

PIM Finder Software

Quick Start Guide

The following steps outline how to set up the PIM Finder equipment to begin finding Product of Intermodulation (PIM) sources that are external to the antenna infrastructure.

Passive Intermodulation is a well-known and common issue in cellular communications infrastructure including tower sites, DAS systems, Macro sites, and Micro sites. Measuring PIM within the antenna infrastructure is routine. However, PIM sources can occur externally to the antenna infrastructure and will effect network quality in the same way. Kaelus has introduced a light-weight, easy to use, PIM Finding solution to assist in accurately finding all sources of PIM issues external to the antenna system.

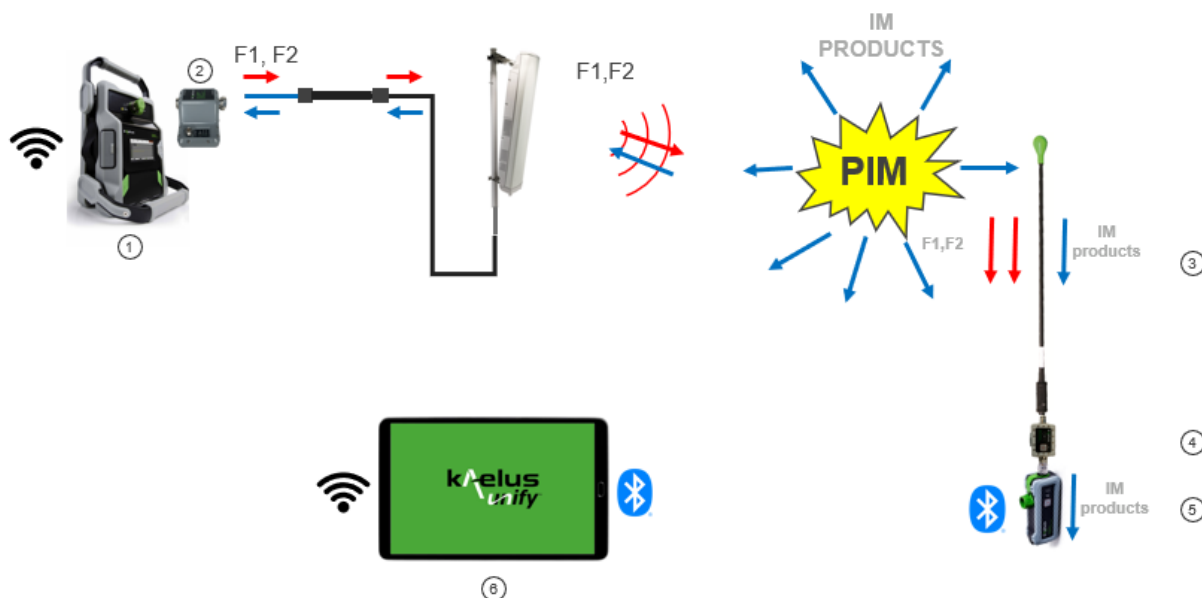
The following steps outline how to set up the Cable & Antenna Analyzer (iVA) and the Portable PIM Analyzer (iPA or iXA) using the Unify app and its "PIM FINDER Mode", to begin the process of locating PIM that is external to the antenna infrastructure.

Equipment Required

1. **Portable PIM Analyzer (iPA or iXA)** – provides 2 RF carriers to be transmitted into the antenna system
2. **Range to Fault Module (RTF)*** - perform Distance to PIM (DTP) and Distance to Fault (DTF) measurements
3. **PIM Finder Probe** – the probe provides the ability to find external PIM sources
4. **Protection Filter or Band-pass filter with Low Noise Amplifier (BPA)**
5. **iVA Cable & Antenna Analyzer** – receiver for measuring the externally generated PIM sources
6. **Control device with Kaelus Unify app installed and PIM Finder Mode enabled** - a tablet or personal computer

Note: (*) External RTF module not required with the iXA.

Equipment Setup



Equipment set up example for 1-Port PIM Finder, refer to Kaelus Website for Equipment set up with 2-Port PIM Finder (iXA).

Please read the entire Quick Start guide BEFORE starting the PIM Finder option in the Kaelus Unify app.


Connect the control device to the iPA or iXA and the iVA

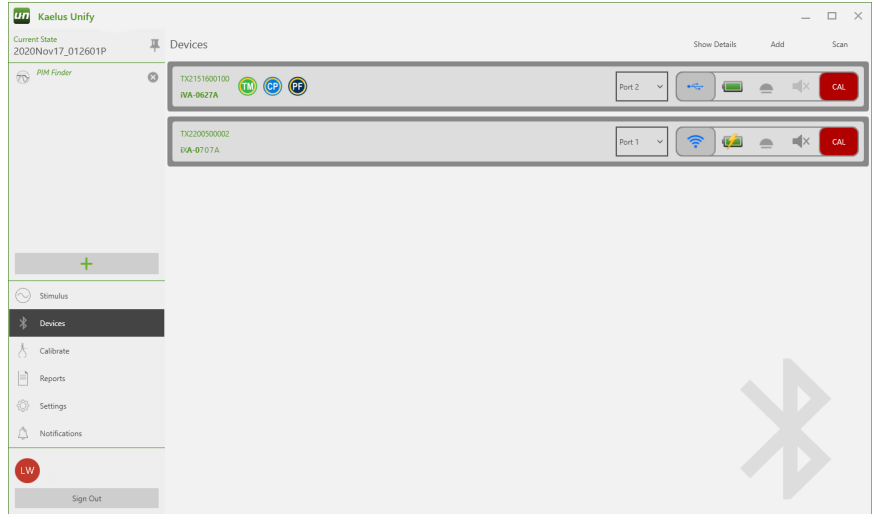
1. Launch Unify on your device, connect to the iPA or iXA.
Select it as Port 1

