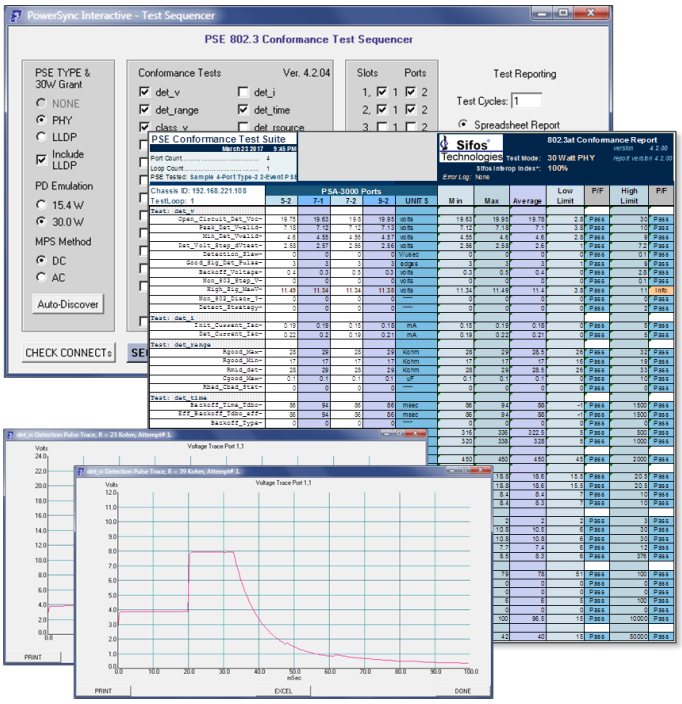
PSA-CT
PSE Conformance Test Suite
for the PSA-3000 PowerSync® Analyzer

Product Overview



Key Features

- ❑ **Robust 802.3at (*PoE+*) PSE Compliance Testing**
- ❑ **Fully Automated Port Sequencing and Statistics**
- ❑ **Greater than 95% 802.3at PICS Coverage* from 23 Tests Producing more than 75 IEEE 802.3at Test Parameters per Port**
- ❑ **Fully Emulates All Type-1 (PD Class 0, 1, 2, or 3) and Type-2 (PD Class 4) PD's Including PoE LLDP-Capable PD's**
- ❑ **Adapts to All Prevalent PSE Signaling and Power Behaviors**
- ❑ **Adapts to Prevalent Composite 802.3at and Proprietary Detection Signaling Behaviors**
- ❑ **Configurable Waveform Trace Diagnostic Generation and Retention to 10 Waveforms per Test**
- ❑ **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

Type-1/Type-2 End-Span

Type-1/Type-2 Mid-Span

PoE/PoE+ Connectors

Power Injectors

The Industry "Norm"

Unmatched 802.3at Specification Coverage

Widely Used by PSE Silicon Manufacturers

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, "smart" 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, safe, non-destructive, and non-disruptive to the traditional data transmission behaviors of those network connections and associated network equipment.

Higher Power with 802.3at

Under the IEEE 802.3at standard, power delivered by a single PSE port to a Powered Device ranges up to 25.5 watts. PSE's must pack more electrical power and more processing power to manage that electrical power. Issues of safety and specification compliance are accentuated by the higher power delivery capabilities of each Ethernet Port.

Smarter PSE's and PD's

In the IEEE 802.3at realm, end-span PSE's such as data switches and routers may use Link Layer Discovery Protocol (LLDP) to communicate power needs and availability with a new generation of Powered Devices (PD's). This extended protocol is a core component of PSE power resource management with granularity to 0.1 watt per Ethernet port.

Fully Automated Testing with Very High Test Coverage

The PSE Conformance Test Suite for 802.3at produces between 75 and 112 IEEE 802.3at test parameters per PSE port depending upon PSE capabilities. 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.

Flexible PD and LLDP Emulation

The 802.3at standard, unlike its 802.3af predecessor, allows for a variety of PSE and PD types including higher power PD's and LLDP-capable PSE's and PD's. As a result, PSE Conformance Testing requires increased test "cases" to allow for the variety of powering configurations that can arise. The PSE Conformance Test Suite for 802.3at enables each of these test cases so as to assure full test coverage of all PSE types.

