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| --- | --- | --- | --- |
| Change Control Record | | | |
| Issue/ Revision | Effective Date | Change Ref. # | Reason for change |
|  |  |  |  |

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| **EXFO Excel Macro Software Validation Test Plan** | | | |
|  | | | |
| LIMS Request Number |  | Catalog No. |  |
| EPM No. |  | Part No. and Revision | 1.0.0.0 |
| Origin of Test Samples | Fiber Test Lab | Location of Test Lab | Shakopee, MN |
| Author’s Name | Amanda Page | Author’s Job Position | Engineering Co-Op |
|  | | | |
| Sample Description | EXFO Macro Summary Software v1.0.0.0 | | |
| Result | Result (Pass/Fail/For information only) | | |

Abstract / Summary

This test plan tests the features and performance of the EXFO Macro Summary Software version 1.0.0.0.

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# Engineering Summary

## Purpose

The purpose of this procedure is to validate the software features and data analysis of the EXFO summary system written with Excel Macros (VBA). This is a new software release, so the version of the program will be 1.0.0.0.

## Testing Rationale

New data acquisition software releases must be validated, as specified in LOP027. The principal features of the software are summarized below. Detailed description of the validation is provided in Section 2. The test case in which the feature is to be validated is provided after the feature

* Open macro enabled excel spreadsheet template created for summary and data analysis
* Imports folders of raw data from the EXFO optical measurement system to raw data and summary tabs in the workbook
* Ability to process a single mode fiber data with wavelengths 1310, 1490, 1550, and 1625.
* Ability to process data for a various number of fibers
* Collection of the specs for IL, Refl, IL change, IL Increase, Mean IL and Refl decrease
* Rearranges layout and appearance of raw data
* Ability to sort the data in time order
* Ability to delete the reference check from the data taken
* Ability to choose which location to use for return loss in the summary
* Ability to choose which splice loss correction form to use when a cutback measurement is detected
* Ability to adjust data for splice loss with insertion loss
* Ability to adjust data for splice loss with return loss
* Ability to delete cutback data once the adjustment has been made
* Ability to arrange samples by test in the summary tab
* Calculates insertion loss change and return loss change when there are initial measurements
* Ability to highlight data red if measurements do not meet given specifications
* Ability to find the maximum at each wavelength for each set of tests
* Ability to create a table that shows maximum IL, mean IL, maximum IL change, maximum mean IL, IL increase, minimum reflectance, and reflectance decrease
* Ability to change data in the raw data tab and update the summary

## Sampling Plan

Samples will be obtained from previous EXFO tests done in Shakopee, MN. Samples will be set up as if they were just finished from testing on an EXFO machine. Samples with different variables are contained below, the minimum should be to test all these different sets of data to get the best validation results

## Sample Description

The following samples are required for testing:

| **Description** | **Type** | **Quantity** |
| --- | --- | --- |
| EXFO Excel Macro Summary Test Software | Software | 1 |
| Computer Workstation (EXFO Machine and Personal Machine) | Hardware | 1 |
| Form A: Methods B & H IL Correction for Splice Loss | Software | 1 |
| Form B: Methods C & D IL & Refl Splice Loss Correction | Software | 1 |
| Data folder containing EXFO test with all 4 wavelengths | Software | 1 |
| Data folder containing EXFO test with 1310 nm and 1625 nm wavelengths | Software | 1 |
| Data folder containing EXFO test with cutback (Form A) | Software | 1 |
| Data folder containing EXFO mechanical test data with cutback and initial and post measurements (Form B, IL and RL change) | Software | 1 |
| Data folder containing EXFO test with an RL location other than RLA (RLB and RLC) | Software | 2 |
| Data folder containing EXFO test with cutback (Form D) | Software | 1 |
| Data folder containing EXFO test with cutback with only 13/15 wavelengths (Form D) | Software | 1 |

Table 1: Sample Requirements

## **Test Results**

(To be filled in upon completion of testing)

See Test Details sections for results

# Test Detail

Note: Report any problems to the test requester, Design or Design Assurance Engineer immediately upon occurrence

Follow the procedures in LOI005 Issue 1 for fiber optic safety and handling.

Prior to mating connectors or performing optical tests, all connectors shall be cleaned following section 4.4 of LOI002 Issue 1.

