

# PS-Cal® Release Notes

## PS-Cal v4.9.3.0, February 2026 Release

### Features and Enhancements

- Added EEPROM backup/restore functionality to TEGAM 28xx feedthrough standard template.
- Added parameter "AdapterRequired" and adapter functionality to PowerStandardCalFactor measurement techniques for PowerMeter and Bridge.
- Added ability to manage new rows in tests by permitting the following items: Cut, Copy, Paste, Delete, Insert Copy, Insert Empty, Insert Special.
- Added measurement techniques "Load\_SplitterDataFromFile" and "Load\_SplitterDataFromEEPROM" which are available to select for the PortMatch test when calibrating a TEGAM 28xx standard.
- Added charting to the Measure\_2800TransferStandardCalFactor\_Bridge\_MultiRun\_wMismatch so that it is available for TEGAM 28xx calibrations.
- Added a driver for a Keysight E5080B.
- When using the measurement technique "Measure\_2800TransferStandardCalFactor\_Bridge\_MultiRun\_wMismatch", a continue after error feature was created. If an error occurs during a run not permitting the run to continue, the current run number and current test frequency, if cal results file is saved, is stored and the technique will continue from that saved run and test frequency if the cal results file is loaded to run.

### Bug Fixes, Corrections, and Incidental Changes

- Fixed problem generating "Object reference not set to an instance of an object" when using TEGAM 1806 as a power meter.
- Modified the measurement technique 'Measure\_2800TransferStandardCalFactor\_Bridge\_MultiRun\_wMismatch' parameter "MinTestFrequency" to default to 9000.
- Added a 50MHz frequency to the frequency list of the CalFactor (High) test for the Boonton 57540 and 57518.
- Corrected charting so that it allows partial file loading of incomplete data from a cal results file.
- Corrected handling of signal generator functionality of a Keysight E5080B VNA. Port 2 is used.
- Corrected the minimum frequency in the HP 8673D driver to 50MHz.
- Changed the Rho limits in templates HP\_11792A, HP\_11792A\_wCable, HP\_11792A\_001, and HP\_11792A\_001\_wCable. Frequencies 50MHz-2GHz is .048, 2GHz-18GHz is .123, and 18GHz-26.5GHz is .167 where applicable.
- When writing to the EEPROM of an HP E-Series sensor, it has been modified to not allow writing linearity data to the EEPROM if only the 'Upload Linearity' item is selected and no linearity data is available.
- During power leveling, an error "Do you want to check your connections and continue?" was displayed if leveling failed but not handled properly. The message displayed will now include 'Yes' and 'No' buttons handled appropriately.
- Removed the "Full Test" functionality from the U2021XA, U2022XA, and U2022XA\_H50 template generators by creating a new measurement technique "Measure\_PowerSensorLinearity\_Keysight\_USeriesSensors\_LeveledGen" to be used for the linearity test.
- Corrected problem whereby Rhode & Schwarz power sensors NRP-Z52 and NRP-Z11 were being reported as "the sensor can not be found" when connected to a R&S NRP2 power meter.
- Added information to be displayed on the Status/Information screen during 'Upload Cal Factors' and when running a '0dBm Ref Adjust' for the U200xA power sensors "Upload Data" test.
- Corrected problem in the PowerRef test for a U2001A/B, whereby the 'Reset Data' button is pressed and causes an error to display. The correct reset data operation is now implemented.
- Changed the names of MeasurePowerSensorRho\_SingleNetworkAnalyzer and MeasurePowerSensorRho\_DualNetworkAnalyzer techniques to MeasurePowerSensorRho\_SingleScalerAnalyzer and MeasurePowerSensorRho\_DualScalerAnalyzer respectively. The newly named techniques obtain their Magnitude value from the 'Rho' column instead of the 'Rho\_Limit' column. The previous techniques were obtaining the magnitude value from the 'Rho\_Limit' column.
- Changed E5080A driver to learn the minimum and maximum frequencies from a query to the Keysight E5080A.
- Changed the minimum frequency of the Rho and CalFactor tests in the 1505A and 2505A templates to 6kHz.
- Added additional messaging for the 8481B and 8482B power sensor tests to indicate when the high power attenuator needs to be assembled with the power sensor or when the power sensor is used without the attenuator.
- Added messaging when using VNAs to notify the user that if the VNA calibration was performed prior to selecting the "Configure Station" button, because the VNA is reset, the Calibration must be redone or calibrations saved to the VNA must be re-selected.
- Added uncertainty lookup value for frequencies >40GHz to 50GHz for Anritsu 37xx VNAs. Previously undefined.

