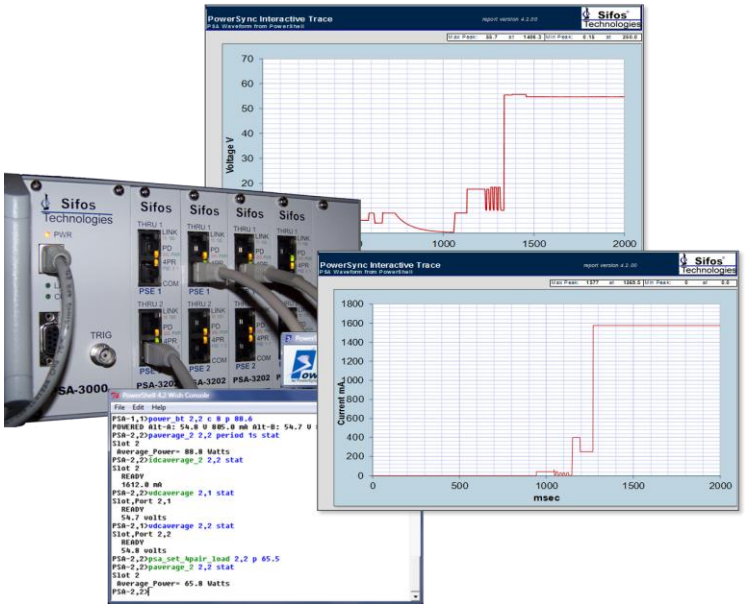
PSA-3202 Test Blade

PowerSync® Analyzer

IEEE 802.3at & 802.3bt Power over Ethernet

Product Overview



PSA-3000 with PSA-3202's

Key Features

- ❑ **Plug Replaceable Upgrade to Existing PSA-3000**
  - **100% Software Compatible with PSA-3102 Blades**
  - **Supports Existing 802.3at PSE Conformance and Multi-Port Test Suites**
- ❑ **4-Pair 802.3bt and Proprietary PSE Testing from Either Port 1 or Port 2**
- ❑ **Sequence Up To 24 Ports with Future 802.3bt Conformance Test in One Chassis**
- ❑ **Emulate Single Signature or Dual Signature PD's**
- ❑ **Greater than 99 Watt Continuous 4-Pair Loading Per Blade**
- ❑ **Load Up to 12 4-Pair PSE Ports Concurrently**
- ❑ **Emulate All Type-3 and Type-4 Multi-Event Classification Signatures**
- ❑ **Emulate Autoclass Signaling and Maximum Load Event**
- ❑ **Coordinated or Independent Control of ALT-A and ALT-B Loads**
  - **Emulate Arbitrary Pair-Pair Load Unbalance**
  - **Emulate Disconnect and Overloads Per Pairset**
- ❑ **Emulate / Test 802.3at and Future 802.3bt PD LLDP Messaging**
- ❑ **Mix with Existing PSA-3102 Test Blades**

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IEEE 802.3bt and Pre-802.3bt PSE's

End-Spans

Mid-Spans & Injectors

Powered Connectors

Plug 'n Play PSA-3102 Substitute

Seamless support for:

802.3at PSE Conformance Test Suite

802.3at PSE Multi-Port System Test Suite

802.3at Live PD Emulation

802.3at PoE Service Analyzer

All other testing features of the PSA-3102.

802.3bt Help… Now

Single Command Emulated 802.3bt Emulated Power-Ups with Optional Waveforms

4-Pair Command Library for Signature Configurations, 4-Pair Connections, 4-Pair Load Control, and 4-Pair Metering

Rugged and Durable

Comprehensive Safety, Emissions, and Susceptibility Compliances

Rated for over 1200 Watt Continuous Loading at 40°C

Overview

The Sifos PSA-3000 serves as a world-wide virtual standard for testing PoE service from Ethernet Power Sourcing Equipment (PSE). Since the IEEE 802.3at standard was released in 2009, the PSA-3000 platform has served to evaluate and verify performance of PSE's at every level from initial hardware design to system software analysis to final QA and manufacturing. The PSA-3000 platform integrates reliable, intelligent testing with high degrees of automation enabling the highest levels of end-user productivity and PSE product quality.