Robust Diagnostics and Reporting

The PSE Conformance Test Suite for 802.3at can automatically sequence 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 test case that is sequenced. Many of the PSE Conformance Tests capture and analyze various voltage and load current "scope" traces in order to evaluate measurement parameters. These traces can be automatically posted to the display, accumulated, and retained until the end of each test for diagnostic purposes. Each trace is individually notated with a description of the trace purpose or measurement parameter.

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

Verification, Simplified.

PSE Conformance Tests & Parameters

Detection Probing and Functional Tests

det_v — Detection Pulse Waveform Parameters

Captures and analyzes PSE detection probe voltages with both valid and slightly non-valid detection signatures.

Voc	Peak open circuit (disconnected) detection voltage
Vvalid(Max)	Maximum Detection Step Level with Valid Signature
Vvalid(Min)	Minimum Detection Step Level with Valid Signature
ΔVtest	Detection Step Magnitude
Detection Slew	Detection step slew rate
Good_Sig_Det_Pulse	Number of Detection Signal transitions
Vbkoff	Minimum Voltage during detection (ALT B) backoff
Non802_Step_V	Level of any pre-detection signals
High_Sig_MaxV	Maximum detection voltage with high detection signature
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".
Detect Strategy	Reports PSE Detection as one of five known strategies including 802.3at standard, proprietary pre-detection, etc.

det_i — Detection Current Limiting

Measures maximum current sourcing capability from a PSE during detection.

Isc(Init)	Max detection current at minimum detection voltage
Isc(Det)	Max detection current during detection

det_range — Detection Passive Acceptance Range

Assesses the range of acceptable PD signatures and the reliability of valid detection given random connect timing and capacitive loading.

Rgood_Max	Maximum accepted detection resistance signature
Rgood_Min	Minimum accepted detection resistance signature
Rmid_det	MAX (or MIN) detection resistance given random connections
Cgood_Max	Maximum accepted detection capacitance signature
Rbad_Cbad_Stat	Power-Up status given a 35Kohm (marginally high) resistive signature with the lowest Capacitive signature rejected by the PSE.

det_time — Detection Timing

Measures detection backoff and detection probe timing parameters.

Tdbo	Detection back-off time (between failed detections)
Tdbo_eff	Effective back-off time for PSE's that ignore rather than disable detection measurements
Tdet	802.3at detection time duration
Tdet_tot	Total detection time including pre-detection measurements
Backoff_Type	Reports PSE Detection back-off as one of several known strategies including 802.3at standard, legacy, and 4-pair detection schemes

det_rsource — PSE Output Resistance during Detection

Measures effective source resistance of PSE port during detection.

Zout	PSE estimated output impedance during detection

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.

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

Classification Signaling and Functional Tests

	Vmark_min	Minimum Port Voltage measured over both MARK regions until power-up

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	Duration of first class pulse given 2-Event Classification
Tcle2	Duration of second class pulse given 2-Event Classification
Tme1	Duration of first mark interval given 2-Event Classification
Tme2	Duration from end of second class pulse to power-up given 2-Event Classification

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_lldp LLDP Protocol and Mutual Discovery Testing

Assesses PSE LLDP basic protocol fields, protocol timing, and power request processing for both Type-1 and Type-2 PD's.

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 state until 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 until first PoE LLDP frame from PSE given Type-2 PD
PSE_LLDP_Type_2	PSE Type advertised by PSE given Class 4 PD signature
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

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

Power-Up Processes

pwrup_inrush — PSE Current Limiting Behaviors During Power-Up

Evaluates PSE current limiting and inrush overload tolerance parameters. Assures compliance to 802.3at figure 33-14, IInrush 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

pwron_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.

pwron_pwrcap — 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

pwron_maxi — PSE Response to Maximum Overloads

The pwron_maxi test evaluates PSE characteristics with respect to the POWER_ON state PI operating current templates in Figure 33-15 of the 802.3at 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_lo_1	% excursion below 50V given 250usec (fast) overload transient (401 mA) given a Type-1 PD (Type-2 PSE’s only)

Power-Up Processes

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
Ktran_lo_2	% excursion below 50V given 250usec (fast) overload transient (686 mA) given a Type-2 PD

pwron_overld — PSE Response to Maximum PD Power Transients

The pwron_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 of the 802.3at 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_pwrdn — 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_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.

