Release Notes

SmartBond Production Line Tool

SW-B-033

Abstract

This document contains the release notes for Renesas SmartBond Production Line Tool, version 6.0 for the DA1459x IC family.

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1 Terms and Definitions

ADC	Analog Digital Converter
CS	Configuration Script
DK	Development Kit
DMM	Digital Multi Meter
DUT	Device Under Test
GA	General Availability
GPIO	General Purpose Input Output
HID	Human Interface Device
LA	Limited Access
OQSPI	Octal or Quad SPI Flash interface
OSPI	Octal SPI Flash
OTP	One-Time Programmable memory
PER	Packet Error Rate
PLT	Production Line Tool
RFCU	Radio Frequency Control Unit
SCPI	Standard Commands for Programmable Instruments
TCS	Trim and Calibration Settings
UART	Universal Asynchronous Receiver/Transmitter
XTAL	Crystal Oscillator

2 Release Data

Table 1. Information table

Software	SmartBondTM Production Line Tool
Device Number	DA1459x
Operating System	Windows 10
Operating System Version	10.0.19044 Build 19044
Software Release Date	Mar, 2024
Software Version Number	6.0
Software Release Type (Note 1)	FULL (GA)

Note 1 Releases can be of the following types: FULL (GA), FULL (LA), RELEASE CANDIDATE, ENGINEERING, PATCH or BINARY.

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3 License

Licenses covering this software release are listed in the `licensing.txt` file in the SmartBond™ Production Line Tool main folder.

4 Related Documentation and References

[1] UM-B-174, SmartBond Production Line Tool, User Manual, Renesas Electronics.

[2] SW-B-025, SmartBond™ Production Line Tool, Release Notes, Renesas Electronics.

Note 1 References are for the latest published version, unless otherwise indicated.

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5 Release description

5.1 Overview

This is a FULL (GA) release of the SmartBond™ Production Line Tool (Note 1) that supports production testing and programming for products using DA1459x family.

Figure 1 shows the main window of the SmartBond™ Production Line Tool Configuration v6.0.

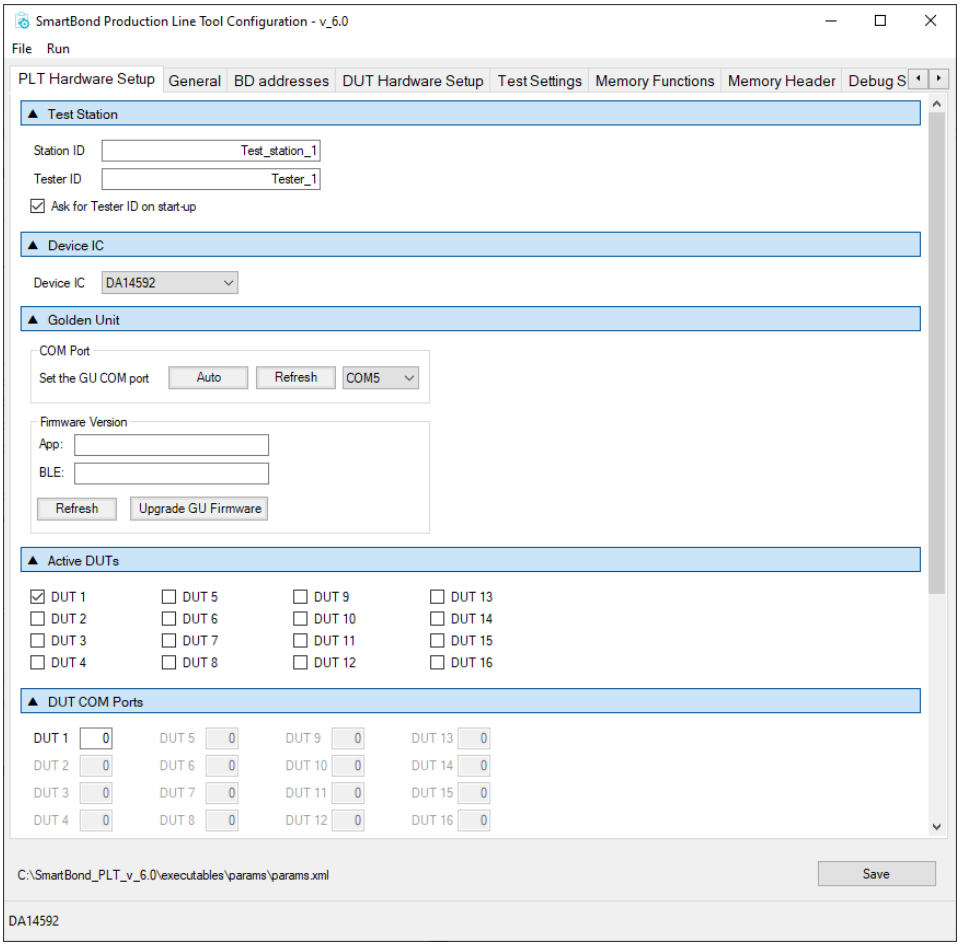

Figure 1. SmartBond™ Production Line Tool configuration 6.0

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Figure 2 shows the main window of the SmartBondTM Production Line Tool GUI 6.0.

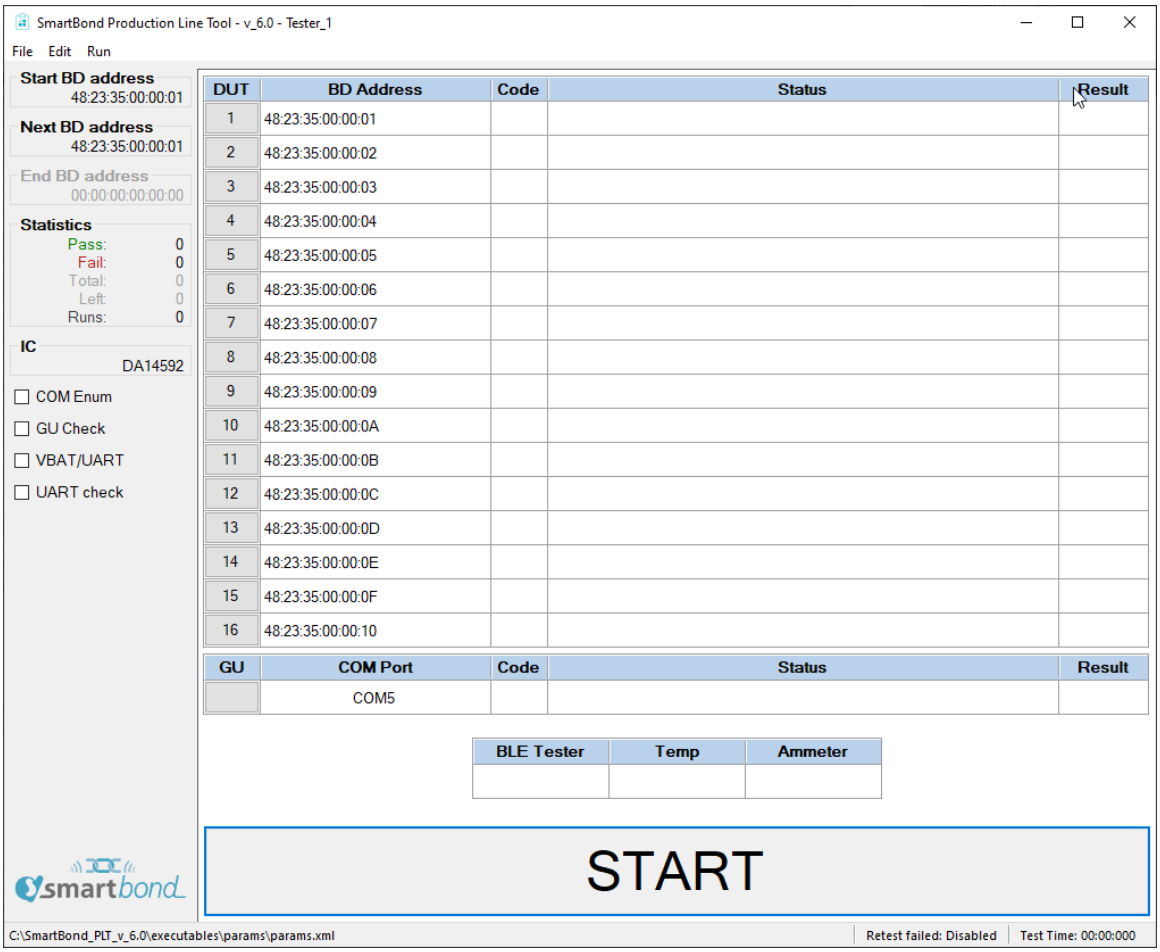

Figure 2. SmartBond™ Production Line Tool GUI 6.0

5.2 New and updated features of version 6.0

Table 2. New features of version 6.0

Feature number	Feature	Description
1	DA1459x support	Supports newly released device DA1459x family only.
2	SDK 10.1.2.86 support	Supports (and uses) the new SDK10 version for the DA1459x family.
3	Support for DA1459x eFlash Operations	DA1459x family includes embedded flash, new functionality is added to support read/write operations to EFLASH along QSPI flash operations.
4	Support for CS in DA1459x eFlash and QSPI	DA1459x family requires CS to be written to the eFlash or QSPI memory. New functionality is added to support these operations.

