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 25 Tests Producing over 140 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 15W PSE's

2-Pair 30W PSE's

2-Pair 802.3bt PSE's

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

** LLDP Emulation & Analysis feature license is sold separately*
*** Microsoft Excel 2007 or later required*

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 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 80 and 140 IEEE 802.3at/802.3bt test parameters per PSE port depending upon PSE capabilities and attributes. These parameters are measured in 25 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 and 802.3bt specifications. 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 interoperation 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 Gen1 EA Logo Testing

Combined with the PowerSync Analyzer, the 2-Pair PSE Conformance Test Suite is qualified for Ethernet Alliance **Gen1** (802.3at) **PoE Logo Certification** testing enabling manufacturers to perform the testing required for EA PoE Logo marks in-house.

Verification, Simplified.

PSE Conformance Tests & Parameters

Parameter Color Key: **All PSE's** **Type-2 & Type-3 PSE's** **Type-3 PSE's only** **Informational**

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.

Open_Circuit_Voc	Peak open circuit (disconnected) detection voltage
Peak_Det_Vvalid	Maximum Detection Step Level with Valid Signature
Min_Det_Vvalid	Minimum Detection Step Level with Valid Signature
Det_Volt_Step_dVtest	Detection Step Magnitude
Detection Slew	Detection step slew rate
Good_Sig_Det_Pulse	Number of Detection Signal transitions
Backoff_Voltage	Minimum Voltage during detection (ALT B) backoff
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.

Init_Current_Isc	Max detection current at minimum detection voltage
Det_Current_Isc	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. Assesses if PSE signals and powers on more than one pairset.

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.
4Pair_Pwr_?	Determine if PSE signals and powers on both the Alt-A and the Alt-B pairsets

det_time — Detection Timing

Measures detection backoff and detection probe timing parameters.

Backoff_Time_Tdbo	Detection back-off time (between failed detections)
Eff_Backoff_Tdbo_eff	Effective back-off time for PSE's that ignore rather than disable detection measurements
Detection_Time_Tdet	802.3at detection time duration
Total_Det_Time	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.

PSE_Detect_Source	Flag indicating if PSE uses current or voltage detection probe
Output_Impedance_Zout	Current probe output impedance during detection

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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_Max	Class Pulse Average Voltage with 1 mA class signature
Vclass_Min	Class Pulse Average Voltage with 45 mA class signature
Mark_Voltage_Vmark	Mark Region Voltage with 4 mA mark signature load
Mark_Voltage_Min	Minimum Port Voltage measured over both MARK regions
Class_Reset_V	Class Probe Reset Voltage (*if class probe present*)

class_time — Classification Timing

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

Class_0_Count	Count of class pulses to a Class 0 PD
Class_4_Count	Count of class pulses to a Class 4 PD
Class_Time_Tpdc	Duration of class pulse given Single-Event 802.3at Classification
Event1_Tcle1	Duration of first class pulse given 802.3at Multi-Event Classification
Event1_Tlce	Duration of first (elongated) class pulse
Event2_Tcle2	Duration of second* class pulse given Multi-Event Classification
Event2_Tcle3	Duration of third class pulse given 802.3bt Multi-Event Classification
Mark_Tme1	Duration of first mark interval given Multi-Event Classification
Mark_Tme2	Duration of second mark interval (802.3bt) Multi-Event Classification
Mark_Tme_Last	Duration of final mark interval given Multi-Event Classification
Mark_Tme1_Lowl	Duration of first mark interval given minimal (0.5mA) mark load from PD
Class_Reset_Time	Duration of IDLE time after class probe (*if class probe present*)
Class_Probe_Events	Number of class pulses in class probe (*if class probe present*)

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_Iim	Maximum Class Current before PSE starts to limit Class Current
Pwr_Cl_Iim	Power-Up response (as binary) following a current limited classification
Pwr_Cl_55	Power-Up response (as binary) following a 55mA (invalid) classification
Mark_Iim	Minimum Mark Current Supported during 2-event Mark Region - tested at 5.5 mA and 105 mA given 2-Event Classification
Pwr_Cl_Uneven	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 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**. (*Requires LLDP Emulation & Analysis feature license*.)

