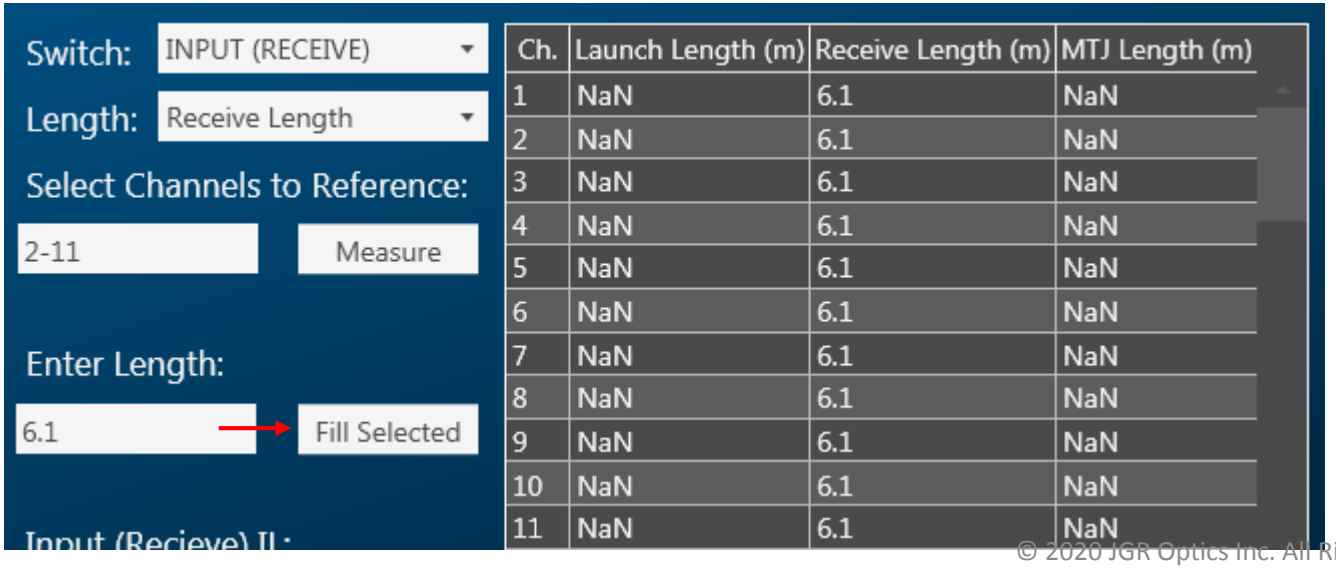


3.5. Direction 1 Length References and System IL

- Measure the receive length of the input switch on ch 1.

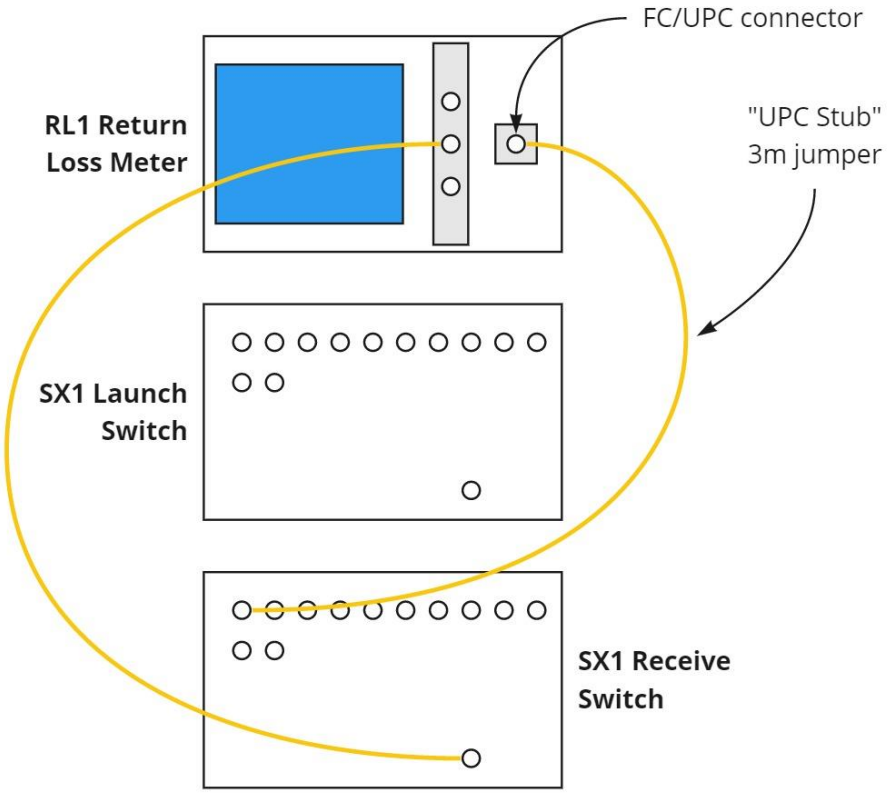


- Repeat for each channel or enter manually if the lengths are known.



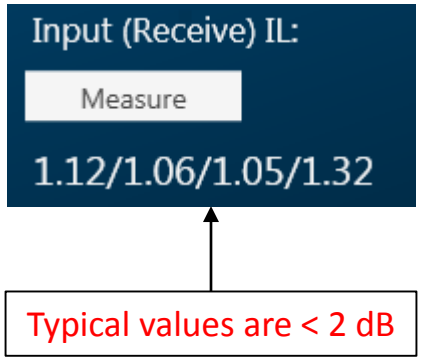
3.6. Direction 2 Length References and System IL

- Direction 2 is **only applicable** for a **bidirectional** (2X) RL1.
  - For a single output RL1, skip 3.6. and go to section 4.
- Connect the 3m jumper from the receive switch ch 1 to the detector.

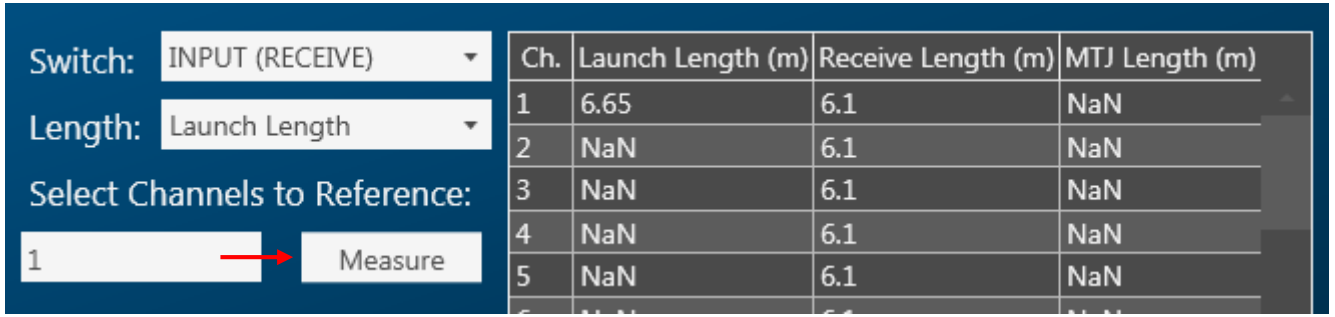


3.6. Direction 2 Length References and System IL

- Measure the *Input (Receive) IL*.