## PS-Cal v4.9.2.0, July 2025 Release

### Features and Enhancements

- Added a driver for an Agilent 33500A.
- Renamed 'PowerSensorVerification\_FeedThroughStandard\_xx' measurement techniques to 'PowerSensorVerification\_2800\_TransferStandard\_xx'.
- Renamed 'CalFactor\_FeedThroughStandard\_xx' measurement techniques to 'Measure\_PowerSensorCalFactor\_2800\_TransferStandard\_MultiRun\_xx'.
- Enhanced 28xx\_Power\_App to support the TEGAM 2850A.

Modified the Keysight E9300 driver to have the capability to burn a partial list of frequencies to the EEPROM.  
Added prompt to ask if want to apply A2LA scope uncertainties prior to writing calfactor uncertainties to EEPROM when aligning a 28xx transfer standard.  
Modified drivers for Keysight P9374A and P5005A VNAs so that the user will be prompted to select a valid E-Cal kit model number from a drop-down menu when either driver is selected during the setup of the Rho measurement technique.  
Modified Rhode & Schwarz Zero and Cal to include prompting to connect the power sensor to the REF Output of the NPR2 power meter.  
Removed prompt "Do you want to zero and Calibrate the Standard Power Sensor?" from measurement technique 'Measure\_2800TransferStandardCalFactor\_Bridge\_MultiRun\_wMismatch'. It is done automatically now.

### Bug Fixes, Corrections, and Incidental Changes

Modified the measurement technique 'Measure\_PowerSensorCalFactor\_2800\_TransferStandard\_MultiRun\_NoMismatch' (and wMismatch) to display DUT\_Power\_x and STD\_Power\_x columns with 7 decimal places to allow for lower displayed power value resolution when the attenuator is attached.  
Modified measurement techniques 'Measure\_PowerSensorCalFactor\_RFBridge\_MultiRun\_NoMismatch' (and wMismatch) calfactor uncertainty calculation to use 2-sigma RFOntStdDev and StandardDeviationError values. Also modified TEGAM 1830A uncertainty from .05 to .1.  
Modified 'Measure\_PowerSensorCalFactor\_2800\_TransferStandard\_MultiRun\_xx' measurement technique's calfactor uncertainty calculation parameters. Adjusted the 28xx feedthrough standard internal reference uncertainty and set RFOntStdDev and StandardDeviationError to be 2-sigma.  
Corrected problem with 0dBm Ref Adjust test for Keysight U series power sensors.  
Corrected LFE option support for Agilent N5230A and Agilent N524xA.  
Corrected the power verification calculation in the measurement technique 'Measure\_PowerVerification\_RFBridge\_MultiRun\_NoMismatch'. STD\_Power. STD\_Power was using a value obtained from the "PowerLevel" parameter instead of the actual measured power.  
Modified LadyBug LB5940L driver. Now calling the appropriate CalFactor test. Also, added the Upload tool.  
Modified the common power leveling routine to ensure that appropriate leveling adjustments occur.  
Keysight E5080 VNA driver modified to extend to frequencies below 100K and to properly handle the reset.  
Added missing driver needed for the U2021XA power verification test.

## PS-Cal v4.9.1.0, January 2025 Release

### Features and Enhancements

Added support for uploading/reading Boonton Data Adapters EEPROM used by Boonton power sensors like the 51075 with the Boonton 4232A power meter.