PoE Today and in the Future

The wide adoption of Ethernet PoE as a flexible, low cost combined networking and powering technology is opening opportunities to expand into new frontiers requiring higher power and more efficient power management. The IEEE **802.3bt** standard extends PoE powering capacity by a factor of three, primarily by taking advantage of all four wire pairs in standard, edge access Ethernet copper cabling. The PSA-3202 test blade from Sifos provides the hardware and embedded resources to test future 802.3bt compliant PSE's while also serving as a plug 'n play substitute for existing PSA-3102 blades.

Protecting PoE Test Investments

The PSA-3202 will operate in all existing PSA-3000 chassis environments. PSA-3202's can be installed side-by-side with existing PSA-3102's so that existing tests covering up to 24 ports on 802.3at compliant PSE's are unaffected by the mix of test blades. PSA-3202's will support the **PSE Conformance Test Suite** for 802.3at interchangeably with PSA-3102's*. PSA-3202's may also be used for 802.3at **Multi-Port Testing**, **Live PD Emulation**, and **LLDP Emulation and Analysis**. Any existing test software written for PSA-3102's will work with their PSA-3202 equivalents seamlessly.

Essential Features for 802.3bt PSE Testing

The PSA-3202 provides robust and flexible emulation of new "multi-event" 802.3bt classification signatures and mutual identification features, including autoclass signature emulation. At any one time, either Port 1 or Port 2 may be configured to emulate a 4-Pair, high power PD including emulation of either "single-signature" or "dual-signature" detection & classification schemes. 4-Pair loading can be "synchronized" between ALT-A/B pairsets but may also be controlled per pairset to emulate pair-pair unbalance and single pairset fault conditions. Working with existing PSA-3000 chassis', continuous power draw totaling over 1200 watts is supported. On the low end, minimal power signatures can be emulated for verifying PSE response to PD "sleep" modes. Future firmware/software upgrades will address new PoE LLDP features as those evolve into the standard.

Future 802.3bt Automation Suites

The PSA-3202 will be a first generation platform to support future, fully automated test suites for **802.3bt PSE Conformance Testing**. Future 802.3bt Multi-Port System Testing will also be addressed by PSA-3202 blades with capacity to test up to 12 4-Pair PSE ports per PSA-3000 chassis.

* PSA-3202's require PSA host software version 4.2 or newer.

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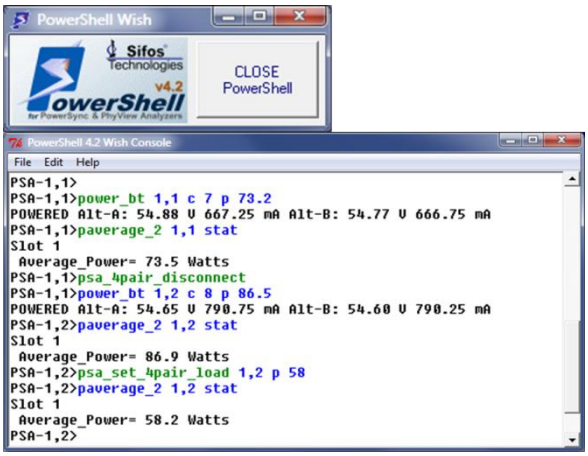
Evaluating 1st Generation 802.3bt PSE's

Using PSA 4.2 software in conjunction with PSA-3202 test blades, first generation 802.3bt PSE ports may be analyzed through the emulation of flexibly defined 802.3bt Powered Devices (PD's). These emulations and associated measurement capabilities are accessible in **PowerShell PSA** Software.

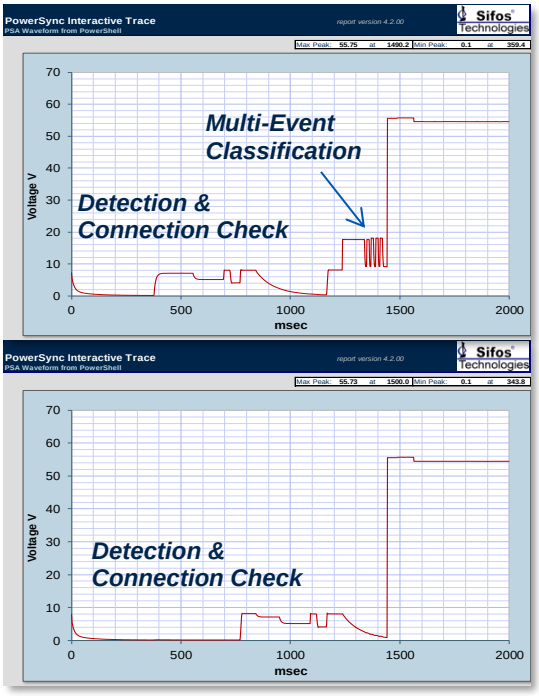
Supported 4-Pair PD emulations include:

- **Single Signature PD's** emulating **Class 1 through Class 8** with loading from 0.1W to over 99W
- **Dual Signature PD's** emulating **Dual Class 1** through **Dual Class 5** including mixed Classifications by pairset
- Single and Dual Signature PD's supporting **Autoclass** protocol
- **Aberrant PD's** with illegal multi-event class signatures
- **Aberrant PD's** with marginal detection signatures
- Compliant and Non-Complaint **pairset unbalance** loading



PowerShell PSA Command Interface

Emulated Single Signature Power-Up

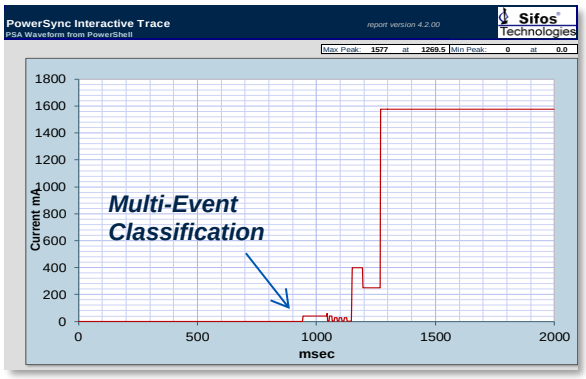


Class 8 Power-Up: Voltage Alt-A and Alt-B

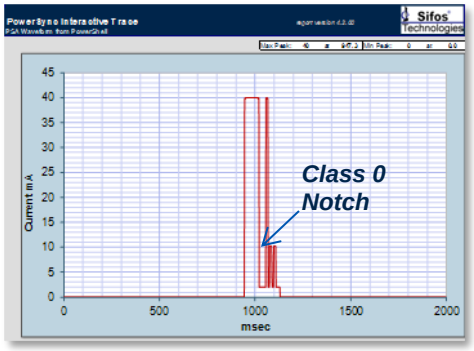
The figures here capture an emulated **Class 8** (Single Signature) power-up to a **90 watt** load at the PSE interface. This analysis is performed using the **power_bt** command with trace capture options. To the left, voltages are captured from PD connection on each of the Alt-A and Alt-B pairsets. Below, 4-Pair load current is captured and presented.

```
power_bt 1,1 c 8 p 90 trace v

power_bt 1,1 c 8 p 90 trace i
```



Class 8 Power-Up: Total 4-Pair Current



Class 6 Signature with Autoclass

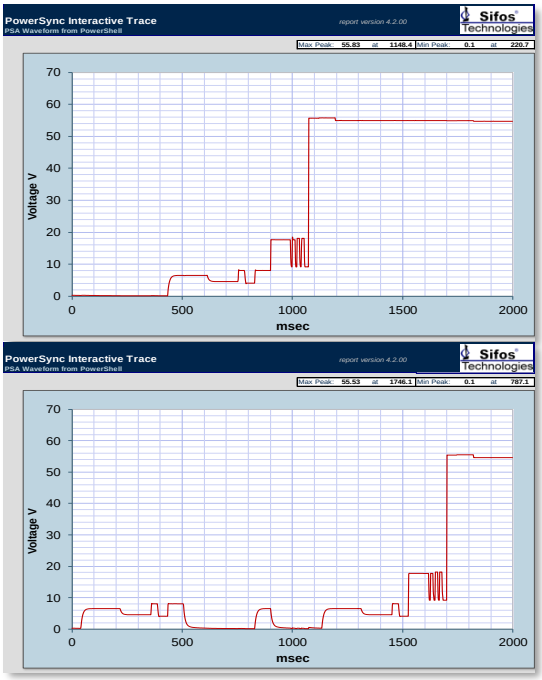
Emulated Autoclass Power-Up

Under the 802.3bt standard, **Autoclass** capability is conveyed from a PD to a PSE by "notching" the end of the first classification event with a Class 0 signature load (e.g. 2mA). This is depicted in the graphic here.

```
power_bt 1,1 c 6 I 1048 autoclass trace i clip
```

