

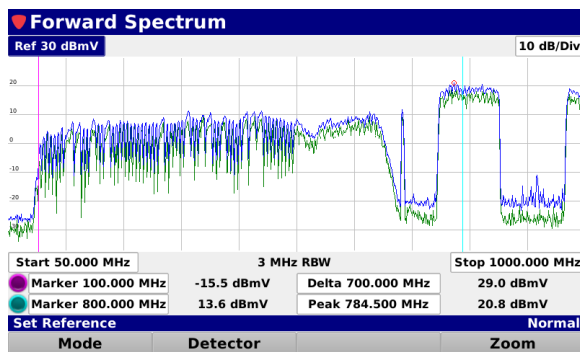
New DSP Family Traffic Control Plus Feature

Introduction

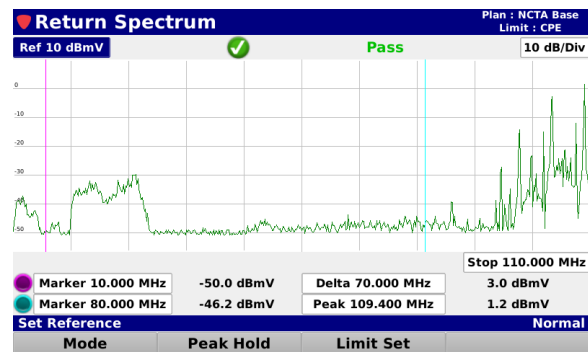
The purpose of this document is to provide instruction on the initial configuration and proper use of the Traffic Control Plus feature, included on the 1G DSP, and optional on other meters.

The Traffic Control Plus spectrum menu provides a real time view of the return band. This menu has 100% coverage, so even the shortest cable modem burst can be seen. It will also show ingress even under a busy upstream.

In a typical HFC plant the RF spectrum is divided into two main bands, the forward band and the return band.

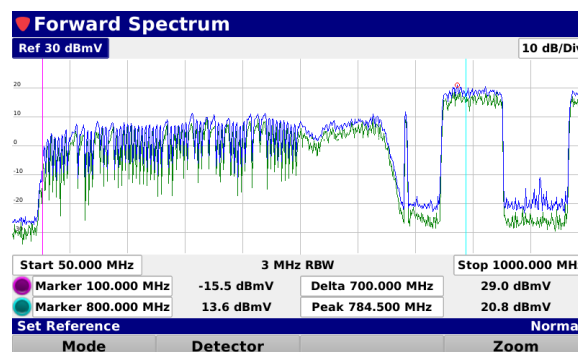


Forward Spectrum



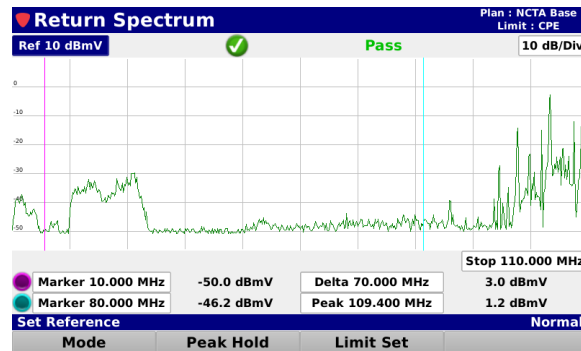
Return Spectrum

The forward band has a larger bandwidth, typically several hundred MHz. The forward band contains signals that are transmitted from the MSO to the customer, such as analog and digital TV channels and DOCSIS downstream.



Forward Spectrum

The return band is smaller than the forward and varies in size from about 40 to 100 MHz. The return band is for signals transmitted from the customer back to the MSO. This is mainly DOCSIS upstreams. While the signals in the forward band are constant and easy to detect, the signals in the return tend to be bursty. This can cause issues while attempting to measure signals in the return band.



