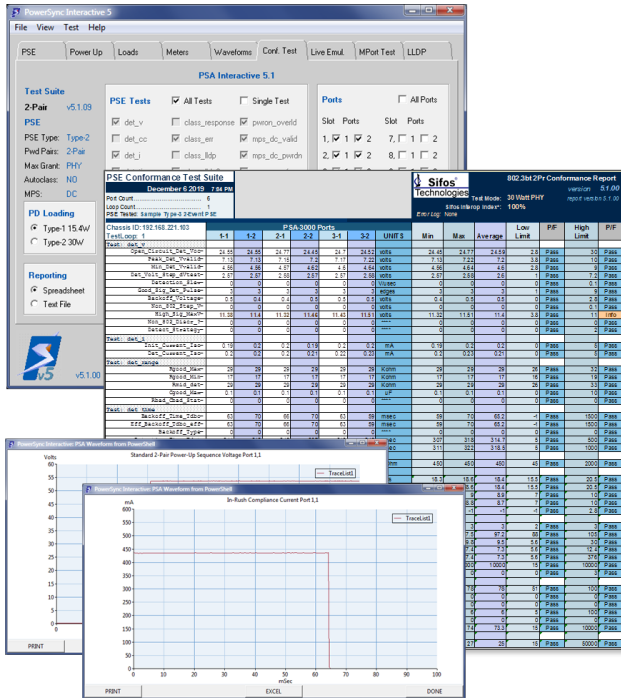




PSA-CT2P PSE Conformance Test Suite

for 2-Pair 802.3at and 802.3bt PSE's

Product Overview



Optional Feature to PSA-3000 Family of PowerSync Analyzers

Key Features

- ❑ Robust 802.3at / 802.3bt 2-Pair PSE Conformance Testing
- ❑ Fully Automated Port Sequencing and Statistics
- ❑ Greater than 95% PICS Coverage from 23 Tests Producing more than 75 IEEE 802.3at/802.3bt Test Parameters per Port
- ❑ Fully Emulates All Type-1, 2, and 3 (Class 0, 1, 2, 3, and 4) PD's Including PoE LLDP-Capable PD's
- ❑ Test Type-2 and Type-3 PSE's that Allocate Class 4 Power Using Multi-Event, LLDP, or Both Multi-Event and LLDP
- ❑ Automatically Adapts to All Prevalent PSE Signaling and Power Behaviors Including 802.3+Legacy Detection Signaling Behaviors
- ❑ Configurable Waveform Trace Diagnostic Generation and Retention
- ❑ Colorful and Informative Spreadsheet Reporting with Compliance (Pass/Fail) Notations and Parameter Statistics
- ❑ Run & Sequence from PSA Interactive GUI or PowerShell PSA Command Line

Verification, Simplified.

IEEE 802.3 PSE's

2-Pair 15, 30W End Span

2-Pair 15, 30W Mid-Span

PoE/PoE+ Connectors

The Industry "Norm"

**Unmatched 802.3
Specification Coverage**

**Widely Used by PSE
Silicon Manufacturers**

**Supports EA PoE Logo
Certification**

Fully Automated One-Button Testing

**Automatic Adaptation to
PSE Probing Techniques
and Hybrid-Legacy
Probing**

**Flexibly Sequence Tests
and Test Ports**

**Pop-Up Spreadsheet
Reporting with Statistics
and Limit Evaluation**

Always Up-To- Date

**Constantly Enhanced
and Improved**

**Tracking Service Support
Agreement**

Responsive Support

Overview

Power-over-Ethernet (PoE) challenges design and test engineers to evaluate multi-channel, "intelligent" DC power sources that are activated and deactivated through signaling protocols operating over several power delivery and polarity configurations. The application and management of DC power over multiple local area network connections must be completely transparent and non-disruptive to the traditional data transmission functions of those network connections.

Higher Power, Smarter Power with 802.3at and 802.3bt

Under the IEEE 802.3 standards, power delivered on two wire pairs to a Powered Device ranges up to 25.5 watts at the PD interface. This places greater demands on PSE's to produce higher power levels and to properly allocate that power to many PD's. Issues of safety and specification compliance are accentuated by the higher power delivery capabilities of each Ethernet Port. The 802.3at and 802.3bt standards also specify a new form of Link Layer Discovery Protocol (LLDP) for PoE whereby new generation PD's can communicate power demand and PSE's can communicate power allocations to those PD's, allowing overall power budgeting with granularity of 0.1 watt per Ethernet port.

Fully Automated Testing with Very High Test Coverage

The PSE Conformance Test Suite for 2-Pair PoE produces between 75 and 112 IEEE 802.3at/802.3bt test parameters per PSE port depending upon PSE capabilities and attributes. These parameters are measured in 23 distinct tests that may be selected and sequenced across up to 24 PSE ports at a time. The test covers **over 95% of the PSE PICS** (conformance check list items) in the IEEE 802.3at specification*. The PSE Conformance Test Suite is widely used throughout the internetworking community as the industry "norm" for PSE specification compliance.

IEEE 802.3af, 802.3at, 802.3bt Cross-Compatibility

In today's world of PoE, PD's developed under three different 802.3 standards must be supported by all PSE's developed under those same standards. The 2-Pair PSE Conformance Test Suite evaluates 2-Pair PSE behaviors to assure proper interoperability with the full gamut of 802.3 compliant PD's.