All fiber preparation, routing, cleaving, and splicing is to be performed per LOI003 Issue 7 and the appropriate fusion splicer LEI.

## Sample Allocation

The EXFO summary test setup consists of a single machine and a sample given. The sample given should vary so many different types of data can be performed on the working machine. These tests should also be completed on an engineer’s personal computer or a technician’s computer. The first step of this test is to first run the program by opening the excel file and clicking the “Upload Data” button.

## Initial Data File Import

This test verifies that the program can import all the files within a chosen folder and add it to an Excel raw data tab and summary tab for use. This includes data measurements, test names and sample names.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Open the EXFO macro program on the computer with the desired folder of data for analysis
2. Click the “Upload Data” button
3. Navigate to desired folder and Select the folder
4. Click “OK”
5. All the data from the folder and files should be copied in the raw data tab as well as the summary tab. This can be checked by opening the files and ensuring all the tests on the samples were copied over.

**Requirements/Results**

| **Step** | **Requirement** | **Pass/Fail** |
| --- | --- | --- |
| 5 | All the data from the files in the selected folder are imported to the raw data and summary tabs within the EXFO macro |  |

Table 2: Test Requirements

## Sort By Date

This test verifies that the program correctly sorts the data in the raw data tab by the date and time that it was measured to ensure when viewing the raw data, it is in the order that it was measured in.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. After the desired data has been imported, navigate to the “Raw Data” tab
2. The samples in the raw data tab should be sorted by the date and time they were measured at to ensure that the data in the raw data tab is in the order in which it was measured

**Requirements/Results**

| **Step** | **Requirement** | **Pass/Fail** |
| --- | --- | --- |
| 2 | In the raw data tab, the oldest dates/times should be at the top as the first measurements and the newest dates/times should be at the bottom |  |

Table 3: Test Requirements

## Reference Check Deletion Verification

This test verifies that the data from the reference checks have been deleted from the summary tab. It will get deleted if the word “Ref” is in the test description, which is not case sensitive.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Navigate to summary tab
2. Verify that there are no test names with “Ref Check” in the description

**Requirements/Results**

| **Requirement/**  **Criteria** | **Pass/Fail** |
| --- | --- |
| No Reference check data should be shown in the summary tab |  |

Table 4: Test Requirements

## Verify Selection of RL Location

This test verifies that the program can detect when there is data in RLB or RLC locations and then ask the user which location they want used in the summary tab, as well as used for cutbacks.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

**Data With RLA Location**

1. Upload data with RL data in a location RLA
2. Verify that the pop up should not come up unless there is data for RLB or RLC as well and not only RLA
3. Choose RLA if the pop up arises, if not, continue to step 4.
4. Verify that RLA is the only RL shown in the summary tab

**Data with RLB Location**

1. Upload data with RL data in a location RLB
2. The pop up should appear with only a choice of RLA or RLB, unless there is also RLC valid data
3. Choose RLB
4. Verify that RLB is the only RL used in the summary tab

**Data with RLC Location**

1. Upload data with RL data in a location RLC
2. The pop up should appear with only a choice of RLA or RLC, unless there is also RLB valid data
3. Choose RLC
4. Verify that RLC is the only RL used in the summary tab

**Requirements/Results**

| **Criteria Category/Step** | **Requirement/**  **Criteria (dB)** | **Pass/Fail** |
| --- | --- | --- |
| Step 2 @ RLA Data | RL Location Pop Up only comes up when there is data in a location other than location RLA |  |
| Step 4 @ RLA Data | RLA should be the only RL shown in the summary tab |  |
| Step 2 @ RLB Data | RLA and RLB should be the only buttons unless there is also valid data in RLC |  |
| Step 4 @ RLB Data | RLB should be the only RL shown in the summary tab |  |
| Step 2 @ RLC Data | RLA and RLC should be the only buttons unless there is also valid data in RLB |  |
| Step 4 @ RLC Data | RLC should be the only RL shown in the summary tab |  |
| In General: | If an RL column has only data with <-99 and/or blank cells, that column should not appear in the summary |  |

Table 5: Test Requirements

## IL Splice Loss Adjustment Accuracy

This test verifies that the adjustments made to the data for IL splice loss are accurate when there is a cutback detected and Form A: Methods B and H IL Correction for Splice Loss is selected.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

