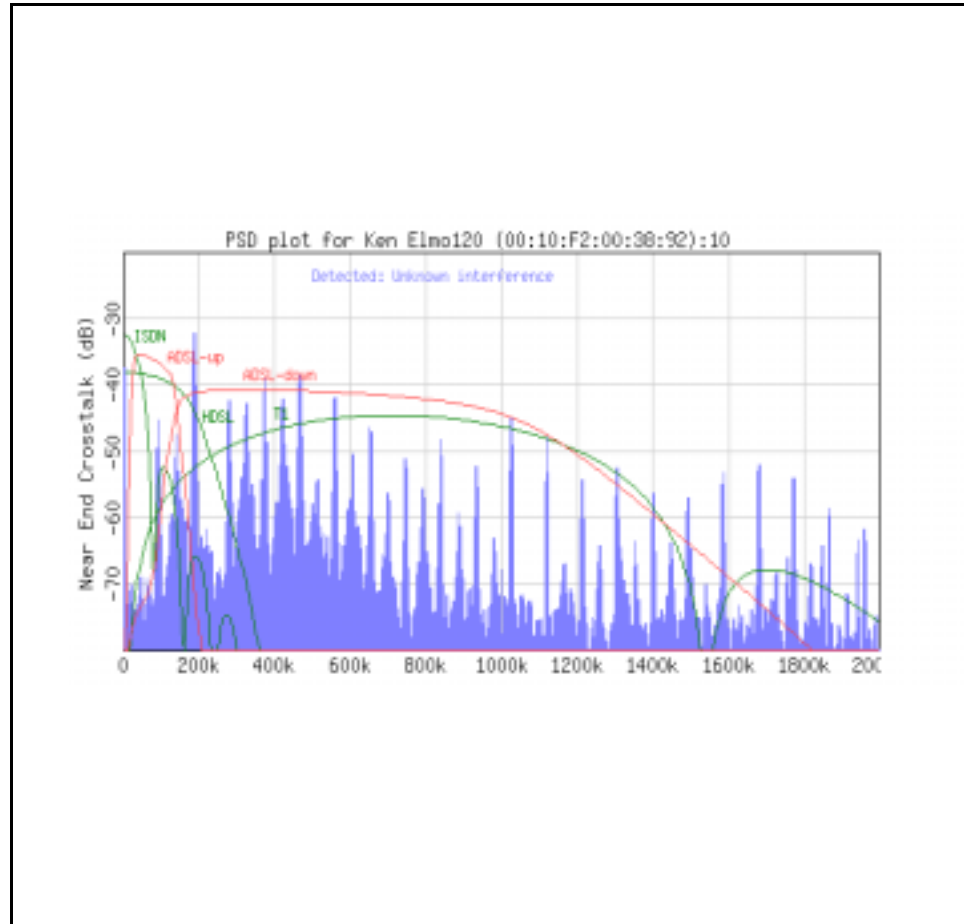


Elastic Networks'
Storm Tracker Spectrum Manager
Installation and User Guide

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About this document

This document contains the installation and user instructions for the Elastic Networks Spectrum Manager Pro.

Audience

The audience for this document includes network operators, installation technicians, and anyone who may be charged with installing and implementing Spectrum Manager Pro.

Introducing the Elastic Networks Spectrum Manager Pro

This chapter introduces Spectrum Manager Pro software.

Chapter Contents

This chapter includes the following information.

Topic	See
Spectrum Manager Pro Description	page 2
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Spectrum Manager Pro and the EtherLoop System Traffic Flow	page 7

Spectrum Manager Pro Description

Elastic Networks' Spectrum Manager Pro monitors Near-End Crosstalk (NEXT) between data bursts and, if necessary, determines how to minimize the effect of coupling with detected services. It enables EtherLoop to function at the highest speed possible (given line conditions and type of data), and deliver high-speed Internet access among noisy bands or bands occupied by other DSL technologies.

Ultimately, Spectrum Manager Pro maximizes the deployability of EtherLoop with two levels of capability: native spectral compatibility (with symmetrical services, T1, HDSL, ISDN, and POTS) and compatibility with asymmetrical services (ADSL, G.Lite, and 1 Meg Modem).