Robust Diagnostics and Reporting

The 2-Pair PSE Conformance Test Suite automatically sequences to a pop-up spreadsheet report with full color notations of parameter pass/fail status per port and cross-port statistics for each parameter. This report automatically adapts test limits to the PSE type and test case that is sequenced. For diagnostic analysis, PSE Conformance Tests can optionally present graphical waveform traces obtained and analyzed during the course of a test. Each trace is individually notated with a description of the trace purpose or measurement parameter.

Certified for 1st Party EA Logo Testing

The PSE Conformance Test Suite, in combination with the PowerSync Analyzer, has been qualified to fulfill all of the PSE testing required to obtain and maintain Ethernet Alliance PoE Logo marks for 802.3at PSE's. A specialized EA PoE Logo Certification Report is also provided for 1st Party Authorized Test Labs seeking EA PoE Logo certification for PSE's.

* For 802.3at PICS Coverage, see Sifos application note:
802.3at PSE PICS Coverage.pdf

PSE Conformance Tests & Parameters

Detection Probing and Functional Tests

det_v	<p>Detection Pulse Waveform Parameters</p> <p>Captures and analyzes PSE detection probe voltages with both valid and slightly non-valid detection signatures.</p> <p>Voc Peak open circuit (disconnected) detection voltage</p> <p>Vvalid(Max) Maximum Detection Step Level with Valid Signature</p> <p>Vvalid(Min) Minimum Detection Step Level with Valid Signature</p> <p>ΔVtest Detection Step Magnitude</p> <p>Detection Slew Detection step slew rate</p> <p>Good_Sig_Det_Pulse Number of Detection Signal transitions</p> <p>Vbkoff Minimum Voltage during detection (ALT B) backoff</p> <p>Non802_Step_V Level of any pre-detection signals</p> <p>High_Sig_MaxV Maximum detection voltage with high detection signature</p> <p>Non802_Discr? Dependence upon Non-802 detection for validity. PSE's that use non-802.3 detection measurements to resolve a valid signature band will report "1".</p> <p>Detect Strategy Reports PSE Detection as one of five known strategies including 802.3at standard, proprietary pre-detection, etc.</p>
det_i	<p>Detection Current Limiting</p> <p>Measures maximum current sourcing capability from a PSE during detection.</p> <p>Isc(Init) Max detection current at minimum detection voltage</p> <p>Isc(Det) Max detection current during detection</p>
det_range	<p>Detection Passive Acceptance Range</p> <p>Assesses the range of acceptable PD signatures and the reliability of valid detection given random connect timing and capacitive loading.</p> <p>Rgood_Max Maximum accepted detection resistance signature</p> <p>Rgood_Min Minimum accepted detection resistance signature</p> <p>Rmid_det MAX (or MIN) detection resistance given random connections</p> <p>Cgood_Max Maximum accepted detection capacitance signature</p> <p>Rbad_Cbad_Stat Power-Up status given a 35Kohm (marginally high) resistive signature with the lowest Capacitive signature rejected by the PSE.</p>
det_time	<p>Detection Timing</p> <p>Measures detection backoff and detection probe timing parameters.</p> <p>Tdbo Detection back-off time (between failed detections)</p> <p>Tdbo_eff Effective back-off time for PSE's that ignore rather than disable detection measurements</p> <p>Tdet 802.3at detection time duration</p> <p>Tdet_tot Total detection time including pre-detection measurements</p> <p>Backoff_Type Reports PSE Detection back-off as one of several known strategies including 802.3at standard, legacy, and 4-pair detection schemes</p>
det_resource	<p>PSE Output Resistance during Detection</p> <p>Measures effective source resistance of PSE port during detection.</p> <p>Zout PSE estimated output impedance during detection</p>

Verification, Simplified.

Classification Signaling and Functional Tests

class_v

Classification Voltages

Captures and analyzes PSE classification voltage levels, focusing on only the final classification performed prior to power-up. Class and Mark voltages are evaluated over every Class and Mark event present.

Vclass	Class Pulse Average Voltage with 1 mA class signature
Vclass_min	Class Pulse Average Voltage with 45 mA class signature
Vmark	Mark Region Voltage with 4 mA mark signature load
Vmark_min	Minimum Port Voltage measured over both MARK regions until power-up
Vreset	(Type-3 PSE's only) Class Probe Reset Voltage (if present)

class_time

Classification Timing

Captures and analyzes PSE classification signal timing, focusing on only the final classification performed prior to power-up.

Event_Count	Count of class pulses
Tpdc	Duration of class pulse given Single-Event Classification
Tcle1/Tlce	Duration of first class pulse given Multi-Event Classification
Tcle2	Duration of second* class pulse given Multi-Event Classification
Tme1	Duration of first mark interval given Multi-Event Classification
Tme2	Duration of second* mark interval given Multi-Event Classification
Class_Reset_Time	(Type-3 PSE's only) Duration of class reset after class probe (if present)
Class_Probe_Events	(Type-3 PSE's only) Number of class pulses in a class probe (if present)

* If a Type-3 PSE performs 3-Event classification, only the first two class and mark events will affect PD signature interpretation. The [class_v](#) test assures that 3rd class and mark voltages are above 7VDC.

class_err

Classification Current Limiting

Evaluates any current limiting applied to classification signals by PSE as well as PSE powering behaviors following overloaded or illegal classification signatures.

