

1 iSCT Introduction and Theory of Operations

Intel Smart Connect Technology (iSCT) provides the user with two key features, always updated critical data and an always accessible system on a platform that does not support connected standby. When the user puts the system into a standby state, iSCT will periodically wake the system and allow the running applications, such as email, social media apps, media download apps to update their media. This ensures that the user's critical data is always up to date.

For always accessible, iSCT creates the ability for the user to remotely wake their system from standby. This allows media access applications to remotely wake the PC to allow the user to access their data (such as pictures, videos etc.)

iSCT creates a logical power state known as S0_iSCT. For platform and OS operations, this is identical to the S0 state; the system is unaware of this logical power state. However, there are some important constraints on this state.

- 1) The system in S0_iSCT will be put to standby when the iSCT application determines that the running applications have completed their operations, such as transferred emails or completed downloading a video file. The "sleep after..." setting of the power policy which puts the system to sleep after an indicated period of inactivity will not be used in S0_iSCT
- 2) The processor is tuned to a very low power state.
- 3) The screen is off
- 4) Audio is muted
- 5) If at any time a thermal or battery limit is reached, iSCT immediately puts the system back into standby.

To the End User, the system appears to still be in the sleep state while in S0_iSCT. If the user happens to interact with the system while it is updating in the S0_iSCT state, iSCT will make it appear as if the system has woken. The system will be moved to the full S0 state where iSCT will not put the system to sleep. The processor power is returned to the value set by the OS power policy. The screen is turned on and audio is unmuted.

In order to maintain freshness of the user's data, iSCT creates a timer to wake the system. It programs the system embedded controller (EC) to wake the system at the time requested by iSCT. This capability is called periodic wake. The user can set the frequency of wakes through the user interface. The Tester can use debug settings in the registry to set values that are not available in the UI. An important aspect of periodic wake is that every time that the system wakes, it should be able to connect to a network and the running applications should be able to update. If a network is not available, the power used to wake the system has effectively been wasted. In order to reduce the number of these wakes where no network is available, if iSCT finds during a wake that no network is available it uses the *Net Detect* feature of the WLAN to ensure that the next wake will only occur if an available and friendly (known) network is present. In this case, iSCT programs the WLAN card to scan for available networks while the system is in S3. The WLAN card will wake the system only when it has found a network to which it can connect (prior, *trusted network*). If iSCT finds that there is no network available, it will program or "arm" net detect in such a way that the WLAN card will begin searching for available networks only after the time specified by the periodic timer, and will continue scanning every 2 minutes until it finds an

available network. Thus, the system cannot wake more often than the timer, but it may wake much later if a network is not available.

iSCT consists of a number of components as shown in the following diagram. At the center is the iSCT Agent Service. This is a user mode Windows service that runs automatically on system startup. This element can be started and stopped by running the following commands within an administrator privileged command window.

Stop the service: `net stop isctAgent`

Start the service: `net start isctAgent`

Stopping and restarting the service is necessary during the testing whenever iSCT registry settings are changed or when clearing the log file.

iSCT writes a log file (isctlog.txt) containing debug information to the following directory:

c:\ProgramData\Intel\iSCT

This file is useful when an error occurs in order to track down what iSCT was doing when the error occurred.

iSCT is configured via settings in the registry. These registry settings are under the **HKEY_LOCAL_MACHINE (HKLM)** hive:

iSCT Root key:

HKLM\Software\Intel\Intel Smart Connect Technology\

iSCT always updated configuration key:

HKLM\Software\Intel\Intel Smart Connect Technology\Always Updated

Debug Values:

Registry Value	Type	Debug Setting	Meaning
"S3SleepDurationNightSeconds"	dword	0x00000258	Time to sleep during "nighttime" (10pm to 6am) = 600 seconds
"WakeOnNetworkDetectEnabled"	dword	0x00000001	Enable the net detect feature
"S3SleepDurationSeconds"	dword	0x0000012c	Time to sleep during "daytime" (7am to 7pm) = 300 seconds
"PeriodicWakeEnabled"	dword	0x00000001	Enable the timer wakes
"LoggingLevel"	dword	0x00000010	Maximum level of error logging
"LoggingEnabled"	dword	0x00000007	Maximum level of error logging
"DebugEnabled"	dword	0x00000001	Allow debug settings (more frequent wakes, logging, etc.)

In the test descriptions, we will occasionally refer to these settings.

Since iSCT configures timers and platform configurations in the EC, the BIOS must create an ACPI device so that the iSCT driver can communicate with the EC. The BIOS contains settings for the iSCT. In order to use iSCT, the feature must be enabled in the BIOS. The default BIOS configuration after enabling the feature is sufficient for most tests.

Testing Tools

Pnpexerciser

The main tool for testing the interactions between the BIOS and the platform is pnpexerciser. The BIOS creates an ACPI device to expose the platform capabilities to the software. Pnpexerciser allows the tester to directly set the values used by this device without requiring the iSCT application to be running. This simplifies the testing. The tests in this document involve setting particular values by pnpexerciser and then observing the state of the machine to make sure that the correct signals are present on the board.

NDTest

The second tool allows the tester to validate that a wakeup generated by an external device is capable of waking the system correctly. NDTest will program the WLAN NIC for a network detection operation which will send a PCIE wake signal to the PCH when it discovers one of the known access points. This will be used to validate that the wake correctly brings the system out of the test state and into full S0.

How to use these tools are included in the test procedures where they are first encountered. Screenshots will define how to set the various parameters required of the test.

Critical BIOS Tests

This section contains the tests required of the BIOS and EC components for validation of each iSCT requirement. The first subsection of each test introduces the requirement as specified in the iSCT BIOS requirements document. The second subsection consists of the test procedures and success criteria for testing the given requirement.

1. Support for waking from timer for desktop/mobile/netbook

Requirement Details

When the BIOS receives a request from the iSCT Agent to set a wake-up timer, the BIOS shall program the requested wake time.

Note: The BIOS is responsible for determining whether to use the EC timer for mobile platforms or the RTC timer for desktop platforms. The wake is to be supported from S3, S4, Deep S3 or Deep S4.

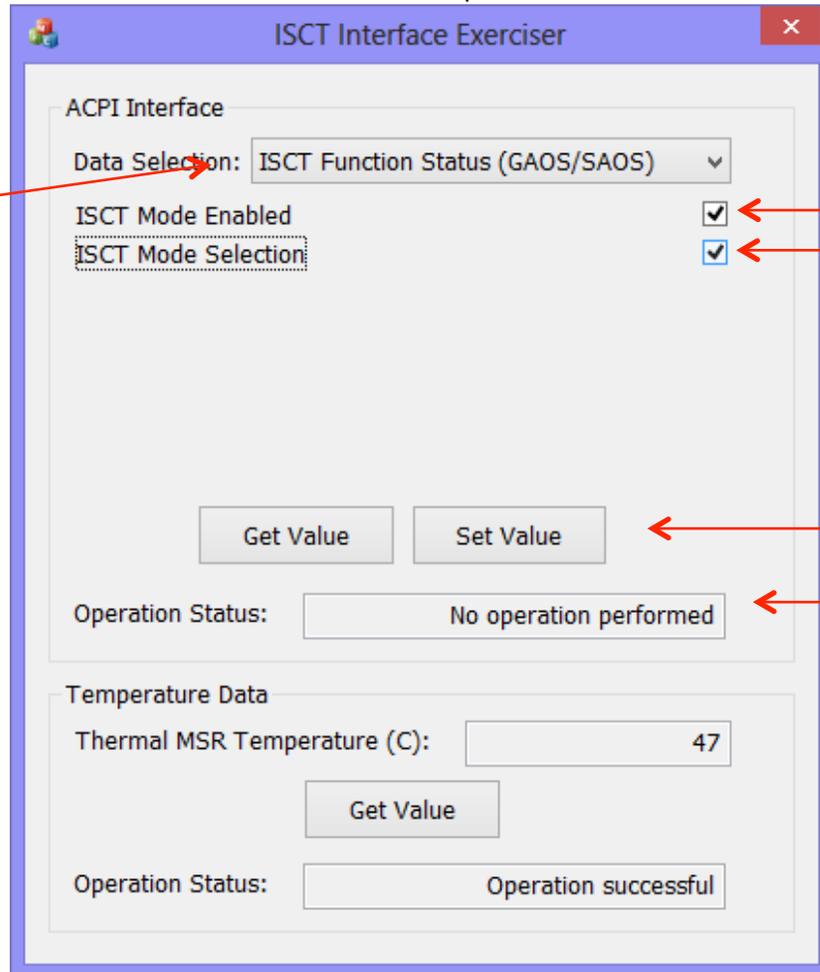
Platform	Shark Bay - Crescent Bay – Bay Trail
Segment	Unassigned,Mobile,Desktop,Ultrabook

Test Procedures

Support for waking from timer for desktop/mobile/netbook	
Tested States	S3, S4, Deep S3 and Deep S4. All deep Sx testing MUST be performed on <u>physically-connected</u> battery power.
Required Tools	Pnpexerciser.exe
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• pnpexerciser MUST be running on the system• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS

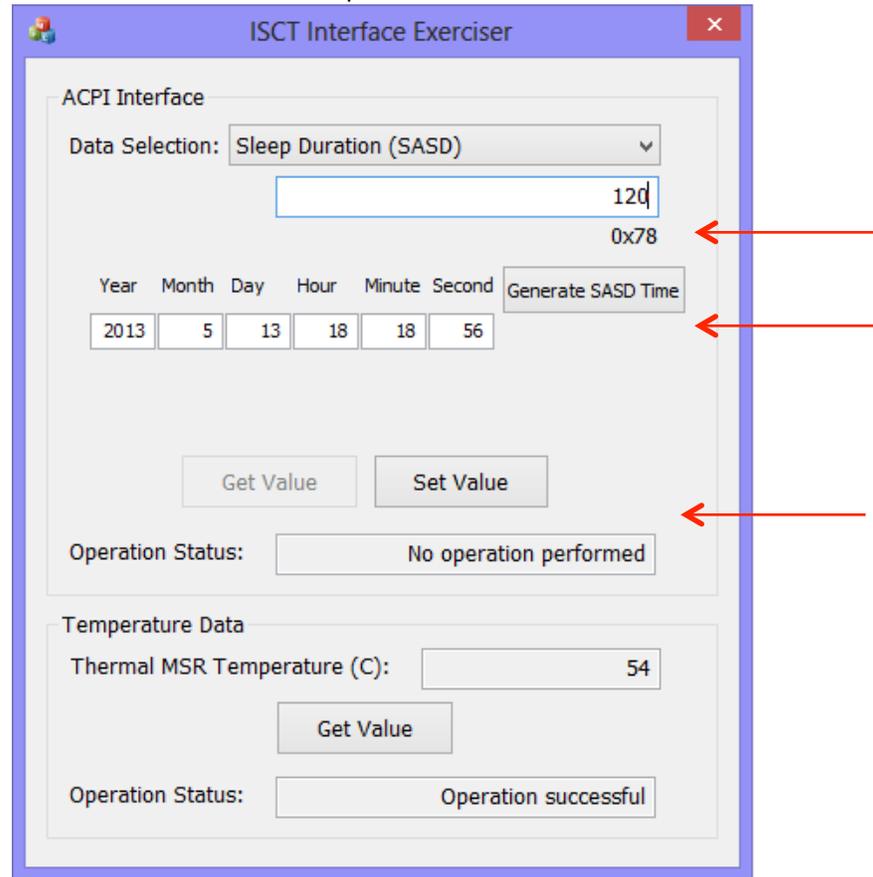
Test Procedures:

1. Using npexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure
3. Using npexerciser select Sleep Duration (SASD) from the Data Selection

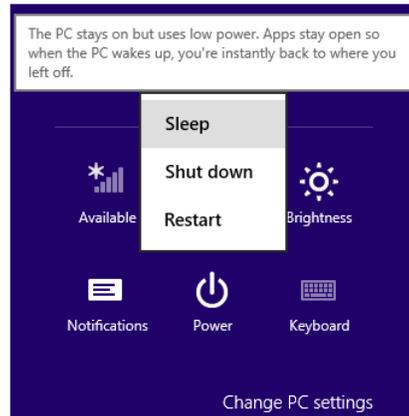
dropdown at the top of the tool. Enter 120 into the text box below the data selection. This will request that the system sleep for 120 seconds. Press Set Value button to set a wakeup event for this time. Note the time.



- a. *Result:* The Operation Status area MUST indicate success of the operation.

Success Failure

4. Put the systems to the *test state* (S3/S4/DS3/DS4)



- a. *Result:* The system MUST successfully enter the test state
Success Failure

5. Wait for iSCT to wake the system (at the time configured above). The screen will be activated when the system wakes.

- a. *Result:* The system MUST wake to S0_iSCT
Success Failure
- b. *Result:* The system MUST wake within 20 seconds of the time selected above
Success Failure

6. Using npexerciser select Platform Wake Reason (GPWR) from the Data Selection

dropdown at the top of the tool. Press the Get Value button.

The screenshot shows a Windows application window titled "ISCT Interface Exerciser". It contains two main sections: "ACPI Interface" and "Temperature Data".

ACPI Interface:

- Data Selection: Platform Wake Reason (GPWR) (dropdown menu)
- User Pressed Power Button or HID Event:
- BIOS Programmed-Timer:
- Non-Periodic Wake RTC Timer:
- PME Wake-up Event:
- Reserved (must be 0):
- ME Wake-up Event:

Buttons: Get Value, Set Value

Operation Status: Operation successful

Temperature Data:

- Thermal MSR Temperature (C): 51

Buttons: Get Value

Operation Status: Operation successful

a. *Result:* Operation Status box MUST indicate that the operation was successful.

Success Failure

b. *Result:* The BIOS Programmed-Timer check box MUST be checked.

Success Failure

2. Enable/Disable timer due to RF kill switch

Requirement Details

While in S3, S4, Deep S3 or Deep S4 states, the EC shall disable timer when RF is disabled through RF kill switch and enable it when RF is enabled through RF kill switch (RF KILL switch is connected to EC only)

NOTE: Traditional 2-chip doesn't have the HW support, so this feature is not supported in traditional.