Tmps	Minimum valid signature ACTIVE time required for DC MPS validity
Duty_Cycle_tol	PSE power response to valid / invalid load cycling of 16.7% duty cycle

mps_dc_pwrdn — Power Timing and Threshold Assessment on DC MPS PSE's

Evaluates power removal timing and DC load requirements on a DC MPS PSE.

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

pwrdn_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 of the 802.3at 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.

PSE Power-Down Characteristics

pwrdn_time — AC MPS Signaling Characteristics

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

pwrdn_v — AC MPS Peak Voltage Characteristics

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

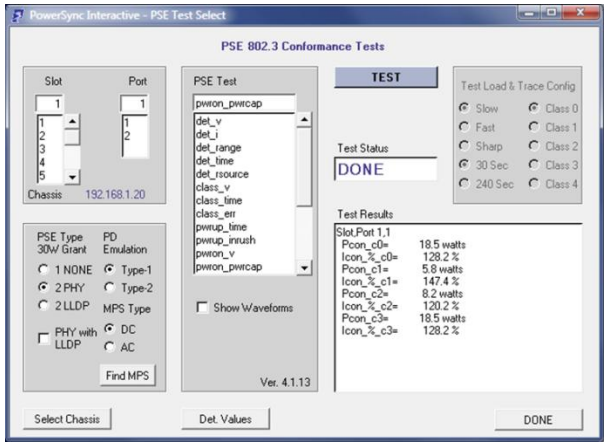
Configuring and Running the PSE Conformance Test Suite

The PSE Conformance Test Suite is accessed from either PSA Interactive Software (GUI) or PowerShell PSA, an extended Tcl/Tk command line shell. PSA Interactive provides two menus with access to the PSE Conformance Test Suite: The **PSE Tests** menu and the **Sequencer** menu.

Within each of these menus, users perform 3 declarations that affect testing and test options:

- PD Emulation: Type-1 (**15.4W**) or Type-2 (**30W**)
- PD 30W Grant Type: **NONE** (Type-1 PSE), **PHY** (Type-2 2-Event PSE), or **LLDP** (Type-2 LLDP)
- PSE Disconnect Detection Method: **AC** MPS or **DC** MPS

The **PSE Tests** menu is geared to running a single test at a time and capturing results from that test. The menu allows users to select a particular PSA test port (slot and port) and then execute a test. Users may optionally select to have any and all measurement waveforms that are used by a given test captured, labeled, and displayed as the test runs.



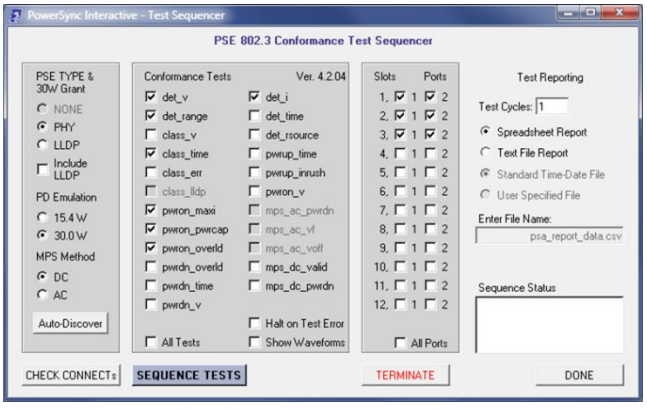
PSA Interactive PSE Tests Menu

The **PSE Tests** menu also provides access to certain other specialized testing functions that include user specified loading profiles and LLDP traces.

The **Sequencer** menu allows users to select one or more tests that are to be automatically sequenced along with the PSA test ports that will also be sequenced.

User's may also select one of several reporting options, the most common of which will 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 from this menu and as with the PSE Tests menu, users may opt to have waveform traces produced by each test appear on screen as each test runs. Users may also choose to have the sequence terminate as soon as an error condition develops in any test on any port.