Class_lim	Maximum Class Current before PSE starts to limit Class Current
Vport_CL_lim	Power-Up response (as binary) following a current limited classification
Vport_CL_err_1	Power-Up response (as binary) following a 55mA (invalid) classification load
Mark_lim	Minimum Mark Current Supported during 2-event Mark Region - tested at 5.5 mA and 105 mA given 2-Event Classification
Vport_CL_err_2	Power-Up response (as binary) following up to 3 successive class signatures that changed from Event #1 to Event #2 (asymmetrical signature)
Treset	Duration of PSE IDLE state following asymmetrical class signature

class_ldap

LLDP Protocol and Mutual Discovery Testing

Assesses PSE LLDP basic protocol fields, protocol timing, and power request processing for Type-1, 2, and 3 PD's. 802.3at TLV's utilized for all cases except **PSE_Alloc_Pwr_bt_tlv_N** & **PD_Pwr_Adjust_bt_tlv_N**.

PSE_Source_Priority	Bit Field for PSE Source, Priority, Reserved
PSE_MDI_Pwr_Sup	Bit Field from legacy TLV for Port Class, MDI Power Support, MDI Power State, Pair Selection, and Reserved
PSE_LLDP_Time_1	Time from Power-On to first PoE LLDP frame from PSE given Type-1 PD
PSE_LLDP_Type_1	PSE Type advertised by a PSE given Class 0-3 PD signature
PSE_Echo_Time_1	Time for PSE to echo back the PD Requested Power level
PSE_Alloc_Pwr_1	Allocated Power in response to 8.1 W PD Request from a Class 0-3 PD
PSE_Alloc_Time_1	Time to respond To 8.1 W PD Request with Power Allocated
PD_Power_Adjust_1	Allocated Power in response to a Change Request from 8.1W to 13W
PSE_Adjust_Time_1	Time to echo a PD 13 watt PD Change Request
PSE_LLDP_Time_2	Time from Power-On state to first PoE LLDP frame from PSE given Type-2 PD
PSE_LLDP_Type_2	PSE Type advertised by PSE given Class 4 PD signature

Classification Signaling and Functional Tests

PSE_Echo_Time_2	Time for PSE to echo back the PD Requested Power level
PSE_Alloc_Pwr_2	Allocated Power in response to 20.3W PD Request from a Class 4 PD
PSE_Alloc_Time_2	Time to respond To 20.3 W PD Request with Power Allocated
PD_Power_Adjust_2	Allocated Power in response to Change Request from 20.3W to 25.5W
PSE_Adjust_Time_2	Time to echo a PD 25.5 watt PD Change Request
Link_Down_Shutdown_?	Indicates if power removed on Link Drop after LLDP negotiation
PSE_Alloc_Pwr_bt_tlv_1	(Type-3 PSE's only) PSE ability to allocate using 802.3bt TLV's with Class 3 PD
PD_Power_Adjust_bt_tlv_1	(Type-3 PSE's only) PSE ability to adjust power using 802.3bt TLV's with Class 3 PD
PSE_Alloc_Pwr_bt_tlv_2	(Type-3 PSE's only) PSE ability to allocate using 802.3bt TLV's with Class 4 PD
PD_Power_Adjust_bt_tlv_2	(Type-3 PSE's only) PSE ability to adjust power using 802.3bt TLV's with Class 4 PD

Power-Up Processes

pwrup_time

Power-Up Timing Parameters

Measures power-up rise time and time delay from completion of final detection until power applied.

Trise	Rise Time from 10% to 90% of Vport
Tpon	Time from end of detection until power-up, Tpon is measured from the final complete detection probe preceding a power-up

pwrup_inrush

PSE Current Limiting Behaviors During Power-Up

Evaluates PSE current limiting and inrush overload tolerance parameters. Assures compliance to 802.3bt figure 145-22, Inrush current and timing limits in the POWER_UP state.

Init_Inrush	Maximum output current immediately after 1 msec of a severe inrush overload
Max_Inrush_c0	Maximum output current in time interval from 1 to 75 msec given Class 0-3 PD
Max_Inrush_c4	Maximum output current in time interval from 1 to 75 msec given Class 4 PD
Min_Inrush	Minimum output current while current limiting in time interval from 1 to 50 msec given 30V or higher port voltage
Tinrush	Duration of current limiting until PSE removes power
Inrush_45m	Port voltage after 50msec following 45 msec current limiting inrush overload
Max_Init_Inrush	Maximum output current up to 1 msec given a severe inrush overload
Vinrush	Average Port Voltage - PSE current limiting, PSA foldback suppression applied
Inrush_Strategy	Indicator if PSE uses "legacy_powerup" exception and consequences thereof categorized into one of five possible outcomes

PSE Powered-On Performance and Processes

pwrn_v

Powered Port Voltage, Ripple, and Noise

Measures PSE port DC and AC voltages in response to minimum and maximum power loads.