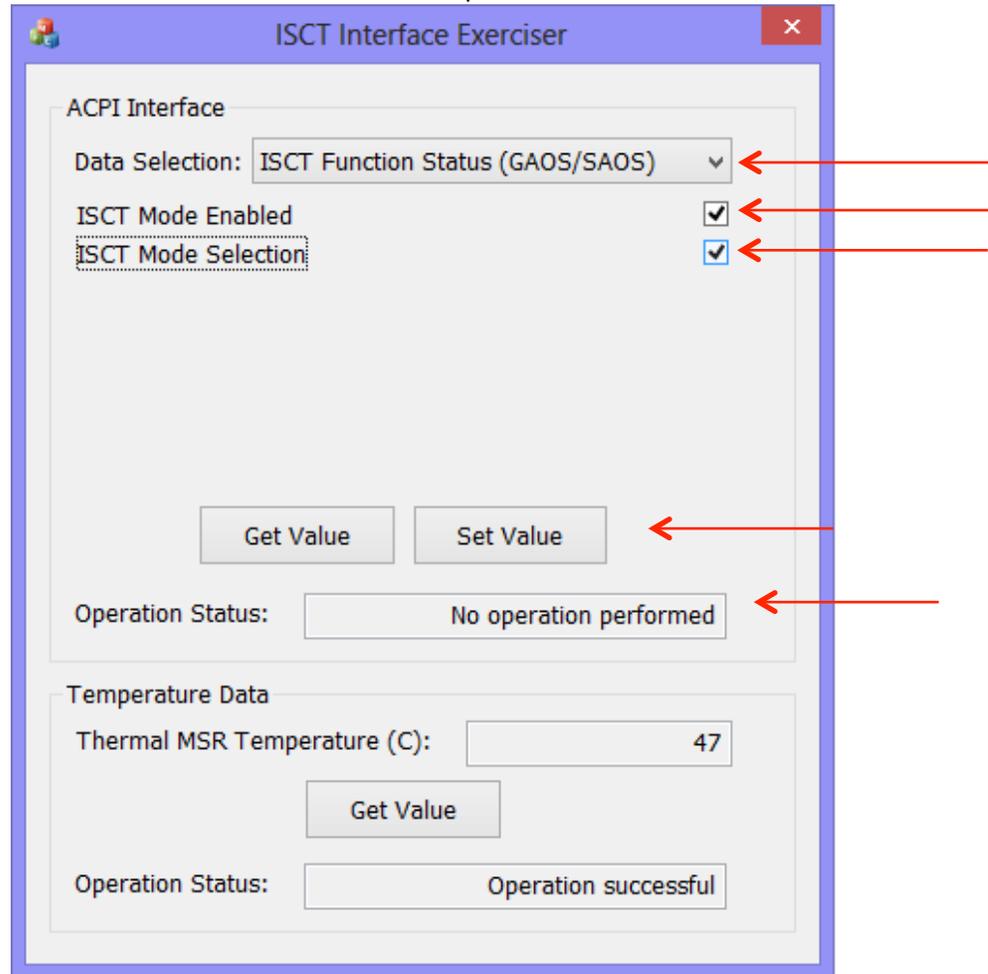
Platform	Shark Bay - Crescent Bay – Bay Trail
Segment	Ultrabook

Test Procedures

Enable/Disable timer due to RF kill switch	
Tested States	S3, S4, Deep S3 and Deep S4. All deep Sx testing MUST be performed on <u>physically-connected</u> battery power.
Required Tools	Pnpexerciser.exe
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• pnpexerciser MUST be running on the system• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS

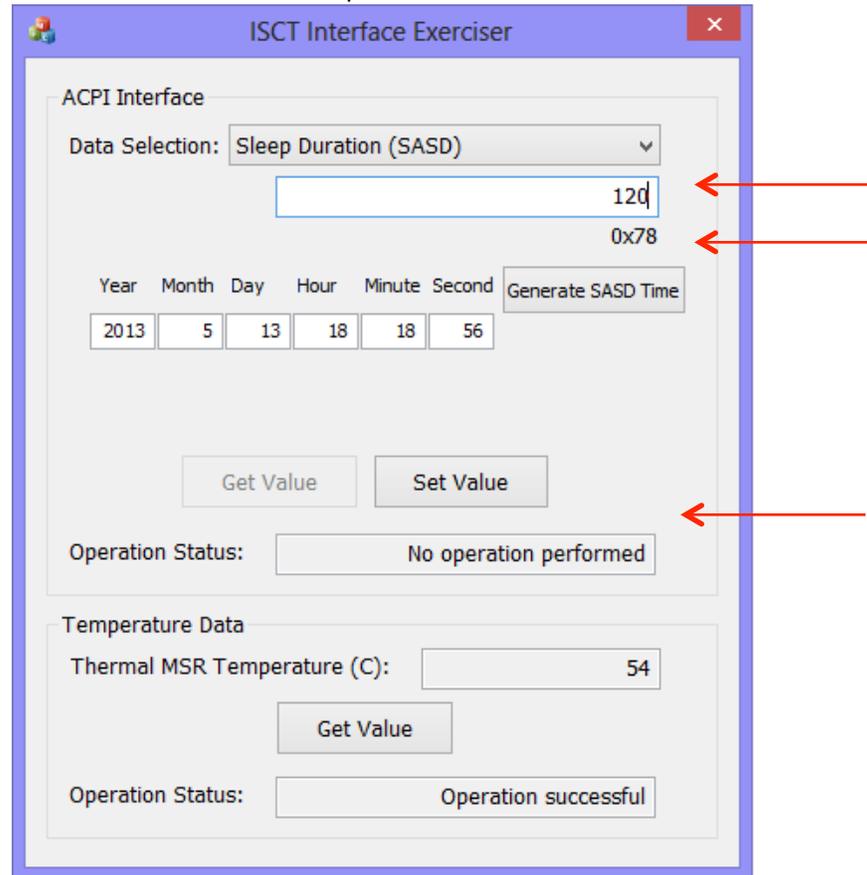
Test Procedures:

1. Using pnpexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure
3. Using pnpexerciser select Sleep Duration (SASD) from the Data Selection

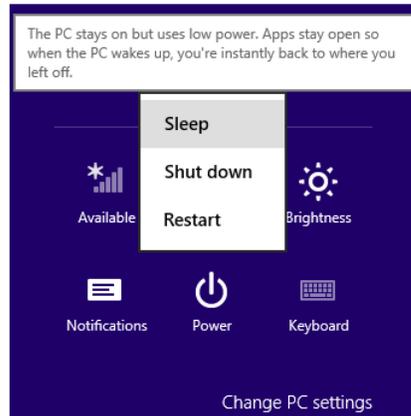
dropdown at the top of the tool. Enter 120 into the text box below the data selection. This will request that the system sleep for 120 seconds. Press Set Value button to set a wakeup event for this time. Note the time.



b. *Result:* The Operation Status area MUST indicate success of the operation.

Success Failure

3. Put the systems to the *test state* (S3/S4/DS3/DS4)



- a. *Result:* The system **MUST** successfully enter the test state
Success Failure
5. Prior to the timer expiring turn on the RF Kill switch (RF disabled) of the platform
6. Wait for a period beyond the time selected above in step **Error! Reference source not found.** for the system to wake from the test state (Observe the LEDs on the CRB to determine the power state of the platform)
 - a. *Result:* The system **MUST** not wake up at the time selected above.
Success Failure

3. Support for power control of WiFi NIC

Requirement Details

The BIOS shall create an ACPI table for the ISCT agent to control the power states of the Wi-Fi NIC in S3, S4, S5, Deep S3 and Deep S4 states.

Note: The BIOS will then route the control information to the Embedded Controller (EC).

Note: This applies to PCIe bus as well as the SDIO bus as required

Note: There eventually needs to be a requirement for the EC that captures the following information:

EC needs to coordinate power control between ME and ISCT in Sx state. For skus which don't support AMT ISCT will control power to the WiFi NIC

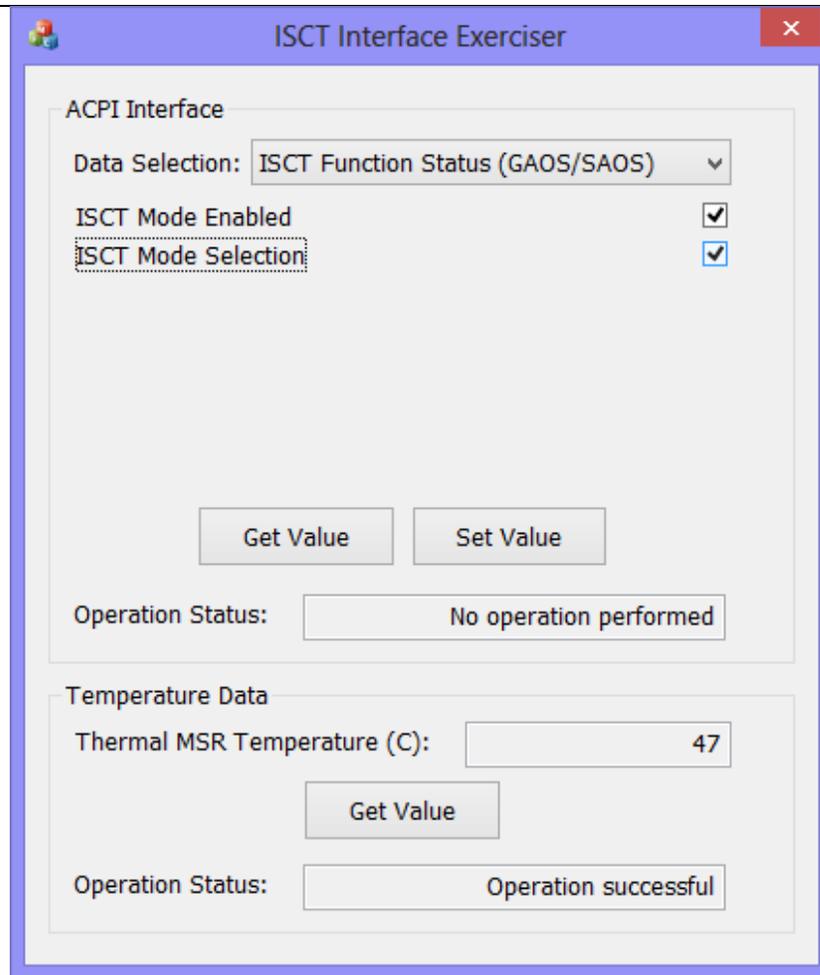
For skus which support AMT, in DC ISCT will control and in AC ME will control

Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

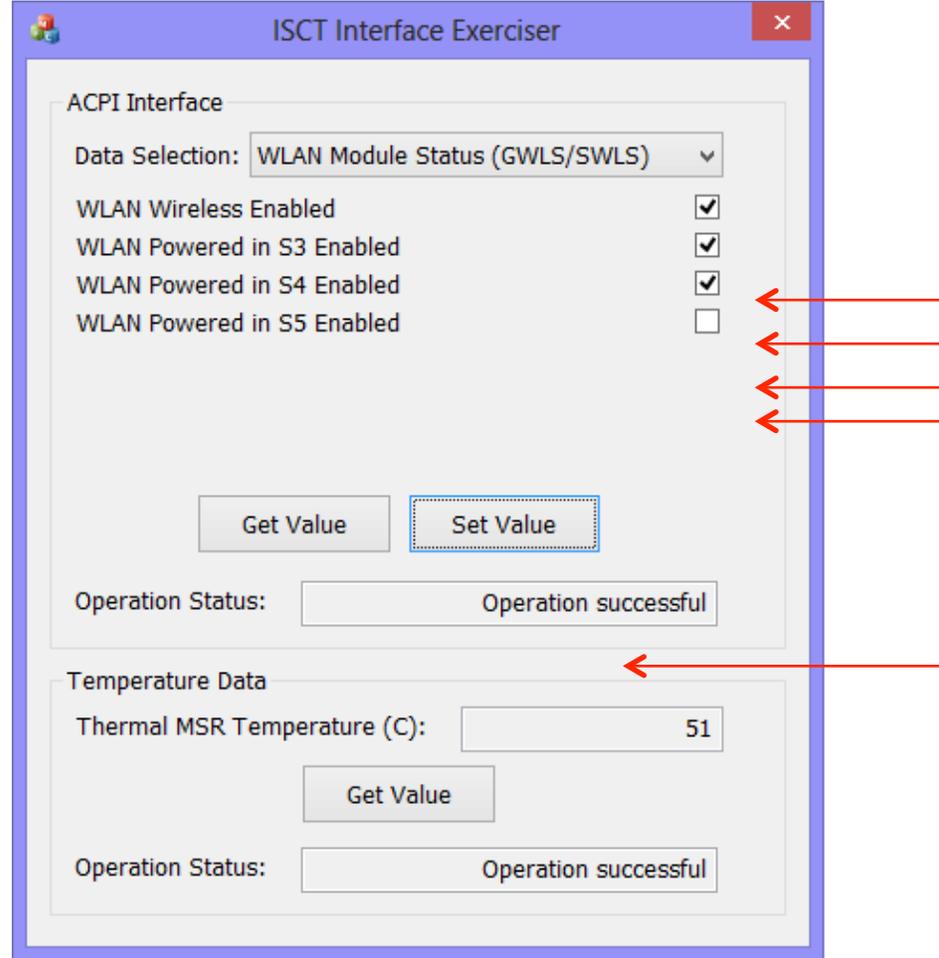
Support for power control of WiFi NIC	
Tested States	S3, Deep S3, S4, Deep S4
Tested Hardware	HMC, NGFF WLAN hardware.
Required Tools	Pnpexerciser.exe, Multimeter
Preconditions:	<ul style="list-style-type: none"> The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document The system MUST be running Win8 (64 bit) or WinBlue (64 bit) iSCT MUST be enabled in the BIOS. iSCT Agent MUST be stopped. A supported WLAN NIC MUST be installed with all required drivers and software. pnpexerciser MUST be running on the system If Deep Sleep state is being tested: <ul style="list-style-type: none"> Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system). Deep Sleep MUST be enabled in the BIOS
Test Procedures:	1. Using pnpexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.





- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure
3. Using pnpexerciser select WLAN Module Status (GWLS/SWLS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for WLAN Wireless Enabled and for the power state under test. If S3 or Deep S3 is being tested,

select WLAN Powered in S3 Enabled. If S4 or Deep S4 is being tested, select WLAN Powered in S4 Enabled. Press the Set Value button



a. *Result:* The Operation Status area MUST indicate success of the operation.