Spectral Compatibility and Debug/Monitor Functionality

Spectrum Manager Pro uses the following four different modes of operation to accommodate several service provider needs.

Native mode: This mode is used for general high-speed connectivity with minimal user intervention. In *Native* mode, EtherLoop operates without the analysis of other service activity in the individual loops.

Monitor mode: This mode is used to optimize high-speed connectivity with advanced interference debug/monitor capability. In *Monitor* mode, Spectrum Manager Pro analyzes other services in the individual loops that may limit EtherLoop performance with potential NEXT interference.

Forced mode: This mode is used to optimize co-located asymmetric service connectivity performance with EtherLoop upstream throughput performance. In *Forced* mode, EtherLoop provides optimum spectrally compatible performance with asymmetric services in the individual loop that may temporarily affect EtherLoop's upstream capability.

Auto-Protect mode: This mode is used to provide best-effort EtherLoop performance with adaptive upstream throughput in the presence of asymmetric NEXT interference. In *Auto-Protect* mode, EtherLoop operates in a limited upstream state while asymmetric interference is occurring. EtherLoop resumes to normal upstream speed once the interference is gone.

Recommended Modes of Operation

The following table is a guide for determining which mode of operation is appropriate to meet the needs of the individual loop in which EtherLoop service is deployed.

Table 1-1. Recommended Modes for Spectrum Manager Pro.

Top Priorities	Secondary Priorities	Mode
General High-Speed Connectivity	No asymmetric compatibility concerns No detailed debug/monitor capability	Native
General to optimized high-speed connectivity Detailed debug/monitor capability required	No asymmetric compatibility concerns	Monitor
Optimized asymmetric compatibility Detailed debug/monitor capability required	General to optimized high-speed connectivity	Forced
Best-effort high speed connectivity Best-effort asymmetric compatibility Detailed debug/monitor capability required		Auto-Protect

Note: EtherLoop connectivity is temporarily lost while switching between modes of operation.

Spectrum Manager Pro - Protective States

When services are detected, Spectrum Manager Pro determines which protective state optimizes EtherLoop performance: No Action Required, Protect ADSL Up, or Protect ADSL Down.

No Action Required: This state is valid for a server (SE) or client (CE) modem. This state is functional in *Monitor* or *Auto-Protect* mode and does not limit or adjust transmitter frequency or EtherLoop modem power. The modem operates with parameters to optimize throughput.

Protect ADSL Up: This state is valid for a server (SE) modem. This state is functional in *Forced* or *Auto-Protect* mode and lowers transmitter frequency or EtherLoop modem power in the presence of ADSL Upstream activity to maintain EtherLoop upstream transmission. Downstream transmissions remain the same.

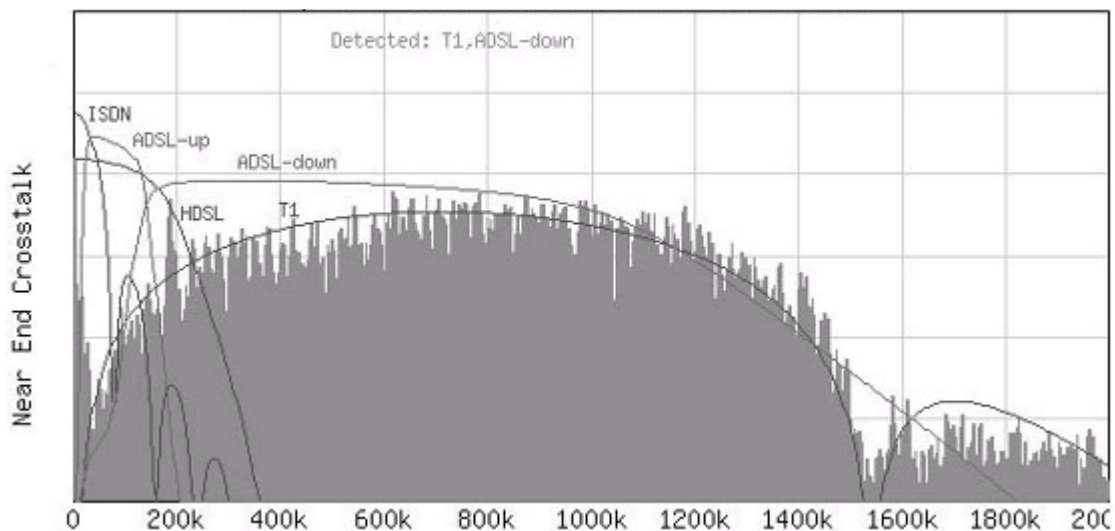
Protect ADSL Down: This state is valid for a client (CE) modem. This state is functional in *Forced* or *Auto-Protect* mode and lowers transmitter frequency or EtherLoop modem power in the presence of ADSL Downstream activity to maintain EtherLoop upstream transmission. Upstream transmissions remain the same.

