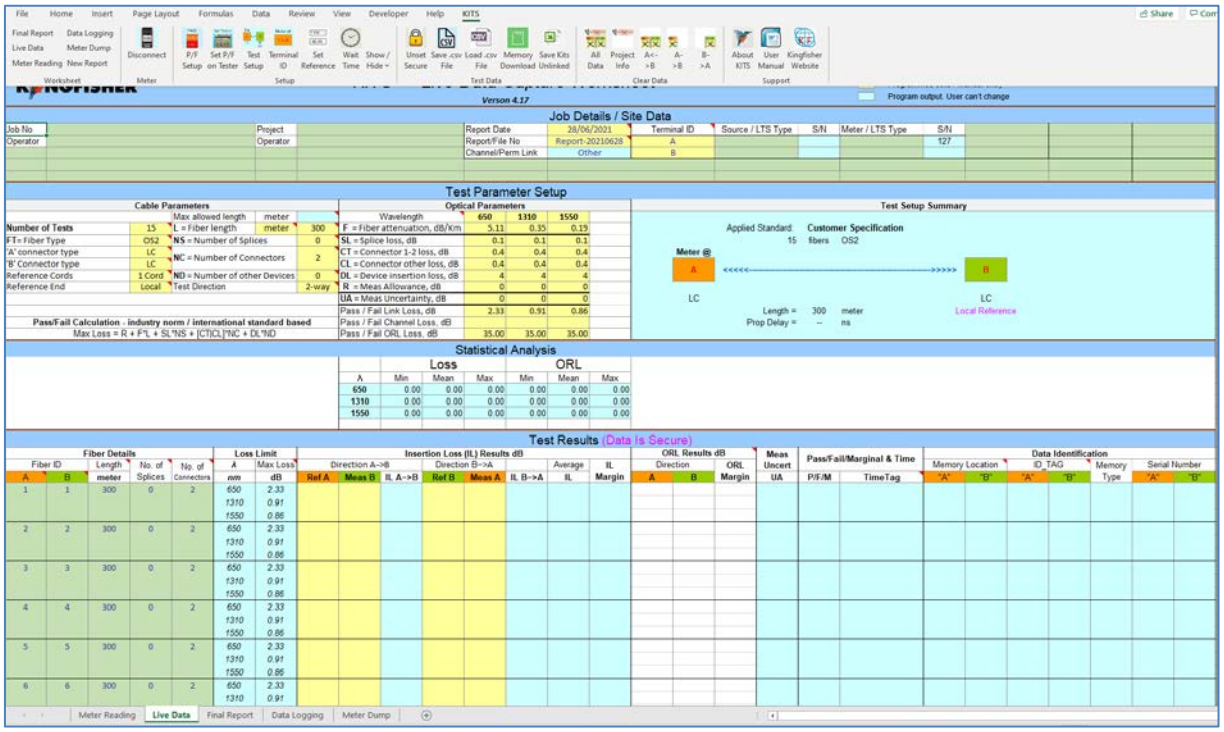
Kingfisher International

User Manual
KITS 4.17

User Manual KITS™ 4.17



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Record of Issues

If you have any suggestions for improvement to this document, please contact us at Kingfisher International Pty Ltd.

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We hope you enjoy using our software

Issue	Issue Date	Comments	Issue Author
10	23 Sep 2021	• Reference the MS App Store install version not working in section 7.1. • Reference the changed installation behaviour (Device driver is now longer installed by KITS) in section B.5 of Attachment B. • Reference the new pop-up message which shows if KITS can't locate an instrument in section B.5 of Attachment B.	TO Ng

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1. PURPOSE

This User Manual describes the use of Kingfisher International Test Software (KITS™) for Testing Loss, ORL, and data acquisition.

It is assumed that the user has basic knowledge of both fibre optical testing and Kingfisher instrument operation.

2. OVERVIEW

KITS™ is an Excel based test and reporting program used for recording and reporting fiber optic power, attenuation, and optical return loss.

Full-feature capability includes real time interactive data acquisition, data logging, a real time meter display, data file import / export, importing data from instrument memory, and manual data input.

Several international and national standards are built into KITS™. The user can add additional standards as required.

KITS™ provides fully customizable cable acceptance reporting layouts.

3. WHAT'S NEW IN THIS VERSION

New in software version V4.17

- Split International Standard selection menu into ISO/IEC/ and TIA.
- Updated to latest ISO/IEC14763-3 & TIA standards parameters
- Modified 'Live Data' worksheet to allow for revised ISO/IEC uncertainty calculations.
- Updated software for KI 23400 & 27400 Two-Way Loss / Length / ORL Test Sets
- Feature to set pass/fail thresholds in KI23400/KI27400 series Loss Testers using KITS.

4. FONT CONVENTIONS USED IN THIS MANUAL

The bold italic font, like ***[Kingfisher] / [Data Logging]***, is used for a command (or a command sequence) in Windows menu system, whether it is for Windows, Office, or KITS™.

The bold font in double quotes, like "**Live Date" / "CONNECTED"** is a displayed field name, worksheet name, name of options, status etc. in Windows, Office, or KITS™.

The text in square brackets, such as [AUTOTEST], is an operation on the test instrument.

5. QUICK TOUR / DEMONSTRATION OF KITS™

It is assumed that the KITS™ software has already been installed on a PC, Notebook or Tablet. See **section 8** for KITS™ installing and **section 7** to check prerequisites.

User has the options to start KITS™ in Demo mode or Live Mode. Refer to **section 5.1** for a Demo Mode Tour or **section 5.2** for a Live Mode Tour. KITS™ software needs to be restarted to change from Demo to Live Mode or vice versa.

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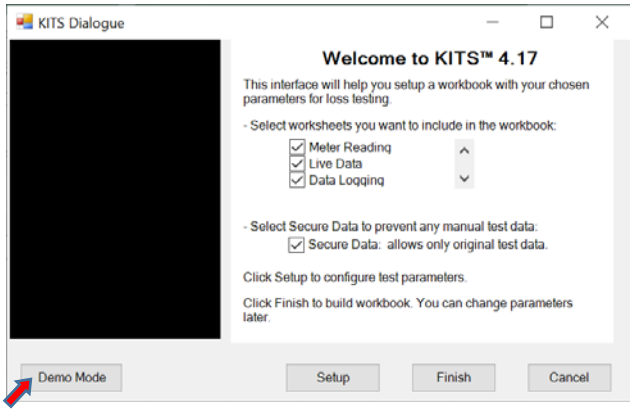
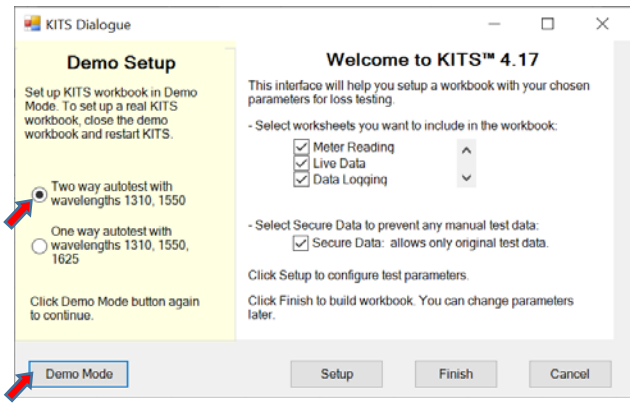
5.1 Demo Mode Tour

This is a simulation mode aimed at providing users with an overview of the KITS™ software. In this mode, only "**Meter Reading"** & "**Live Data"** worksheets are active with simulated meter readings. No such support for all other worksheets.

Step	Procedure
①	Start KITS™ by double-click on the **"KITS Wizard"** icon. Alternatively navigate via the Windows Start menu. e.g. ***[Start] -> [all Programs] -> [Kingfisher Kits] -> [Kits Wizard]***
②	Select **"Demo Mode"** on the dialogue box below; 
③	Select the "**Two way AutoTest**…." option and click **"Demo Mode"** again to go to "**Meter Reading"** sheet. 
④	Watch how test data & results are displayed on the Meter Reading worksheet. Change to Live Data worksheet and click on one of the yellow-highlighted cell under Test Results section and test data/results of the corresponding row will be entered automatically. Click on the yellow cells of the next few rows to enter more data.
⑤	Close and restart KITS™. This time select "**One way AutoTest**…." on the dialogue box (see Step 3 above). Repeat Step 4 above and, observe the differences in terms of the type of data being entered onto the worksheets.

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5.2 Live Mode Tour

This section provides users with a step-by-step guidance for connecting test instrument to KITS™ software, and for working with the various worksheets and the associated commands.

Step	Procedure	See more detail in…
5.2.1 INSTRUMENT CHOICE AND SETUP		
①	**Instrument selection** Use the following instrument depending on their availability, - a light source (e.g., KI2812) and a power meter (e.g., KI2600-InGaAs that support Autotest) pair - a pair of 2-way Loss Testers of *identical model* E.g., KI23422OLV-InGaAs with ORL & length measurements or, the legacy KI734xx series 2-way LTS.	Refer to user manual of respective instrument models
②	**Instrument setup** Turn on the instruments with their auto-power-off feature disabled. Clear instruments' memory (assuming no stored data is wanted!).	
③	**Connect up instruments optically** *For a light source and power meter pair:* Connect the optical ports on the light source and power meter with an appropriate optical test-lead (e.g., 9/125µm SMF type). *For a 2-way Loss Tester pair:* Connect an appropriate optical test-lead to the 2-way ports of the instruments.	
④	**Initiate measurement on instrument** *For a light source and power meter pair:* Select an output wavelength (e.g., 1310 nm) on light source. Select the same measurement wavelength (1310 nm in tis example) on power meter to do manual measurement in absolute mode. *For a 2-way Loss Tester pair:* If KI234xx series instrument is use, select "AUTO" on any of the instruments. The instrument pair will operate in 2-way Autotest mode. If the legacy KI734xx is used, it is recommended to select/start "Auto test" on the instrument to be connected to KITS™.	Refer to user manual of respective instrument models
⑤	**Saving measurement data on instrument** Save some test data (e.g. into 5 memory locations) on instruments. This data will be useful in the later stages of this tour. *For a light source and power meter pair:* Save measurement data on the power meter. *For a 2-way Loss Tester pair:*	

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Save Autotest data on one of the instruments (which will be connected to KITS™ later).

5.2.2 CONNECTING METER TO KITS™ SOFTWARE

Connect instrument via USB to PC installed with KITS™,

For a light source and power meter pair:
Connect power meter to PC/KITS™.

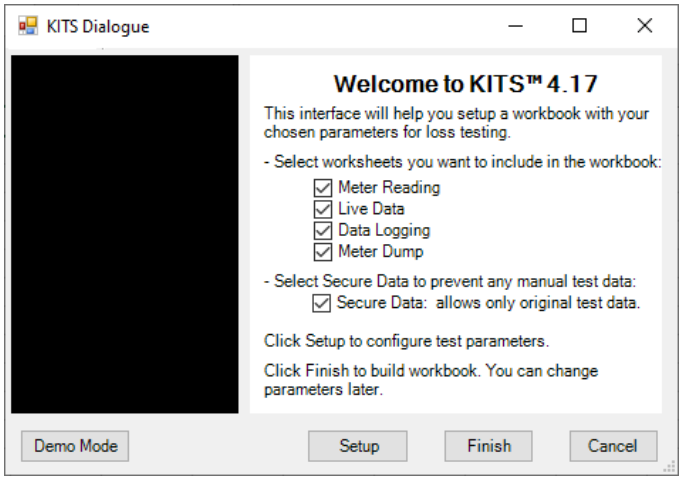
For a 2-way Loss Tester pair:
If KI234xx series instrument is use, connect the instrument which has been stored with Autotest data (see step ⑤) to PC/KITS™.

If the legacy KI734xx is used, connect to PC/KITS™ the instrument on which Auto test was initiated and, data has been stored (see step ⑤).

5.2.3 START KITS™

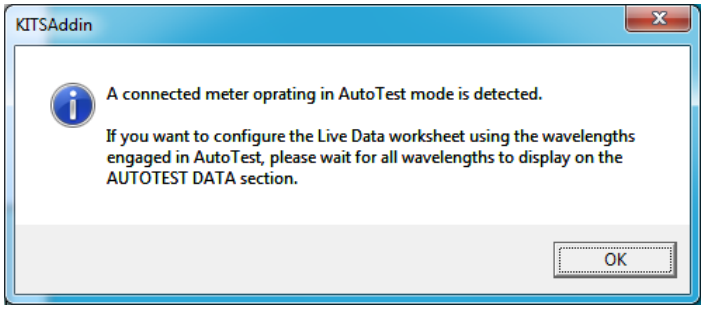
Start KITS™ by double-click on **"KITS Wizard"** icon on desktop. Click on **"Finish"** when the dialog box below pops up.

Refer to Section 9 for more detail



Upon starting-up successfully, Meter Reading worksheet will open automatically.

Note: At this stage, KITS™ detects a connected instrument (for the case of a pair of 2-way Loss Tester) which is operating in Autotest mode, the message below will be popped up,



Click **"OK"** to proceed.

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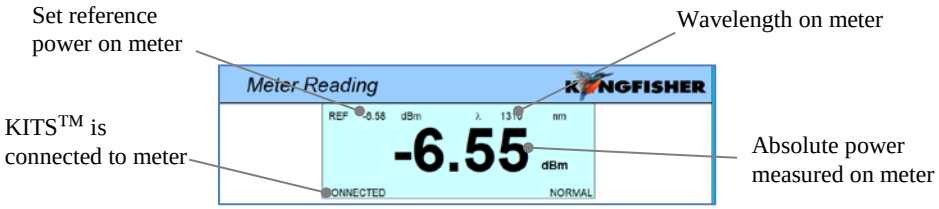
5.2.4 WORKING WITH METER READING WORKSHEET:

For a light source and power meter pair:
The wavelength and it corresponding power shown on the connected meter will be "projected" onto the window at the top of the sheet.



Click on "KITS" on the ribbon to show the KITS™ command options,

Use these commands to disconnect/connect meter, set reference power of meter, hold/resume display update, select absolute or relative measurement on meter, select wavelength on meter. Note that these command only work if meter is connected to KITS™.

For a 2-way Loss Tester pair:
Wait for all active Autotest wavelengths (1310 & 1550 nm in this example) and their relevant data to display in the AUTOTEST DATA section of the worksheet, This is to ensure that all active wavelengths get auto configured onto Live Data sheet when open later.

AUTOTEST DATA		λ1	λ2	λ3	λ4
Wavelength	nm	1550	1310		
Power Reading	dBr	-8.15	-8.17		
Source Power	dBm	-7.00	-7.00		
Reference	dBm	-8.48	-8.75		
Local Meter Serial Number			25018		
Remote Source Serial Number			11216		

Refer to Section 12 for more detail.

5.2.5 WORKING WITH LIVE DATA WORKSHEET

Click on **"Live Data"** tab of KITS™ to open the worksheet

Note: For the case of connected 2-way Loss Tester pair operating in Autotest mode, it is only possible to open the LIVE DATA sheet when its tab font turns bold, which signifies that data of all active wavelengths have already been captured in the AUTOTEST DATA section of Meter Reading worksheet (refer to 5.2.4 above)

For a light source and power meter pair:
The popup window below will be shown,

Refer to Section 10.1 for more detail.

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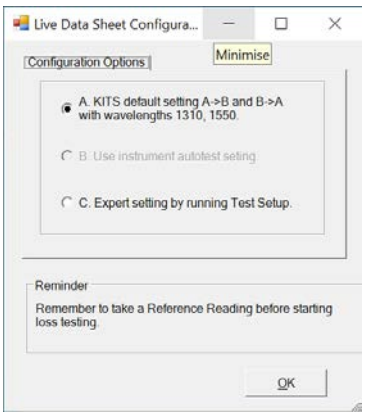
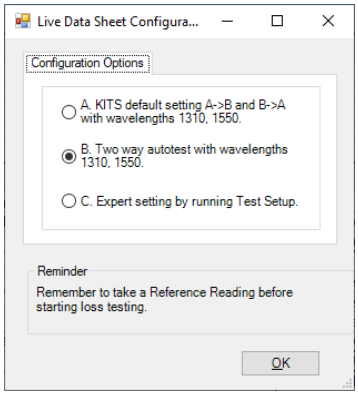


Click **"OK"** to proceed will result in Test Result section of the opened worksheet automatically configured with the wavelengths 1310, 1550 nm.

For a 2-way Loss Tester pair:
KITS™ detects that the connected instrument is operating in 2-way Autotest and, display the popup message below,



Click **"OK"** now will result in Test Result section of the open worksheet automatically configured with all active wavelengths (1310, 1550 nm in this example).

5.2.5.1 *Set up Live Data worksheet*

①	**Configure the worksheet for intended test type** *For a light source and power meter pair:* Set up worksheet for 1-way IL test configuration as decribed below, - Click on **"KITS"** on ribbon to show all the KITS™ commands - Click on the command ***[Test Setup]*** and, check/uncheck the option buttons/boxes on the popup menu as shown below,	Refer to Section 10.1 for more detail.

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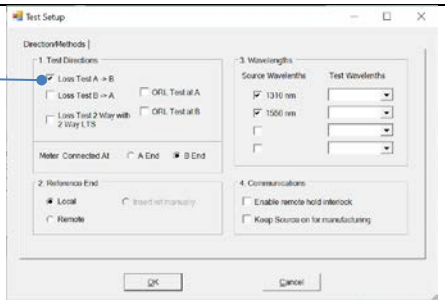
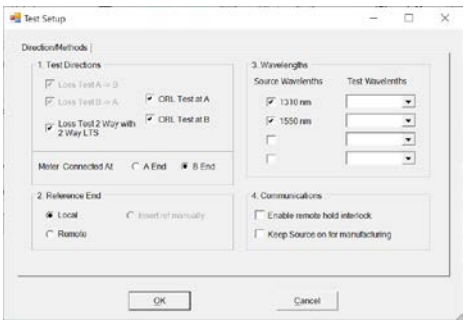
	Assuming light source is at location "A", power meter is at location "B".  - Click **"OK"** to proceed *For a 2-way Loss Tester pair*: Set up Live Data sheet for 2-way IL & ORL test configuration as decribed below, - Click on "KITS" on ribbon to show all the KITS™ commands - Click on the command, ***[Test Setup]*** and, check/uncheck the option buttons/boxes on the popup menu as shown below,  - Click **"OK"** to proceed	
②	**Enter Job Detail/Site Data** In the Job Details / Site Data section of the worksheet, manually enter info in the respective green cells. Note that the yellow cells are auto entered with default dates, report name, terminal IDs respectively that are still editable. If you wish, click on the ID cells to change them to your preferred names. The blue cells are auto entered with serial number/s of the connected instrument as follow, *For a 2-way Loss Tester pair (operating in Autotest):* Serial numbers of both instruments will be auto entered (with serial number of connected instrument entered in the field for "Meter / LTS Type".) *For a light source and power meter pair (operating in manual mode):* Serial number of the connected power meter will be auto entered.	Refer to Section 10.2.2 for more detail.
③	**Setup Test Parameters (pass/fail limits)** In the Test Parameter Setup section of the worksheet, click on KITS™ command ***[Pass/Fail Setup]*** to bring up the menu box below,	

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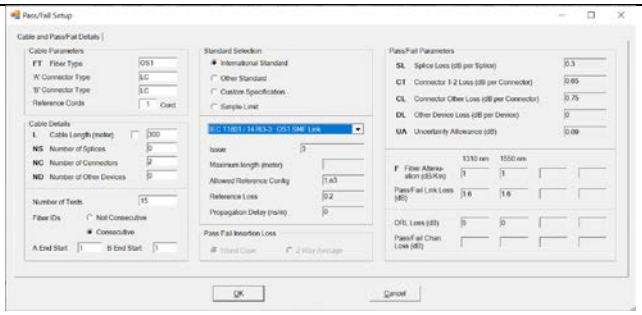

Select a pre-stored test standard (for example IEC11801/14763-3 OSM SM Link) from the drop down list under the **Standard Selection** section of the menu box. Click **"OK"** to proceed.

You will noticed that the test parameters of the test standard selected will be displayed in the corresponding cells in [ ] and [Test Setup Summary] sub-sections.

5.2.5.2 *Enter data on Live Data worksheet*

Live data on instrument can be entered onto section of the worksheet by just a mouse-click.

Refer to Sections 10.3.2 for detail.

For a light source and power meter pair:
Make sure that the power meter is connected and, with both instruments set at 1310 nm. Click on a yellow cell on the 1'st row (1310 nm for **Fiber ID 1**). After a short delay, you will see that the set reference power and, measured absolute power on power meter entered in the cells under **"Ref A"** and **"Meas B**" respectively. The Insertion loss will be worked out automatically and shown under the cell **"IL A–>B"**.

Change wavelength on light source and power meter to 1550 nm. Click on a yellow cell on the 2'nd row (1550 nm for **Fiber ID 1**). The cells under **"Ref A"** and **"Meas B**", **"IL A–>B"** in this row will be entered with the corresponding data from the power meter. At this stage, the overall IL test result (against the test standard selected in step ③ above) for **Fiber Id 1** will be shown. Addition, the test time stamp and serial number of the connected power meter will also been shown.

Repeat the above for a few more Fiber ID to familiarize yourself with the data entry process.

For a 2-way Loss Tester pair:
Make sure that the connected instrument is operating in 2-way Autotest mode.
Click on one of the yellow cells on the 1'st or 2'nd row (for **Fiber ID 1**). After a short delay, you will see the set bidirectional reference (under columns "**Ref A", "Ref B")** and absolute powers (under columns "**Meas A", "Meas B")** on the connected instrument, entered onto the rows for both 1310 and 1550 nm of "**Fiber Id 1**. You will also notice that the auto-computed IL (Insertion Loss) at each test direction and their averages and margins are entered in the cells under the columns, **"IL A–>B"**, **"IL B–>A"**, **"Average IL"**, **"IL Margin"** respectively.
If ORL option is available on the connected instrument, the ORL value for each direction and their respective margin can be seen entered in the cells under column, **"ORL Results dB"**.
If length measurement option is available on the connected instrument, the length value can be seen entered in the cell under column, **"Length"**.

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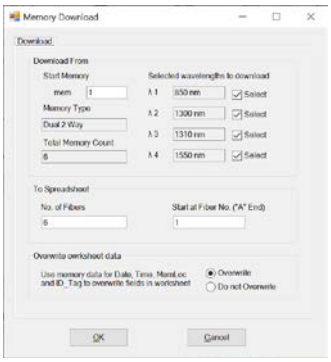
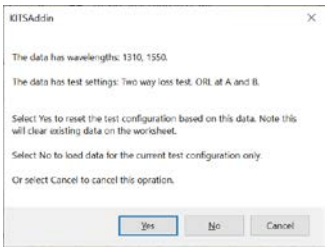
	The overall test results (against the test standard selected in step ③ above) for **Fiber ID 1** can be seen displayed under the column, **"Pass/Fail/Marginal & Time"** with test timestamp. The serial numbers of both instruments can been seen recorded in the last 2 columns. Repeat the above for a few more Fiber ID to familiarize yourself with the data entry process.	