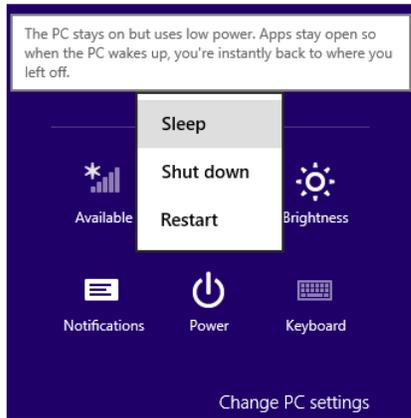
Success Failure

4. Press the Get Value button

a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes that were set above MUST remain checked.

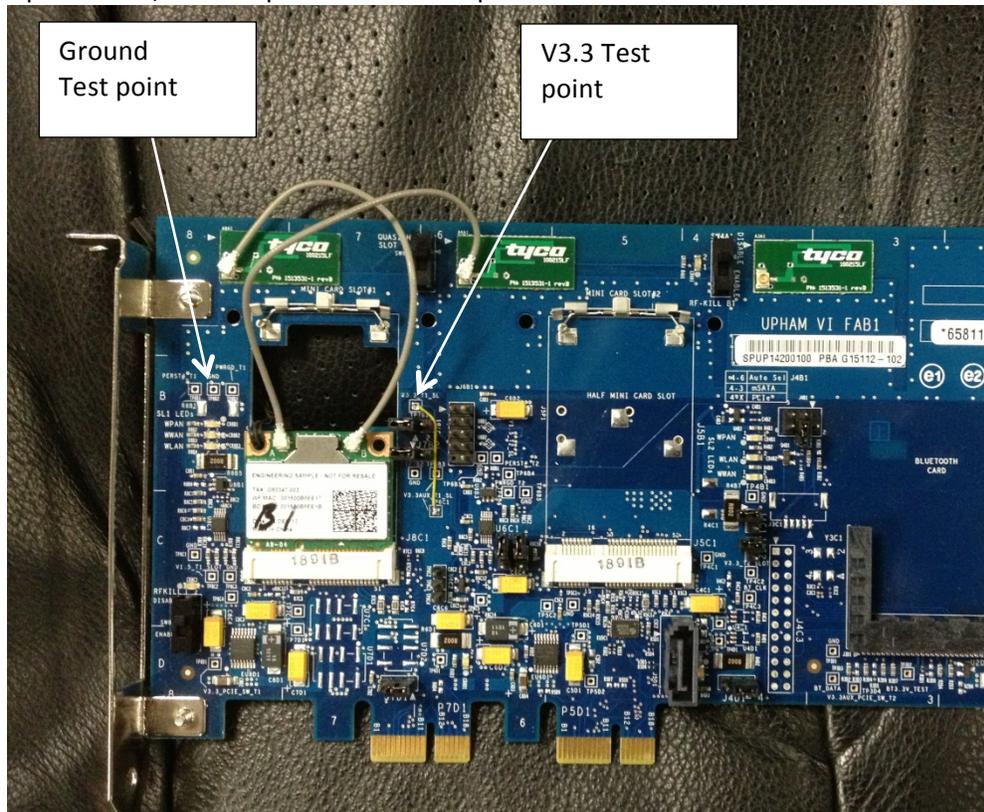
Success Failure

4. Put the systems to the *test state* (S3/S4/DS3/DS4)



- a. *Result:* The system MUST successfully enter the test state
 Success Failure

Test the VCC power into the WLAN card. For Half Mini Card (HMC) cards using the Upham riser, test the power at the test points indicated below



- a. The system MUST have power at the indicated locations
 Success Failure

4. Support for wake from WiFi NIC

Requirement Details

The BIOS shall program the PCH to wake for WiFi PME from S3, S4, Deep S3 or Deep S4 states.

Defined: PME: Power Management Event

Note: The WiFi NIC PME could be routed to the PCH, GPIO27 or EC.

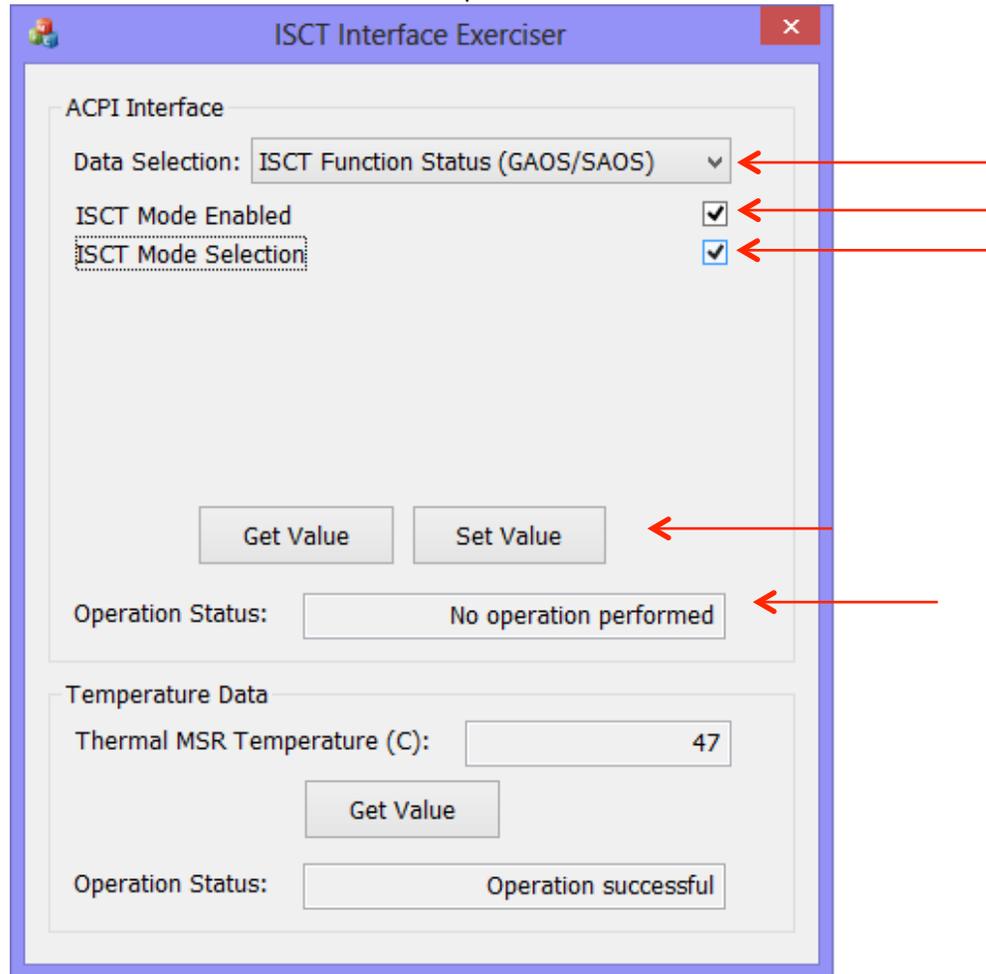
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

Support for wake from WiFi NIC	
Tested States	S3, Deep S3, S4, Deep S4
Tested Hardware	HMC, NGFF WLAN hardware.
Required Tools	Pnpexerciser.exe, NDTestApp.exe, dedicated AP that can be unplugged
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped• A supported WLAN NIC MUST be installed with all required drivers and software.• pnpexerciser MUST be running on the system• The correct version (32 or 64 bits) of the Net Detect Test Application MUST be running on the system.• The dedicated AP MUST be set up and powered at the start of the test (no requirement for internet connectivity)• There MUST be a single WLAN auto-connect profile established on the DUT, that MUST be for the dedicated AP, and the DUT MUST be connected to it at the start of the test.• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS

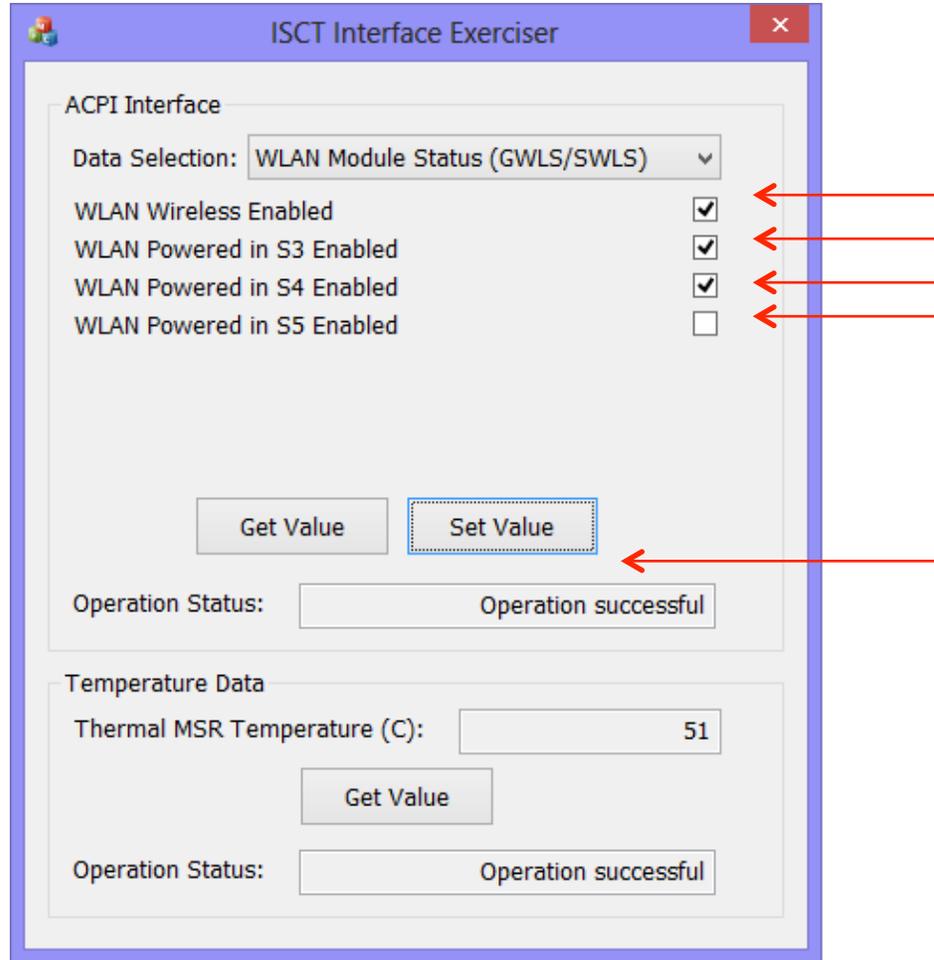
Test Procedures:

1. Using npexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



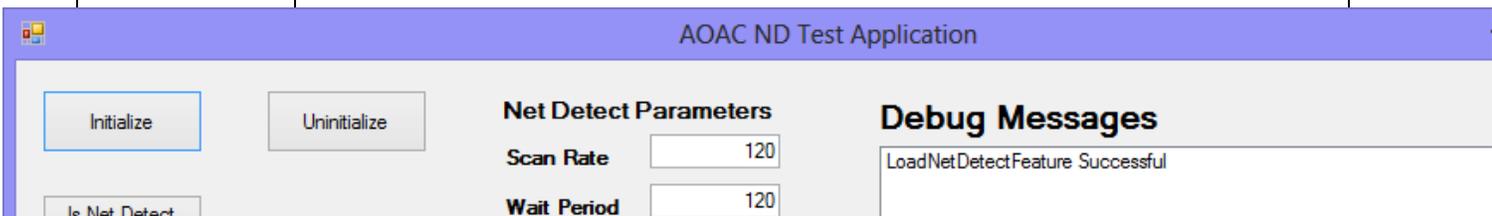
- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure

3. Using npnexerciser select WLAN Module Status (GWLS/SWLS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for WLAN Wireless Enabled and for the power state under test. If S3 or Deep S3 is being tested, select WLAN Powered in S3 Enabled. If S4 or Deep S4 is being tested, select WLAN Powered in S4 Enabled. Press the Set Value button

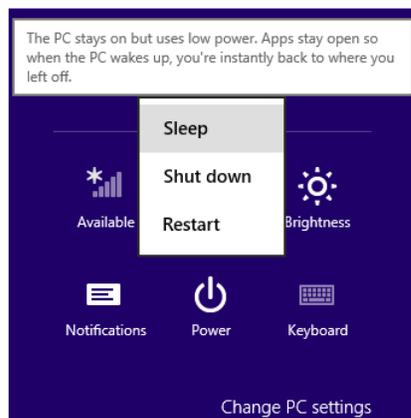


- a. *Result:* The Operation Status area MUST indicate success of the operation.
 Success Failure
4. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes that were set above MUST remain checked.
 Success Failure

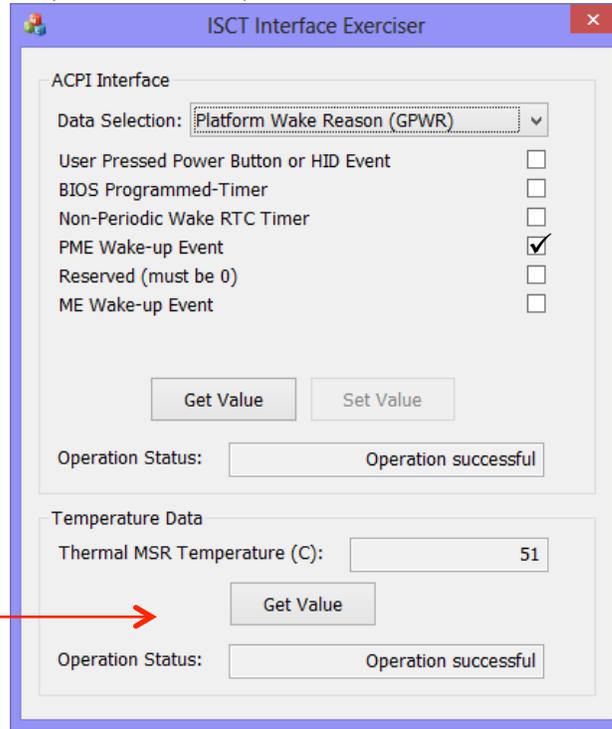
5. Using the Net Detect Test Application press the Initialize Button



