Getting Started
with **Merlin**™
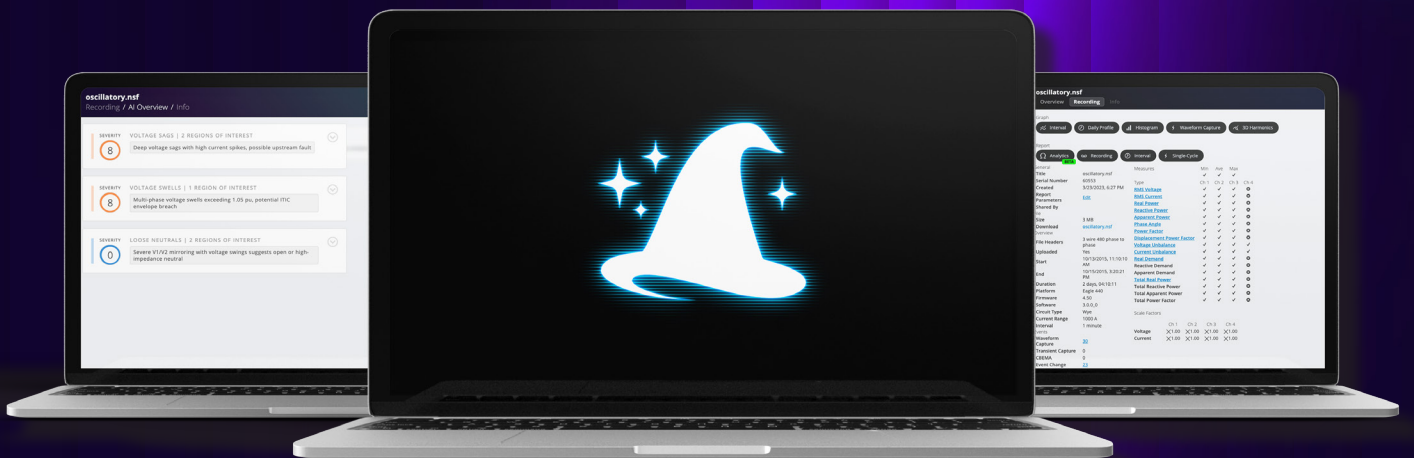
Before You Begin:
Understanding **PQ Canvass**
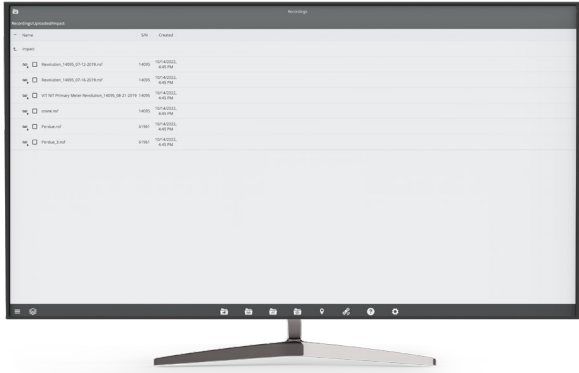
What is PQ Canvass?

PQ Canvass is a cloud-based software platform used to view and analyze power quality data.

- It's cloud-based: You don't need to install any software. You can access it from any modern web browser on your desktop, tablet, or smartphone.

- It connects to devices: It collects and analyzes data from PMI field devices (like the Bolt, Seeker, or Tensor)

- It's (near) real-time: Devices can stream data as it's gathered, so you can log in and see what's happening without waiting for a recording session to end.

PQ Canvass allows you to remotely view streaming data from the device, enable email and SMS alerts on PQ or power events, view live waveforms, access recordings, initialize new recordings, and more.

Recordings

A recording is the collection of power quality data streamed from a device. An account's recordings are listed in the Recordings window, which is accessible from the Main Menu or the Dock.

You can organize recordings into custom directory hierarchies, and recordings shared by others are found in the **Shared With Me** directory. Uploaded field recordings can be found in **Uploaded**.

Devices

Devices are the PMI hardware in the field that collects data, such as the Bolt, Seeker, or Tensor. They connect to PQ Canvass via WiFi, LTE, or Ethernet to stream data in real-time.

The Devices window, accessible from the Dock, lists all devices in your account. From here, you can see a device's online status, view live data, and start new recordings.

Accessing a Recording

To begin analysis, you must first open a recording. Navigate to the Recordings window from the Dock at the bottom of your screen. This view lists all available recordings.

Click the name of any recording to open its summary page. Once the recording is open, you can access its detailed data, and use **Merlin** to generate an analysis.