5.2.5.3 *Download data stored in instrument memory onto "Live Data" worksheet*

	Data stored in internal memories of instruments can be downloaded onto LIVE DATA worksheet. Make sure that the connected instrument is turned on. If the instrument is operating in Autotest mode, stop Autotest. Click **"KITS"** in ribbon to show the command options. Click ***[Clear All Data]*** to clear all existing data on the worksheet. By clicking ***[Memory Download]***, you will been shown with the total number of data record saved in instrument, see example below,  Click **"OK"** in the box above will bring up another box showing the type of test data saved in instrument, see example below,  After clicking **"Yes"** in the box above, all data in instrument will be uploaded onto the Test Result section of worksheet.	Refer to Section 10.3.3 for detail.

5.2.5.4 *Download 1-way test data in instrument and merge them as 2-way test data on "LIVE DATA" worksheet*

	A typical requirement in the field is to download & merge two single-direction test data saved in instrument memory, onto a worksheet which has been configured for 2-way test. Consider the example below with 5 records of 1-way test data saved in an instrument memory,	

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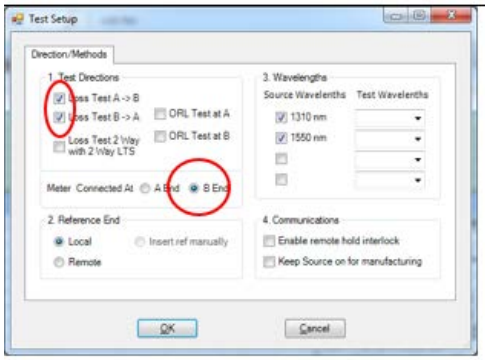
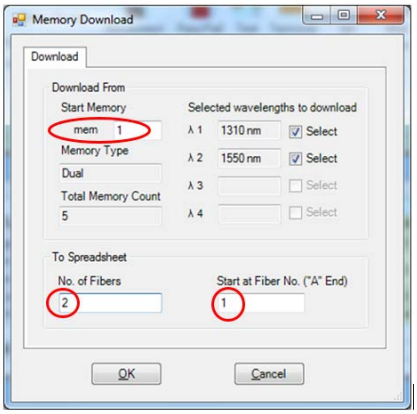
Memory location	Memory content
1 ~ 2	Data for test direction A -> B for Fiber ID, 1 & 2 respectively
3 ~ 4	Data for test direction B -> A for Fiber ID, 1 & 2 respectively
5	Irrelevant test data

To download and merge the above test data onto the worksheet with 2-way configuration, follow the steps below,

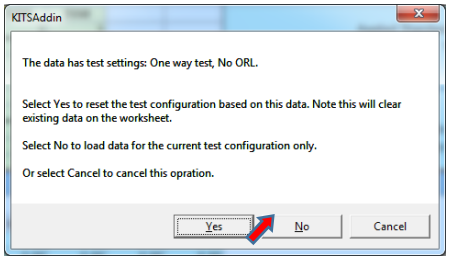
❶ *Configure worksheet for test direction A -> B:* Select command, ***[Test Setup]*** and check options for **"Test Directions"** & **"Meter Connected"** as shown below.



❷ *Select the 1'st 2'nd locations of memory in instrument to download:* Select command, ***[Memory Download]***. Enter "1" for **"Start Memory",** "2" for **"No. of Fibers"** and "1" for **"Start at Fiber No"** as below.



❸ *Click **[No]** on the popped up dialog box below to continue.*



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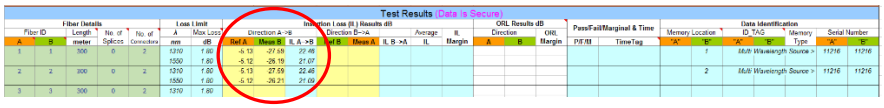
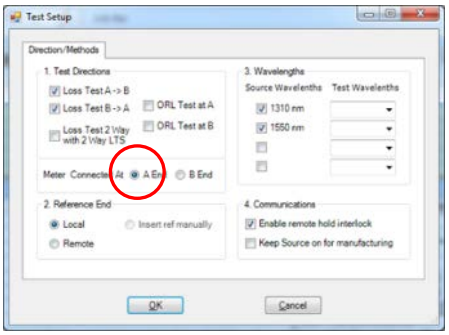
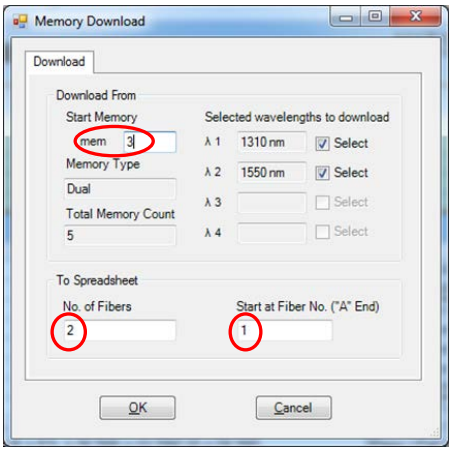
Data for test direction A -> B in instrument memory location will be downloaded onto worksheet as below.



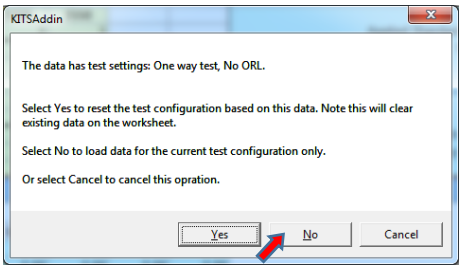
❹ *Configure worksheet for test direction B -> A:* Select command, ***[Test Setup]*** and check options, for **"Test Directions"** & **"Meter Connected"** as shown below.



❺ *Select the 3'rd & 4'th locations of meter memory to download:* Select command, ***[Memory Download]***. Enter "3" for **"Start Memory"** and "2" for **"No. of Fibers"** and "1" for **"Start at Fiber No"** as below.



❻ *Click **[No]** on the popped up dialog box below to continue.*



Data for test direction B -> A in instrument memory location will be downloaded and merged onto the worksheet as shown below.

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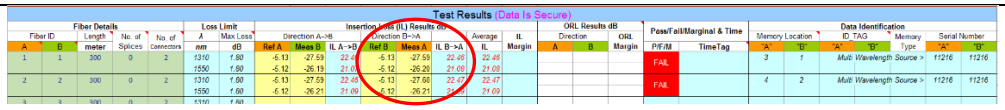

Note:
Downloading & merging 1-way test data on the worksheet from memories stored in 2 different instruments, can also be done by following the same instructions above, except that it involves changeover of instrument for test data of specific directions.

5.2.5.5 *Saving data of "Live Data" worksheet into a CSV file*

	Select KITS™ command, ***[Save .csv File]*** to save existing data on Live Data worksheet to a CSV file named, Example.csv in a directory on the PC.	Refer to Section 10.4.10 for more detail

5.2.5.6 *Loading data saved in a CSV file onto "Live Data" worksheet*

	In **"Live Data"** worksheet, select KITS™ command, ***[Clear All Data]*** to clear existing data in the worksheet. Select KITS™ command, ***[Load .csv File]*** to upload the data in the earlier saved file, *Example.csv* onto the "**Live Data"** worksheet.	Refer to Section 10.3.4 for more detail.

5.2.5.7 *Working with "Enable remote hold interlock" function*

This function only works with a pair of identical KI7340 or KI23400/KI27400 series 2-way Loss Testers 2-way LTS). It provides operators at the ends of a fiber link with a useful communication tool to coordinate their works better.

① Connect up the 2-way ports of the instruments (2-way LTS) with a fiber cable.

② Connect 1 of the 2-way LTS to KITS™ via USB.

Note: The instrument connected to KITS™ becomes the "Near End Unit" while the other instrument becomes the "Far End Unit" of the connected fiber.

③ Start Autotest operation on the 2-LTS connected to KITS™.

④ Launch KITS™ and follow the prompted instructions to switch **"Live Data"** worksheet. The worksheet should have been configured as 2-way test automatically. Select command, ***[Test Setup]*** and check the option, **"Enable remote hold interlock"** on the Test Setup window.

⑤ Do steps ❶~❸ and observe the sequences of events on KITS™ and instruments, as tabulated below,

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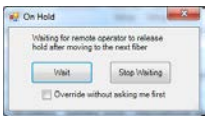
Step	Action	Events		
		KITS™	**"Near End Unit"**	**"Far End Unit"**
❶	Click on a yellow cell on the row for Fiber ID, "1" to start auto-enter data on LIVE DATA worksheet.	• Data for Fiber ID, "1" is entered on worksheet after a short delay.	• Beeps once. • Display freezes (LTS in Hold mode)	• Beeps twice. • Display freezes (LTS in Hold mode) **[NOTE:** Near end operator makes use of this to signal far end operator that test data for the current fiber has been recorded in KITS™, time to move on to the next fiber.**]**
❷	Briefly press ***[Hold]*** on "Far End Unit" *If a yellow cell on a Fiber ID row is clicked when the LTS are in Hold mode, see **Note 1** below for what will happen.*		• Beeps once • Display unfreezes (LTS in real time mode) **[NOTE:** Far end operator makes use of this to signal near end operator that a new fiber has been connected, test data entry on KITS™ can now commence.**]**	• Beeps once • Display unfreezes (LTS in real time mode)
❸	Click on a yellow cell in the row for the subsequent Fiber ID and repeat ❶~❷ until you are familiarized with the function.			

Note 1:
The dialog box below will be displayed,



- If ***[Wait]*** is clicked: Both the LTS will remain in "freeze" (Hold) mode, and no data will be entered on the worksheet until ***[Hold]*** on "Far End Unit" is pressed, after which the events that begin with step ❷ resumes.

- If ***[Stop Waiting]*** is clicked: The displays of both the LTS will "unfreeze" (reverted to real time mode), and data will be entered on the worksheet row which was clicked on. The events in steps, ❶~❸ then repeats.

  Note that, doing this in real field application may result in the worksheet being entered with test data of an unintended or wrong fiber.

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	• If option, **"Override without asking me first"** is checked, followed by a click on ***[Stop Waiting]:*** The displays of both the LTS will "unfreeze" (reverted to real time mode), and data will be entered on the worksheet row which was clicked on. The "Remote hold interlock" function will then be disabled. Note that, doing this in real field application may result in the worksheet being entered with test data of an unintended or wrong fiber. ⑥ The **"Enable remote hold interlock"** function can be disabled by unchecking this option on the **"Test Setup"** window.	
5.2.6 WORKING WITH "FINAL REPORT" WORKSHEET		
	This worksheet contains a report auto generated from test data/result on **"Live Data"** worksheet. Click on **"Final Report"** tab and the worksheet will open after a short delay. Only data for a max of 2 wavelengths will be shown on this report. Use the KITS™ commands in **[Show / Hide Detail]** to display more or less details on the report.	Section 11
5.2.7 WORKING WITH "DATA LOGGING" WORKSHEET		
	Use this function/worksheet to monitor power levels measured on a power meter over time. Typical applications include monitoring source stability, environmental induced changes and test jig failure timing. Make sure that the instrument connected to KITS™ is, - turned on - in Meter Mode - with its meter port optically connected to the output of a light source via an fiber. Click **"Data Logging"** to open worksheet. Select ***[Connect]*** on the ribbon to connect instrument to KITS™ . Select ***[Start AutoLog]*** and when prompted, enter name of file & location for data to be saved. Data logging will start and with the data at the set interval displayed in a graph. Data logging will stop automatically when it reaches the set log size. You can interrupt/halt a data logging process using ***[Stop]*** command, and use ***[Continue AutoLog]*** command to resume.	Section 13
5.2.8 WORKING WITH "METER DUMP" WORKSHEET		
	Click tab to open **"Meter Dump"** worksheet and select KITS™ command, ***[Download]*** to download data in the meter onto the worksheet. You can ***[Clear]*** data on the worksheet or save it in a CSV file by selecting command, ***[Save as .csv]*** on the ribbon.	Section 14
5.2.9 CLOSING KIT SOFTWARE		
	Close and save the workbook (with existing data and results) using Office's standard commands. Note: When the saved workbook is reopened, KITS™ will start up automatically. Alternatively, the workbook can be saved using KITS™, ***[Save Kits Unlink]*** (on the **"Live Data"** worksheet. Reopening file saved in this way will no longer load KITS™, see Section 10.4.13 for more detail.	
5.2.10 SAVE CSV UTILITY		

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	This is a KITSTM feature used to download data from an instrument memory directly into a CSV file, even if the host computer hasn't been installed with Microsoft Office. Note: If the full KITSTM software is installed, it is recommended to close KITSTM first before executing this function. Close KITS™. Connect instrument to computer then click on the ***[Start]*** button on your PC (the Windows logo displayed at the left end of the Taskbar). Select ***[Kingfisher Kits]*** followed by ***[Save Csv]*** from the displayed lists. After a short delay (depending on the number of records saved in instrument memory), enter the file name and location for data to be saved as prompted.	Refer to Section 15 for more detail.

6. QUICK REFERENCE GUIDE

This Section provides a summary of the worksheets features.

6.1 KITS™ Worksheets

The KITS™ software has 5 worksheets named: -

1. Live Data
2. Final Report
3. Meter Reading
4. Data Logging
5. Memory Dump

Additional user designed worksheets can be added as required.

6.1.1 LIVE DATA WORKSHEET

❖ All loss testing data is entered to the **"Live Data"** worksheet.

- The "Live Data" worksheet can be configured for 1~4 wavelengths.
- The "Live Data" worksheet performs analysis.
- The "Live Data" worksheet can be configured to provide an international, local or user defined standard compliant report.
- The "Live Data" worksheet can be auto configured with wavelengths base on the memory contents downloaded from a meter, or the wavelengths engaged in an AutoTest operation.

❖ Data can be entered into the "**Live Data"** worksheet by:-

- manual entry **(only if Data Secure Mode is unset)**
- clicking with a mouse during live testing or
- by memory download direct from instrument
- Import from CSV file.

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❖ For Ki23400/KI27400 series 2-way Loss Testers: Pass/fail thresholds for IL, ORL, length (depending on availability of these options on the connected instrument) can be set up and uploaded to instrument from “Live Data” worksheet.

6.1.2 FINAL REPORT WORKSHEET

The **“Final Report”** worksheet is used when the test data is required to be presented in an alternate format to that of **“Live Data”** worksheet.

- The **“Final Report”** worksheet is ‘receive’ only. All data is imported from the **“Live Data”** worksheet.
- The **“Final Report”** worksheet can be configured to display or hide different sections in the report by selecting the appropriate commands from KITS™ [Show / Hide Detail] command group.
- The **“Final Report”** worksheet can be configured to show test data of 2 wavelengths.

6.1.3 METER READING WORKSHEET

Typically used in a classroom situation or where a large display size is required.

- Basic meter functions available are: -
- Change wavelength
- Set reference
- Absolute or relative mode – dBm/dBr
- Hold
- ORL

6.1.4 DATA LOGGING WORKSHEET

Data logging is used when it is required to monitor power levels over a time period.

Typical applications include source stability, environmental induced changes and test jig failure timing.

Required logging parameters are: -

- Wavelength
- Size of log – number of samples
- Sample interval
- Absolute or relative mode – dBm/dBr

6.1.5 MEMORY DUMP WORKSHEET

This is a straightforward procedure that is especially useful when an instrument's memory content is not known. All data in an instrument’s Memory is extracted to a simple Excel worksheet. No analysis is performed. The data layout depends upon the instrument series.

6.2 KITS™ Save CSV

This program is independent of the KITS™ Wizard and is similar to the function of Memory Dump worksheet. It is typically used when the host computer does not use Microsoft Office.

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All data in an instrument's Memory is extracted to a CSV file and includes a checksum. No analysis is performed.

7. COMPUTER & INSTRUMENT FIRMWARE REQUIREMENTS

7.1 Computer

- Windows XP to Windows 11 (Win 11 was tested 6 July 2021)
- MS Office 2007 to Office 365 (Latest version, tested 2 September 2021)
  Office 365 must not be installed from the Microsoft Store. It must be installed using the Office Installer, which is available from the Office Portal (office.com/login).
  ARM devices are not supported.
  If KITS is installed without MS Office, a "Save csv" utility can download test data from an instrument. For Windows 7 or higher.
- Legacy instruments with an RS232 interface, (pre-2008), will need an RS232 port adding, if your computer doesn't have one.
  If you have a desktop computer, a PCIe - RS232 adaptor card is a more reliable solution (Sunix has proven reliable), or
  If you have a notebook computer, you can use a USB-RS232 converter and add drivers. Either install this on all USB ports, or mark the correct USB port.

KITS™ support for any non-English language Windows environments is as follows: -

- English language installations of Microsoft Office require a relevant language Microsoft Office MUI (Multilingual User Interface) to run in another language.
- Non-English language installations of Microsoft Office require an English language Microsoft Office MUI.

7.2 Instrument

KI2x two-way loss test set (two-way LTS):

Firmware version 1.03 and above. Earlier firmware versions may provide reduced functionality.

The firmware version is displayed on the instrument LCD during turn on. Firmware is field upgradeable. Details on how to upgrade the Firmware are on our web site.

http://www.kingfisherfiber.com/Fiber-Optic-Test-Equipment/KI2000-Firmware/Firmware.htm

KI2000 meter or loss test set (LTS):

Firmware version 5.00 and above. Earlier firmware versions may provide reduced functionality.

The firmware version is displayed on the instrument LCD during turn on. Firmware is field upgradeable. Details on how to upgrade the Firmware are on our web site.

KI 7000 or loss test set (LTS):

Firmware version 5.00 or later. Earlier firmware versions may provide reduced functionality.

The firmware version is displayed on the instrument LCD during turn on. Firmware upgrades must be performed at a service center.

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8. KITS™ SOFTWARE INSTALLATION

To install KITS™, the user must log into the computer using a profile with local administrator rights or know administrator credentials.

The latest release of KITS™ is available for download on our web site
https://kingfisherfiber.com/products/software/kits-reporting-software/download-kits-software/

8.1 Before Installation

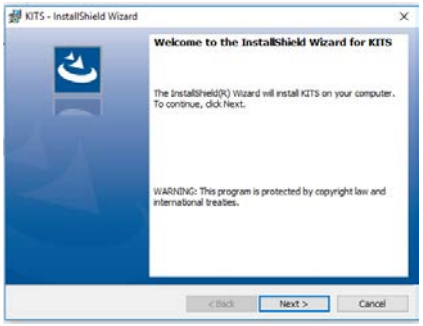
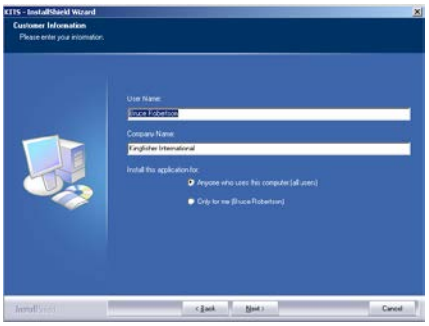
If updating from a previous version, you may like to back up existing data before proceeding.

Manually uninstall the old KITS and reboot the computer before installing the new version.

Uninstalling KITS may leave two dll files, KIDrvNet.dll and KIRS232.dll, in the KITS program folder. Make sure to delete this folder, typically C:\Program Files (x86)\Kingfisher\KITS before installing a new version of KITS.

Before installation, ensure that Microsoft Office is installed.

8.2 Setup.Exe

Step	Installation Procedure
1	Run the setup.exe file.
2	 Select ***[Next]***
3	Enter Customer information.  Select ***[Next]***

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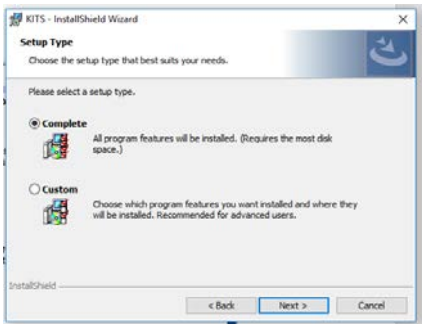
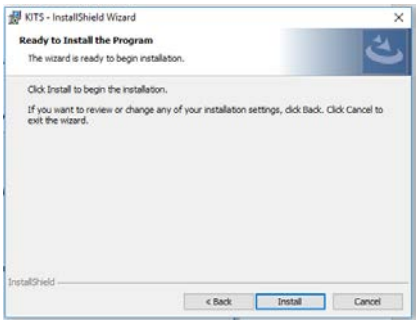
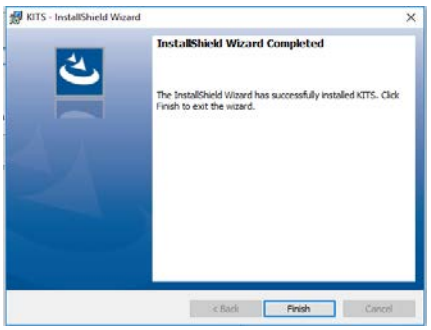
4	 In this instruction, selection, 'Complete' is assumed. Select ***[Next]***
6	 Select ***[Install]***
9	KITS™ program is installed  Select ***[Finish]***.

During installation, if a pre-installed KITS™ software version is detected, user will be prompted to perform a repair, modify (custom) or uninstall.

8.2.1 WHERE ARE THE KITS™ FILES LOCATED?

Specification spreadsheets:

The default directory for the Master Layout Spreadsheet, standards specification Excel files, 'Loss Test Standards.xls' and 'User-LossTest-Standards.xls' depends upon which version of the Windows operating system is being used and how the computer system is configured.

Typically, this will be either.

C:\Documents and Settings\All Users\Application Data\Kingfisher\KITS4
or
C:\Program Data\Kingfisher\KITS4

Note: For some users, this may be a hidden directory. To unhide/show this directory:

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In Window Explorer, press ***[Alt]*** on keyboard to bring up the Menu Bar, select ***[Tool]*** follow by ***[Folder Options…]***, click on tab, **"View"** & select **"Show hidden files, folders, and drives"**, click ***[OK]***.

Application and configuration files:

The default directory for the application and configuration files is: -

C:\Program Files\Kingfisher\KITS
or
C:\Program Files (x86)\Kingfisher\KITS

Note: Due to security and administration requirements, Microsoft Windows often places application and configuration files in different locations depending on which version of Windows you are using and how it has been configured.

If the KITS™ files are not in the default directory, then: -

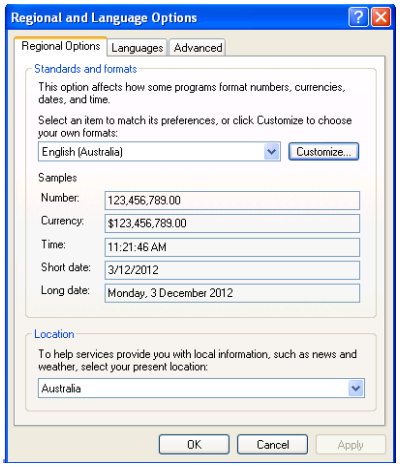
- To locate the KITS™ application files, locate the application shortcut in the Start Menu, right click it, click ***[Properties]***, and then click ***[Find Target]***.
- If you have lost the application shortcuts, try looking for either 'KITS' or 'Kingfisher' in the default Program Files directory on your computer.