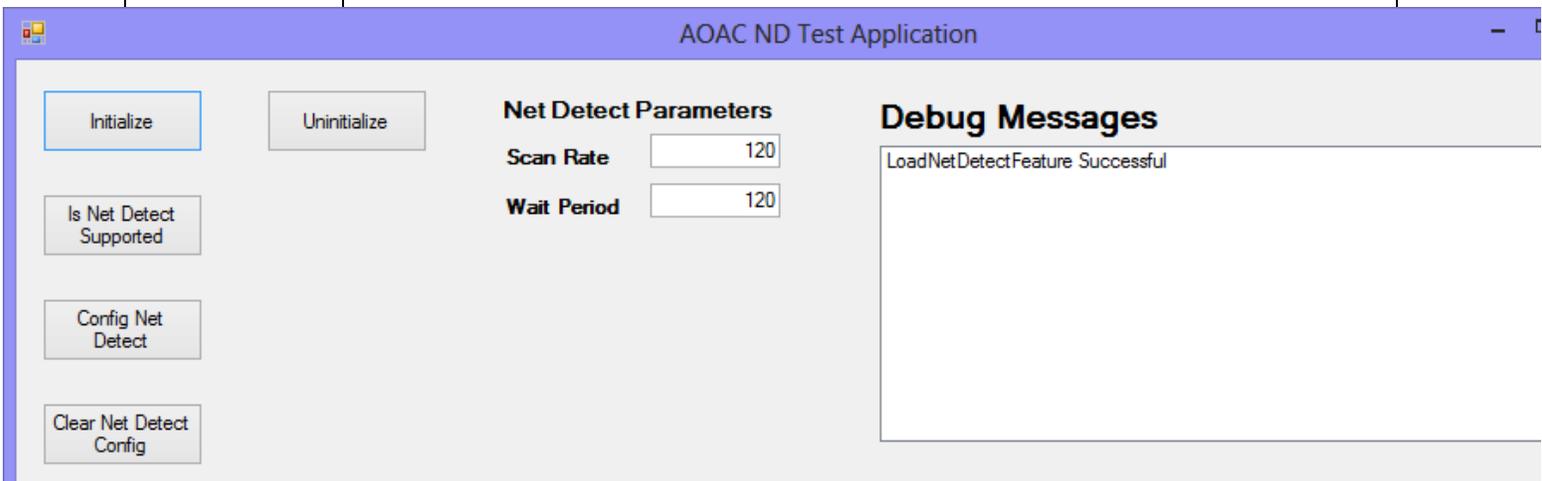
- a. The Debug Messages area MUST indicate success of the operation.
Success Failure
6. Using the Net Detect Test Application press the Is Net Detect Supported Button
 - a. The Debug Messages area MUST indicate success of the operation.
Success Failure
7. Using the Net Detect Test Application Set the Wait Period to 120 seconds and the Scan Rate to 120 seconds and press the Config Net Detect button
 - a. The Debug Messages area MUST indicate success of the operation.
Success Failure
8. Unplug the AP
9. Wait until the system determines that the AP is no longer present.
10. Put the systems to the *test state* (S3/S4/DS3/DS4)



- a. *Result:* The system MUST successfully enter the test state
 Success Failure
11. Wait for 120 seconds
12. Plug in the AP
13. Wait for the system to wake – this is the net detect wake.
- a. *Result:* The system MUST successfully wake within 240 seconds
 Success Failure
14. Using pnpexerciser select Platform Wake Reason (GPWR) from the Data Selection dropdown at the top of the tool. Press the Get Value button.



- a. *Result:* Operation Status box MUST indicate that the operation was successful.
 Success Failure
- b. *Result:* The PME Wake-up Event check box MUST be checked.
 Success Failure
15. Using the ND Test Application, press the Get Wake Reason Button



	<p>a. <i>Result:</i> The Debug Message area will indicate that the wake reason was a Net Detect Match.</p> <p>Success <input type="checkbox"/> Failure <input type="checkbox"/></p>
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5. Wake reason

Requirement Details

When the platform resumes from the S3, S4, Deep S3, or Deep S4 states, the BIOS shall notify the iSCT agent of the wake reason as per the Intel Smart Connect Technology Platform Design Specification.

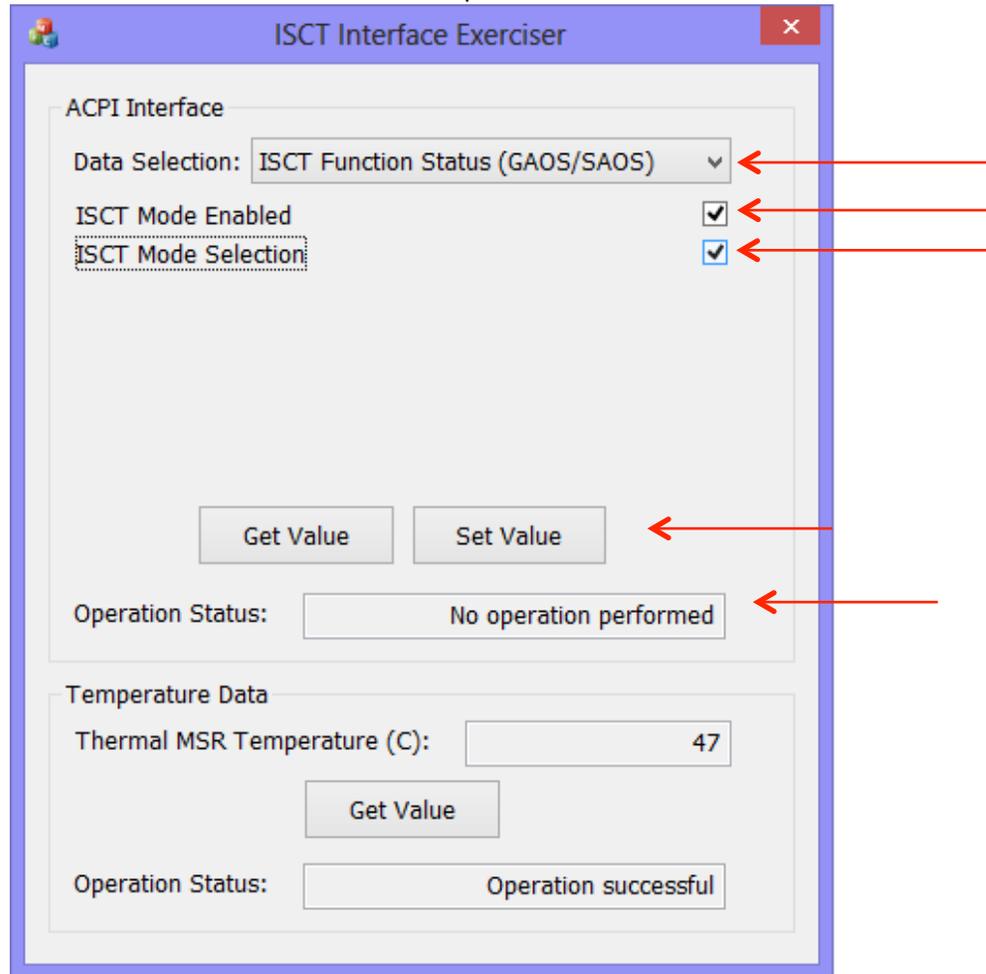
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

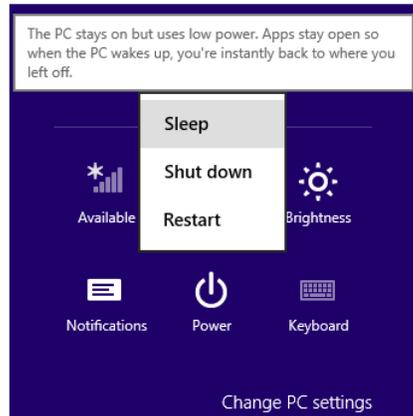
Wake reason	
Tested States	S3, Deep S3, S4, Deep S4
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• pnpexerciser MUST be running on the system• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS

Test Procedures:

1. Using npexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure
3. Put the systems to the test state (S3/DS3/S4/DS4)



- a. *Result:* The system MUST successfully enter the test state – observe the LEDs on the CRB to determine the power state of the board.

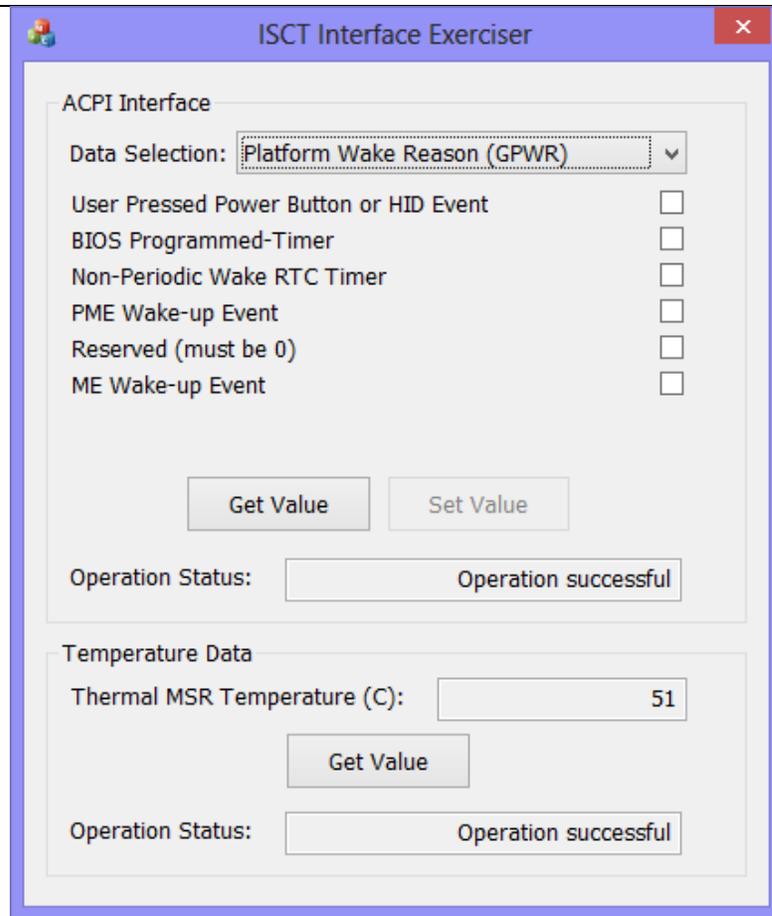
Success Failure

4. Wake the system with a power button press

- a. *Result:* The system MUST successfully enter the test state – observe the LEDs on the CRB to determine the power state of the board.

Success Failure

5. Using npexerciser select Platform Wake Reason (GPWR) from the Data Selection dropdown at the top of the tool. Press the Get Value button.



a. *Result:* Operation Status box MUST indicate that the operation was successful.

Success Failure

b. *Result:* The User Pressed Power Button or HID Event check box MUST be checked.

Success Failure

6. Coexistence with Rapid Start

Requirements Details

ISCT shall coexist with Rapid Start in the S3, S4, Deep S3 and Deep S4 states as per the Intel Smart Connect Technology Platform Design Specification.

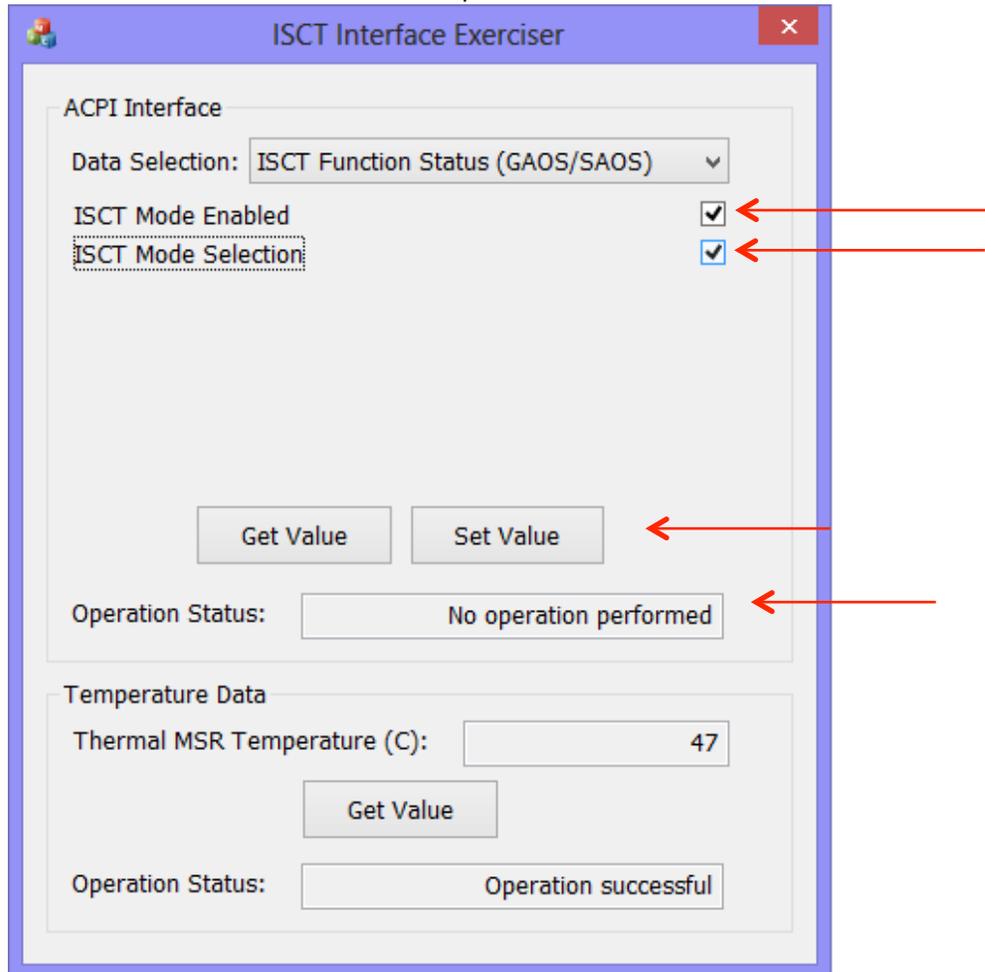
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

Coexistence with Rapid Start	
Tested States	S3, Deep S3
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• pnpexerciser MUST be running on the system• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS• Intel Rapid Start Technology MUST be configured as enabled in the BIOS.• Intel Rapid Start Technology MUST be installed on the system including establishing a hibernation partition for the use of the technology.