Connect to the iVA , Select it as Port 2

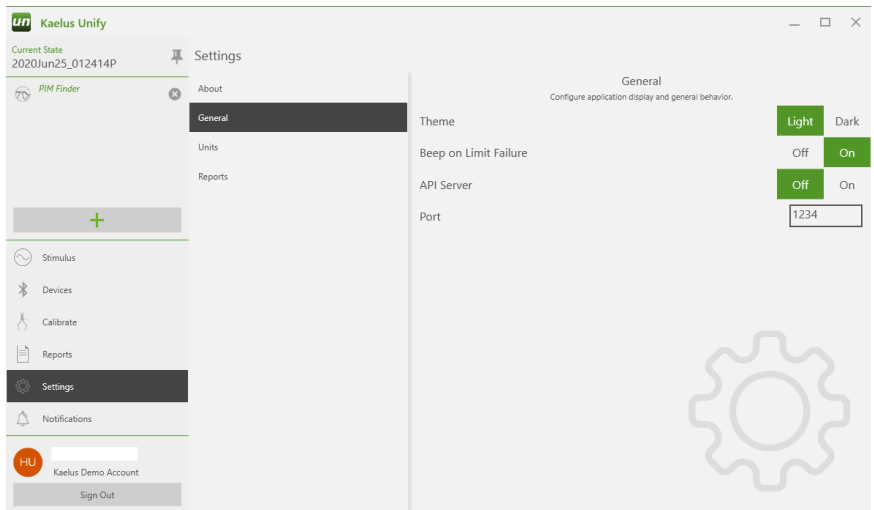
Note: iVA must have  (PIM Finder) Software option Installed.


Refer to Kaelus Unify or contact Kaelus to purchase and install the PIM Finder software.

 In order to effectively utilize the PIM Finder mode with the iPA and iVA, it is imperative to connect to the Kaelus Unify App beforehand, especially when utilizing the iPA as a Wi-Fi hotspot device.

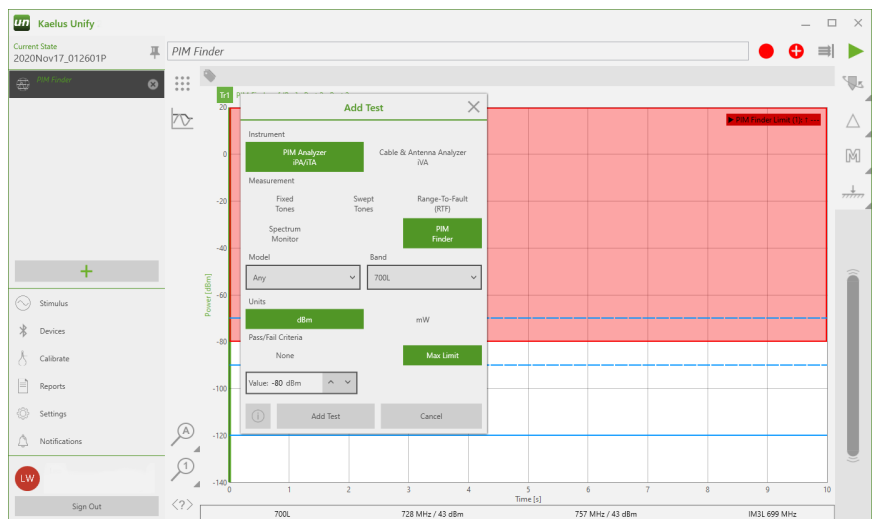


2. Go to “Settings” – “General” – Enable “Beep on Failure”



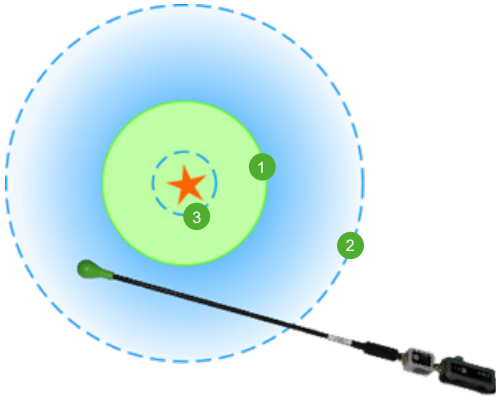
3. Initiate a new test by clicking the plus  icon
 - a. Instrument: “PIM Analyzer”
 - b. Measurement: “PIM Finder”
 - c. Select the relevant iPA or iXA Model, the TX tones frequency and IM3 frequency will be set automatically*
 - d. Units: Typically, “dBm” optional mW selection
 - e. Pass/Fail Criteria: Max Limit
 - f. Target value, refer to next page for settings
 - g. Add new test

Note: (*) TX tones and IM3 frequency can also be set manually. Contact Kaelus for details.