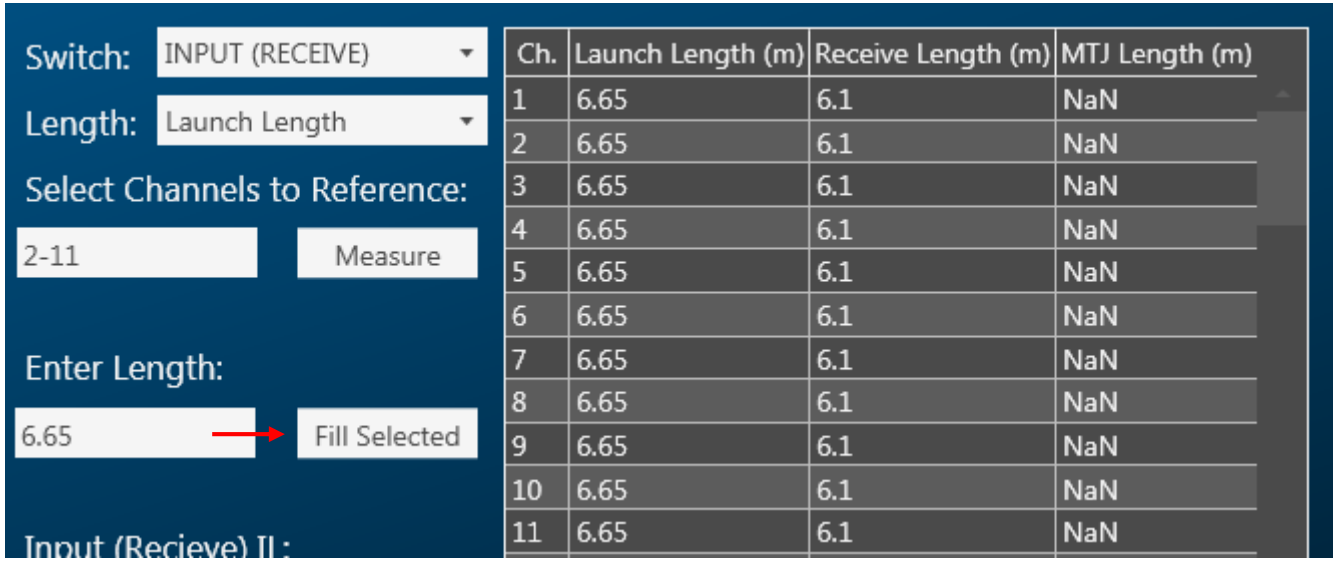


- Measure the launch length of the input switch on ch 1.



3.6. Direction 2 Length References and System IL

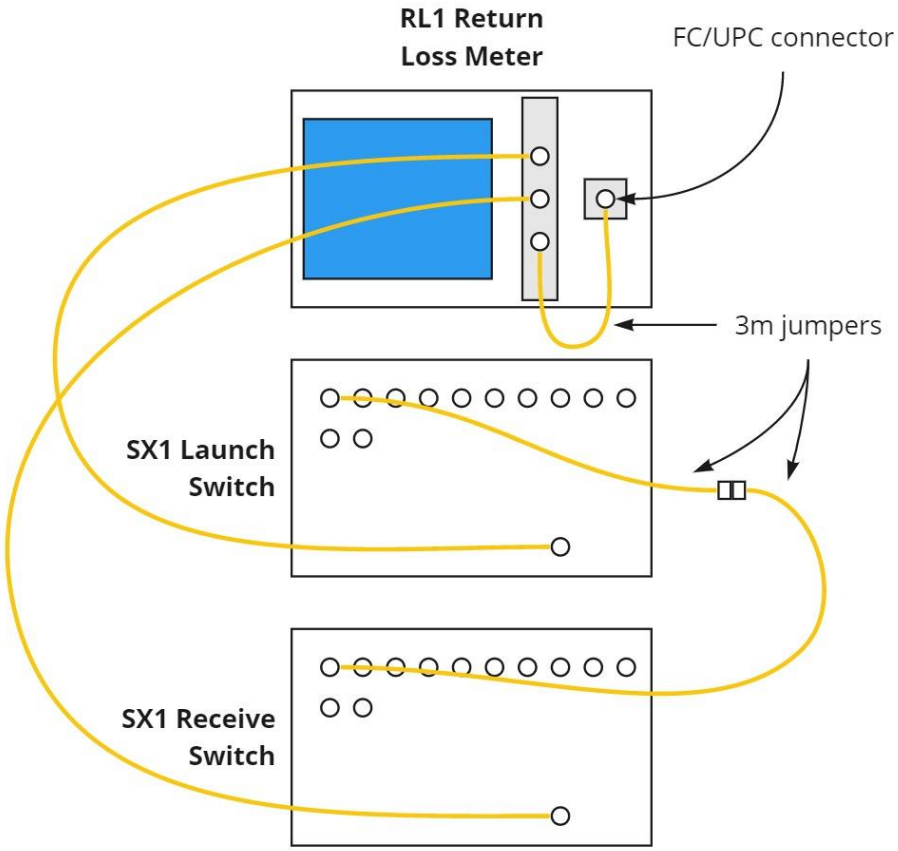
- Repeat the previous point for each channel or enter manually if the lengths are known.



Ch.	Launch Length (m)	Receive Length (m)	MTJ Length (m)
1	6.65	6.1	NaN
2	6.65	6.1	NaN
3	6.65	6.1	NaN
4	6.65	6.1	NaN
5	6.65	6.1	NaN
6	6.65	6.1	NaN
7	6.65	6.1	NaN
8	6.65	6.1	NaN
9	6.65	6.1	NaN
10	6.65	6.1	NaN
11	6.65	6.1	NaN

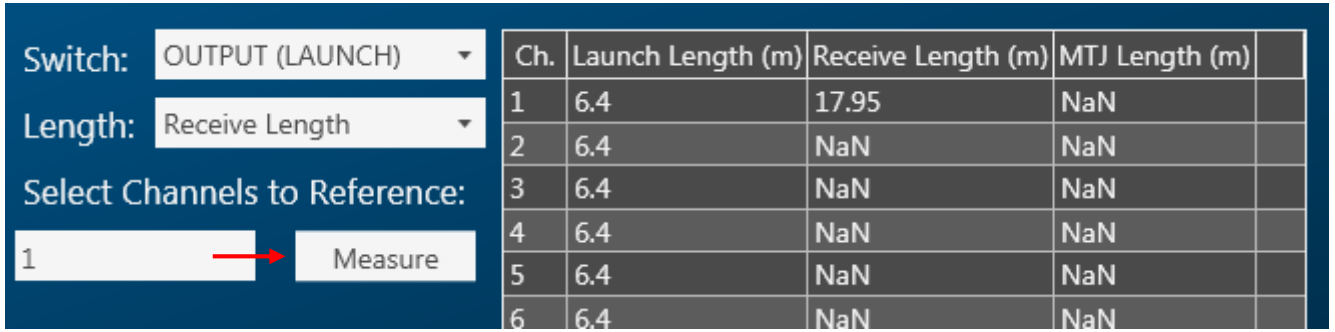
3.6. Direction 2 Length References and System IL

- Connect two 3m jumpers between the launch switch ch 1 and receive switch ch 1.



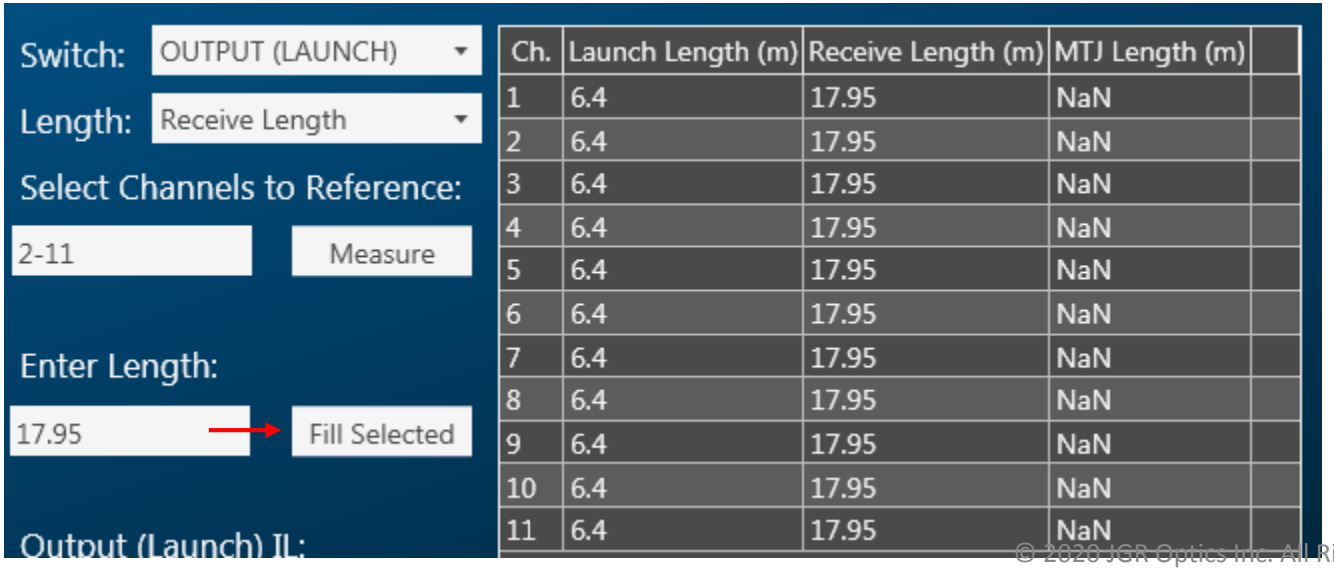
3.6. Direction 2 Length References and System IL

- Measure the receive length of the output switch on ch 1.