Test Procedures:

1. Using npexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure
3. Using npexerciser select Sleep Duration (SASD) from the Data Selection dropdown

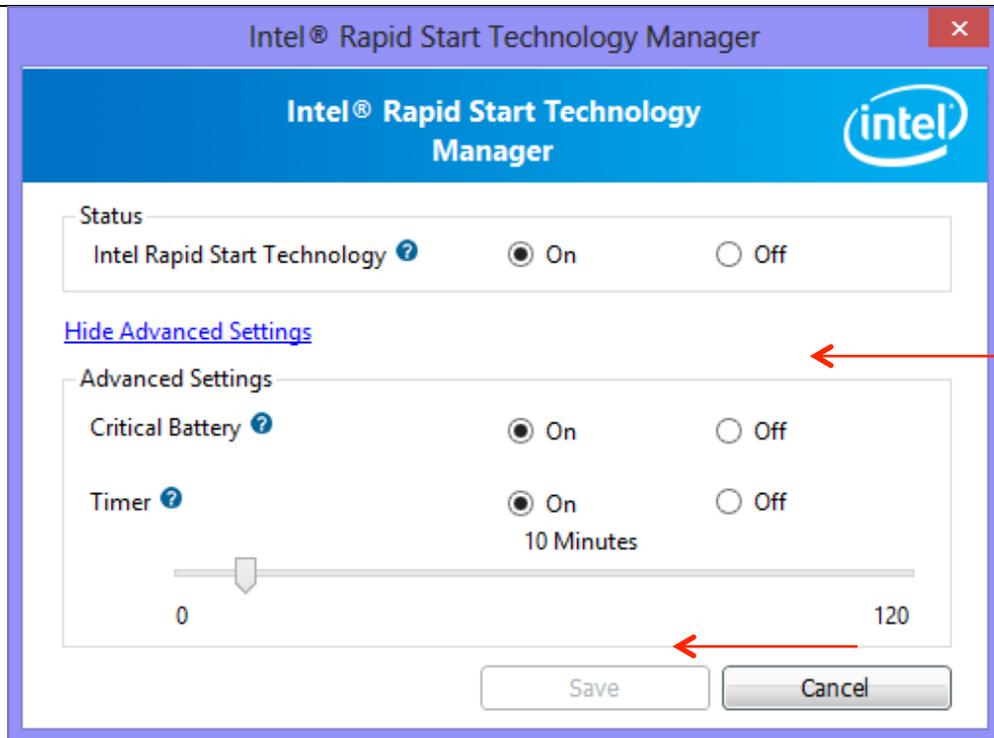
at the top of the tool. Enter 120 into the text box below the data selection. This will request that the system sleep for 120 seconds. Press Set Value button to set a wakeup event for this time. Note the time.

The screenshot shows the 'ISCT Interface Exerciser' application window. It is divided into two main sections: 'ACPI Interface' and 'Temperature Data'.
In the 'ACPI Interface' section:
- 'Data Selection' is a dropdown menu set to 'Sleep Duration (SASD)'.
- Below it is a text input field containing '120'.
- To the right of this field is another text input field containing '0x78'.
- Below these are fields for 'Year', 'Month', 'Day', 'Hour', 'Minute', and 'Second', with values: 2013, 5, 13, 18, 18, 56.
- A 'Generate SASD Time' button is located to the right of the date/time fields.
- Below the date/time fields are 'Get Value' and 'Set Value' buttons.
- At the bottom of this section is an 'Operation Status' field displaying 'No operation performed'.
In the 'Temperature Data' section:
- 'Thermal MSR Temperature (C):' is a text input field containing '54'.
- Below it is a 'Get Value' button.
- At the bottom of this section is an 'Operation Status' field displaying 'Operation successful'.
Red arrows point to the '120' text box, the '0x78' text box, and the 'Set Value' button.

- a. *Result:* The Operation Status area MUST indicate success of the operation.

Success Failure

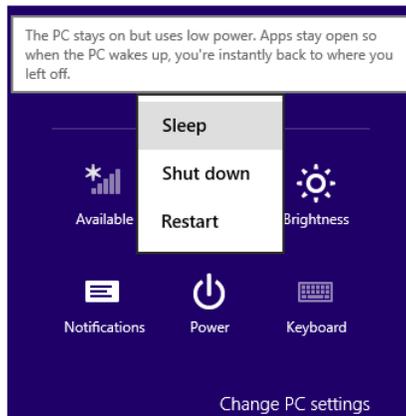
4. Using the Rapid Start Technology Manager, set the Rapid Start Technology to Enabled (On) and the Advanced settings timer to 10 minutes. Press the Save Button



- a. *Result:* The application MUST NOT generate an error message in the configuration.

Success Failure

5. Put the systems to the *test state* (S3 /DS3)



- a. *Result:* The system MUST successfully enter the test state

Success Failure

6. Wait for iSCT to wake the system (at the time configured above). The screen will activate when the system wakes.

- a. *Result:* The system MUST wake within 140 seconds of the time that the system was put to Sleep.

Success Failure

7. Using npexerciser select Platform Wake Reason (GPWR) from the Data Selection dropdown at the top of the tool. Press the Get Value button.

The screenshot shows the 'ISCT Interface Exerciser' application window. It has a blue title bar with a close button. The main content area is divided into two sections: 'ACPI Interface' and 'Temperature Data'. In the 'ACPI Interface' section, there is a 'Data Selection' dropdown menu currently showing 'Platform Wake Reason (GPWR)'. Below it are several checkboxes: 'User Pressed Power Button or HID Event' (unchecked), 'BIOS Programmed-Timer' (checked), 'Non-Periodic Wake RTC Timer' (unchecked), 'PME Wake-up Event' (unchecked), 'Reserved (must be 0)' (unchecked), and 'ME Wake-up Event' (unchecked). Two red arrows point to the 'Reserved (must be 0)' and 'ME Wake-up Event' checkboxes. Below these checkboxes are 'Get Value' and 'Set Value' buttons. The 'Operation Status' box shows 'Operation successful'. The 'Temperature Data' section has a 'Thermal MSR Temperature (C):' label with a value of '51' in a text box. A red arrow points to the 'Thermal MSR Temperature (C):' label. Below the text box is a 'Get Value' button. The 'Operation Status' box for this section also shows 'Operation successful'.

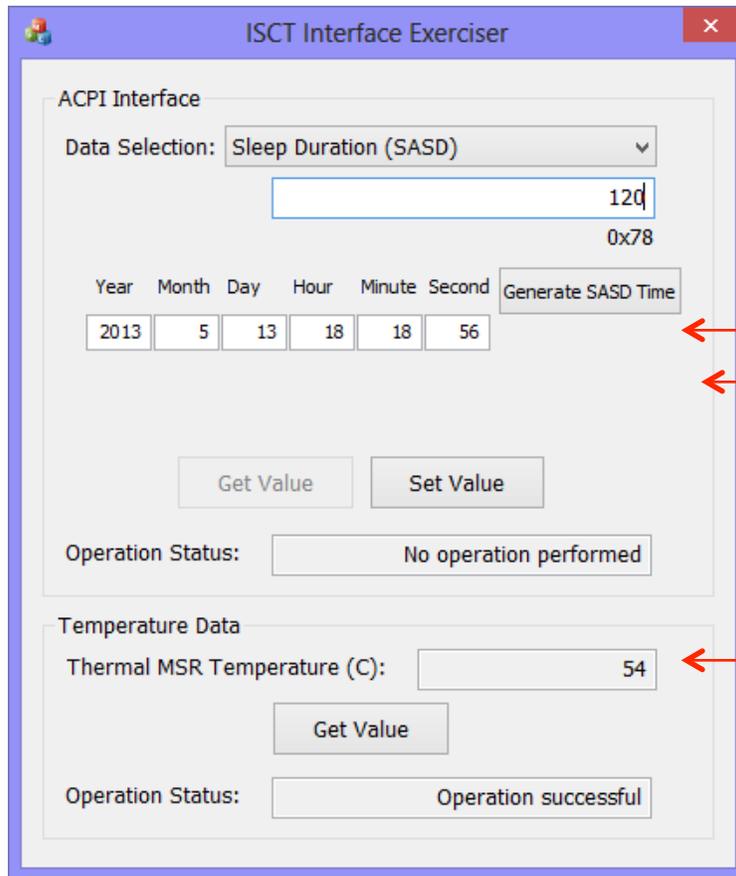
- a. *Result:* Operation Status box MUST indicate that the operation was successful.

Success Failure

- b. *Result:* The BIOS Programmed-Timer check box MUST be checked.

Success Failure

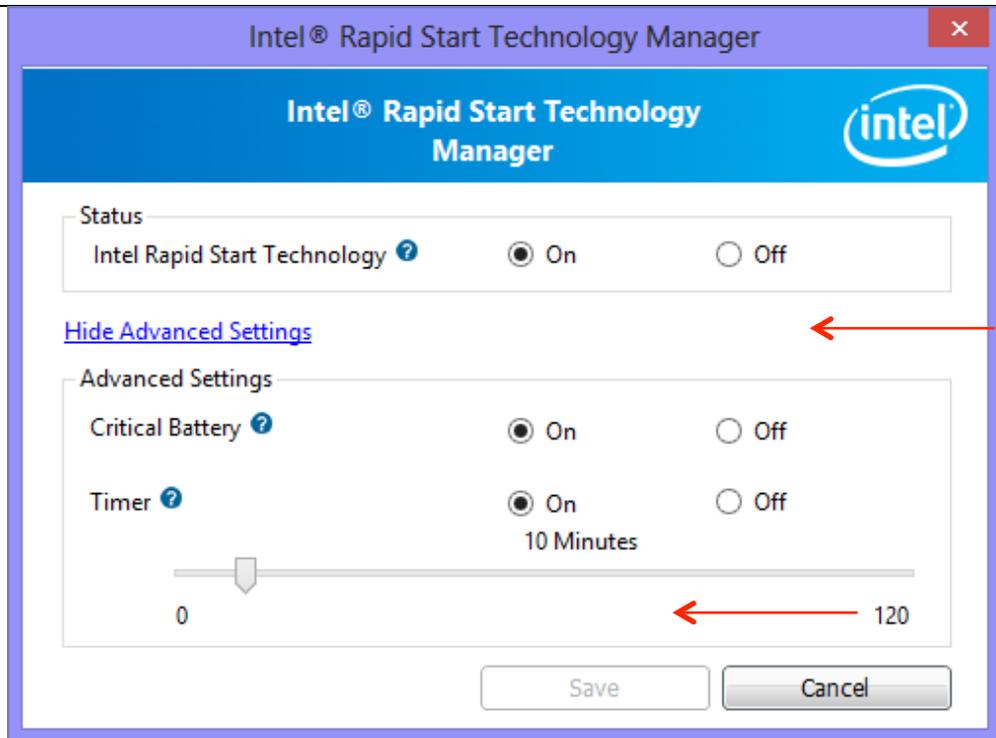
8. Using npexerciser select Sleep Duration (SASD) from the Data Selection dropdown at the top of the tool. Enter 600 into the text box below the data selection. This will request that the system sleep for 600 seconds. Press Set Value button to set a wakeup event for this time. Note the time.



a. *Result:* The Operation Status area MUST indicate success of the operation.

Success Failure

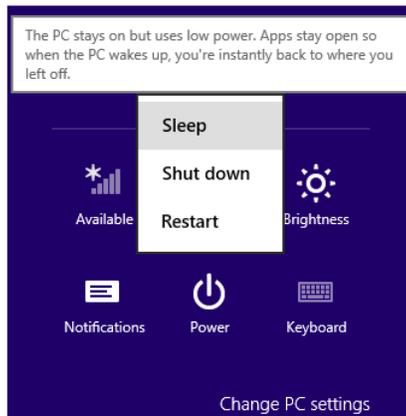
9. Using the Rapid Start Technology Manager, set the Rapid Start Technology to Enabled (On) and the Advanced settings timer to 5 minutes. Press the Save Button



a. *Result:* The application MUST NOT generate an error message in the configuration.

Success Failure

10. Put the systems to the *test state* (S3 /DS3)



a. *Result:* The system MUST successfully enter the test state

Success Failure

11. Wait for Rapid Start Technology to move the system from S3/DS3 to S0 and ultimately to S4/DS4). Observe the power state LEDs to determine the state of the platform. This MUST occur at 5 minutes after the system has entered the test

state.

- a. The system MUST correctly perform the Rapid Start Technology transition.

Success Failure

- 12. Wait for iSCT to wake the system (at the time configured above). The screen will activate when the system wakes. This MUST occur 10 minutes from the time that the system first entered the test state.

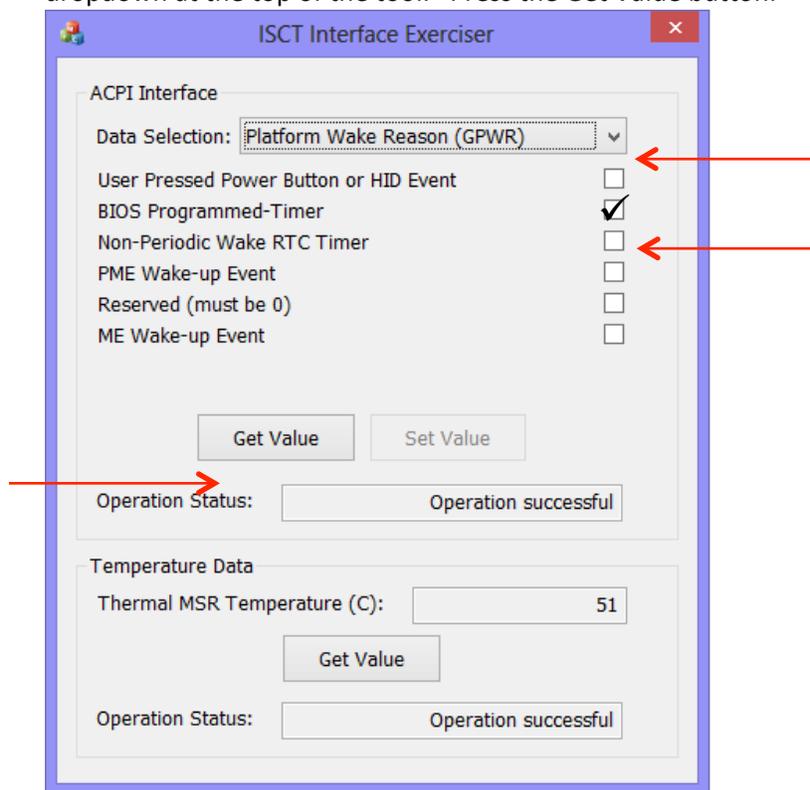
- a. *Result:* The system MUST wake to SO_iSCT

Success Failure

- b. *Result:* The system MUST wake at 10 minutes from the time that it initially entered the test state.