Return Spectrum

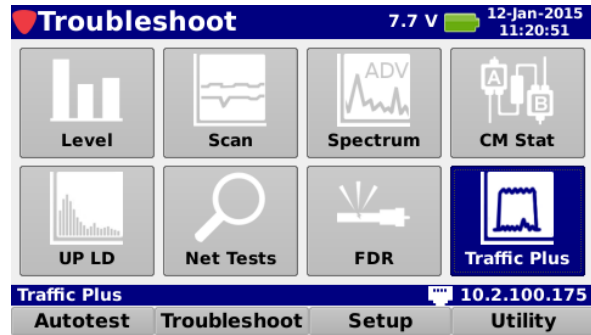
The Return Spectrum menu on the DSP line of meters is a powerful tool to troubleshoot and fix many issues in a typical cable TV system. It can be used to detect ingress and noise sources that can be disruptive to the return band of the system. These issues may lead to cable modem problems, causing a poor experience for the user. While the return spectrum is very good at detecting continuous signals, it does not always catch bursty signals such as a cable modem upstream channels. An upstream burst can be as short as 6.25 microseconds.

If there is enough upstream traffic, return spectrum may catch a full channel, or it may only catch a single slice of the channel. All these factors make it very difficult to differentiate traffic signal, noise, and ingress under the traffic.

To access this feature, select the **Traffic Plus** icon from the **Troubleshoot** menu, as shown in the images below.



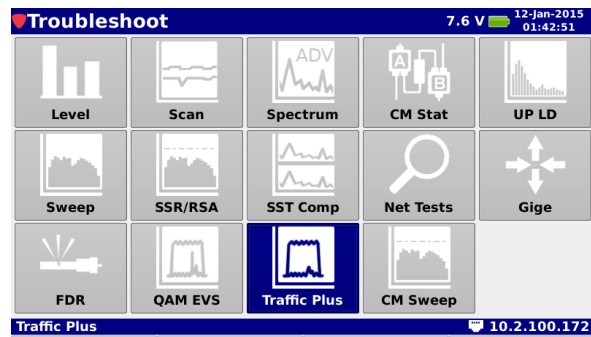
180 DSP Troubleshoot Menu



360 DSP Troubleshoot Menu



720 DSP Troubleshoot Menu



1G DSP Troubleshoot Menu

How to Verify Activation of the Traffic Control Plus Option on a 180 DSP, 360 DSP, or 720 DSP?

The Traffic Control Plus feature is included with all 1G DSP meters and is an optional feature for the 180 DSP, 360 DSP, and 720 DSP. If the Traffic Control Plus Option is not activated on your device, you can purchase an activation code for this feature by calling Trilithic at 1-800-344-2412 or 317-895-3600.

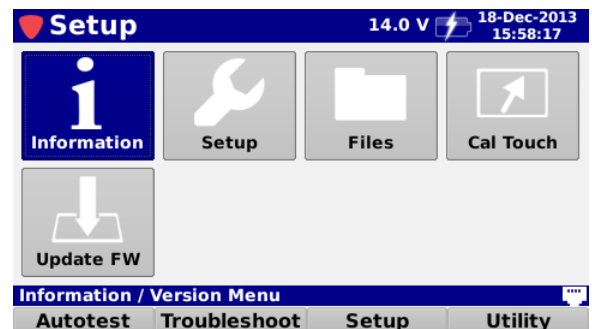
There are two methods that can be used to verify whether the Traffic Control Plus Option has been activated on your 180 DSP, 360 DSP, or 720 DSP:

- Select the **Traffic Plus** icon from the **Troubleshoot** menu. If the option is activated, you will be able to access this feature. If the option is not activated, a **Warning** window will appear as shown in the image to the right.



- Select the **Information** icon from the **Setup** menu, as shown in the image to the right. Select the **Option Information** button from the **Information** screen to see if you have the Traffic Control Plus option.

If the option is activated, the screen will display **Yes** before the option name.