Device Driver Files:

Further information relating to the KITS™ RS232 and USB driver configuration files can be found in **Appendix B (RS232 / USB Driver configuration & Installation**).

8.2.2 REGIONAL CONFIGURATION

Number configuration and distance units are set in the Windows, Regional and Language Options dialogue box.

Step	Procedure
1	Start **Control Panel**.
2	Select ***[Regional and Language Options]*** 

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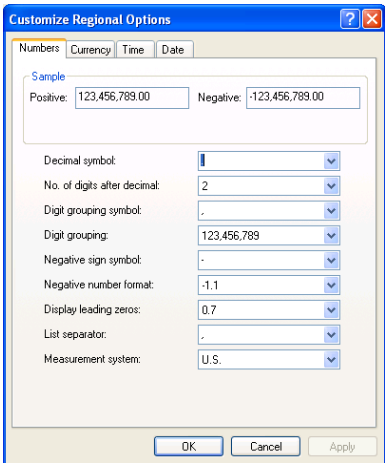
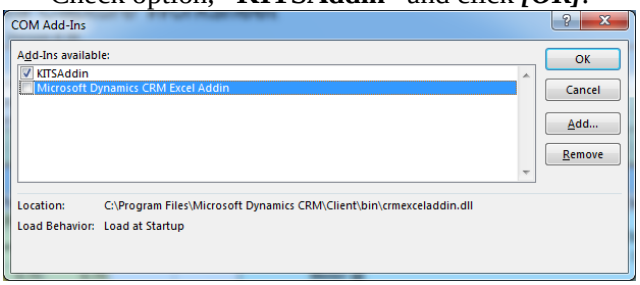
3	Select ***[Customize]*** 
4	Enter required number moderators and distance units as required.
5	Select ***[OK]***
6	Select ***[OK]***
7	Close Control Panel

8.2.3 RE-ENABLE OR REINSTALL KITS™ IF IT DOES NOT STARTUP PROPERLY

In some occasions, if KITS™ starts inappropriately, it will only open a blank Excel spreadsheet. Try the following to re-enable the software.

Step	Procedure
1	Click ***[Office Button]*** or select ***[File]*** from the Menu Bar of the opened spread sheet.
2	Select ***[Excel Options]***.
3	Select ***[Add-Ins]*** from the option list, select "**COM Add-ins"** from the drop-down menu at **"Manage:"** and click ***[Go]***.
4	Check option, **"KITSAddin"** and click ***[OK]***. 
5	You may need to check the registry if KITS™ add-in is enabled. Run regedit.exe and go to the directory HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\Excel\AddIns. If the *LoadBehavior* key value of KITSAddin.AddinModule is not 3, change it to 3 (decimal).

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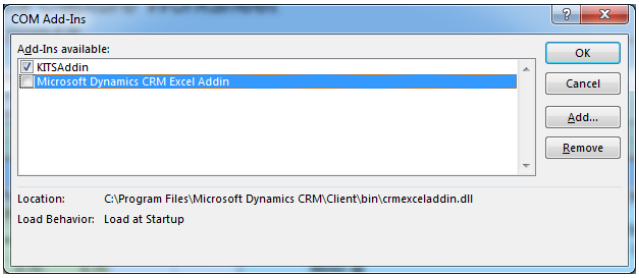
6	This should re-enable KITS™ in most cases. If KITS™ still cannot run, a reinstallation is needed. AT Step 4 of the above, check option, **"KITSAddin"** and click ***[Remove]*** to remove it from the list. 
7	Uninstall KITS™, reboot computer and reinstall the software.
8	KITS™ should be able to start normally.

8.3 MUI for Running KITS™ in another Language

If you use non-English Windows or, choose another language from "***Regional and Language Options"***, you may receive an error message "Old format or invalid library …" when you start KITS™.

There are two scenarios which cause this message: -
1. English Windows. Non English Office.
2. Non English Windows.

There are various possible ways to fix this:

1. For English Language Installations of Windows / Office: Change the Windows operational language back to English:
   i. Go to ***[Start] / [settings] / [Control Panel] / [Regional and Language Options] / [Regional Options]*** tab.
   ii. Set both the "standards and formats" drop down to a version of English.
   iii. Then select the Languages tab and, set all "input language" details to a version of English. "Standards and formats" can be customised.
2. For non-English installations of Office: The English Language Office MUI (Multilingual User Interface) must be installed. The Microsoft MUI is a separate Microsoft product that allows users to use Office in other languages.
3. Leave the computer in the non-English language but install the relevant Microsoft Office English MUI.

9. STARTING KITS™ & CONNECTING AN INSTRUMENT

(Click to go ack to Live Mode Tour section)

The software can be started with or without an instrument connected.

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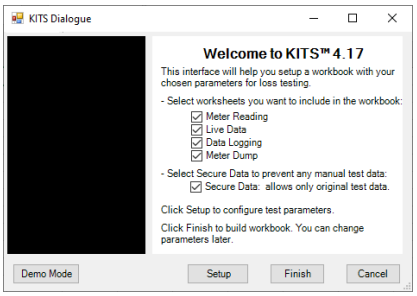
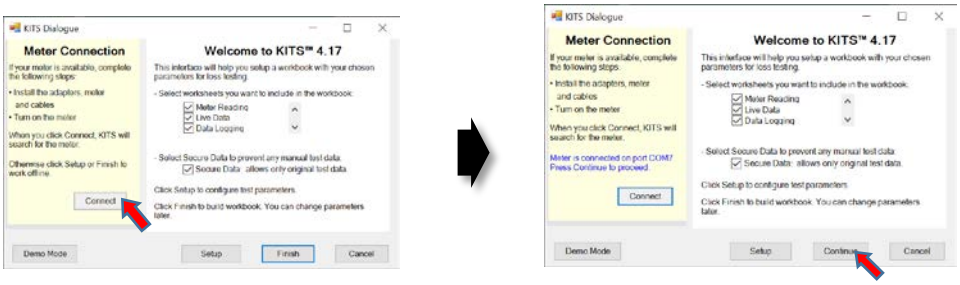
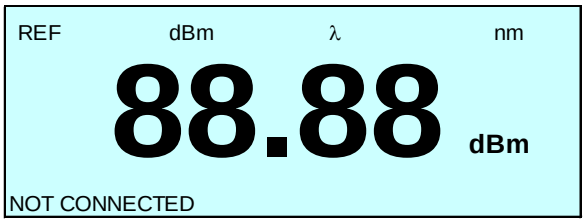
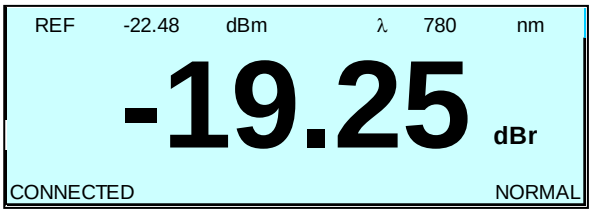
The KITS™ start up program permits ***[Test Setup]*** configuration before or after the worksheet is fully opened.

The procedure below assumes ***[Test Setup]*** configuration is to be performed after the KITS™ worksheets are fully opened.

In rare occasion, if KITS™ starts inappropriately as a blank Excel spreadsheet, see Section 8.2.3 for re-enabling or reinstallation of the software.

Step	Starting KITS™ & connecting an instrument
1	On your desktop, double click on **"KITS Wizard"** icon. Alternatively navigate via the Windows Start menu. e.g. ***[Start] -> [all Programs] -> [Kingfisher Kits] -> [Kits Wizard]***
2	Excel will start, with a screen "Welcome to KITS x.xx
3	Select ***[Finish]***.  Optionally, uncheck the options to disable some worksheets and/or 'Secure Data' mode.
4	If no meter is connected up to this stage, a dialogue box will display the instructions for Meter Connection. ***a. To continue by connecting a meter:*** Physically connect a meter to the computer as per the instructions in the yellow **"Meter Connection"** section of dialog box. Select ***[Connect]*** followed by ***[Continue]*** on the subsequent dialog box.  If a KI2000 series meter fails to connect to the software, do one or more of the following, - make sure that instrument is powered up and, is properly connected via USB cable. - check under computer's Device Manager that the COM port number auto-assigned for the connected meter is not greater than 20, reassign the port number if necessary, see Appendix B-section B.5.2. Or edit the register, 'IgnoreHWSerNum' on the computer to avoid the need to do reassign COM port number, see Appendix B-section B.5.3. - reinstalled the Device Driver software, see Appendix B-section B.5.1. ***b. To continue without connecting a meter:*** Select ***[Finish]*** to continue without connecting a meter to work off-line or for manual data entry.

Copyright

Step	Starting KITS™ & connecting an instrument
5	The KITS™ info screen below will be displayed momentarily.
6	The "**Meter Reading"** worksheet will then be opened with displays depending on the conditions stated below. • With no meter connected, the screen will display "**88.88 dBm"** and "**NOT CONNECTED"**.  • With a connected meter operating in non-AutoTest mode, the screen will display the power level read from meter and shows "**CONNECTED"**.  • With a connected meter operating in AutoTest mode, the popup message below will be displayed.

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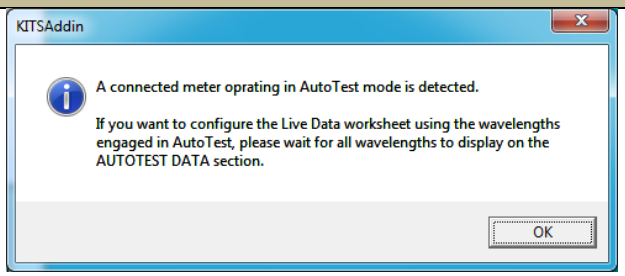
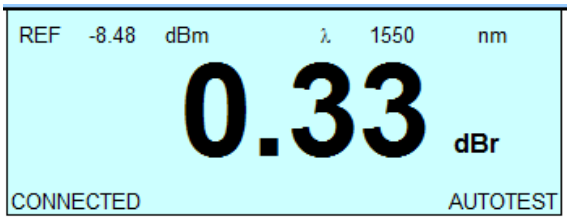
Step	Starting KITS™ & connecting an instrument



Click ***[OK]*** to close the popup message, and wait until all the wavelengths (along with their respective test data) involved in Autotest are displayed under the **"AUTOTEST DATA"** section (see image below) before switching to another worksheet. This is critical in ensuring that when opened, "Live Data" worksheet will be auto configured with all the wavelengths involved in Autotest.



AUTOTEST DATA		λ1	λ2	λ3	λ4
Wavelength	nm	1550	1310		
Power Reading	dBr	-8.15	-8.17		
Source Power	dBm	-7.00	-7.00		
Reference	dBm	-8.48	-8.75		

Autotest wavelengths.

Real time measurements transferred from the meter operating in Autotest mode.

Local Meter Serial Number	25018
Remote Source Serial Number	11216

Note:
This auto wavelength configuration feature of "**Live Data"** worksheet is only available when a fresh KITS™ workbook starts with a meter operating in AutoTest mode connected. It is not available when a saved KITS™ workbook is opened or with the meter connected after KITS™ has started up.

7	Beside the opened **"Meter Reading",** there are 4 other worksheets i.e., **"Live Date"**, **"Final Report"**, **"Data Logging"** & **"Meter Dump"** in the KITS™ workbook, if none of these worksheets was unchecked in Step 3 above.

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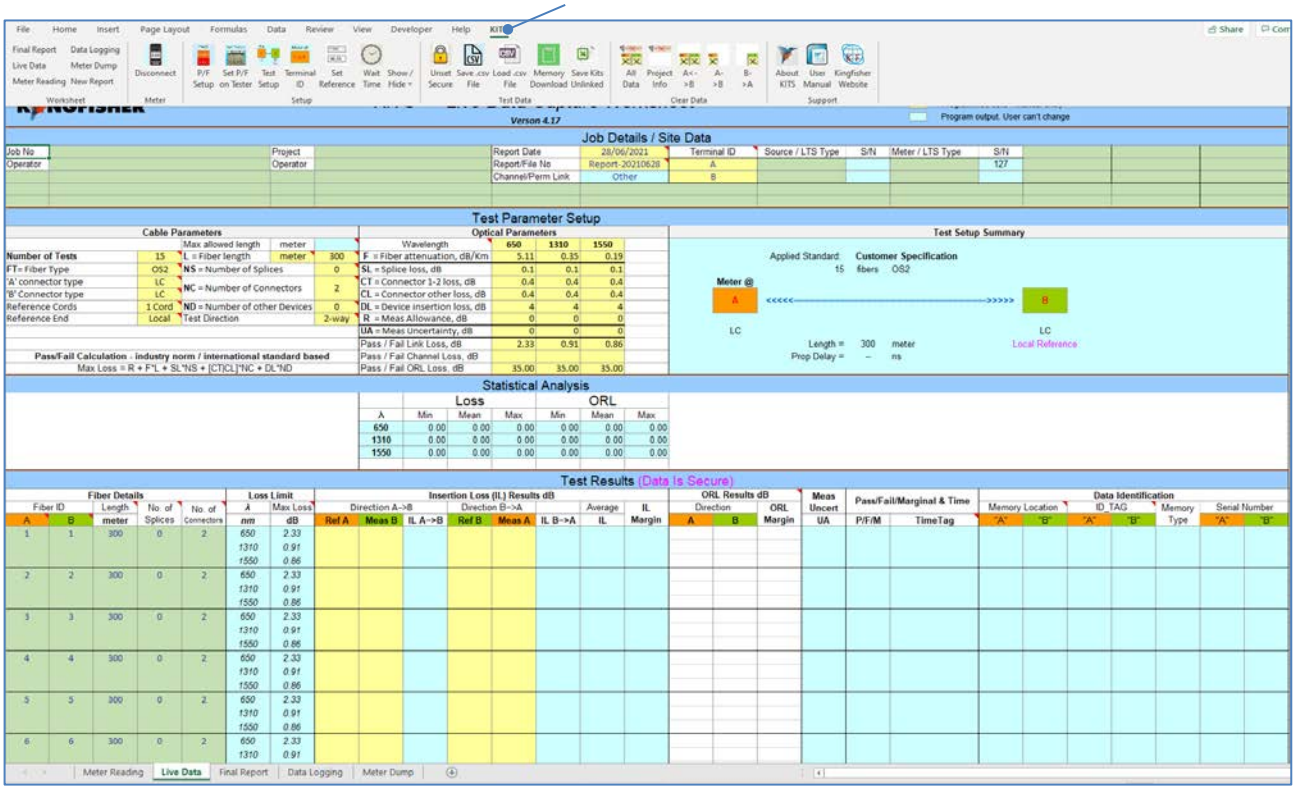
10. LIVE DATA WORKSHEET

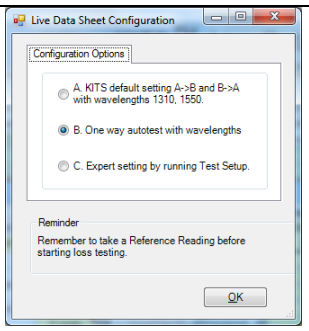
Click **"KITS"** to show commands in ribbon.

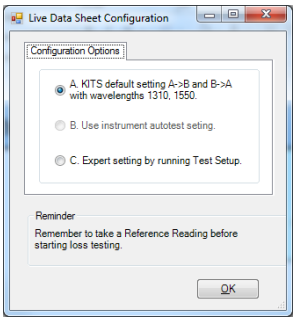


10.1 Opening & Configuring Live Data worksheet

(Click to go back to Live Mode Tour section)

Step	Opening & Configuring Live Data worksheet
1	Click on the Sheet Tab, **"Live Data"** on the Excel workbook. Alternatively select ***[Worksheet]*** -> ***[Live Data]*** on KITS™ command ribbon.
2	Select initial configurations for **"Live Data"** worksheet: *If an instrument operating in AutoTest mode is connected to the software:* Option, **"B"** will be selected by default. Click ***[OK]*** now will automatically configure **"Live Data"** worksheet with all the active wavelengths engaged in AutoTest. *If no instrument is connected or if a connected instrument is operating in non-AutoTest mode:* Select options, **"A"** (default) or **"C"**. If option **"C"** is selected, a "**Test Setup"** window (see Step 5 of this section) will be prompted for manual setup configuration. Click ***[OK]*** to confirm selections.





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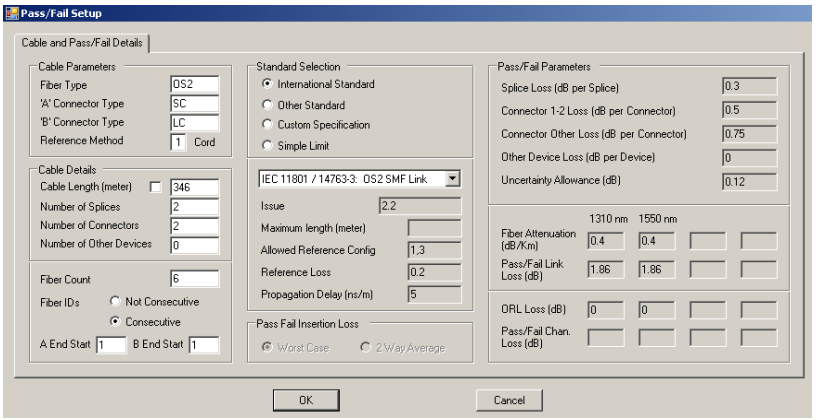
3	The **"Live Data"** worksheet will be configured according to the option selected in Step 2 above, and with the corresponding columns of cells (in the "**Test Results"** subsection) for data entries highlighted in yellow.
4	Configure the **"Pass / Fail setup"** parameter. Select KITS™ command, ***[Pass/Fail Setup]*** • Enter test parameters: - o Standard selection (should be selected first) ***** o Cable parameters o Cable details o Fibre count o Fibre identification number ***** Once a standard is selected the following restrictions apply: - • Specifications that are set by the standard are greyed as they are not user changeable. • KITS™ will not allow a referencing method or length parameter at variance to the standard.  ***Hint****: The above submenu can also be opened by clicking on any of the yellow cells under* ***"Cable Parameters"*** *in the "****Test Parameter Setup"*** *subsection.*

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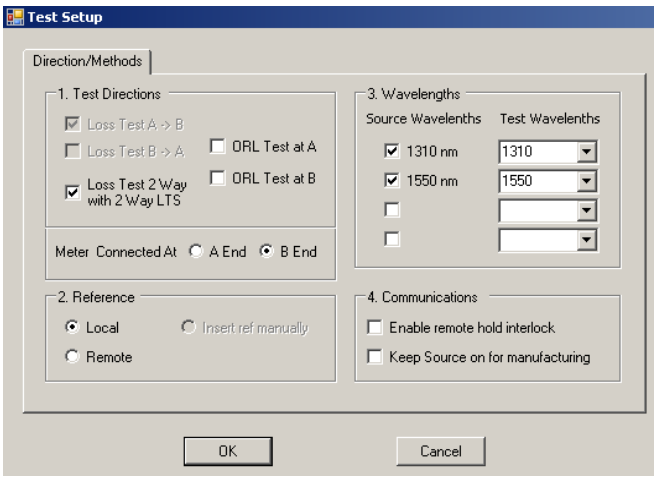
5

Configure the **"Test Setup"** (for test direction setting) parameters.

- Select KITS™ command, ***[Test Setup]***
- Select test direction:
  - To test A->B tick the box 'Loss Test A->B'
  - To test in both directions using a source and a meter tick boxes 'Loss Test A->B' and 'Loss Test B->A'
  - If using a two-way Loss Test Set (LTS) to test in both directions automatically, tick the box 'Loss Test 2 way with 2 way LTS'
  - Enter the meter location e.g.
  - To test A->B configure the meter at the B end.
  - To test B->A configure the meter at the A end.
- Configure for Local or Remote referencing.

  For an explanation of Local & Remote Referencing, see Note 2 of Section 10.4.4.

- Choose wavelength(s) to be used for testing.



Note: *Whilst the 'Test Setup' and the 'Pass/Fail Setup' sub-menus can be configured in any order; it is recommended that the 'Pass/Fail Setup' sub-menu be configured first to minimise any interaction between them.*

Test Setup – Wavelengths: Additional information:

1. If no Meter is connected, the KITS dropdown menu shows a range of common wavelengths to select from.
2. If a meter is connected, the available wavelengths are those within the meter.
3. In all cases, any arbitrary wavelength can be selected by typing its value into the appropriate drop-down menu, e.g., 1383.

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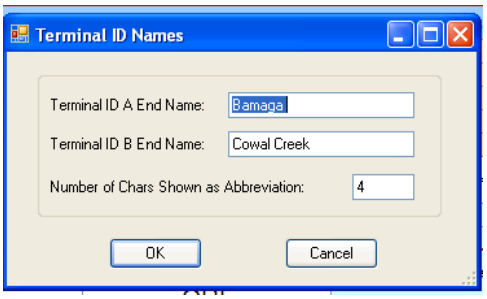
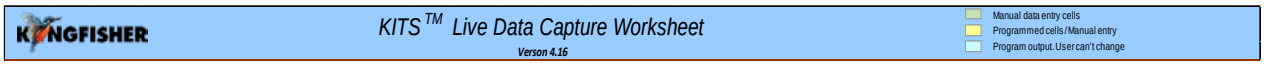
6	Assigning Terminal ID Names By default, the two terminal ends are called 'A' and 'B'. If required, the terminals can be given individual names for identification purposes. To assign terminal names: - • Select KITS™ command, ***[Terminal ID Names]*** • Assign names • Assign number of characters used for name abbreviation. • Click ***[OK]*** 
7	The Workbook is now configured and ready for test data entries.

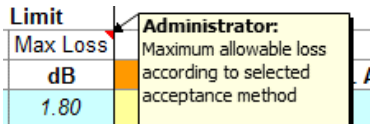
10.2 The 5 subsections in Live Data worksheet

10.2.1 HEADER SUBSECTION



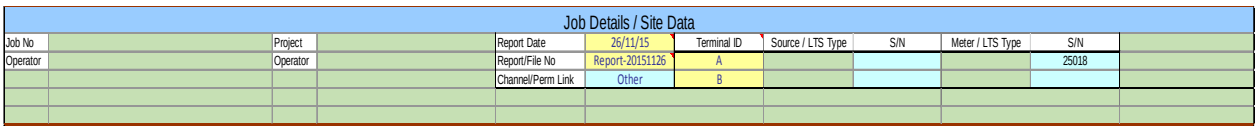
This subsection provides users with revision information of KIT™. It also provides explanations of the colour convention used for the cells on the worksheet. There are 3 categories of cells i.e., **Manual data entry cell**, **Programmed cells / Manual entry**, **Program output User can't change,** each represented by the colours as shown on the right side of this section.

Note: Additional information for some of the cells on the worksheet is also available via their respective Excel Comment (indicated by a red triangle at the top-right corners of these cells). Placing the cursor on these cells will display contents of the comments as shown in the example below,



10.2.2 JOB DEAIL / SITE DATA SUBSECTION

(Click to go back to Live Mode Tour section)



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Project specific data is entered to the worksheet in this subsection of the worksheet.