Vport_min_N	Min Port voltage with 0.5 Watt and Pport_Max (PD Class) loading
Vport_max_N	Max Port voltage with 0.5 Watt and Pport_Max (PD Class) loading
Vpp_ripple_N	Peak AC Ripple with 0.5 Watt and Pport_Max (PD Class) loading
Vpp_noise_N	Peak AC Noise with 0.5 Watt and Pport_Max (PD Class) loading
Vtrans_max_N	Maximum Port Voltage measured during a 5msec load transient from 12mA to Pport_Max / Vport and back.
Vtrans_min_N	Minimum Port Voltage measured during a 5msec load transient from 12mA to Pport_Max / Vport and back.

pwrn_pwr cap

PSE Port Power Capacity

Measures the maximum power delivery capability of a PSE port given various PD Classifications and LLDP power allocations.

Pcon_c0=	Maximum output power from PSE Port given Class 0 PD
Icon_%_c0=	Maximum static output current relative to 802.3at Icon(Pclass_0)
Pcon_c1=	Maximum output power from PSE Port given Class 1 PD

Icon_%_c1=	Maximum static output current relative to 802.3at Icon(Pclass_1)
Pcon_c2=	Maximum output power from PSE Port given Class 2 PD
Icon_%_c2=	Maximum static output current relative to 802.3at Icon(Pclass_2)
Pcon_c3=	Maximum output power from PSE Port given Class 3 PD
Icon_%_c3=	Maximum static output current relative to 802.3at Icon(Pclass_3)
Pcon_c4=	Maximum output power from PSE Port given Class 4 PD
Icon_%_c4=	Maximum static output current relative to 802.3at Icon(Pclass_4)
Type-2_Enable	Verifies > 450 mA continuously available at 80 msec following 2-event power-up for 2-event, Type-2 PSE's or verifies >450 mA is not available for LLDP capable Type-2 PSE's prior to negotiation
Pclass_LLDP_22.7	Indicator of PSE ability to deliver Pclass (Icon) given 22.7W power grant
Pclass_LLDP_24.5	Indicator of PSE ability to deliver Pclass (Icon) given 24.5W power grant

pwrn_maxi

PSE Response to Maximum Overloads

The **pwrn_maxi** test evaluates PSE characteristics with respect to the **POWER_ON** state PI operating current templates in Figures 33-15 and 145-23 of the 802.3 specification.

Ilim_Peak	Maximum output current tolerated by PSE in time frame of 8 to 75 msec
Ilim_Min_1	Minimum output current up to 50 msec with 402mA load pulse and foldback suppression applied to assure > 30VDC (Type-1 PD emulation)
Tlim_1*	Time to port shutdown in response to 400 mA overload given Type-1 PD
Vlim_1	Average port voltage coincident with Tlim_1 measurement
Ilim_Max_1	Maximum output current from 1 to 75 msec given 700mA load pulse and foldback suppression active given a Type-1 PD
Ilim_Low_V_Tol_1	Measures time-to-port-foldback given a Type-1 PD with extreme overload
Ktran_Io_1	% excursion below 50V given 250usec (fast) overload transient (401 mA) given a Type-1 PD (Type-2 PSE's only)
Ilim_Min_2	Minimum output current up to 50 msec with 686mA load pulse and foldback suppression applied to assure > 30VDC given Type-2 PD emulation
Tlim_2*	Time to port shutdown in response to 684 mA overload given Type-2 PD
Vlim_2	Average port voltage coincident with Tlim_2 measurement
Ilim_Max_2	Maximum output current from 1 to 75 msec given 860mA load pulse and foldback suppression active given a Type-1 PD
Ilim_Low_V_Tol_2	Essentially a measure of time-to-port-foldback given a Type-2 PD

* Type-3 PSE's may report **Tlim_min_N** and **Tlim_max_N** separately where **Tlim_max_N** is time to port shutdown in response to an 850mA overload given Type-1 or Type-2 PD.

pwrn_overld

PSE Response to Maximum PD Power Transients

The **pwrn_overld** test assesses powered PSE port behaviors with respect to **Ipeak**, the maximum power overload allowed to a PD as defined in Equation 33-4 and 145-11 of the 802.3 standard.

%Ipeak_N	Percent of required Ipeak current that is supported over 50msec duration where Ipeak required is defined by Equation 33-4 given a Type-N PD – maximum level verified is 125%
Vport_Ipeak_N	Min Port Voltage at Ipeak transient pulse given a Type-N PD
Vport_5%DC_N	Min Port Voltage over 5 seconds with a quantity of 50 msec Ipeak pulse transients separated by 1 second (5% duty cycle) given a Type-N PD

MPS Processes for Power Removal on PD Disconnect

mps_ac_pwrndn

Power Timing and Load Current Impact on AC MPS PSE's

Evaluates power removal timing and DC load tolerance on an AC MPS PSE.

Tmpdo	Disconnect power-down timing from disconnect event
I_hold_ac	Maximum DC Load Current tolerated with AC MPS Disconnect Shutdown

mps_ac_vf

AC MPS Signaling Characteristics

Measures AC MPS signaling characteristics during the **Tmpdo** interval.