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5.3 Fixes and improvements since version 6.0

Table 3. Fixes and improvements of version 6.0

Fix number	Fix/Improvement	Description
1	Removed support for other device families	PLT ver 6.0 only supports the DA1459x device family. Therefore, support for other devices is removed, for clarity of source code.
2	Removed support for OTP operations	DA1459x does not host OTP memory. All operations related to OTP are removed and operations related to the CS are replaced.
3	Updated file headers to Renesas	All file headers are updated to the new Renesas standard.
4	Temporary BD address the MSB issue	Under the latest SDK, to adhere to the Bluetooth LE standards, the temporary addresses used during testing must have the two most significant bits set to 1 (Static Address). The issue would not arise in a real environment with assigned BD addresses, but it could hinder simple testing using non-standard addresses. PLT is modified to OR the BD addresses for the DUTs with 0xC00000 for the RF tests to work correctly, it is then reverted to the original.
5	Added DUT log PASSED suffix and status	DUT log files now receive a PASSED suffix in the filename when the tests are completed and passed. The FAIL suffix remains the same. This indicates that a test is incomplete when there is no suffix. A new line is also added in the header of the log file indicating the status of the test. This status defaults to FAILED until all tests are completed and if all tests pass the status is changed to PASSED.
6	GU Failures not indicated on DUT logs	In some cases, GU errors would not indicate that anything was wrong in the DUT logs (incomplete tests). This is updated to include most causes of GU errors to indicate a GU error flag on the DUT log and cause the status to turn to FAILED.
7	BD addresses from the file	An erroneous message was appearing when the next set of BD addresses was loading at the end of the testing phase. The counter of BD addresses was not accounting for all zeros addresses and in some cases when the .ini file was auto-generated this was an issue. The counter was modified to count all zero addresses.
8	Litepoint IQmeasure update	Updated Litepoint IQmeasure library to latest for IQxel-MW instrument support.

5.4 Known limitations of version 6.0

Table 4. Known limitations of version 6.0

Issue number	Description
1	The DA1459x device family has the option to lock the CS area, App keys area, or the entire EFLASH. When trying to write a locked EFLASH area PLT either displays a FAILED test or INTERAL SYSTEM ERROR. No messages specifically exist at this version to clarify that the error is caused by a locked area. This is to be addressed in next release.

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6 Release History

PLT releases and related documents are structured according to the device families that they support as follows.

Table 5. PLT releases and related documents

Device family	DA1458x DA1468x	DA1453x DA1469x	DA1470x	DA1459x
Latest PLT version	4.3	4.6	5.0	6.0
PLT user manual	UM-B-041 v4.3	UM-B-163	UM-B-041 v4.8	UM-B-174
PLT Release notes	SW-B-025	SW-B-031	SW-B-025	SW-B-033

6.1 Version 5.0

6.1.1 Overview

Version 5.0 of the SmartBond Production Line Tool for the DA1470x family was released Oct, 2022.

Figure 3 shows the main window of the SmartBond™ Production Line Tool Configuration 5.0.

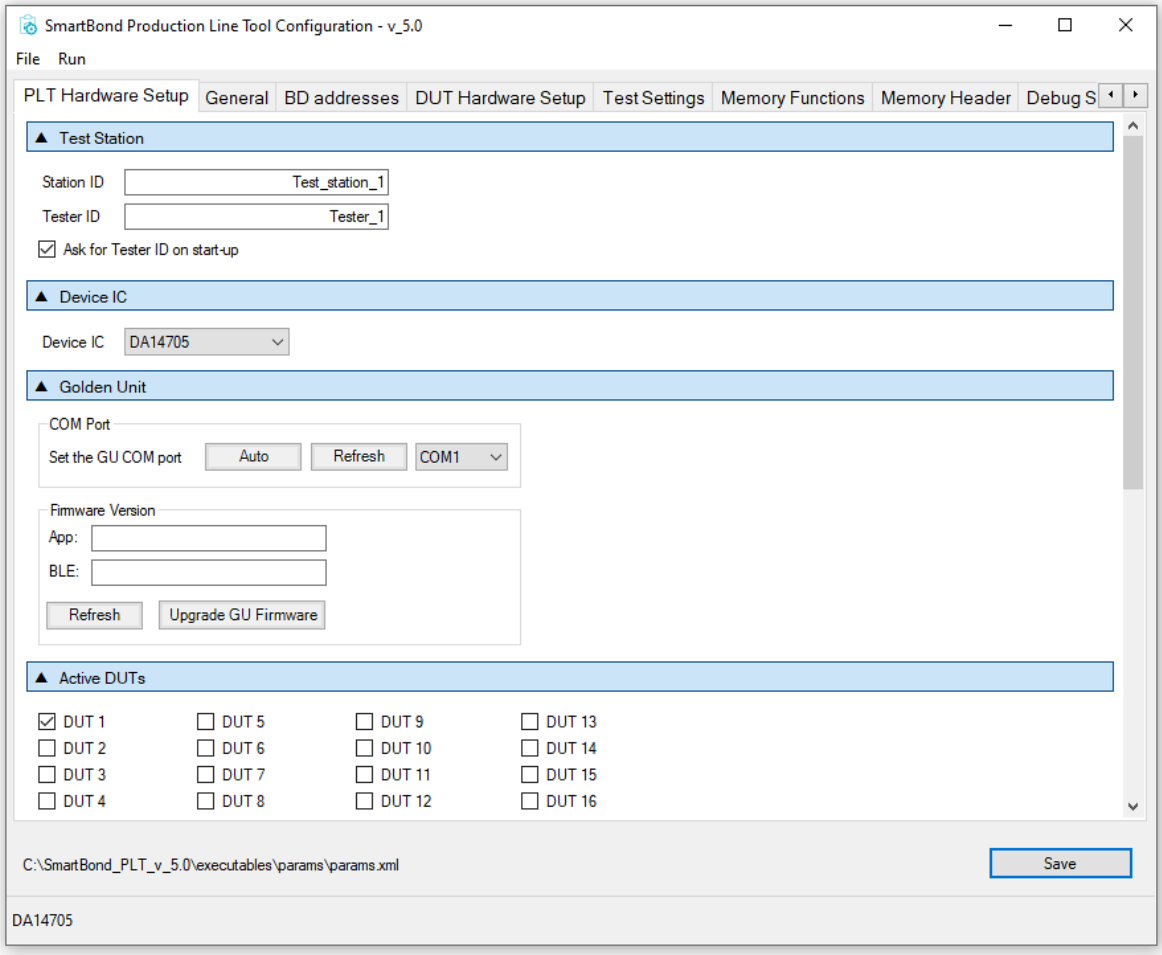

Figure 3. SmartBond™ Production Line Tool configuration 5.0

Figure 4 shows the main window of the SmartBond™ Production Line Tool GUI 5.0.

