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Document Issue	Description of Document Change	Date	Authors	Authorisation
Rev A	Initial draft	7/06/18	TL,KH,HS,SR,LW	TL
RevB	Removal of Infinite Branding	02/12/2020	RA	

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## 1. Introduction

This manual describes the functionality of the Kaelus Unify App developed by Kaelus.

The Kaelus Unify App allows users to operate and control Kaelus T&M products (iPA & iVA) from a smartphone or tablet. The Kaelus Unify App is available from the Apple App Store (iOS) or Google Play Store (Android) at no charge. Unify will control all Kaelus T&M products, thereby replacing existing iVA apps.

## 2. Features

- Engineered and constructed for field and lab environments
- Pre-configured test sequences can be stored in a single state file
- Comprehensive reporting tools include markers, limits, tags and trace math
- One-click format creates professional, downloadable reports with minimal editing; raw data stored for later use
- Supports multiple simultaneous connections (such as Kaelus iVA, iPA and iTA)
- Easy-to-use interface eliminates time spent switching between devices and combining test results



### 3. Website

To begin managing your test and measurement instruments on the free Kaelus Unify portal, follow the steps below. Once your account is created and devices registered, you will be able to accurately TEST, REPORT and CERTIFY both PIM and sweep measurements.

#### How to Create an Account

1. Complete registration for the Kaelus Unify portal at [www.kaelus.com](http://www.kaelus.com).
2. Confirmation will be sent by email. Once received, open email and click REGISTER NOW.
3. Complete contact, user name and password fields.
4. Click REGISTER button and begin sign-in using email and password.

#### How to Register a Device

1. User is taken directly to devices page after sign-in.
2. Click (+) to add each device.
3. Locate the instrument barcode then type in serial number and date from barcode sticker.
4. The instrument will now appear on the devices page; click to expand and view details.



Figure 1 Unify Website

## 4. Equipment

### 4.1 Supported Equipment

iVA Cable & Antenna Analyzer  
iPA Passive Intermodulation (PIM) Analyzer Series  
iTA Multi-Band Passive Intermodulation (PIM) Analyzer Series  
RTF External Range-to-Fault (RTF) Module Series

### 4.2 How to connect to iPA / iTA / RTF

#### 4.2.1 For iPA or iTA, Establish Wi-Fi Connection to Units

Power on your iPA or iTA. Under the settings menu, select Network. Scroll down to ensure hotspot setting is enabled and Wi-Fi setting is disabled.

##### 4.2.1.1 Enable Wi-Fi setting on your control device

Enable Wi-Fi on your laptop, Android device, iOS device, tablet or smartphone, and locate the serial number of the unit to be used. Select from list of available networks.

##### 4.2.1.2 Enter default password

Password is required for connection. Enter default password for all Kaelus devices “kaelusap” (\*note\* all lowercase).

#### 4.2.2 Launch UNIFY Application

Once you have installed the Unify application there will be an icon in your applications list. If the Kaelus Unify application is not visible on your PC screen, check in “All Programs” menu and launch Unify from there. Click on it to start the program.



#### 4.2.3 Establishing a Wi-Fi Connection

Unify program will initiate on the “Devices” menu screen. Click the faded blue Wi-Fi icon of the located device to establish a full connection. Ensure your iPA or iTA has been scanned and located by the program. Click the pale blue Wi-Fi icon for the device you wish to connect. The icon will become solid/bright blue.

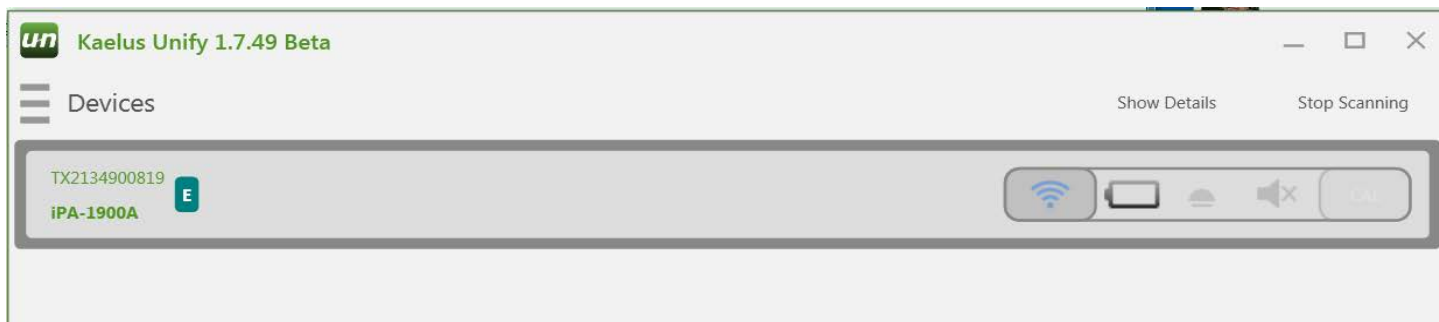


Figure 2 Device Icon Select



**Figure 3 Device Icon Selected**

## 4.3 How to Connect to iVA

### 4.3.1 Enable Bluetooth Setting on your Control Device

### 4.3.2 Power ON the iVA

A momentary touch on the Power Button will switch ON the iVA.



**Figure 4 IVA On Button**

When the iVA is first switched on, the Bluetooth LED will be flashing, indicating that the iVA is not paired with the Unify app. First time users to connect iVA to PC via USB using cable provided to allow drivers to be installed (Recommended for Windows based devices).

### 4.3.3 Launch Unify App (Windows, Android, iOS)



Once you have installed the Unify application there will be an icon in your applications list. If the Kaelus Unify application is not visible on your PC screen, check in “All Programs” menu and launch Unify from there. Click on it to start the program.

Unify program will initiate on the “Devices” menu screen. Ensure your iVA has been scanned and located by the program. Click the pale blue Bluetooth icon for the device you wish to connect. The icon will become solid/bright blue.

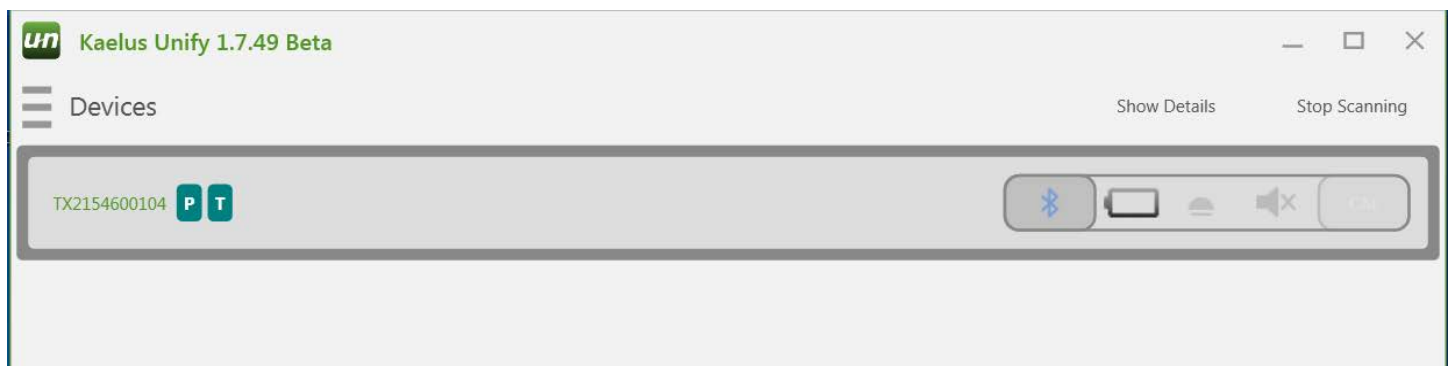


Figure 5 Bluetooth Device Menu Before Connection

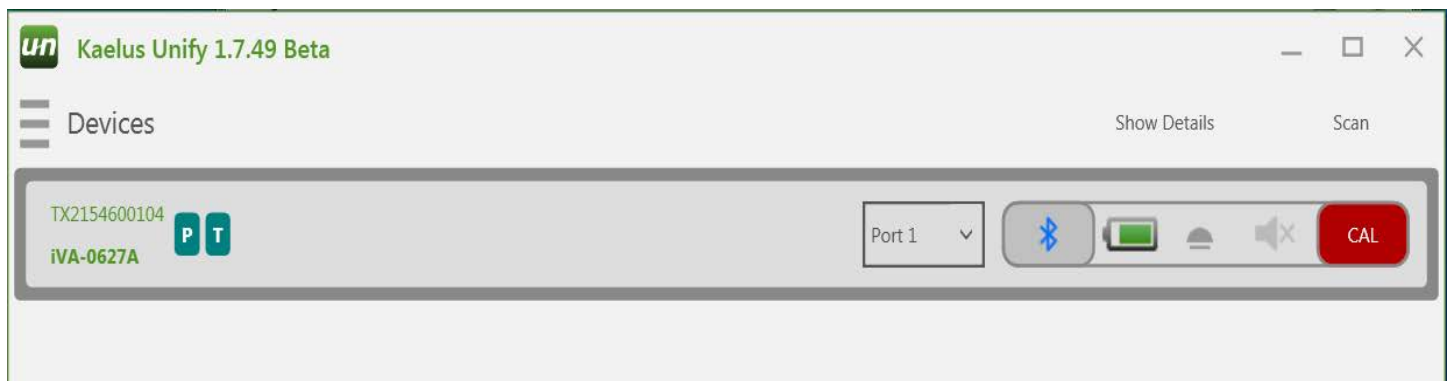


Figure 6 Bluetooth Device Menu After Connection

The Bluetooth LED on your iVA will change from flashing to continuous ON.

## 5. Basic Usage

### 5.1 How to Manage State (Create, Export, Rename)

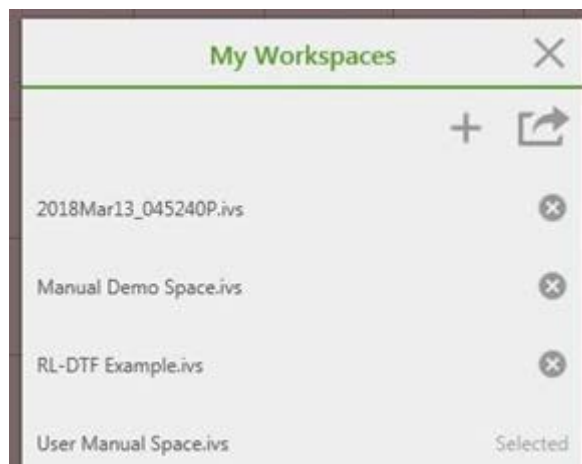
The My Workspace function allows the user to setup and save multiple complex test configurations. Specific workspaces include information on test equipment, test types & test setups, limits, tags, etc.

Select workspace. Click on 'My Workspace' area.



**Figure 7 State Selection**

Select a state from the list, + create a new one, or export (save) the current one.



**Figure 8 Creating a New State**

If you chose to + create a new state, enter a state name and select a template.

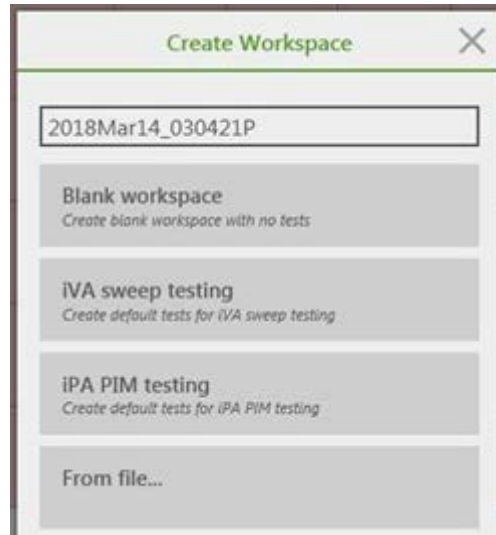


Figure 9 Selecting a State Template

## 5.2 How to Set Up a Test (New Test, New Trace, Set Tags)

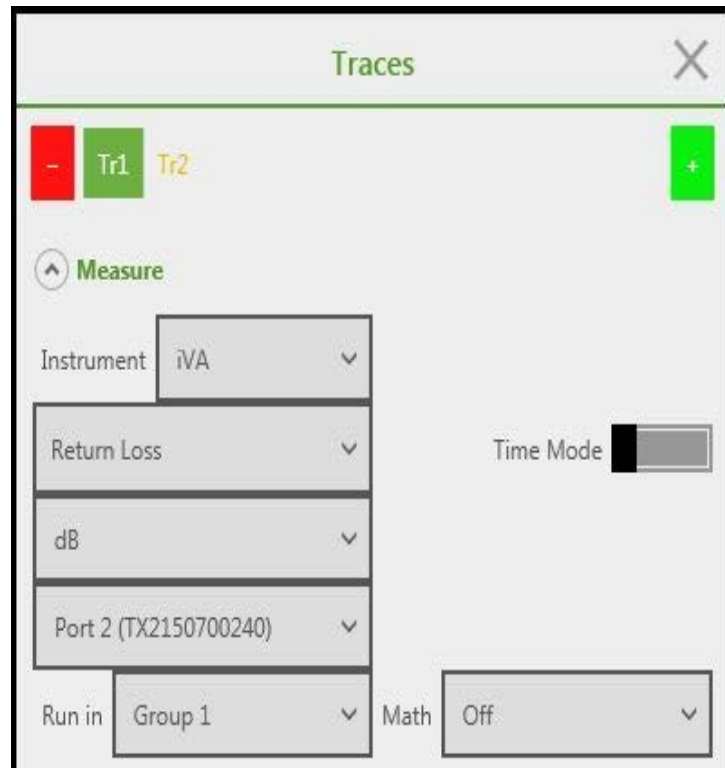
Select 'Add New Test' from Main Menu to create a blank test template.

Use 'Rename' to change name of 'Unnamed Test' to the planned test sequence name. See Section 5.3 to set up report and record plots.



Figure 10 Naming a Test

- Use the Traces menu to build the required test sequence.
- Select (or create) Tr1 to Tr4 different traces (specific individual tests).
- Up to 4 tests (Tr1 to Tr4) can run in automated sequence.



**Figure 11 Trace Menu**

- Choose Instrument model from list. Verify the Instrument is on the Port # identified.
- Set test type and other parameters as required for the planned test.

Test types available depend on Instrument type selected.  
Other parameters required depend on the Test Type selected.

- Use the Plot menu to scale the graph. Both vertical and horizontal scales are fully configurable (for all selected traces).

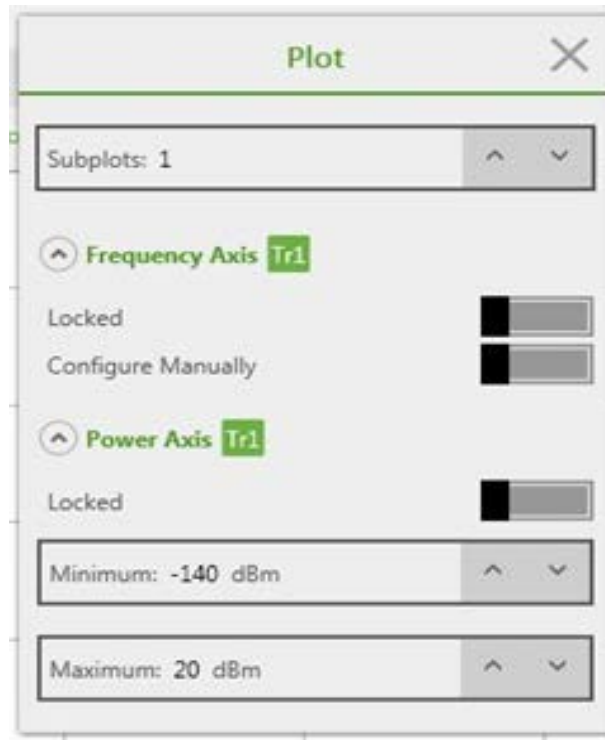


Figure 12 Plot Menu

### 5.3 Set Up Report and Record Plots

- Two types of information are set up for reporting: General report/Contractor information and Site-Specific Test results.
- General report/Contractor information is entered in the 'Report' tab of the Settings menu. This information does not regularly change.

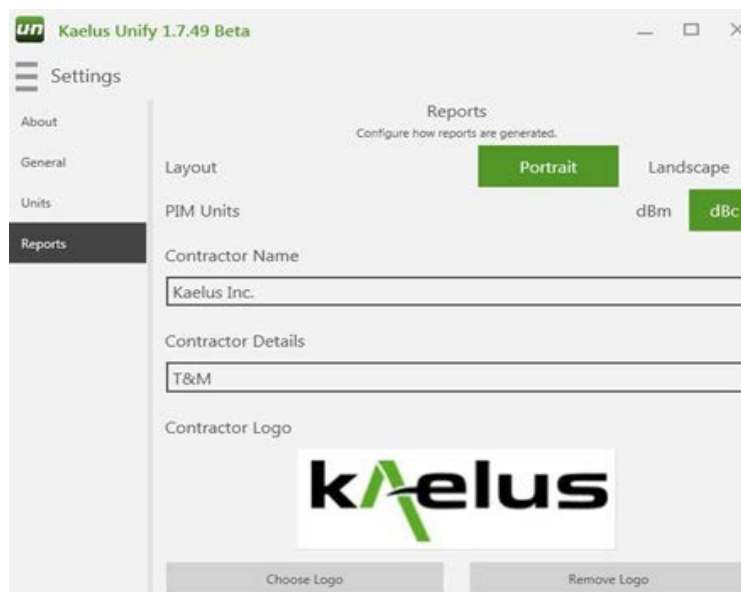


Figure 13 Contractor Information Panel



- Site-specific information is entered on the Reports menu. Test results are displayed below the site header information.

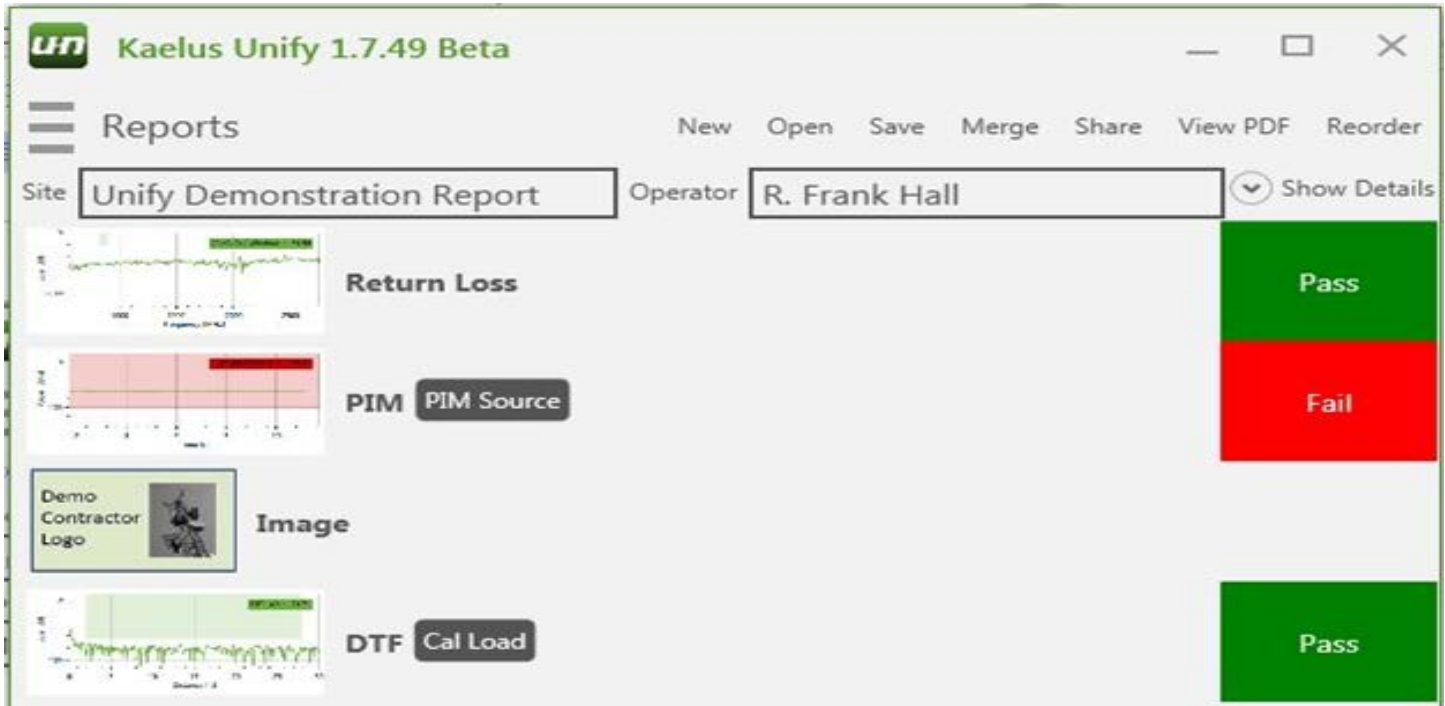




Figure 14 Site Specific Data Entry

- From this tab you can also;
  - Created a **new** (blank) report with no content
  - **Open** an existing report (from any model of Kaelus test equipment)
  - **Save** the current report to a file
  - **Merge** this and any other Kaelus test report
  - **Share** the report via web app. (i.e. DropBox)
  - Create a standard PDF version of the report with **View PDF**
  - Re-sequence line items in the report with the **Reorder** option
- To record a Test result, select the Record  or Record special  buttons from any test screen.
- The Record button saves the currently displayed test to the report.
- The Record Special button either saves the current trace or inserts a photo into the report.