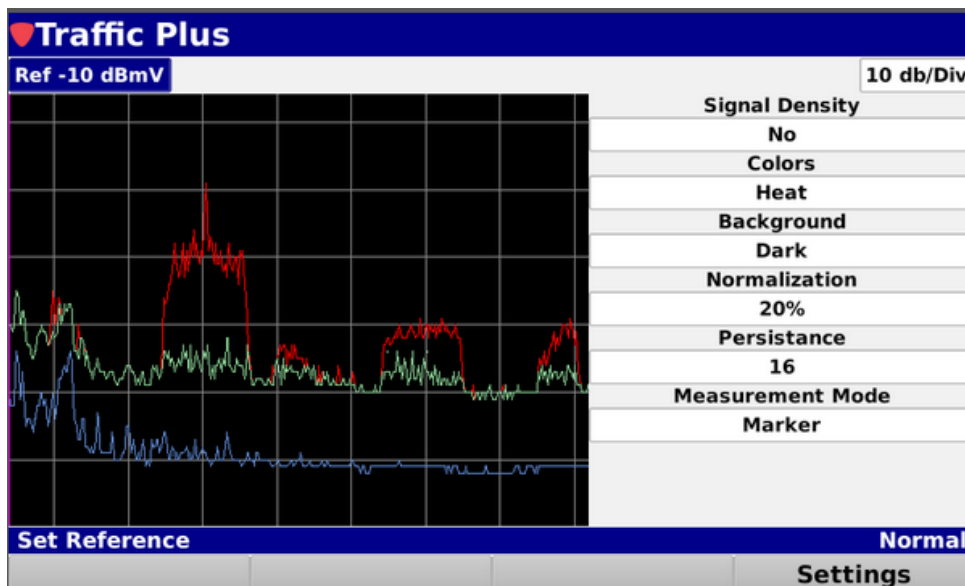


Basic Settings

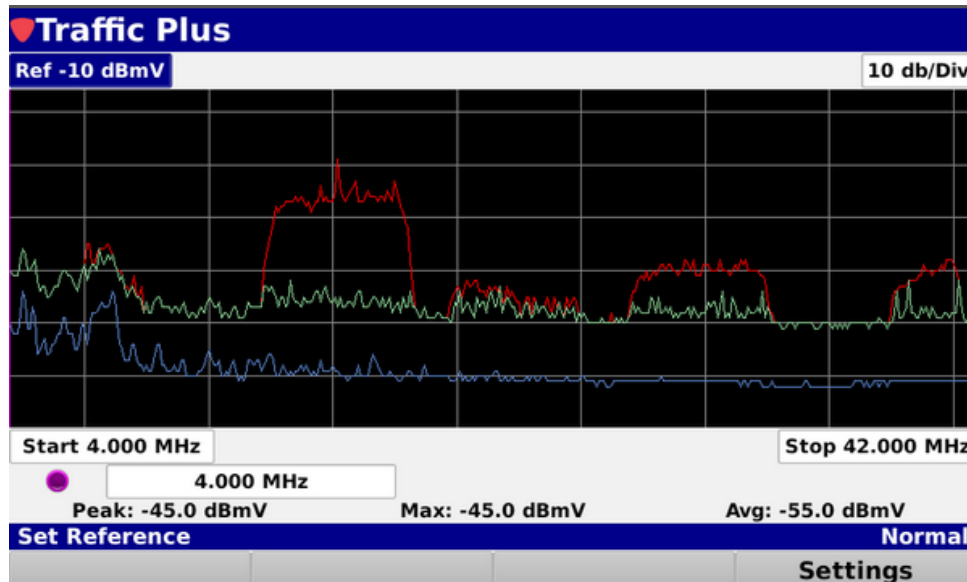
When using the Traffic Control Plus feature for the first time, select the **Settings** softkey and use the following configuration:

Signal Density: No
 Colors: (Any)
 Background: Dark
 Normalization: 20%
 Persistence: 16
 Measurement Mode: Marker

To adjust a setting, highlight the field, then use the up/down arrow buttons to change.



Once finished, select the **Back** button and the screen will be displayed as shown in the following image:



The following traces are always shown on the display.