Note that action taken for protective states occurs approximately every 10 seconds. If ADSL services are detected, there is small hysteresis loop in the system to prevent the modem from bouncing back and forth from protective and non-protective states every 10 seconds.

Spectrum Manager Pro and the EtherLoop System

Spectrum Manager Pro software operates on an OAM&P Site Manager through an EtherLoop modem to help support high-speed data on phone lines. This process begins by requesting modems to take “data samples” for analysis. These samples are then analyzed for significant coupling and a resultant Power Spectral Density (PSD) signal is compared with previously modeled signal templates of high-speed digital services (ADSL, HDSL, T1, etc.). The PSD plot displays raw receiver data used to make decisions for EtherLoop performance based on the services detected. The blue receiver data is pre-scaled to use the full dynamic range of the display, absolute levels of interference **cannot** be inferred from the graph. Figure 1 shows a PSD plot when significant coupling was detected from a T1 or ADSL-Down service.

Figure 1. Spectrum Manager Pro PSD Report.



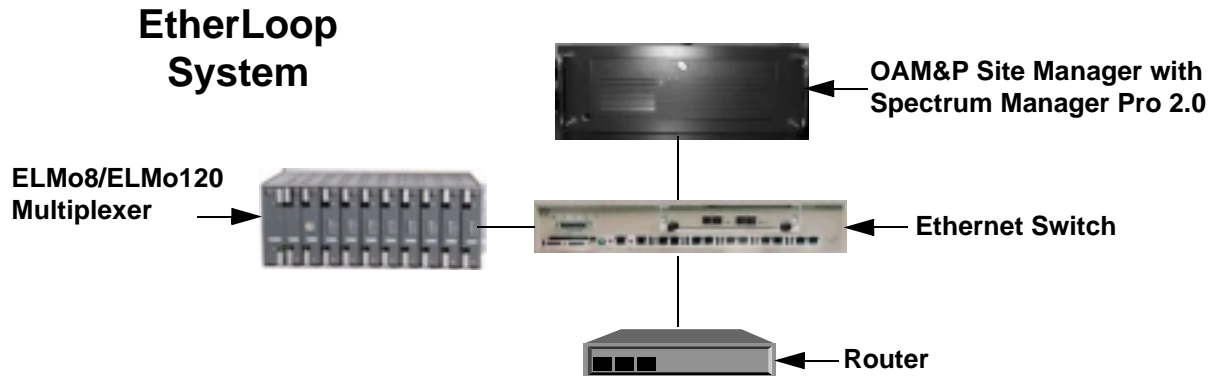
The resultant PSD analysis of other services detected and classified in the binder are logged in each modem to provide summaries and details. An update is provided with the Update/Refresh functionality. A detected service decision is made every 10 seconds for each modem. See Table 1-2 for result descriptions.

Table 1-2. Detected Services.

Detected Service	Meaning
No Interference	No significant levels of interference were detected.
ISDN	Significant levels of interference with ISDN characteristics were detected.
ADSL-Up, HDSL, G.Lite, or 1MM-Up	Significant levels of interference with ADSL-up, HDSL, G.Lite, or 1MM-up characteristics were detected.
T1 or ADSL-down	Significant levels of interference with T1 or ADSL-down characteristics were detected (wide-band services).
ELoop 89	Significant levels of interference with EtherLoop 89 kHz were detected.
ELoop 125	Significant levels of interference with EtherLoop 125 kHz were detected.
ELoop 178	Significant levels of interference with EtherLoop 178 kHz were detected.
ELoop 250	Significant levels of interference with EtherLoop 250 kHz were detected.
ELoop 357	Significant levels of interference with EtherLoop 357 kHz were detected.
ELoop 500	Significant levels of interference with EtherLoop 500 kHz were detected.
ELoop 714	Significant levels of interference with EtherLoop 714 kHz were detected.
ELoop 833	Significant levels of interference with EtherLoop 833 kHz were detected.
ELoop 1000	Significant levels of interference with EtherLoop 1000 kHz were detected.
Unknown Interference	Significant levels of interference with distinguishing characteristics were detected.