V_open	Peak-Peak AC probing voltage following PD Disconnect
V_open_%Vport	Peak-Peak AC probing voltage expressed as a % Vport_pse
Fp	AC probing signal frequency following PD Disconnect
AC_MPS_SR	AC probing signal slew rate
Isac	Signal current sourced by AC MPS signal generation resource

MPS Processes for Power Removal on PD Disconnect

mps_ac_voff	AC MPS Peak Voltage Characteristics Measures voltage peaks following PD disconnect and power-down events given an AC MPS PSE. V_open1 Peak port voltage found after AC MPS power removal event Vopen_pk Peak port voltage following PD disconnect over a period of one second
mps_dc_valid	DC MPS Valid Signature Timing Characteristics Measures intermittent load tolerance thresholds of a DC MPS PSE. Test conditions and limits differ between Type-1/2 PSE's and Type-3 PSE's. Tmps Minimum valid signature ACTIVE time required for DC MPS validity Duty_Cycle_tol PSE power response to minimum valid load duty cycle
mps_dc_pwrdsn	Power Timing and Threshold Assessment on DC MPS PSE's Evaluates power removal timing and DC load requirements on a DC MPS PSE. Test conditions and limits differ between Type-1/2 PSE's and Type-3 PSE's. I_hold Minimum current required to maintain power given DC MPS PSE Tmpdo Disconnect power-down timing from start of invalid signature Vopen_pk Peak port voltage following PD disconnect over a period of one second

PSE Power-Down Characteristics

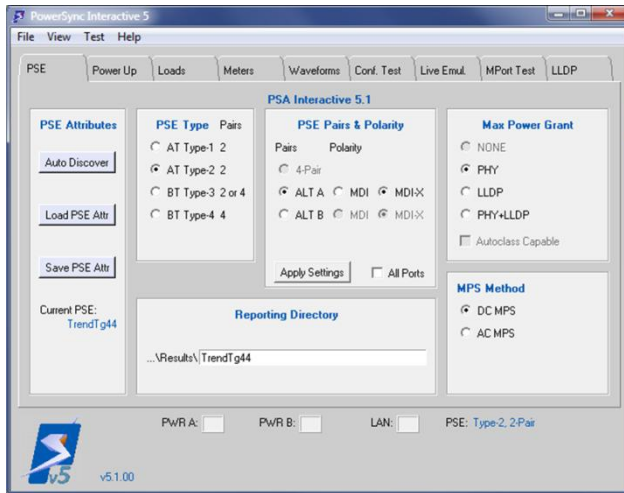
pwrdsn_overld	PSE Response to Non-Current Limiting Overloads Evaluates PSE handling of non-current limiting overloads in the PSE discretionary region of the PI operating current templates in Figure 33-15 and 145-23 of the 802.3 specification. Icut_N Smallest load current of duration equal to Tcut_Max, or 75 msec, that causes immediate or delayed power removal given a Type-N (1 or 2) PSE. Tcut_N Time from start of transient until power removal but not exceeding 75msec, the duration of the applied load transient. Isoft_N Smallest load current of duration equal to 2 seconds that causes immediate or delayed power removal given a Type-N (1 or 2) PSE. Tsoft_N Time from start of transient until power removal but not exceeding 2 seconds, the duration of the applied load transient.
pwrdsn_time	PD Disconnect Shutdown Timing Evaluates PSE disconnect discharge timing as well as output characteristics during power removal. Toff Power discharge time with hypothetical 320KΩ load. Cout PSE output capacitance during power discharge Rp PSE shunt output resistance during power discharge
pwrdsn_v	Post-Overload Shutdown Voltage and Timing Measures PSE post-power-removal characteristics following an overload shutdown condition. Voff IDLE state voltage between detections after overload shutdown Ted Time from overload condition shutdown until a detection probe leading to a successful power-up Ved Peak voltage over the Ted interval

Configuring and Running the PSE Conformance Test Suite

The PSE Conformance Test Suite is accessed from either PSA Interactive Software (GUI) or PowerShell PSA, an extended Tcl/Tk command line shell.

Within **PSA Interactive**, two menus are relevant to the PSE Conformance Test Suite. First the **PSE** tab menu allows users to describe, discover, or load previously stored PSE Attributes. These parameters are critical to the behavior of the PSE 2-Pair Conformance Test Suite and should be properly established for any PSE to be tested.

PSE attributes include **PSE Type** (e.g. Type-1, 2, or 3), **PSE Pairs** (ALT A or ALT B), **PSE Polarity** (MDI or MDI-X), **Max Power Grant** method (NONE, PHY, LLDP, or PHY+LLDP), and **MPS Method** (DC or AC). If these parameters are not properly declared and applied, then the PSE conformance test sequencing may produce errors, inappropriate or missing parameters, or incorrect limit checking. PSE attributes can be automatically discovered from a connected PSE using the **Auto Discover** menu. They can be saved for future recall using the **Save PSE Attr** control and they can be recalled and applied to the PSA instrument by using the **Load PSE Attr** control.