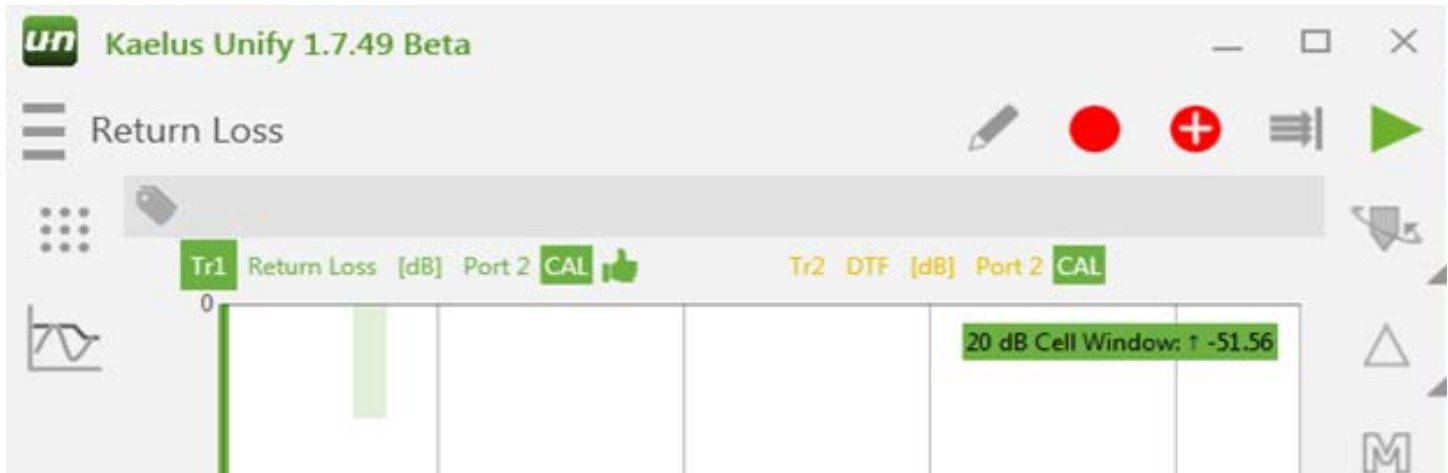


Figure 15 Record Buttons

## 5.4 Checking for Interferers (iPA spectrum monitor mode)

From the Main menu, select a current Spectrum test mode, or create a 'New' PIM test.

Using the Traces menu, set the 'Measure' criteria.

- Set PIM Instrument type and model
- Set port # for required instrument
- Set Measurement type to Spectrum
- Set Power reference to dBm or mW as required
- Run in GROUP 1, Math OFF.

Using the Traces menu, set the 'Response'.

- Set measurement step size (KHz)

Using the Traces menu, set the 'Limits' as required.

- Set Annotations On or Off, (all traces)
- Set Specific Limits On/Off



**Figure 16 Annotations and Limits Switches**

## 5.5 Measuring PIM

From the Main menu, select a current PIM test mode, or create a 'New' PIM Test.

Using the Traces menu, set the 'Measure' criteria.

- Set PIM Instrument type and model
- Set port # for required instrument
- Set Time Mode slider to ON (Green)
- Set Measurement type to PIM
- Set power reference to dBm or dBc as required
- Run in GROUP 1, Math OFF

Using the Traces menu, set the 'Stimulus Tone 1 and 2'.

- Set Stimulus Tone 1 Frequency and Power Setpoint level
- Set Stimulus Tone 2 Frequency and Power Setpoint level

Using the Traces Menu, set the 'Response'.

- Set Product, pick an appropriate IM to track, i.e. IM3L, IM5L
- Set Test Duration from the drop down listing

Using the Traces Menu, set the 'Limits' as required.

- Set Annotations On or Off, (all traces)
- Set Specific Limits On/Off

The screenshot shows the 'Traces' menu for 'Tr1'. It contains several sections:

- Measure:**
  - Instrument: iPA-1900A
  - PCS-1900
  - PJM
  - dBc
  - Port 1 (TX2134600604)
  - Run in: Group 1
  - Math: Off
  - Time Mode: [Green/Black bar]
- Stimulus Tone 1:**
  - Frequency: 1930 MHz
  - Power Setpoint: 43 dBm
- Stimulus Tone 2:**
  - Frequency: 1990 MHz
  - Power Setpoint: 43 dBm
- Response:**
  - Product: IM3L
  - Duration: 300 s

Figure 17 Time Mode Trace Menu

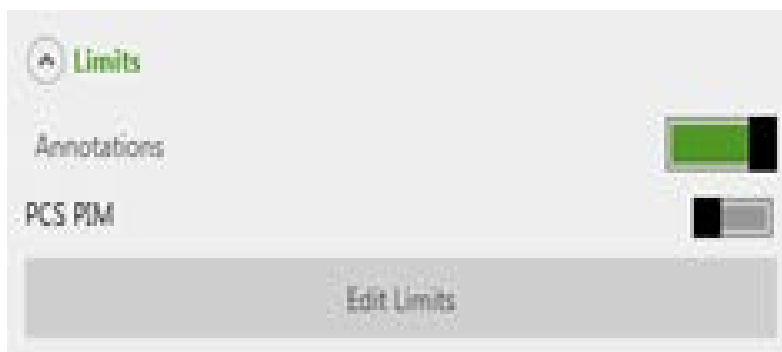


Figure 18 Switching on a Limit

## 5.6 How to Calibrate your iVA

### 5.6.1 Locate the CAL Icon on the Far Right of the Screen

After establishing a connection, the Bluetooth icon has become solid/bright blue. First step is to perform an OSL (Open, Short, Load) calibration.



CAL Performed	Colour CAL Symbol & Criteria	Report Status	Note
Time: OSL Present	Less than 12 Hours	Calibrated	Reportable Measurements
	Between 12 & 36 Hours	Uncalibrated	Fault finding and repairs
	Greater than 36 Hours	Uncalibrated	General quick check and repairs at a given measurement plane
Temp: OSL Present	Less than $\pm 8^{\circ}\text{C}$ Temp Change	Calibrated	Reportable Measurements
	Greater than $\pm 8^{\circ}\text{C}$	Uncalibrated	Fault finding and repairs

Figure 19 IVA Calibration Status Table

5.6.2 Enter Calibration Menu

Click the CAL icon of the selected iVA to enter the calibration menu.

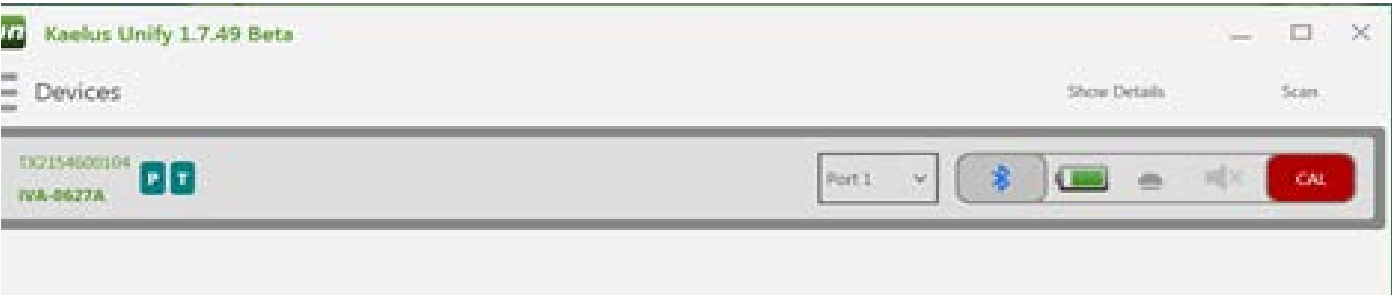


Figure 20 Entering the Calibration Menu

5.6.3 Calibration Menu

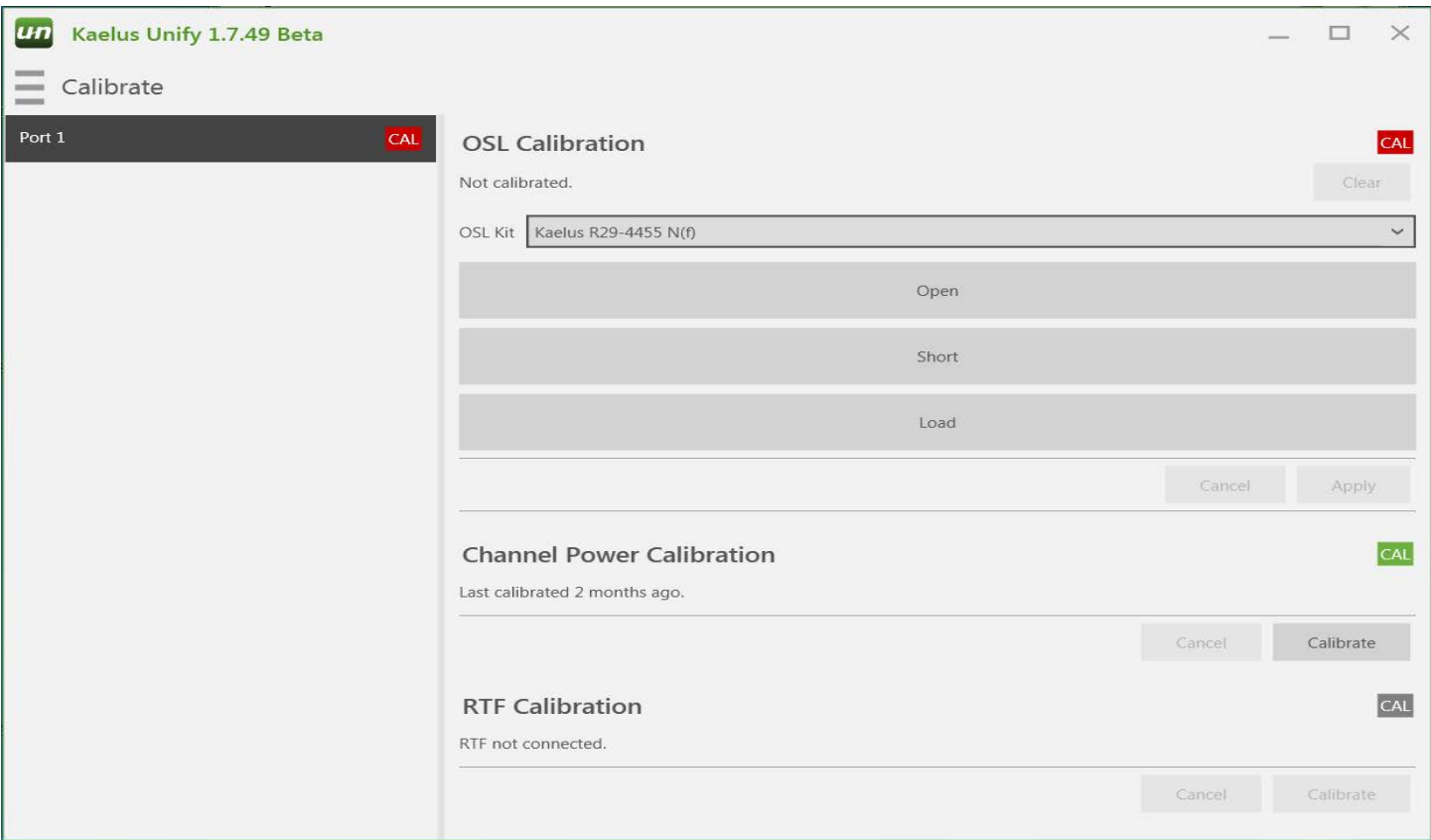
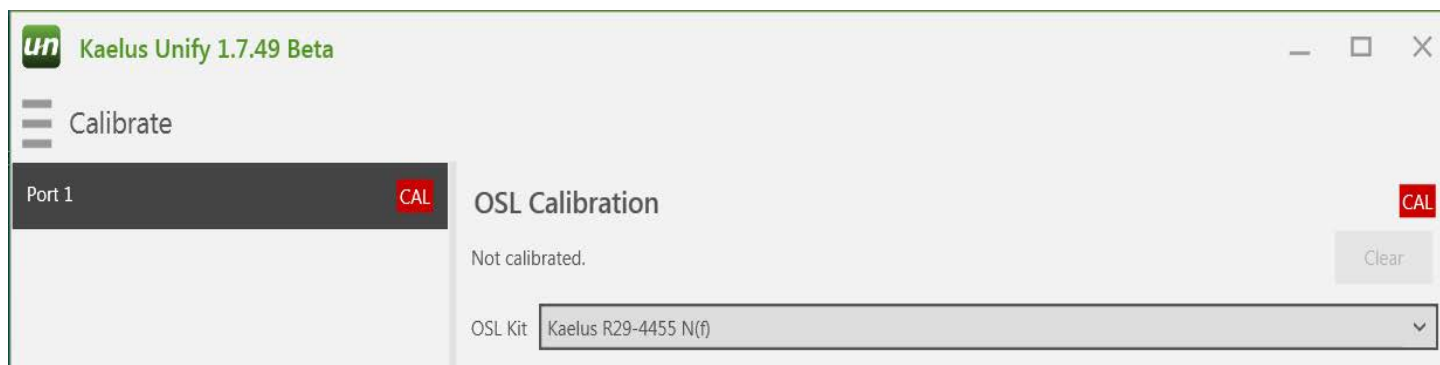


Figure 21 OSL Menu

Select the OSL Kit to be used for calibration from the drop-down menu.



**Figure 22** Selecting the OSL Standard for the iVA

After connecting each individual calibration standard component of your OSL Kit, click on the corresponding bar to calibrate each standard.



**Figure 23** iVA OSL Standard

Once the Standards have been measured, Open, Short, Load, click on Apply to load the full calibration.

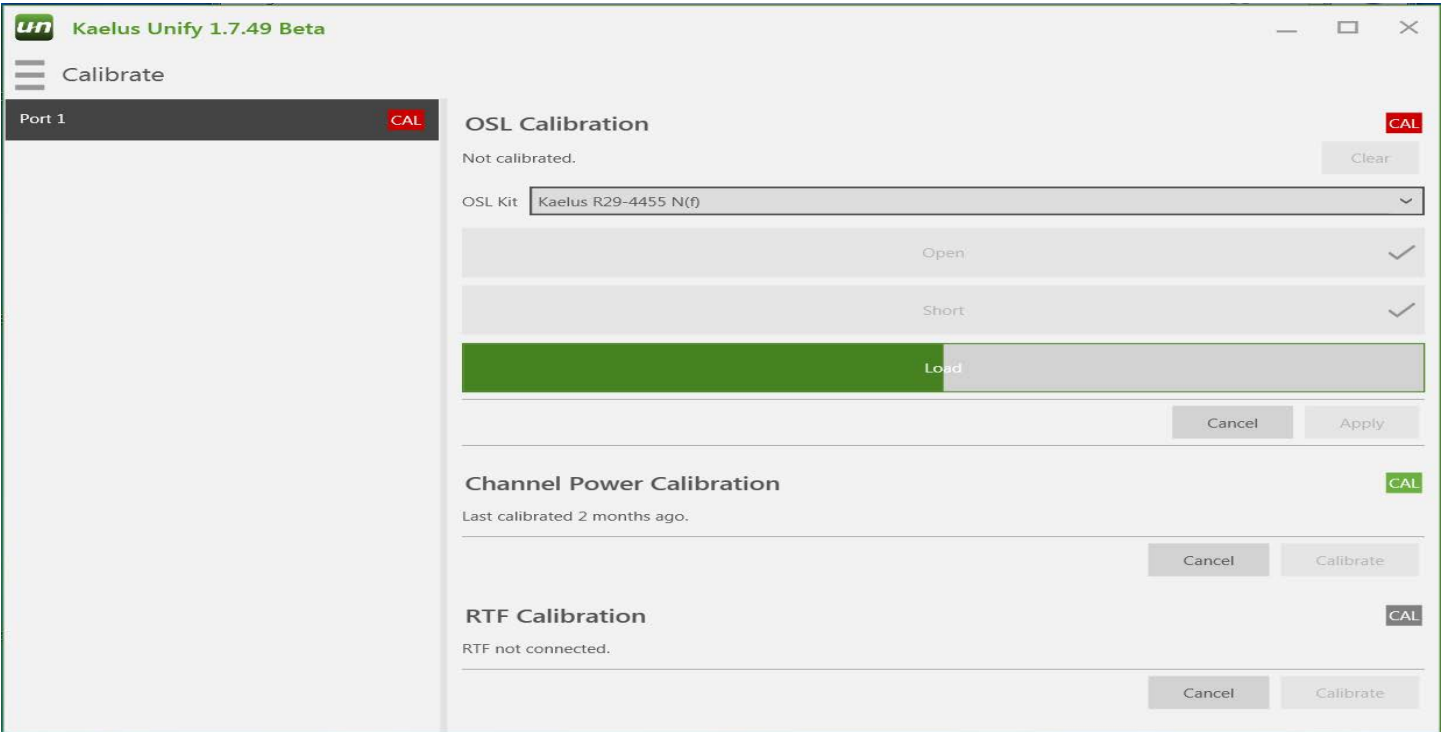
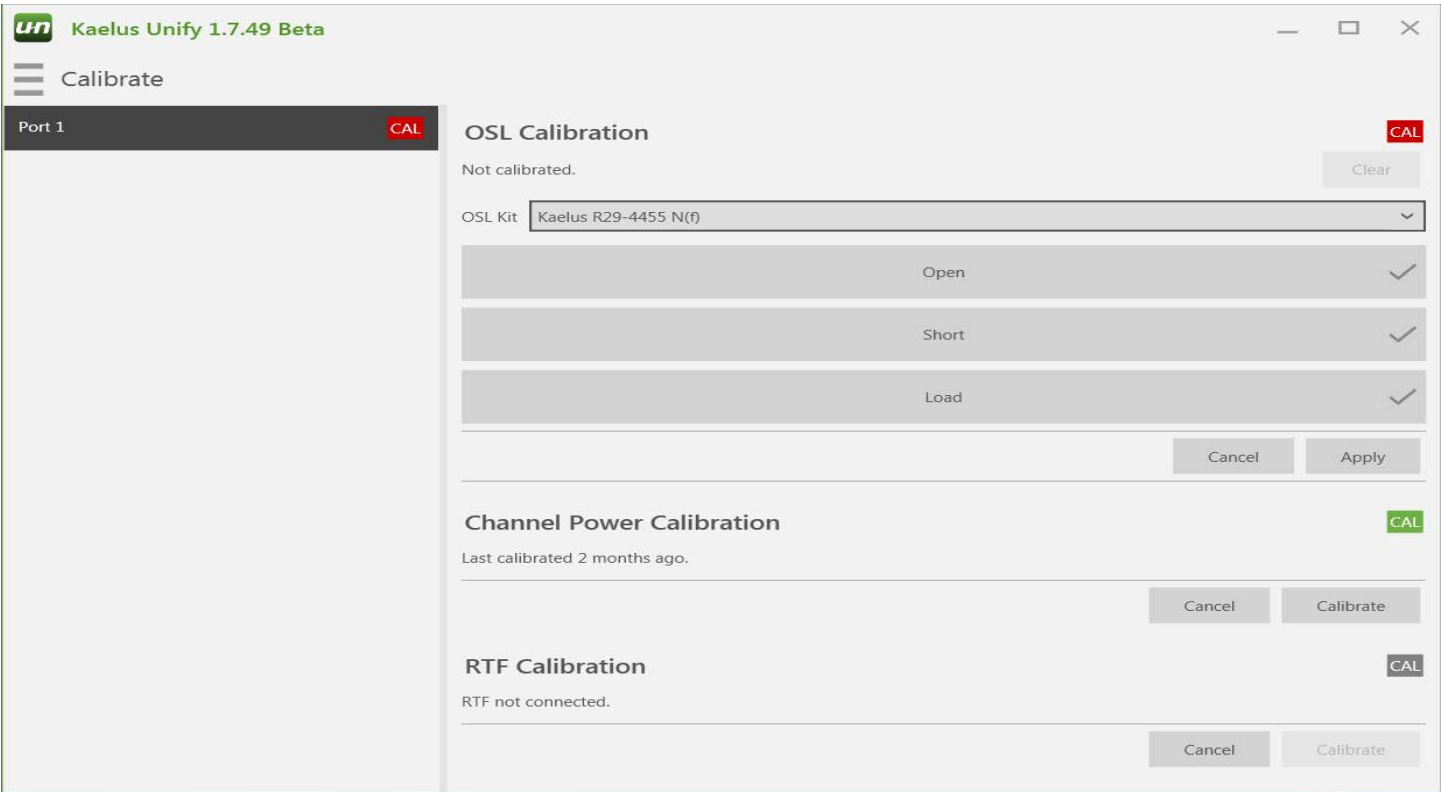


Figure 24 Measuring the OSL Standards



Your IVA is now ready for use.