The yellow cells are auto filled out with current date, default report file name (for the CSV file in which data is saved) and Terminal IDs which can be edited by user.

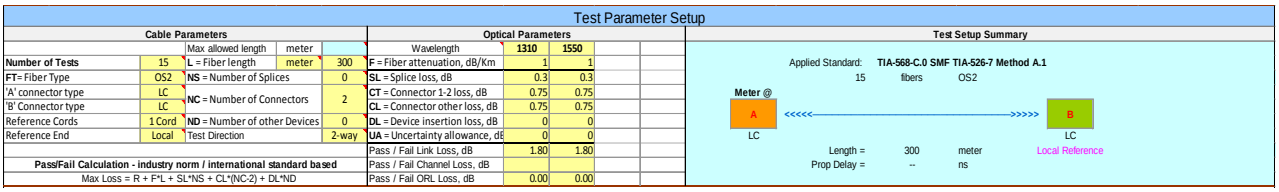
The blue cells are auto filled out with the serial number/s of the connected instrument/s which are not editable.

All green cells are left to the user.

Cells with a header such as 'Job No', 'Operator' etc. and any values in their associated green cells will be automatically copied to the **Final Report** worksheet.

By default, this subsection is shown and can be hidden using the KITS™ command group, ***[Show / Hide]***.

10.2.3 TEST PARAMETER SETUP SUBSECTION



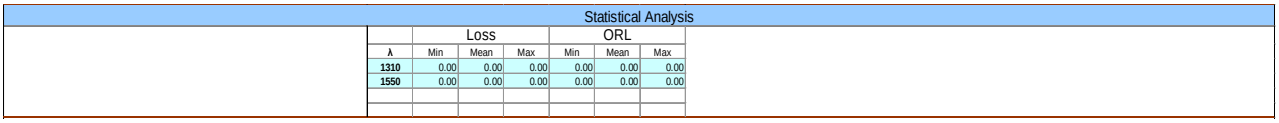
This subsection of the worksheet shows the cable & optical test parameters and a test configuration diagram.

The terminal identification (ID) name boxes are coloured orange or green when a meter is connected, and grey when there is no connection.

The values of the **"Cable Parameters"** and **"Optical Parameters"** varies according to the Standard selected via KITS™ command ***[Pass /Fail Setup]***, see section **10.4.3**.

By default, this subsection is shown and it can be hidden or shown using the KITS™ command group, ***[Show / Hide].***

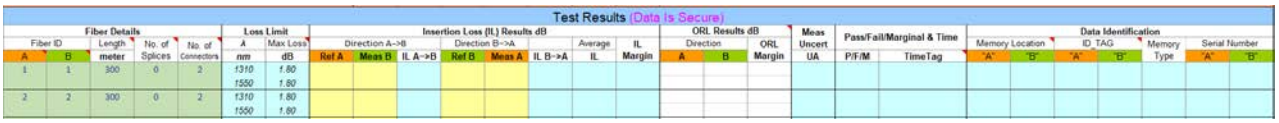
10.2.4 STATISTICAL ANALYSIS SUBSECTION



This subsection of the worksheet provides test statistical analysis. The statistical analysis table is filled out automatically when new data is entered.
For Manual data entry, the statistical data is calculated only after an operation that includes a recalculation of the statistics (such as running ***[Test Setup]***, or saving and reopening a file).
This subsection is shown by default and can be hidden or shown using the KITS™ command group, ***[Show / Hide]***.

10.2.5 TEST RESULT SUBSECTION

(Click to go back to Live Mode Tour section)



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10.2.5.1 *"Fiber Details" columns:*

The values in the cells under these columns are automatically entered based on the values in the **Cable Parameters"** & "**Optical Parameters"** sections under the ***[Pass/Fail Setup]*** command. These values are specific to the test Standard selected. Alternatively, these cells can be manually edited in Non Secure Mode.

10.2.5.2 *"Loss Limits" columns:*

The values under column, **"λ"** are entered automatically according to the configuration option selected in Step 2 of Section 10.1. The values under columns, **"λ"** and **"Loss Limit"** can be changed using KITS™ commands, ***[Test Setup]*** & ***[Pass/Fail Setup]***.

10.2.5.3 *"Insertion Loss (IL) Results dB" & "ORL Result dB" columns:*

Columns labelled as **"RefA"**, **"MeasB"**, **"RefB"**, **"MeasA"**, **"A"** & **"B"** are editable only in Non Secure Mode. These columns of cells are usually highlighted in yellow according to the configuration option selected in Step 2 of section 10.1, or the setup via KITS™ commands, ***[Test Setup]***. If a column is set white, no data should be entered.

10.2.5.4 *"ORL Result dB"*

ORL measurements are entered here. These columns of cells are usually highlighted in yellow according to the configuration option. Editable only in Non Secure Mode. If a column is set white, no data should be entered.

10.2.5.5 *Measurement uncertainty (UA)*

The calculated measurement uncertainty (UA) will automatically be inserted here according to the International Standard based configuration option selected. If a user defined UA parameter is required, it must be specified in the International Standard Testing Template. Note: The Telstra Corporation "R" factor in its testing standard, is not a measurement uncertainty parameter.

10.2.5.6 *"Pass/Fail/Marginal & Time" columns:*

Values in the cells of these columns are not manually editable but computed and populated automatically.

10.2.5.7 *"Data Identification columns":*

For data downloaded from a meter, the information such as memory location, ID Tag assigned, Memory type and instrument serial numbers will be automatically populated in the cells of these column. These cells are not manually editable.

10.2.5.8 *"Test Results (Data is Secure)":*

"(Data is Secure)" shown beside **"Test Results"** subsection header indicates that the worksheet is in Data Secure Mode. Secure Data Mode is set as default when the KITS™ workbook is installed.

Data Secure Mode is used to protect the worksheet against unauthorised or accidental manual data modification.

In this mode, manual data entry on the worksheet is not allowed. Only data entered via clicking of the mouse during live testing, memory download, file import are permitted.

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If manual data entry is required, the Data Secure Mode can be disabled via KITS™ command, ***[Unset Secure].*** When Data Secure Mode is disabled, **"(Data is NOT Secure)"** will be shown beside **"Test Results"** subsection header.

10.3 Test Data Entry in Live Data Worksheet

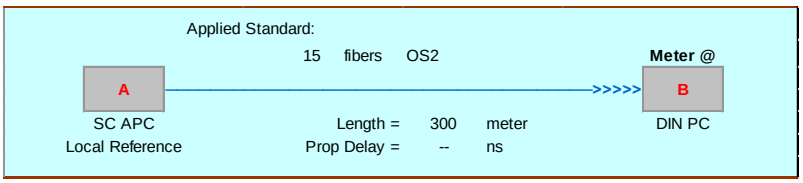
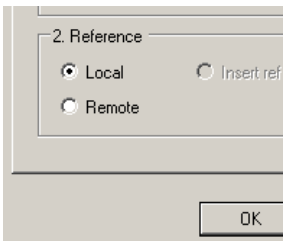
Test measurement data can be input into the "**Test Results"** subsection of **"Live Data"** worksheet in 4 ways: -

- Manual entry **(only if Data Secure Mode is unset)**
- Clicking with a mouse during live testing (one click entry)
- By memory download direct from meter
- Import from CSV file.

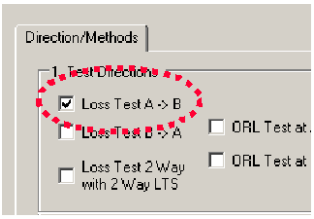
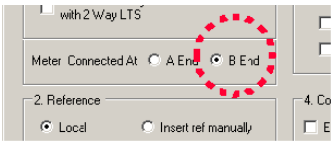
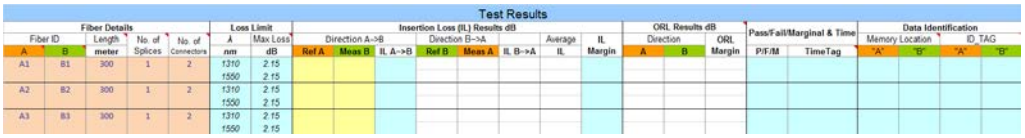
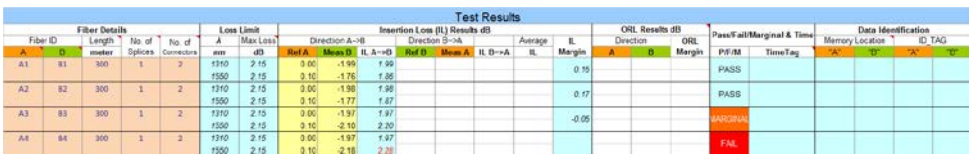
10.3.1 MANUAL DATA ENTRY (ONLY WHEN DATA SECURE MODE IS UNSET) - *LOCAL REFERENCING, ONE-WAY TEST.*

The example below assume: -

- Local Referencing.
- Test direction configuration: Test A->B

Step	Manual data entry, one way, local reference Procedure
1	The test configuration drawing below shows the current configuration including 'Meter' location. 
2	If required, re-configure the 'reference type' via KITS™ command so that test data will be correctly entered. To configure: - • Select ***[Test Setup]*** • Select option, **"Local"** for **"Reference"**. • Click On ***[OK]*** To Confirm 

Copyright

Step	Manual data entry, one way, local reference Procedure
3	If required, re-configure the test direction via KITS™ command. In this example we are testing A->B To configure: - • Select ***[Test Setup]*** • Select option, **"Test Directions A->B"** for **"Test Direction"**. • Click on ***[OK]*** to confirm. 
4	If required, re-configure the meter location via KITS™ command so that test data will be entered in the correct direction. In this example, we are testing A->B To configure: - • Select ***[Test Setup]*** • Select option **"B End"** for **"Meter connected at"** • Click on ***[OK]*** to confirm.  Important: Meter end selection is relevant only for two-way test. For example, test direction A->B and meter at A is not a valid configuration.
5	Enter the test data as required into the yellow columns/cells under the headings Ref A and Meas B. • **Ref A**: Transmitted power. Power level that is sent from the 'A' end to the 'B' end. • **Meas B**: Received power. Power received at the 'B' end. 
6	When all required test data for a particular fibre has been entered, KITS™ will display the test result analysis. • Test failed test results are shown in red and indicated as 'FAIL' in the P/F/M column. • Marginal results are normally accepted as a Pass. Further guidance for the treatment of marginal results can be found in International Standard ISO/IEC 14763-2. 

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10.3.2 ONE CLICK DATA ENTRY

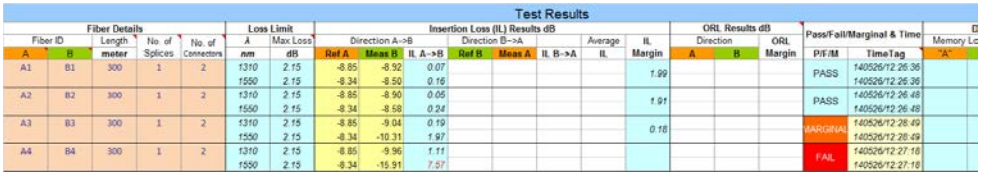
(Click to go back to Live Mode Tour section)

10.3.2.1 One click entry- local referencing, one-way test.

This can be performed with the instruments operating in AutoTest mode.

The example below assumes: -

- Instruments operating in AutoTest mode
- Use of a source and a meter at each end (or a simple Loss Test Set at each end.)
- Local Referencing.
- Test direction configuration: Test A->B.

Step	AutoTest, one way, local reference Procedure
1	Configure the worksheet as per Sections 10.3.1 above.
2	Connect meter to the KITS™ software. If the meter is turned On and connected to the computer when KITS™ starts, KITS™ will automatically connect.
3	In the KITS™ worksheet, click on 'Ref A' or 'Meas B' for the relevant fibre number. • Test data will be automatically entered. • KITS™ will automatically analyse the results. • Pass/Fail assessment is based upon the Pass/Fail configuration.  • Test failed test results are shown in red and indicated as 'Fail' in the P/F column. • Marginal results are normally accepted as a pass. • Fibres that are re-tested are marked in the 'Time Tag' column. **Note 1:** KITS™ will not accept data clicked into the wrong cells. **Note 2:** Test data wavelength must match KITS™ configuration.

10.3.2.2 One click entry - local referencing, two-way test

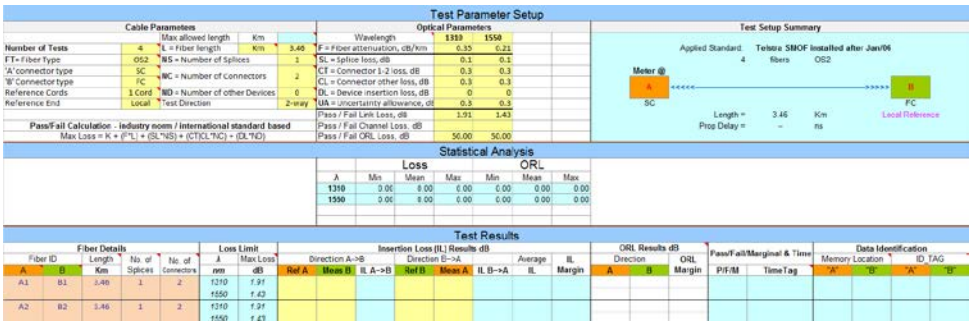
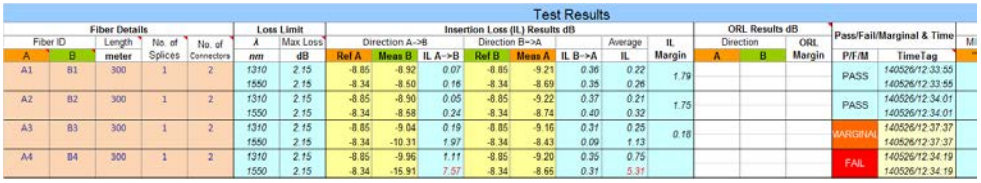
This can be performed with two instruments operating in AutoTest mode.

The example below assumes: -

- Instruments operating in AutoTest mode
- use of a KI734x at each end
- Local Referencing
- Test direction configuration: Test A<->B.

Step	AutoTest, two way/bi-directional, local reference Procedure
1	Configure KITS™ as per **Sections** 10.1.1 above for two-way / bidirectional testing.
2	Connect meter to the KITS™ software. • If the meter is turned on and connected to the computer when KITS™ starts, KITS™ will automatically connect.

Copyright

Step	AutoTest, two way/bi-directional, local reference Procedure
	If not, click on KITS™ command, ***[Connect]*** to connect meter to KITS™ software.
3	
4	In the worksheet, click on **"Ref"** or **"Meas"** for the relevant fibre number. • The test data will be automatically entered onto the worksheet. • KITS™ will automatically analyse the results. • Pass/Fail assessment is based upon the Pass/Fail configuration.  • Test result failures are shown in red and indicated as 'Fail' in the P/F column. • Marginal results are normally accepted as a pass. • Fibres that are re-tested are marked in the 'Time Tag' column. **Note 1:** KITS™ will not accept data clicked into the wrong cells. **Note 2:** Test data wavelength must match KITS™ configuration.

10.3.2.3 One click data entry for ORL measurements

(Click to go back to Live Mode Tour section)

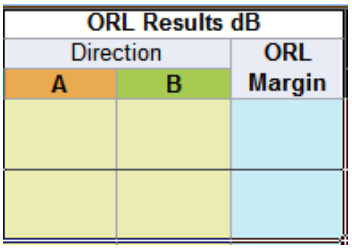
If you have an ORL meter, then you may perform all the tests detailed in Sections 10.3.1 & 10.3.2 above plus Optical Return Loss (ORL) measurement.

10.3.2.3.1 One click data entry for ORL measurements – AutoTest mode

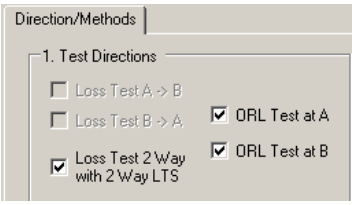
An ORL equipped Kingfisher instrument operating in two-way AutoTest mode automatically measures ORL. Depending upon the test set up selected, KITS™ may already be configured for ORL measurement.

- When configured to record ORL, the "**ORL Results dB"** columns, in "**Live Data"** worksheet will be coloured yellow.

Copyright



If needed, configure the worksheet for 2-way ORL measurement as per below:

Step	Setup 2-Way ORL measurement
1	Select ***command, [Test Setup].***
2	Select options, **[ORL Test at A]** and **[ORL Test at B]** for **"Test Directions".** 
3	Set up the KI734xx series 2-way ORL instruments into 2-way mode and connect them to KITS™.
4	In the KITS™ worksheet, click on 'Ref', 'Meas' or ORL for the relevant fibre number. • The test data will be automatically entered in the worksheet.

Note 1: If the circuit under test has a small insertion loss, the instrument's ORL isolation may not be sufficient for accurate ORL readings. In such situations, a manual measurement should be considered. Refer Section 10.3.2.3.2 below.

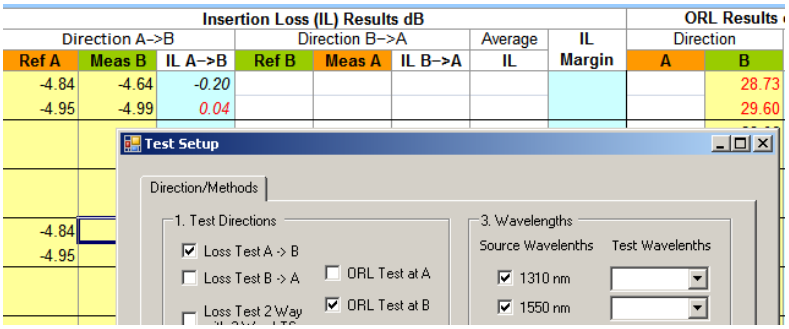
Note 2: The standard KI734xx series 2-way ORL meters have an ORL isolation of about 25 dB. ORL isolation can be optionally increased to about 50 dB at time of purchase. Most existing SMF instruments can also be modified.

10.3.2.3.2 One click data entry for ORL measurements – meter in manual mode

Manual ORL measurement is usually performed with the Far End connected to an ORL terminator. Configure KITS™ for ORL measurement as per below.

Step	Manual ORL measurement
1	Select command, ***[Test Setup].***

Copyright

Step	Manual ORL measurement
2	Select option, **[ORL Test at A]** or **[ORL Test at B]** for **"Test Direction"**. • To measure ORL as seen from the 'A' end select option, **[ORL Test at B]** • To measure ORL as seen from the 'B' end select option, **[ORL Test at A]** 
3	If necessary, terminate the Far End in an ORL termination.
4	On the worksheet, click on a yellow **"Ref", "Meas"** or "**ORL"** cell for the relevant fibre number and wavelength. • The test data will be automatically entered in the worksheet.

10.3.3 DATA ENTRY BY DOWNLOADING FROM INSTRUMENT MEMORY

(Click to go back to Live Mode Tour section)

The instrument memory contents can be selectively dumped and mapped into the **"Live Data"** worksheet directly via KITS™ command, ***[Memory Download]***.

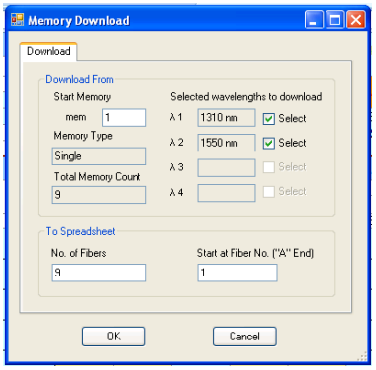
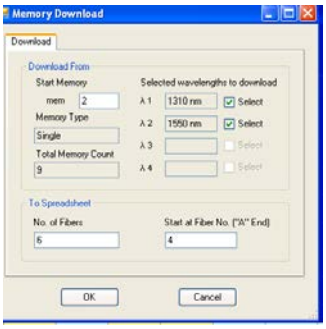
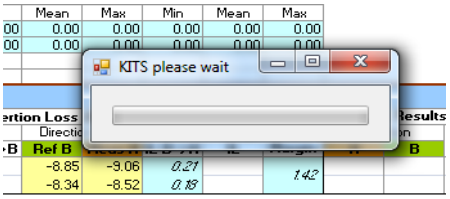
- Memory download should not be performed with the instrument in AutoTest mode.
- All wavelengths data in the instrument memory will be downloaded onto the "**Live Data"** regardless of the wavelength configuration configured using ***[Test Setup]*** command.
- If unsure of the instrument memory contents, perform a memory dump first using the **"Meter Dump"** worksheet (see Section 14) or **"Save Csv"** program (see section 15).

The example below assumes: -

- Use of a source and a meter at each end (or a simple Loss Test Set at each end.)
- Data in instrument memory was saved during either AutoTest or Manual test mode.
- Worksheet configuration (via Test Setup command): Reference End: Remote: Test Direction: A->B

Step	Memory download Procedure
1	Select command, ***[Connect]*** followed by ***[Memory Download].***
2	The "**Test Result"** subsection of the **"Live Data"** worksheet will be automatically configured with the test wavelengths according to the contents in the instrument's memory.

Copyright

Step	Memory download Procedure
3	The **"Memory Download"** pop-up will open & shows info of the data contents in instrument memory. • If no pop-up: the meter is not connected. 
4	Select: - • Meter memory location to start downloading data from: **"Start Memory"** • Wavelengths to be downloaded: **"Select wavelengths to download"** • Number of memory locations / results to be downloaded: "**No. Of Fibers"** **(**User may need to enter the appropriate number in this field in order to load all or part of the data from instrument memory to the worksheet) • Fibre number in Live Data worksheet to begin the download at: **"Start at Fiber No. ("A" End)"** For example; download from Memory location 2, data for 6 fibres starting at fibre 4, see figure below; 
5	Click ***[OK]*** to begin memory download. A 'KITS please wait' dialogue box will open during download, closing automatically when download is completed. 

10.3.4 DATA ENTRY BY DOWNLOADING FROM CSV FILES

(Click to go back to Live Mode Tour section)

Copyright

The data contents saved in a CSV (Comma Separated Values) file can be selectively dumped and mapped into **"Live Data"** worksheet directly via KITS™ command, ***[Load .csv File]***.