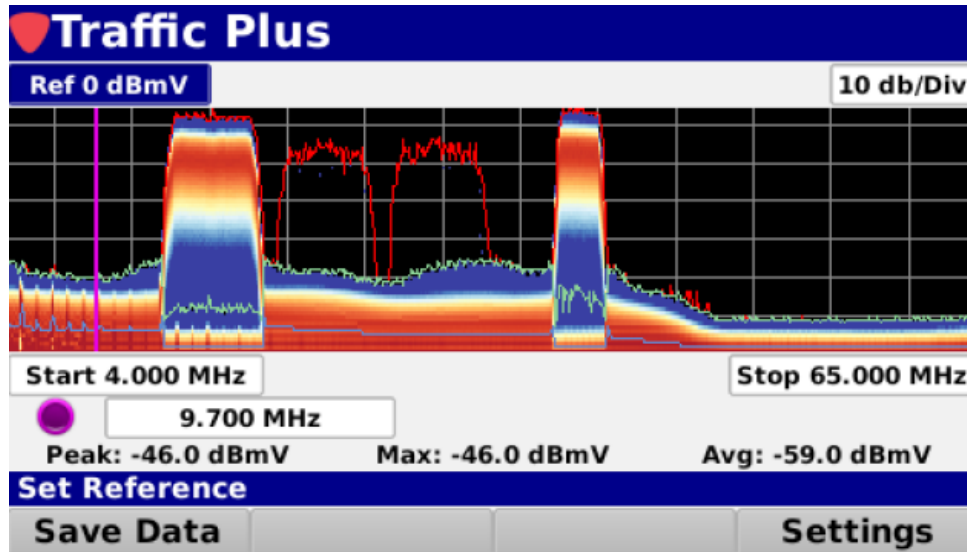
Red Trace – Max peak signal. Typically shows an outline of the existing upstream modem carriers.

Green Trace – Max constant signal, which may be the noise floor for a bursty signal or some sort of continuous signal.

Blue Trace – Average constant signal. Like the green trace, shows the noise floor, ingress under the carrier, or other unwanted signals.

Signal Density

Along with the previously described traces, the Traffic Control Plus spectrum shows the distribution of spectral power using color to represent the prevalence of a signal. This gives the user a visual cue if the event is occurring frequently, infrequently, or somewhere in between. This can also help find a signal beneath the traffic. To use this function select the **Settings** softkey and set **Signal Density** to **Yes**. Select a Colors option. Set the Normalization setting to **10%**, this will be explained later in this section. Select the **Back** button and the display should look something like the following image.



In the above example, with the **Colors** set to **Blue Yellow Red**, the blue section represents the area of the spectrum where the signal was most prevalent, the red the least prevalent, and the yellow in between. As you can see, the red, green, and blue traces are still visible.

The determination of what is most prevalent, least prevalent, and in between is dependent on the **Normalization** setting. This value is adjustable from 0.01% to 100%. In the example above where we have the Normalization set to **10%**, the blue section, or most prevalent, shows signal power that was present at least 10% of the time. As you increase or decrease this value, you can see the effect on the display. Suggested settings for this value are 10 or 20%.

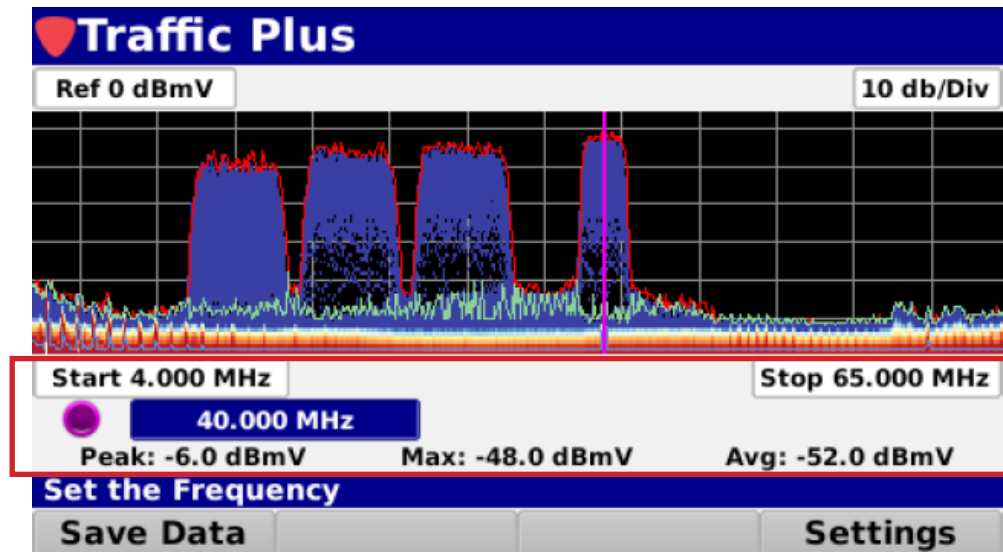
Other Settings

The **Background** setting of the display can be either **Dark** or **Light**. Adjust this for the best readability of the display.