## 5.7 Measuring Cable Loss

From the Main menu, select a current Cable Loss test mode, or create a 'New' Cable Loss test.

Using the Traces menu, set the 'Measure' criteria.

- Set IVA Instrument type
- Set Port # for required instrument
- Set Time Mode slider to OFF (gray)
- Set Measurement type to Cable Loss
- Set Measurement value type (dB, Mag)
- Run in GROUP 1, Math OFF

Using the Traces menu, set the 'Stimulus'.

- Set Start Frequency (must be  $\Rightarrow$  560MHz)
- Set Stop Frequency (must be  $\leq$  2750MHz)
- Set number of Data Points (1 - 2191)

Using the Traces menu, set the 'Limits' as required.

- Set Annotations On or Off, (all traces)
- Set specific Limits On/Off



The screenshot shows the 'Traces' menu with the following settings:

- Measure:**
  - Instrument: iVA
  - Cable Loss
  - dB
  - Port 2 (TX2150700240)
  - Run in: Group 1
  - Math: Off
  - Time Mode: OFF (gray)
- Stimulus:**
  - Start Frequency: 560 MHz
  - Stop Frequency: 2750 MHz
  - Points: 601
- Limits:** (collapsed)

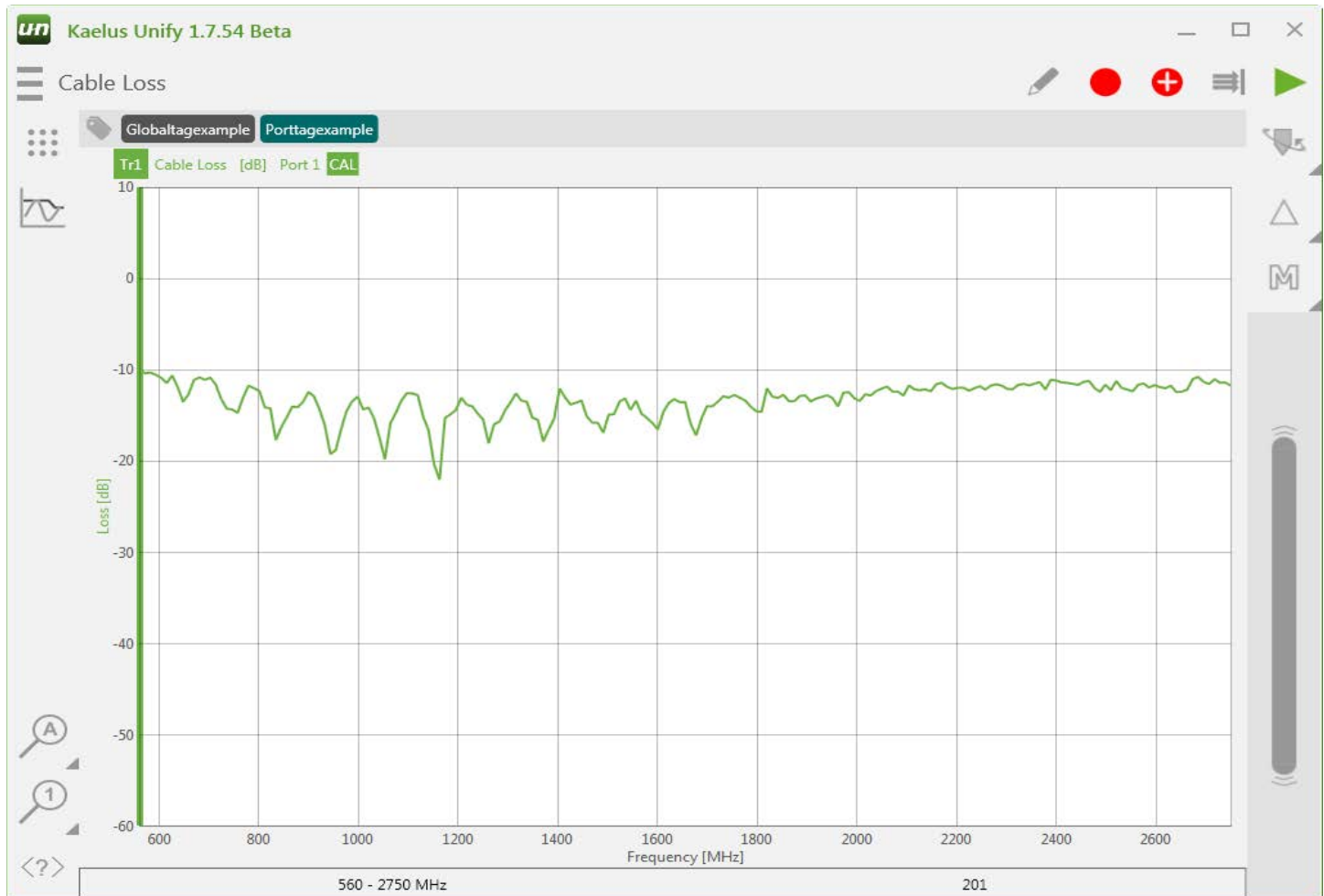


Figure 25 Cable Loss Trace

## 5.8 Measuring Return Loss

From the Main menu, select a current Return Loss test mode, or create a 'New' PIM test.

Using the Traces menu, set the 'Measure' criteria.

- Set IVA Instrument type
- Set Port # for required instrument
- Set Time Mode slider to OFF (gray)
- Set Measurement type to Return Loss
- Set Measurement value type (dB, VSWR, etc)
- Run in GROUP 1, Math OFF

Using the Traces menu, set the 'Stimulus'.

- Set Start Frequency (must be  $\Rightarrow$  560MHz)
- Set Stop Frequency (must be  $\leq$  2750MHz)
- Set number of Data Points (1 - 2191)

Using the Traces menu, set the 'Limits' as required.

- Set Annotations On or Off, (all traces)
- Set specific Limits On/Off

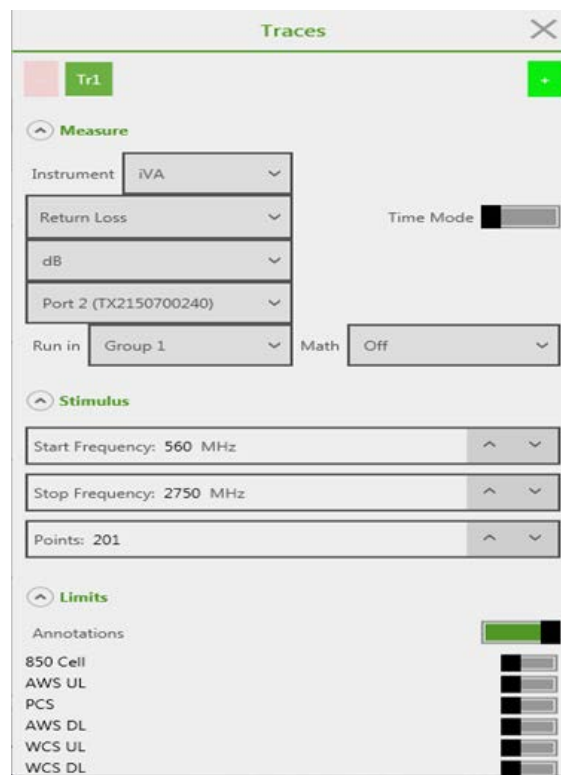


Figure 26 Return Loss Trace Menu

## 5.9 Links to Manuals

[R99-0124 iOS\\_IVA\\_Operating\\_Manual](#)  
[R99-0105 ANDROID\\_IVA\\_Operating\\_Manual](#)  
[R99-0120 WINDOWS\\_iVA\\_Operating\\_manual](#)  
[R99-0090 iPA\\_Operating\\_Manual](#)  
[R99-0110 iTA A-Series Operating Manual](#)  
[R99-0068 RTF\\_A-Series\\_Operating manual](#)

## 6. Advanced Usage

### 6.1 Fault finding (DTF / DTP)

#### 6.1.1 How to Connect and Calibrate RTF (Range-to-Fault) Module

Attach RTF module to RF output port of the iPA PIM analyzer.

**\*NOTE:** Do not allow the body of the RTF module to rotate while tightening the connector, as this can cause damage to the 7/16 connector matting surfaces.

Connect Monitor cable to Aux port of RTF module to the RF-Aux port of the iPA/iTA located under the right-side cover, using N-SMB cable provided.

Connect mini USB port of the RTF module to the Type A USB port of the iPA/iTA located under the left-side cover, using cable provided.

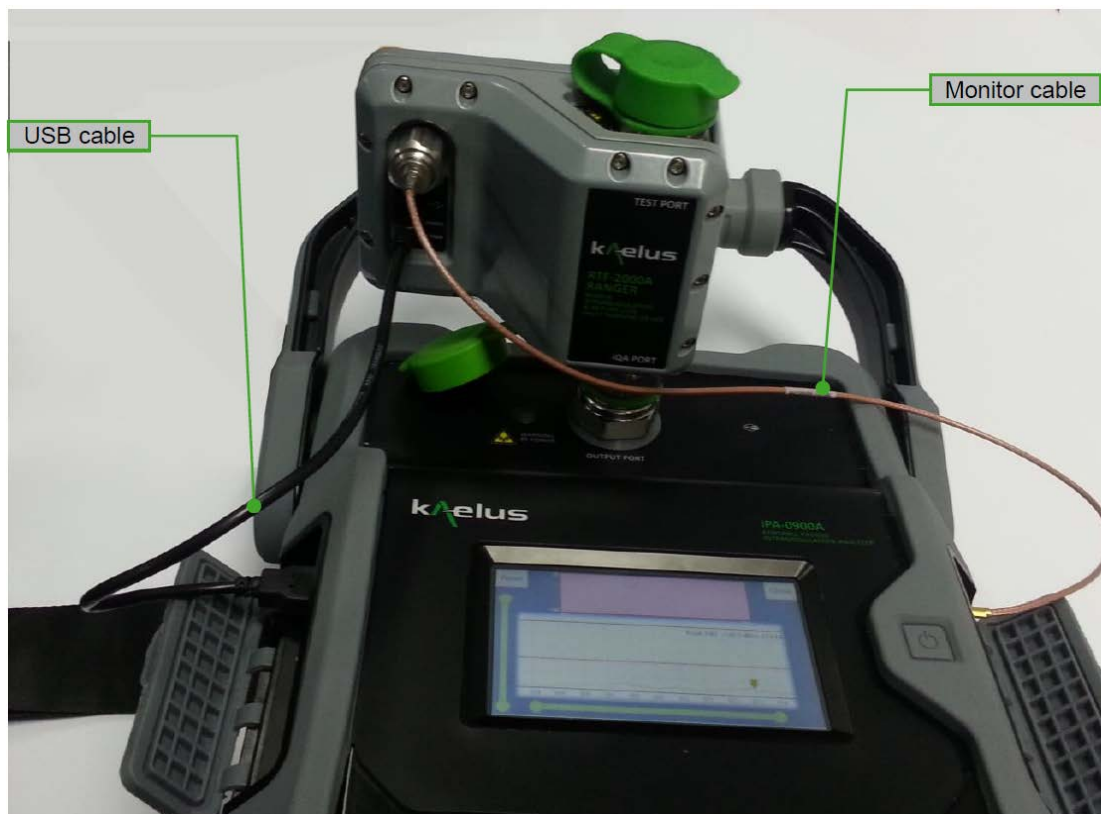
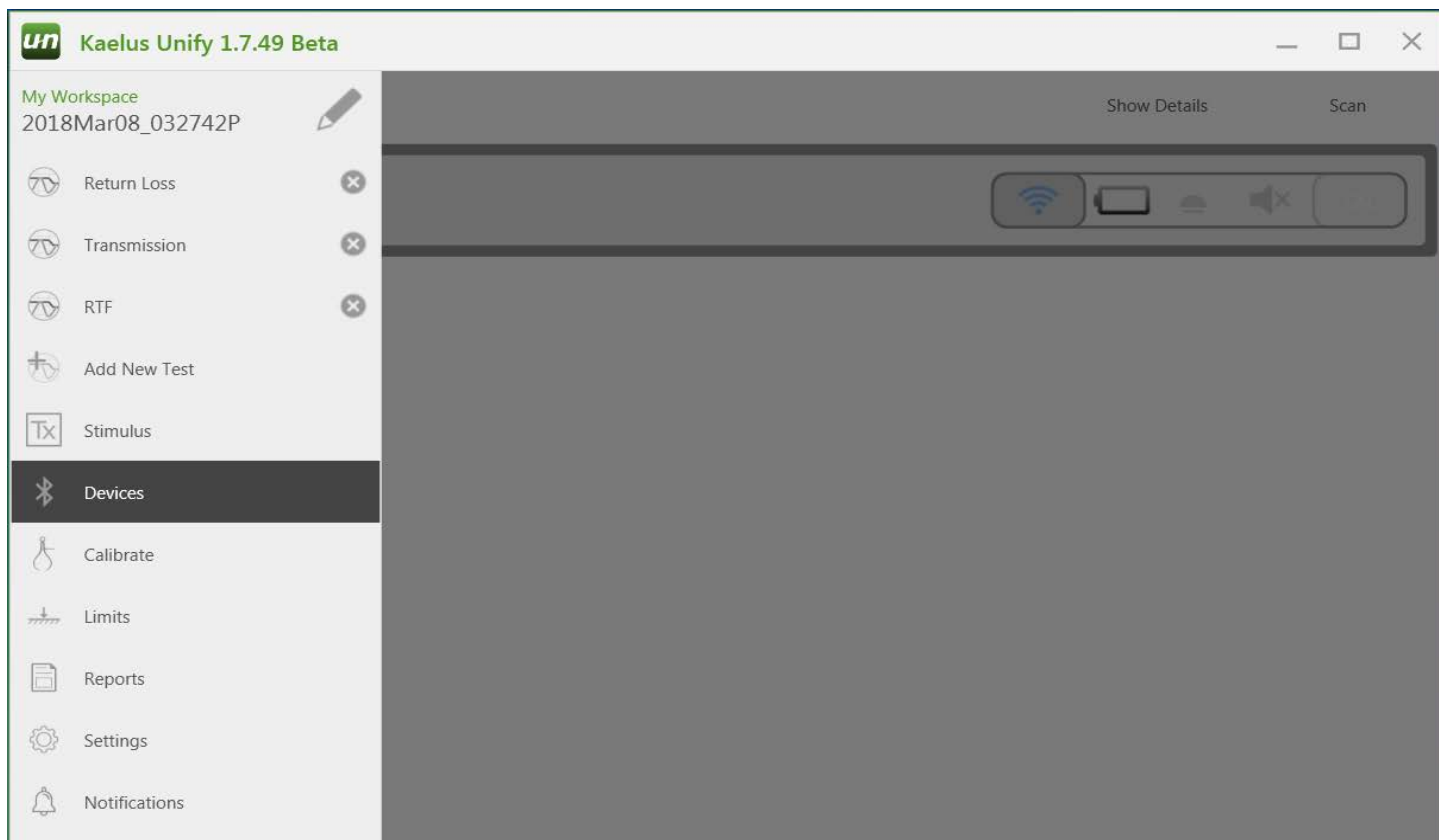


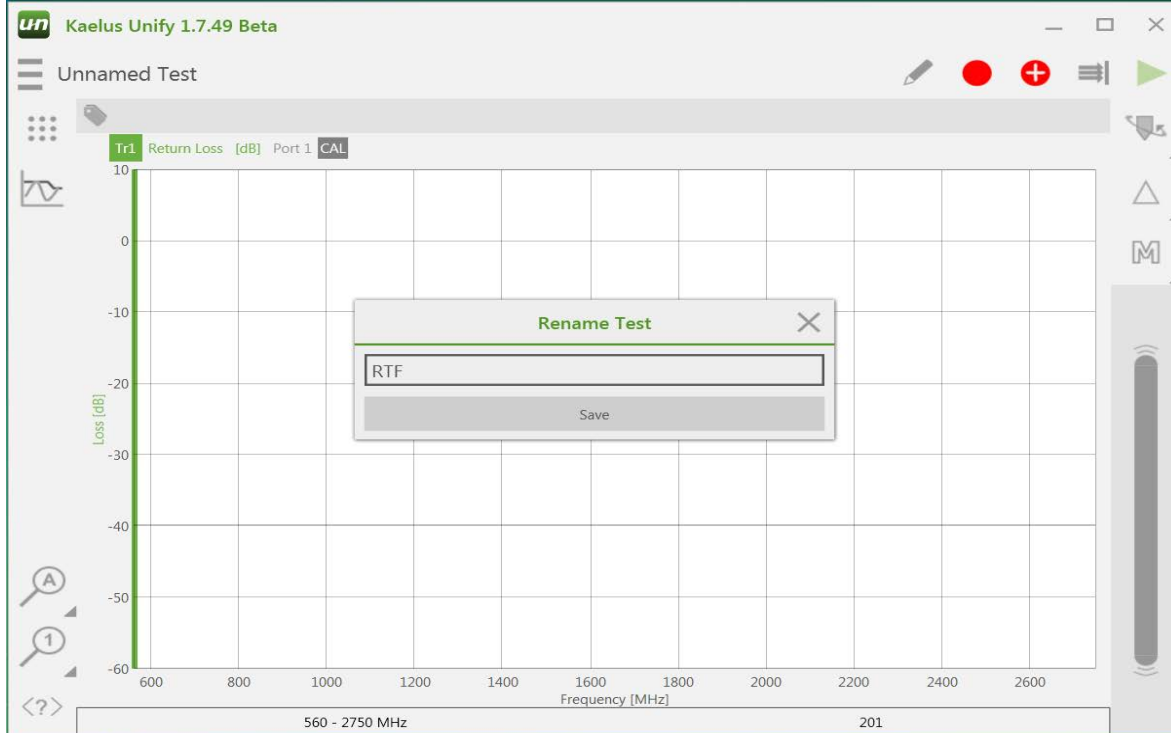
Figure 27 iPA RTF Cable Connections

## 6.1.2 Setup for RTF Module Calibration

A new test must be added. Click on “Devices” and select “Add New Test.”