Step	CSV File Download Procedure
1	Configure the "**Live Data"** worksheet as per Section 10.1 (Steps 4~7).
2	Select command, ***[Load .csv File].*** **Note:** If the CSV file contains data exported from a meter memory using; - KITS™ function, **Save Csv** or - KITS™ Command, ***[Save as .csv]*** on ***"Final Report"*** worksheet or - Memory dump (data saved in USB memory stick from KI2600 series) Note: the "**Live Data"** worksheet provides a user selectable option to automatically configure the worksheet with the wavelengths and test direction matching the CSV file.
3	In the **"Open"** pop-up, select the saved CSV files to initiate the downloading process. **Note:** As part of KITS Secure Data feature, CSV file which has been edited/resaved is not downloadable on the worksheet in Secure Data Mode. On the prompt, if the user presses OK to continue, KITS™ will set the worksheet as "Data is NOT Secure" and load the data. *For testing purposes, a collection of sample KITS™ CSV files are included with KITS™ installation.* *User may view these files from the directory,* ***C:\ProgramData\Kingfisher\KITS Sample Files****.* *There are 4 categories of CSV files in the subdirectories:* *- Files exported from KITS (live data read from meter)* *- Files exported from KITS (data read from memory of meter)* *- Files exported from meter using Save Csv* *- Files saved in USB dump*

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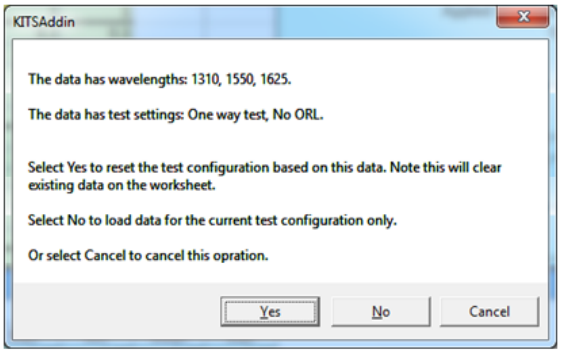
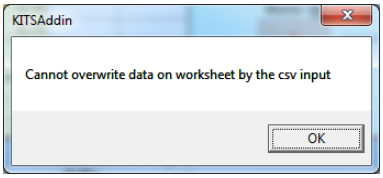
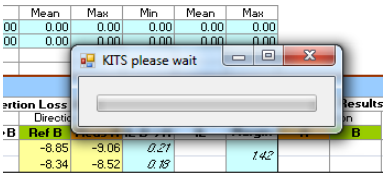
Step	CSV File Download Procedure
4	Select: - • Row number in CSV file to start downloading data from: **"Start Data Row"** • The numbers of fibres on the worksheet to map the downloading data: "**No. Of Fibers"** • Select/deselect the data for the wavelength/s to be downloaded: - check/uncheck the boxes near the wavelength numbers • Test direction or ORL option of the data to be downloaded: "**A->B"** or **"B->A"** or **"ORL at A"** or **"ORL at B"** **Note: "ORL at A"** and/or **"ORL at B"** must be selected in order for ORL data in CSV file to be successfully downloaded onto the worksheet. Note: If a field is greyed out, that is because it is not selected in configuration. Run ***[Test Setup]*** to select the field. • Fibre number in "**Live Data"** worksheet to begin the download at: **"Start at Fiber No. ("A" End)"** For example; download from **row**, 1 of the available 15 rolls of data in the csv file, map it on 15 Fibers on the **"Live Data"** worksheet starting from the 1'st **Fiber No**, see figure below; Click ***[OK]*** to proceed.
5	If the CSV file to be downloaded contains wavelengths which are different from that configured in **Step 1**, the pop-up below will be displayed.  Select **[Yes]** or **[No]** or **[Cancel]** accordingly to proceed.

Copyright

Step	CSV File Download Procedure
6	If the pop-up below is displayed, click on [OK]. Clear all data on the worksheet using the KITS™ *Clear Data* command, ***[All Data]*** and go back to Step 2 to reinitiate data download process. 
7	A 'KITS please wait' dialogue box will open during download, closing automatically when download is complete. 

10.4 Associated KITS™ Commands on Live Data Worksheet

Click on KITS™ Menu Tab to display all available KITS command on the worksheet's ribbon. If only some of these commands are displayed, click on the tab for any other worksheet followed by switching back to this worksheet, to refresh the ribbon with all the available commands.

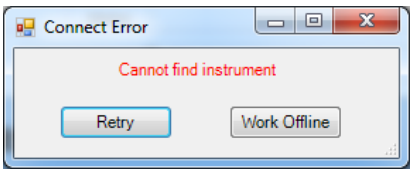
10.4.1 WORKSHEET: *[FINAL REPORT], [LIVE DATA], [METER READING], [DATA LOGGING], [METER DUMP], [NEW REPORT]*

Users can alternatively use this commands to switch between the worksheets with the KITS™ software instead of clicking on the Excel Sheet Tab.

- ***[Final report]:*** To go to **"Final Report"** worksheet
- ***[Live Data]:*** To go to **"Live Data"** worksheet
- ***[Meter Reading]:*** To go to **"Meter Reading"** worksheet
- ***[Data Logging]:*** To go to **"Data Logging"** worksheet
- ***[Meter Dump]:*** To go to **"Meter Dump"** worksheet
- ***[New Report]:*** Used to design a custom report layout. See **section 16 Customization.**

10.4.2 *[CONNECT/DISCONNECT]*

Click to connect or disconnect the instrument to KITS™. If the error below pops up after a connect command, make sure that the meter is turned on, unplug and re-plug USB connection between meter and computer, select ***[Retry]*** to connect again.



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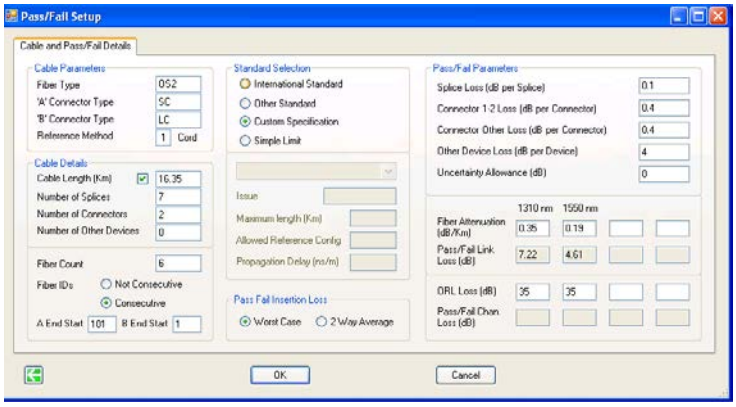
If the above does not solve the problem, see section B.5.1 of Appendix B for manual installation of device driver.

10.4.3 *[PASS FAIL SETUP]*

This command is used to configure the workbook for: -

- Standard selection.
- If a local or international standard is selected, then the various pass/fail parameters defined in the standards will be 'greyed out' to prevent alteration.
- Cable build details such as connector type, length, fibre count, number of splices etc.
- The number of test cords used in referencing the test instruments is also set here.
- Measurement uncertainty.
- Pass/ fail/ marginal result based upon worst case or two-way average loss.



Note: Some standards restrict and or specify the allowable test cord referencing method. KITS will warn regarding this if necessary.

Definition of Pass / Fail / Marginal Result

The ISO & IEC standard organisations define the following:

Pass Result

Measured value which meets the specified requirement and where the absolute value of the difference between the measured value and the specified requirement is greater than the stated measurement uncertainty. *Provided any apparent gain does not exceed the measurement uncertainty."*

Fail Result

Measured value which fails to meet the specified requirement and where the absolute value of the difference between the measured value and the specified requirement is greater than the stated measurement uncertainty.

Marginal Result

Measured value which differs from the specified requirement, by an amount not exceeding the stated measurement uncertainty.

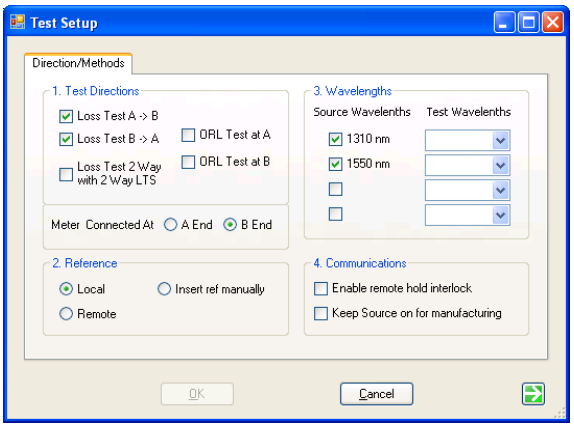
10.4.4 *[TEST SETUP]*

(Click to go back to Live Mode Tour section)

Copyright

This command is usually used after the ‘Pass/Fail’ configurations. It is used to configure the workbook for: -

- Test direction – one way, two-way with a source and meter or two way using a two way LTS.
- ORL measurement included or not.
- DUT ‘end’ at which the Power Meter is connected.
- Type of referencing used – Local or Remote, see Note 2 below.
- Wavelengths to be tested – maximum of 4.
- User communication function selections, see Note 3 below.



Note 1:

Whilst the ***[Test Setup]*** and the ***[Pass/Fail Setup]*** sub-menus can be configured in any order, it is recommended that when testing to a Standard, that the ***[Pass/Fail Setup]*** sub-menu be configured first to minimise any interaction between them.

E.g. the standard may specify testing at two wavelengths, however the user may only be testing at one wavelength.

Note 2:

Local / Remote Referencing Definition

Whilst the terms ‘Local’ and ‘Remote’ referencing are used internationally, there is often some confusion.

Local:

- A Local Reference is performed when one power meter is used to measure both the Reference Level and the far end measurement.
- The two instruments that will be used to measure the DUT loss are co-located when referenced.
- Local Reference is commonly used in a situation where both ends of a system can be accessed readily by the one meter (for instance loop-back testing, or bench testing).
- With a Local Reference the meter can be configured to read the loss directly in dBr.

Remote:

- A Remote Reference is usually performed on a "long" link where it is inconvenient or impractical to use one power meter to measure the power at both the ends of the link.

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- In a Remote Reference two power meters are used. One power meter is used to measure the Reference Level (e.g., the light source output power), and the other meter is used to measure the received level at the other end of the link.
- With a Remote Reference, a calculation must be made to determine the loss.

Note 3:

"Enable remote hold interlock" option

To work with this option, a pair of identical KI7340 series Loss Test Sets must be used. This option provides a useful communication aid to the operators at both ends of a DUT in coordinating their tasks i.e., the far end user knows when a reading has been saved in KITS™, and the near end user knows when the far end user has moved to the next fiber, and so is ready for the next reading. For detail operations in this mode, see steps under 5.2.5.2 of section, 5.2 (Live Mode Tour).

"Keep Source on for manufacturing" option

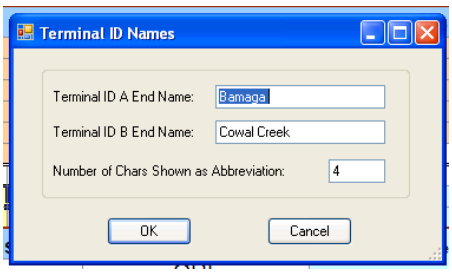
When this option is selected, KITS will defeat the auto-timeout (for auto-off function) of the Light Source. To reactivate the auto-timeout, unchecked this option in Test Setup window, switch off the unit then turning it back on by briefly pushing its [POWER] button.

10.4.5 *[TERMINAL ID]*

(Click to go back to Live Mode Tour section)

This command is used to specify the names of the two ends to be tested: -

- The A & B end test location names e.g., Bamaga
- The number of characters to be used for abbreviation.
  e.g. 4 => BAMA, 3 => BAM



10.4.6 *[SET REFERENCE]*

(Click to go back to section 12.2.2)

The ***Set Meter Reference*** sub-menu provides a convenient form to either:-

- Set the Reference Value,
  Select λ from the drop-down list, click ***[Set]*** to set the value in "**Current Mater Reading"** as reference for the selected wavelength.

- Define the Reference Value,

  Select λ from the drop-down list, enter a value for "**Reference Value"** & click ***[Define].*** The entered value will become the reference for the selected wavelength.

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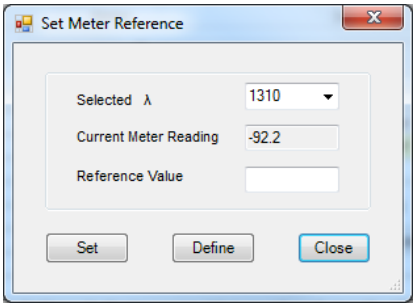
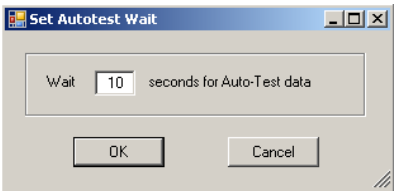
Note:
i. The **"Set Meter Reference"** popup is only available when an instrument is connected.
ii. This feature is not functional in AutoTest mode.
iii. This is a per wavelength setting.



10.4.7 *[WAIT TIME]*

This command allows user to choose the time interval to receive update of Autotest readings. Default is 10 seconds.



10.4.8 *[SHOW / HIDE]*

Users have the options to show or hide the different subsection of the "Live Data" worksheet using the command options below;

- **"Hide/show Job Detail"** to hide/show subsection, "**Job Detail / Site Data"**
- **"Hide/Show Pass Fail Setup"** to hide/show subsection, **"Test Parameter Setup"**
- **"Hide/Show Test Summary"** to hide/show subsection, **"Statistical Analysis"**

10.4.9 *[UNSET/SET SECURE]*

These commands are used to enable or disable the Secure Data Mode, see Section 10.2.4.6.

10.4.10 *[SAVE .CSV FILE]*

(Click to go back to Live Mode Tour section)

Select this command to save existing test data/results on **"Live Data"** worksheet in a CSV file. Data/result will be saved in CSV file with checksum. CSV file that has been resaved will not be reloadable or loaded only in non-secured data mode on KITS™. This is a KITS™ secured data feature to prevent unauthorized data alteration.

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10.4.11 [*LOAD .CSV FILE]*

Download and map test data/results saved in a CSV file onto **"Live Data"** worksheet, see Section 10.3.4.

10.4.12 *[MEMORY DOWNLOAD]*

Download and map test data/results saved in the memory of a meter onto **"Live Data"** worksheet, see Section 10.3.3.

10.4.13 *[SAVE KITS UNLINKED]*

(Click to go back to Live Mode Tour section)

Normally when a KITS™ workbook is opened, it will automatically start the KITS™ software. When required, use this command to save the workbook as Unlinked to the KITS™ software. This file will later open in Excel as per a normal workbook.

Once performed, the action CANNOT be undone.

Step	Unlink KITS™ workbook
1	Open the workbook to be Unlinked • Ensure workbook display layout is as required. • Once Unlinked, the action CANNOT be undone
2	Select command, ***[Save KITS Unlink]***
3	Type in file name and select directory to save the worksheet.

10.4.14 CLEAR DATA: *[ALL DATA], [PROJECT INFO], [A <-> B], [A -> B], [B -> A]*

These commands are used to clear all or part of the test data/results. Operation is self-explanatory.

10.4.15 *[USER MANUAL]*

Click to access the User Manual for KITS™.

Alternatively, the User Manual can be: -

1. Located on your computer as detailed in Section 8.2.1 above.
2. Downloaded from the Kingfisher International web site.

10.4.16 *[ABOUT KITS]*

Displays the current KITS™ version number and release date.

Copyright

10.4.17 *[KINGFISHER WEB SITE]*

Links to the Kingfisher International web site.

10.4.18 *[SET P/F ON TESTER]*

This feature is applicable to KI23400/KI27400 series instrument only.

Launch KITS™ and open "**LIVE DATA"** worksheet. Connect instrument to computer via USB. Click **"KITS"** on ribbon to show all KITS™ commands. Select command, ***[Connect]*** to connect instrument to the software. Select ***[Set P/F on Tester]*** to display the **"Set Tester"** window below,

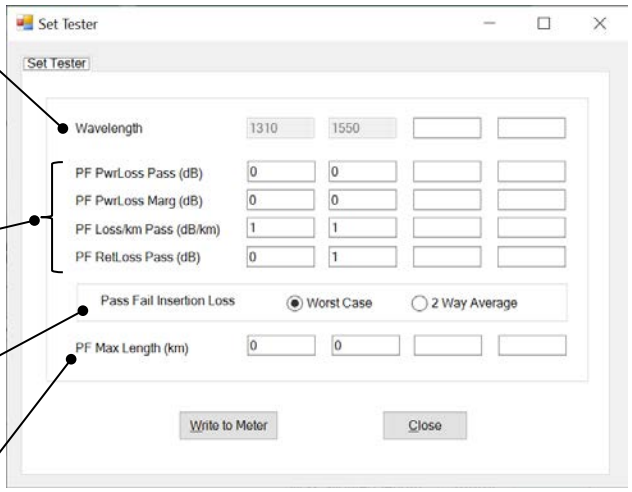
Make sure that these boxes are auto populated with all wavelengths available on instrument otherwise, do the following,

Close the setup window, disconnect and reconnect instrument to software using the commands ***[Disconnect]*** and ***[Connect]***. Select [Set P/F on Tester] to display "Set Tester" window again.

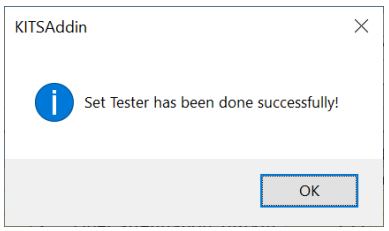
Enter the desired dB threshold values (follow a negative sign) in the boxes of these pass/fail parameters.

Select either Worst Case or 2-way Average pass/fail mode for IL and ORL tests.

Enter threshold values for length test. Note that the max acceptable values is 65 Km and 2 Km for SM and MM wavelength respectively.



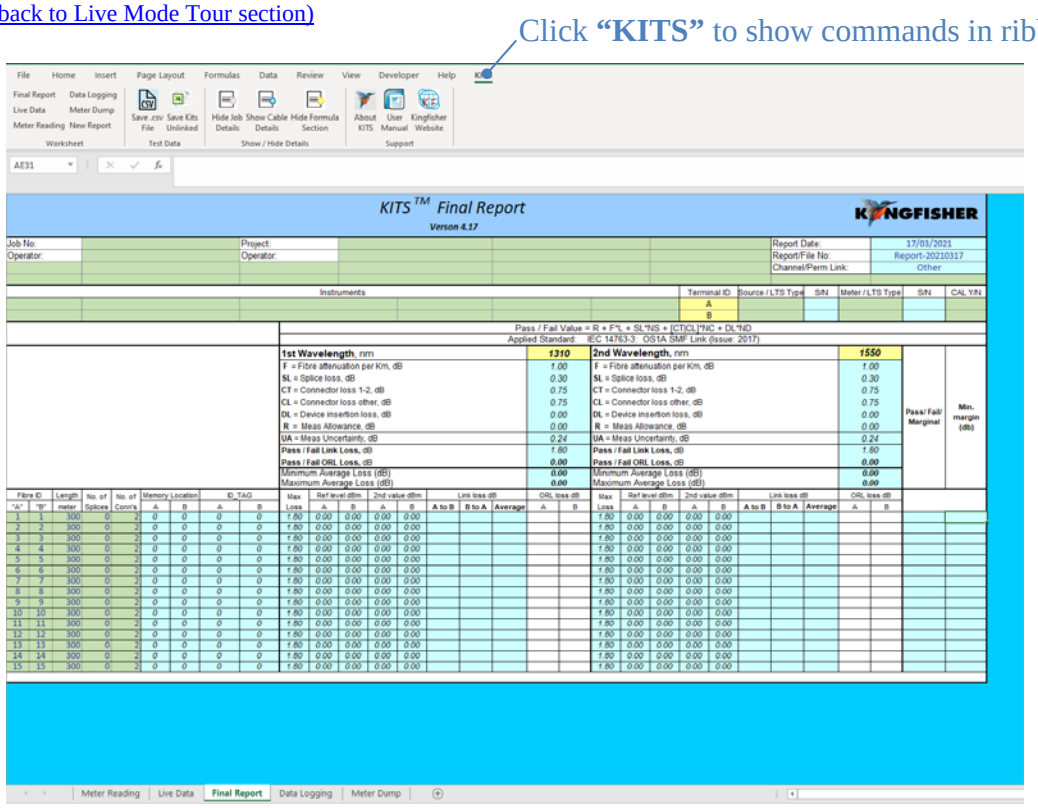
Click on **"Write to Meter"** button to save the entered values and selection on the Set Tester window to the connected instrument. When prompted with the popup box below, click **"OK"** to proceed.



Copyright

11. FINAL REPORT WORKSHEET

(Click to go back to Live Mode Tour section)



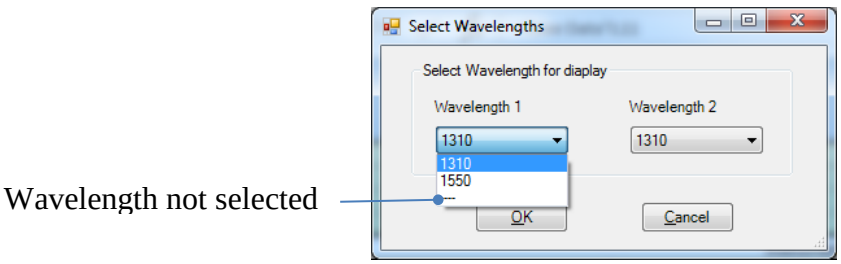
11.1 Final Report Worksheet

The **"Final Report"** worksheet is used when the test data is required to be presented in an alternate format to that of the **"Live Data"** worksheet.

- The Loss testing worksheet is 'receive' only.
- All data is imported from the **"Live Data"** worksheet.
- To open the worksheet, click on **"Final Report"** worksheet and "KITS please wait" will pop up.

- The Loss testing worksheet can be configured to display one or maximum two wavelengths.

  To configure:
  Click on the yellow **1st** or **2nd wavelength** cells to specify the wavelength(s) displayed as below;



11.2 Associated KITS™ Commands of Final Report Worksheet

Copyright

Click on KITS Menu Tab to display all available KITS™ command on the worksheet's ribbon. If only some of these commands are displayed, click on any other worksheet tab followed by switching back to this worksheet, to refresh the ribbon with the full commands.

11.2.1 *[SAVE .CSV FILE]*

See Section 10.4.10.

11.2.2 *[SAVE KITS UNLINKED]*

See Section 10.4.13.

11.2.3 SHOW / HIDE DETAILS: *[SHOW/HIDE JOB DETAILS], [SHOW/HIDE CABLE DETAILS], [SHOW/HIDE FORMULA SECTION]*

These commands are used to show or hide the subsections on the worksheet. Operation is self-explanatory.

11.2.4 *[USER MANUAL]*

See Section 10.4.15.

11.2.5 *[ABOUT KITS]*

See Section 10.4.16.

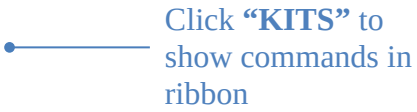
11.2.6 *[KINGFISHER WEB SITE]*

See Section 10.4.17.