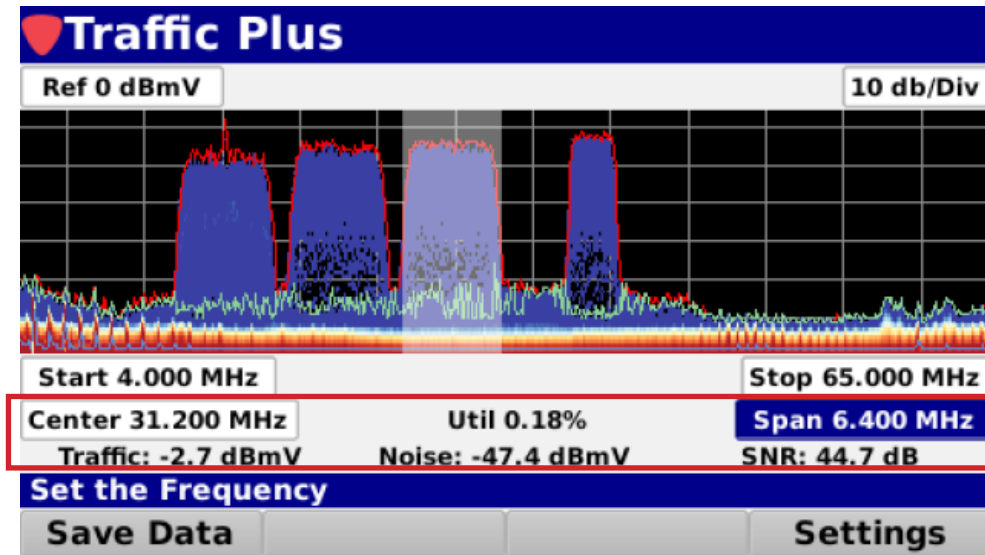
The **Persistence** setting can be a value from **1** to **32**, selectable in multiples of two (1,2,4,8,16,32). This value has a direct effect on the number of samples used to build the specific traces. The end effect of this setting is the higher the value, the longer the max trace stays visible. A suggested value for this field is 8 or 16.

Measurement Mode

The Traffic Control Plus spectrum has two measurement modes: **Marker** mode and **Region of Interest** mode. The marker mode allows the user to move a marker to any frequency and display the values of the three traces at that frequency (see image below).

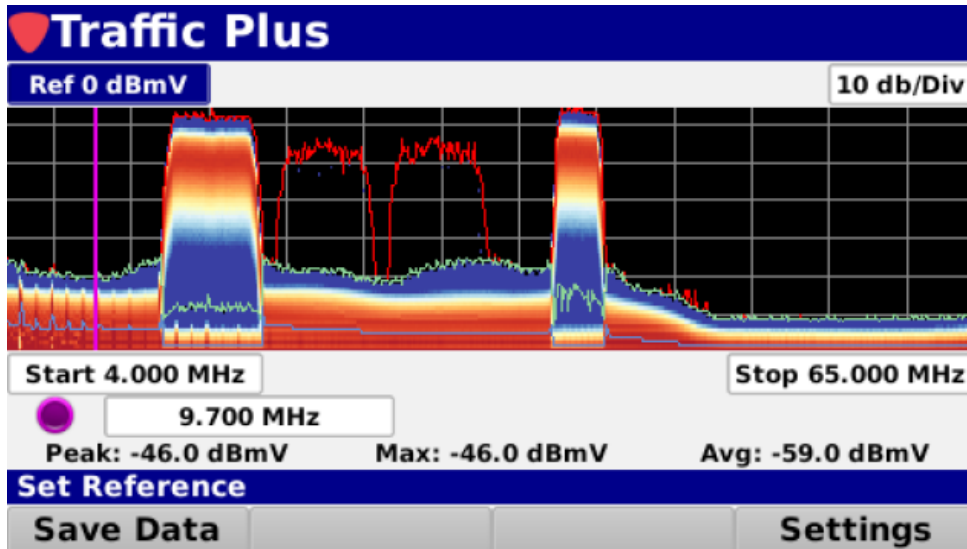


In the region of interest measurement mode, you can define a center frequency and a span, such as a cable modem channel. The traffic level, signal to noise ratio, and channel utilization will be calculated for that region (see below). Please note that the region of interest measurements are only valid for bursty signals.