Ch.	Launch Length (m)	Receive Length (m)	MTJ Length (m)
1	6.4	17.95	NaN
2	6.4	NaN	NaN
3	6.4	NaN	NaN
4	6.4	NaN	NaN
5	6.4	NaN	NaN
6	6.4	NaN	NaN

- Repeat for each channel or enter manually if the lengths are known.



Ch.	Launch Length (m)	Receive Length (m)	MTJ Length (m)
1	6.4	17.95	NaN
2	6.4	17.95	NaN
3	6.4	17.95	NaN
4	6.4	17.95	NaN
5	6.4	17.95	NaN
6	6.4	17.95	NaN
7	6.4	17.95	NaN
8	6.4	17.95	NaN
9	6.4	17.95	NaN
10	6.4	17.95	NaN
11	6.4	17.95	NaN

4.1. MTJ Length References

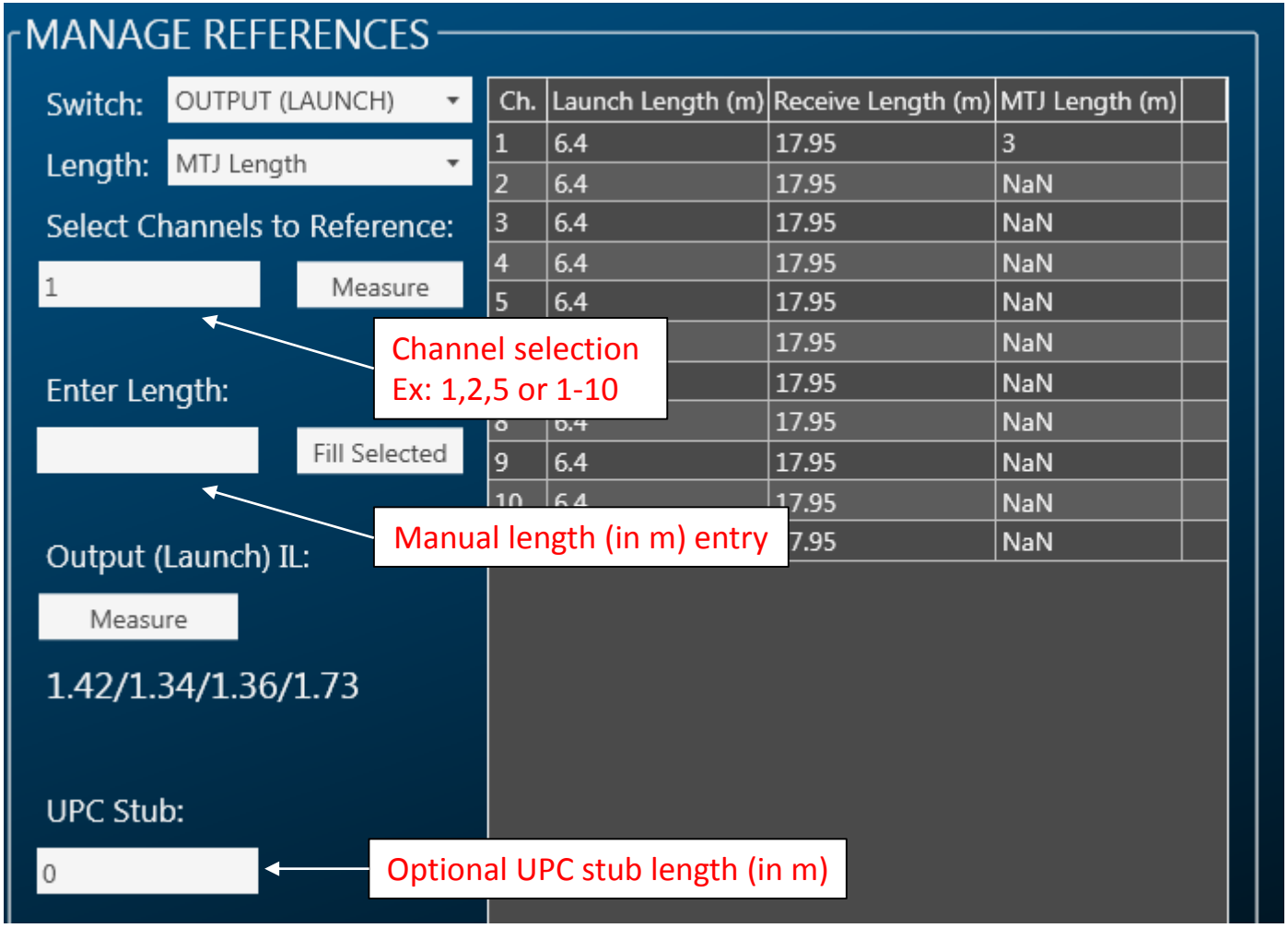
Press ALT + S to exit supervisor mode and lock the launch and receive lengths. These lengths should be fixed unless hardware is changed.

The MTJ lengths can be easily adjusted if the reference cables leading to the environmental chamber are changed by one of the following methods:

1. enter manually if the MTJ lengths are known
2. connect the reference cable and leave open to air then measure with the RL1
3. connect a UPC stub of known length and leave open to air then measure with the RL1 in cases of uncertainty

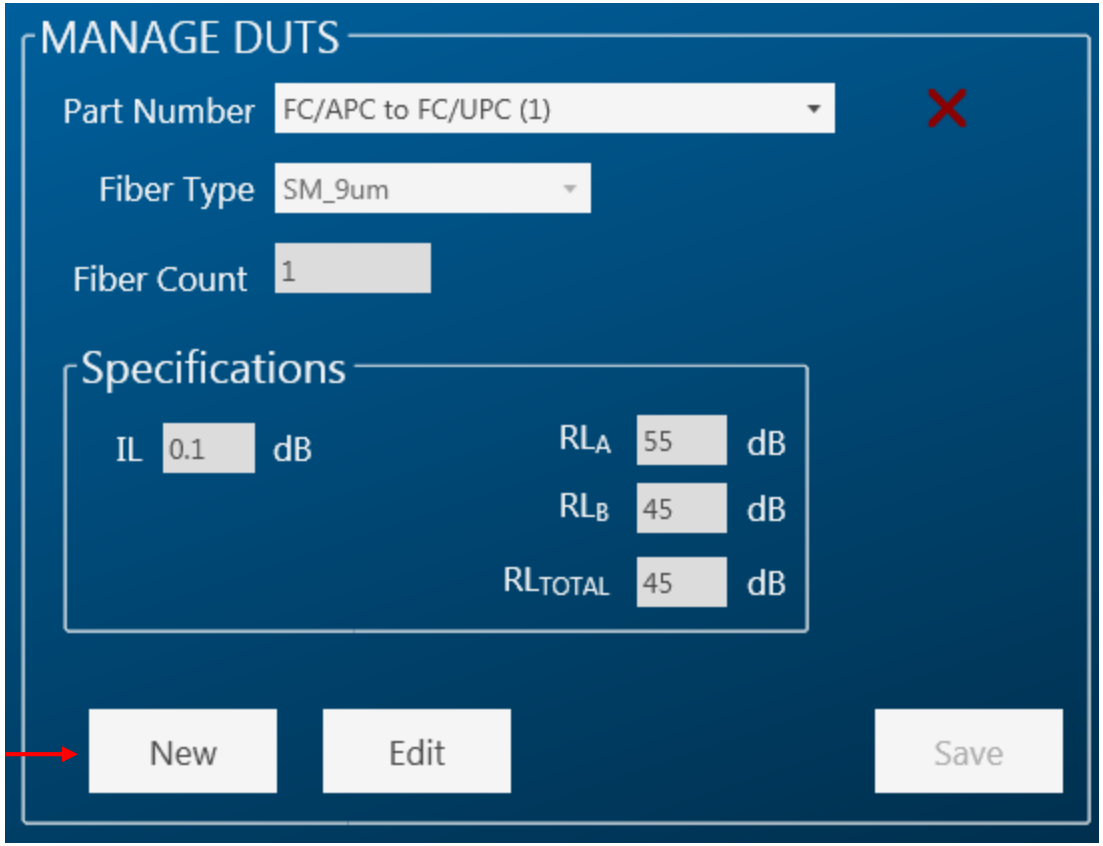
(see next page)

4.1. MTJ Length References



4.2. Create a DUT

Click *New* and fill in the DUT parameters then click *Save*. Specifications can be left blank.