Spectrum Manager Pro and the EtherLoop System Traffic Flow

Spectrum Manager Pro is installed on an OAM&P Site Manager to operate in the EtherLoop system. The EtherLoop system extends Ethernet over the twisted pair. The diagram below shows the main EtherLoop system components: Elite Modem, ELMo8/ELMo120 Multiplexer and the OAM&P Site Manager (including Spectrum Manager Pro).



Installing and Operating Spectrum Manager Pro

This chapter describes the software installation and operation of the Elastic Networks Spectrum Manager Pro.

Chapter Contents

This chapter includes the following information:

Topic	See
Spectrum Manager Pro Requirements	page 10
Installing Spectrum Manager Pro	page 10
Using Spectrum Manager Pro	page 11

Spectrum Manager Pro Requirements

The Spectrum Manager Pro software must be installed OAM&P Site Manager.

Installing Spectrum Manager Pro

The following steps describe the installation process for Spectrum Manager Pro.

Step	Action
------	--------

- 1 From the OAM&P Site Manager main menu, select **System Maint**. Click **Install/Upgrade**. The following screen appears:

Install / Upgrade

- Specify a file from your local workstation to install onto this Site Manager

File to Install

<input type="text"/>	<input type="button" value="Browse..."/>
<input type="button" value="Install File"/>	

- Display the log of the previous installation

<input type="button" value="Display Status"/>

- 2 To install Spectrum Manager Pro on the OAM&P Site Manager, click **Browse** to select the install file (the file may be on a local disk drive, local hard drive, or a network drive), then click **Install File**.

Optional: Click **Display Status** to review a previous installation.

Using Spectrum Manager Pro

The selection page (below) is where modems are selected for retrieving the resultant PSD analysis from the EtherLoop modems.

Note: Ensure that firmware version 2.2.2 or later is installed prior to using Spectrum Manager Pro.

The screenshot displays the 'Spectrum Manager - Select Modems' web interface. At the top, a navigation menu includes 'Home', 'Database', 'EtherCraft', 'Downloader', 'Spectrum Mgr', 'SNMP', 'System Maint', and 'Help'. The 'Spectrum Mgr' tab is active. Below the navigation, there are two buttons: 'View/Modify Status' and 'View Log'. A 'Total Selected: 0' indicator is present. A checkbox labeled 'Auto-select modem at other end of EtherLoop line' is checked. The interface is divided into two main sections: 'Server Modems (Modem:Port)' and 'Client Modems'. The 'Server Modems' section contains a scrollable list with one entry: 'CO-2280 (00:10:F2:00:08:E8)'. The 'Client Modems' section contains a scrollable list with one entry: 'CPE-228000 (00:10:F2:00:07:DB)'. At the bottom of each section are 'Select All' and 'Select None' buttons.

The following steps describe the modem selection process for Spectrum Manager Pro to retrieve data samples.

- | Step | Action |
|------|---|
| 1 | Click Select All in each modem scroll-down menu to request data from all modems, or Ctrl + Left-Click to request data from select modems.
CAUTION: Deselecting the Auto-select checkbox may compromise the integrity of the results. Please consult with technical support before changing this default setting. |
| 2 | Click View/Modify Status to display modem detection, action, protection mode, and log mode. A screen similar to the following appears: |

Spectrum Manager - Status

After making changes, click on the 'Update' button above.