PSA Interactive Sequencer Menu

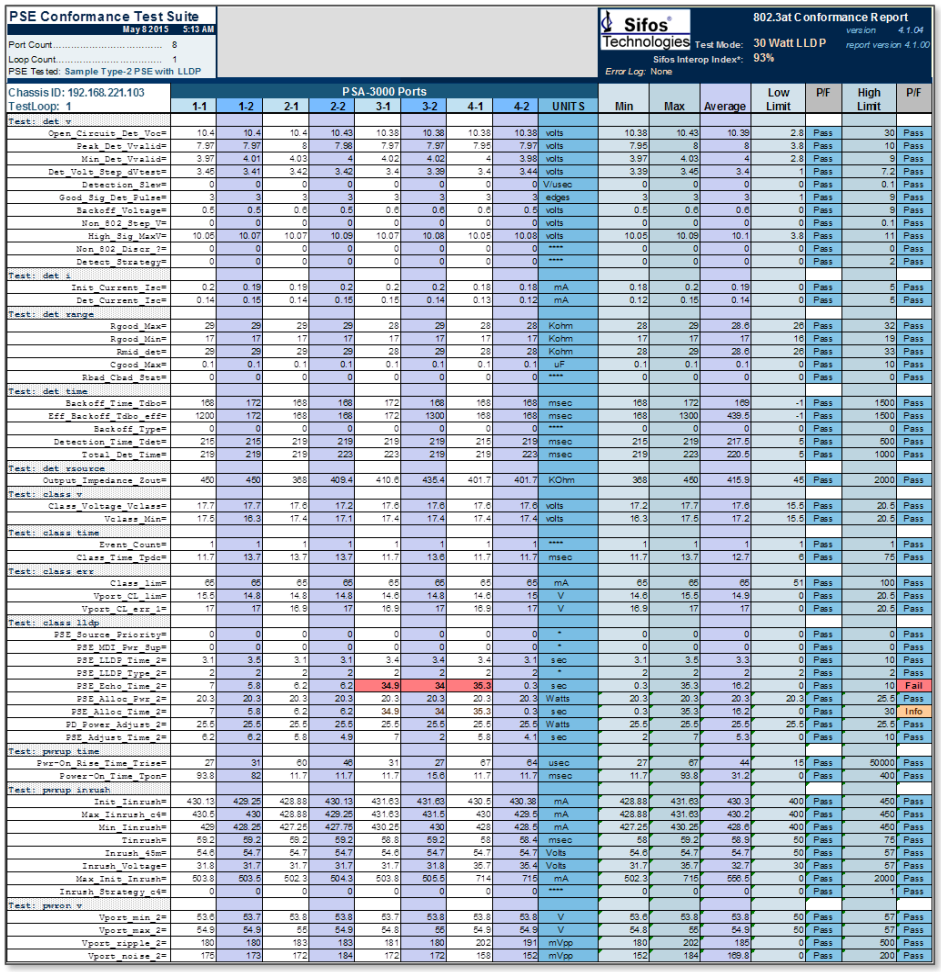
The PSE Conformance Test Suite Standard Report

The standard spreadsheet test report for the 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 or Type-2), 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.



PSE Conformance Test Suite
May 8 2015 5:13 AM
Port Count..... 8
Loop Count..... 1
PSE Tested: Sample Type-2 PSE with LLDP

Sifos Technologies
802.3at Conformance Report
version 4.1.04
Test Mode: 30 Watt LLDP
report version 4.1.00
Sifos Interop Index*: 93%
Error Log: None