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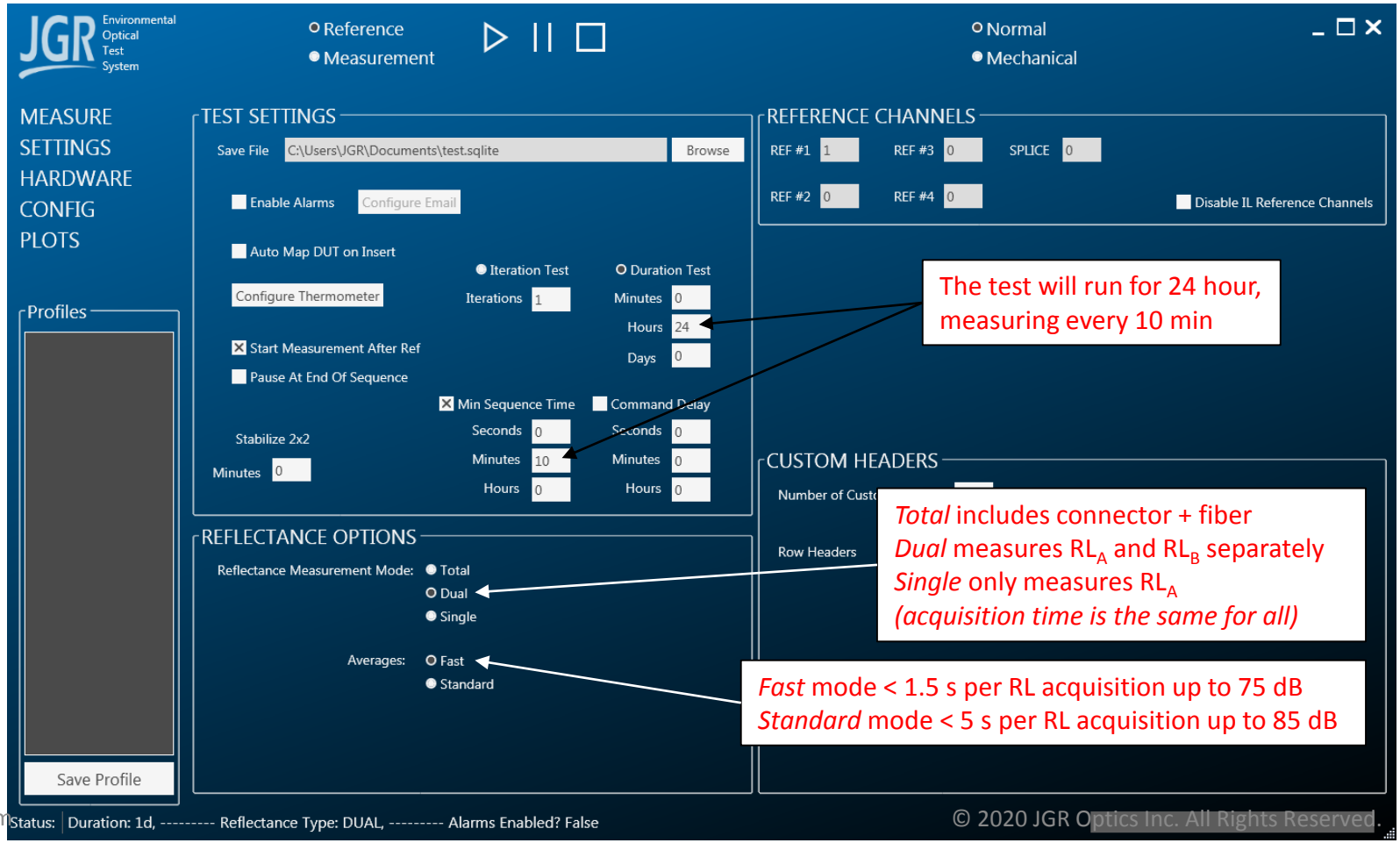
4. Setting Up a Test

4.3. Review Settings

- Click on the *SETTINGS* tab and select measurement settings.