What is **Merlin?**

Merlin is an AI-driven analytics suite in PQ Canvass to give utility engineers rapid, defensible answers to power-quality problems.

Starting an **Analysis**

This is the central hub for running an analysis on your recording. From here, you can start the process that generates both the **Waveform Classification** and **Stripchart Analysis** reports.
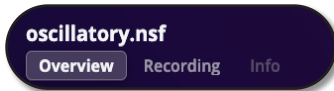
1 ## Open a Recording

Begin by navigating to your **Recordings** window (accessible from the Dock) and clicking the name of any recording in your library to open it.

2 ## Navigate to 'Overview'

Once your recording is open, click the Overview tab (located next to the Recording tab) to open the main analysis screen.
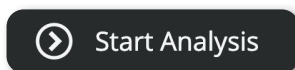
oscillatory.nsf
Overview   Recording   Info

3 ## Start the Analysis

In the bottom toolbar, click the **Start Analysis** button.

- A confirmation window will appear; click Start Analysis again to begin.

- The analysis will run in the background, and you can monitor its status via the progress bar at the bottom of the screen.

⊙ Start Analysis

4 ## Access Your Report

Once complete, the cards on the Overview screen become active.

You can now click **Waveform Classification** to view the waveform report, or **Stripchart Analysis** to view the stripchart report.

Waveform Analysis

The waveform analysis provides a detailed breakdown and summary of every event captured in your recording. It breaks down all captured events, sorts them by importance, and provides a full text summary of its findings.

Prioritize Instantly

The report automatically sorts all captured events, separating critical "High Severity" issues from minor ones so you know exactly where to focus your attention.

Get Clear Answers

Move beyond raw data. The report provides a full Executive Summary, attribution analysis, and clear Investigation Guidance to help you understand the root cause.

Share Findings Instantly

Instantly export the entire text analysis to PDF for permanent records, or copy it to your clipboard to paste directly into an email or team chat.
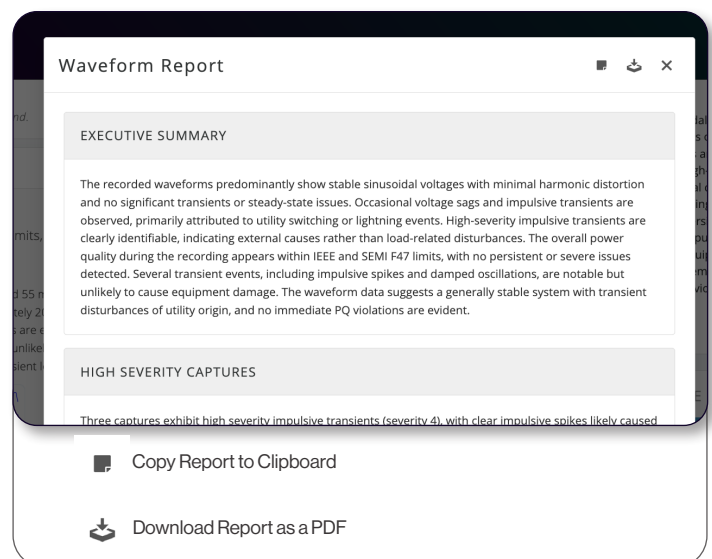
The Waveform Report

This section provides a high-level overview of the entire recording, designed to help quickly understand the overall picture.

Click '**READ MORE**' to open the full report, which provides a detailed narrative organized into these key sections:

- **Executive Summary**: A high-level summary of all findings, including overall power quality, dominant issues, and potential causes.

- **High Severity Captures**: A specific look at the most critical events found in the recording and why they are significant.

- **Compliance Summary:** An analysis of whether events violated common standards like IEEE, SEMI F47, or ITIC.

- **Attribution:** An assessment of the likely root cause of the disturbances, such as utility-side issues (lightning, switching) or customer-side load

- **Waveform Exam Next Steps**: Specific, actionable recommendations for which captures to review manually to confirm findings.

- **Investigation Guidance:** Provides context on how the data can be used to solve the power quality issue, advising on next steps like focusing on external events or continued monitoring.

- **Followup PQ Recording Advice:** Suggestions for how to adjust recorder settings for future monitoring to capture more relevant data.