Modem Group Settings

(Replaces ALL settings below when updated)

Protection Mode	Log Mode
Set Individually	Set Individually

Selected EtherLoop Lines

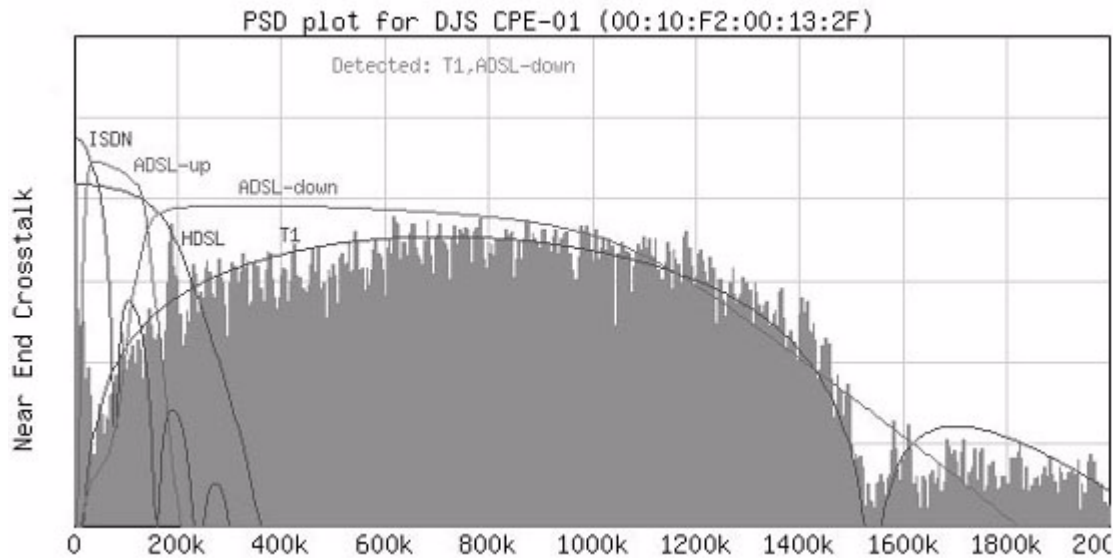
Total Selected:

Auto-link Server and Client protection mode changes

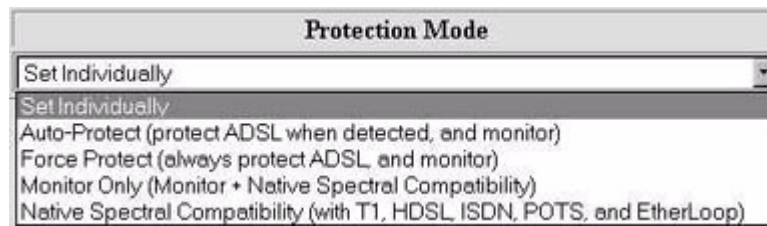
Sort by:	Detected Services / Action	Protection Mode	Log Mode
<input type="radio"/> Server Modem:Port (SE) <input checked="" type="radio"/> Client Modem (CE)	(Click on links below for most recent detected services and PSD plots)	A = Auto-Protect F = Force Protect M = Monitor Only N = Native Spectral Compatibility	D = Detailed S = Summary
SE: Ken Elm120 (00:10:F2:00:38:92):00 CE: 00:10:F2:00:38:92 (00:10:F2:00:12:8C)	Unknown interference / Protect ADSL-Up Unknown interference / Protect ADSL-Down	<input type="radio"/> A <input type="radio"/> F <input type="radio"/> M <input type="radio"/> N	<input type="radio"/> D <input type="radio"/> S <input type="radio"/> D <input type="radio"/> S
SE: Ken Elm120 (00:10:F2:00:38:92):10 CE: 00:10:F2:00:38:92 (00:10:F2:00:13:15)	Unknown interference / Protect ADSL-Up No interference / No action required	<input type="radio"/> A <input type="radio"/> F <input type="radio"/> M <input type="radio"/> N <input type="radio"/> A <input type="radio"/> F <input type="radio"/> M <input type="radio"/> N	<input type="radio"/> D <input type="radio"/> S <input type="radio"/> D <input type="radio"/> S

Warning: When the protection mode is changed from **Auto** or **Forced** to **Monitor** or **Native**, or from **Monitor** or **Native** to **Auto** or **Forced**, service will be disrupted on the changed line for approximately one minute.