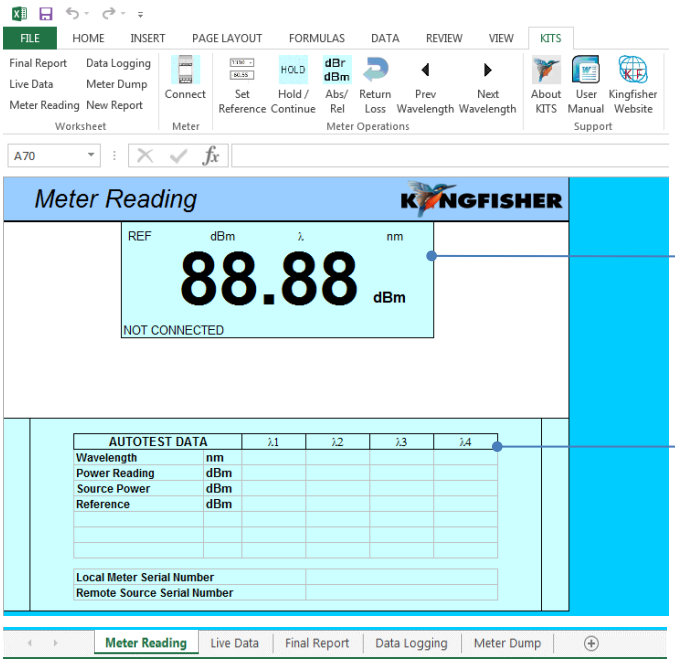
12. METER READING WORKSHEET

(Click to go back to Live Mode Tour section)

12.1 Meter Reading Worksheet



Copyright



Meter Reading section - displays real time meter readings/references by wavelength, meter mode & connection status.

AUTOTEST DATA section – records meter reading, reference values, meter/source SN information.

The "**Meter Reading"** work sheet provides basic meter functions and is useful for confirming instrument connection, and where a large display is required. This worksheet is opened by default when KITS™ completes start-up.

When ***[connect]*** to a meter, the meter reading will be displayed on Meter Reading section and or AUTOTEST DATA section, depending on whether the meter is operating in AutoTest or non-AutoTest mode, see Step 6 of Section 9 for more detail.

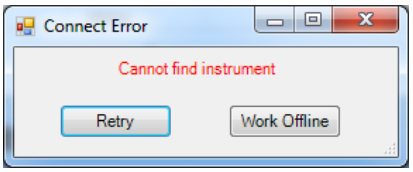
Click "**KITS"** on Menu Bar to show commands in ribbon.

12.2 Associated KITS™ Commands of Meter Reading Worksheet

Click on KITS Menu Tab to display all available KITS™ command on the worksheet's ribbon. If only some of these commands are displayed, click on any other worksheet tab followed by switching back to this worksheet, to refresh the ribbon with the full commands.

12.2.1 *[DISCONNECT /CONNECT]*

Click to connect or disconnect the meter from KITS™ software. When connected, **"CONNECTED"** will be shown on the display. If the error below pops up after a connect command, make sure that the meter is turned on, unplug and re-plug USB connection between meter and computer, select the ***[Retry]*** or connect command again.



If the above does not solve the problem, see section B.5.1 of Appendix B for manual installation of device driver.

Copyright

12.2.2 *[SET REFERENCE]*

See Section 10.4.6.

12.2.3 *[HOLD / CONTINUE]*

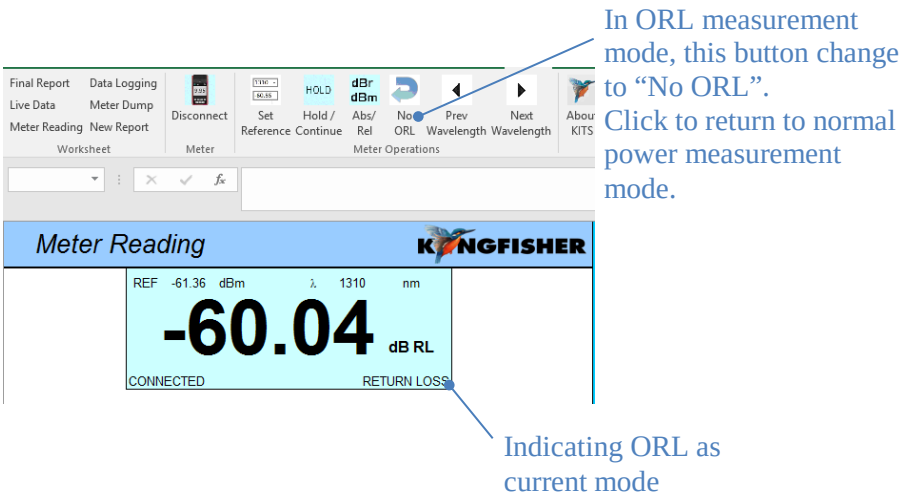
Click to hold meter display or to continue with real time display. When in hold-mode, "**HOLD**" will show on the display.

12.2.4 *[ABS / REL]*

Click to toggle between absolute / relative meter measurements modes.

12.2.5 [RETURN LOSS]

Click to enter ORL measurement mode. See picture below for a sample display of Meter Reading worksheet in ORL mode.



12.2.6 *[PREVIOUS WAVELENGTH] & [NEXT WAVELENGTH]*

To change wavelength (and its test data) displayed in the Meter Reading section.

Note:

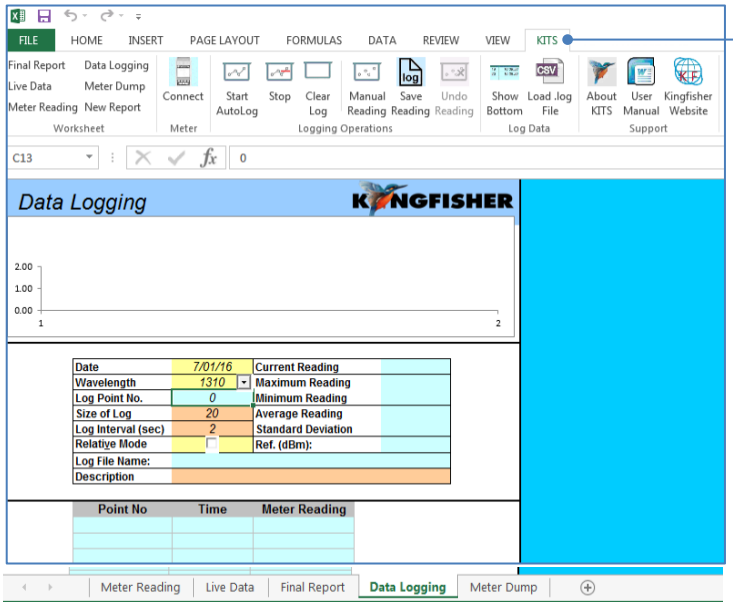
i. This feature is not available when source is in AutoTest mode.

ii. In AutoTest mode, the display shows live data.

13. DATA LOGGING WORKSHEET

(Click to go back to Live Mode Tour section)

Copyright



The Data Logging sheet supports data logging whether the meter is in Power Meter, one-way or two-way Autotest mode.

The following statistical information is recorded: -

- max,
- min,
- mean,
- standard deviation and
- current reading.

13.1 Data Logging

Data Logging can be performed automatically or manually. User is allowed to specify: -

- the meter wavelength,
- the size of the log,
- the log time interval and
- Absolute or Relative mode

During data logging, each data point is automatically written to the specified log file, minimising data loss in case of a process interruption.

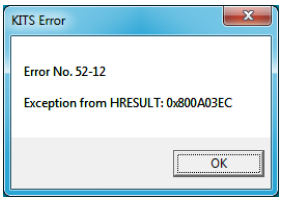
Caution: The source should be in CW mode; however, data logging may be possible in AutoTest mode. Depending upon sample interval and computer speed, the reading may become unreliable if the instrument is in AutoTest mode. AutoTest samples intervals greater than 5 seconds are generally OK.

If sampling with the source in AutoTest mode is required, trial test parameters before committing to the test.

13.1.1 AUTOMATIC DATA LOGGING

Step	Automatic Data Logging Procedure
1	Select the **"Data Logging"** worksheet.

Copyright

Step	Automatic Data Logging Procedure
2	To select the wavelength, use the arrow buttons next to **"Wavelength"**. **Note:** Meter must be connected for this function.
3	Define **"Size of log"**.
4	Define **"Log Interval (sec)"**.
5	If required, select **"Relative Mode"**.
6	If required, add a **"Description"**.
7	To clear existing data, select KITS™ command, ***[Clear Log]***.
8	To start logging, click KITS™ command, ***[Start Autolog]*** and enter file name in the dialog box, and select a directory to save data. If Excel is in cell input mode (e.g. the cursor is placed inside the **"Size of log"** cell), clicking ***[Start Autolog]*** will trigger the error message below. Exit input mode by clicking on any cell outside the tables, amd click ***[Start Autolog]*** to restart auto data logging.  • Consider using the **"Description"** from Step 6 above for the file name.
9	To hold data logging before it is completed, click KITS™ command, ***[Stop]*.** To resume data logging, click KITS™ command ***[Continue AutoLog].*** Click ***[Stop]*** twice to abort a data logging session.

13.1.2 MANUAL DATA LOGGING

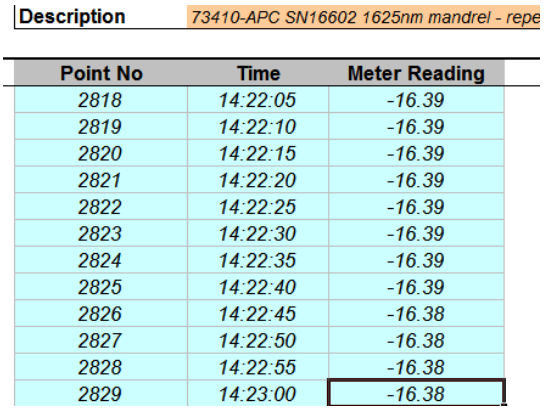
Data is stored upon user command.

Step	Manual Data Logging Procedure
1	Select the **"Data Logging"** worksheet.
2	To clear existing data, select KITS™ command, ***[Clear Log].***
3	To set the wavelength, use the arrow buttons next to **"Wavelength"**. **Note:** A meter/instrument must be connected for this function.
4	If required, select **"Relative Mode"**.
5	If required add a **"Description"**.
6	On each click of KITS™ command, ***[Manual Reading]*** a data point is logged. The data point index and the size of the log is automatically incremented.
7	To undo the last reading, select KITS™ command, ***[Undo Reading]***. This decreases the data point index, but not the size of log value.
8	To save the data log, click KITS™ command, ***[Save Reading]*** and enter file name and select directory to save data in the dialog box.

Copyright

13.2 Viewing data whilst logging

Whilst the data is being logged, the default is to show the earliest (top of the spreadsheet) readings. If required, the user can display the current readings (at the bottom of the spreadsheet).

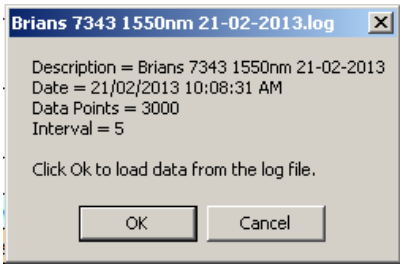
Step	View data options whilst logging
1.	To show current data readings, select KITS™ command, ***[Show Log Data Bottom].***
.	
2.	To revert to the top of the data readings, select KITS™ command, ***[Show Log Data Top].***

Description 73410-APC SN16602 1625nm mandrel - repe

Point No	Time	Meter Reading
2818	14:22:05	-16.39
2819	14:22:10	-16.39
2820	14:22:15	-16.39
2821	14:22:20	-16.39
2822	14:22:25	-16.39
2823	14:22:30	-16.39
2824	14:22:35	-16.39
2825	14:22:40	-16.39
2826	14:22:45	-16.38
2827	14:22:50	-16.38
2828	14:22:55	-16.38
2829	14:23:00	-16.38

13.3 Loading saved log files

A saved log file can be loaded into this spreadsheet.

Step	Loading saved Log file
1.	Ensure no instrument is connected to KITS™.
2.	Select KITS™ command, ***[Load .log File]***.
3.	A pop up dialogue box provides information about the selected Log file. Select ***[OK]*** to load or ***[Cancel]*** to back out.  **Note:** very large Log files may take a while to load. Load completion is easily confirmed by the presence of the graph.

13.4 Printing log files

Use Windows print options to print hardcopy of the logged data.

Copyright

13.5 Associated KITS™ Commands of Data Logging Worksheet

Click on KITS Menu Tab to display all available KITS™ command on the worksheet's ribbon. If only some of these commands are displayed, click on any other worksheet tab followed by switching back to this worksheet, to refresh the ribbon with the full commands.

13.5.1 *[DISCONNECT /CONNECT]*

See Section10.4.2.

13.5.2 *[START AUTOLOG]*

To start Automatic Data logging, see application in Section 13.1.1.

13.5.3 *[STOP / CONTINUE AUTOLOG]*

[Stop]: One click to halt existing automatic data logging process. Click twice will abort the existing automatic data logging process. ***[Continue AutoLog]:*** To resume a halt data logging process. See application in Section 13.1.1.

13.5.4 *[CLEAR LOG]*

To clear the exiting logged data on the display, see application in Section 13.1.1.

13.5.5 *[MANUAL READING]*

To manually enter log data. A data point will be entered on each click of this command, see application in Section 13.1.2.

13.5.6 *[SAVE READING]*

To save the existing logged data on the display in the specified file see application in Section 13.1.2.

13.5.7 *[SHOW LOG DATA BOTTOM] & [SHOW LOG DATA TOP]*

To move the cursor to the bottom or to the top of the display to view the 1st or the last data point, see application in Section 13.2.

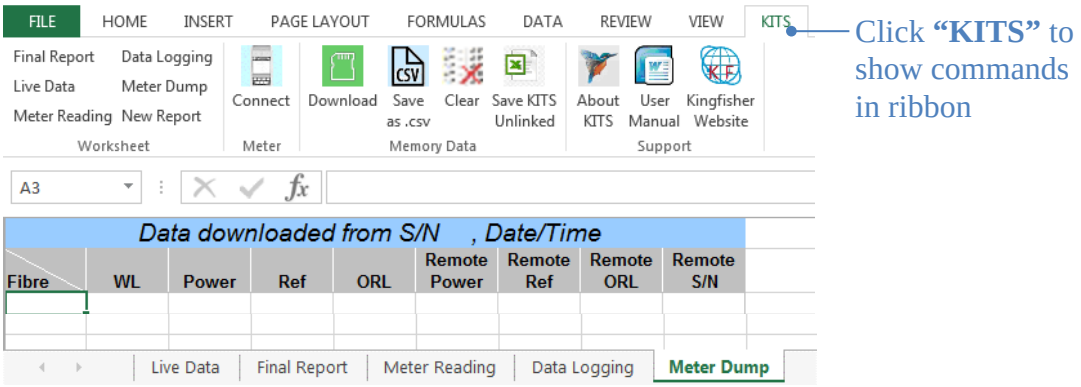
13.5.8 *[LOAD .LOG FILE]*

Load a log files saved in a directory onto the worksheet see application in Section 13.3.

14. METER DUMP WORKSHEET

(Click to go back to Live Mode Tour section)

Copyright



14.1 Meter Dump Worksheet

The **"Meter Dump"** worksheet provides a simple and convenient way to download and view the loss test data stored in a meter/instrument.

Unlike the **"Live Data"** worksheet where only the memory readings that match the selected wavelengths are downloaded, the **"Meter Dump"** sheet downloads all data from meter memory. No analysis is performed.

Step	Meter Dump Operations
1.	Select command, ***[Connect]*** to connect meter to KITS™ software.
2	Select command, ***[Download]***.
3	All memory cells of meter will be downloaded to the worksheet.
4	To Clear the data on worksheet, select ***[Clear]***.
5	To save the data on worksheet to a CSV file, select ***[Save as .csv]*** followed by specify a file name and directory to save.
6	Alternatively, select ***[Save KITS Unlink]*** to save the workbook (inclusive of the downloaded data in the Meter Dump worksheet in a normal Excel format (not linked to KITS™).

Data downloaded from S/N 25018, Date/Time 3/12/15 16:09:05

Fibre	Date	Time	Type	ID Tag	Remote S/N	WL	Power	Ref	Nom
1	10/12/13	9:25	2WlAuto	ABCD013	11216	1310 nm	-7.74	-7.69	-7.00
1	10/12/13	9:25	2WlAuto	ABCD013	11216	1550 nm	-7.74	-7.76	-7.00
2	10/12/13	9:25	2WlAuto	ABCD014	11216	1310 nm	-7.75	-7.69	-7.00
2	10/12/13	9:25	2WlAuto	ABCD014	11216	1550 nm	-7.73	-7.76	-7.00
3	10/12/13	9:25	2WlAuto	ABCD015	11216	1310 nm	-7.76	-7.69	-7.00
3	10/12/13	9:25	2WlAuto	ABCD015	11216	1550 nm	-7.75	-7.76	-7.00

14.2 Associated KITS™ Commands of Meter Dump Worksheet

Click on KITS Menu Tab to display all available KITS™ command on the worksheet's ribbon. If only some of these commands are displayed, click on any other worksheet tab followed by switching back to this worksheet, to refresh the ribbon with the full commands.

14.2.1 *[DISCONNECT /CONNECT]*

Copyright

To connect or disconnect meter with the software, see application note in Section 14.1.

14.2.2 *[DOWNLOAD]*

To download meter's memory onto the worksheet, see application note in Section 14.1.

14.2.3 *[SAVE AS .CSV]*

See Section 10.4.10.

14.2.4 *[CLEAR]*

To clear data on the worksheet, see application note in Section 14.1.

14.2.5 *[SAVE KITS UNLINK]*

To save data the whole workbook in a normal Excel file, see application note in Section 14.1.

15. EXTRACT MEMORY OF A METER DIRECTLY

(Click to go back to Live Mode Tour section)

Save Csv

KITS™ has an option to download data from an instrument memory directly into a CSV file.

This feature is independent of Microsoft Office.

Note: If the full KITS™ software is installed, it is recommended to close KITS™ first before executing this function.

Step	Extract to CSV
1.	Connect the instrument to the RS232 or USB port of the PC.
2.	Click on the ***[Start]*** button on your PC (the Windows logo displayed at the left end of the Taskbar), then select ***[Kingfisher Kits]*** followed by ***[Save Csv]*** from the displayed lists.
3.	After a short delay (depending on the number of records saved in instrument memory), enter the file name and location for data to be saved as prompted.
4.	Click ***[Save]*** on the popup window to save data to the specified file and location in CSV format. • The contents in the saves CSV file may vary with instrument type e.g., KI7000 series differs to that of KI2000 series. See below for samples files. • The save CSV file includes a checksum.

Memory extract KI2600 via 'Save Csv':

Save csv output from KI2X00. SN: 25018		Time in 24h format.	Wavelengths in nm.	Optical Power values in dBm.										
Mem	Date	Time	Type	ID_Tag	RemSN	WI1	Pwr1	Ref1	Nom1	WI2	Pwr2	Ref2	Nom2	WI3
1	26/05/2014	10:09	2WIAuto	THUR001	11216	1310	-8.9	-0.7	-7	1550	-8.57	-0.77	-7	
2	26/05/2014	10:09	2WIAuto	THUR002	11216	1310	-9.31	-0.7	-7	1550	-8.59	-0.77	-7	
3	26/05/2014	10:09	2WIAuto	THUR003	11216	1310	-9.42	-0.7	-7	1550	-8.61	-0.77	-7	
4	26/05/2014	10:09	2WIAuto	THUR004	11216	1310	-8.91	-8.93	-7	1550	-8.63	-8.28	-7	
5	26/05/2014	10:09	2WIAuto	THUR005	11216	1310	-8.95	-8.85	-7	1550	-8.28	-8.34	-7	

Memory extract KI7343 via 'Save Csv':

Copyright

Save csv output from KI Meter. SN: 11216 Time in 24h format. Wavelengths in nm. Optical Power values in dBm.																
Mem	Date	Time	ID_Tag	RemSN	Length	Wl1	Pwr1	Ref1	Orl1	RemPwr1	RemRef1	RemOrl1	Wl2	Pwr2	Ref2	Orl2
1				24919		1310	-0.34	-99.99	1.44	-99.99	-99.99	-99.99	1310	-0.43	-99.99	99.98
2				24919		1310	-0.1	-0.1					1550	-0.25	-0.25	
3				24919		1310	-0.09	-0.1					1550	-0.25	-0.25	
4				24919		1310	-8.33	-0.1					1550	-19.31	-0.25	
{xcheck: 00a1a199e0}																

16. CUSTOMISATION

Being Excel based, KITS™ offers a number of modification options.

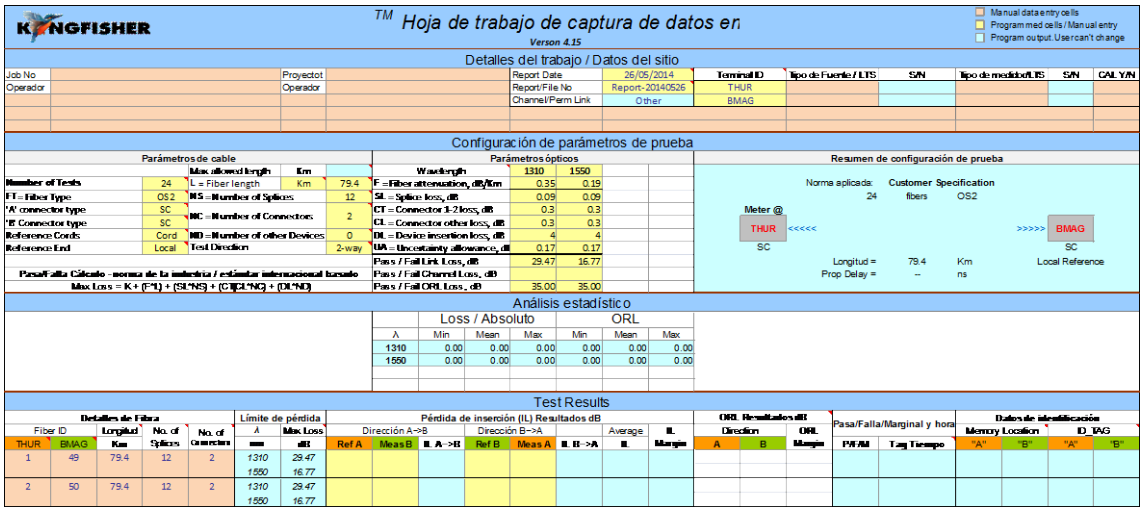
16.1 Renaming worksheets

This is as standard Windows function. A worksheet name can be changed to any other text accepted by Excel. KITS™ remembers the new sheet name when the workbook is saved.

16.2 Modifying the Live Data & Loss Testing worksheets

Many fields in the Live Data & Loss Testing worksheets can be modified. There are two options for performing this being:

1. Modifying the Master Layout template or
2. Modifying an open or existing KITS™ workbook.



Modifications to the Master Layout template will affect all new KITS™ workbooks. However, it will be overridden should KITS™ be upgraded or reloaded at a later date.

The Master Layout template, KitsXls 4.16.xlsx is typically installed under ***<Drive>:\Documents and Settings\All Users\Application Data\Kingfisher\ KITS4.***

Modifying an existing or open KITS™ workbook, and saving it with a specific name, is preferred by many users as it permits them to create several customised worksheets.

- Once modified the changes should be protected. The two methods of protecting the changes are covered in Section 16.3 below.

16.2.1 MODIFICATION RULES

Copyright

Live Data

The text in cells with a blank or light blue background may be changed.

Final Report

The text in cells with a blank background may be changed.