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

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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	PSE ability to allocate using 802.3bt TLV's with Class 3 PD
PD_Power_Adjust_bt_tlv_1	PSE ability to adjust power using 802.3bt TLV's with Class 3 PD
PSE_Alloc_Pwr_bt_tlv_2	PSE ability to allocate using 802.3bt TLV's with Class 4 PD
PD_Power_Adjust_bt_tlv_2	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.

Power-On_Trise_c0	Rise Time from 10% to 90% of Vport to a Class 0 PD
Power-On_Tpon_c0	End of detection time until [power-up + 50 msec] time given a Class 0 PD
Power-On_Trise_c4	Rise Time from 10% to 90% of Vport to a Class 4 PD
Power-On_Tpon_c4	End of detection time until [power-up + 50 msec] time given a Class 4 PD

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, 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
Inrush_Voltage	Average Port Voltage - PSE current limiting, PSA foldback suppression applied
Inrush_Strategy_c0	Indicator if PSE uses "legacy_powerup" exception (and consequences thereof) categorized into one of five possible outcomes given a Class 0 PD
Inrush_Strategy_c4	Indicator if PSE uses "legacy_powerup" exception and consequences thereof categorized into one of five possible outcomes given a Class 4 PD
LowV_Inrush	Inrush current measured when PSE output voltage allowed to drop to ~15V at start of inrush.

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	Minimum Port voltage with 95% of maximum supported current load
Vport_max	Maximum Port voltage with low power (0.5 Watt) load
Vport_ripple	Peak AC Ripple with 0.5 Watt and 95% of maximum supported current load
Vport_noise	Peak AC Noise with 0.5 Watt and 95% of maximum supported current load
Vtrans_min	Minimum Port Voltage measured during a 5msec load transient from 12mA to Pclass (max supported power) and back
Vtrans_max	Maximum Port Voltage measured during a 5msec load transient from 12mA to Pclass (max supported power) 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. (*LLDP emulations require LLDP Emulation & Analysis license*.)

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

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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 furnish **Pclass** (**Icon**) given 22.7W power grant
Pclass_LLDP_24.5	Indicator of PSE ability to furnish **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 Figures 33-15 and 145-23 of the 802.3 specification.

Ilim_Peak_1	Maximum current PSE outputs in response to 1.9A load after 8 msec to a Class 0 PD
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 or **Tlim_min_1**	Time to port shutdown in response to 400 mA overload given Type-1 PD
Tlim_max_1	Time to port shutdown in response to 850 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
Ktran_lo_1	% excursion below 50V given 250usec (fast) overload transient (402 mA) from a Class 0 PD
Ilim_Peak_2	Maximum current PSE outputs in response to 1.9A load after 8 msec to a Class 4 PD
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 or **Tlim_min_2**	Time to port shutdown in response to 684 mA overload given Type-2 PD
Tlim_max_2	Time to port shutdown in response to 850 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
Ktran_lo_2	% excursion below 50V given 250usec (fast) overload transient (684 mA) from a Class 4 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 and 145-11 of the 802.3 standard.

%Ipeak_1	Percent of required **Ipeak** current that is supported over 50msec duration where **Ipeak** (Eq. 33-4 in 802.3at) tested up to 125% with Class 0 PD
Vport_Ipeak_1	Minimum Port Voltage at **Ipeak** transient pulse given a Class 0 PD
Vport_5%DC_1	Minimum Port Voltage over 5 seconds with a quantity of 50 msec **Ipeak** pulse transients separated by 1 second (5% duty cycle) given a Class 0 PD
%Ipeak_2	Percent of required **Ipeak** current that is supported over 50msec duration where **Ipeak** (Eq. 33-4 in 802.3at) tested up to 125% with Class 4 PD
Vport_Ipeak_2	Minimum Port Voltage at **Ipeak** transient pulse given a Class 4 PD
Vport_5%DC_2	Minimum Port Voltage over 5 seconds with a quantity of 50 msec **Ipeak** pulse transients separated by 1 second (5% duty cycle) given a Class 4 PD

pwron_autoclass

PSE Response to Autoclass Signature & Autoclass Power Capacity

The pwron_autoclass test applies only to 802.3bt Type-3 PSE's and while it will run with any 2-Pair PSE, is targeted to PSE's that support the 802.3bt autoclass process of measuring maximum PD power draw in the autoclass time window following power-up and adjusting Pclass accordingly.