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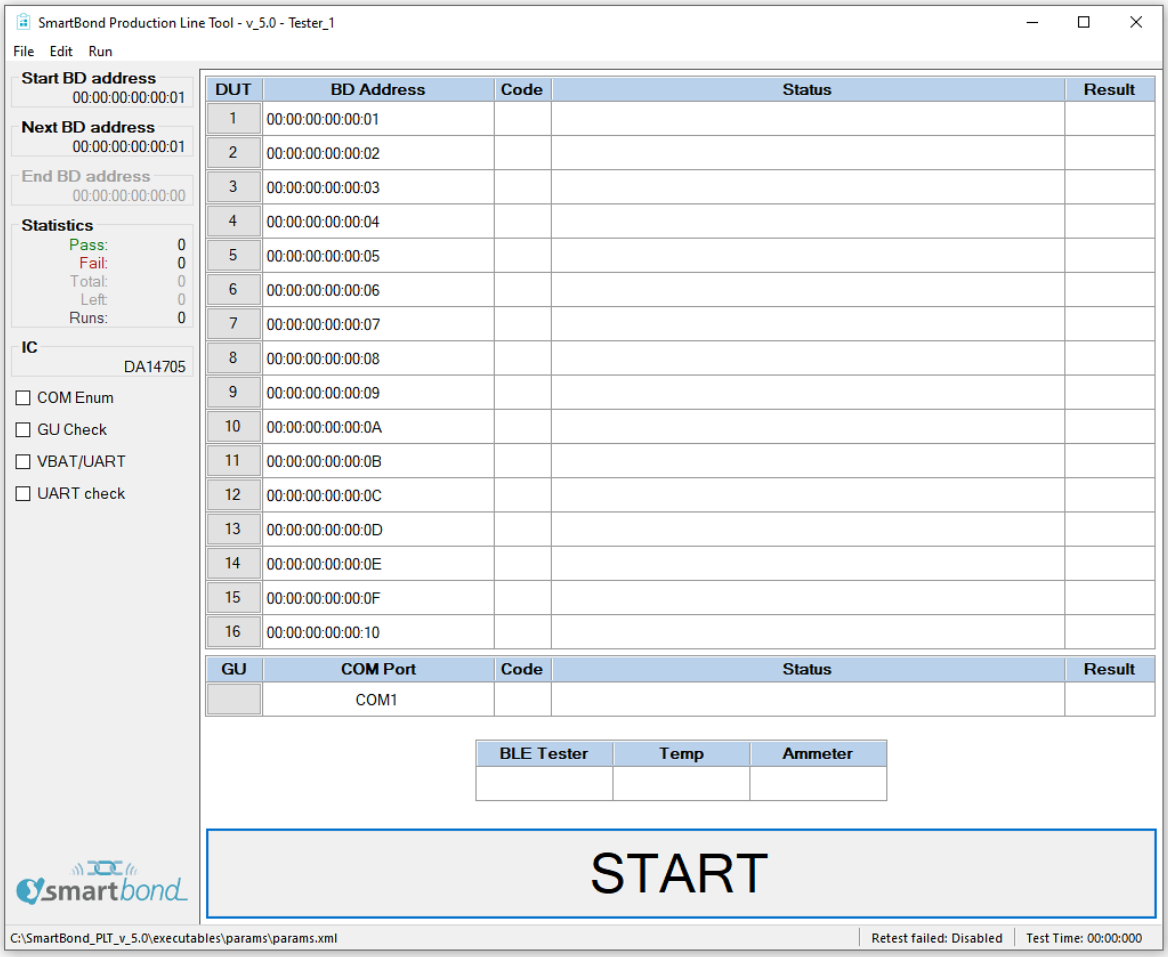

Figure 4. SmartBond™ Production Line Tool GUI 5.0

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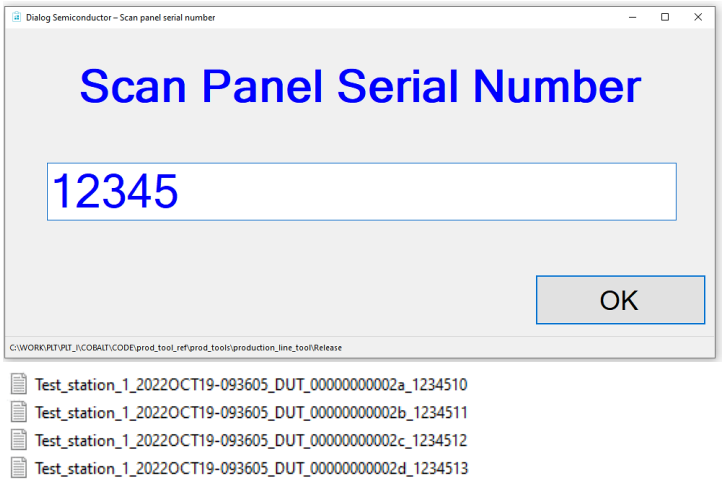
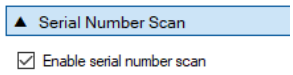
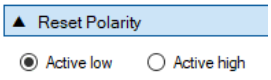
6.1.2 New and updated features of version 5.0

Table 6. Version 5.0 new features

Feature number	Feature	Description
1	DA1470x family support	Supports only the DA1470x family. The older SmartBond family of products are supported in previous PLT versions.
2	Removed support of DA14531 and DA1469x	Removed support of older SmartBond product families, DA14531 and DA1469x. These are supported in SmartBond Production Line Tool 4v5.
3	**PCB panel serial number**	Before each test, a dialog prompts the user to enter the panel serial number. PLT will add numbers 1-16 to the end of the serial number and append it to each DUT log as shown below for DUTs 10, 11, 12, and 13.  Test_station_1_2022OCT19-093605_DUT_00000000002a_1234510 Test_station_1_2022OCT19-093605_DUT_00000000002b_1234511 Test_station_1_2022OCT19-093605_DUT_00000000002c_1234512 Test_station_1_2022OCT19-093605_DUT_00000000002d_1234513 This feature can be disabled in the Configuration tool, as shown below. 
4	**OTP configuration script**	The OTP CS programming parameters are specific to the DA1470x product family.
5	XTAL 32 MHz settle time calibration.	XTAL 32 MHz calibration is extended to support settle time calibration, with values found programmed in the OTP CS and applied in XTAL32M_TRIM_REG (0x50050408) DA1470x register. Operation adds less than 1 s extra delay but has great benefits in overall product sleep and thus power performance.
6	**Added support for Octal SPI Flash interface.**	DA1470x supports Octal SPI flash (OSPI or OQSPI). The user has the option to choose which interface to use for flash erase, programming, or read. An example of flash erase choosing the OQSPI interface is shown next. 
7	**Reset polarity selection**	**DUT** reset polarity is now configurable. 

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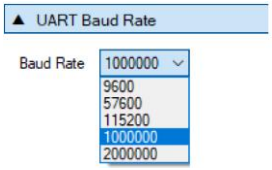
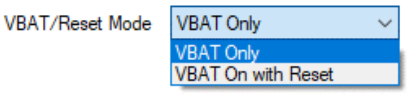
Feature number	Feature	Description
8	2Mbaud UART baud rate	Support of 2Mbaud UART baud rate. 
9	Removed barcode scanner support	The feature of scanning BD addresses using a barcode scanner was removed.
10	Removed feature **VBAT as Reset**	Power cycle and DUT reset can only be done using **VBAT Only** and **VBAT On with Reset**. 
11	Removed support for using DA1468x DK as the current measurement instrument.	Using DA1468x DK as the current measurement instrument was removed because it requires extra calibration steps that make it difficult to safely be used in production.
12	Removed support for current measurements using USB-6009 NI instrument.	Using the USB-6009 NI instrument for current measurement was removed because it requires extra calibration steps and external circuitry with accurate shunt resistors that would only work in certain current ranges.