Rename “Unnamed Test” to your preference. (Example: “RTF.”) Click the pencil icon. Name the new test and click “Save.”




Click on “Traces” icon.



**Figure 28 Traces DTP Menu**

Select the appropriate Instrument from the drop-down menu for (Tr1) Trace 1.

Select “DTP” from the drop-down menu for type of test and select and adjust all appropriate parameters, including Cable Type, Stimulus Tone 1 and 2, Response, and Limits.

Add (Tr2) Trace 2 by clicking the Green plus icon  on the top right side of the Traces Menu.

Make all necessary adjustments to Tr2 measurement criteria.

- Instrument: Must be iPA being used
- Measurement: Should be DTF
  - \*NOTE that this DTF measurement is NOT to be confused with DTF setting for Sweep Measurement using the iVA
- Measurement Types: Return Loss, VSWR, or Mag
- Port: Must be the same Port that the iPA will be operating in
- All other parameters must be adjusted as per user specifications

### 6.1.3 Calibrate RTF Module

Click the red CAL icon. This will bring up the Calibration menu.



Figure 29 CAL Icon RTF

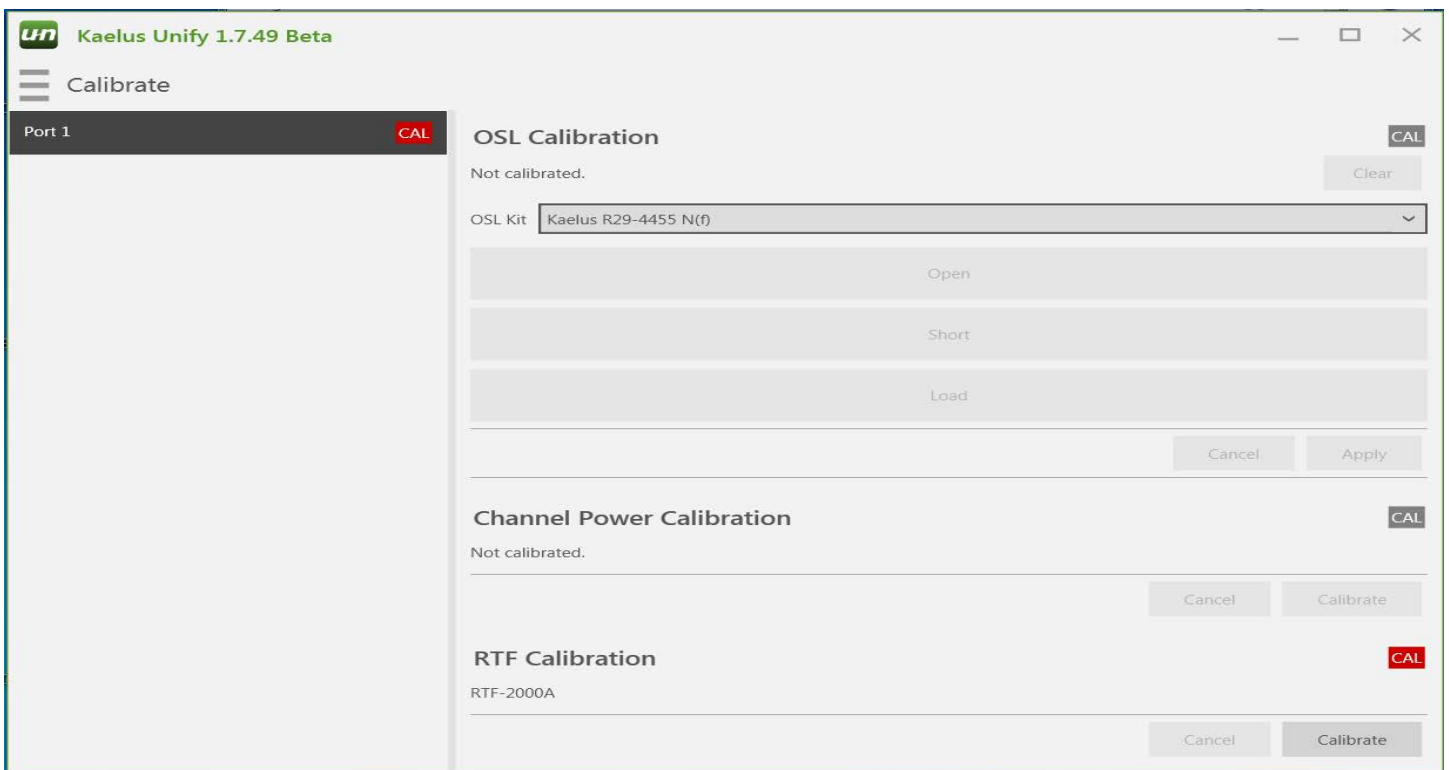
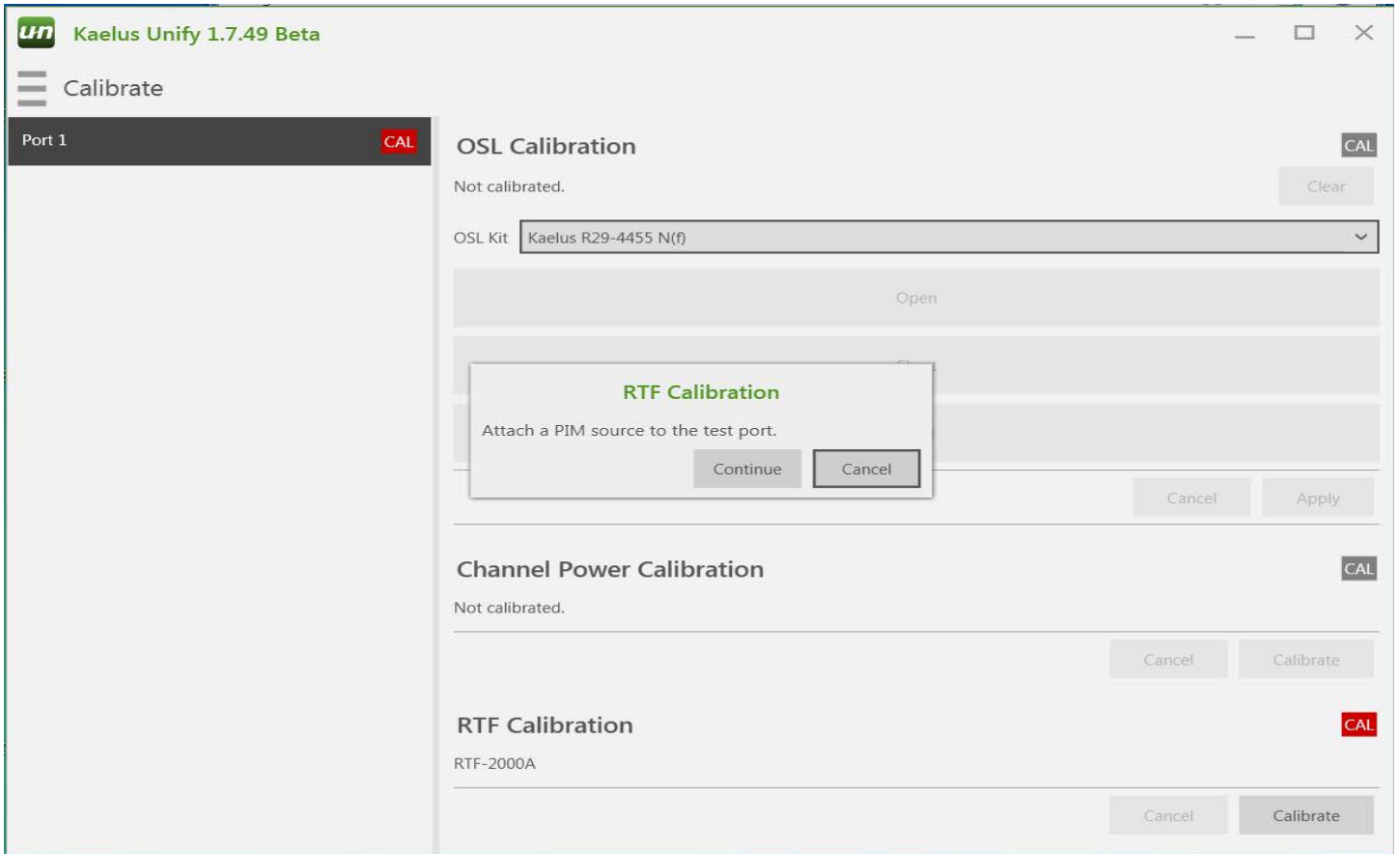


Figure 30 Calibrate RTF Screen

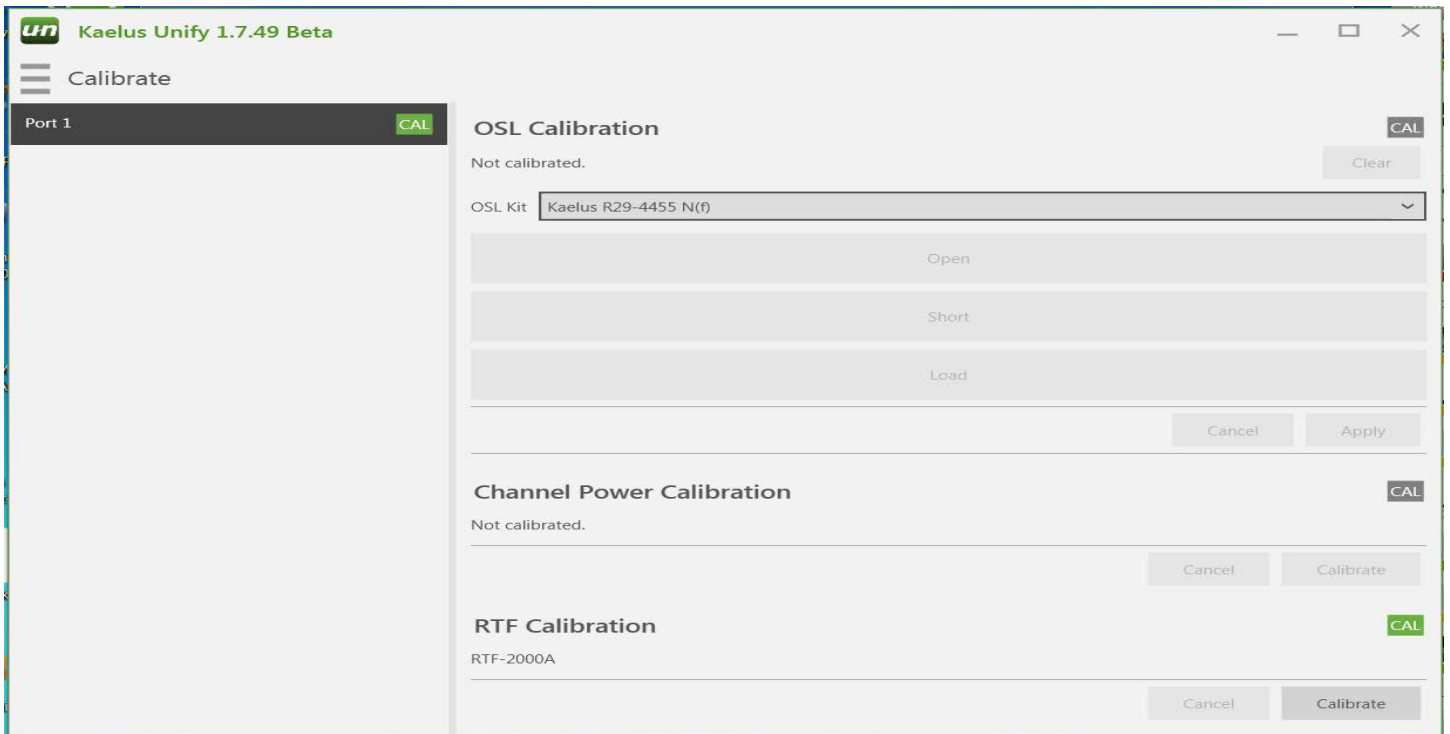
Under the RTF Calibration section, click “Calibrate” and follow prompts.





**Figure 31 RTF Calibration Menu**

Red CAL indicators will become Green, indicating that the RTF is calibrated and ready for use.

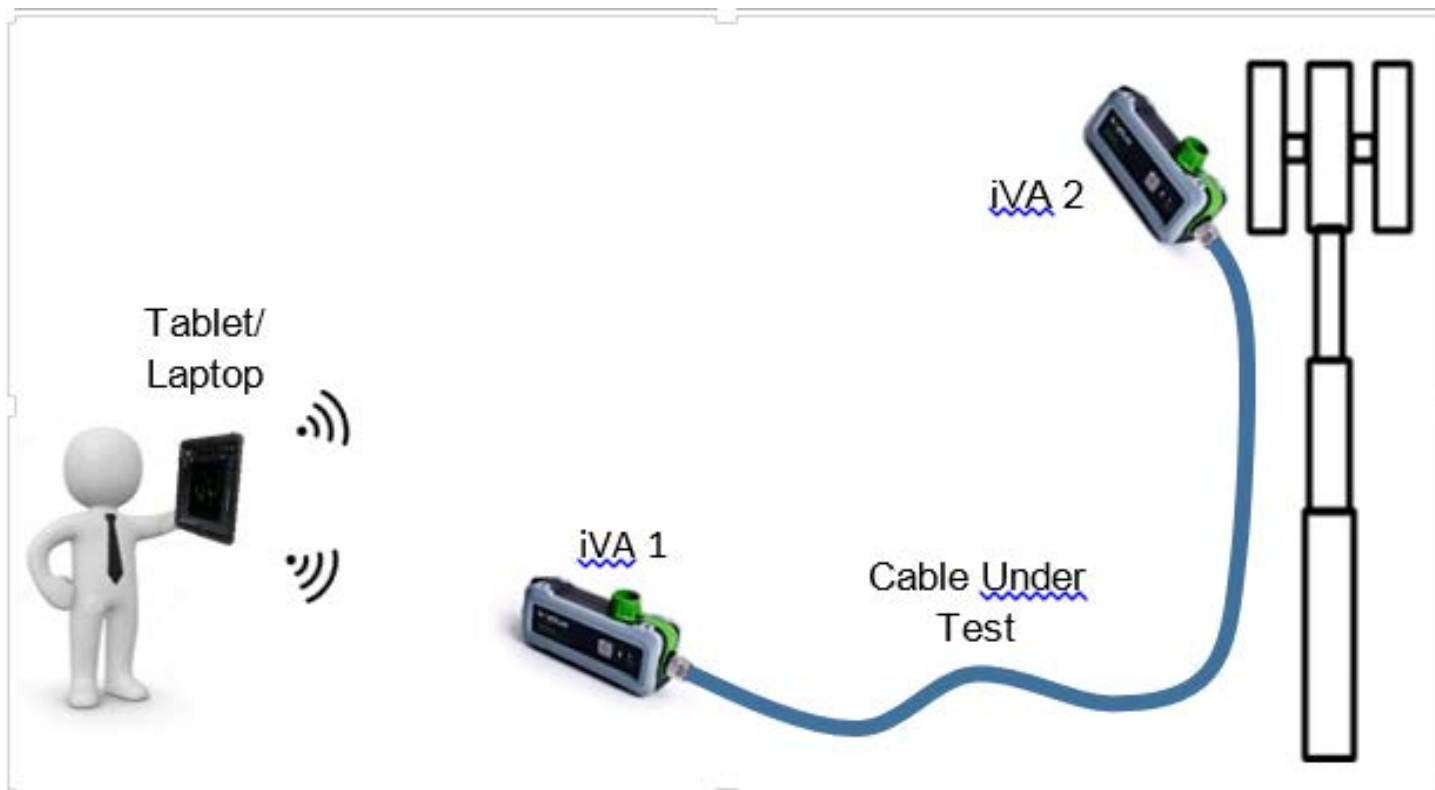


RTF Module is now ready for use as per setup.

\*NOTE: If setup is altered in any way, calibration will need to be redone.

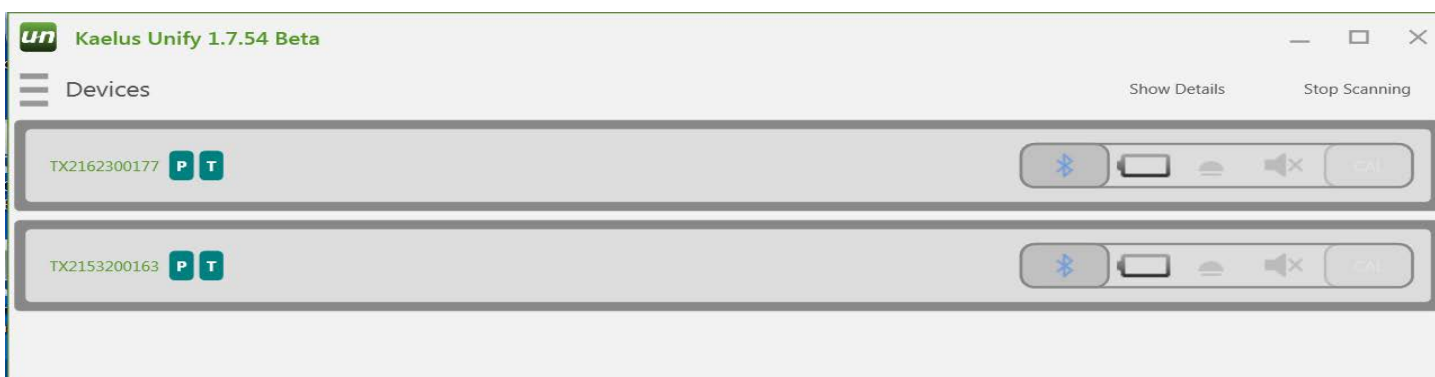
## 6.2 Transmission Mode

A typical use for Transmission mode is depicted as follows.