Autoclass_shutdown	Flag indicating if PSE adjusts power capacity in response to a Type-3 autoclass signature and power measurement.
Pac_margin_C3_low	Flag indicating autoclass power support to low power (3W) Class 3 PD
Pac_margin_C3_high	Flag indicating autoclass power support to high power (9W) Class 3 PD
Pac_margin_C4_low	Flag indicating autoclass power support to low power (3W) Class 4 PD
Pac_margin_C4_high	Flag indicating autoclass power support to high power (16W) Class 4 PD
Autoclass_4W	Flag indicating that an autoclass signature of less than 4W is ignored whereupon PSE furnishes assigned class from classification.

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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.

Power_Down_Time_ Tmpdo	Disconnect power-down timing from disconnect event
DC_Max_Load_Imin1	Minimum DC current enabling AC MPS Disconnect Shutdown

mps_ac_vf — AC MPS Signaling Characteristics

Measures AC MPS signaling characteristics during the Tmpdo interval.

AC_MPS_V_open	Peak-Peak AC probing voltage following PD Disconnect
AC_MPS_V_open%	Peak-Peak AC probing voltage expressed as a % Vport_pse
AC_MPS_Frequency	AC probing signal frequency following PD Disconnect
Slew_Rate	**AC probing signal slew rate**
Source_Current_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.

Peak_AC_MPS_V_open1	Peak port voltage found after AC MPS power removal event
Peak_Disconnect_Vport	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 betweenType-1/2 PSE's and Type-3 PSE's.

Min_Valid_Time_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_pwrdn — 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 betweenType-1/2 PSE's and Type-3 PSE's.

Min_Valid_I_hold	Minimum current required to maintain power given DC MPS PSE
Time-to-Shutdown_Tmpdo	Disconnect power-down timing from start of invalid signature

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 and 145-23 of the 802.3 specification.

Icut_1	Required current to produce a Tcut (< 75msec) shutdown to a Class 0 PD
Tcut_1	Time from initiation of Icut_1 load until power removal
Isoft_1	Required current to produce a 2 second shutdown to a Class 0 PD if less
Tsoft_1	Time from initiation of Isoft_1 load until power removal
Icut_2	Required current to produce a Tcut (< 75msec) shutdown to a Class 4 PD
Tcut_2	Time from initiation of Icut_2 load until power removal
Isoft_2	Required current to produce a 2 second shutdown to a Class 4 PD if less
Tsoft_2	Time from initiation of Isoft_2 load until power removal

pwrdn_time — PD Disconnect Shutdown Timing

Evaluates PSE disconnect discharge timing as well as output characteristics during power removal.

Turn-Off_Time_Toff	Power discharge time with hypothetical 320KΩ load resistor
Output_Cap_Cout	PSE output capacitance during power discharge
Output_Load_Rp	PSE shunt output resistance during power discharge

pwrdn_v — Post-Overload Shutdown Voltage and Timing

Measures PSE post-power-removal characteristics following an overload shutdown condition.

Avg_Idle_Voff	IDLE state voltage after overload shutdown
Error_Delay_Ted	Time from overload shutdown until a detection probe leading to a successful power-up
Peak_Error_Delay_Ved	Peak voltage over the Ted interval