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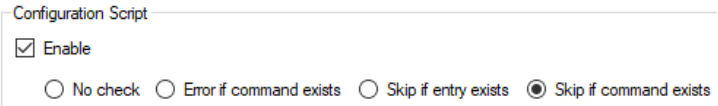
6.1.3 Fixes and improvements since version 4.5

Table 7. Fixes and improvements of version 5.0

Fix number	Fix/Improvement	Description
1	**Major PLT software code refactoring**	Improved software code readability and maintainability by performing a major code refactor. Unused software for not supported product families was removed.
2	**OTP configuration script check empty**	Improved the operation of the OTP CS check empty algorithm.  **No check:** Check disabled. **Error if command exists:** Returns an error if the command is already written in the DUT, even if the data are the same. **Skip if entry exists:** Skip writing an entry without error if the command and the data are already written in the DUT. If the same command is found with different data an error will be returned. **Skip if command exists:** Skip writing without returning error if the command in the DUT OTP CS is already written, no matter what the data are (same or different).
3	**32 kHz test moved before XTAL trim**	The 32 kHz test was moved before the XTAL trim operation. That is because the improved XTAL trim operation requires the system to go to sleep, where the external 32 kHz crystal oscillator is required to be functional. So, the external 32 kHz crystal oscillator operation should first be tested before performing the XTAL trim.
3	Low-level debug log files flush	Low-level debug logs are flushed continuously. No need to close the application executable anymore for the log files to be updated.

6.1.4 Known limitations of version 5.0

Table 8. Known limitations of version 5.0

Issue number	Description
1	VBAT as Reset is not supported.
2	Barcode scanner for BD addresses scan is not supported.
3	Burning different image per DUT, a feature existed in previous PLT versions, is not supported.

6.2 Version 4.5

Version 4v5 of the SmartBond Production Line Tool for DA14531 and DA1469x was released Feb, 2022.

6.2.1 Overview

This is a FULL (GA) release of the SmartBond™ Production Line Tool (Note 1). It supports production testing and programming for products using DA14531 and DA1469x only.

Figure 5 shows the main window of the SmartBond™ Production Line Tool Configuration.

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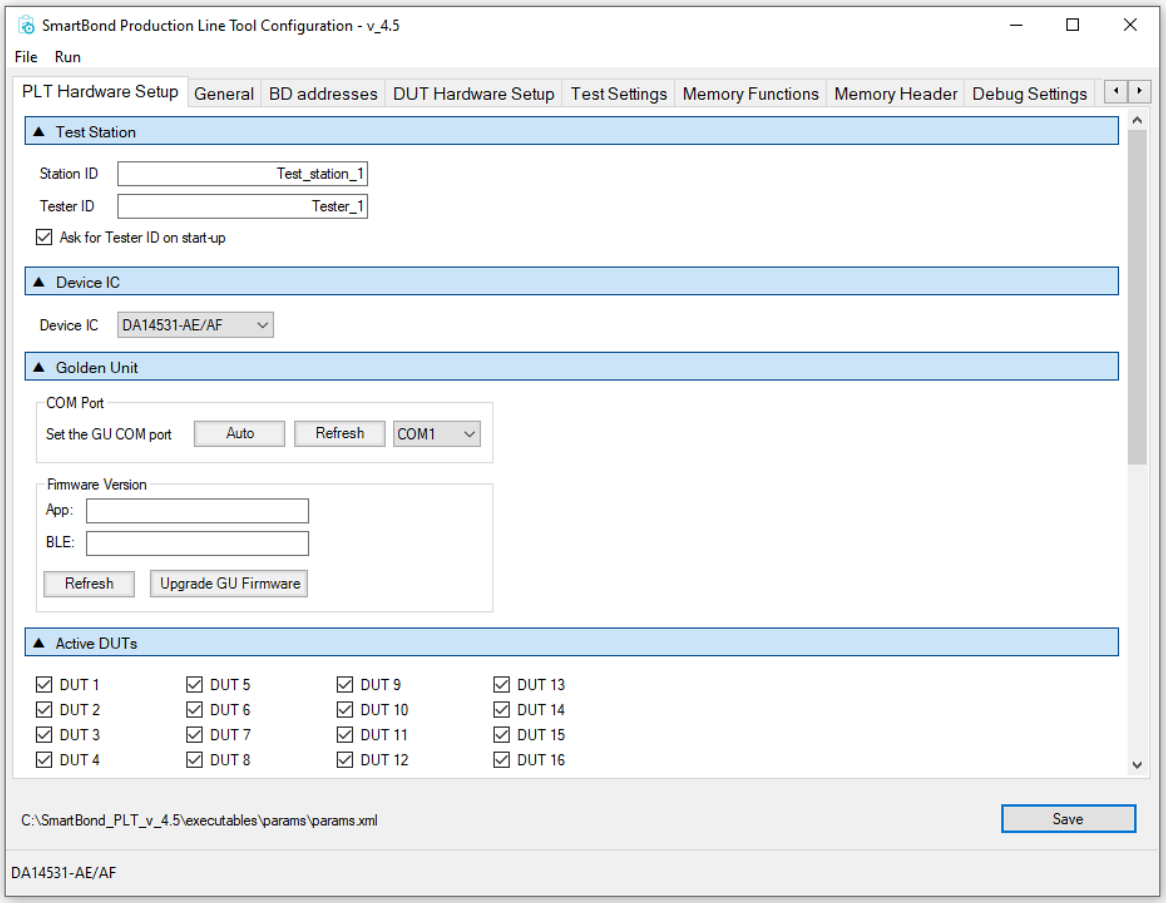

Figure 5. SmartBond™ Production Line Tool configuration version 4.5

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Figure 6 shows the main window of the SmartBond™ Production Line Tool GUI.

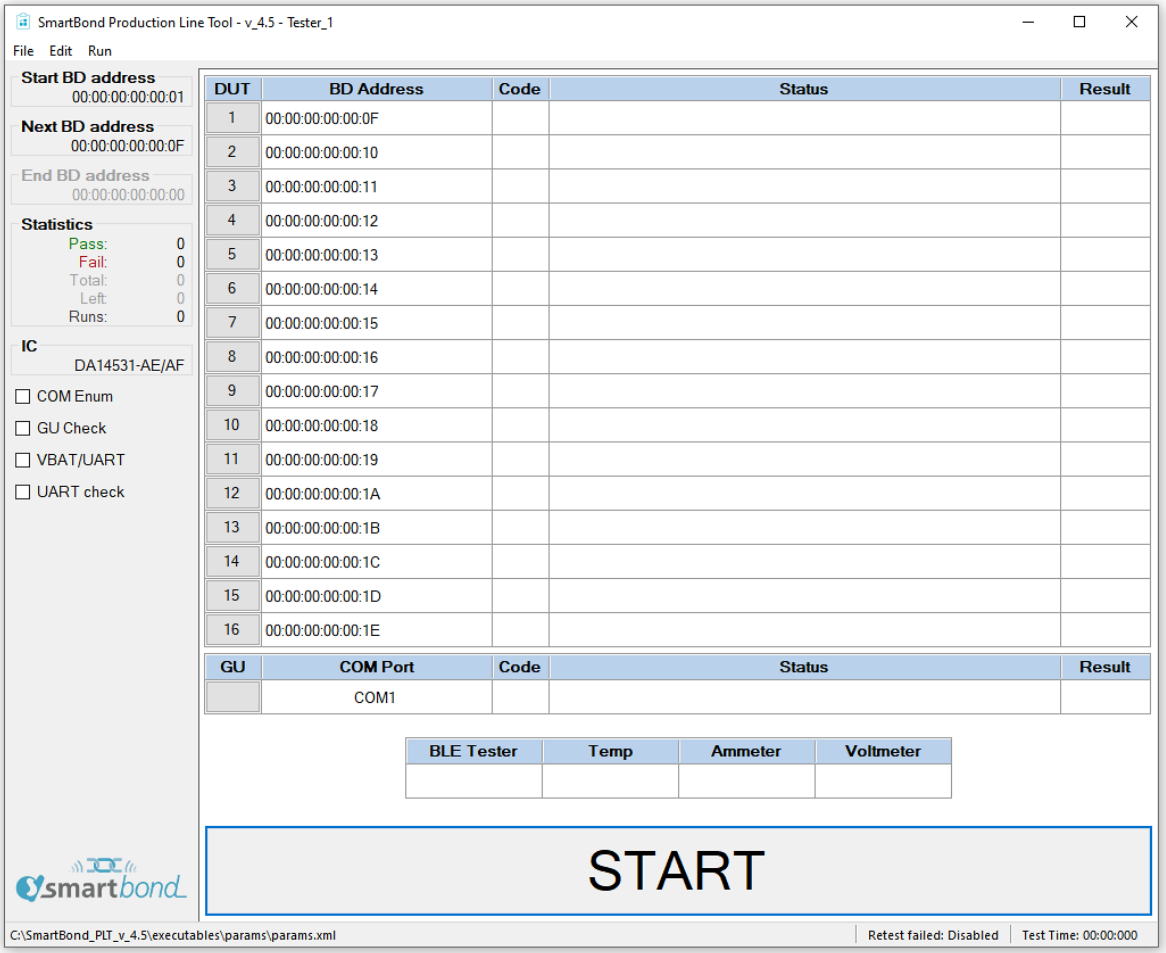

Figure 6. SmartBond™ Production Line Tool GUI version 4.5

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6.2.2 New and updated features of version 4.5

Table 9. Version 4.5 new features

Feature number	Description
1	DA1469x production test (prod_test_69x.bin) and memory programmer (uartboot_69x.bin) firmware update, which adds support to PCN 2021_901.