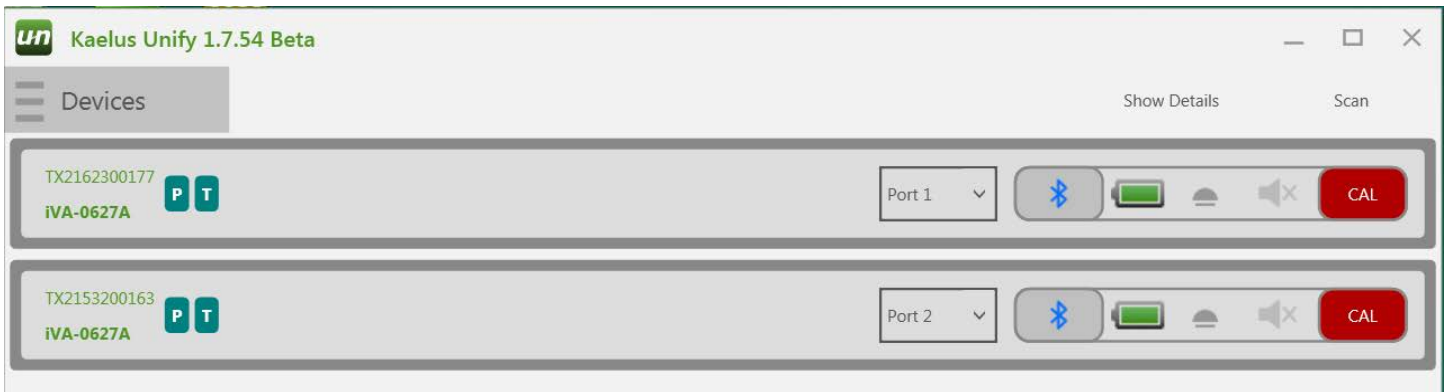


**Figure 32 Cable Loss with Transmission Mode**

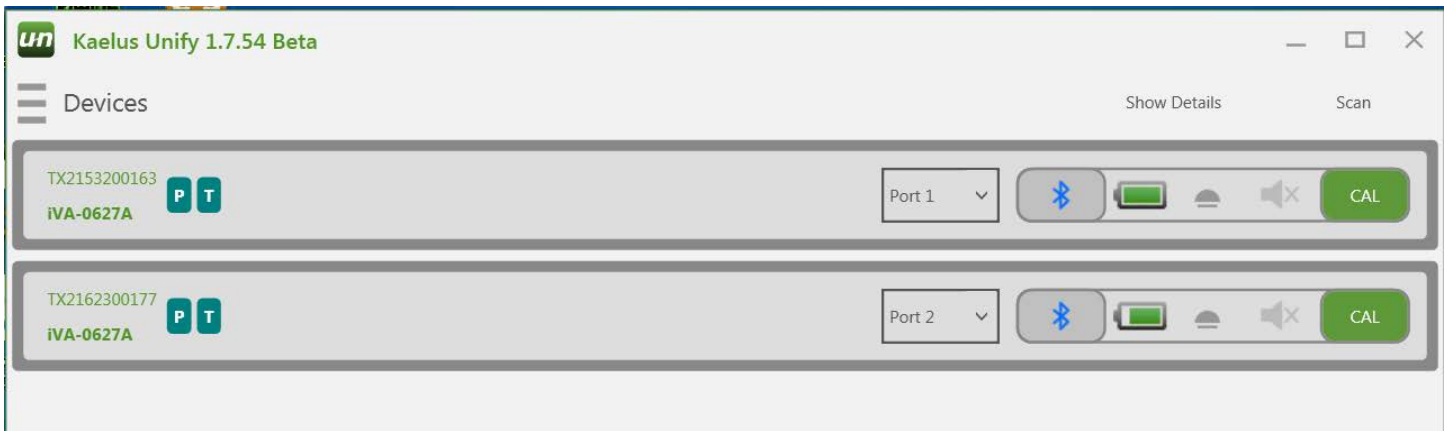
This measurement requires two iVA units.



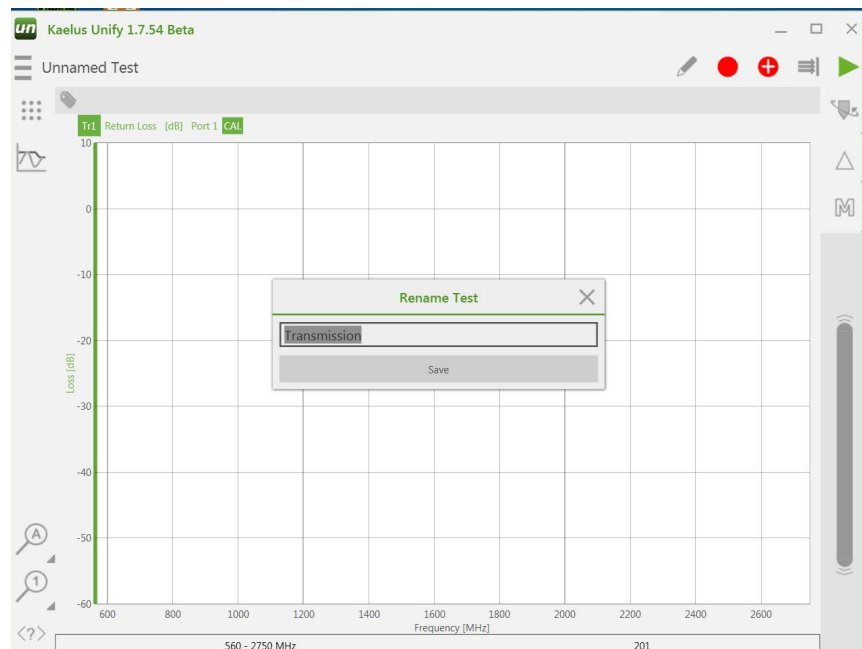
Pair both iVA units to the same control device, (Windows, Android, iOS).



Perform an OSL calibration on each iVA as described in Section 5.6.



Create a “New Test” and choose a name. In this example we name the test “Transmission.”

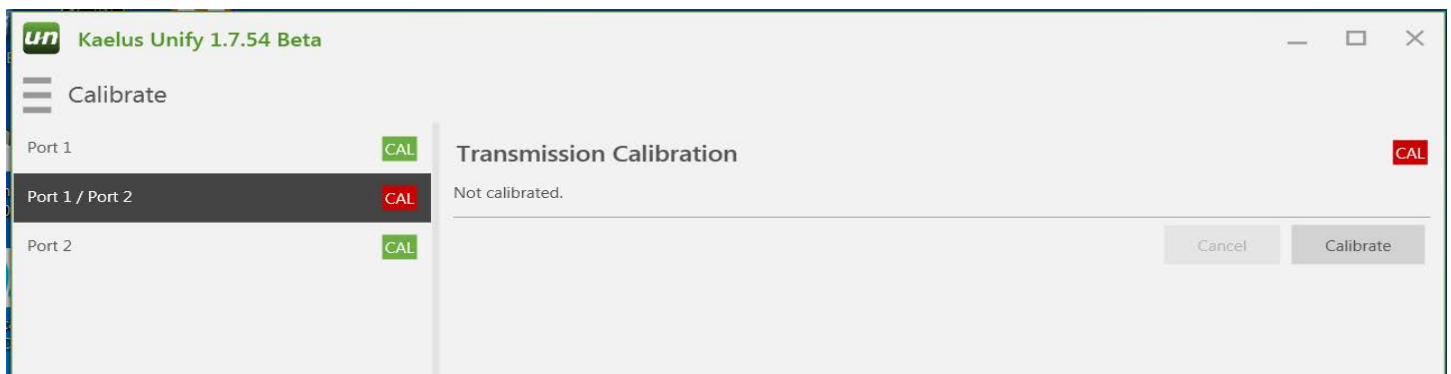


In Traces menu, select Transmission as measurement type.



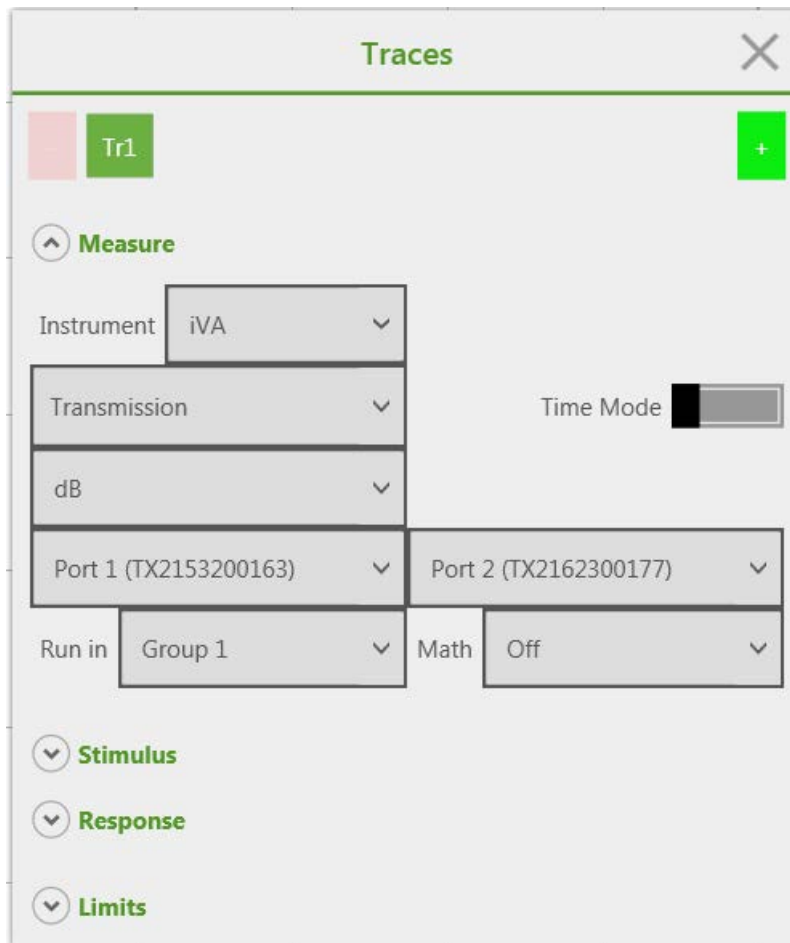
Perform a Transmission calibration

- Go to "Calibrate" screen and select "Port 1/Port 2"



- Return to “Transmission” state
- Specify Frequency Sweep setting as well as all necessary parameters

An additional option is to specify the direction of the Transmission measurement, i.e. Port 1 to Port 2, or Port 2 to Port 1. This setting can be accessed in the “Traces” menu.



Transmission setup is complete and ready for transmission measurements.

## 6.2.1 Transmission Mode Multiport



**Figure 33 Four Port Analysis Using 4 iVA's and Transmission Mode**

Two iVA's can be used in transmission mode to characterise a transmission path. Additional iVA's can be used for multiport or combiner analysis as shown in Figure 33 above (4 iVA's used here).

## 6.3 Channel Power

The Channel Power mode allows the measurement of RF power available within a specified narrow band or channel by measuring the full signal spectrum, and then summing up the total RF power between any two frequencies. Measurement bandwidths of up to 75 MHz are allowed, for signal levels ranging from +15 dBm to -100 dBm. Both modulated and continuous wave (CW) signals are supported. Maximum allowable power is +20 dBm.

From the Main menu, select a current Channel Power test mode, or create a 'New' iVA test.

Using the Traces menu, set the 'Measure' criteria.

- Set IVA Instrument type
- Set Port # for required instrument
- Set Measurement type to Spectrum
- Set Time Mode slider to OFF (gray)
- Set Measurement value type (dBm or mW)
- Set Measurement range

(Low, -115 to -35 or High, -50 to +20)

- Run in GROUP 1, Math OFF

Using the Traces menu, set the 'Stimulus'.

Start / Stop frequencies must cover the band used.

- Set Start Frequency (must be  $\geq$  560MHz)
- Set Stop Frequency (must be  $\leq$  2750MHz)
- Set number of Data Points (1 - 2191)

Using the Traces menu, set the 'Channel Power'.

Start / Stop frequencies should cover the Channel to be measured.

- Set Annotations On or Off
- Set 'Signal Type' to CW or Modulated



- Set Start Frequency (must be  $\geq 560$  MHz)
- Set Stop Frequency (must be  $\leq 2750$  MHz)

Using the Traces menu, set the 'Limits' as required.

- Set Annotations On or Off, (all traces)
- Set specific Limits On/Off



**Traces**

**Measure**

Instrument: iVA

Spectrum

dBm

Port 2 (TX2150700240)

Time Mode: [Slider]

Run in: Group 1

Math: Off

**Stimulus**

Start Frequency: 1820 MHz

Stop Frequency: 2000 MHz

Points: 601

Channel Power

Annotations

-

1

Signal Type

CW

Start Frequency: 1950 MHz

Stop Frequency: 1990 MHz

Limits

Annotations

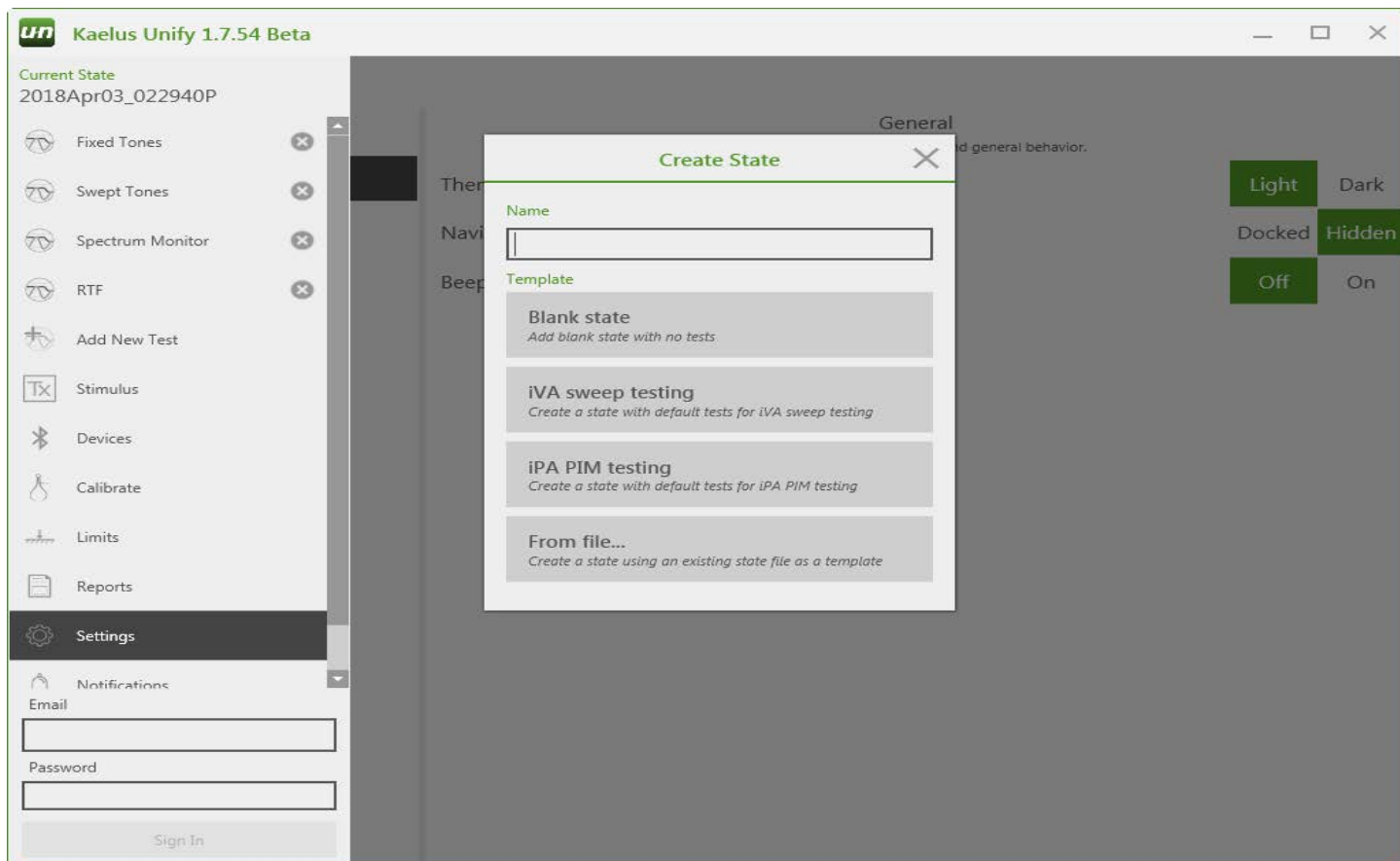
Spectrum

Edit Limits

Figure 34 Channel Power Settings Menu

## 7. Application Reference

### 7.1 State



**Figure 35 State File Menu**

Unify provides a simple platform to save instrument setups to a state file, including Tags, Limits, Modes, Traces and Markers. It is worth spending some time to organize test setups and workflow with state files. State files can be sent and shared via normal sharing mechanisms, including email, Dropbox, Wi-Fi Direct, and USB Upload. Sharing choices are available when entering the state saving menu.




## 7.2 Tests

### 7.2.1 Return Loss



**Figure 36 Return Loss Menu**

1. Plot Menu. Set parameters for this measurement channel. See section 7.3.
2. Add and delete measurement tags menu. See Section 7.6.
3. Traces menu. Add and edit traces to the display. See section 7.4.
4. Reset scales. Reset zoom settings.
5. Show/hide button labels.
6. Display for start/stop stimulus frequency.
7. Display for the number of plot/measurement points. Edited via the trace menu. See section 7.4.
8. Edit Test name.
9. Add measurement markers.
10. Change highlighted marker on the selected trace.
11. Move highlighted marker.
12. Calibration indicator.
13. Enter the state files menu. See section 7.1.
14. Switch between single or continuous sweep.
15. Start stop trace/measurement.
16. Record (record display for a report).

17. Record progress icon  appears as the trace sweeps.
18. Spec limit displayed.
19. Trace pass/fail indicator.  
20. Picture menu.

## 7.2.2 Cable Loss Measurement

Cable loss is determined by measuring return loss to a shorted end of the Cable under test, then halving that loss. First, perform an OSL (Open Short Load) calibration on the iVA (see Section 5.6) Next, fit the iVA to one end of the cable under test and the OSL short to the other end. If more than one iVA is available, cable loss can also be measured using Transmission mode. See Section 6.2.1.

## 7.2.3 Distance to Fault

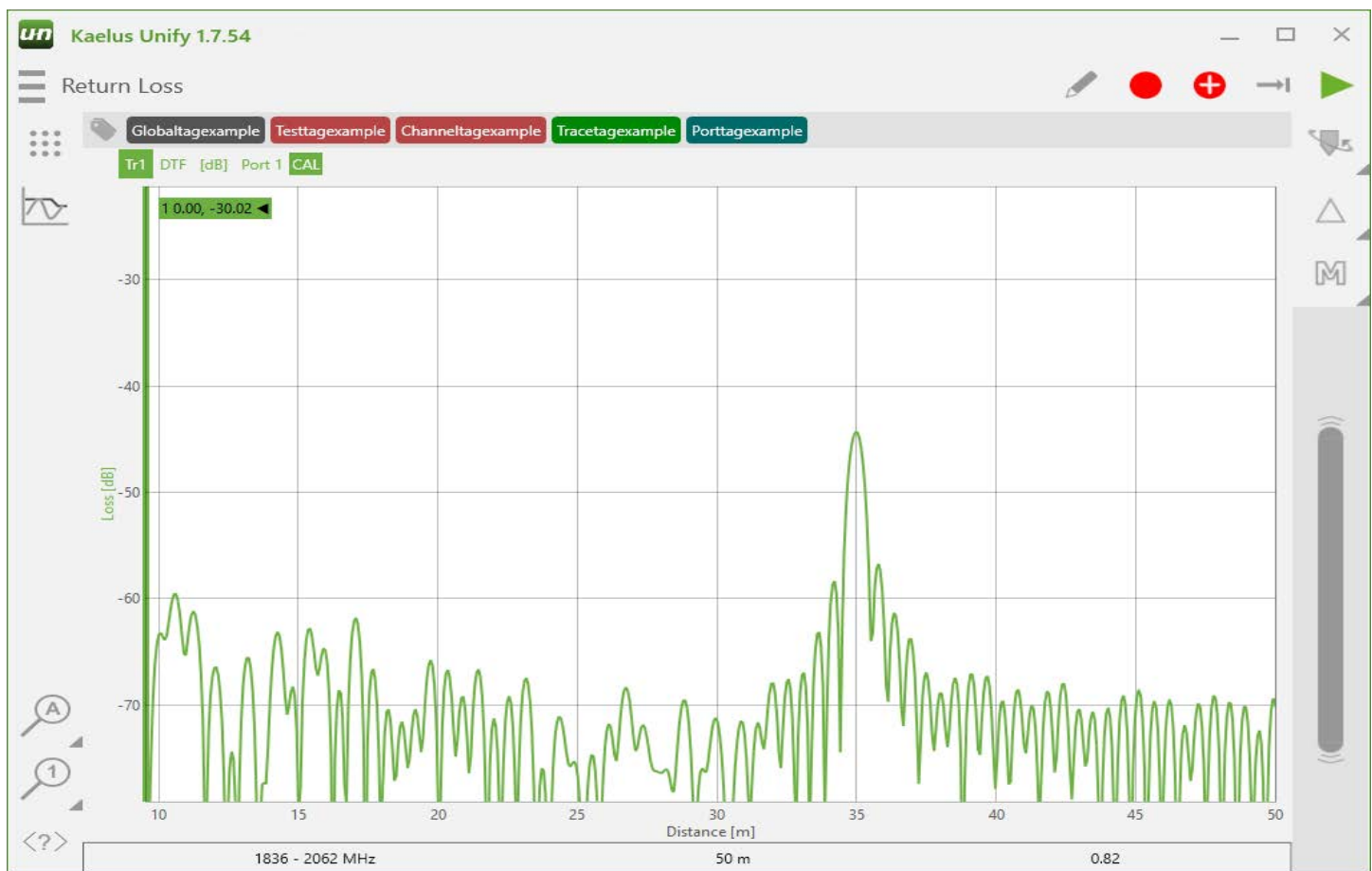


Figure 37 Distance to Fault Display

#### **7.2.4 PIM Measurements**

Refer to Section 5.5 on page .