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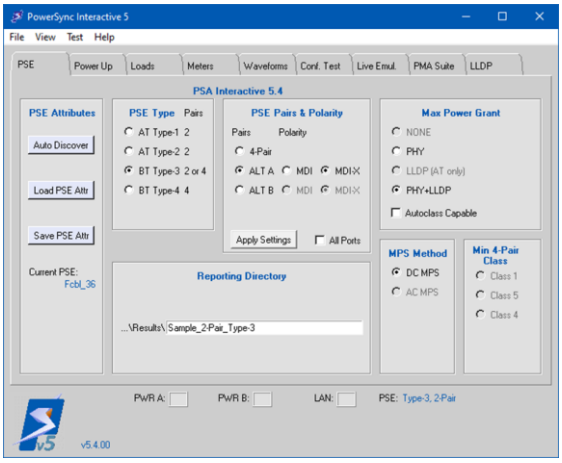
Configuring and Running the 2-Pair PSE Conformance Test Suite

The PSE Conformance Test Suite is accessed from both PSA Interactive Software (GUI) and 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.

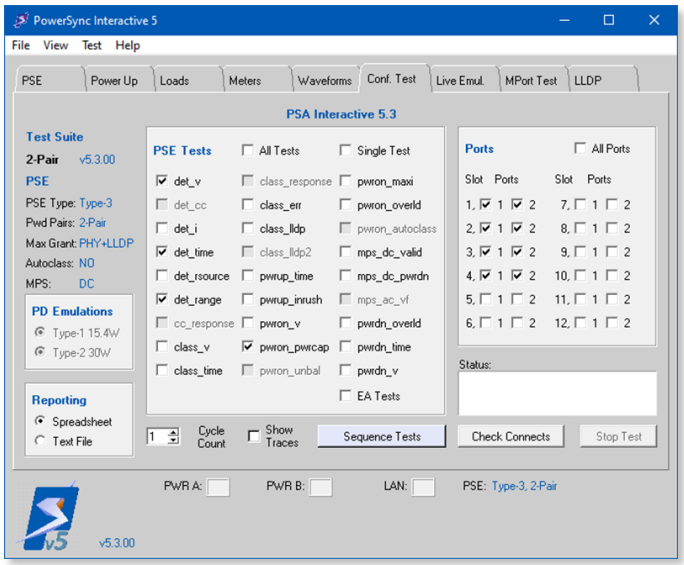


PSA Interactive PSE Tab Menu

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 PSE using the **Auto Discover** menu. They can be saved for future recall using the **Save PSE Attr** button and they can be recalled and applied to the PSA instrument using the **Load PSE Attr** button.

The presently described **PSE Type** and **Powered Pairs** is always displayed in blue in the lower right. 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.

The **Conf. Test** tab menu is then 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. The menu also supports running just a **Single Test** on a single port.



PSA Interactive Conformance Test Menu

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

With the **2-Pair** PSE test suite, PSE's that support up to 15.4 watt loading (Max Power Grant = **NONE**) are tested using mostly emulated Type-1 PD's. PSE's that support up to 30 watt loading (Max Power Grant = **PHY**, **LLDP**, or **PHY+LLDP**) are tested using combinations of Type-1 PD emulations and Type-2 PD emulations and therefore produce many more test parameters.