6.2.3 Fixes and improvements since version 4.4.2

No fixes or improvements were added since version 4.4.2.

6.2.4 Known limitations of version 4.5

Same as PLT 4.4.2, see Table 11.

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6.3 Version 4.4.2

Version 4.4.2 of SmartBond Production Line Tool for DA14531 and DA1469x was released Aug 4, 2020.

6.3.1 Overview

This is a FULL (GA) release of the SmartBond™ Production Line Tool (Note 1). It supports production testing and programming for products using DA14531 and DA1469x only.

Figure 7 shows the main window of the SmartBond™ Production Line Tool Configuration.

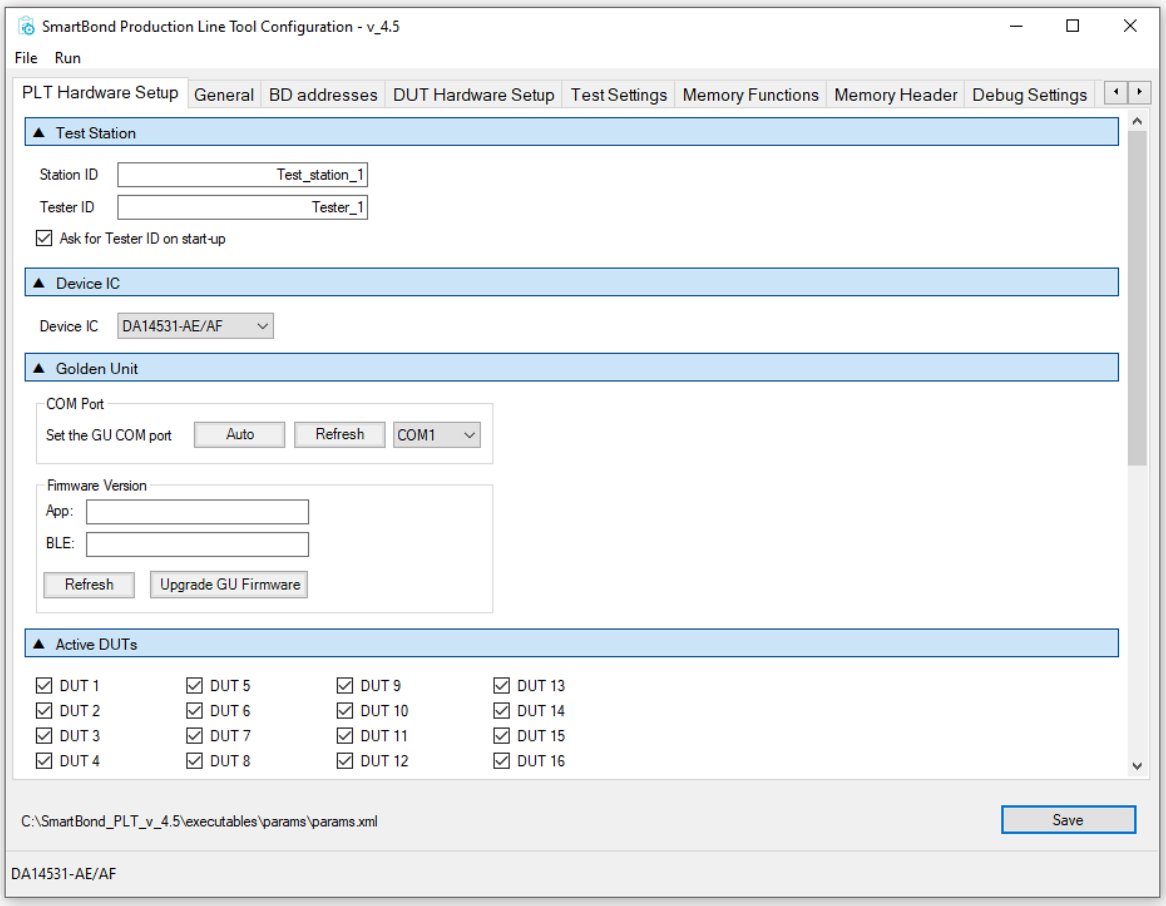

Figure 7. SmartBond™ Production Line Tool configuration version 4.5

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Figure 8 shows the main window of the SmartBond™ Production Line Tool GUI.

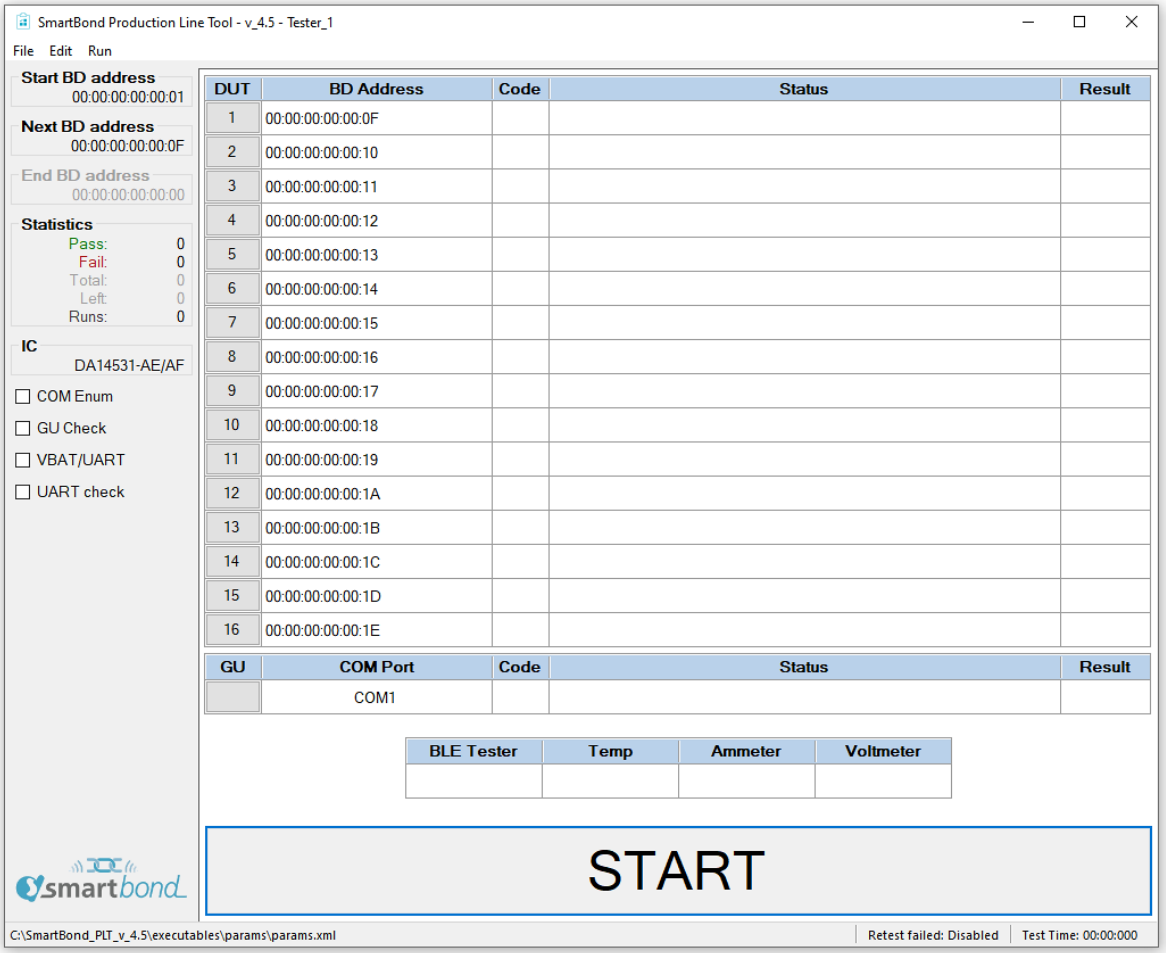

Figure 8. SmartBond™ Production Line Tool GUI version 4.5

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6.3.2 New and updated features of version 4.4.2

No new features were added.