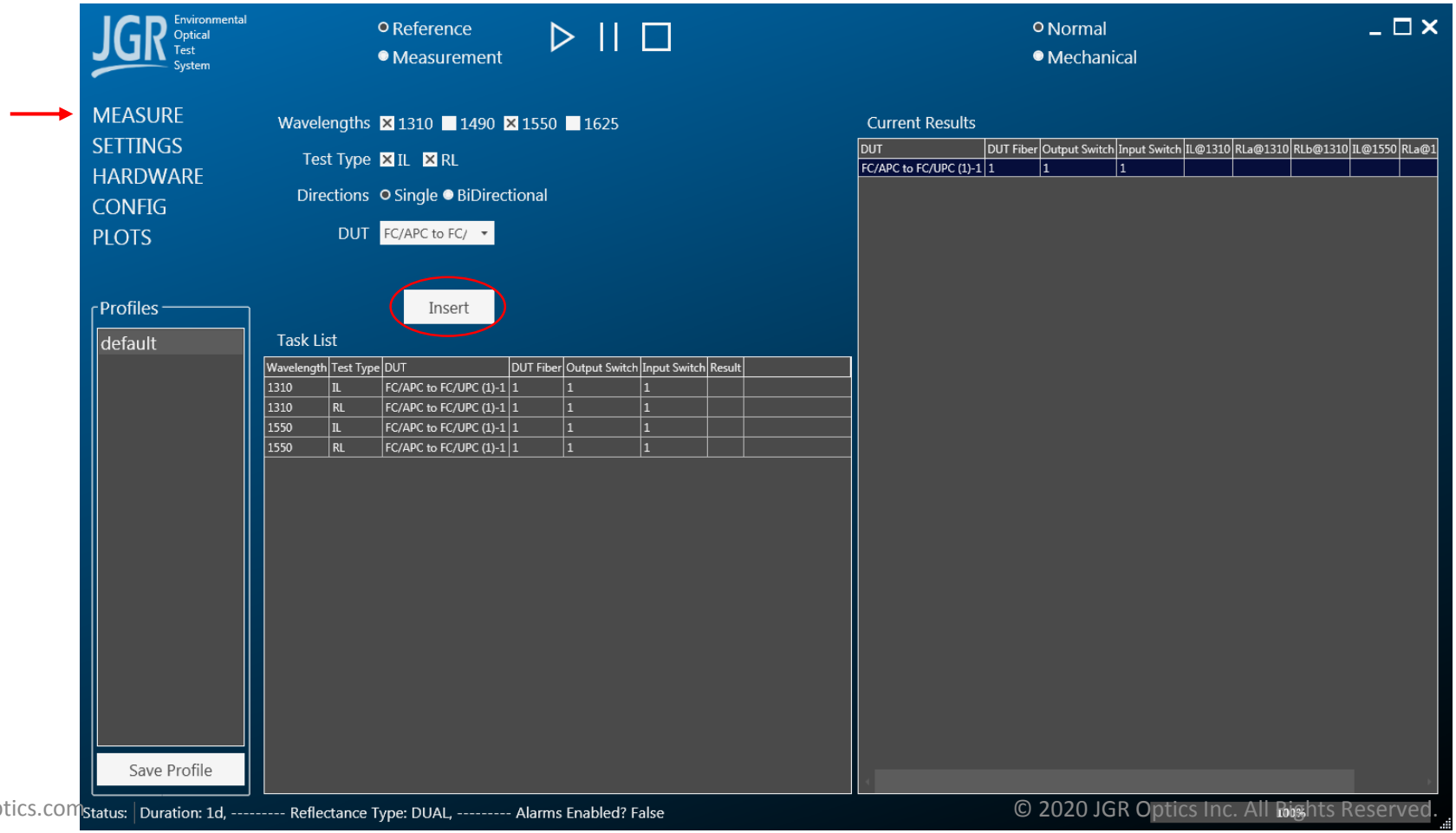


Getting Started with the EOTS Software

4. Setting Up a Test

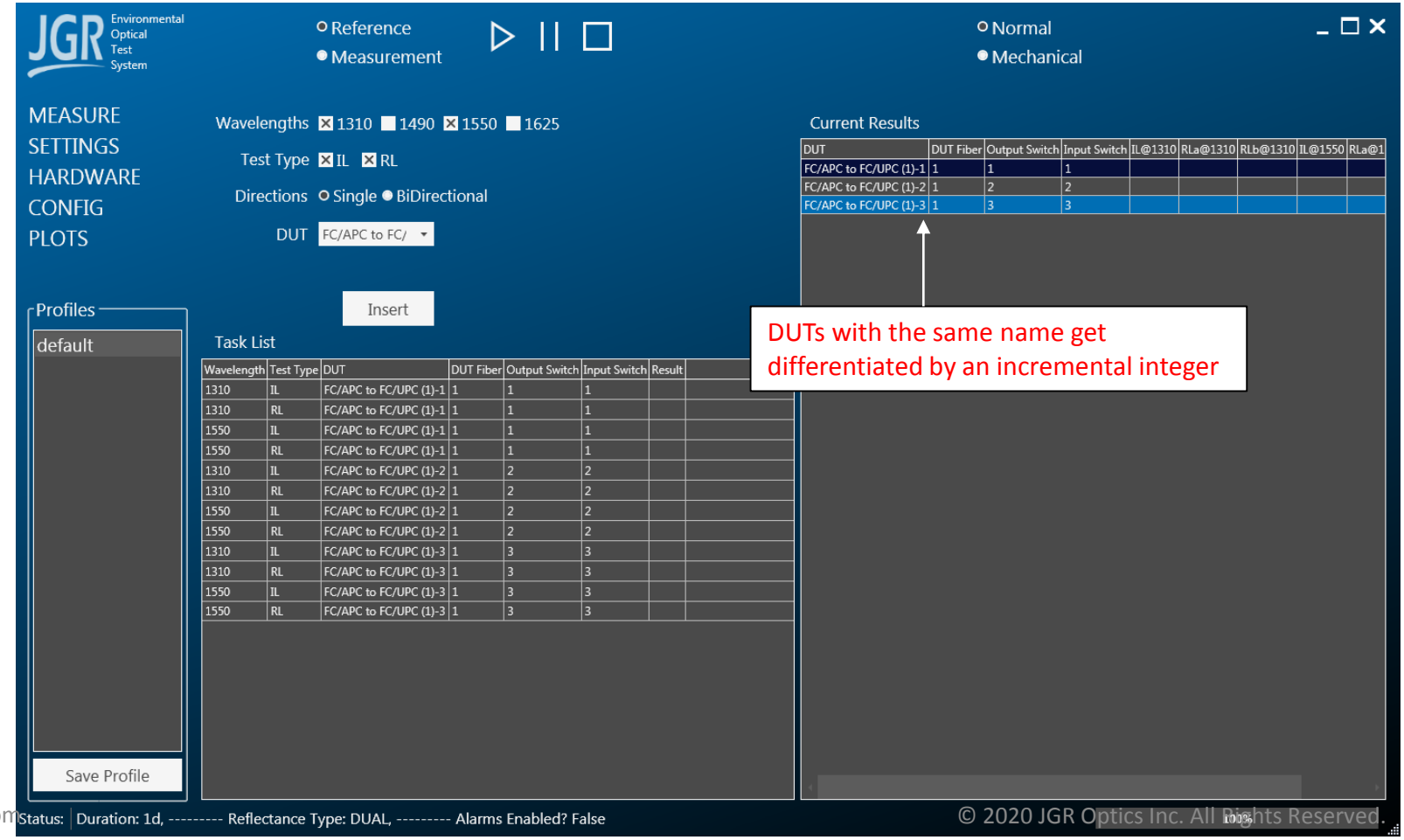
4.4. Create a Test Sequence

- Click on the *MEASURE* tab and select test parameters then click *Insert*



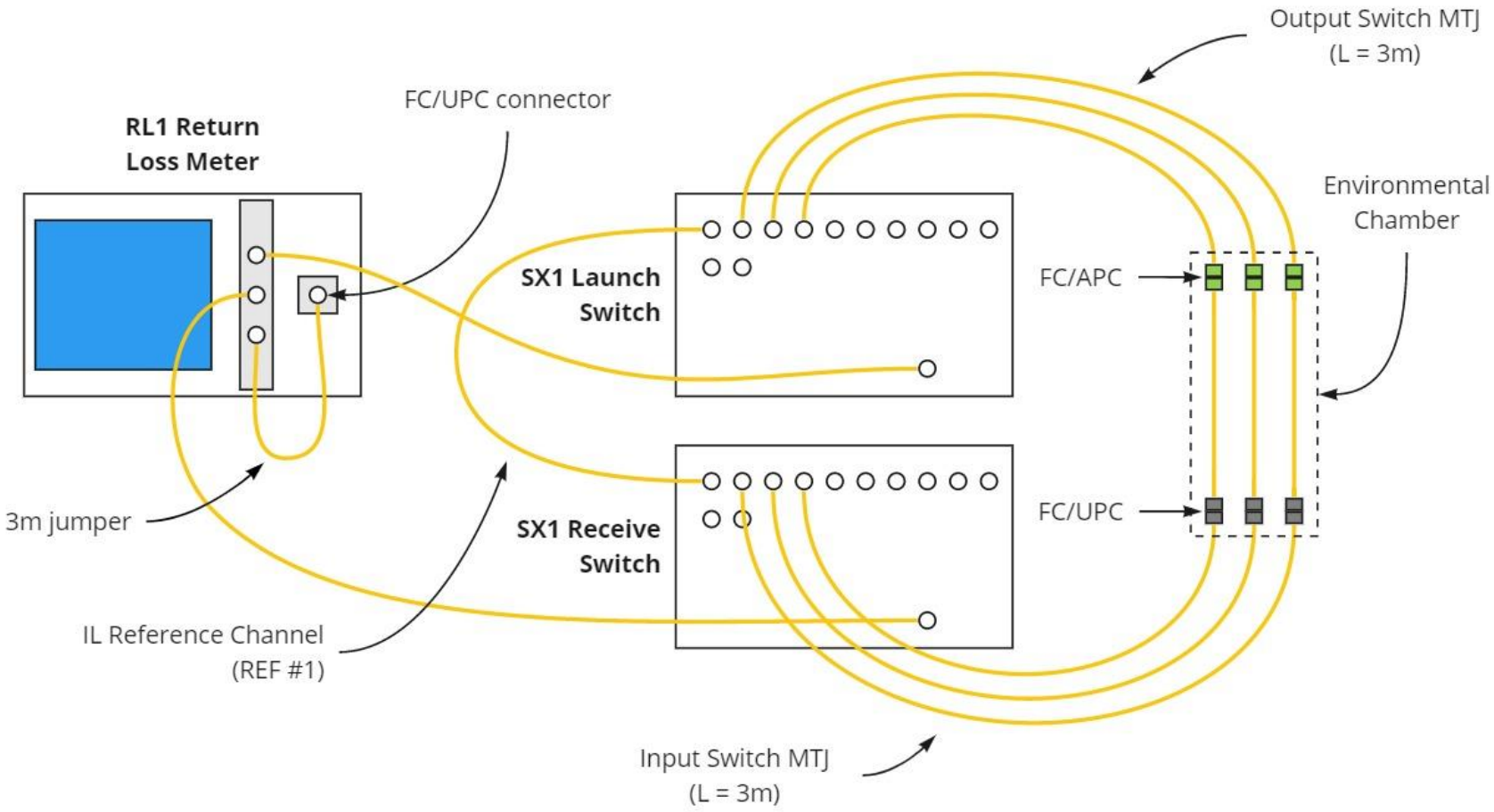
4.4. Create a Test Sequence

- Multiple DUTs can be entered in the sequence.