**4 Wavelength Test**

1. Upload a data folder with a data set with all 4 wavelengths that was performed using method B with a cutback.
2. Verify that a pop-up window appears asking which form to apply to the data set.
3. Choose Form A
4. Verify that the cutback was applied to the correct sample and fiber number by comparing the results to the results from pasting them into Form A: Methods B and H IL Correction for Splice Loss (validated form).
   1. Open test data file
   2. Copy DUT data into the ‘DUT Data’ tab in Form A
   3. Copy cutback data into the ‘Cutback Data’ tab in Form A
   4. Navigate to the first tab
   5. Compare the adjusted values in the table to the values in the summary macro to verify that they are the same
   6. Repeat with the rest of the samples that are shown in the macro summary tab

**13/16 Wavelength Test**

1. Upload data file with Form A Needed and 13/16 wavelength data only
2. Verify that a pop-up window appears asking which form to apply to the data set
3. Choose Form A
4. Verify that cutback was applied to correct sample and fiber number by comparing the results to the results from pasting them into Form A: Methods B and H IL Correction for Splice Loss (validated form).
   1. Open test data file
   2. Copy DUT data into the ‘DUT Data’ tab in Form A
      1. Paste data so that it is in correct placement as if there were all 4 wavelengths since the Form is not set up for less than 4 wavelengths
   3. Copy cutback data into the ‘Cutback Data’ tab in Form A
      1. Paste data so that it is in correct placement as if there were all 4 wavelengths since the Form is not set up for less than 4 wavelengths
   4. Navigate to the first tab
   5. Compare the adjusted values in the table to the values in the summary macro to verify that they are the same
   6. Repeat with the rest of the samples that are shown in the macro summary tab

**Data with 2 Cutbacks Test**

1. Upload data file with Form A needed and 2 cutbacks were taken for the same measurement (the macro only supports one cutback, but this tests what it does if 2 are measured on accident)
2. Verify that a pop-up window appears asking which form to apply to the data set
3. Choose Form A
4. Verify that only the first cutback measurement was correctly applied to the data and the second one was ignored
   1. Open test data file
   2. Copy DUT data into the ‘DUT Data’ tab in Form A
   3. Copy the first cutback measurement into the ‘Cutback Data’ tab in Form A
   4. Navigate to the first tab
   5. Compare the adjusted value in the table to the value shown in the summary macro to verify that they are the same
   6. Repeat with the rest of the samples that are shown in the macro summary tab

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| Step 2 @ 4 Wavelengths | A pop up appears asking which form to apply |  |
| Step 4 @ 4 Wavelengths | The insertion loss was accurately adjusted from the cutback |  |
| Step 2 @13/16 Wavelengths | A pop up appears asking which form to apply |  |
| Step 4 @ 13/16 Wavelengths | The insertion loss was accurately adjusted from the cutback |  |
| Step 4 @ 2 Cutback Test | Only the first cutback adjustment is applied when 2 cutbacks are taken accidentally |  |

Table 6: Test Requirements

## RL Splice Loss Adjustment Accuracy

This test verifies that the adjustments made to the data for RL splice loss are accurate when there is a cutback detected and Form B: Method C and D IL and Refl Splice Loss Correction is selected.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

**4 Wavelength Test**

1. Upload data folder via method C or D with Form B needed for IL and RL splice loss adjustment from a cutback
2. Verify that a pop-up window appears asking which form to apply to the data set
3. Choose Form B
4. Verify that cutback was applied to correct sample and fiber number by comparing the results to the results from pasting them into Form B: Method C and D IL and Refl Splice Loss Correction (validated form).
   1. Open test data file
   2. Copy DUT data into the ‘DUT Data’ tab in Form B
   3. Copy cutback data into the ‘Cutback Data’ tab in Form B
   4. Navigate to the first tab
   5. Compare the adjusted values in the table to the values in the summary macro to verify that they are the same
   6. Repeat with the rest of the samples that are shown in the macro summary tab
5. Verify that the correct RL location was used for the cutback based off of the user’s RL Location selection