Chassis ID: 192.168.221.103
TestLoop: 1

	PSA-3000 Ports														
	1-1	1-2	2-1	2-2	3-1	3-2	4-1	4-2	UNITS	Min	Max	Average	Low Limit	P/F	High Limit	P/F
Test: det_v																
Open_Circuit_Det_Voc=	10.4	10.4	10.4	10.43	10.38	10.38	10.38	10.38	volts	10.38	10.43	10.39	2.8	Pass	30	Pass
Peak_Det_Vvalid=	7.97	7.97	8	7.98	7.97	7.97	7.95	7.97	volts	7.95	8	8	3.8	Pass	10	Pass
Min_Det_Vvalid=	3.97	4.01	4.03	4	4.02	4.02	4	3.98	volts	3.97	4.03	4	2.8	Pass	9	Pass
Det_Volt_Step_dVtest=	3.45	3.41	3.42	3.42	3.4	3.39	3.4	3.44	volts	3.39	3.45	3.4	1	Pass	7.2	Pass
Detection_Slew=	0	0	0	0	0	0	0	0	V/usec	0	0	0	0	Pass	0.1	Pass
Good_Sig_Det_Pulse=	3	3	3	3	3	3	3	3	edges	3	3	3	1	Pass	9	Pass
Backoff_Voltage=	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.5	volts	0.5	0.6	0.6	0	Pass	9	Pass
Non_802_Step_V=	0	0	0	0	0	0	0	0	volts	0	0	0	0	Pass	0.1	Pass
High_Sig_MaxV=	10.05	10.07	10.07	10.09	10.07	10.08	10.05	10.08	volts	10.05	10.09	10.1	3.8	Pass	11	Pass
Non_802_Discr_?=	0	0	0	0	0	0	0	0	****	0	0	0	0	Pass	0	Pass
Detect_Strategy=	0	0	0	0	0	0	0	0	****	0	0	0	0	Pass	2	Pass
Test: det_i																
Init_Current_Isc=	0.2	0.19	0.19	0.2	0.2	0.2	0.18	0.18	mA	0.18	0.2	0.19	0	Pass	5	Pass
Det_Current_Isc=	0.14	0.15	0.14	0.15	0.15	0.14	0.13	0.12	mA	0.12	0.15	0.14	0	Pass	5	Pass
Test: det_range																
Rgood_Max=	29	29	29	29	28	29	28	28	Kohm	28	29	28.6	26	Pass	32	Pass
Rgood_Min=	17	17	17	17	17	17	17	17	Kohm	17	17	17	16	Pass	19	Pass
Rmid_det=	29	29	29	29	28	29	28	28	Kohm	28	29	28.6	26	Pass	33	Pass
Cgood_Max=	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	uF	0.1	0.1	0.1	0	Pass	10	Pass
Rbad_Cbad_Stat=	0	0	0	0	0	0	0	0	****	0	0	0	0	Pass	0	Pass
Test: det_time																
Backoff_Time_Tdbo=	168	172	168	168	172	168	168	168	msec	168	172	169	-1	Pass	1500	Pass
Eff_Backoff_Tdbo_eff=	1200	172	168	168	172	1300	168	168	msec	168	1300	439.5	-1	Pass	1500	Pass
Backoff_Type=	0	0	0	0	0	0	0	0	****	0	0	0	0	Pass	0	Pass
Detection_Time_Tdet=	215	215	219	219	219	219	215	219	msec	215	219	217.5	5	Pass	500	Pass
Total_Det_Time=	219	219	219	223	223	219	219	223	msec	219	223	220.5	5	Pass	1000	Pass
Test: det_vsource																
Output_Impedance_Zout=	450	450	368	409.4	410.6	435.4	401.7	401.7	KOhm	368	450	415.9	45	Pass	2000	Pass
Test: class_v																
Class_Voltage_Vclass=	17.7	17.7	17.6	17.2	17.6	17.6	17.6	17.6	volts	17.2	17.7	17.6	15.5	Pass	20.5	Pass
Vclass_Min=	17.5	16.3	17.4	17.1	17.4	17.4	17.4	17.4	volts	16.3	17.5	17.2	15.5	Pass	20.5	Pass
Test: class_time																
Event_Count=	1	1	1	1	1	1	1	1	****	1	1	1	1	Pass	1	Pass
Class_Time_Tpdc=	11.7	13.7	13.7	13.7	11.7	13.6	11.7	11.7	msec	11.7	13.7	12.7	6	Pass	75	Pass