Success Failure

- 13. Using npexerciser select Platform Wake Reason (GPWR) from the Data Selection dropdown at the top of the tool. Press the Get Value button.



- a. *Result:* Operation Status box MUST indicate that the operation was successful.

Success Failure

- b. *Result:* The BIOS Programmed-Timer check box MUST be checked.

Success Failure

7. No Wake during Rapid Start S3 to S4

Requirements Detail

When the ISCT timer expires and the system was transitioning from the S3 to S4 state via Rapid Start, the BIOS shall not wake the platform.

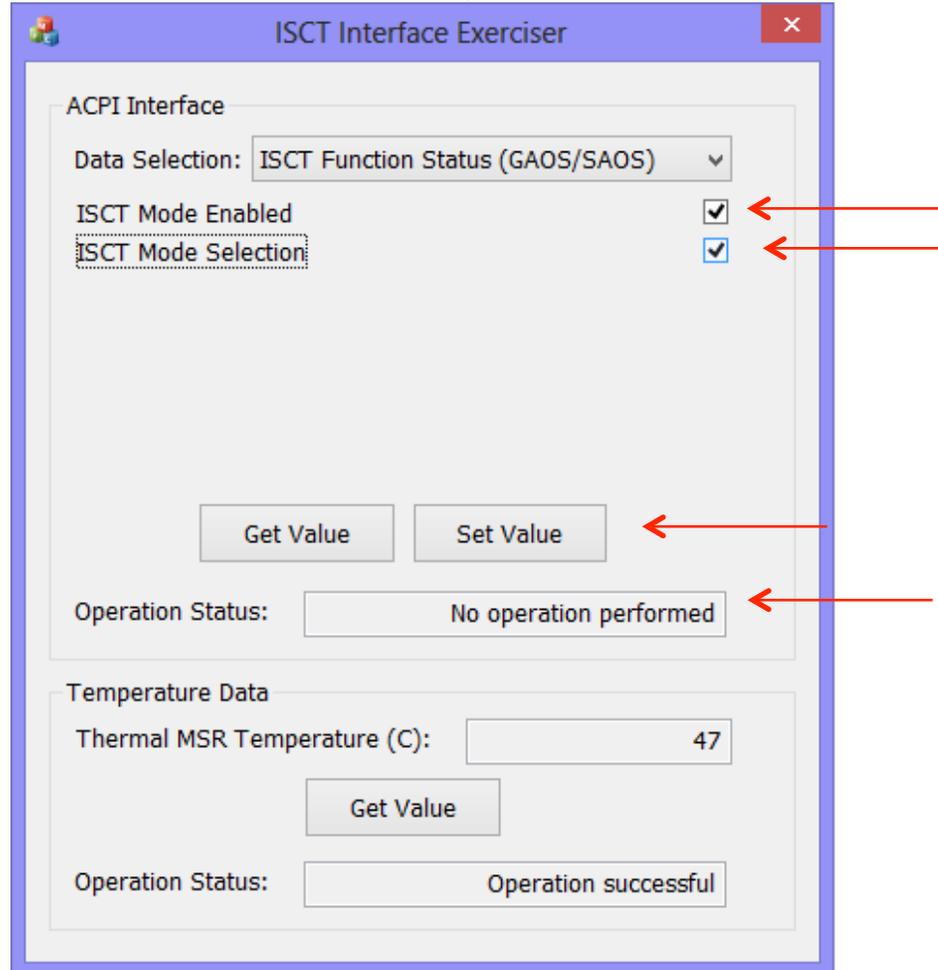
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

No Wake during Rapid Start S3 to S4	
Tested States	S3, Deep S3
Tools Used	PnpExerciser
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• pnpexerciser MUST be running on the system• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS• Intel Rapid Start Technology MUST be configured as enabled in the BIOS.• Intel Rapid Start Technology MUST be installed on the system

Test Procedures:

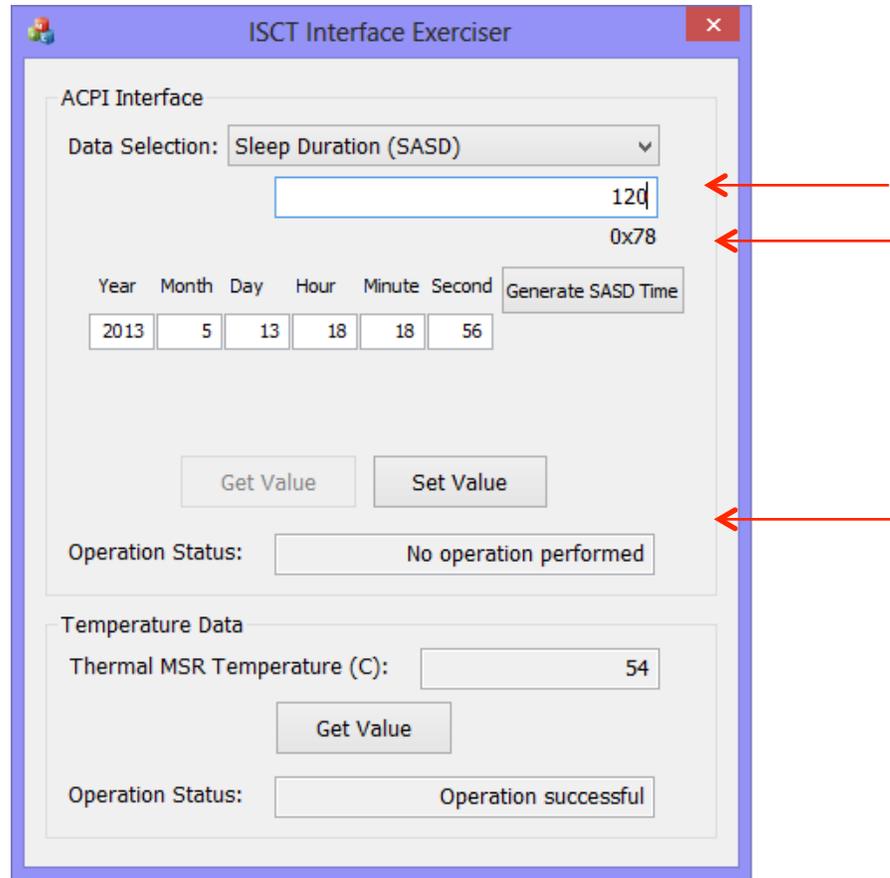
1. Using npexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure

3. Using npexerciser select Sleep Duration (SASD) from the Data Selection

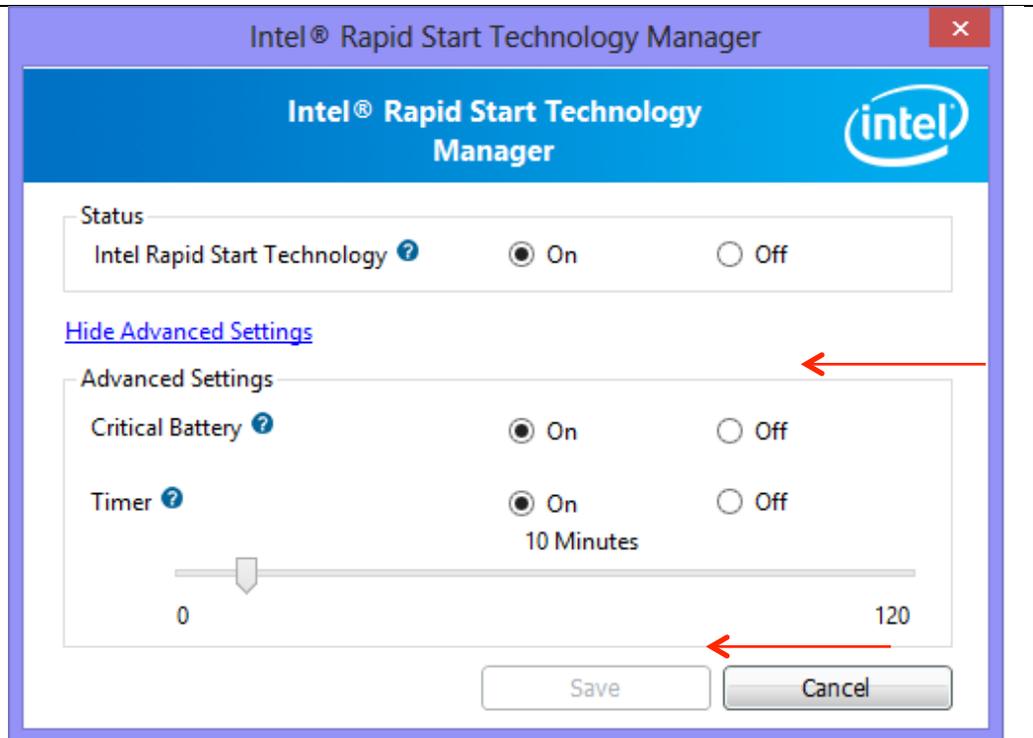
dropdown at the top of the tool. Enter 600 into the text box below the data selection. This will request that the system sleep for 600 seconds. Press Set Value button to set a wakeup event for this time. Note the time.



a. *Result:* The Operation Status area MUST indicate success of the operation.

Success Failure

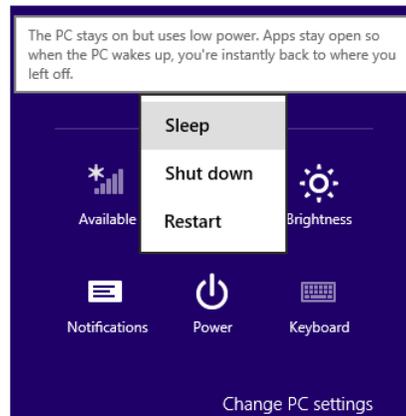
4. Using the Rapid Start Technology Manager, set the Rapid Start Technology to Enabled (On) and the Advanced settings timer to 10 minutes. Press the Save Button



- a. *Result:* The application MUST NOT generate an error message in the configuration.

Success Failure

5. Put the systems to the *test state* (S3 /DS3)



- a. *Result:* The system MUST successfully enter the test state
- Success Failure

6. Wait for Rapid Start Technology to move the system from S3/DS3 to S0 and ultimately to S4/DS4). Observe the power state LEDs to determine the state of the platform. The system MUST transition states 10 minutes from the time that it was put into the test state.

a. The system MUST correctly perform the Rapid Start Technology transition.

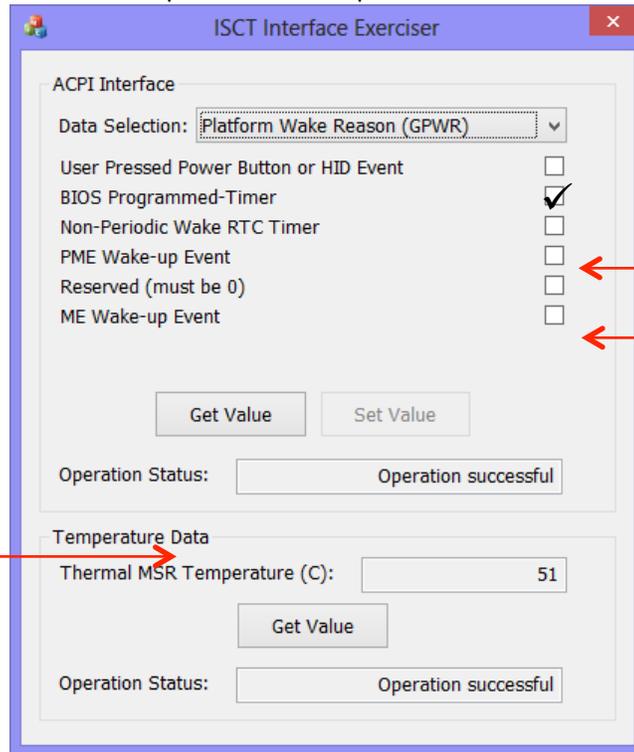
Success Failure

7. Wait for iSCT to wake the system (Immediately after the Rapid Start Technology transition) .The screen will activate when the wake occurs.

a. *Result:* The system MUST wake to S0_iSCT immediately after the Rapid Start Technology Transition completes.

Success Failure

8. Using npexerciser select Platform Wake Reason (GPWR) from the Data Selection dropdown at the top of the tool. Press the Get Value button.



a. *Result:* Operation Status box MUST indicate that the operation was successful.

Success Failure

b. *Result:* The BIOS Programmed-Timer check box MUST be checked.

Success Failure

8. Coexistence with FFS (NIC)

Requirements Detail

While the system is in the S0-lite state, the BIOS shall reset the Wi-Fi NIC as required by conditions specified in the Intel Smart Connect Technology Platform Design Specification

referenced in Appendix B.

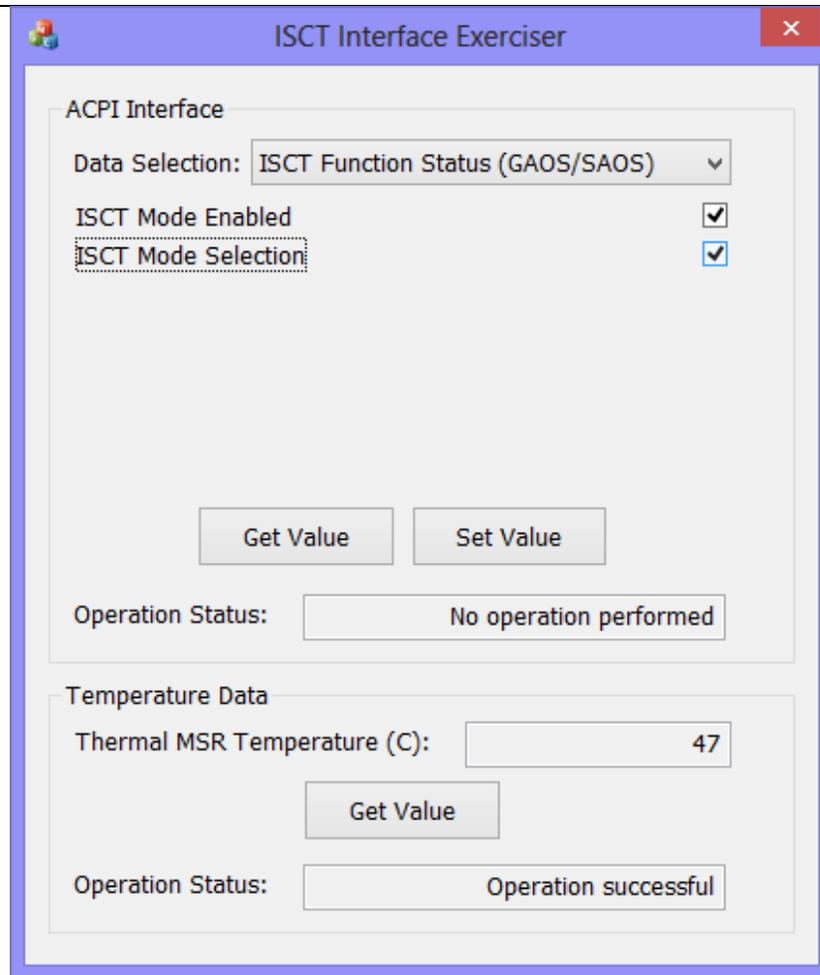
Note: the S0-lite state is defined by Rapid Start where the BIOS is executing but the OS is not executing.

Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

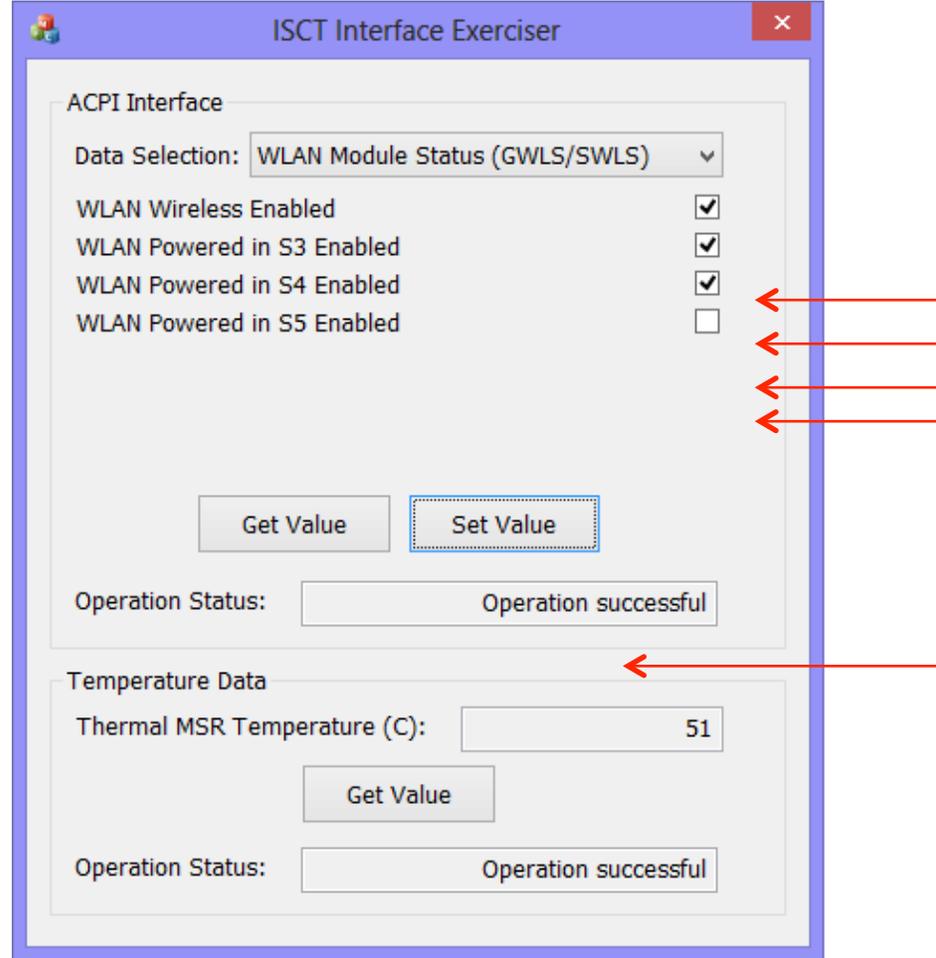
Coexistence with FFS (NIC)	
Tested States	S3, Deep S3
Tested Hardware	HMC, NGFF WLAN hardware.
Tools Used	Pnpexerciser, Net Detect Test Application, dedicated AP for testing
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• A supported WLAN NIC MUST be installed with all required drivers and software.• pnpexerciser MUST be running on the system• Net Detect Test Application MUST be running on the system• There must be a dedicated AP available which the tester has control over (will need to power and turn off the AP during testing). There is no need for internet connectivity from the dedicated AP.• There MUST be a single WLAN auto-connect profile established on the DUT for the dedicated AP and the DUT MUST be connected to it at the start of the test.• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS• Intel Rapid Start Technology MUST be configured as enabled in the BIOS.• Intel Rapid Start Technology MUST be installed on the system
Test Procedures:	<ol style="list-style-type: none">1. Using pnpexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.





- a. *Result:* The Operation Status area MUST indicate success of the operation.
 Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
 Success Failure
3. Using pnpexerciser select WLAN Module Status (GWLS/SWLS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for WLAN Wireless Enabled and for the power state under test. If S3 or Deep S3 is being tested,

select WLAN Powered in S3 Enabled. If S4 or Deep S4 is being tested, select WLAN Powered in S4 Enabled. Press the Set Value button



a. *Result:* The Operation Status area MUST indicate success of the operation.

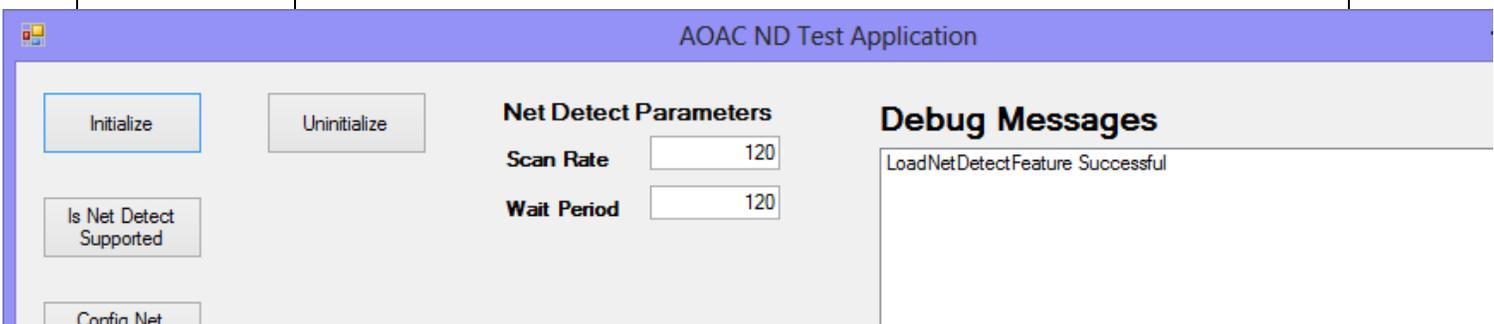
Success Failure

4. Press the Get Value button

a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes that were set above MUST remain checked.

Success Failure

5. Using the Net Detect Test Application press the Initialize Button



- a. The Debug Messages area MUST indicate success of the operation.
Success Failure

6. Using the Net Detect Test Application press the Is Net Detect Supported Button

- a. The Debug Messages area MUST indicate success of the operation.
Success Failure

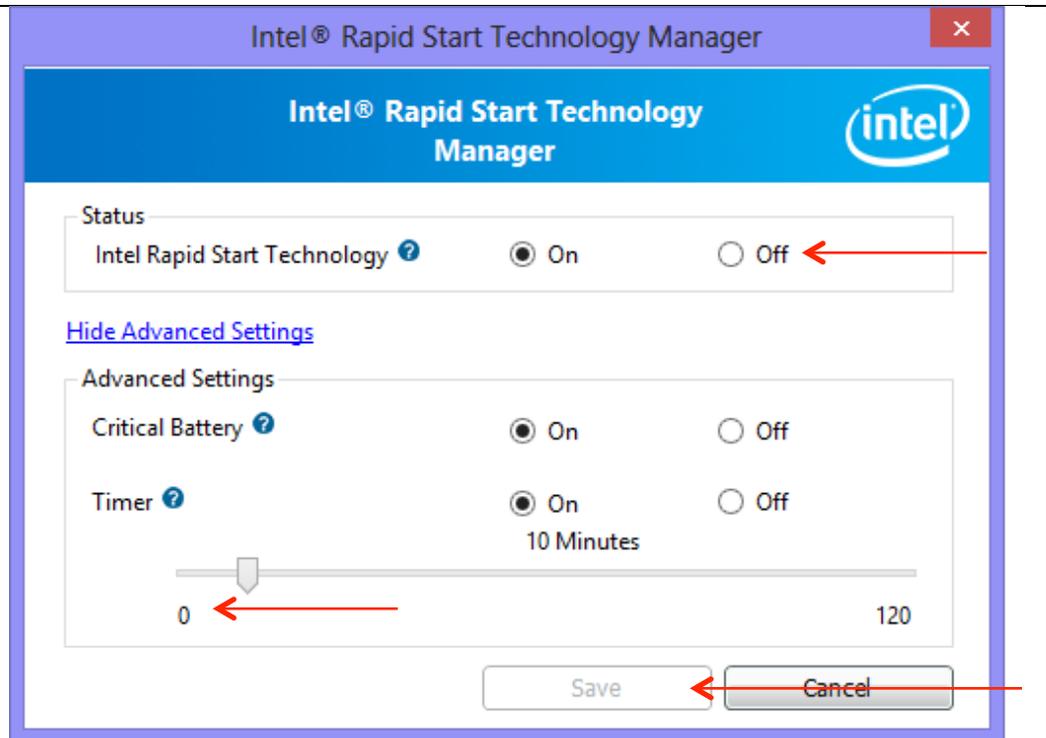
7. Using the Net Detect Test Application Set the Wait Period to 120 seconds and the Scan Rate to 120 seconds and press the Config Net Detect button

- a. The Debug Messages area MUST indicate success of the operation.
Success Failure

8. Unplug the AP

9. Wait until the system determines that the AP is no longer present.

10. Using the Rapid Start Technology Manager, set the Rapid Start Technology to Enabled (On) and the Advanced settings timer to 0 minutes. Press the Save Button

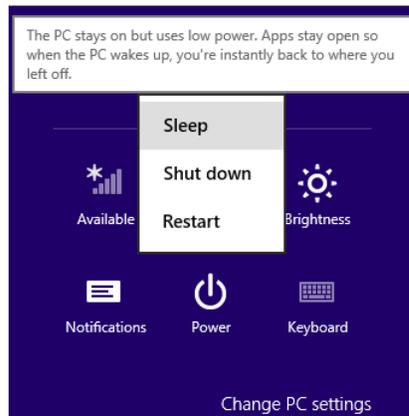


- a. *Result:* The application MUST NOT generate an error message in the configuration.

Success Failure

11.

12. Put the systems to the *test state* (S3/DS3)



- a. *Result:* The system MUST successfully enter the test state

Success Failure

13. Wait for Rapid Start Technology to move the system from S3/DS3 to S0 and

ultimately to S4/DS4). Observe the power state LEDs to determine the state of the platform.

- a. The system MUST correctly perform the Rapid Start Technology transition.

Success Failure

14. Wait for 120 seconds

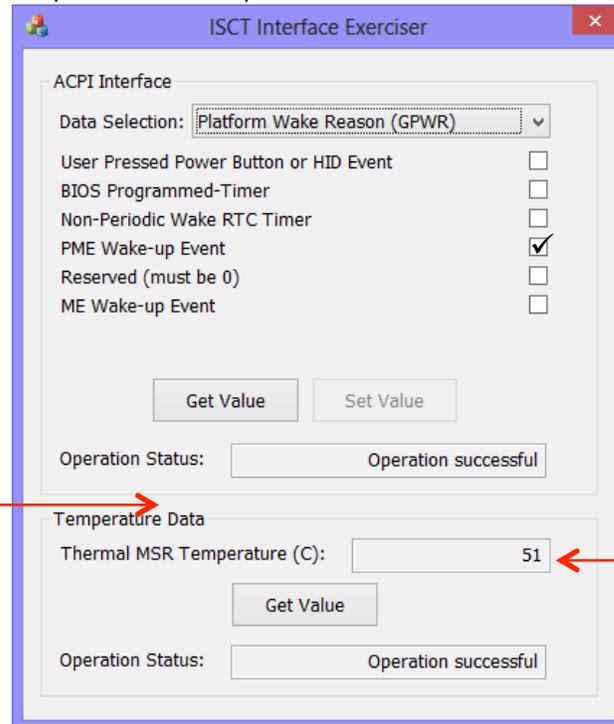
15. Plug in the AP

16. Wait for the system to wake

- a. *Result:* The system MUST successfully wake within 240 seconds

Success Failure

17. Using npexerciser select Platform Wake Reason (GPWR) from the Data Selection dropdown at the top of the tool. Press the Get Value button.



- a. *Result:* Operation Status box MUST indicate that the operation was successful.

Success Failure

- b. *Result:* The PME Wake-up Event check box MUST be checked.

Success Failure

9. Power switch event to the OS

Requirements Detail

While the system is in the S0-ISCT state, when the Embedded Controller notifies BIOS that the user has pressed the power button, the BIOS shall:

- not send a notification to the Operating System that the power button was pressed
- send a notification to the ISCT Agent that the power button was pressed

Note: Normally, if the system is in an S0 state and the power button is pressed, then the system will transition to the S3 state. However, in this case since the user thinks the system was in a sleep state (but is actually in the S0-ISCT state), the system should instead transition to the S0 state (normal power on operation).