- To view services present in the binder or actions taken by each modem, click the hyperlink in the Detected Services/Action column. A screen similar to following appears:



- 4 Select a mode from the **Protection Mode** drop-down menu:



Set Individually: allows each individual modem to have different mode settings.

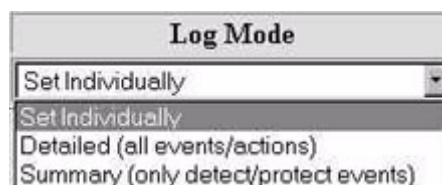
Auto-Protect: protects only when asymmetrical services are detected by placing EtherLoop in asymmetrical mode, same downstream speed, low upstream speed. Always compatible with symmetrical services.

Force-Protect: keeps protection mode on at all times, placing EtherLoop in asymmetrical mode, same downstream speed, low upstream speed, whether asymmetrical services are detected or not. Always compatible with symmetrical services.

Monitor Only: monitors for interference and reports it, no protection is provided.

Native Spectral Compatibility: always compatible with symmetrical services, T1, HDSL, HDSL/2, ISDN, SDSL, and POTS. No monitoring.

- 5 Select a mode from the **Log Mode** drop-down menu:

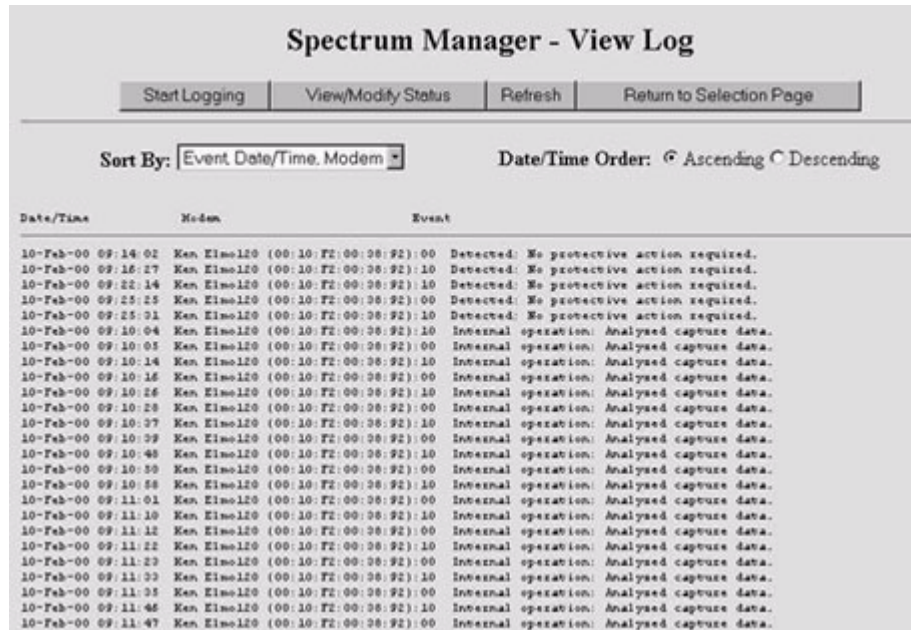


Set Individually: allows each individual modem to have different mode settings.

Detailed: displays all spectral events and actions within the binder.

Summary: displays only detected and protected events within the binder.

- 6 Click **View Log** to display the modes selected for each modem. A screen similar to the following appears:



- 7 Make a selection from the **Sort By** drop-down menu:

Date/Time
 Modem, Date/Time, Event
 Modem, Event, Date/Time
 Event, Date/Time, Modem
 Event, Modem, Date/Time

Then, from the **Date/Time Order** radio buttons, select **Ascending** or **Descending**.

Note: Click **Return to Selection Page** to review or modify modem selections.

- 8 Click **Refresh** after changing settings, then click **Start Logging** to prompt Spectrum Manager to log requested data. Click **Stop Logging** at any time to prompt Spectrum Manager Pro to end the logging process.

Appendix A: PSD Plots

This appendix provides the three sample plots Spectrum Manager Pro displays when monitoring for digital services within a binder.