6.3.3 Fixes and improvements since version 4v4

Table 10. Fixes and improvements of version 4.4.2

Fix number	Issue title	Chipset	Description
1	OTP CS burn	DA1469x and DA14531	In SmartBond™ PLT 4v4 if the OTP CS of either DA14531 or DA1469x has an entry with 0xFFFFFFFF, PLT will consider it as the end of the OTP CS, and use it as the first empty slot to burn XTAL trim, BD address and other CS entries. Thus, PLT will overwrite already written OTP CS calibration data, resulting in a silicon with unpredictable behavior. PLT will give FAIL result because OTP CS readback verification will fail. But there are two cases where it could still PASS if: ● OTP CS Verify option has been disabled by a user. It is ON by default ● “Re-test failed DUTs” has been enabled by a user. In such case, PLT may give a PASS under certain cases after the re-test. Re-test is OFF by default This issue has been solved in SmartBond™ PLT v4.4.2.
2	System calibration	DA1469x	In SmartBond™ PLT 4v4 the trim values, taken from the OTP CS section, were used after the initial full calibration was executed after the system startup. This could cause an unstable RF test operation. This issue has been solved in SmartBond™ PLT v4.4.2.
3	External memory in JTAG pins	DA14531	If a JTAG pin is used for an external memory, SmartBond™ PLT 4v4 could not access it to program it. This issue has been solved in SmartBond™ PLT v4.4.2.

6.3.4 Known limitations of version 4.4.2

Table 11. Known limitations of version 4.4.2

Issue number	Description
1	VBAT as Reset is not supported
2	DA14531 and DA1469x test firmware cannot go into sleep unless a specific amount of time passes after boot. Therefore, PLT counts the time from booting the device until the sleep test and waits appropriate time to execute it, if needed.

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6.4 Version 4.4

Version 4v4 of SmartBond Production Line Tool for DA14531 and DA1469x was released Apr 30, 2020.

6.4.1 Overview

This is a FULL (GA) release of the SmartBond™ Production Line Tool (Note 1). It supports production testing and programming for products using DA14531 and DA1469x only.

Figure 9 shows the main window of the SmartBond™ Production Line Tool Configuration.

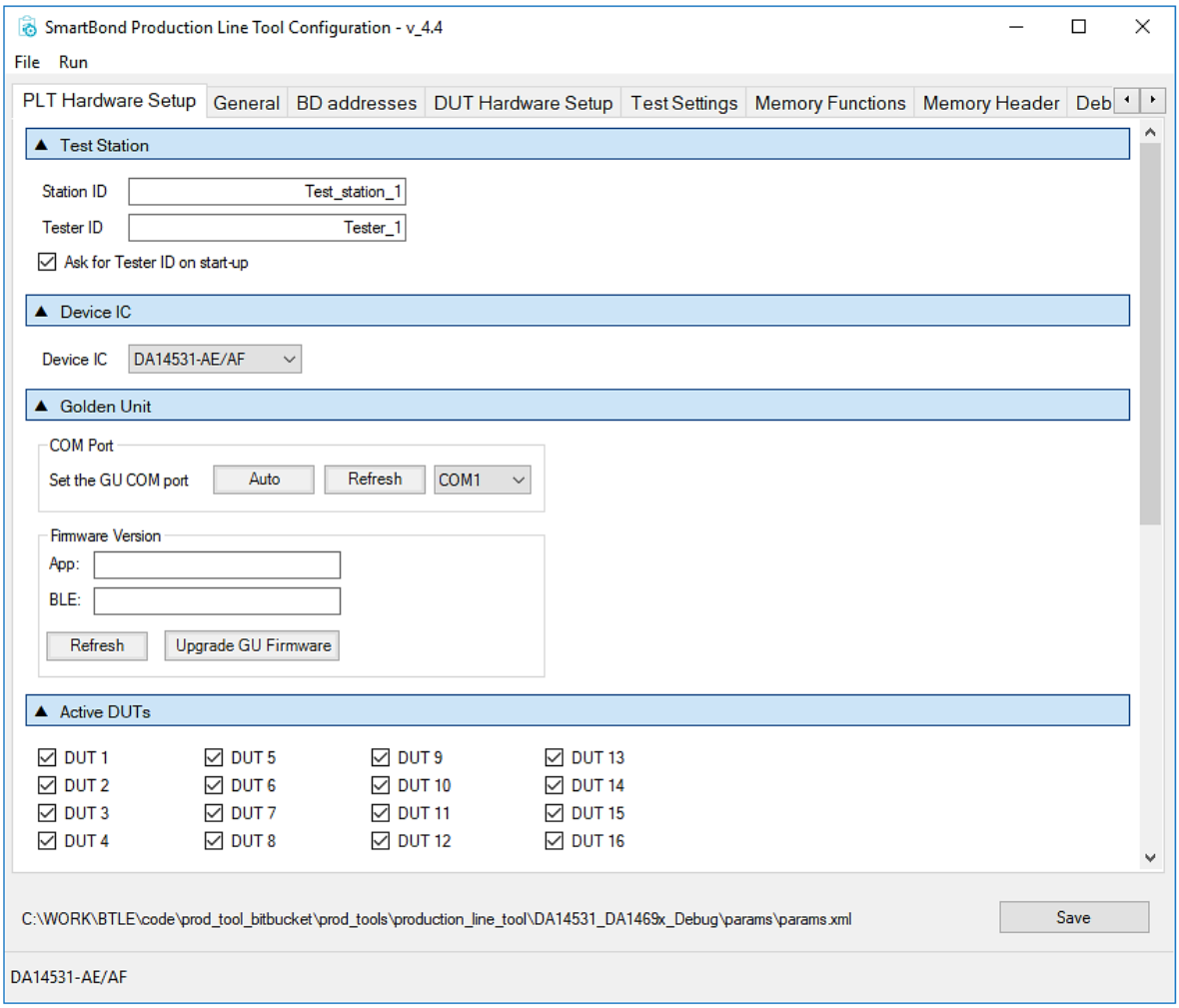

Figure 9. SmartBond™ Production Line Tool configuration

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Figure 10 shows the main window of the SmartBondTM Production Line Tool GUI.