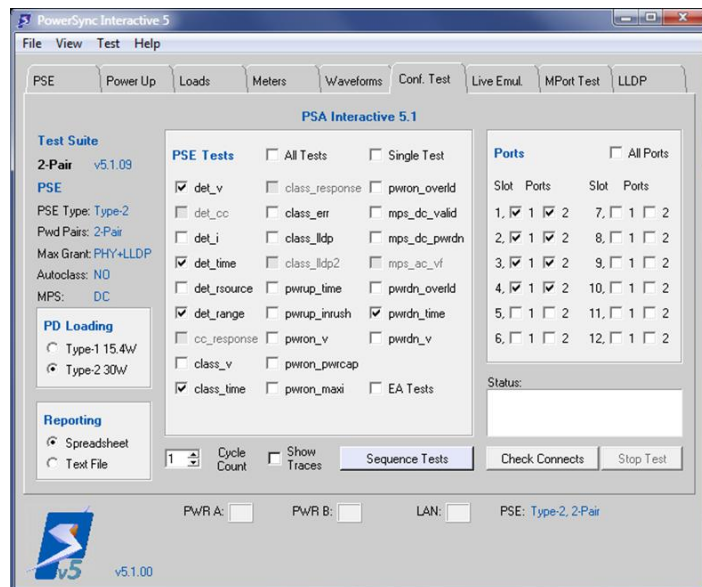


PSA Interactive PSE Tab Menu

In the lower right corner of the main window, the presently described **PSE Type** and **Powered Pairs** is always displayed in blue. The 2-Pair PSE Conformance Test Suite will only be activated when this indicator displays **Type-1, 2-Pair**, **Type-2, 2-Pair**, or **Type-3, 2-Pair**.

In PowerShell PSA, PSE attributes can be auto-discovered using the `psa_auto_port` command and can be recalled using the `psa_pse` command. PSE attributes are saved using the `psa_saveConfig` command.

Once the PSE Type and associated PSE attributes are properly established and applied to the connected PSA instrument, the **Conf. Test** tab menu is accessed to configure fully automated test sequences. This menu will automatically configure itself for **2-Pair PSE** testing when the most recently described PSE is **Type-1, 2-Pair**, **Type-2, 2-Pair**, or **Type-3, 2-Pair**. Using this menu, automated sequences of selected tests across selected test ports are readily configured and initiated. Alternatively, the menu supports running just a **Single Test** on a single port.



PSA Interactive Conformance Test Menu

When the menu is configured for **2-Pair PSE** testing, users have the option to specify whether the **PD Loading** should come from emulated Type-1 or Type-2 PD's. If the PSE is Type-1, then only **Type-1 15.4W** loading will be possible. If the PSE is Type-2 or Type-3, then both **Type-1 15.4W** and **Type-2 30W** options are available and comprehensive PSE testing is performed using both scenarios.

Other PSE attributes including maximum power granting method (**Max Grant**) and **MPS** method are displayed and correspond to settings established in the PSE tab menu. These attributes affect which tests are available and selectable in the menu.

User's may also select one of two reporting options when sequencing tests including the default option to produce a pop-up (Microsoft Excel) spreadsheet report that performs all test parameter limit checking and analysis.

Multi-Port PSE connections can rapidly be verified prior to testing using the **Check Connects** control after selecting the desired **Ports**. This feature can save the inconvenience of re-running the test suite when one or more ports experiences a bad physical connection. Additionally, users may opt to have waveform traces produced by each test appear on screen as each test runs. Test sequences may be re-cycled up to 16 times using a **Cycle Count** control for those who need to perform exhaustive QA while getting insights into intermittent PSE behaviors.

Test sequencing from PowerShell PSA is performed using the `sequence` command and requires that PSE attributes be properly set and applied before executing that command.

The 2-Pair PSE Conformance Test Suite Standard Report

The standard spreadsheet test report for the 2-Pair PSE Conformance Test Suite provides efficient feedback by clearly notating any specification compliance violations both by test parameter and by test (PSE) port. The report also accumulates minimum, maximum, and average parameter values across PSE ports so that users can spot individual port deviations and assess performance to design goals. Multiple cycles of testing can be specified to produce one report page per sequence cycle.

All test limit processing automatically adapts to the mode of PD Emulation, the type of PSE (e.g. Type-1, Type-2, or Type-3), and other factors that are specified before the sequence begins. Test limit tables are found on the **Limits** page of the report.

The report includes a **Notes** page with detailed explanations of each parameter of each test and an **Interop** page that rates the "Interop" Risks of any particular combination of specification violations. This leads to an aggregate **Interop Index** when a high percentage of available tests are run.

The report will automatically scale to the number of tested PSE ports and will produce multiple pages for multiple test cycles.