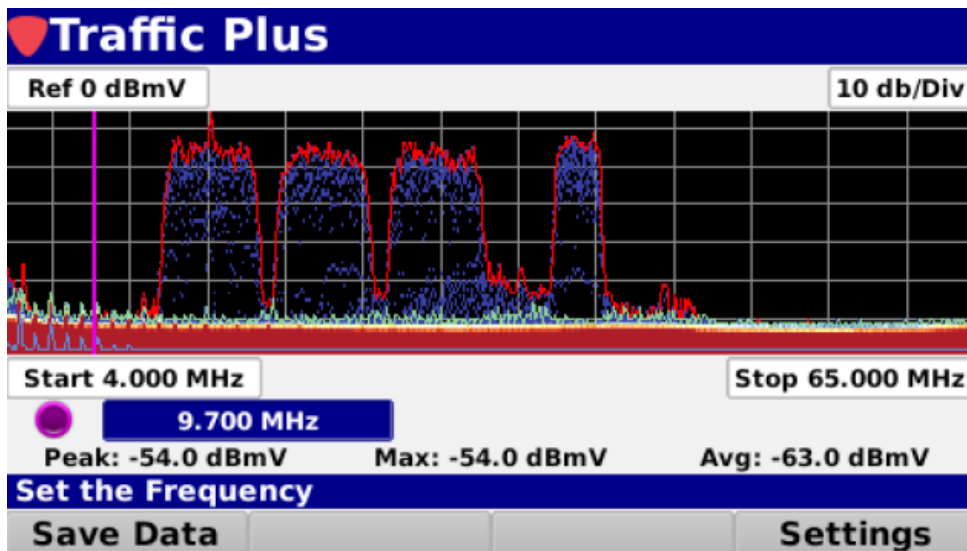


Additional Examples

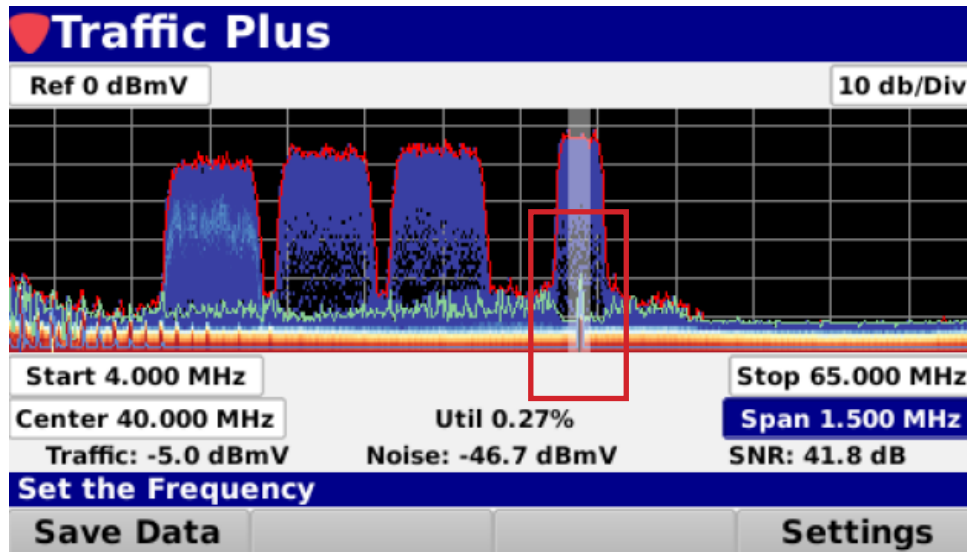
The following image is an example of frequent modem traffic.



While the below image shows infrequent modem traffic.



Finally, this image shows ingress under the carrier.



Conclusion

Issues that typically would not be detectable using a spectrum analyzer can now be seen by the technician using the Traffic Control Plus feature. This is a powerful tool to help the technician maintain and troubleshoot the upstream spectrum of the plant.



For Additional Help, Contact Trilithic Applications Engineering
1-800-344-2412 or 317-895-3600
support@trilithic.com or www.trilithic.com