**13/16 Wavelength Test**

1. Upload data folder via method C or D with Form B needed for IL and RL splice loss adjustment from a cutback and only 13/16 wavelength data
2. Verify that a pop-up window appears asking which form to apply to the data set
3. Choose Form B
4. Verify that cutback was applied to correct sample and fiber number by comparing the results to the results from pasting them into Form B: Method C and D IL and Refl Splice Loss Correction (validated form).
   1. Open test data file
   2. Copy DUT data into the ‘DUT Data’ tab in Form B
      1. Paste data so that it is in correct placement as if there were all 4 wavelengths since the Form is not set up for less than 4 wavelengths
   3. Copy cutback data into the ‘Cutback Data’ tab in Form B
      1. Paste data so that it is in correct placement as if there were all 4 wavelengths since the Form is not set up for less than 4 wavelengths
   4. Navigate to the first tab
   5. Compare the adjusted values in the table to the values in the summary macro to verify that they are the same
   6. Repeat with the rest of the samples that are shown in the macro summary tab
5. Verify that the correct RL location was used for the cutback based off of the user’s RL Location selection

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| Step 2 @ 4 Wavelengths | A pop up appears asking which form to apply |  |
| Step 4 @ 4 Wavelengths | The insertion loss and return loss were accurately adjusted from the cutback |  |
| Step 5 @ 4 Wavelengths | Correct RL location data was used for the cutback |  |
| Step 2 @ 13/16 Wavelengths | A pop up appears asking which form to apply |  |
| Step 4 @ 13/16 Wavelengths | The insertion loss and return loss were accurately adjusted from the cutback |  |
| Step 5 @ 13/16 Wavelengths | Correct RL location data was used for the cutback |  |

Table 7: Test Requirements

## Cutback Deletion Verification

This test verifies that cutback data has been deleted from the summary tab once it has been used.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload data with a cutback measurement in it
2. A pop up appears asking which cutback form to apply to the data
3. Select to apply either form for a cutback depending on the data used
4. Verify that there is no cutback data in the summary tab
5. Verify that the cutback data is still in the raw data tab

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 4 | The cutback data has been deleted from the summary tab |  |
| 5 | The cutback data can be found in the raw data tab |  |

Table 8: Test Results

## Arrange by Test Verification

This test verifies that each group of samples is accurately grouped under the same test name.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload mechanical data with many different tests and fibers (e.g. initial, during, post, flex, proof, TWAL, twist, etc.)
2. Verify samples taken in the same test are grouped together in the summary tab
3. Verify that when there are multiple fibers, the samples are listed in order of fiber number (e.g. 1-12) in the summary tab
4. Repeat with a set of data with only 13/16 wavelengths

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 2 | Samples are grouped by test |  |
| 3 | Samples are listed in the order they were taken and in order of fiber number |  |
| 4 | Sorts by test with varying wavelength data |  |

Table 9: Test Results

## Insertion and Return Loss Change

This test verifies that the insertion and return loss change columns in the summary table display when there are initial measurements and correctly calculates the insertion and return loss changes from initial to during or post measurements.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

**4 Wavelength Mechanical Data**

1. Upload mechanical data with many different tests and initial and post measurements
2. If applicable, select the proper return loss location and the correct form to apply for a cutback.
3. Navigate to the summary tab.
4. Next to during/post measurements of the same sample as the initial measurements, there should be a column with IL change after the columns with IL and RL for each wavelength
5. Verify that the IL and RL changes are accurate
   1. Find a blank portion of the excel spreadsheet
   2. Type “=” in a cell and then select the first 13 IL post measurement
   3. Type a “-“ after that cell and select the first 13 IL initial measurement
   4. Hit enter
   5. Drag down the corner of that cell to the length of the test set column to obtain the IL change data for the rest of the column for that test set
   6. Ensure that these values are the same as the values shown in the IL Change column
   7. Repeat this with the RL column
   8. Repeat this with the 1490nm, 1550nm and 1625nm columns as well.
6. Verify that it doesn’t take the IL or RL change if there is no initial measurement for that sample or wavelength or the initial or post measurement is equal to <-99.