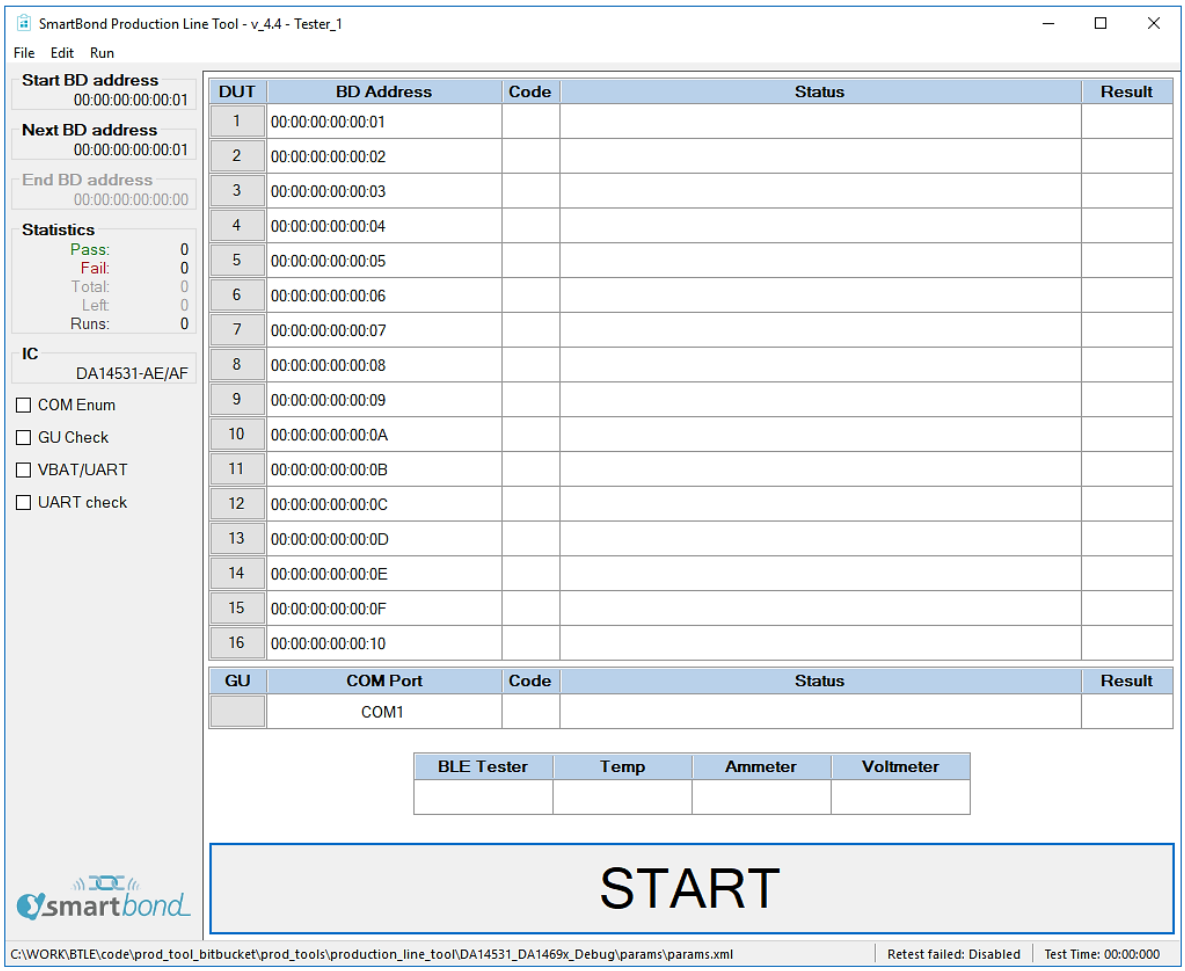
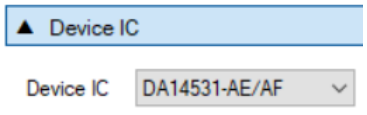
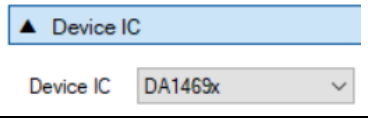
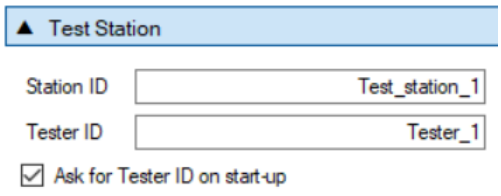


Figure 10. SmartBond™ Production Line Tool GUI

6.4.2 New and updated features of version 4.4

Table 12. Version 4.4 new features

Feature number	Description	Picture
1	**DA14531-AE/AF** support	
2	**DA1469x** support	
3	Added **Tester ID**. Tester ID is shown in the SmartBondTM Production Line Tool GUI, in the DUT logs, and the CSV log file.	

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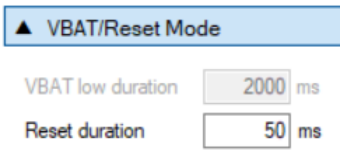
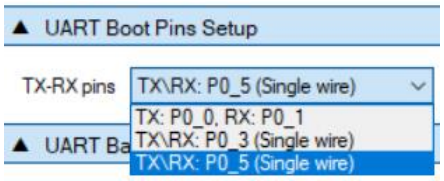
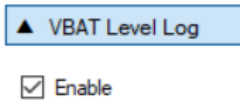
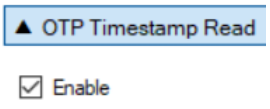
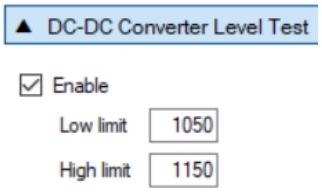
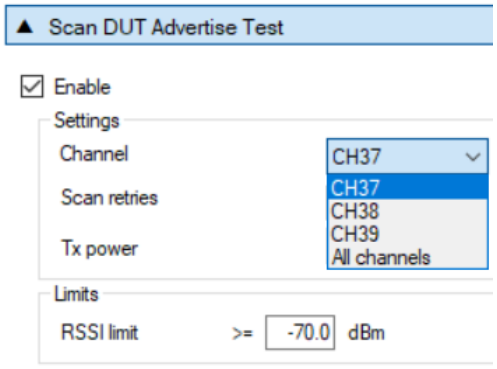
Feature number	Description	Picture
4	**Reset duration** can now be more than 50 ms. In previous versions, the reset duration was fixed to 50 ms. Now, this can be adjusted between 10ms and 1000 ms.	
5	**Single wire UART** support for DA14531 devices, at either P03 or P05 GPIOs.	
6	**Measure VBAT** and log it, using internal ADC.	
7	Read the IC-specific OTP **timestamp** and log it.	
8	DA14531 **DC-DC converter level** test.	
9	BLE scan test at all advertisement channels. If **All channels** is selected, three different tests are performed, at CH37, CH38, and CH39. Before, if All channels was selected, the Bluetooth LE stack was selecting the advertisement channel according to the Bluetooth® specification.	

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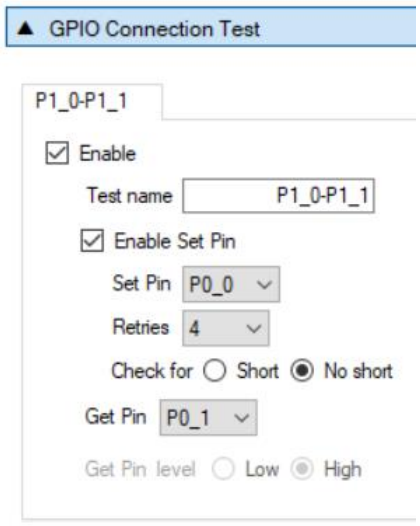
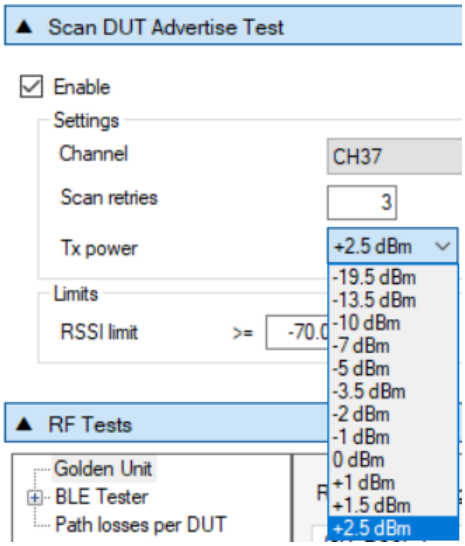
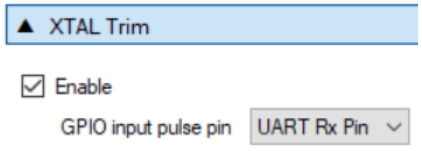
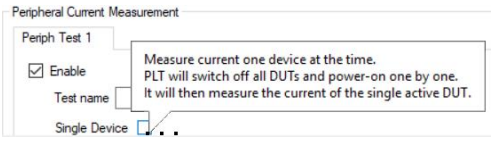
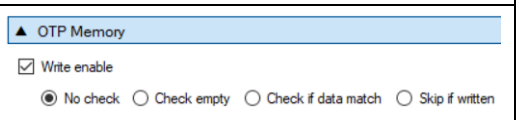
Feature number	Description	Picture
10	Added **No short** GPIO connection test. If the No short checkbox is selected, the tool returns an error if the two GPIOs are found to be shorted.	
11	Added **TX power** control for DA14531 devices. The TX power control can be adjusted in Scan DUT Advertise Test and all TX Bluetooth LE tester tests.	
12	The **UART RX Pin** can now be selected as XTAL trim GPIO input pulse pin. Before user had to select the specific GPIO (for example, P05).	
13	Added **Single Device** current measurement test. This is to be used during PLT production setup and not in the actual production line, to find the average current measurement limits, by first measuring multiple devices.	
14	Added **Skip if written** in all OTP writes. If this option is selected, the tool first reads the OTP area to be written. If the area contains data, it will not write new data and proceed to the next operation without error.	