### Bug Fixes, Corrections, and Incidental Changes

Corrected a problem to prevent Keysight/HP/Agilent E-Series power sensor's EEPROM corruption when uploading calibration information.  
Corrected a problem to prevent Keysight/HP/Agilent E-Series power sensor's EEPROM corruption when loading from a backup file.  
Corrected the handling of the ZERO command of the Boonton 4500A power meter.  
For TEGAM 2818A and 2850A RF Power Standards, modified charting to include Cal Factor column "K\_Pct" as displayable data during the verification process.  
Corrected the cause of the "You must select a Measurement Method!" message received when defining test information during the creation of a template from a blank template.

## PS-Cal v4.9, August 2024 Release

### Features and Enhancements

Added driver and calibration template for TEGAM 2850A feedthrough standard

### Bug Fixes, Corrections, and Incidental Changes

Improved calculation for "Scale < 100%" for power sensor Cal Factors  
Corrected R&S NRVS power measurement response handling for reported incorrect high measured values.

## PS-Cal v4.8.3, June 2024 Release

### Features and Enhancements

Added performance verification to Keysight U2021XA/22XA/22XA\_H50 templates.

### Bug Fixes, Corrections, and Incidental Changes

Corrected Boonton 4532 power meter's read EEPROM "Calibration Failed, would you like to repeat test?" error.  
Corrected Agilent PNA N5245A stopping and showing a spinning cursor during configuration problem.  
Corrected "unknown range" error when running linearity test on the Keysight U2021XA/22XA/22XA\_H50.  
Added a check for the "H1K" to extend frequency minimum limit to 100KHz for Keysight E8257D generator.

Corrected R&S ZR41 "Unable to find sensor." error during initialization using NRP2 power meter.

## PS-Cal v4.8.2, December 2023 Release

### Features and Enhancements

Added support for Agilent N524xB Low Frequency Extension  
Added R&S NRX driver with support for R&S USB sensors  
Added multi-path R&S and HP 848xB sensor support to 2818A

### Bug Fixes, Corrections, and Incidental Changes

Corrected EEPROM process for Agilent 9300B  
Corrected EEPROM process for R&S NRPxS sensors

## PS-Cal v4.8, September 2023 Release

### Features and Enhancements

Added templates for Keysight U2020XA family of power sensors  
Added Keysight P9374B and P5005A drivers  
Added support for Keysight N9640D E-Cal module  
Added driver and calibration template for TEGAM 2818A feedthrough standard  
Added support for PMX18-CS calibration system  
Implemented ability to detect if HP 478 Series sensors cause a "Power Underload" condition

- If condition is detected, PS-Cal will attempt to re-zero the meters
- If condition persists, PS-Cal will halt test

Added capability for "CalResults" files to be imported as Standard files (TEGAM Thermistor Mounts)  
Included statement on reports indicating k=2 confidence factor  
Enhanced N522xB driver to act as signal generator at low frequencies

### Bug Fixes, Corrections, and Incidental Changes

Corrected Boonton sensor templates that use 1 GHz as calibration frequency.  
Renamed HP 83600 Series from "8360Series"  
Notated E4412A/E4413A upload process  
Clarified attenuator file dialog  
Ladybug LB59xx driver reconfigured for cal factor tests  
Corrected "unhandled exception" charting error if invalid CalResults file is loaded  
Changed Ref CF on printed sensor labels from 0 to value of 50 MHz reference  
Fixed inconsistencies between rho and cal factor tables on some sensors.

## PS-Cal v4.7, August 2022 Release

### Features and Enhancements

Added custom VSWR/Gamma parameter for NoMismatch templates (Input 0 or 1 for v4.6 behavior)  
Improved Boonton driver compatibility  
Added import capability for splitter and bolometer .DAT files from MET/CAL  
1830/478A changes:

- 432 Comp/Bias mode parameter added
- Added 478-H75 Template

Added Anritsu ML2495 driver  
Added PASS/FAIL limits in live charting for Performance Verification and Power Accuracy templates/techniques  
Added Uncertainty check to Ladybug sensors  
Templates added for N8481A-CFT, N8482A-CFT, N8485A, N8485A-033-CFT, N8487A-CFT

### Bug Fixes, Corrections, and Incidental Changes

Corrected Halt button behavior during test  
E9327A template updated  
Feedthrough calibration factor resolution changed to 4 digits in related reports  
Updated limits on Ladybug sensors  
Ladybug LB59xx driver reconfigured for cal factor tests  
Corrected "unhandled exception" charting error if invalid CalResults file is loaded  
Changed Ref CF on printed sensor labels from 0 to value of 50 MHz reference  
Fixed inconsistencies between rho and cal factor tables on some sensors.