16.3 Protecting a worksheet design

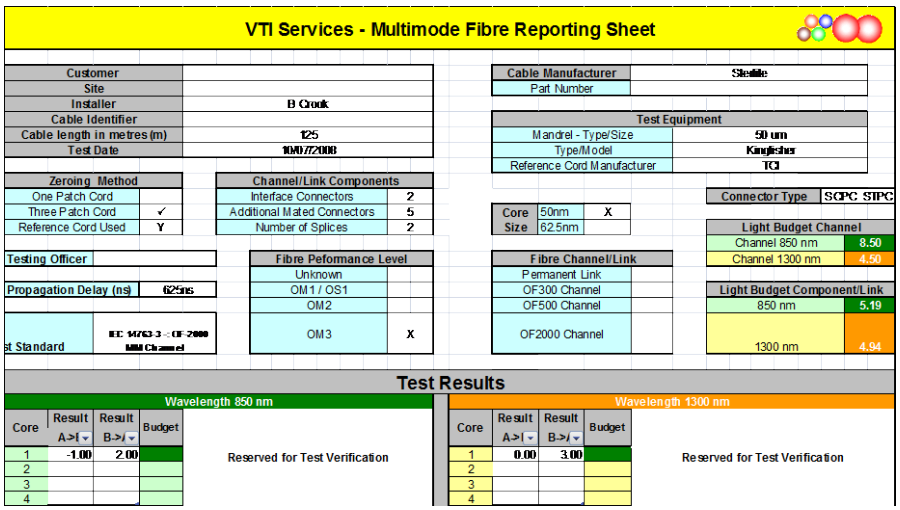
This is very handy for working on assorted jobs, changing languages, terminology, and so on. Windows offers two methods for creating a protected worksheet. These are:

1. Write Protecting a file or
2. Creating a Template.

As these are standard Windows functions, instructions are not given within this manual.

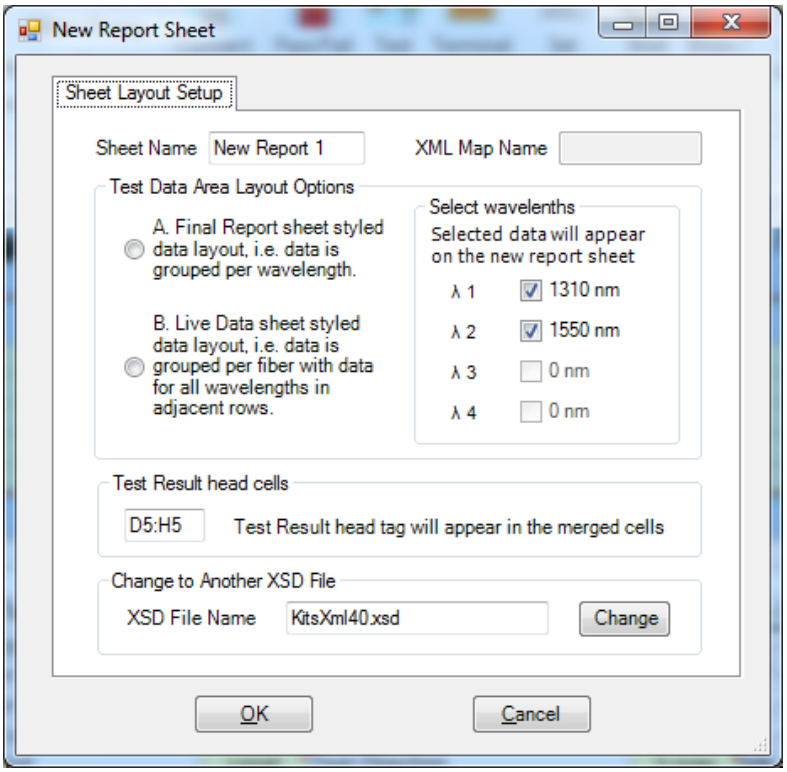
16.4 Designing a Customised Report Sheet

From years of experience in customer support, it is recognised that a generic report sheet format can never satisfy different user needs. A new report generating function is provided in KITS™ that allows users to design their own report worksheet and automatically populate the test data to the custom designed report worksheet.

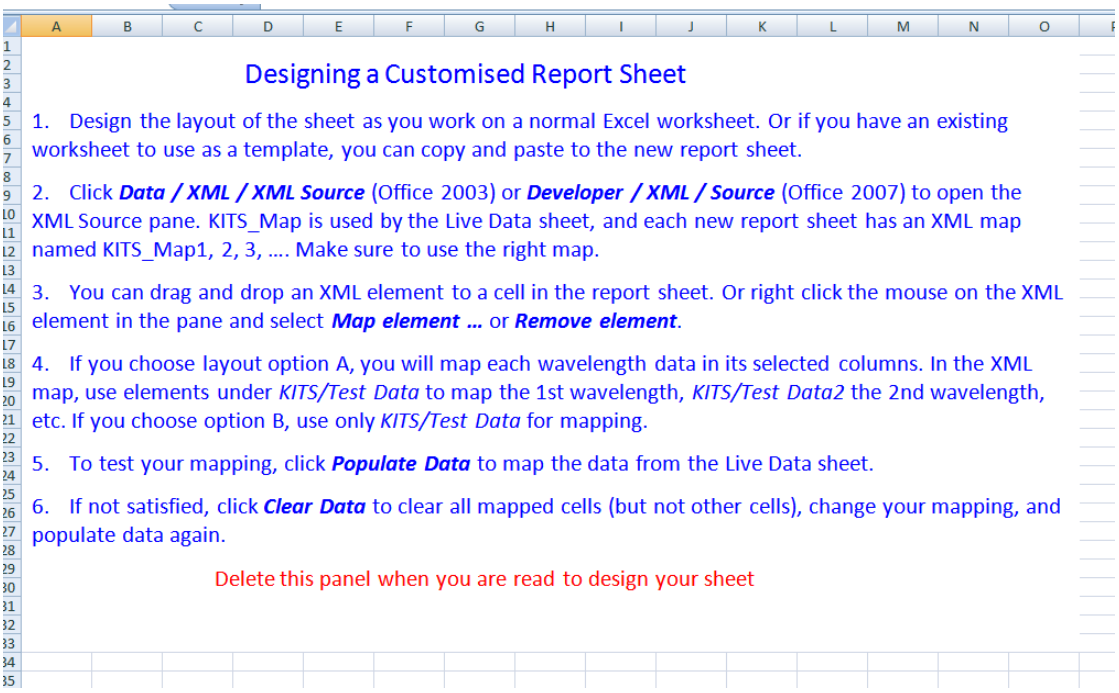


Step	Designing a Customized Report Sheet
1	It is suggested that the design of the new report sheet be performed or obtained before starting. Alternatively, you can design the layout of the sheet as you work.
2	Create a new or open a saved KITS™ workbook, set up all parameters for the Live Data sheet.
3	Select command, ***[New Report]***. A **"New Report Sheet"** form will pop up.
4	Enter a sheet name.

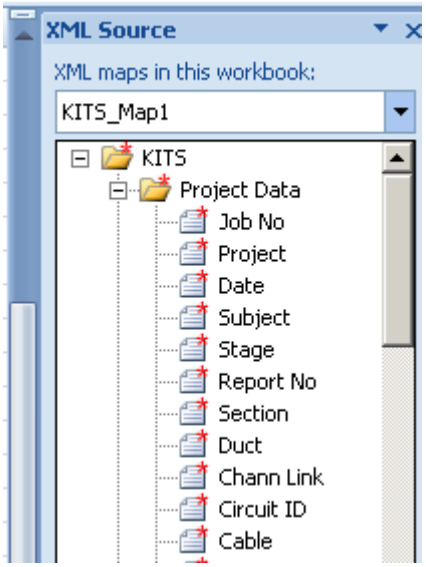
Copyright

Step	Designing a Customized Report Sheet
5	Choose data layout option A or B • **A** is the layout of the **"Final Report"** worksheet, where one Excel row has data for all wavelengths of one fiber. • **B** is the layout of the **"Live Data"** worksheet, where one Excel row has data for one wavelength and data for one fiber is grouped in consecutive rows). For option B, you can tick check boxes to decide which wavelengths to include in the report. By default, the new report worksheet uses the same XSD (XML Schema Definition) file as used by the Live Data sheet. You can customise this file and supply it to the new report.  XML Map Name shows the name of the XML map for this sheet. It is empty before the sheet is created.

Copyright

Step	Designing a Customized Report Sheet
6	Click ***[Ok]*** to complete. A new sheet is created which contains a picture frame with instructions to customise a report sheet.  Read and delete this frame before you start designing the sheet (or copy it somewhere else, if you may need to refer to it later).
7	If you have an existing worksheet to use as a template, you can copy part or the whole sheet and paste it into the new report worksheet. Alternatively, you can design the layout of the sheet as you work.

Copyright

Step	Designing a Customized Report Sheet
8	In KITS™, click the Excel menu item, ***Developer / XML / Source*** (Office 2007) to open the XML Source pane.  **Figure 1, XML source pane** A dropdown list on the top of the pane shows the XML maps in the workbook. • KITS_Map is used by the Live Data sheet, • The new report sheet has an XML map named KITS_Map1. Any subsequent report sheets will be named with the suffix 2, 3, etc. **Note:** You must use the correct XML map, otherwise the data cannot be populated correctly. The KITS_Map and subsequent XML maps, are divided into 13 sections, being: Project Data, A Terminal, B Terminal, Cable Details, Pass Formula1, Pass Formula2, Pass Formula3, Pass Formula4, Stat Analysis, Test Data, Test Data2, Test Data3 and Test Data4.
9	You can drag and drop an XML element to a cell in the report sheet. Alternatively, right click the mouse on the XML element in the pane and select ***Map element*** ⋯ or ***Remove element***.
10	**If you choose layout option A:** You will need to map each wavelength data in its selected column. • Use elements under **KITS/Test Data** to map the first wavelength, • Use elements under **KITS/Test Data2** to map the second wavelength, etc. **If you choose layout option B:** Use only **KITS/Test Data** for mapping.
11	To test your mapping, click ***[Populate Data]*** to map the data from the Live Data sheet.
12	If not satisfied, click ***Clear Data*** to clear all mapped cells (but not other cells), change your mapping, and then re-populate the data.

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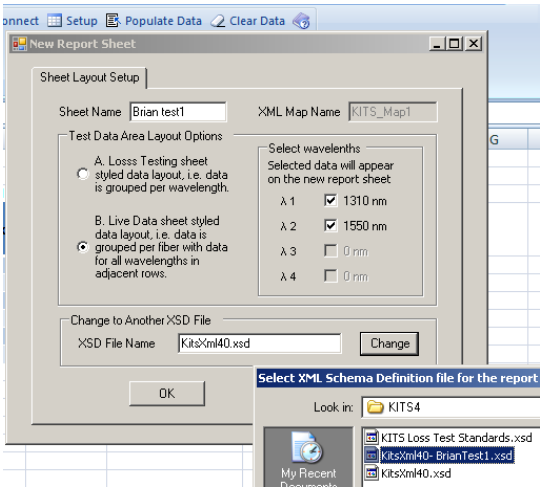
16.4.1 XML MAPPING TIPS:

- An XML element can be mapped only once. If you do want a piece of data to appear in another cell, you can use an Excel formula to refer to the mapped cell.
- An XML element which maps with a blue background and a pull down arrow (

) is called a repeating element, which allows the element to appear any number of times. This is used to map an array of data. The first cell is for the title with the data mapped to the rows below. You can either use this title as the heading, rename it with your own heading or hide the title element.
- A repeating element, such as the fibre number cannot auto size. If you do want to change the number fibres, you can manually edit the new XML work book
- To remove a mapped repeating element, first do ***Remove element*** from the XML pane, then click on the mapped element (where the dropdown icon still appears), click Excel menu ***List / List / Convert to Range*** (Office 2003) or ***Design/Convert to Range*** (Office 2007) to convert the area to normal Excel range. After that, you can remap the element.
- To know which XML is mapped to the current report sheet, open the XML pane, click on a mapped cell, the pane will show the map with the element that is mapped to the cell selected. Alternatively, click the ***Setup*** button, the XML Map Name in the popup form shows the name of the map.
- If you map repeating elements to adjacent columns in the sheet you may receive an "XML map is not exportable" error when you try to export the XML data. Click ***Options*** in the XML pane, and deselect ***Automatically Merge Elements When Mapping***. Alternatively, depending upon your design, you can insert a column in between two XML mapped lists and set its width to 0 (this may affect other rows in the sheet).
- You can copy the XSD file KitsXml40.xsd (typically under *<Drive>:\Documents and Settings\All Users\Application Data\ Kingfisher\KITS4*) to another file, remove the elements in KITS/Test Data[234] that are not needed and rearrange the remaining elements so that KITS/Test Data[234] can be mapped to an XML list as a whole.
  Then, from within the customised KITS™ worksheet, run ***[Setup]*** to change to the new XSD file name.



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17. TECHNICAL TIPS

17.1 Running an additional KITS™ Workbooks

Due to the restriction in resource sharing, only one KITS™ workbook can run within one Excel application. To run additional KITS™ workbooks, you must start another Excel application (***Start / programs / Microsoft Office / Excel***), then open an existing or start a new KITS™ workbook.

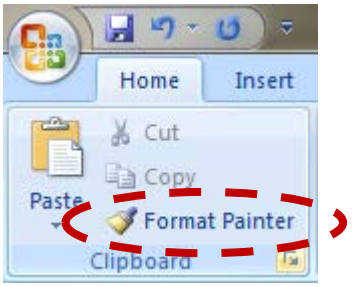
The two KITS™ workbooks each run in their own workspace without interfering with another.

17.2 Opening an Old format KITS™ Workbook

If you have a workbook saved by an earlier release of KITS™, it may not work properly with the new release because of the changes made to the program as well as sheet layout.

If the old workbook does not open correctly in KITS™, open the workbook in Excel and see how much existing data is still available. You may still be able to retain some of the data.

In the worst case, you can create a new KITS™ workbook, enter the setup parameters following the settings of the old one, and manually copy the data you want to keep and paste it to the new KITS™ workbook. The special windows 'Clipboard' function, which permits copying and pasting of multiple items is ideal for this. Below shows its location in Office 2007.



Note: This can only be done in 'Non Secure Mode'.

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APPENDIX A
SUPPORT

A comprehensive range of FAQs is available on our web site at:-
http://www.kingfisherfiber.com/Fiber-Optic-Test-Equipment/Kits-Software/FAQ/Index.htm
or via www.kingfisherfiber.com and select ***Support.***

For advanced technical support, let us know:

- The KITS™ version and build date. This can be found located in KITS™, under Kingfisher / about KITS,
- Your instrument model number, firmware version and serial number.
  - KI7000 instrument firmware version is displayed during instrument start-up,
  - KI2000 series instruments require holding down [F4] during turn on
  - and the instrument serial number is usually on the rear label.
- Your Windows and Office versions, including any non-English language options.

If you have any suggestions for improvement to this document or to the software, please contact sales@kingfisher.com.au

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APPENDIX B
RS232 / USB DRIVER CONFIGURATION & INSTALLATION

Early instruments used a RS232 interface, later instruments use an USB interface.

B.1 RS232

Prior to version 4.15, KITS™ required that Com port assignment be in the range of 1~4. Version 4.15 removed this restriction.

If a new RS232 lead is needed for a legacy instrument, the connection details are as follows.

	Wire 1	**Wire 2**	**Wire 3**
Instrument Jack Plug	Body (Gnd)	Ring (Tx)	Tip (Rx)
9 Pin D connector	Pin 5 (Gnd)	pin 2 (Rx)	Pin 3 (Tx)
25 pin D connector	Pin 7 (Gnd) **	Pin 3 (Rx) **	Pin 2 (Tx)

Table 1, RS232 pinout

Note 1: ** Some (out of spec) serial ports need a 10 K resistor in the D connector across wires 1 & 2.

Note 2: If your instrument has an RS232 interface and your computer does not, then you will need to install a suitable USB to RS232 adaptor/driver.

These can be purchased from most computer supply shops.

Note 3: With some versions of Windows the USB to RS232 driver is only installed on one USB port! In this situation, either note the correct USB port or also install the driver on the other USB ports.

B.2 USB Power

Some computers, particularly laptops, may be configured to shut off power to the USB port.

If KITS™ seems to hang for no reason this may be due to the power management settings.

KITS™ is a real-time data acquisition program, and computer power management settings may need to be modified or disabled.

B.3 Change Meter Port

Users normally do not need to consider the meter port as KITS™ finds the port automatically on connection. The sequence is that KITS™ searches an available USB port first, and then search for an RS232 port.

The Change Meter Port menu item is useful if multiple KITS™ applications are running in the same computer (e.g., in a laboratory situation). In this situation, the user may need to specify the COM port manually for a particular instance of KITS™.

B.4 USB KI7000 series

The KI7000 series USB instruments use a HID interface that is built into Windows.

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B.5 USB KI2000 series

The device driver is either installed automatically via Windows 10 supported versions (not the KITS installer), or it may need installing manually on unsupported versions of Windows.

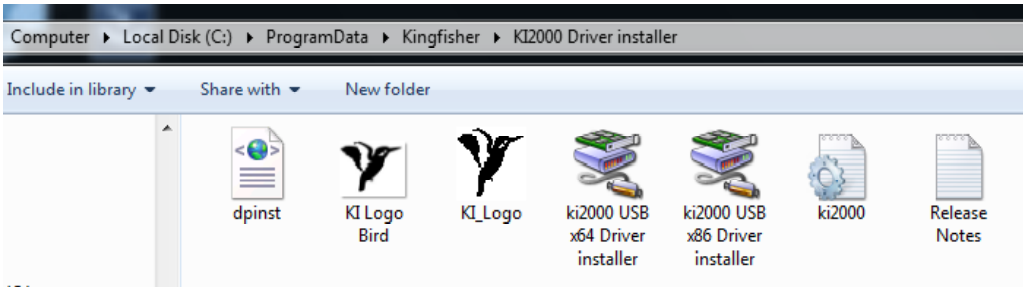
B.5.1 INSTALL KI2000 SERIES DEVICE DRIVER MANUALLY

If manual installation is required (on older Window versions that do not support auto driver installation), you navigate to the folder below,

C:\Documents and Settings\<User>\Application Data\Kingfisher\KI2000 Driver installer

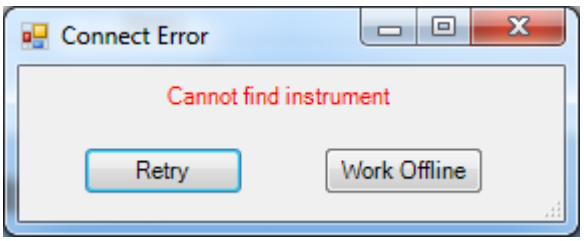
or

C:\ProgramData\Kingfisher\KI2000 Driver installer.

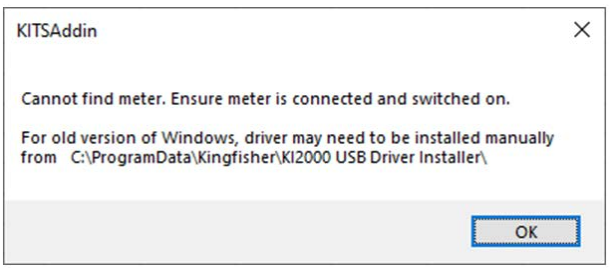


Then, run the .exe (x86 or x64) program located in this folder. X86 for 32 bit and x64 for 64 bit machines.

Alternatively, when the pop-up below is displayed after KITS™ command, ***[Connect]*** was selected, click ***[Retry]***.



Read the instructions in the next pop-up below and click ***[OK]***, select and double-click to execute the suitable installer file (.exe) listed on the Window Explorer window.