#### **7.2.5 Distance to PIM**

Refer to Section 6.1 on page .

#### **7.2.6 Transmission mode measurements**

Refer to Section 6.2 on page .

## 7.3 Plots



The Plot menu is accessed by pressing the plot icon shown.



**Figure 38 Plot Menu Possibilities**

The plot menu is used to control a number of plot characteristics. Plot X and Y Scales can be set manually or locked if you require the same scale to be used between reports. The plot menu expands depending on the available trace plot functions.

### 7.3.1 Subplots

Up to 4 subplots can be displayed at once. Add your traces through the traces menu, then increase the number of subplots. The Y axis display is split depending on the number of plots.

### 7.3.2 Locked

Both X and Y axes have locked on/off icons. These allow for the scale to be locked at its current setting.

### 7.3.3 Configure Manually

When the Configure Manually icon is on, the X scale can be configured manually. Depending on the trace type used, the X scale may be time, frequency or distance as shown in Figure 38. Where the X scale is the same type, it is shared between sub-plots. All Y axis traces or subplots can be set manually if required.

### 7.3.4 X Axis Min Max

The X axis scale can be set manually. Depending on the Plot type, this access might be time, frequency or distance. Where multiple plots/sub-plots are used and the X axis is a common unit type, the x axis scale can be shared.

### 7.3.5 Y Axis Min Max

The Y axis scale can be set manually. Each of the Y axis scales can be set independently.

## 7.4 Traces

The trace menu provides configuration options for up to 4 traces. Available selections change depending on the instrument and trace type selected.

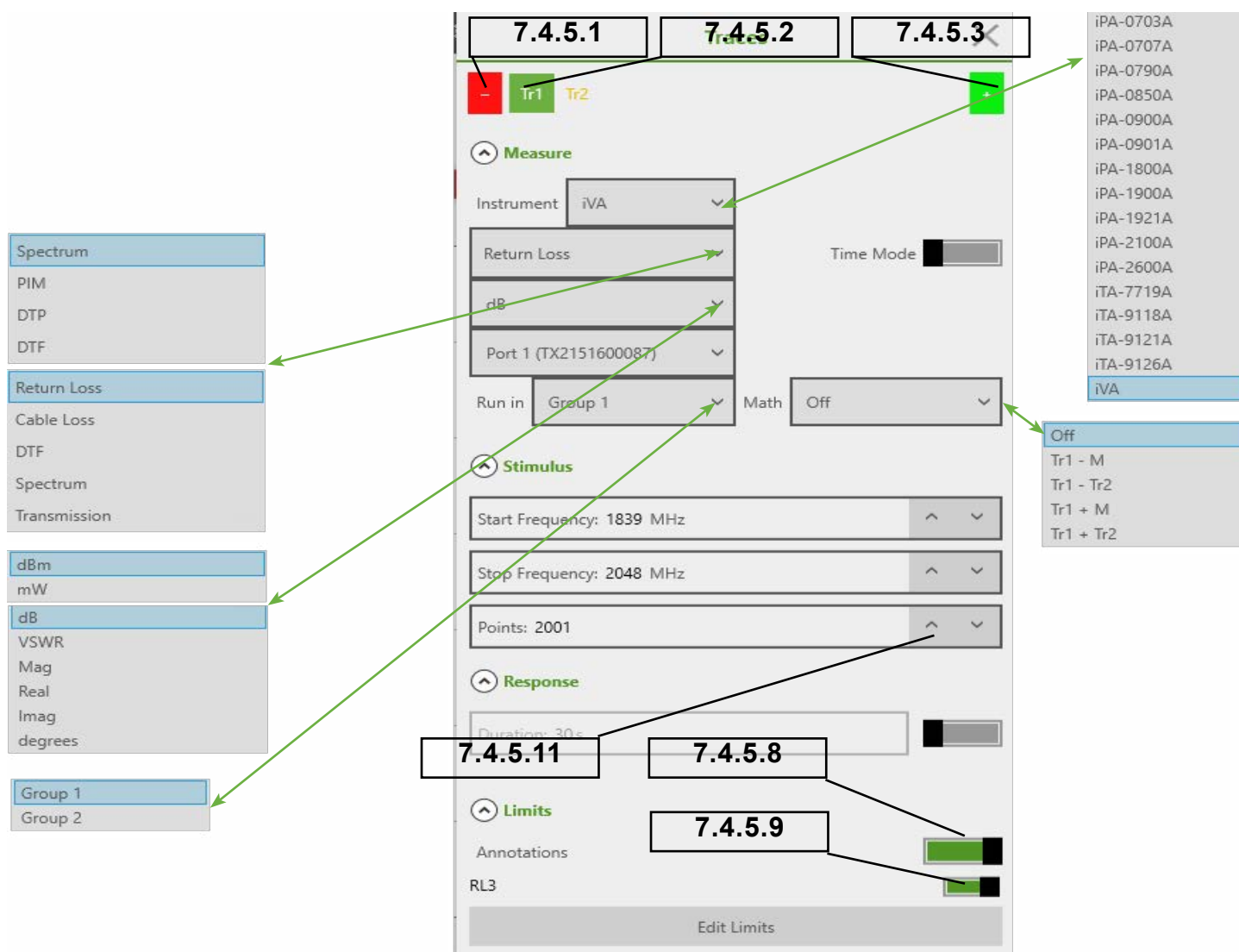


Figure 39 Traces Menu



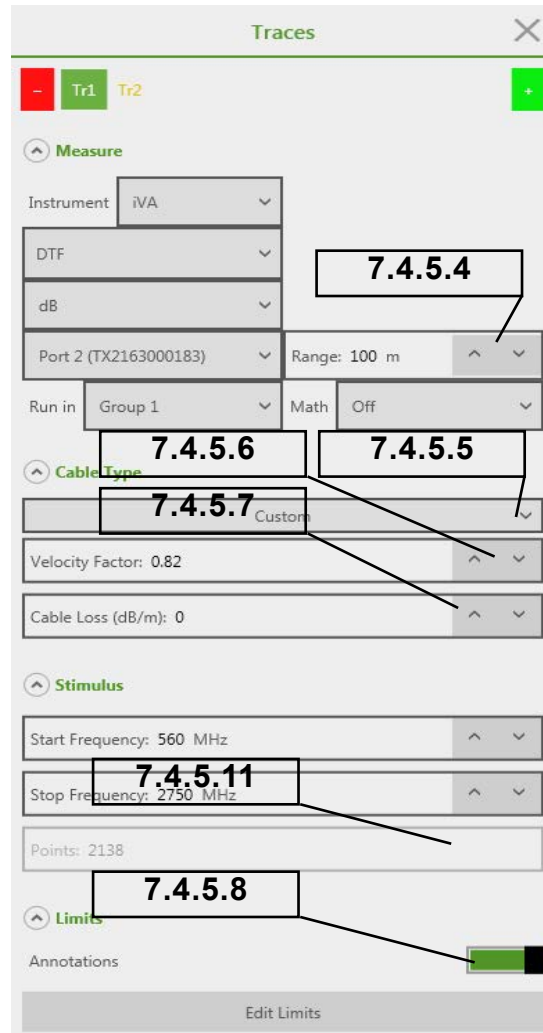


Figure 40 DTF Trace Menu

#### **7.4.5.1 Remove Trace**

This feature removes the highlighted trace.

#### **7.4.5.2 Shows the Trace Number**

This shows the trace number for the current parameter menu. Other traces can be Tr2, Tr1 and so on.

#### **7.4.5.3 Add an Additional Trace**

This feature adds a trace to the current display channel.

#### **7.4.5.4 DTF Range**

This sets the maximum measurement range and trace X Scale on the DTF graph.

#### **7.4.5.5 Cable Type**

A pull-down menu displays a number of pre-configured cable types. This populates items 7.4.5.6, and 7.4.5.7 automatically. If your desired cable is not displayed, select custom and enter items 7.4.5.6 and 7.4.5.7 from your cable datasheet.

#### **7.4.5.6 Velocity Factor**

Velocity Factor displays relative speed of the radio waves in the desired cable compared to (air is 1.00) Incorrect velocity factor entry can introduce errors in the distance-to-fault measurements.

#### **7.4.5.7 Cable Loss Per Unit Length**

Length units can be set in the settings menu. Enter the cable loss per meter.

#### **7.4.5.8 Annotations Switch**

If the Annotations switch is on, the entered limits are overlaid on the display. Individual user entered spec limits can be applied to this trace by switching them on.

#### **7.4.5.9 Apply Limits Switches**

Spec Limits entered in the Limits menu can be applied to the selected trace, via an ON/OFF switch in this sub-menu.

#### **7.4.5.10 Open Limits Menu**

This will take you directly to the limits edit menu. See Section 7.7.1 for details.

#### **7.4.5.11 Points**

This menu item details number of measurement points to be created and displayed.

## 7.5 Markers

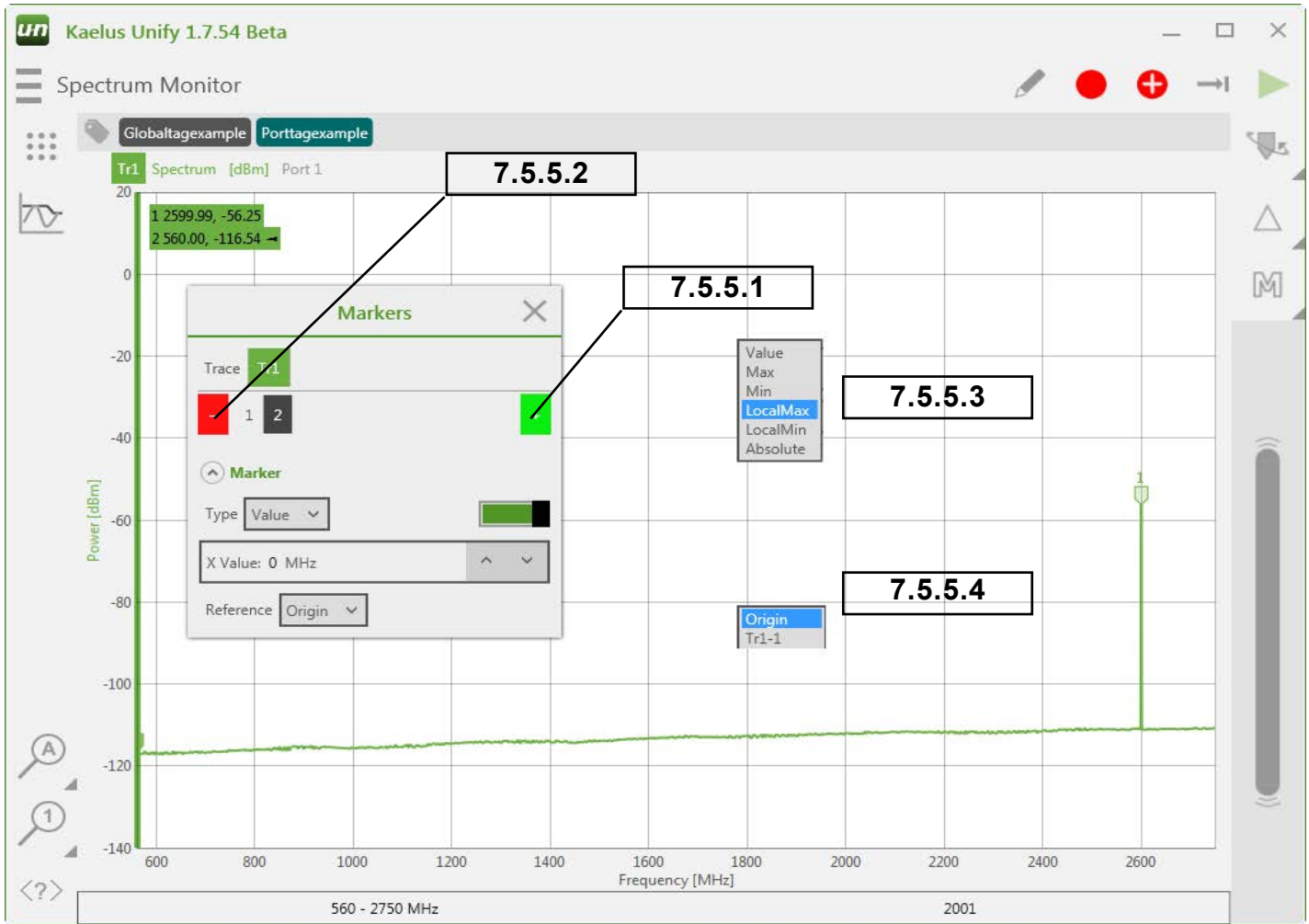


Figure 41 Marker Setting

### 7.5.5.1 Add Marker

Add a marker to the currently selected trace.

### 7.5.5.2 Remove Marker

Remove currently selected marker from the trace.

### 7.5.5.3 Marker Type

Marker type pop up menu appears. These include Value, Max and Min marker types.

#### 7.5.5.3.1 Value Marker

Value markers allow you to enter an absolute X value. Once an absolute marker value has been entered, this can be further adjusted by the slider control or entering a new value.

#### **7.5.5.3.2      Max Marker**

When both max and min Marker types have been selected it is possible to enter a threshold value. The Max marker will ignore maxima below the threshold value.

#### **7.5.5.3.3      Min Marker**

When both max and min Marker types have been selected it is possible to enter a threshold value. The Min marker will ignore minima above the threshold value.

#### **7.5.5.4      Marker Reference Menu**

This marker pop-up menu allows the user to select what point the marker result references. In its simplest form, Origin is the origin of the trace (0,0). This gives you absolute marker values. In addition to this on the pop-up menu, any other currently set marker on any other trace can be compared as a result shown on your current marker result. TrX signifies the trace number. Tr1-X Indicates the marker number on that trace. Therefore, to perform a Delta measurement from Tr1-1 (Trace 1 Marker 1) Marker 2, the delta result would have its reference set to Tr1-1. Marker 2 will then show the difference in frequency and level from marker 1 on Trace 1 .

## 7.6 Tags

### 7.6.1 Tag Menu Options

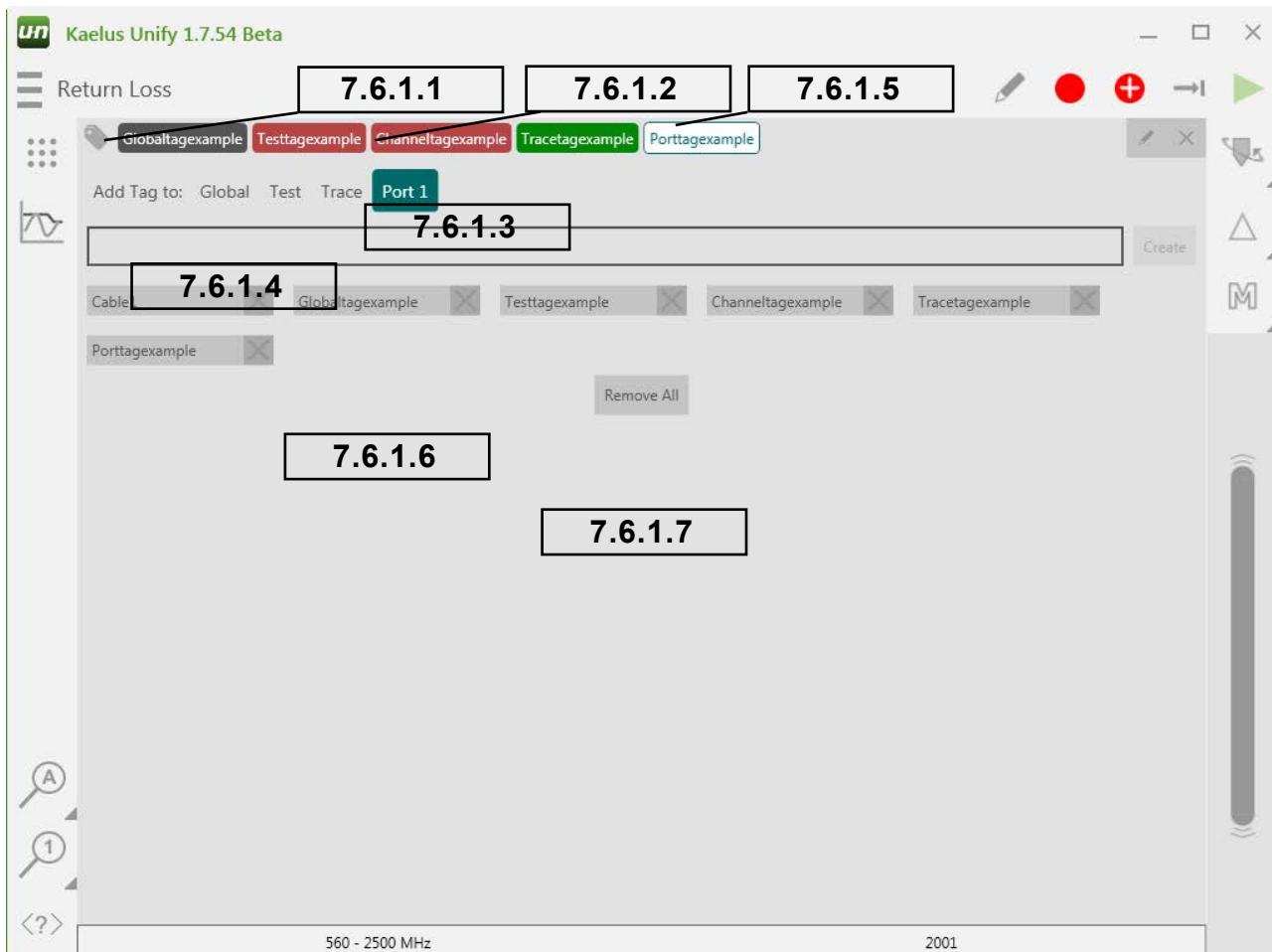


Figure 42 Tag Menu

### **7.6.1.1 Enter and Exit the Tag Menu**

The tags menu icon appears on all measurement Test screens. Touch on it to make the tags menu appear. Touch this icon again to exit the tags menu.

### **7.6.1.2 Current Tags List Area**

Prior to entering the tags menu, whichever trace, test, port, or channel in use will have its particular set of tags displayed in the current tags list area. Tags are displayed in color order as per the tag scope selection order. Drag tags can be dragged up and down to associate with a different scope if required. Alternatively, select a tag and use the scope buttons.

### **7.6.1.3 Tag Scope Selection**

The tag you enter in the Tag Entry Area (See Figure 42) will be associated with a tag scope. Frequency of tag visibility will depend what scope is selected when you press “create tag.”

#### **7.6.1.3.1 Global**

Global tags appear everywhere. Every plotted result in the report will have the tag you have entered associated with it.

#### **7.6.1.3.2 Test**

Everything in the currently selected Test will have the tag you enter associated with it. Tests can be one of the default Tests such as the DTP Test shown in Figure 27, or one of your user-created Tests. If you create a second Spectrum Monitor Test, your tag would only associate with the Test currently selected when you entered the tags menu.