PSE Conformance Test Suite				Sifos Technologies				802.3at2Pr Conformance Report			
December 30 2019 12:32 AM				Test Mode: 30 Watt LLDAP				version 5.1.00			
Port Count: 4				Sifos Interop Index: 95%				report version 5.1.00			
Loop Count: 1				Error Log: None							
PSE Tested: Sample Type-2 LLDAP PSE											
Chassis ID: 192.168.221.141											
Test Loop: 1											
PSEA3000 Ports											
UNIT S											
Min Max Average Low Limit P/F High Limit P/F											
Test: det_v											
Open_Circuit_Det_Vocv 14.8 14.82 14.83 14.85 volts 14.8 14.98 14.85 2.8 Pass 30 Pass											
Peak_Det_Vvalidd 7.05 7.08 7.04 7.04 volts 7.04 7.06 7.1 3.8 Pass 10 Pass											
Min_Det_Vvalidd 4.98 5.01 4.99 4.98 volts 4.98 5.01 5 2.8 Pass 9 Pass											
Det_Volt_Slep_dVbeavn 1.4 1.39 1.38 1.38 volts 1.38 1.4 1.4 1 Pass 7.2 Pass											
Detection_Slewv 0 0 0 0 V/msec 0 0 0 0 Pass 0.1 Pass											
Good_Sig_Det_Pulsev 3 3 3 3 edges 3 3 3 1 Pass 5 Pass											
Backoff_Voltagev 0.5 0.5 0.5 0.5 volts 0.5 0.5 0.5 0 Pass 9 Pass											
Non_802_Step_Vv 0 0 0 0 volts 0 0 0 0 Pass 0.1 Pass											
High_Sig_MaxVv 11.26 11.28 11.19 11.48 volts 11.18 11.26 11.2 3.8 Pass 11 Info											
Non_802_Discv ? 0 0 0 0 --- 0 0 0 0 Pass 0 Pass											
Detect_Strategyv 0 0 0 0 --- 0 0 0 0 Pass 2 Pass											
Test: det_i											
Init_Current_Iacv 0.2 0.2 0.21 0.22 mA 0.2 0.22 0.21 0 Pass 5 Pass											
Det_Current_Iacv 0.17 0.18 0.19 0.19 mA 0.17 0.19 0.18 0 Pass 5 Pass											
Test: det_range											
Road_Maxv 29 29 29 29 Kohm 29 29 29 26 Pass 32 Pass											
Road_Minv 17 17 17 17 Kohm 17 17 17 16 Pass 19 Pass											
Road_detv 29 29 29 29 Kohm 29 29 29 26 Pass 33 Pass											
Road_Maxv 0.1 0.1 0.1 0.1 uF 0.1 0.1 0.1 0 Pass 10 Pass											
Road_Cbad_Statv 0 0 0 0 --- 0 0 0 0 Pass 0 Pass											
Test: det_time											
Backoff_Time_Tdov 660 648 660 660 msec 648 660 665 -1 Pass 1500 Pass											
Eff_Backoff_Tdov_effv 660 648 660 660 msec 648 660 665 -1 Pass 1500 Pass											
Backoff_Typev 0 0 0 0 --- 0 0 0 0 Pass 0 Pass											
Detection_Time_Tdov 256 268 256 258 msec 256 256 256 5 Pass 500 Pass											
Total_Det_Timev 264 266 266 266 msec 264 266 266.5 5 Pass 1000 Pass											
Test: det_resource											
Output_Impedance_Sourv 450 450 450 450 KOhm 450 450 450 45 Pass 2000 Pass											
Test: class_v											
Class_Voltage_Volav 17.4 17.4 17.7 17.8 volts 17.4 17.7 17.5 15.5 Pass 20.5 Pass											
Class_Voltage_Minv 17.3 17.4 17.7 17.5 volts 17.3 17.7 17.5 15.5 Pass 20.5 Pass											
Test: class_time											
Event_Countv 2 2 2 2 --- 2 2 2 1 Pass 1 Fail											
Class_Time_Tpdov 11.4 10.4 11.6 10.4 msec 10.4 11.5 10.9 5.8 Pass 75 Pass											
Test: class_err											
Class_Limv 75 75 78 78 mA 75 78 78 51 Pass 100 Pass											
Pwr_Cl_Limv 0 0 0 0 --- 0 0 0 0 Pass 0 Pass											
Pwr_Cl_55v 0 0 0 0 --- 0 0 0 0 Pass 0 Pass											
Test: class_lldp											
PSE_Source_Priorityv 0 0 0 0 * 0 0 0 0 Pass 0 Pass											
PSE_MDI_Pwr_Supv 0 0 0 0 * 0 0 0 0 Pass 0 Pass											
PSE_LLDAP_Time_2v 3.9 3.8 3.8 4.1 sec 3.8 4.1 3.9 0 Pass 10 Pass											
PSE_LLDAP_Type_2v 2 2 2 2 2 2 2 2 2 2 Pass 2 Pass											
PSE_Echo_Time_2v 1.4 1.4 1.4 1.4 sec 1.4 1.4 1.4 0 Pass 10 Pass											
PSE_Allow_Pwr_2v 20.3 20.3 20.3 20.3 Watts 20.3 20.3 20.3 20 Pass 25.5 Pass											
PSE_Allow_Time_2v 1.8 1.8 1.8 1.8 sec 1.8 1.8 1.8 0 Pass 30 Pass											
PD_Power_Adjust_2v 25.5 25.5 25.6 25.5 Watts 25.5 25.5 25.5 25.5 Pass 25.5 Pass											
PSE_Adjust_Time_2v 1.8 1.9 1.8 2.3 sec 1.8 2.3 2 0 Pass 10 Pass											
Link_Down_Shutdown_?v 1 1 1 1 1 1 1 1 0 Pass 0 Info											
Test: perov_time											
Pwr-On_Rise_Time_Triav 11 11 11 11 usec 11 11 11 15 Fail 5000 Pass											
Power-On_Time_Tpov 56.6 52.7 52.7 52.7 msec 52.7 56.6 53.7 0 Pass 400 Pass											
Test: perov_inrush											
Init_Inrushv 437.25 442 437 440.5 mA 437 442 438.2 400 Pass 400 Pass											
Max_Inrush_cdv 443 445 440.75 444.75 mA 440.75 445 443.4 400 Pass 450 Pass											
Min_Inrushv 432.5 436.38 431 431 mA 431 436.38 432.7 400 Pass 450 Pass											
Inrushv 65 65 65 66 msec 65 66 65 50 Pass 75 Pass											
Inrush_45mv 53.5 53.4 53.6 53.5 Volts 53.4 53.5 53.5 50 Pass 57 Pass											
Inrush_Voltagev 31.3 31.7 32 32.2 Volts 31.3 32.2 31.8 30 Pass 57 Pass											
Max_Temp_Inrushv 560.5 561 436 440.3 mA 436 561 504.5 0 Pass 2000 Pass											
Inrush_Strategyv 0 0 0 0 --- 0 0 0 0 Pass 1 Pass											
Test: perov_v											
Vport_min_2v 52.9 53.1 53 53 V 52.9 53.1 53 50 Pass 57 Pass											
Vport_max_2v 54 54 54 54 V 54 54 54 50 Pass 57 Pass											
Vport_ripple_2v 650 674 642 626 mVpp 626 674 648 0 Pass 500 Fail											
Vport_noise_2v 11 5 11 5 mVpp 5 11 8 0 Pass 200 Pass											
Vports_min_2v 51.5 51 52.5 51 V 51 51 51.5 50 Pass 57 Pass											
Vports_max_2v 54.3 54.4 54.3 54.4 V 54.3 54.4 54.4 50 Pass 57 Pass											
Test: perov_power											
Pcon_cdv 30.7 30.8 30.7 30.4 watts 30.4 30.8 30.7 28.7 Pass 38.9 Pass											
Icon_k_cdv 104.8 105 104.8 103.9 --- 103.9 106 104.6 100 Pass 9999 Pass											
Type-2_Enablev 0 0 0 0 --- 0 0 0 0 Pass 0 Pass											
Pclass_LLDAP_24_5v 1 1 1 1 --- 1 1 1 1 Pass 1 Pass											
Pclass_LLDAP_24_5v 1 1 1 1 --- 1 1 1 1 Pass 1 Pass											
Test: perov_max											
Ilim_Peakv 832.8 832.3 829.3 833.5 mA 829.3 833.5 832 0 Pass 1750 Pass											
Ilim_Min_2v 686 686.5 686.6 685.5 mA 685.5 686.5 686.9 683 Pass 1750 Pass											
Ilim_2v 63.3 63.3 64 63.3 msec 61 63.3 49.5 10 Fail 75 Pass											
Vlim_2v 52.6 52.8 52.7 52.7 V 52.6 52.8 52.7 50 Pass 57 Pass											
Ilim_Max_2v 805.5 816.5 807.2 813.8 mA 807.5 816.5 811.8 0 Pass 1750 Pass											
Ilim_Low_V_Tol_2v 38.3 27.7 38.3 34 msec 27.7 38.3 34.6 10 Pass 9996 Pass											
Rtran_1c_2v 105.4 106 105.3 106 % 105.4 106 106.8 92.4 Pass 115 Pass											