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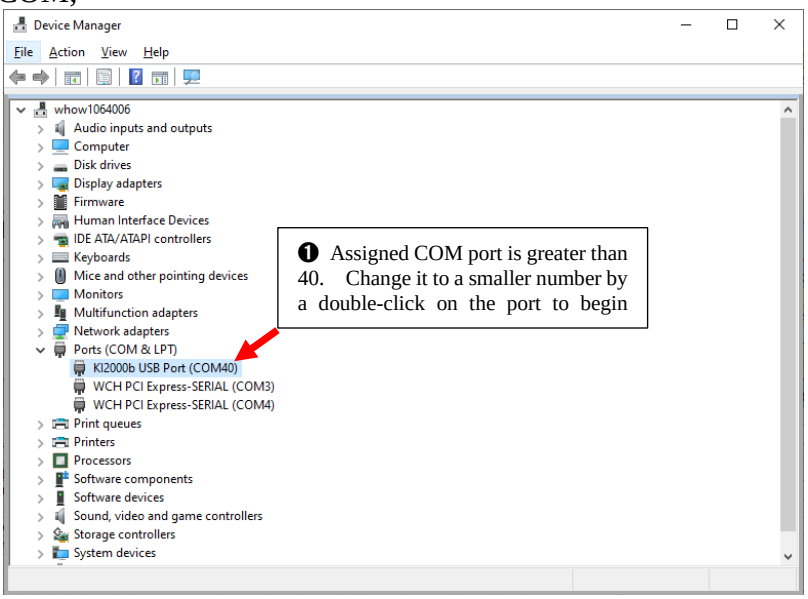
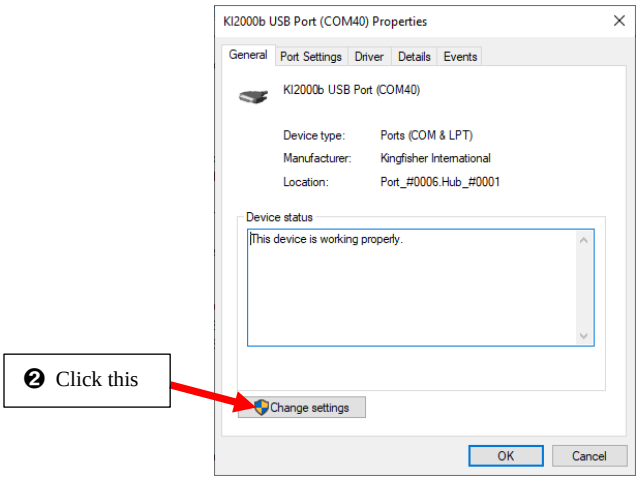
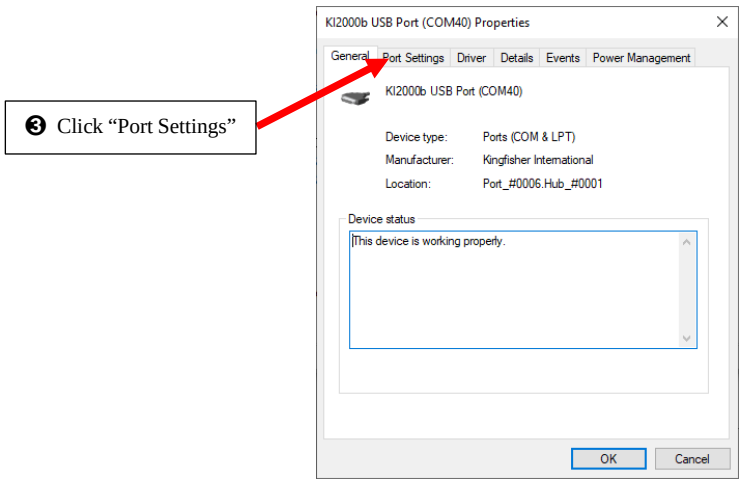
B.5.2 CHECK/EDIT COM PORT NUMBER ASSIGNED FOR CONNECTED METER ON COMPUTER

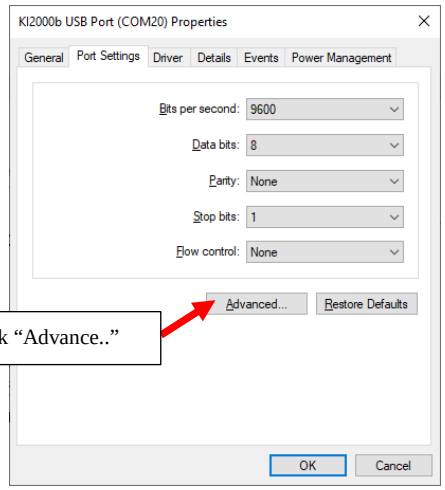
i. Open Device Manger on computer and, check that the auto-assigned COM port number assigned is not greater than '20' when the meter is connected. If necessary, do as instructed below to change the auto-assigned COM,



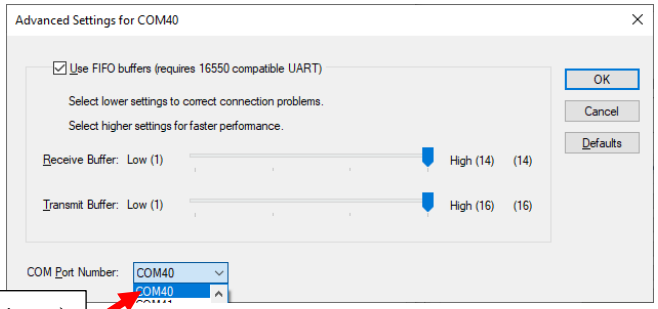




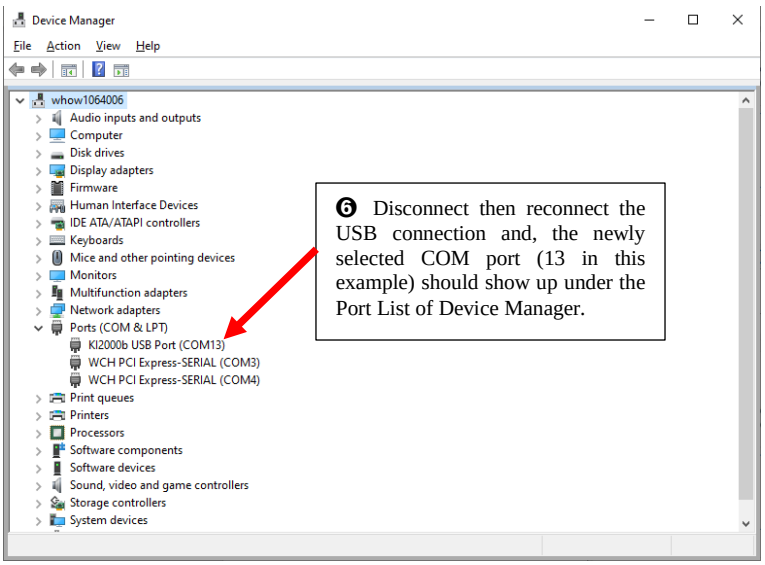
Copyright



❹ Click “Advance..”



❺ Select an available (not in use) COM port with a number ⩽20 e.g., COM13.



❻ Disconnect then reconnect the USB connection and, the newly selected COM port (13 in this example) should show up under the Port List of Device Manager.

Copyright

B.5.3 ADD/EDIT REGISTER, 'IGNOREHWSERNUM' ON A COMPUTER

'IgnoreHWSerNum' registry setting is helpful for production and testing of USB devices to fix a driver problem that develops when a large number of different s/n instruments are plugged into the same computer, and new instruments no longer communicate with KITS:

By default:

Each MCP2200 (i.e., KI2x00 USB interface) has a unique serial number.

Windows adds a new device instance triad for each unique serial number.

A COM port number is also assigned incrementally to each serial number. If you examine the Windows device manager, you can see that the instrument com port has a large number assigned.

Change this behavior:

'IgnoreHWSerNum' registry setting makes Windows ignore the difference of serial number.

Instead, Windows sees USB port 'location'. With this setting, all MCP2200s are assigned to the same COM port number, as long as they are plugged into the same USB port. You may also want to manually re-assign the assigned com port number to a small value.

Using a registry editor (regedit etc.), go to:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\

Add binary value under this key, name it IgnoreHWSerNum

The entry name should have VID/PID of KI2x00 (18BE/2000) like, IgnoreHWSerNum18BE2000
Set its value to 0x01 (REG_BINARY, length must be exactly one byte)

Re-start computer to make change effective.

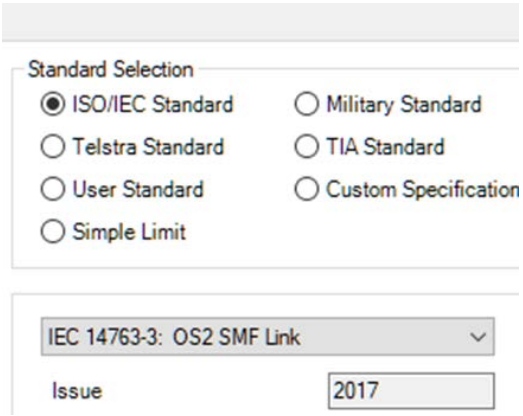
Copyright

APPENDIX C
USE OF INTERNATIONAL AND OTHER STANDARDS

KITSTM 4.10 introduced the option of Standards based testing. When selected, KITS™ automatically configures the workbook with a set of predefined parameters for Pass/Fail assessment.

In KITS 4.17, seven parameter based standard pass/fail options are provided: -

1. ISO/IEC International Standard
2. Military Standard
3. Telstra Standard
4. TIA Standard
5. User Standard
6. Custom Specification
7. Simple Limit



C.1 ISO/IEC Standards

As installed, this workbook is preconfigured for ISO/IEC 14763-3 insertion loss Standards. The data is stored in the file **IEC-LossTest-Standards.XLS**. The file is Write Protected to prevent accidental changes.

Note: that the pass/fail parameters for the ISO/IEC standards involve a formula complexity not seen in the other standards.

Should other International Standards be required to be referenced, contact your nearest KI distributor or Kingfisher International directly.

C.2 Military Standard

As installed, this workbook is preconfigured for the MIL-STD-2042 insertion loss Standards. The data is stored in the file **MIL-LossTest-Standards.XLS**.

Should other Military Standards be required to be referenced, contact your nearest KI distributor or Kingfisher International directly.

C.3 Telstra Standard

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As installed, this workbook is preconfigured for the Telstra insertion loss Standards. The data is stored in the file **Telstra-LossTest-Standards.XLS**.

The Telstra standard specifies a Measurement Allowance 'R'. This is NOT a measurement uncertainty value.

Should other Telco Standards be required to be referenced, contact your nearest KI distributor or Kingfisher International directly.

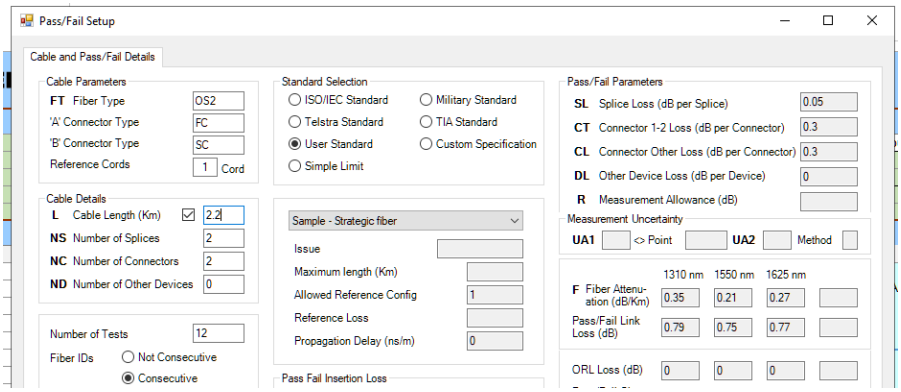
C.4 TIA Standard

As installed, this workbook is preconfigured for the TIA insertion loss Standards. The data is stored in the file **TIA-LossTest-Standards.XLS**.

C.5 User Standard

User defined standards can be entered into the **User-LossTest-Standards.XLS**. This spreadsheet is generally used for repeat work with a customer.

Note: Remember, changes will be overridden, should a KITS™ update be applied or the program be re-installed.



C.6 Custom Specification

Typically used for non-standard based testing or one-off jobs. There is no associated XLS template.

C.7 Simple Limit

Typically used for basic pass/fail insertion loss testing. E.g., attenuators or patch-cords. There is no associated XLS template.

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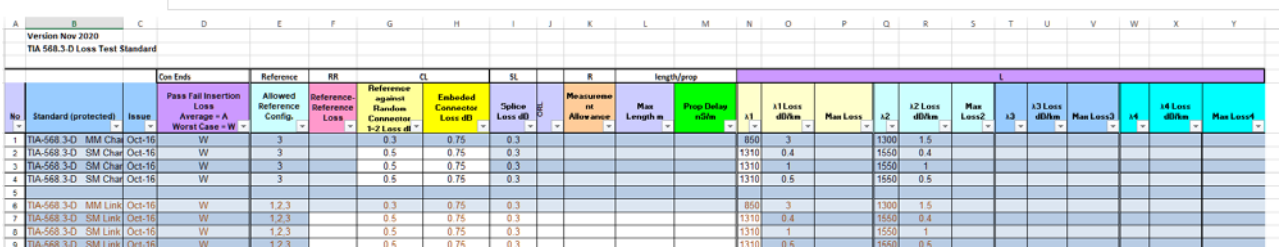
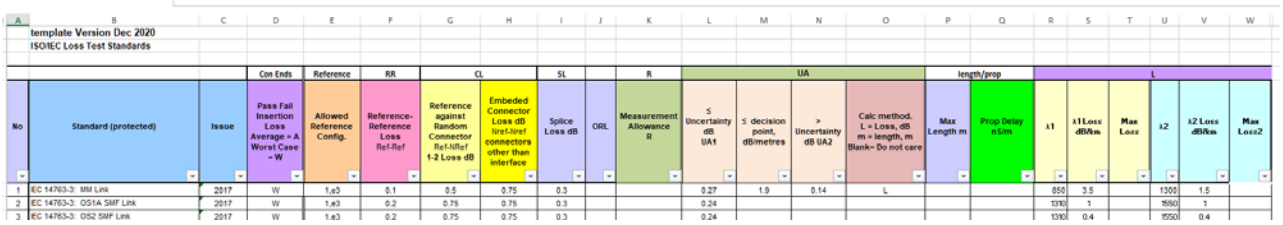
APPENDIX D
FIELDS OF THE STANDARD TEMPLATES

You can modify or add to the existing Standard list within a template.

NOTE: Due their unique handling of Measurement Uncertainty (UA), the International Standards template has a number of additional fields compared to the other templates.



'Normal' standard template



'ISO/IEC' standard template

D.1 Common template fields

Column A: No:

Numbers the standards. To provide for more, add additional rows

Column B: Standards (Protected) / User Definable.

Enter name of the standard or local specification here.

Column C: Issue Number

Enter version number of the standard or local specification here.

Column D: Pass/Fail Insertion Loss

This cell defines the way in which test results are assessed for a Pass/Fail condition. When testing to International Standards, this is usually ass3essed against the Worst Case single direction result. By comparison, many telcos assess their Pass/Fail criteria against the two-way average.

Enter an 'A' for two-way Average or a 'W' for Worst Case assessment.

Column E: Allowed Reference Configuration.

The number of test cords permitted to be used in establishing a reference condition may be defined.

E.g. for International Standards, only 1 or enhanced 3 cord referencing (e3) methods are permitted, whilst for NBN Co work 2 is specified.

Enter the allowed test cord referencing configurations, separated by a comma. Thus to permit all 3 configurations use 1, 2, 3, e3.

E.G. If only 1 & e3 referencing methods allowed enter 1,e3.

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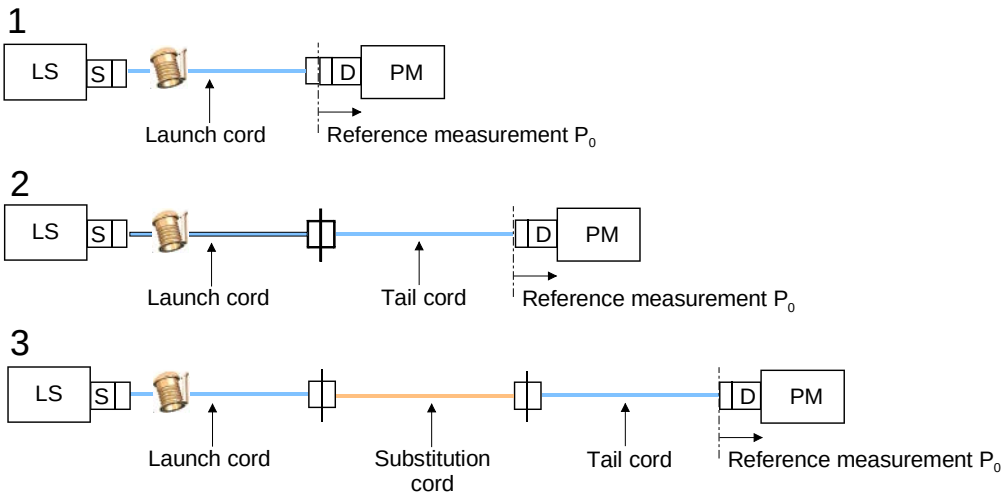
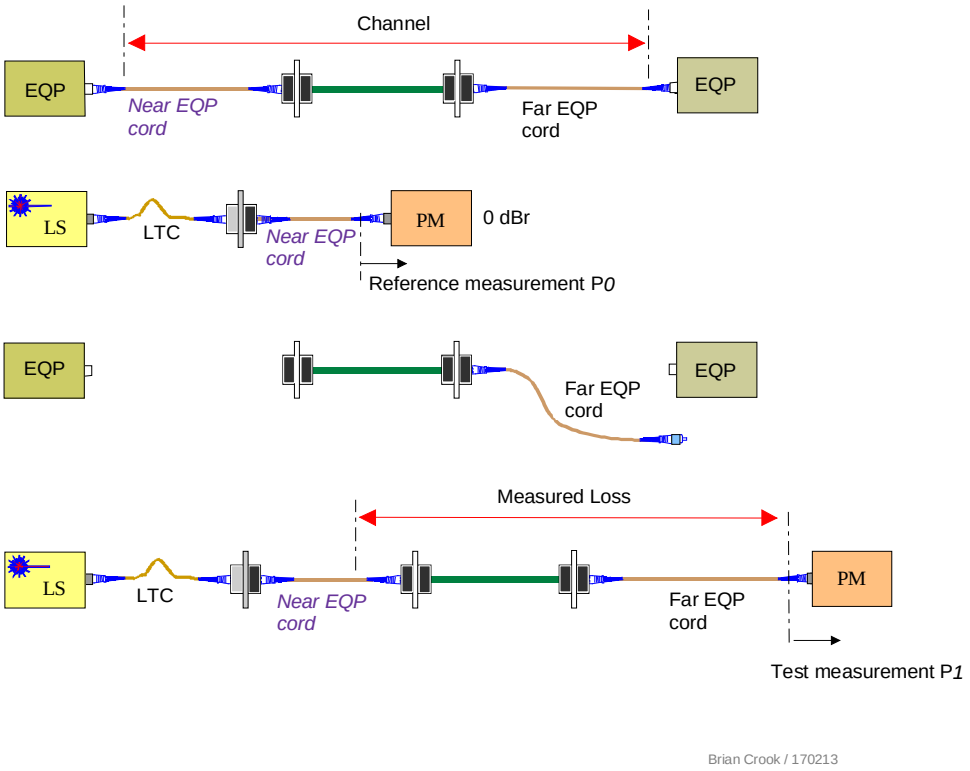


Traditional 1~3 test cord referencing configurations



Enhanced 3 cord reference method (e3) for a Channel

Column F: Reference to Reference Loss, Ref-Ref ,dB

The maximum allowable Reference to Reference (Ref-Ref) loss is entered in this column. At time of writing, these values are not used within the KITS formulae.

Column G: Connector 1-2 Loss, Ref-NRef, dB

Some standards mandate that the mated test cord to DUT connections (Ref-NRef) shall have a lower maximum allowable loss to any other mated connectors that may be in the DUT /installed cabling.

Enter the Maximum Allowable loss in dB for the first two, or end connectors here. You must also enter a value for any subsequent mated connectors under 'Connector other loss' as detailed below.

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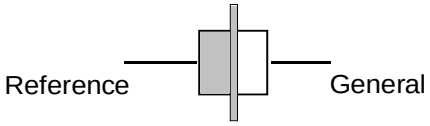
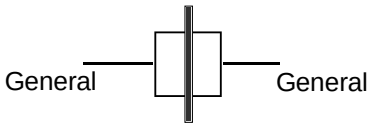
For ISO/IEC typically, MMF= 0.5 dB and SMF = 0.75 dB.



Column H Connector Other Loss dB

Enter the Maximum Allowable loss in dB for any subsequent mated connectors here.

For ISO/IEC typically, MMF= 0.5 dB and SMF = 0.75 dB.



Column I: Splice Loss, dB

Enter the Maximum Allowable splice loss in dB here.

Typically, 0.1 dB for a Telco and 0.3 dB for ISO/IEC/ TIA

Column J: ORL

Enter the Maximum Allowable ORL in dB here. The entered ORL value can be $^{+}$Ve or $^{-}$Ve; the software will automatically convert the number to absolute.

Column K: Measurement Allowance (R), dB

If required, enter the allowance for Measurement Allowance in dB.

This number is added to the calculated maximum link loss. It is NOT a Measurement Uncertainty value. NOTE: Some earlier versions of KITS treated this as a Measurement Uncertainty value.

Common values for Measurement Allowance are in the range of 0 to 0.3 dB.

E.g., Telstra R=0.3 dB

Column L: Max Length, m (Column P in ISO/IEC)

Enter any maximum allowable length in metres.

Column M: Propagation Delay, ns (Column Q in ISO/IEC)

If propagation delay (PD) is required to be reported, enter the required delay parameter in Nano seconds/metre (ns/m), here.

The software will automatically calculate the propagation delay in ns.

PD = length m * (1000 *IOR) / C. Where IOR is the cables Index of Refraction and C is the speed of light.

E.g.: For IOR = 1.469 => 4.90 ns/m, IOR = 1.490 => 4.97 ns/m.

For International Standards based testing use 5 ns.

Columns N-X: Wavelength parameters (Columns R-W in ISO/IEC)

Specifications in dB/Km or maximum loss for up to 4 wavelengths may be entered here.

Parameters are:

1. Wavelength(nm), Loss (dB/km), Maximum allowable loss (dB)

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D.2 ISO/IEC template specific fields

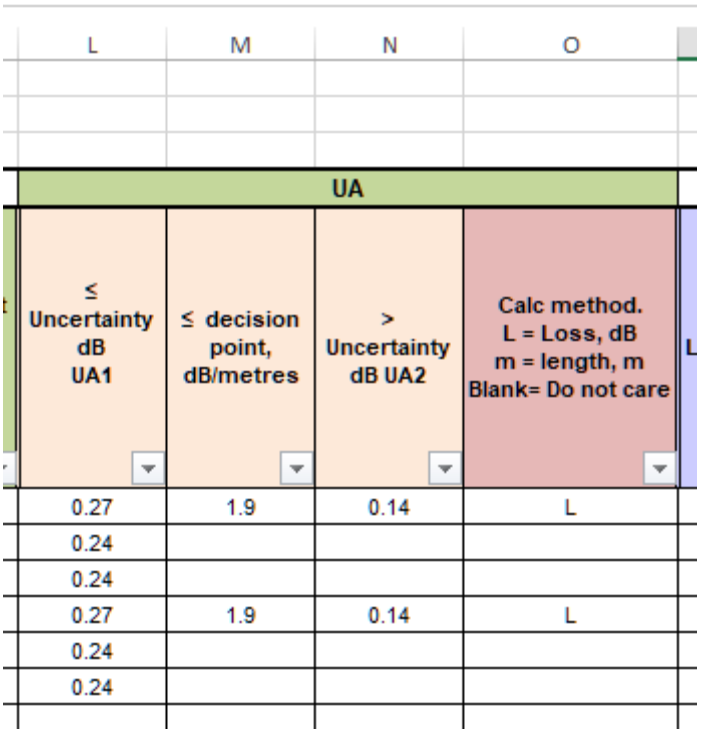
The ISO/IEC calculate measurement uncertainty based upon fibre type. There are 3 methods in which it may be calculated:

a) A specified value, UA1

b) A specified value UA1 or UA2, based upon insertion loss (IL)

c) A specified value UA1 or UA2, based upon measured length (m) *(proposed at time of writing)*

Earlier versions of this standard implemented a fixed value based upon fibre type.



	L	M	N	O
	UA			
	≤ Uncertainty dB UA1	≤ decision point, dB/metres	> Uncertainty dB UA2	Calc method. L = Loss, dB m = length, m Blank= Do not care
	0.27	1.9	0.14	L
	0.24			
	0.24			
	0.27	1.9	0.14	L
	0.24			
	0.24			

D.2.1 FIXED UNCERTAINTY VALUE

Column L: Uncertainty (UA1), dB

Enter the measurement uncertainty value in Column L. Leave column O blank

If the measurement uncertainty is wavelength dependant, enter 2 values separated by a comma.

E.g., 0.09 or 0.09,0.13

D.2.2 CALCULATED UNCERTAINTY VALUE, (UA1, UA2), DB

Implementation of this Measurement Uncertainty calculation requires data to be entered into columns L to O

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Columns L & N

Where the specified uncertainty value is dependent upon either Insertion Loss (IL) or fibre length (m), the uncertainty numbers are entered into both columns L & N.

Columns M & O

The decision point, Insertion Loss (IL) or length in metres (m) for using UA1 or UA2 is entered into Column M.

If the decision point parameter is IL: enter L into column O

If the decision point parameter is length: enter M into column O

Copyright

APPENDIX E

E.1 End-User-License Agreement for Kingfisher International software

IMPORTANT - READ CAREFULLY: This Kingfisher International End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Kingfisher International for the Kingfisher software products, which include computer software and may include associated media, printed materials, and "online" or electronic documentation ("SOFTWARE PRODUCT"). By installing, copying, or otherwise using the SOFTWARE PRODUCT, you agree to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not install or use the SOFTWARE PRODUCT; you may, however, return it to place of purchase for a full refund.

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