**13/16 Wavelength Mechanical Data**

1. Upload mechanical data with many different tests and initial and post measurements with only 1310nm and 1625nm wavelengths.
2. Navigate to the summary tab.
3. Next to during/post measurements of the same sample as the initial measurements, there should be a column with IL change after the columns with IL and RL for each wavelength
4. Verify that the IL and RL changes are accurate
   1. Find a blank portion of the excel spreadsheet
   2. Type “=” in a cell and then select the first 13 IL post measurement
   3. Type a “-“ after that cell and select the first 13 IL initial measurement
   4. Hit enter
   5. Drag down the corner of that cell to the length of the test set column to obtain the IL change data for the rest of the column for that test set
   6. Ensure that these values are the same as the values shown in the IL Change column
   7. Repeat this with the RL column
   8. Repeat this with the 1625nm columns as well.
5. Verify that it doesn’t take the IL or RL change if there is no initial measurement for that sample or wavelength or the initial or post measurement is equal to <-99.

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 4 @ 4 Wavelengths | IL and RL change columns next to during and post data where applicable |  |
| 5 @ 4 Wavelengths | Accurate data is displayed in all IL/RL change columns |  |
| 6 @ 4 Wavelengths | IL/RL Change only taken when there are initial measurements & not taken from <-99 |  |
| 3 @ 13/16 Wavelength | IL and RL change columns next to during and post data where applicable |  |
| 4 @ 13/16 Wavelength | Accurate data is displayed in all IL/RL change columns |  |
| 5 @ 13/16 Wavelength | IL/RL Change only taken when there are initial measurements & not taken from <-99 |  |

Table 10: Test Results

## Spec Pass and Fail Tests Verification

This test is to verify that the program can take the test specification numbers entered into the table on the first tab for Max IL, Min Refl, Max IL Change, and Refl Decrease, Max Mean IL and apply these numbers to the data in the summary tab to see if the data was acceptable. If the data is not acceptable, it turns that data red. The data in the summary tables tab should be highlighted as well.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Enter test specifications in the table on the first tab labeled “Test Specifications Table”
2. Upload data with initial and post measurements that will have IL and RL changes
3. Navigate to the summary tab
4. Verify that values are highlighted red when they do not meet the test specifications defined in the table in the summary tab
5. Verify that values are highlighted in red when they do not meet their specs in the summary tables tab
6. Change the spec values and click update data. Verify that the highlight now complies with the new spec values.

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 4 | Values that fail the spec are highlighted red in the summary tab |  |
| 5 | Values that fail the spec are highlighted red in the summary tables tab |  |
| 6 | Modified spec values from clicking update data are used when finding what failed and highlighting red |  |

Table 11: Test Results

## Verify Deletion of Unnecessary Columns

This test verifies that columns that do not contain any data, for example if only 2 wavelengths are used, are removed from the summary.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

**13/16 Wavelength Only Data**

1. Navigate to the raw data tab.
2. Check that the 14/15 wavelength columns do not have data in them for IL or RL.
3. Navigate to the summary tab
4. Verify that the 14/15 wavelength columns do not appear in the summary

**1490 Wavelength Only Data**

1. Navigate to the raw data tab.
2. Check that all the other wavelength columns besides 1410 do not have data in them for IL or RL.
3. Navigate to the summary tab
4. Verify that the only wavelength in the summary is 1410 and that the data correctly transferred over

**Any Data**

1. Navigate to the summary tab
2. Verify there is no length data, technician names, dates, labtrack numbers, temperature, humidity, or system numbers in the summary tab

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| Step 2 @ 13/16 Wavelength | No data in the 14/15 wavelength columns in the raw data tab for IL or any RL |  |
| Step 4 @ 13/16 Wavelength | Only the 13/16 wavelength columns appear in the summary |  |
| Step 2 @ 1490 Wavelength | No other data besides the 1490nm data show in the raw data tab for any IL/RL |  |
| Step 4 @ 1490 Wavelength | Only the 1490nm data appears in the summary |  |
| Step 2 @ Any Data | Length data, technician names, dates, labtrack numbers, temperature, humidity, or system numbers should not appear in the summary tab for any set of data |  |