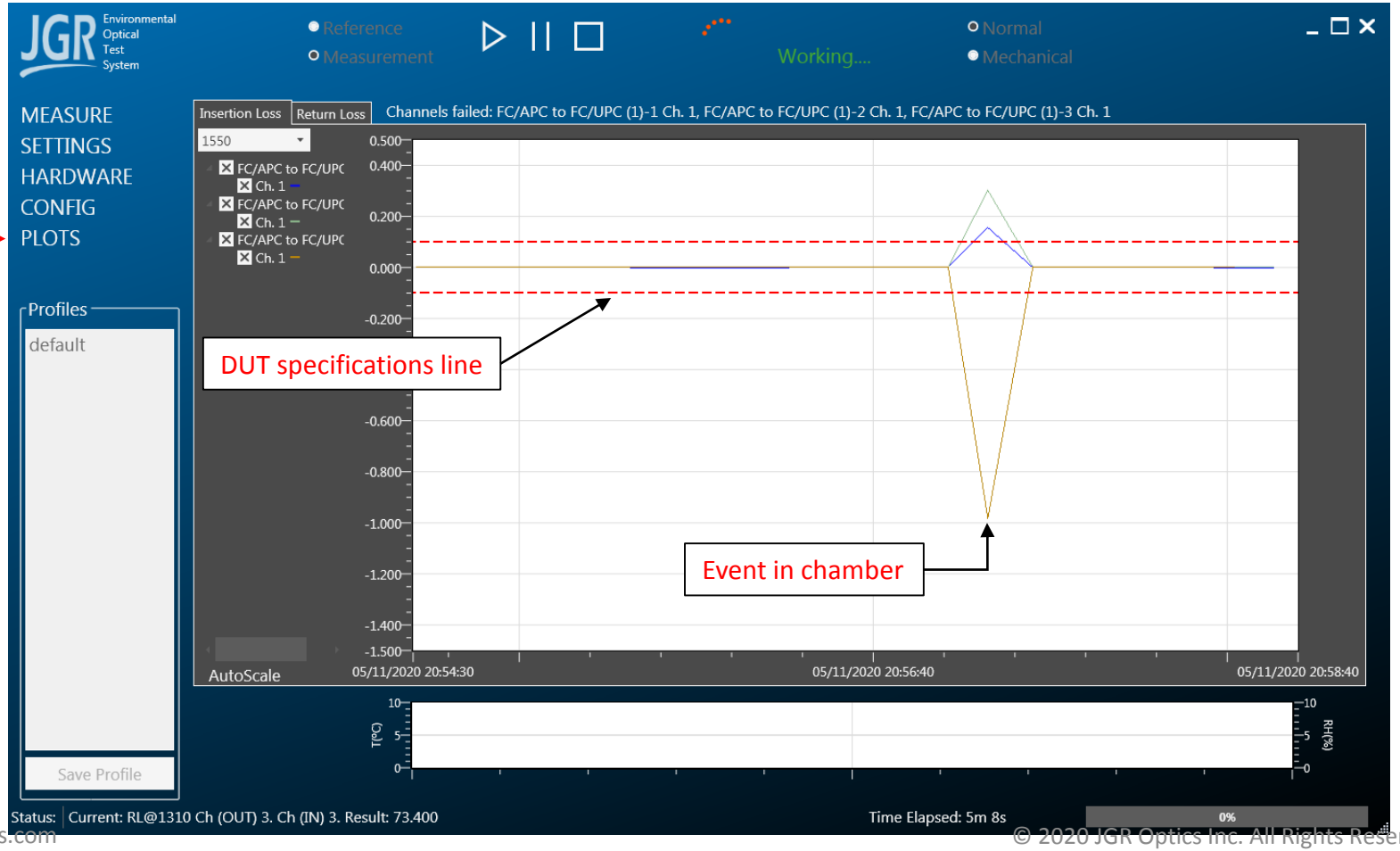
4.5. Start a Test

- Connect the DUTs fully then click on ▷
- For the test sequence of the previous page (with *REF #1* = 1), the optical connections are:



4.6. Monitor Results in Real-time

- Click on the *PLOTS* tab to view real-time graphs of the results



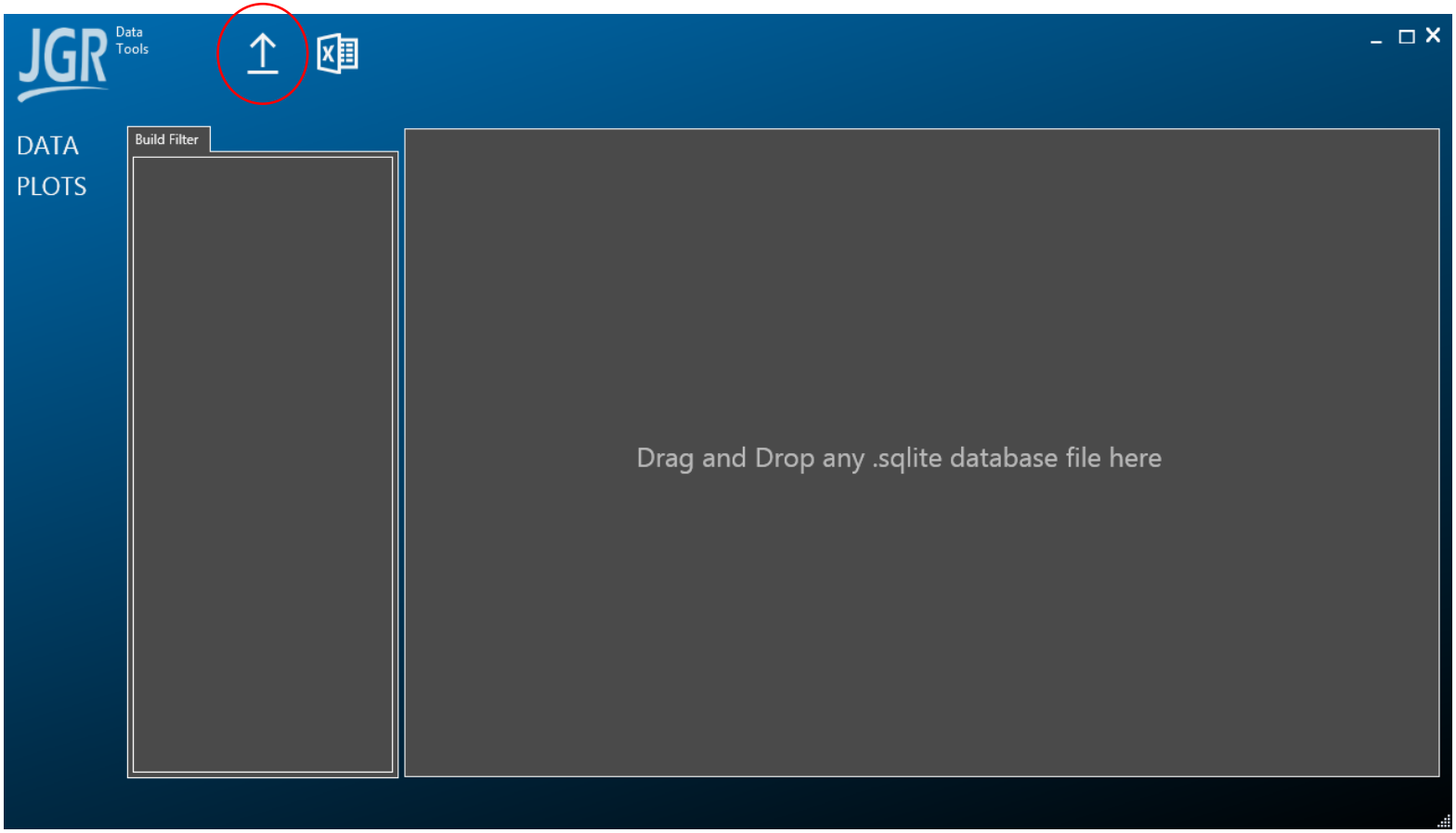
Getting Started with the EOTS Software

4. Setting Up a Test

4.6. Monitor Results in Real-time

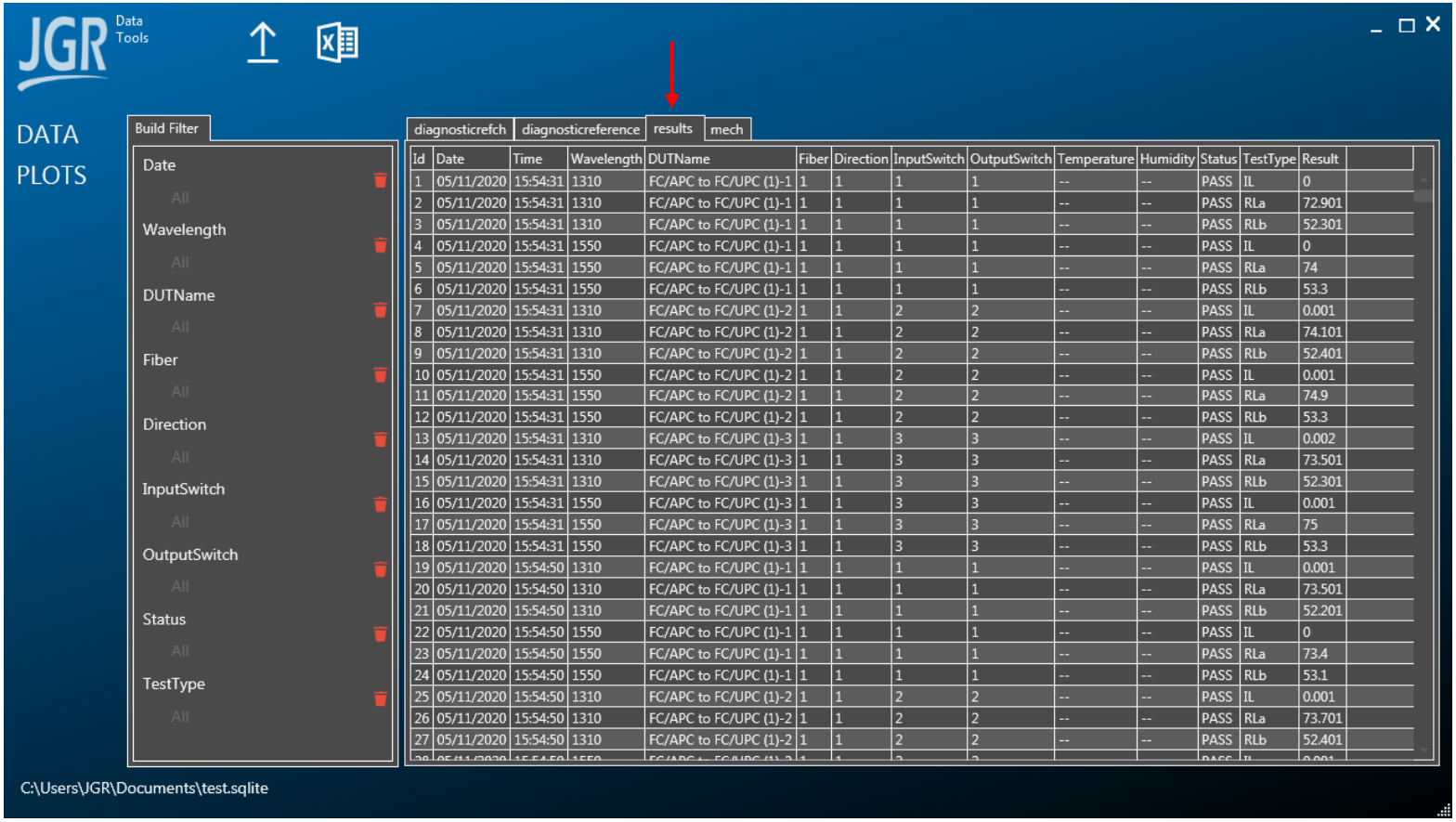
5.1. Load Data in Data Tools

- Open JGR Data Tools then click on the icon below to load an .sqlite file.



5.2. View Data in Data Tools

- Results can be viewed in table form.



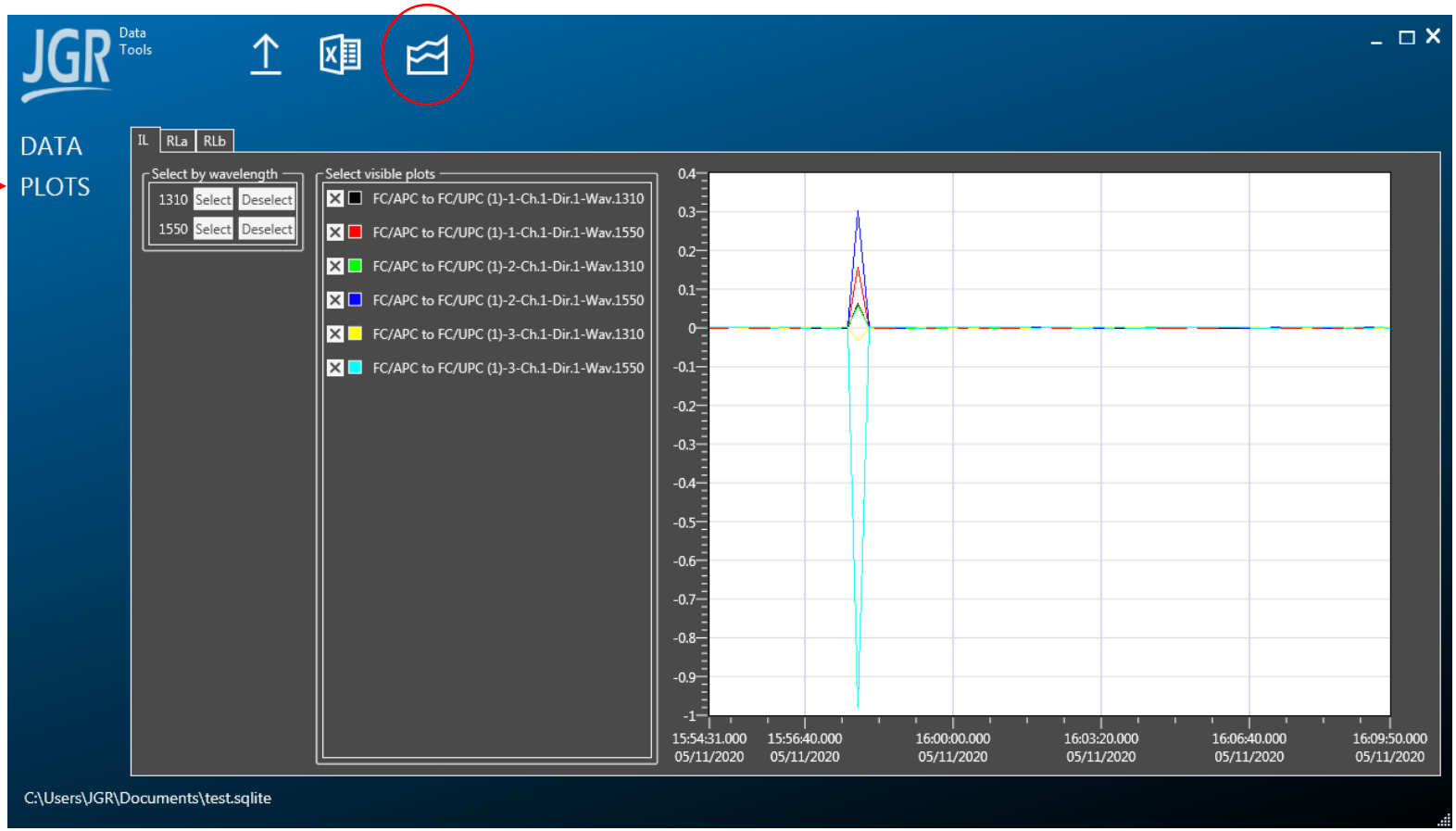
Id	Date	Time	Wavelength	DUTName	Fiber	Direction	InputSwitch	OutputSwitch	Temperature	Humidity	Status	TestType	Result
1	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	IL	0
2	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLa	72.901
3	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLb	52.301
4	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	IL	0
5	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLa	74
6	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLb	53.3
7	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	IL	0.001
8	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	RLa	74.101
9	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	RLb	52.401
10	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	IL	0.001
11	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	RLa	74.9
12	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	RLb	53.3
13	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-3	1	1	3	3	--	--	PASS	IL	0.002
14	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-3	1	1	3	3	--	--	PASS	RLa	73.501
15	05/11/2020	15:54:31	1310	FC/APC to FC/UPC (1)-3	1	1	3	3	--	--	PASS	RLb	52.301
16	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-3	1	1	3	3	--	--	PASS	IL	0.001
17	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-3	1	1	3	3	--	--	PASS	RLa	75
18	05/11/2020	15:54:31	1550	FC/APC to FC/UPC (1)-3	1	1	3	3	--	--	PASS	RLb	53.3
19	05/11/2020	15:54:50	1310	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	IL	0.001
20	05/11/2020	15:54:50	1310	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLa	73.501
21	05/11/2020	15:54:50	1310	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLb	52.201
22	05/11/2020	15:54:50	1550	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	IL	0
23	05/11/2020	15:54:50	1550	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLa	73.4
24	05/11/2020	15:54:50	1550	FC/APC to FC/UPC (1)-1	1	1	1	1	--	--	PASS	RLb	53.1
25	05/11/2020	15:54:50	1310	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	IL	0.001
26	05/11/2020	15:54:50	1310	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	RLa	73.701
27	05/11/2020	15:54:50	1310	FC/APC to FC/UPC (1)-2	1	1	2	2	--	--	PASS	RLb	52.401