## PS-Cal v4.6, December 2020 Release

### Features and Enhancements

Chart Device Under Test (DUT) cal factors in real-time during calibration  
Compared cal factors in real-time against a user-selected historical calibration data file (historical data must be another PS-Cal calibration results file)

Compared two historical calibration data files (both files must be PS-Cal calibration results files)

Added view modes for comparison charts:

- Single calibration results data file
- Cal factor comparison of two data files
- Cal factor difference between two data files
- Combination chart with cal factor comparison plotted against the left y-axis, and cal factor difference plotted against the right y-axis

Implemented limited calibration process log file capability

Added calibration frequencies to the TEGAM 1505A RF and 2505A RF Power Standards calibration templates

## Bug Fixes, Corrections, and Incidental Changes

Corrected numerous typographical errors

Removed 10 MHz and 30 MHz frequencies from the Keysight E9327A template

Corrected rho limits for Anritsu MA2473A, MA2472A, MA2473D, MA2474D templates

Implemented sequential program build numbers

Fixed minor bugs in various workflows

Improved error handling in various workflows that resulted in fatal program errors or other unexpected behavior

Corrected upper and lower limits for all Ladybug series sensors

Removed Ceyear AV1464 driver

Updated PS-Cal to Microsoft .Net Framework 4.6.2

Upgraded Grape City ActiveReports library from version 8.x to 13.x

## PS-Cal v4.5, October 2019 Release

### Features and Enhancements

Added LadyBug power sensor support and required files

Added EEPROM Table 0 read/write for Anritsu power sensors

Added support for Keysight N5222B Opt 205 (Low Frequency Extension)

Added measurement uncertainty lookup tables and verification against Statement of Accreditation