#### **7.6.1.3.3 Trace**

Only the currently selected Trace will have the tag you enter associated with it.

#### **7.6.1.3.4 Port**

In the devices menu each connected iVA is associated with a Port (1 , 2 , 3, etc.). Any trace using the selected Port will include the tag you enter associated with it. This tag grouping can associate with an iVA's physical location, such as Cable1, for example.


### **7.6.1.4 Tag Entry Area**

Tags should be entered here with no spaces. Ensure the desired group is selected first, then press Create Tag or hit Enter.

### **7.6.1.5 Highlighted tag for deletion.**

Highlight/select one of the tags in the current tags list area as shown. Pressing  will delete it.

### **7.6.1.6 Tags Pool**

Enter your required grouping then touch one of the tags in the tag pool to re-use any of the tags you have already entered. An  appears by each tag in the pool to allow it to be deleted.

### **7.6.1.7 Remove All**

Remove all the tags in the tags pool.

## 7.7 Setting Test Limits

Test limits can be entered and enabled per trace. There are several test limit types that can be applied to a given trace. Single or multiple limits can be applied to the same trace, providing great versatility.

### 7.7.1 Limits Menu Options



Figure 43 Limits Menu

#### 7.7.1.1 Add a New Limit

Each New Limit will be appended to the end of the list. Highlight the New Limit and edit your new spec to suit.

#### 7.7.1.2 Remove Limit

Whatever limit that is currently highlighted will be removed. Ensure you highlight the limit you want to remove first before pressing Remove Limit.

#### 7.7.1.3 Limit Label Field

Edit the Label of your spec. This label will appear in the corner of the trace when the limit is enabled. It will also appear on your test report and test report preview screen, and is used to label your limit enable switches.

#### 7.7.1.4 Limit Type Field

Provides a pull-down menu allowing the limit type to be selected.

##### 7.7.1.4.1 Minimum Spec Type

Refer to Figure 44 and Section 7.7.2.

##### 7.7.1.4.2 Maximum Spec Type

Refer to Figure 45 and Section 7.7.3.

##### 7.7.1.4.3 Tolerance Spec Type

Refer to Figure 47 and Section 7.7.5.

#### **7.7.1.4.4 Ripple Spec Type**

Refer to Figure 46 and Section 7.7.4.

#### **7.7.1.5 Spec Limit Trace Type Field**

This specifies the type of trace for applied specs, including DTF, Return Loss, Cable Loss, Spectrum.

#### **7.7.1.6 Measurement Units**

This provides a pull-down menu that allows measurement units to be selected.

#### **7.7.1.7 Start Point**

This specifies the start point the spec limit is applied over including start frequency or the starting distance if used with DTF (Distance to Fault) measurements.

#### **7.7.1.8 End Point**

This specifies the end point the spec limit is applied over, which can be end frequency or the end distance if used with DTF (Distance to Fault) measurements.

#### **7.7.1.9 Value**

The limit value can be entered here. This can be the ripple value, maximum level, or minimum level. For tolerance specs , this will be the amount above and below the center value.

#### **7.7.1.10 Center**

Used with tolerance spec limits, Center specifies the center of the tolerance window. The value here sets the amount above and below the center value, and only appears for Tolerance spec limits.

**Note:** A limit cannot pass unless there is sweep data that covers its full range (Start Point to End Point). Sweeps must be equal to or outside the limits set. When testing against limits please ensure your sweep is configured appropriately.



## 7.7.2 Minimum Limit



Figure 44 Minimum Spec Limit

### 7.7.2.1 Minimum Limit Start

This is the starting point that spec level is applied over, in this case 2000MHz.

### 7.7.2.2 Minimum Limit Stop

This is the end point that spec level is applied over, in this case 2080MHz.

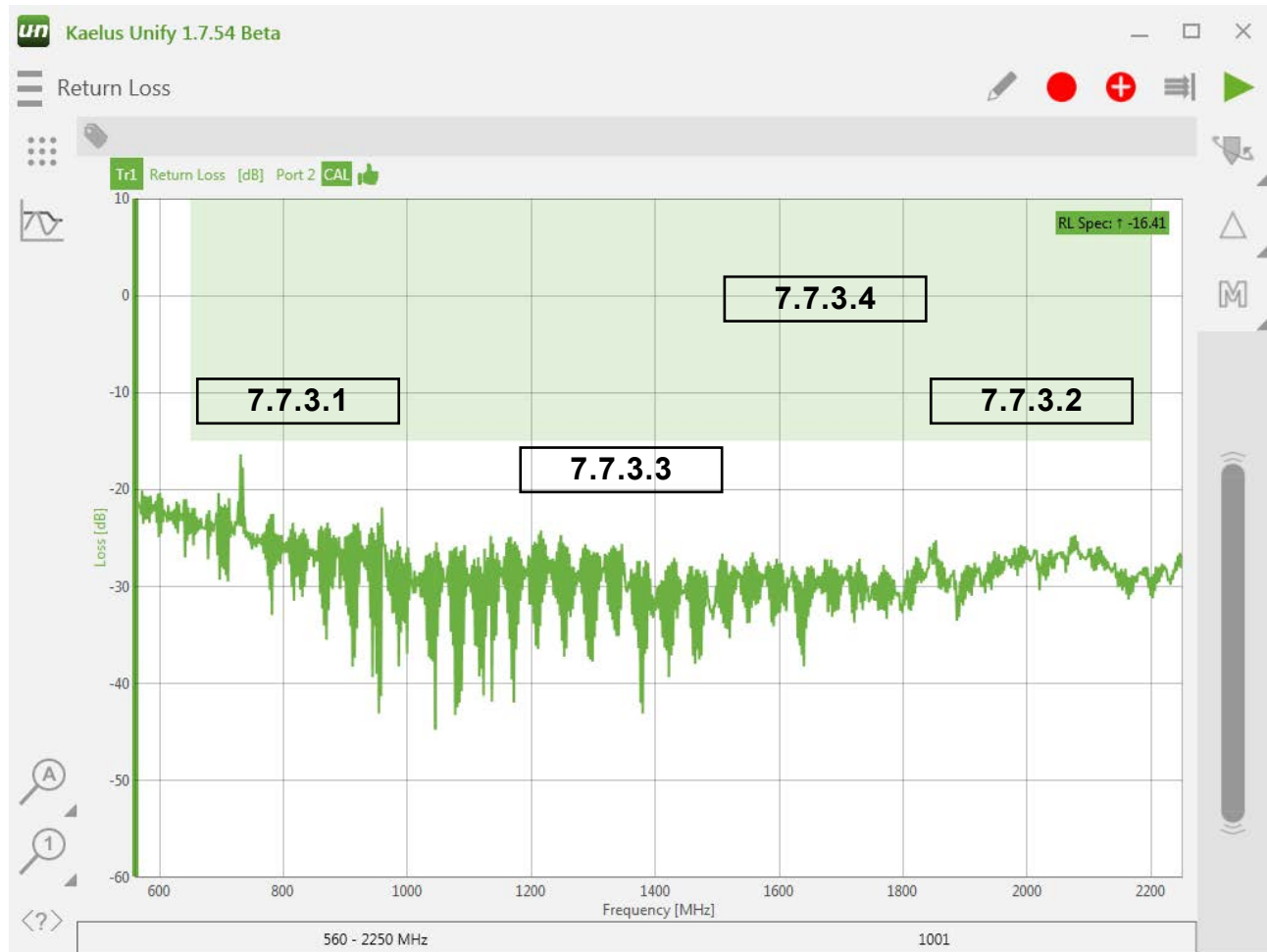
### 7.7.2.3 Minimum Limit Level

This is the minimum amplitude (magnitude) limit, in this case 0dB.

### 7.7.2.4 Limit label, type and result

The limit label shows the label you created in the limits menu. The down arrow shows this is a minimum spec limit. There is a result shown here also; between the start and stop points the trace has a Minima of -0.35.

### 7.7.3 Maximum Limit



**Figure 45 Max Limit Drawn on a Return Loss Trace**

#### 7.7.3.1 Maximum Limit Start

This is the starting point that spec level is applied over, in this case 650MHz.

#### 7.7.3.2 Maximum Limit Stop

This is the end point that spec level is applied over, in this case 2200MHz.

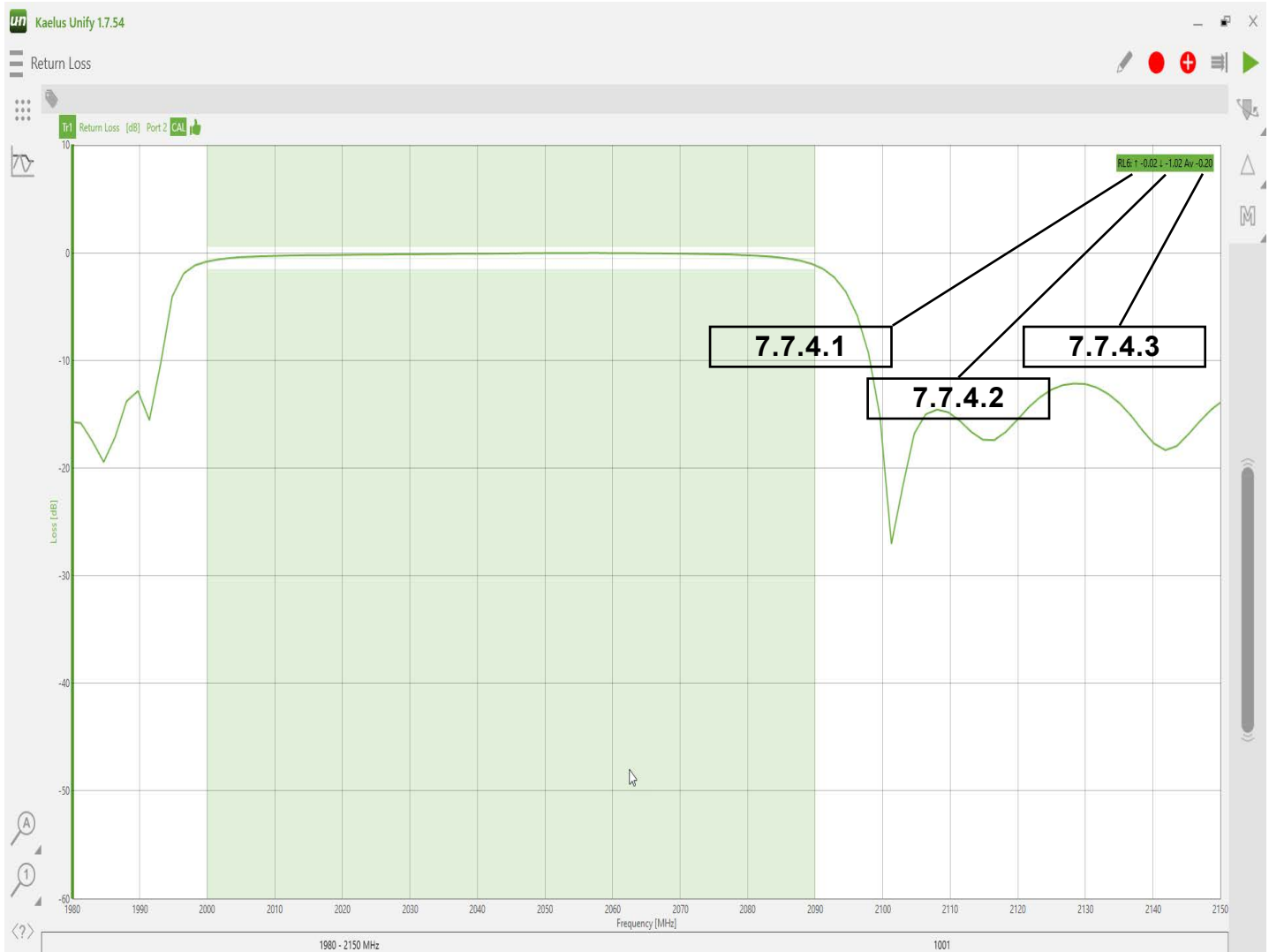
#### 7.7.3.3 Maximum Limit Level

This is the maximum amplitude (magnitude) limit, in this case -15dB.

#### 7.7.3.4 Limit label, type and result

The limit label shows the label you created in the limits menu. The up arrow shows this is a maximum spec limit. There is a result shown here also; between the start and stop points the trace has a peak of -16.41 .

## 7.7.4 Ripple Limit



**Figure 46 Ripple Limit on a Trace**

### 7.7.4.1 Ripple Max in Band

This shows the maximum level that has occurred between ripple limits start and stop.

### 7.7.4.2 Ripple Min in Band

This shows the minimum level that has occurred between ripple limits start and stop.

### 7.7.4.3 Ripple Average in Band

This shows the average value of the ripple between start and stop.

### 7.7.4.4 Ripple Level

The limit set for the example in Figure 46 was 2dB. The difference between -0.2 and -1.2 is 1dB, so this example indicates a pass.




## 7.7.5 Tolerance Limit

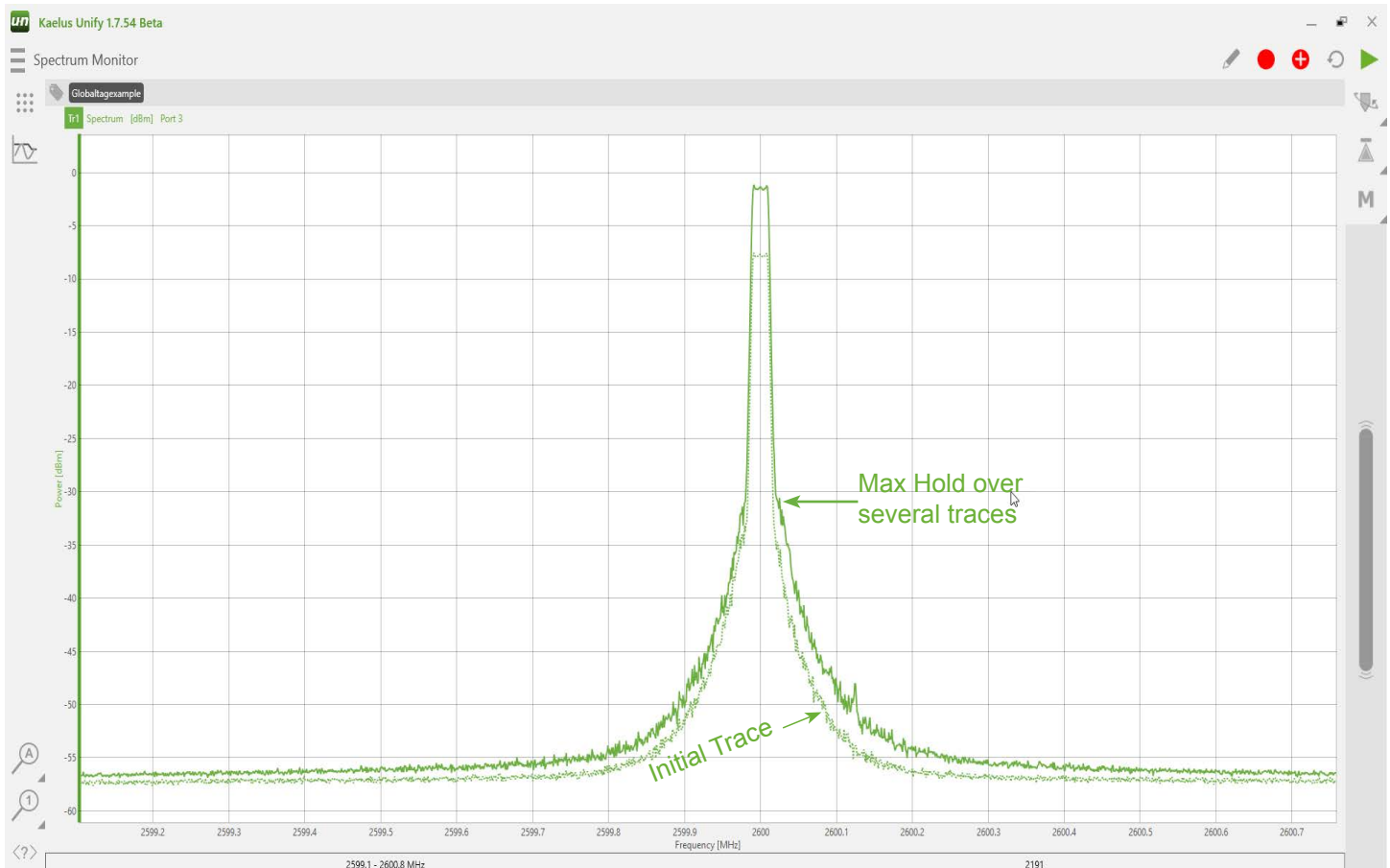


**Figure 47 Tolerance Spec Limit**

Tolerance Limits set an absolute level center and a plus/minus value. This differs from the ripple limit, which uses whatever level is present in the ripple start-stop range.

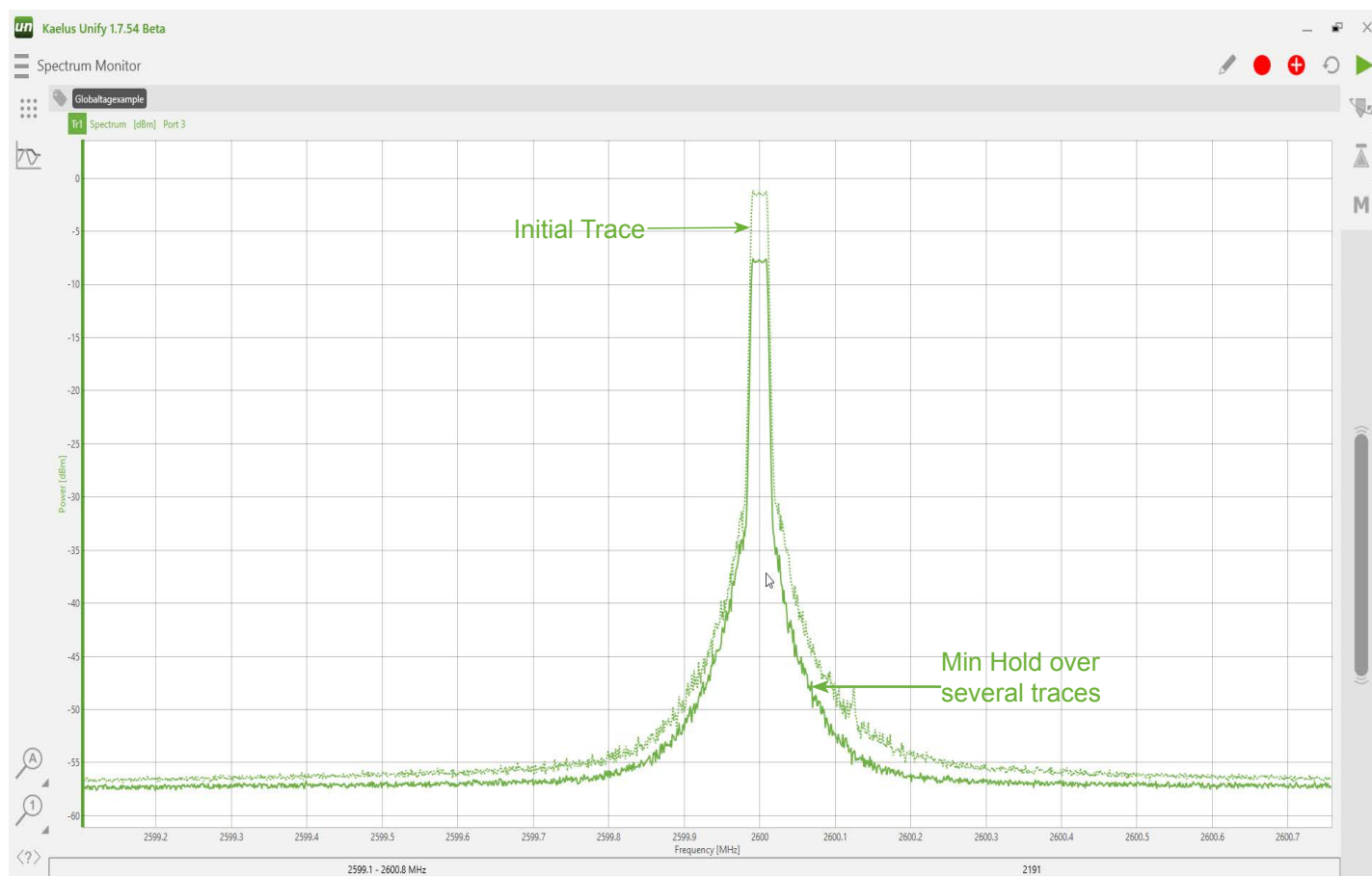
## 7.8 Trace Hold

The Trace Hold function has 3 states:  Trace hold off,  Trace hold max,  Trace hold min. Trace hold off performs normal trace functions. Trace hold max builds a trace based on the maximum values from multiple traces. Trace hold min builds a trace based on the minimum values from multiple traces.