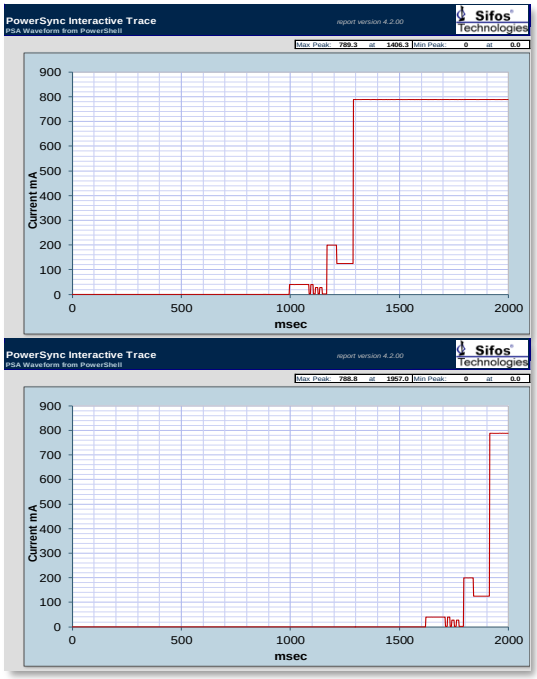
Here, the **clip** option to the **power_bt** command causes the power-up current to be removed from the captured waveform in order to expand the vertical scale for classification current.

Emulated Dual Signature Power-Up



Dual Class 5 Power-Up: Voltage Alt-A and Alt-B

In this example, a dual Class 5 (Dual Signature) power-up is emulated and analyzed. This represents a PD that has independent power interfaces on the Alt-A and Alt-B pairsets and presents up to Class 5 loading (e.g. 45 watts) on each pairset. Pairset voltage and current traces can be optionally captured, where unlike with Single Signature emulation, current is shown per pairset.



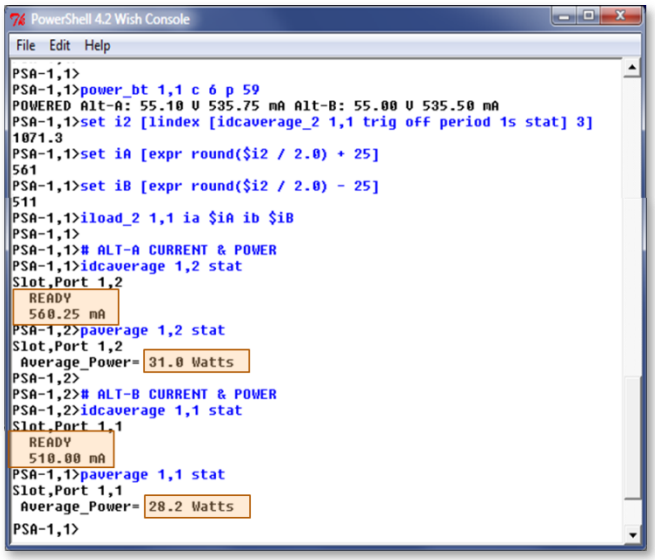
Dual Class 5 Power-Up: Current Alt-A and Alt-B

```
power_bt 1,1 c 5D p 90 trace v

power_bt 1,1 c 5D p 90 trace i
```

Asymmetric Pairset Loading to Assess Pairset Unbalance Response

When Single Signature PD's are powered using 4 pairs, the load current flowing to and back from the PD is not assured of spitting evenly between two pairsets. For this reason, PSE's must tolerate a specified level of pair-to-pair current unbalance while the PD and the cabling are restricted as to how much pair-to-pair load, or resistive, unbalance they introduce in both the feed and return side connections.



Class 6, 59W Power-Up followed by 50 mA Unbalance

This example, a PSE port powers a Class 6 Single Signature PD drawing 59 watts at the PSE interface. The load current is then unbalanced by 50 mA such that one pairset (Alt-A) is loading 560mA and the other pairset (Alt-B) is loading 510mA. This amounts to an unbalance of 2.8 watts between pairsets. The PSE maintains power to both pairsets as it is required to do unless one or the other pairset exceeds 682mA of load current.

This analysis utilizes several PowerShell PSA commands:

```
power_bt
iload_2
idcaverage_2
paverage_2
```

For **Technical Specifications** associated with the PSA-3202, see the **PSA-3000 Product Overview**.

Verification, Simplified.