Waveform Report

EXECUTIVE SUMMARY

The recorded waveforms predominantly show stable sinusoidal voltages with minimal harmonic distortion and no significant transients or steady-state issues. Occasional voltage sags and impulsive transients are observed, primarily attributed to utility switching or lightning events. High-severity impulsive transients are clearly identifiable, indicating external causes rather than load-related disturbances. The overall power quality during the recording appears within IEEE and SEMI F47 limits, with no persistent or severe issues detected. Several transient events, including impulsive spikes and damped oscillations, are notable but unlikely to cause equipment damage. The waveform data suggests a generally stable system with transient disturbances of utility origin, and no immediate PQ violations are evident.

HIGH SEVERITY CAPTURES

Three captures exhibit high severity impulsive transients (severity 4), with clear impulsive spikes likely caused

Copy Report to Clipboard

Download Report as a PDF

Waveform Classifications

This section analyzes every individual waveform captured in your recording. Each event is examined and automatically classified by Merlin, marked with a severity score (0-10). To help you prioritize your Power Quality investigation, Merlin automatically divides the results into high and low severity.

High Severity
Shows the most critical events found in the recording so you know where to focus your attention first.

Low Severity
Groups all minor or less significant events, which can be reviewed after addressing critical issues.

Severity Breakdown
Visually summarizes all captured events, showing the percentage that falls into each severity score.

Residential_vsag.nsf
Recording / AI Overview / Info

HIGH SEVERITY WAVEFORMS

SEVERITY	INTERRUPTION	CAPTURE
9	Instantaneous interruption with brief sag	25

SEVERITY	INTERRUPTION	CAPTURE
9	Interruption with preceding oscillatory transient	52

LESS SEVERE WAVEFORMS

SEVERITY	VOLTAGE SAG	CAPTURE
4	Voltage sag within IEEE limits, transient in voltage waveform	2

	RVC	CAPTURE
		30

WAVEFORM REPORT

The recording predominantly shows load-induced small voltage steps on V2, correlating with significant increases in load current, indicative of customer load starts. Several captures reveal persistent, minor RMS shifts within IEEE 1159 limits, with no evidence of transient disturbances or utility switching. A notable exception is a high-severity interruption event near the end of the session, likely caused by upstream protection. Overall, the data suggests flicker-related effects primarily driven by customer load activity, with minimal utility contribution.

READ MORE →

SEVERITY

53 WAVEFORMS

■	SEVERITY 9	4%
■	SEVERITY 5	4%
■	SEVERITY 4	5%
■	SEVERITY 2	64%
■	SEVERITY 1	21%
■	SEVERITY 0	2%
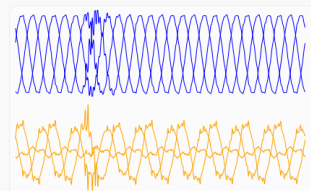
DISTURBANCE TYPE

No Disturbance

RVC

Common Disturbances
Groups all events by their classification to show which issues are most frequent.

SEVERITY	VOLTAGE SAG	CAPTURE
4	Voltage sag within IEEE limits, transient in voltage waveform	2

A voltage sag occurred between 35 ms and 55 ms, with V1 dropping below 0.9 pu (IEEE 1159 §4.4.2.2). The event duration is approximately 20 ms, within the IEEE sag threshold. No oscillatory ringing or other transient issues are evident. The sag remains within IEEE and SEMI F47 limits, indicating a minor disturbance unlikely to cause equipment malfunction. A brief voltage drop occurred, likely due to a transient load change or utility source variation.

CAPTURE DETAILS

Timestamp	10/13/2015, 7:30:08 AM
Cycle	10
Channel	N/A
Dur...	
Trig...	
Valu...	

WAVEFORM PREVIEW

Click to Expand
Display a detailed text analysis, specific capture details, and a visual preview of the waveform.

Stripchart Analysis

Merlin's Stripchart Analysis automatically analyzes your entire recording, identifying key patterns and problem areas so you don't have to scan days or weeks of trend data manually. It organizes these findings into distinct regions, scores them by severity, and presents a detailed analysis of the most significant power quality issues found in the stripchart data.
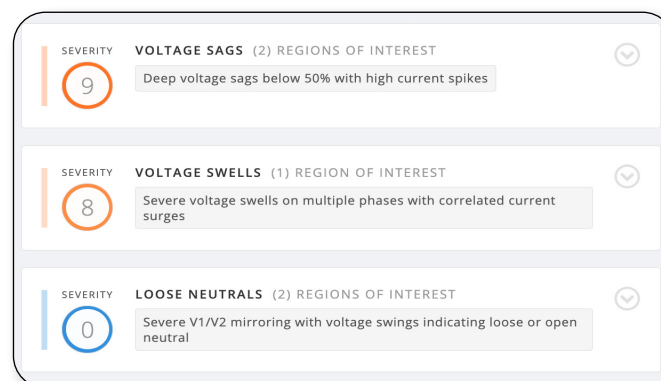
Understanding Your Results

Once the analysis is complete, the Overview screen activates and presents the findings on interactive cards. Each card is dedicated to a specific type of power quality phenomenon detected by an AI sub-agent.