**Figure 48 Trace Hold Max**

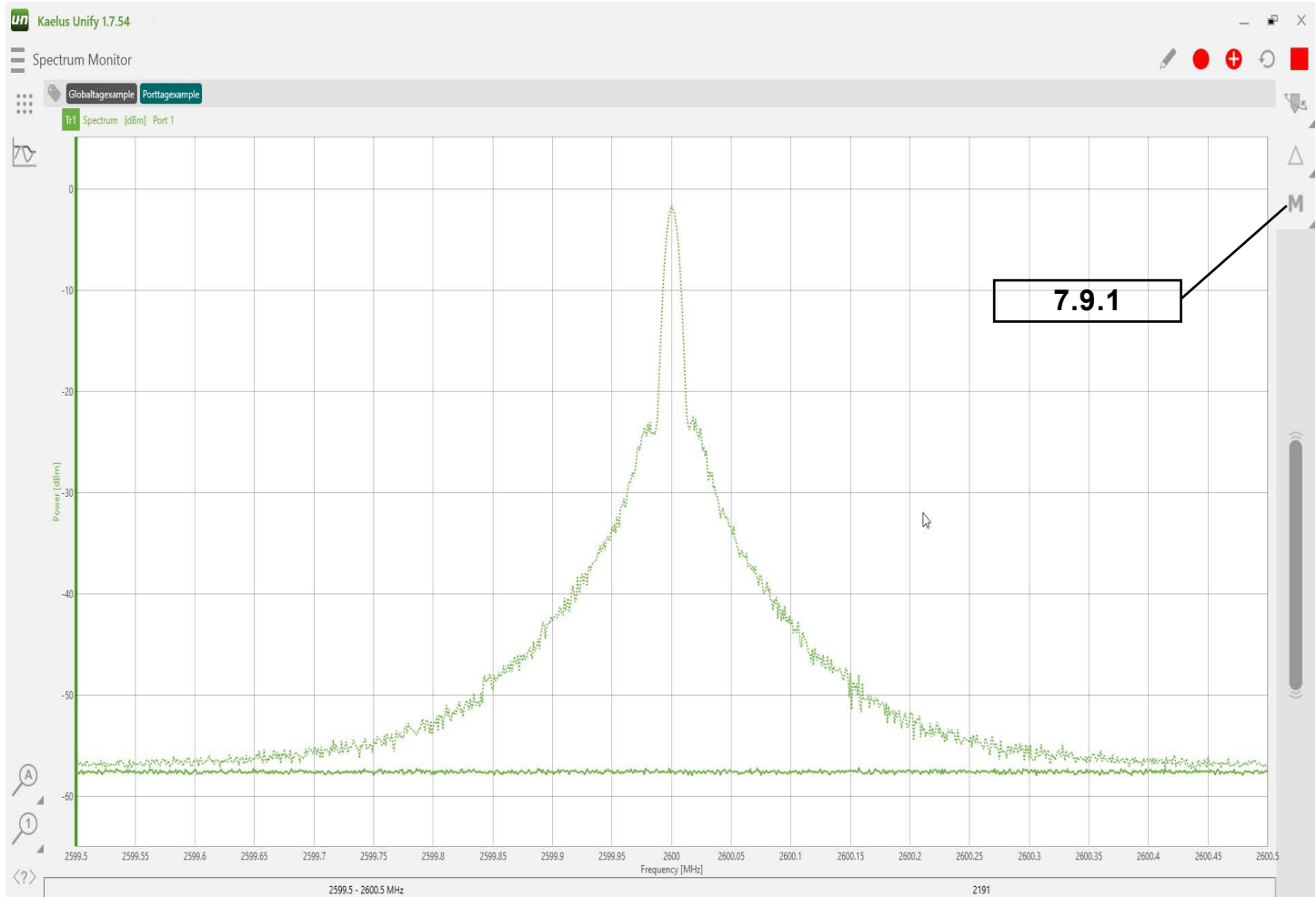
From the initial trace shown in Figure 48, the trace will build based on maximum values from each subsequent trace.



**Figure 49 Trace Hold Min**

From the initial trace shown in Figure 49, the trace will build based on minimum values from each subsequent trace.

## 7.9 Trace Memory



**Figure 50 Trace Memory**

Traces can be stored in trace memory and be referred to in a subsequent trace. Traces in memory can be saved or reloaded for future use. Memory traces are displayed as a dashed line (see Figure 50). Trace memory can be used in trace math (see Section 7.10). Note: Ensure the desired trace is highlighted before activating trace storage or memory functions.

### 7.9.1 Activating Trace Memory

A momentary touch will cause the current trace to be stored in memory. A long press or right click for Windows users will activate the trace storage menu.

### 7.9.2 Trace Storage and Recovery

From the trace Storage menu the following options are available .

#### 7.9.2.1 Save Memory

The current memory trace can be saved as a CSV file. A default date/time stamp file name will be provided, or you can specify the file name you wish.

7.9.2.2 Load Memory

A previously stored trace can be loaded into memory.

7.9.2.3 Save Trace

The current trace (solid line) can be saved as a CSV file for future use in memory or the main trace.

7.9.2.4 Load Trace

This will will load an an existing CSV file into the main trace (solid line).

7.10 Trace Math

Trace math is a powerful and versatile tool. A trace can be the result of the trace math function. The trace you are creating can have one of the other traces on the screen added or subtracted from it, or the contents of the trace memory added or subtracted.

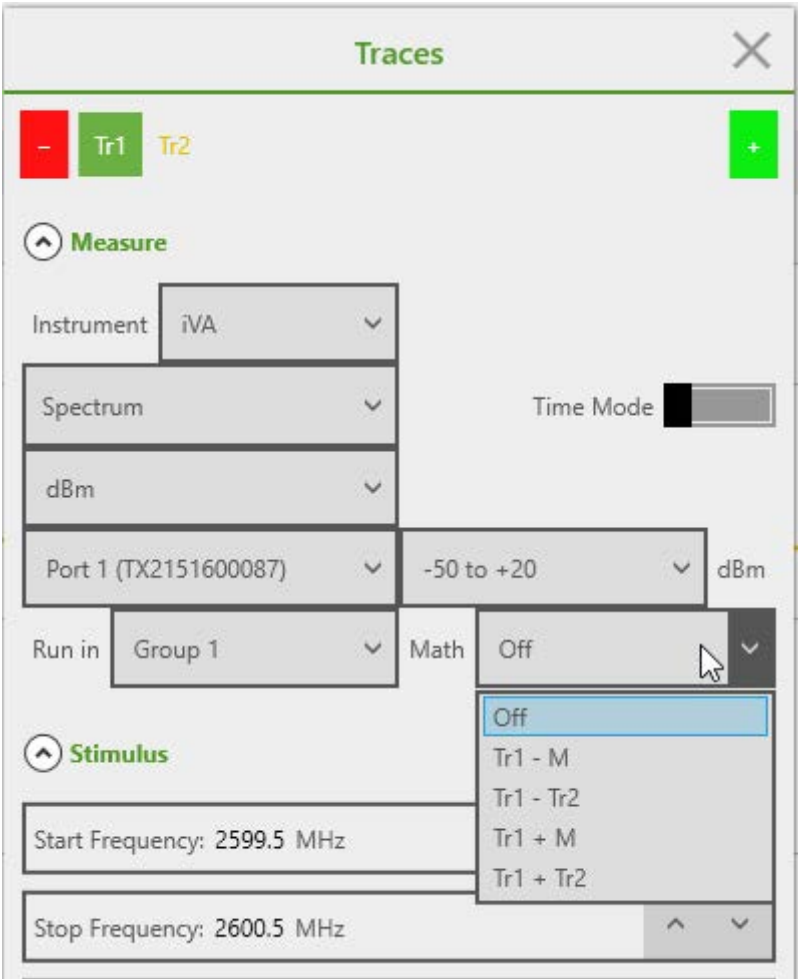


Figure 51 Trace Math Menu



## 7.11 Reports

### 7.11.1 Site Information Menu

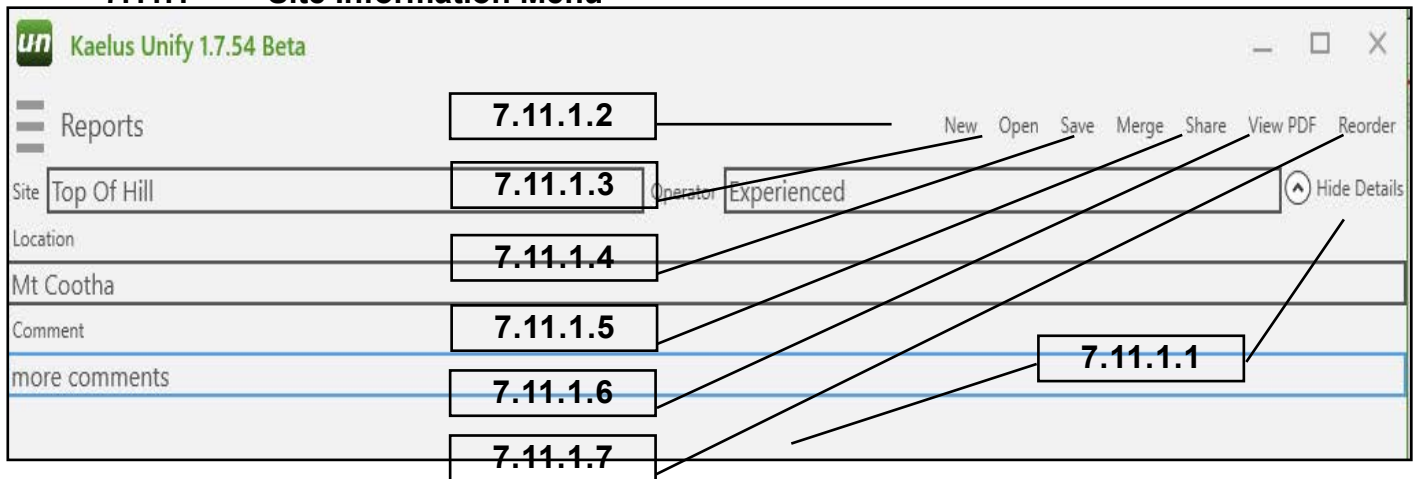


Figure 52 Report Site Information

#### 7.11.1.1 Less/More/Show/Hide Details

Expand and contract the site information menu. Location and comments field can be open or hidden to save screen space.

#### 7.11.1.2 New

Clear the current report and start a new report. Save the current report first if you need to recall it later.

#### 7.11.1.3 Open

Open an existing report file. The current report information in RAM will be lost. Tags and Settings are still available for new traces. You can save the current report data first to retrieve it later.

#### 7.11.1.4 Save

Save existing report to a file. The file name will be autogenerated based on the site, user, and test date and time, or it can be manually entered.

#### 7.11.1.5 Merge

This allows previously saved reports to be merged with the current report. This includes PIM reports from both the iQA and iPA series products including \*.rpt legacy reports and current \*.zip report formats. If conversion is required an update dialog will appear. Merged reports are saved in the current \*.zip format.

#### 7.11.1.6 Share

The file/report sharing is also available through this menu. Sharing options will depend on what Apps and resources are available on your tablet. These can include various cloud services (Dropbox, Google Drive, Onedrive) email, Wi-Fi direct. Saved reports are also available via USB from the tablet under Kaelus/iVA/Reports/. PDF reports can be shared from the PDF viewing program that you have installed and are also available via the USB under Kaelus/iVA/. Apple iOS devices can share via cloud services.

#### 7.11.1.7 View PDF

Touch to view how the final PDF report will look. The PDF viewer of your tablet will be used for this. If you want to save or share the PDF report use the save and share functions in your PDF app.

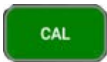
## 7.12 Stimulus

Stimulus Mode is available for Kaelus iVA instruments. This provides a test signal that can be used for system fault finding and checking. A single carrier or a sequence of frequencies and periods can be programmed. While the run control is active this sequence is repeated until the run control is turned off. See the iVA spec sheet for level specifications. Care should be taken when using stimulus mode to ensure that all appropriate regulatory laws are complied with, and that accidental nonionizing radiation that might cause interference or harm to licensed spectra or other users does not occur.

## 7.13 Calibration

There are several calibrations to complete depending on the configured measurement. OSL (Open Short Load), for iVA, Transmission Cal or Power Calibration, and PIM Calibration for DTP (Distance To Pim) for the iPA.

### 7.13.1 Calibration Indicator



Calibration saved



Requires calibration



Calibration still suitable for fault finding and repairs. See Below.

CAL Performed	Colour CAL Symbol & Criteria	Report Status	Note
Time: OSL Present	Less than 12 Hours	Calibrated	Reportable measurements
	Between 12 & 36 Hours	Uncalibrated	Fault finding and repairs
	Greater than 36 Hours	Uncalibrated	General quick check and repairs at a given measurement plane
Temp: OSL Present	Less than $\pm 8^{\circ}\text{C}$ Temp Change	Calibrated	Reportable measurements
	Greater than $\pm 8^{\circ}\text{C}$	Uncalibrated	Fault finding and repairs

7.14 Settings

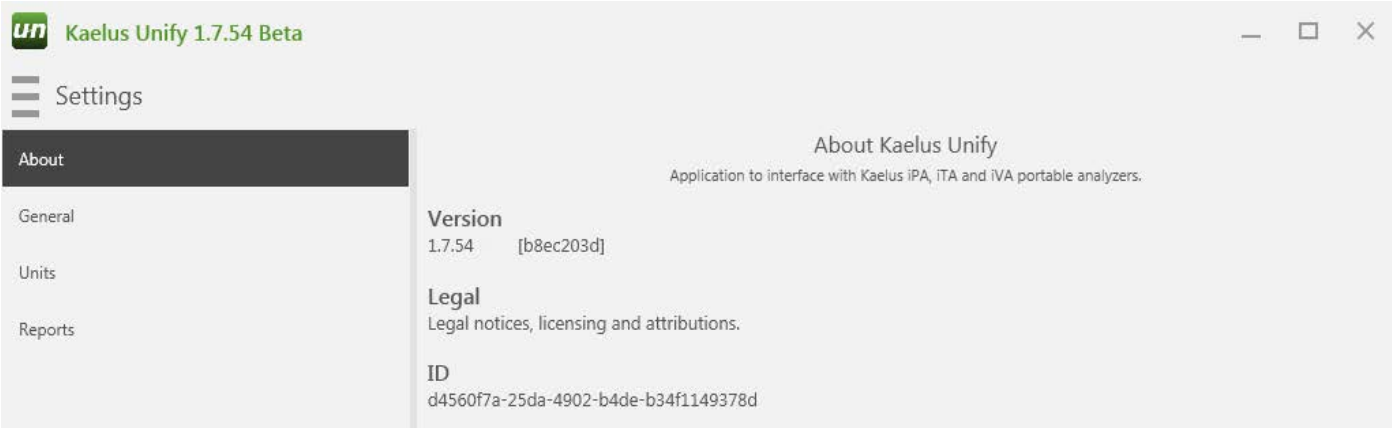


Figure 53 Settings About

The Settings “About” screen provides general information about the software.

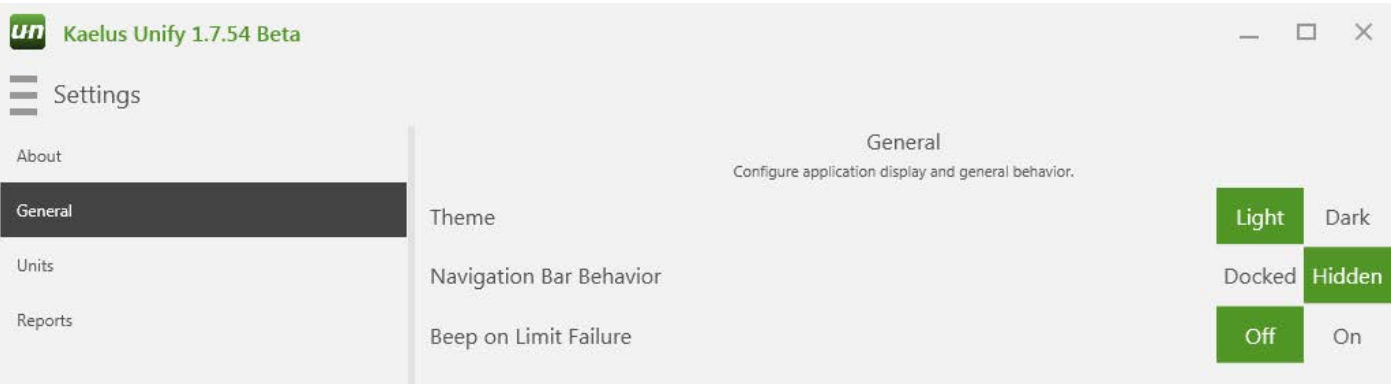


Figure 54 Settings General




Figure 55 Settings Units

### 7.14.1 Dark/Light Theme

Display Unify with either a dark theme (white writing on a dark background) or a light theme (dark writing on a light background). Refer to Figure 54 for details.

### 7.14.2 Docked/Hidden Navigation Bar

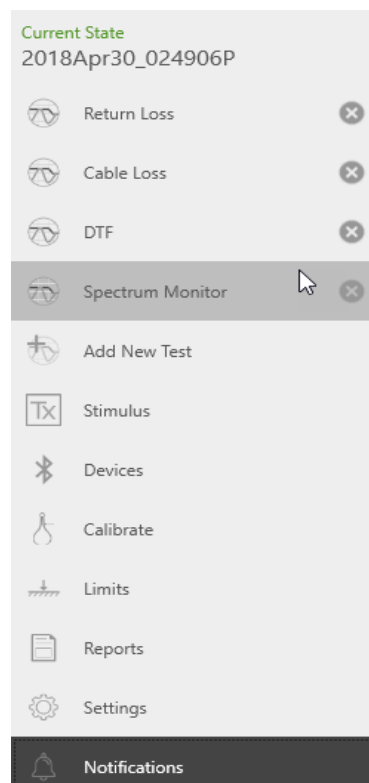
Access test and menu items via a side menu bar on the left-hand side of the display. When in the Docked mode, the side navigation panel is always visible. This reduces display space available for traces, etc. If in Hidden mode, the Navigation bar is available after pressing the  icon, and will retract when not in use to increase available display space.

### 7.14.3 Beep on Limit Failure On/Off

The Unify application has the ability to set test limits. (refer to Section 7.7). If the Beep on Limit Failure is set to on, when a trace fails to pass the limit set an Alarm Beep will sound. (Note: If running on a desktop computer, ensure a speaker is connected.)

## 7.15 Notifications

System notifications are available through the Notifications menu . This is a log of error reports, which can include attempting to apply the wrong specification type to a trace or requesting a measurement out of band of the selected instrument. You can Save, Share or Clear the Notifications log.



**Figure 56 Notifications Select**