PSE 2-Pair Conformance Test Suite Standard Report (excerpt)

EA PoE Logo Certification

The Ethernet Alliance (EA) introduced an industry program in 2017 to certify PSE's and powered devices (PD's) so that interoperability and safety factors associated with PoE network equipment could be better ensured across the industry. The certification program includes a PoE Logo, or mark, that can be applied to certified equipment and to associated literature. Additionally, the program includes a web-based registry describing all certified equipment.

The PSA-CT2P Conformance Test Suite was tested and approved for first party (in-house) EA certification testing. Contact Sifos for further information on this topic.



Ordering Information

PSA-CT2P*, 2-Pair PSE Conformance Test Suite for One PSA Address (Up to 24 Test Ports)

PSA-CT2P-TS1, Tracking Service, 2-Pair PSE Conformance Suite for One Year for One PSA Address

PSA-CT2P-TS2, Tracking Service, 2-Pair PSE Conformance Suite for Two Years for One PSA Address

PSA-CT2P-ST51, Tracking Service, 2-Pair PSE Conformance Suite for One Year for Multiple PSA Addresses
Operating at a Single Site

PSA-CT2P-ST52, Tracking Service, 2-Pair PSE Conformance Suite for Two Years for Multiple PSA Addresses
Operating at a Single Site

PSA-48-QTD, PowerSync Analyzer Test Suite 48 Port Discount

***NOTE:** *PSA-CT2P requires one or more **PSA-3x02** test blades or **PSA-3x02** Compact PSA and is also supported on the **PSA-3x48** RackPack PSA.*

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Learn MORE about the 2-Pair PSE Conformance Test Suite.
See the **PSE Conformance Test Suite Demo**
video presentation at www.sifos.com.

Verification, Simplified.