Table 12: Test Results

## Maximum Measurement Verification

This test verifies that the row below each set of tests gives the maximum for each wavelength in the given set of tests. This is the row where the summary tables pull the maximum values from.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload mechanical data set with initial, during, and post measurements so that there are IL and RL change columns
2. Navigate to the summary tab
3. Verify that the last row under of a set of test data is labeled “Maximum Values”
4. Verify that the maximum given is the maximum of that column of grouped test data above for each individual wavelength
5. Verify that it does count <-99 in its search for the maximum value
6. Verify that if there is only one number displayed in a column, it can give that number as a maximum
7. Verify that if there is no data in a column, it does not give a maximum for that column

**Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 3 | The last row under each set of test data is labeled “Maximum Values” |  |
| 4 | The maximum value given for each column is accurate |  |
| 5 | <-99 is ignored as a value towards the maximum |  |
| 6 | If there is only one number in a column for a test, it displays that number as the max value |  |
| 7 | It does not write anything in the max values row when there is no data in that column |  |

**Table 13: Test Results**

## Summary Tables Information Accuracy

This test is used to verify that a summary table is created for each different test. The summary table should display Max IL, Mean IL, Max IL Change, IL Increase, Min Refl, and Refl decrease. It should fill in any appropriate rows/columns based off of the number of wavelengths in the test and based off of the type of test that was taken.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

**13/16 Wavelength Data**

1. Upload data with only 13/16 nm wavelengths and no IL or Refl changes are needed
2. Navigate to the “Tables” tab
3. Verify that the number of tables in the “Tables” tab is the same as the number of different tests in the “Summary” tab
4. Verify that the title of the table is the appropriate test description for the set of data that is being summarized in the table
5. Verify that the 1310 and 1625 columns are filled in with the correct Max IL, Mean IL and Min Refl
6. Verify that when there is no RL data for 1625 IL or Refl (as this data set has for some tests and not others), that the 1625 summary table column is blank and no errors occur
7. Verify that the maximum for all wavelengths is accurate in each row
8. Verify that the mean IL is calculated accurately
   1. Find a blank column on the summary tab
   2. Type into a blank cell “=AVERAGE( “
   3. Select the appropriate cells with the data to average
   4. Click Enter
   5. Compare this value to the value given in the summary table
   6. Repeat this for the other wavelengths

**4 Wavelength Data**

1. Upload mechanical data with all 4 wavelengths as well as initial and post data so that there will be Max IL Change and Refl Change
2. Navigate to the “Tables” tab
3. Verify that the number of tables in the “Tables” tab is the same as the number of different tests in the “Summary” tab
4. Verify that the title of the table is the appropriate test description for the set of data that is being summarized in the table
5. Verify that the table is filled in for each wavelength and each of the maximums are accurate and the same as the maximums shown in the row below each test in the summary tab
6. Verify that the maximum for all wavelengths is accurate in each row
7. Verify that the mean IL is calculated accurately
   1. Find a blank column on the summary tab
   2. Type into a blank cell “=AVERAGE( “
   3. Select the appropriate cells with the data to average
   4. Click Enter
   5. Compare this value to the value given in the summary table
   6. Repeat this for the other wavelengths

**Requirements/Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 3 @ 13/16 Wavelength | The number of tables in the “Tables” tab is the same as the number of different tests in the “Summary” tab |  |
| 4 @ 13/16 Wavelength | The title of the table is the appropriate test description for the set of data that is being summarized in the table |  |
| 5 @ 13/16 Wavelength | The 1310 and 1625 columns are filled in with the correct Max IL, Mean IL and Min Refl |  |
| 6 @ 13/16 Wavelength | When there is no RL data for 1625 IL or Refl (as this data set has for some tests and not others), that the 1625 summary table column is blank and no errors occur |  |
| 7 @ 13/16 Wavelength | The maximum for all wavelengths is accurate in each row |  |
| 8 @ 13/16 Wavelength | Verify that the mean IL is calculated accurately |  |
| 3 @ 4 Wavelengths | The number of tables in the “Tables” tab is the same as the number of different tests in the “Summary” tab |  |
| 4 @ 4 Wavelengths | The title of the table is the appropriate test description for the set of data that is being summarized in the table |  |
| 5 @ 4 Wavelengths | The table is filled in for each wavelength and each of the maximums are accurate |  |
| 6 @ 4 Wavelengths | The maximum for all wavelengths is accurate in each row |  |
| 7 @ 4 Wavelengths | Verify that the mean IL is calculated accurately |  |

Table 14: Test Results

## Raw Data to Summary Data Transfer Accuracy

This test verifies that the data that is uploaded into the raw data tab is accurately transferred into the summary tab.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload any data
2. Navigate to the raw data tab
3. Compare the data in the raw data tab to the data in the summary tab. Ensure that they are the same.
4. Repeat with 2 more data sets of any kind.