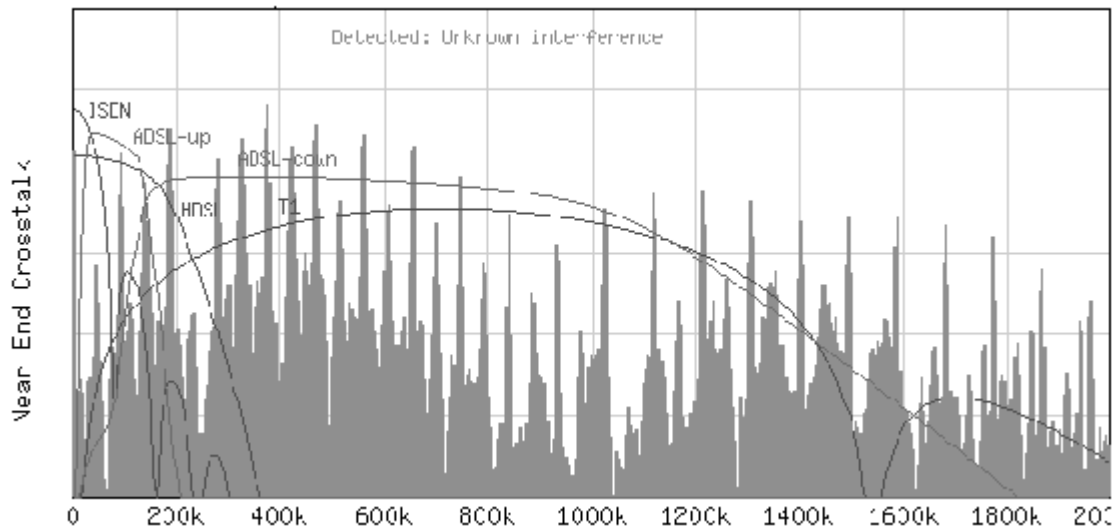
Detected Interference

This PSD plot displays when previously provisioned signals match the data samples found in the binder.



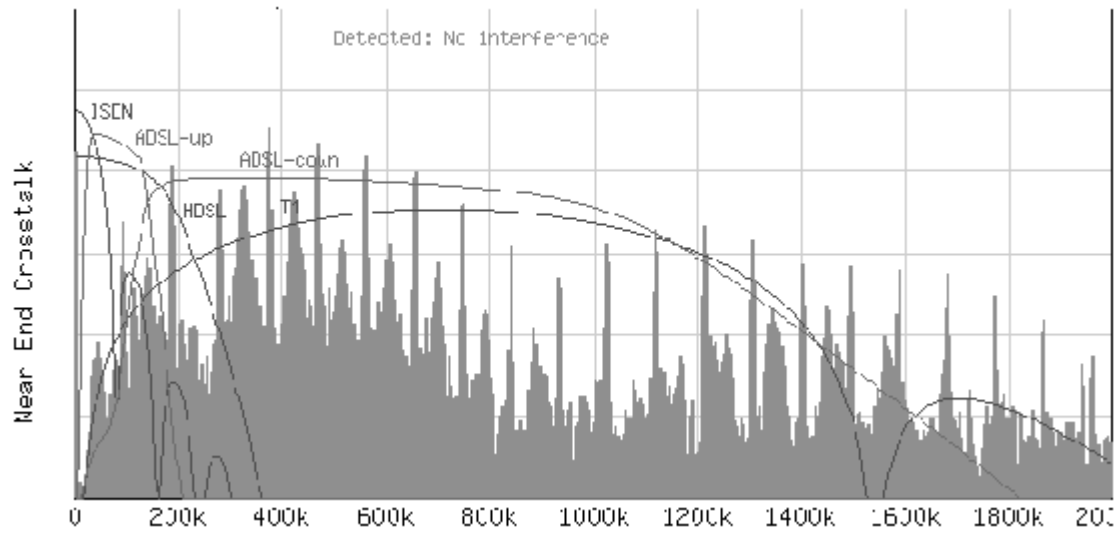
Unknown Interference

This PSD plot displays when the when previously provisioned signals do not find a match with data samples found in the binder. In this case, Spectrum Manager Pro operates as provisioned in protection mode.



No Interference

This PSD plot displays when there is no interference in the binder.



Elastic Networks

Spectrum Manager

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