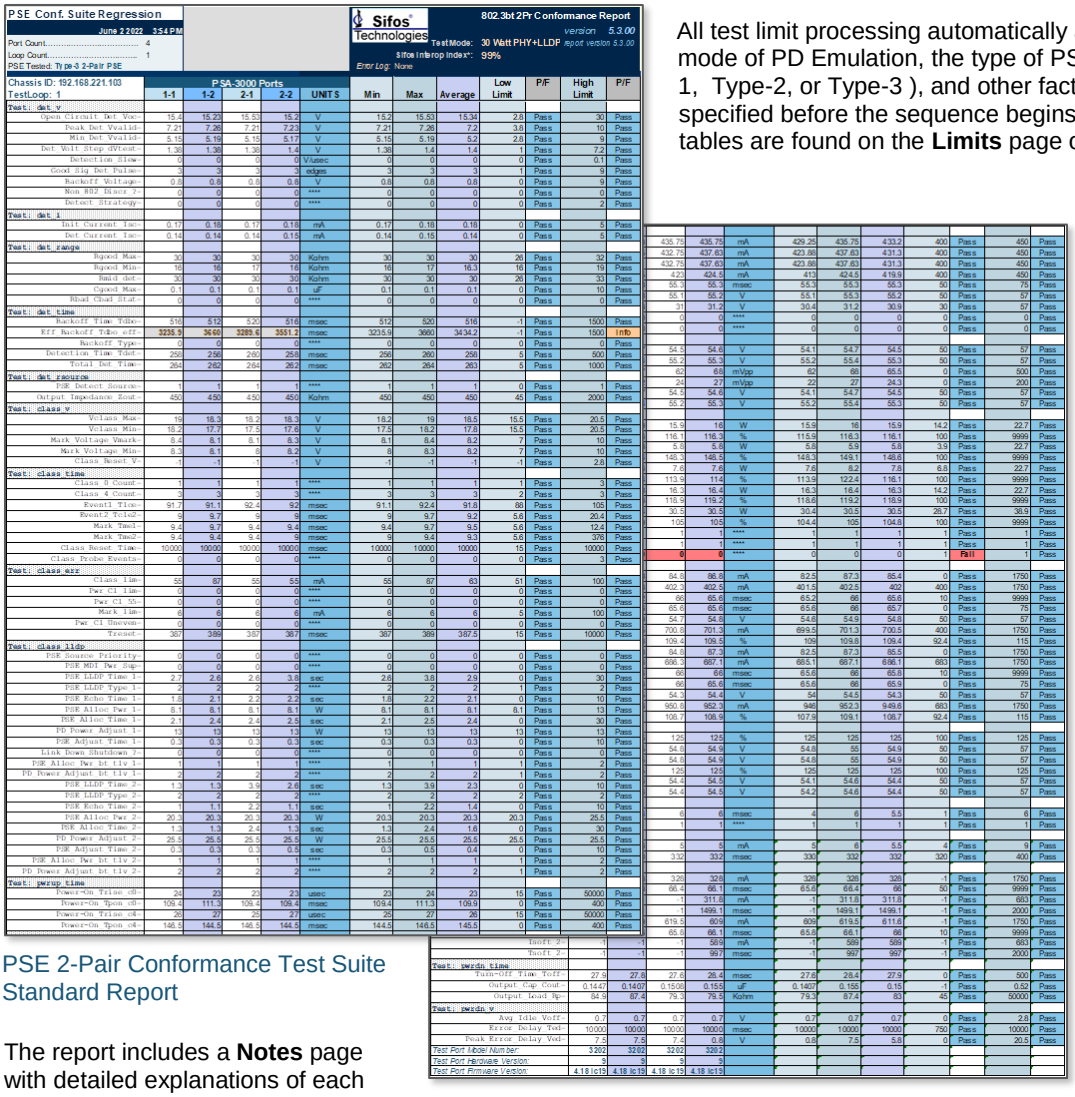
User's may also select one of two reporting options when sequencing tests including the default option to produce a pop-up (Microsoft Excel) spreadsheet report that performs all test parameter limit checking and analysis.

Multi-Port PSE connections can rapidly be verified prior to sequencing tests using the **Check Connects** control after selecting the desired **Ports**. 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.

In PowerShell PSA, PSE attributes are auto-discovered using the **psa_auto_port** command and can be recalled with the **psa_pse** command. Test sequencing from PowerShell PSA is performed using the **sequence** 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.



PSE 2-Pair Conformance Test Suite Standard Report

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 automatically scales to the number of tested PSE ports produces multiple pages for multiple test cycles.

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. The program also includes a web-based registry describing all certified products.

The PSA-CT2P Conformance Test Suite has been tested and approved for first party (in-house) EA logo 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-STS1, Tracking Service, 2-Pair PSE Conformance Suite for One Year for Two or More PSA Addresses Operating at a Single Site
PSA-CT2P-STS2, Tracking Service, 2-Pair PSE Conformance Suite for Two Years for Two or More PSA Addresses Operating at a Single Site

***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. Any emulation and testing of PSE LLDP behaviors further requires the **LLDP Emulation & Analysis** feature license for the PSA-3000.*

Standard spreadsheet reporting requires Microsoft Excel version 2007 or later installed on a host PC.

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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.

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