- **Prioritize by Severity:** Each card displays a Severity Score (0-10), showing you at a glance which issues are the most critical. A high score demands immediate attention, while a low score (like 0) means no significant events of that type were found.

- **View Detailed Analysis:** Click any card to expand it. This reveals a **'Detailed Analysis'** narrative. This summary explains the patterns Merlin found, their likely causes (such as customer load activity or upstream faults), and their overall impact on power quality.

- **Regions of Interest:** Below the analysis, you'll find a list of **'Regions of Interest'**. These are the specific, time-stamped periods where Merlin identified the most notable events. This allows you to move from a high-level summary directly to the most important data in your recording.

Key Analysis Modules

Merlin's stripchart analysis runs several specialist agents to find specific problems. The main findings are grouped into the following categories:

- **Voltage Sags:** This analysis identifies periods of low voltage. It correlates voltage dips with high current spikes to help determine if the sags are caused by customer load (like a motor starting) or upstream utility events. It also flags deep sags that could violate equipment tolerance standards.

- **Voltage Swells:** This module scans for significant voltage increases above the nominal level. It detects events like severe swells occurring on multiple phases and correlates them with current surges. This helps identify potential causes, such as capacitor bank switching or upstream fault conditions.

- **Loose Neutrals**: This critical analysis detects symptoms of a loose or open neutral connection. It specifically looks for the classic "mirroring" pattern in single-phase recordings, where voltage swings on V1 and V2 move in opposite directions—a clear indicator of a potentially hazardous neutral fault.

SEVERITY		
9	**VOLTAGE SAGS** (2) REGIONS OF INTEREST	
	Deep voltage sags below 50% with high current spikes	
8	**VOLTAGE SWELLS** (1) REGION OF INTEREST	
	Severe voltage swells on multiple phases with correlated current surges	
0	**LOOSE NEUTRALS** (2) REGIONS OF INTEREST	
	Severe V1/V2 mirroring with voltage swings indicating loose or open neutral	

PQ Assistant

Merlin also serves as a chat-based AI tool designed to provide instant analysis and context for your power quality data. You can use it directly from a specific waveform or stripchart to get immediate, expert-level insights without leaving the graph.
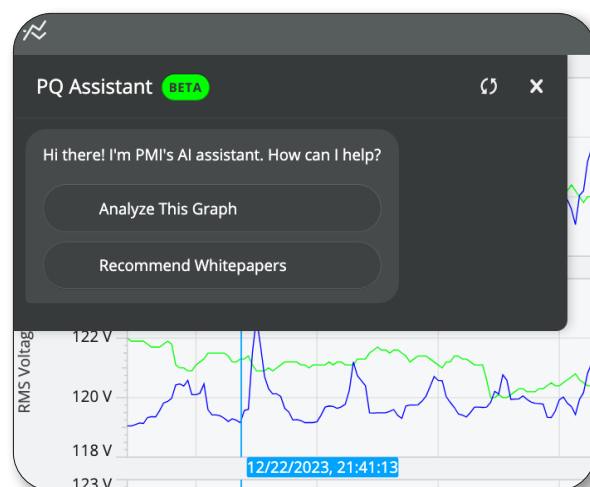
1 Launch The Assistant

From any open waveform or stripchart graph, click the **PQ Assistant** icon in the toolbar at the bottom of your screen. A chat window will open with the greeting, "Hi there! I'm PMI's AI assistant. How can I help?".

2 Analyze Your Graph

In the chat window, select the **Analyze This Graph** button to begin. The PQ Assistant will analyze the graph currently on your screen and provide a summary of its findings directly in the chat.

- **Tip:** For a more tailored analysis, add extra context in the text box

- **Example:** "This was captured at a residential location" or "This waveform was captured near an industrial park".

3 Get Further Insights

After the assistant provides its initial analysis, you have two options for follow-up:

- **Discuss the Analysis**: Choose this to ask follow-up questions about the findings and dig deeper into the data.

- **Recommend Whitepapers:** Select this to receive links to relevant technical documents and whitepapers from PMI's extensive library, related to what the AI found in your graph.