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 3 | The raw data accurately transfers to the summary tab |  |

Table 15: Test Results

## Update Summary Button Verification

This test verifies that the update summary button on the first tab works properly. If a change is made in the raw data tab, clicking the update summary button should result in that change being shown in the summary tab.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload any data
2. Navigate to the raw data tab
3. Modify a test description for a DUT measurement
   1. E.g. delete a letter from the end or delete a word to make it different
4. Navigate to the first tab
5. Click the “Update Summary” button
6. Verify that when the summary tab appears, the test name that was modified now shows up by itself in the grouping of tests since its name was different
7. Navigate back to the raw data tab
8. Change the test description that was modified back to its original name
9. Navigate to the first tab
10. Click the “Update Summary” button again
11. Verify that the test description that was changed is now back in its original grouping in the summary tab before the changes were made
12. Repeat this with
    1. Changing data values
    2. Changing sample names
    3. Deleting data values
    4. Deleting rows of data

**Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 6 | Summary accurately updated when a test name was modified |  |
| 11 | Summary accurately updated when a test name was fixed |  |
| 12 a | Summary accurately updated when data values were changed |  |
| 12 b | Summary accurately updated when sample names were changed |  |
| 12 c | Summary accurately updated when a data value was deleted |  |
| 12 d | Summary accurately updated when a row of data was deleted |  |

Table 16: Test Results

## Form D Splice Loss Correction Accuracy

# This test verifies that the adjustments made to the data for IL splice loss are accurate when there is a cutback detected and Form D: Method E IL Correction for Splice Loss is selected.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload a data folder with a data set with all 4 wavelengths that was performed using method E with a cutback.
2. Verify that a pop-up window appears asking which form to apply to the data set.
3. Choose Form D
4. Verify that the cutback was applied to the correct sample and fiber number by comparing the results to the results from pasting them into Form D: Method E IL Correction for Splice Loss (validated form).
   1. Open test data file
   2. Copy DUT1 data into the ‘DUT1 Data’ tab in Form D
   3. Copy DUT2 data into the ‘DUT2 Data’ tab in Form D
   4. Copy cutback data into the ‘Cutback Data’ tab in Form D
   5. Navigate to the first tab
   6. Compare the adjusted values in the table to the values in the summary macro to verify that they are the same. This can be done by subtracting the values in one sheet from the values in the other and ensuring that it outputs 0 for all measurements which means that they are the same.
   7. Repeat with the rest of the samples that are shown in the macro summary tab
5. Repeat this test with 13/15 wavelength data

**Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 2 | A pop-up window appears with buttons asking which form to apply |  |
| 4 | The splice loss is accurately adjusted as per Form D |  |
| 5 | Splice loss is accurate with 13/15 wavelength data |  |

Table 17: Test Results

## Verify Automatic Save

# This test verifies that the macro automatically saves the workbook when data is uploaded. It should save it as “Summarized <Name of Data Folder Selected>” and when the update summary button is used, it should save these updates.

**Finding**

(To be filled in upon completion of testing)

**Test Method**

1. Upload any data
2. Verify that the title at the top of the workbook reads “Summarized <Name of Data Folder uploaded>”
3. Navigate to the folder that was used in the macro
4. Verify that within that folder the workbook was saved
5. Change data in the raw data tab and click update summary
6. Verify that the workbook saved into the folder is now saved with the updates
7. Verify that when another data set is uploaded from the new saved workbook, it then saves that into the proper folder with the proper name

**Results**

|  |  |  |
| --- | --- | --- |
| **Step** | **Criteria** | **Pass/Fail** |
| 2 | Workbook is saved as “Summarized <name of data folder uploaded>” |  |
| 4 | Workbook was saved into the folder in which the data was selected from |  |
| 6 | The workbook is saved again when the update summary button is used |  |
| 7 | The macro still works when data is uploaded from the new saved workbook |  |

Table 18: Test Results