Test: class_err																
Class_lim=	65	65	65	65	65	65	65	65	mA	65	65	65	51	Pass	100	Pass
Vport_CL_lim=	15.5	14.8	14.8	14.8	14.6	14.8	14.6	15	V	14.6	15.5	14.9	0	Pass	20.5	Pass
Vport_CL_err_1=	17	17	16.9	17	16.9	17	16.9	17	V	16.9	17	17	0	Pass	20.5	Pass
Test: class_lldp																
PSE_Source_Priority=	0	0	0	0	0	0	0	0	*	0	0	0	0	Pass	0	Pass
PSE_MDI_Pwr_Sup=	0	0	0	0	0	0	0	0	*	0	0	0	0	Pass	0	Pass
PSE_LLDP_Time_2=	3.1	3.5	3.1	3.1	3.4	3.4	3.4	3.1	sec	3.1	3.5	3.3	0	Pass	10	Pass
PSE_LLDP_Type_2=	2	2	2	2	2	2	2	2	*	2	2	2	2	Pass	2	Pass
PSE_Echo_Time_2=	7	5.8	6.2	6.2	34.9	34	35.3	0.3	sec	0.3	35.3	16.2	0	Pass	10	Fail
PSE_Allos_Pwr_2=	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	Watts	20.3	20.3	20.3	20.3	Pass	25.5	Pass
PSE_Allos_Time_2=	7	5.8	6.2	6.2	34.9	34	35.3	0.3	sec	0.3	35.3	16.2	0	Pass	30	Info
PD_Power_Adjust_2=	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	Watts	25.5	25.5	25.5	25.5	Pass	25.5	Pass
PSE_Adjust_Time_2=	6.2	6.2	5.8	4.9	7	2	5.8	4.1	sec	2	7	5.3	0	Pass	10	Pass
Test: pwrup_time																
Pwr-On_Rise_Time_Trise=	27	31	60	46	31	27	67	64	usec	27	67	44	15	Pass	50000	Pass
Power-On_Time_Tpon=	93.8	82	11.7	11.7	11.7	15.6	11.7	11.7	msec	11.7	93.8	31.2	0	Pass	400	Pass
Test: pwrup_inrush																
Init_Iinrush=	430.13	429.25	428.88	430.13	431.63	431.63	430.5	430.38	mA	428.88	431.63	430.3	400	Pass	450	Pass
Max_Iinrush_c4=	430.5	430	428.88	429.25	431.63	431.5	430	429.5	mA	428.88	431.63	430.2	400	Pass	450	Pass
Min_Iinrush=	429	428.25	427.25	427.75	430.25	430	429	428.5	mA	427.25	430.25	428.6	400	Pass	450	Pass
Tinrush=	59.2	59.2	59.2	59.2	58.8	59.2	59	58.4	msec	58	59.2	58.9	50	Pass	75	Pass
Inrush_45m=	54.6	54.7	54.7	54.7	54.6	54.7	54.7	54.7	Volts	54.6	54.7	54.7	50	Pass	57	Pass
Inrush_Voltage=	31.8	31.7	31.7	31.7	31.7	31.8	35.7	35.4	Volts	31.7	35.7	32.7	30	Pass	57	Pass
Max_Init_Inrush=	503.8	503.5	502.3	504.3	503.8	505.5	714	715	mA	502.3	715	566.5	0	Pass	2000	Pass
Inrush_Strategy_c4=	0	0	0	0	0	0	0	0	****	0	0	0	0	Pass	1	Pass
Test: pwron_v																
Vport_min_2=	53.6	53.7	53.8	53.8	53.7	53.8	53.8	53.8	V	53.6	53.8	53.8	50	Pass	57	Pass
Vport_max_2=	54.9	54.9	55	54.9	54.9	55	54.9	54.9	V	54.9	55	54.9	50	Pass	57	Pass
Vport_ripple_2=	180	180	183	183	181	180	202	191	mVpp	180	202	186	0	Pass	500	Pass
Vport_noise_2=	175	173	172	184	172	172	158	152	mVpp	152	184	168.8	0	Pass	200	Pass

PSE Conformance Test Suite Standard Report (excerpt)

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***NOTE**: *PSA-CT requires one or more **PSA-3x02** test blades, **PSA-3x48** RackPack, or **PSA-300x** Compact PSA*

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