Getting Started with the EOTS Software

5. Viewing and Exporting Data

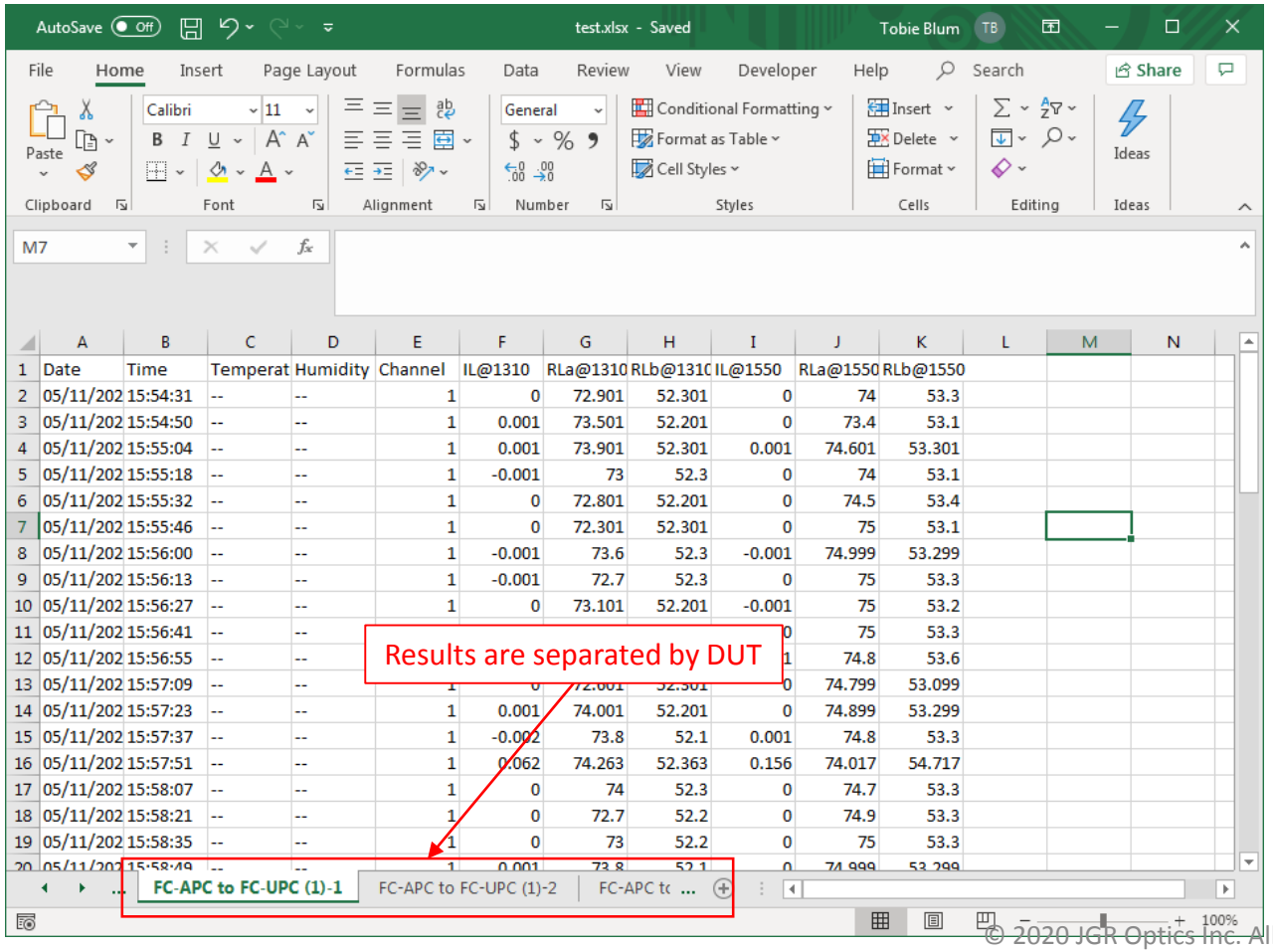
5.2. View Data in Data Tools

- Click on *PLOTS* to view data plots.



5.3. Export Data to Excel

- Click on  to export data to Microsoft Excel.



	A	B	C	D	E	F	G	H	I	J	K
1	Date	Time	Temperat	Humidity	Channel	IL@1310	RLa@1310	RLb@1310	IL@1550	RLa@1550	RLb@1550
2	05/11/202	15:54:31	--	--	1	0	72.901	52.301	0	74	53.3
3	05/11/202	15:54:50	--	--	1	0.001	73.501	52.201	0	73.4	53.1
4	05/11/202	15:55:04	--	--	1	0.001	73.901	52.301	0.001	74.601	53.301
5	05/11/202	15:55:18	--	--	1	-0.001	73	52.3	0	74	53.1
6	05/11/202	15:55:32	--	--	1	0	72.801	52.201	0	74.5	53.4
7	05/11/202	15:55:46	--	--	1	0	72.301	52.301	0	75	53.1
8	05/11/202	15:56:00	--	--	1	-0.001	73.6	52.3	-0.001	74.999	53.299
9	05/11/202	15:56:13	--	--	1	-0.001	72.7	52.3	0	75	53.3
10	05/11/202	15:56:27	--	--	1	0	73.101	52.201	-0.001	75	53.2
11	05/11/202	15:56:41	--	--						75	53.3
12	05/11/202	15:56:55	--	--						74.8	53.6
13	05/11/202	15:57:09	--	--						74.799	53.099
14	05/11/202	15:57:23	--	--	1	0.001	74.001	52.201	0	74.899	53.299
15	05/11/202	15:57:37	--	--	1	-0.002	73.8	52.1	0.001	74.8	53.3
16	05/11/202	15:57:51	--	--	1	0.062	74.263	52.363	0.156	74.017	54.717
17	05/11/202	15:58:07	--	--	1	0	74	52.3	0	74.7	53.3
18	05/11/202	15:58:21	--	--	1	0	72.7	52.2	0	74.9	53.3
19	05/11/202	15:58:35	--	--	1	0	73	52.2	0	75	53.3
20	05/11/202	15:58:49	--	--	1	0.001	73.8	52.1	0	74.999	53.299