Create your circle of Concern

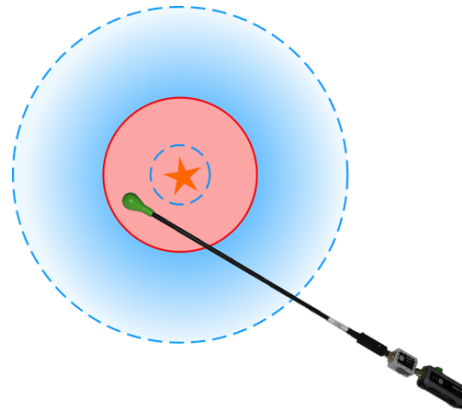
Set target value **1**, a good starting point would be ~10dB lower than the IM Swept result performed with the PIM tester. The Min **2** and Max **3** Tone Y Offset values are represented by blue dashed lines relative to your target value. These offsets control the lowest and highest comfortable audio tone values. Any signal received between these will provide a smooth audio feedback, and anything below will be silent. By being defined as offsets, these values move with your limit, meaning no adjustments are required as you scroll **4** your threshold to target a differently sized PIM source.



Note: the limit lines can also be set to the desired level with a single (left) click on Limit icon

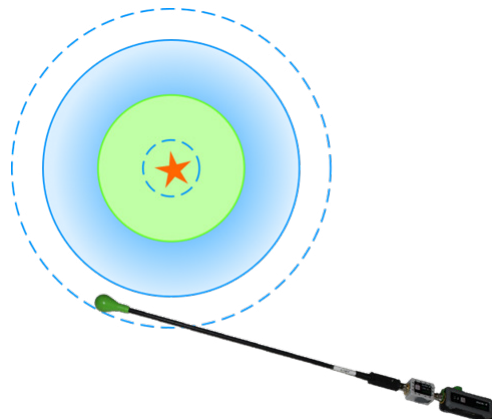
Finding the center

Your screen turns red only when your trace crosses the threshold set by your PIM Finder Limit. A short beep gets your attention without distracting from the continuous audio.




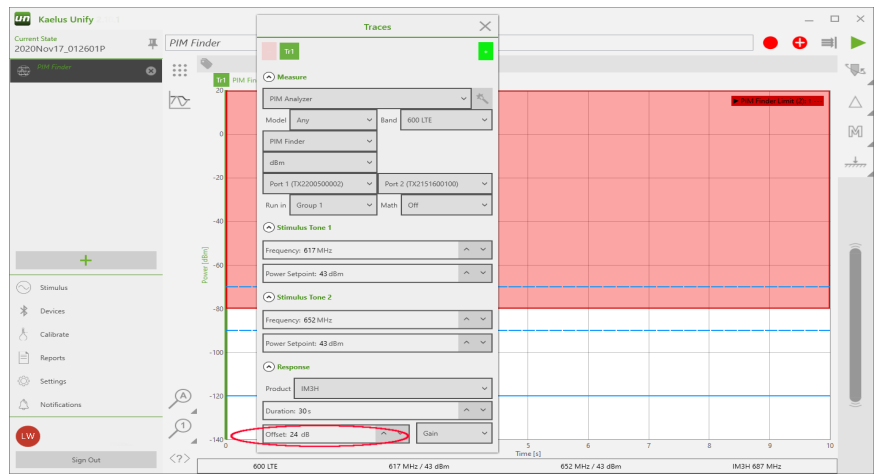
Avoid the noise floor

Often you must search for PIM right down to the noise floor of your spectrum analyzer. If the lower audio threshold happens to go below the noise floor, you'll always hear a tone and you lose your circle-of-concern. Set the Squelch Y Position **5** just above your noise floor to automatically trim your circle-of-concern when getting down this low and save the pain of having to adjust your audio offset settings.



When using a Band-pass filter with Low Noise Amplifier (BPA)

Select "Traces"  icon
 Add BPA Gain offset found on the back of the BPA unit.
 Note: Ensure you select the correct "Gain" value





Enter desired Gain value (High or Low)

Note: If a Protection Filter is used instead of a Band-pass filter with Low Noise Amplifier (BPA), leave the offset at 0dB.

Begin PIM Finding



1. Trigger the measurement in Kaelus Unify by pressing the play button (), the PIM analyzer will be turned on  and the iVA will start receiving signals.
2. Use the PIM probe to search, find, and identify PIM sources.
3. Adjust target value to help narrow down the exact location of external PIM source.

Kaelus Demystifying PIM Finding

Making PIM Finding methodology simple to execute and less time consuming