Added support for the Fluke 96000 high frequency signal generator

Added / Updated mismatch uncertainty calculations for 1805 & 1806 calibrator

Added U2002A-Option H26 power sensor calibration template

Added Gigatronics 80350A power sensor

Added Agilent U2002A Option H26 power sensor

Added verification only support for R&S NRVS power meters and sensors

Added Marconi 6960 power meter driver and support for Marconi power sensors

Added bridge support for the HP thermistors

Updated 478 and 8478 thermistor features

Added PCS-K150-II switched amplifier support

Updated the PNA-X network analyzers to support external amplifiers

Added calibration support for E4P41xA power sensors templated at <+ 16 dBm

Updated leveling loop to support power sensor calibrations at +18 dBm

Added support for the Keysight E5080A PNA

Added command to default Agilent power meter settings

Added E441x high power verification templates

Added power standard Cal-Factor calibration with thermistor or bridge

Added Agilent\_PNA\_E836xA to equivalent port match

Changed amplifier safety levels

Updated linearity measurements with the PCS-K150

Added frequency limits button to high power calibration with directional coupler

Added error handling for uncertainty lookup and fixed naming errors

Added equivalent port match and power standard reports

Added measurement method for high power calibrations using high power VNA

Update voltmeter drivers for to improve calibration times

Updated power standard calibration & 3458A ratio voltage measurements

Added high power measurement capabilities to the VNA cal factor measurement

### Bug Fixes, Corrections, and Incidental Changes

Resolved 100 kHz minimum frequency error

Resolved maximum level error for Keysight H-series sensors

Changed install requirements to .NET 4.0

Added 50 MHz to 80701A template

Updated 1830A driver to support thermistors in the correct mode

Resolved 1830A error when calibrating Tegam bolometers

Resolved issue with start over crashing

Resolved issue using 1830A as the UUT in bridge mode

Resolved issue with 1830 averaging unlimited zero values

Resolved issue with Bridge-Averaging tool not removing zero measurement

Resolved localization issue setting the application to US English  
Resolved issue of setting the power level on the 8757 network analyzer  
Resolved I/O errors with 8757D  
Resolved connection message issue with Fluke 5790A  
Resolved EEPROM upload issue for Giga-tronics power sensors  
Modified station verification method from +/- 0.05 dB to < RSS of instruments  
Resolved issue with E9302A\_H18 having two frequency lists  
Updated test process selection to scale  
Resolved error calculating mismatch uncertainties scaled to %  
Corrected typo in the Anritsu upload tool  
Added CRLF to the end of all calls to the CETC AV1464x signal generator  
Updated station calibration for Type-F and Type-G Cal-Factor  
Minor updates to the UI and application version

## **PS-Cal v4.4, August 2018 Release**

Add EEPROM programming support for the N1913A and N1914A power meters  
Add templates for TEGAM RF standards 1505A, 2505A, 1510A, 2510A, and 1807A  
Add support for Keysight U8481A, U8485A, and U8487A power sensors  
Add uncertainty data for E5071C at frequencies above 8.5 GHz  
Add user-definable reference frequency parameter to Giga-tronics 80701  
Update HP 8340A driver to set RF to OFF after preset command  
Update the Boonton power sensor calibration upload routine  
Update Boonton 4232 power meter driver  
Split Boonton power sensors into peak and CW groups  
Set calibration frequency to 1 GHz for select Boonton models  
Resolve type issue with Agilent PNA N5230C driver  
Correct attenuator math error  
Correct error in E9304A H18/H19/H20/H24/H25 sensor templates  
Update Keysight 34401A drivers  
Update Test Report user interface  
Improve EEPROM upload routines  
Add user prompt to restart PS-Cal after removing instrument(s) from Station  
Change E930xA cal level from -10 to -11 dBm  
Add EEPROM upload to the Anritsu MA248x power sensors  
Add extended frequency points to TEGAM bolometer templates  
Rename power splitter files  
Correct 1830A Measurement Error when Calibrating Power Sensors at -30 dBm  
Update Giga-tronics upload tool

## **PS-Cal v4.3, February 2018 Release**

Changed bridge measurement methodology to reduce measurement time per frequency  
Added amplifier support  
Added samples / measurement parameter  
Added dwell time parameter and set default to 13 s  
Updated install package  
Updated Bridge Method verification process to set frequency on DUT power meter  
Fixed 13s delay setting in verification tests  
Changed order of inheritance for Direct Comparison  
Updated TEGAM 2510 lower frequency limit  
Updated and tested TEGAM 1806 bridge measurement methods  
Split E9304A into two templates to allow use of TEGAM 2505A  
Resolved calculation issues with 1806A bridge  
Added temperature in degrees Celsius to linearity test  
Added zero and power averaging tool  
Updated main form error handling  
Resolved issue with template for 2002A  
Updated I/O for Keysight meters writing data to EEPROMS  
Added Rohde &Schwarz .NET header to files to interact with DLL files  
Added notification stating that Boonton 4500B can only read EEPROM  
Resolved Z51 upload issue  
Updated leveling loops to 0.05db  
Changed voltmeter drivers to 6.5 Digits  
Added new driver for CETC\_AV1464x series signal generator  
Resolved timeout settling errors with Rohde &Schwarz EEPROM upload and HP 3458A  
Resolved problem with 9640A setting signal source to +6 dbm  
Resolved 1830A Com Port setting errors when VISA resource is not available  
Resolved issue with Boonton 4500A programming EEPROM

Modified DMM drivers for a 10V range and 2.5V measurement default for TEGAM hardware  
Updated power sensor template e932xa  
Increased scroll bars on selection UI for Select Test Method screen  
Updated drivers so all have static creation classes  
Updated Boonton 4500B driver to support watts  
Added better error messages for exporting n553xx data