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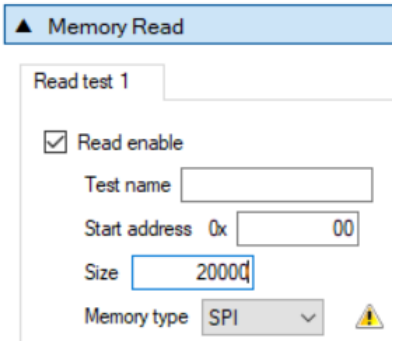
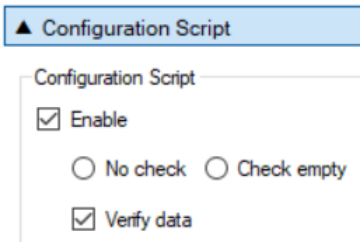
Feature number	Description	Picture
15	The **memory read size** has been extended by more than 256 bytes to 64 Mbytes. If the size to be read is more than 256 bytes, the read data will be saved on a file under the **mem_read_test** folder.	
16	**OTP configuration script** support for DA14531 and DA1469x.	

6.4.3 Fixes and improvements since version 4.3

Table 13. Fixes and improvements since version 4.4

Fix number	Description
1	Application names changed to SmartBond_CFG_PLT.exe, SmartBond_CLI_PLT.exe, and SmartBond_GUI_PLT.exe.
2	Changed IDE from Visual Studio 2015 to Visual Studio 2017.
3	Improve current measurement tests. Fixed bugs in retry.
4	Instrument DLLs can now be built without prior installation of NI VISA. This is because linking to NI libraries is done dynamically and not during the build. However, installation of NI VISA is needed and a valid license to use the ammeter_scpi.dll, ni_usb_tc01.dll, and volt_meter_scpi.dll.
5	Fix GPIO incorrect GPIO prints in DUT logs.
6	Fix an issue in peripheral current measurement with LED1/2 are used.
7	Fix a bug in ammeter_scpi.dll for Rigol DM3058E DMM.
8	Improve the OTP address ranges in tooltips in the configuration tool, SmartBond_CFG_PLT.exe.
9	Added the OTP CS value and address to be programmed in DUT logs and CSV.
10	Improve code documentation, accessed in the **help** folder.
11	Fix an issue with the log file name, that ended with FAILED even in tests succeeded.
12	Fix a bug in the debug console. Once opened it could not be closed unless the main application was closed.
13	Improved speed when performing QSPI operations in DA1469x.
14	DA14531 and DA1469x test firmware cannot go into sleep unless.
15	Fix a bug in the CSV header when exceeding 2000 letters.
16	Increase VBAT low time.
17	Improve input range in IQXelm Bluetooth tester support.

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Fix number	Description
18	OTP customer field programming became a separate test operation. Before it was written together with the rest of the OTP header fields. This change helps to identify problems.
19	Improve printing of BD addresses in CLI at the end, if BD address read or compare operations are enabled.
20	Fix the “DUT RF path losses” group box enable state in the configuration tool, SmartBond_CFG_PLT.exe.
21	Fix bug in ammeter SCPI commands causing incompatibility with some DMMs when serial communication protocol was used through UART. Line feed was added at the end of all SCPI commands.

6.4.4 Known limitations of version 4.4

Table 14. Known limitations of version 4.4

Issue number	Description
1	VBAT as Reset is not anymore supported
2	DA14531 and DA1469x test firmware cannot go into sleep unless a specific amount of time passes after boot. Therefore, PLT counts the time from booting the device until the sleep test and waits appropriate time to execute it, if needed.

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6.5 Version 4.3

Version 4.3 of DA1458x/DA1468x Production Line Tool was released Jul 16, 2018.

6.5.1 Overview

This is a GA release of the DA1458x/DA1468x Production Line Tool, which added various test and programming features for products having DA1458x and DA1468x devices.

6.5.2 New and updated features of version 4.3

Table 15. Version 4.3 new features

Feature number	Description
1	Automated GU firmware upgrade.
2	External 32 kHz connection test.
3	HID barcode scanner support.
4	DA14585 range extender tests.
5	Option to burn OTP image and header as a single binary.
7	Improvements for DA14683 secure boot.
8	DA14683 32 MHz hardware support.
9	Warning pop-up window when any OTP write is enabled.
10	Peripheral current measurements.
11	GPIO toggle for external watchdog.
12	DA1468x DK power profiler as the current measurement instrument.
13	Set/Get GPIO status test.
14	DA1458x configurable SPI and EEPROM memories.
15	DA1458x memory enable GPIO.
16	DA1458x sleep clock selection (needed for boost mode).
17	OTP TCS section write.
18	Scan advertisements using the production test firmware.
19	Added PER limits in RF RSSI tests.

6.5.3 Fixes and improvements since version 4.2

Table 16. Version 4.3 fixes and improvements

Fix/Improvement number	Description
1	Updated Homekit setup code generator.
2	Configurable firmware download retries.
3	CSV OTP re-burn protection.
4	Support the latest Anritsu MT8852B firmware (5.00.009).
5	Barcode scanner improvements.
6	Increase QSPI operation timeouts.
7	Remove all DA1468x QSPI dependencies from production test firmware.

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Fix/Improvement number	Description
8	DA1468x uartboot QSPI initialization only when required. Uartboot and plt_fw now operate even with no QSPI mounted.
9	Improve external script execution.
10	Idle current measurement removed.
11	Added DUT IC name in DUT logs.
12	DA14585 SPI boot header fix.
13	Fix DA1468x configurable UART boot pins.

6.5.4 Known limitations of version 4.3

Table 17. Version 4.3 known limitations

Issue number	Description
1	DA1458x_DA1468x_CLI_PLT.exe needs all fields in the params.xml configuration file to be filled in even if these are not actually used by the current test setup.
2	The DA1458x memory programming may fail at 1M UART baud rate at some specific PCs and at a rate of around 1-2 %. This is solved by splitting the data to be burned into chunks (3960 bytes is a good tested chunk) or lowering the UART baud rate to 115200. This PLT version has configurable chunk sizes through the PLT configuration tool, with the default set to 3960 bytes and tested to be safe to operate at a 1M UART baud rate.
3	Sleep current measurement tests need production test firmware changes to power down the external peripherals used (for example, sensors, memory flashes, and so forth).

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Appendix A Software Versioning Rules

This describes the software version numbers and does not apply to documentation version numbers (as found in the footer of this document).

Each software version number string consists of four numbers: MAJOR. BRANCH. MINOR. and BUILD.

#MAJOR: It is increased (by one only) if the project undergoes a major modification, for example major ROM changes. It usually changes only when the project sources undergo major restructuring affecting most of the repository. It is initialized at 1.

#BRANCH: Used in the case of concurrent projects that for special reasons need to be spun off the major repository. It corresponds to different versions of the repository code that have to be supported concurrently. In this case each branch number corresponds to a different GIT branch. The basic project has BRANCH id 0.

#MINOR: Odd numbers indicate Engineering (or Patch or Binary) versions, even numbers indicate Full release versions or Release Candidates of Full versions. Each Full release increases this number by one. After the Full release, the number is increased by one again. Therefore, Project releases correspond to release numbers like 2.0.1.xxx, 2.0.2.xxx. etc. The #MINOR number is initialized at 1.

#BUILD: The # BUILD number increases by one at every repository update and thus indicates the total number of changes since repository initialization. The BUILD number is initialized at 1.

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Document Revision History

This section summarizes the changes made to this document and not to the software that this document describes.

Revision	Date	Description
1.0	Mar 11, 2024	Initial release on PLT for DA1459x only.

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Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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