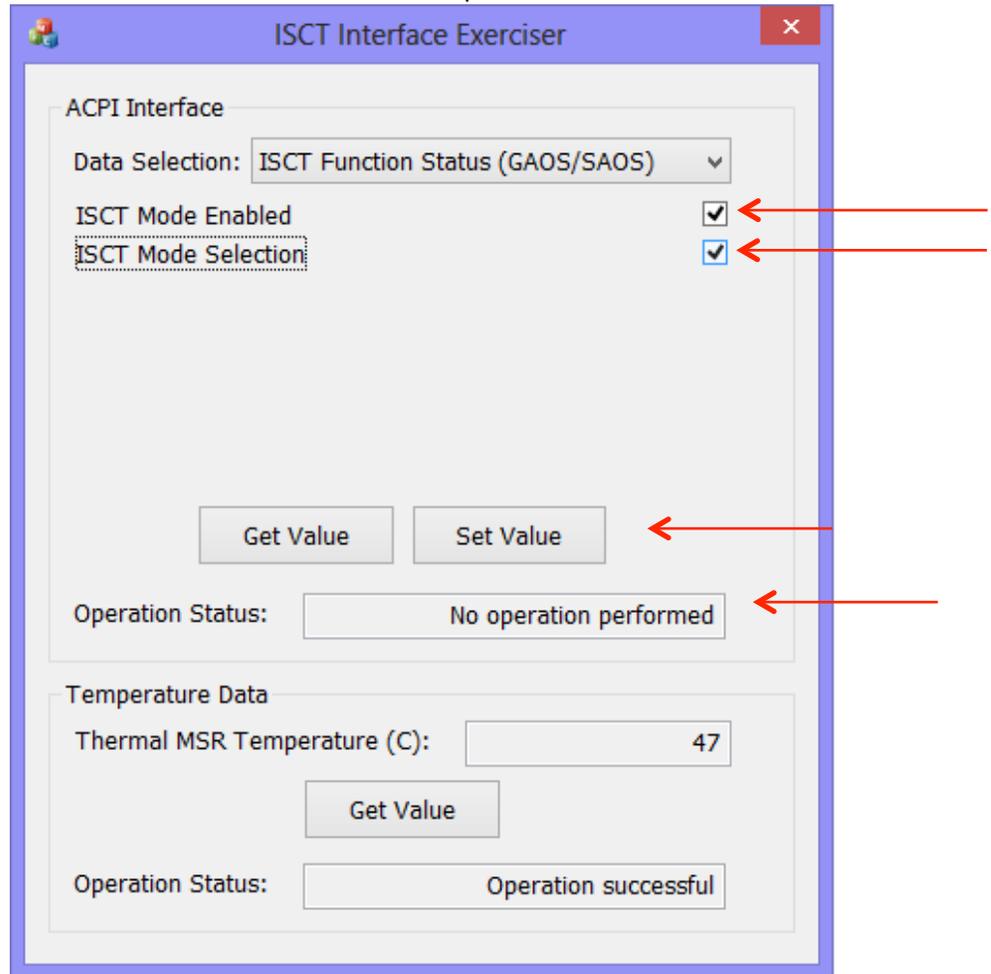
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

Power switch event to the OS	
Tested States	S3, Deep S3, S4, Deep S4
Tools Used	Pnpexerciser.exe
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• pnpexerciser MUST be running on the system• If Deep Sleep state is being tested:<ul style="list-style-type: none">• Deep Sleep MUST be enabled on the platform and, for this test case, a physical battery MUST be used to power the platform (without AC connected to the system).• Deep Sleep MUST be enabled in the BIOS

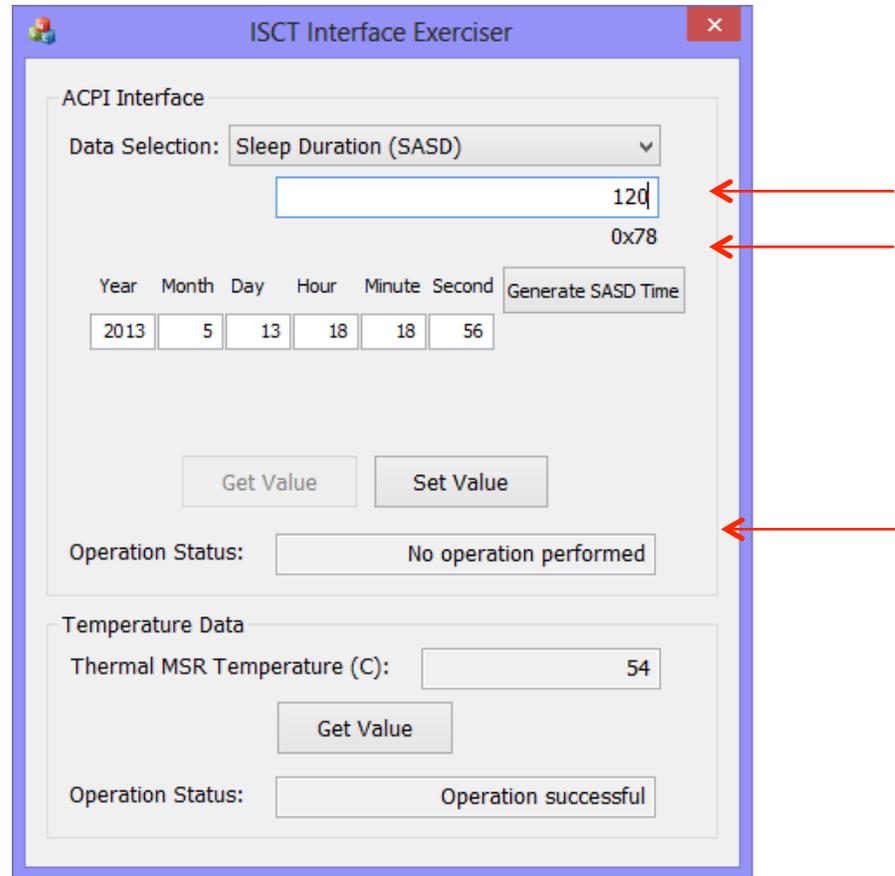
Test Procedures:

1. Using npexerciser select ISCT Function Status (GAOS/SAOS) from the Data Selection dropdown at the top of the tool. Set the checkboxes for ISCT Mode Enabled and ISCT Mode Selection and press the Set Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
2. Press the Get Value button
 - a. *Result:* The Operation Status area MUST indicate success of the operation and the check boxes for ISCT Mode Enabled and ISCT Mode Selection MUST remain checked.
Success Failure
 3. Using npexerciser select Sleep Duration (SASD) from the Data Selection

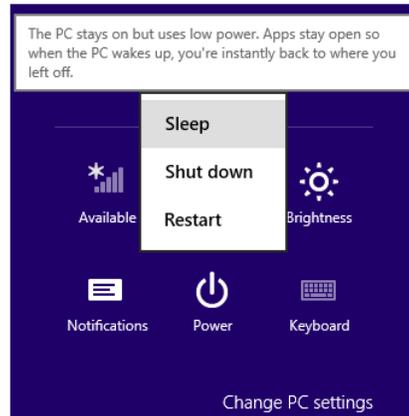
dropdown at the top of the tool. Enter 120 into the text box below the data selection. This will request that the system sleep for 120 seconds. Press Set Value button to set a wakeup event for this time. Note the time.



a. *Result:* The Operation Status area MUST indicate success of the operation.

Success Failure

4. Put the systems to the *test state* (S3/S4/DS3/DS4)



- a. *Result:* The system MUST successfully enter the test state
Success Failure
- 5. Wait for iSCT to wake the system (at the time configured above) . The screen will be off so observe the LEDs on the CRB to determine when the system is in S0.
 - a. *Result:* The system MUST wake to S0_iSCT
Success Failure
 - b. *Result:* The system MUST wake within 20 seconds of the time selected above
Success Failure
- 6. While the system is in S0_iSCT, press the power button on the system
 - a. *Result:* The system MUST NOT immediately enter S3
Success Failure
 - b. *Result:* The system MUST turn on the display
Success Failure

10. BIOS shall report the RF Kill switch type

Requirements Details

The BIOS shall report the kill switch type through an ACPI method as per the Intel Smart Connect Technology Platform Design Specification.

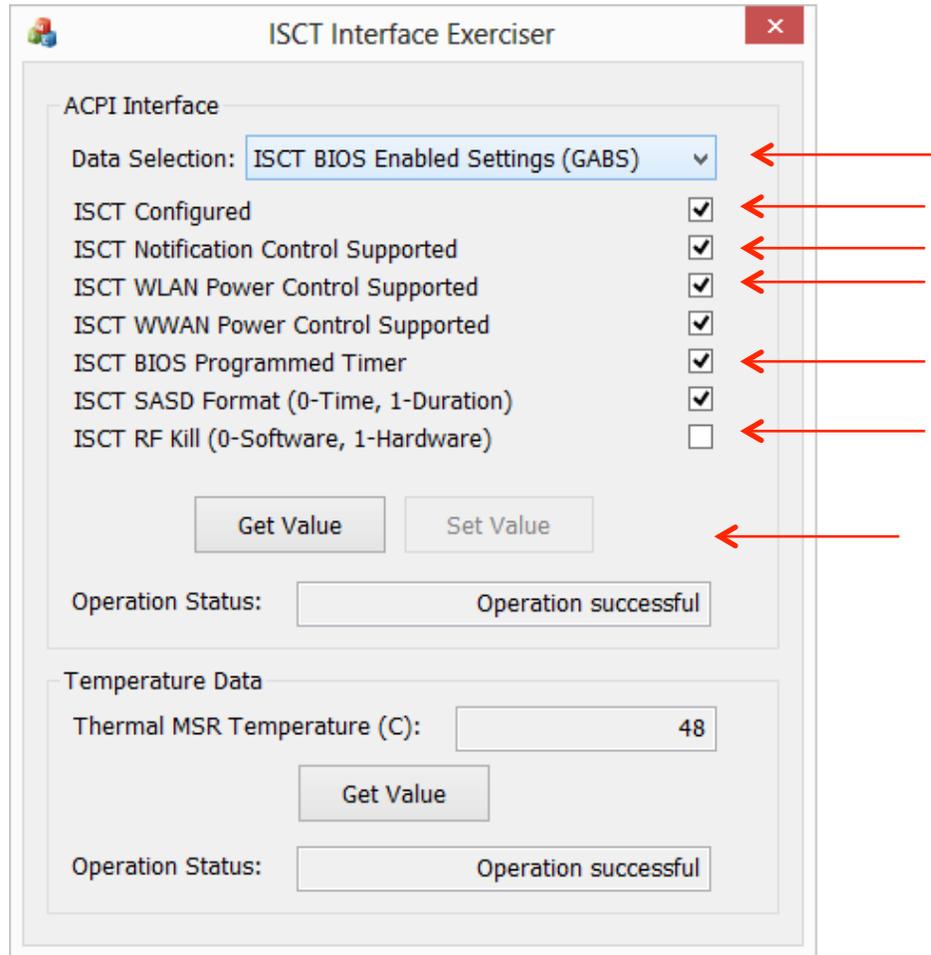
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

BIOS shall report the RF Kill switch type	
Tested States	N/A
Tested Hardware	WLAN HMC and NGFF
Tools Used	Pnpexerciser.exe
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• A supported WLAN NIC MUST be installed with all required drivers and software.• pnpexerciser MUST be running on the system• There MUST be a single WLAN auto-connect profile established on the DUT and the DUT MUST be connected to it at the start of the test.

Test Procedures:

1. Using npexerciser select ISCT BIOS ENABLED Settings (GABS) from the Data Selection dropdown at the top of the tool. Press the Get Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
- b. *Result:* The ISCT Configured checkbox MUST be checked
Success Failure
- c. *Result:* The ISCT Notification Control Supported checkbox MUST be checked
Success Failure
- d. *Result:* The ISCT WLAN Power Control Supported checkbox MUST be checked
Success Failure
- e. *Result:* The ISCT BIOS Programmed Timer checkbox MUST be checked
Success Failure
- f. *Result:* The ISCT RF Kill checkbox MUST be checked
Success Failure

11. BIOS shall report LID state to IAOE name space

Requirements Detail

The BIOS shall report the current laptop lid state (open or closed) to the iSCT agent through an ACPI method as per the Intel Smart Connect Technology Platform Design Specification.

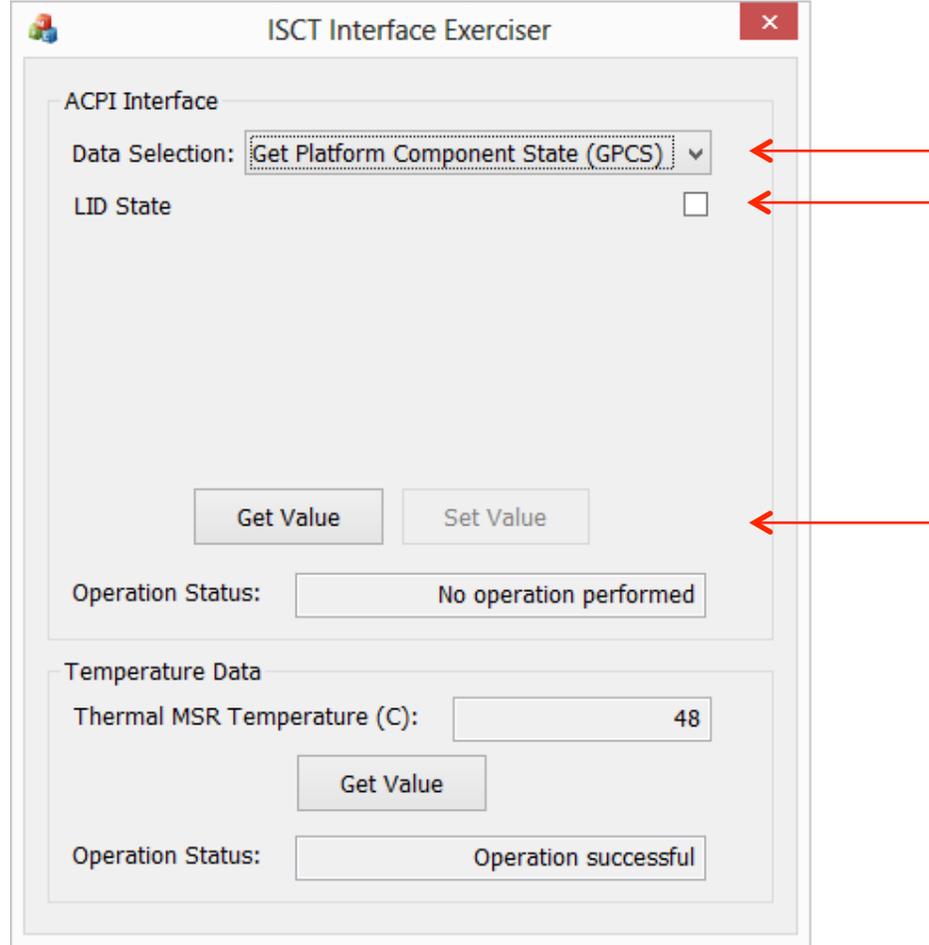
Platform	Shark Bay - Crescent Bay – Bay Trail
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Test Procedures

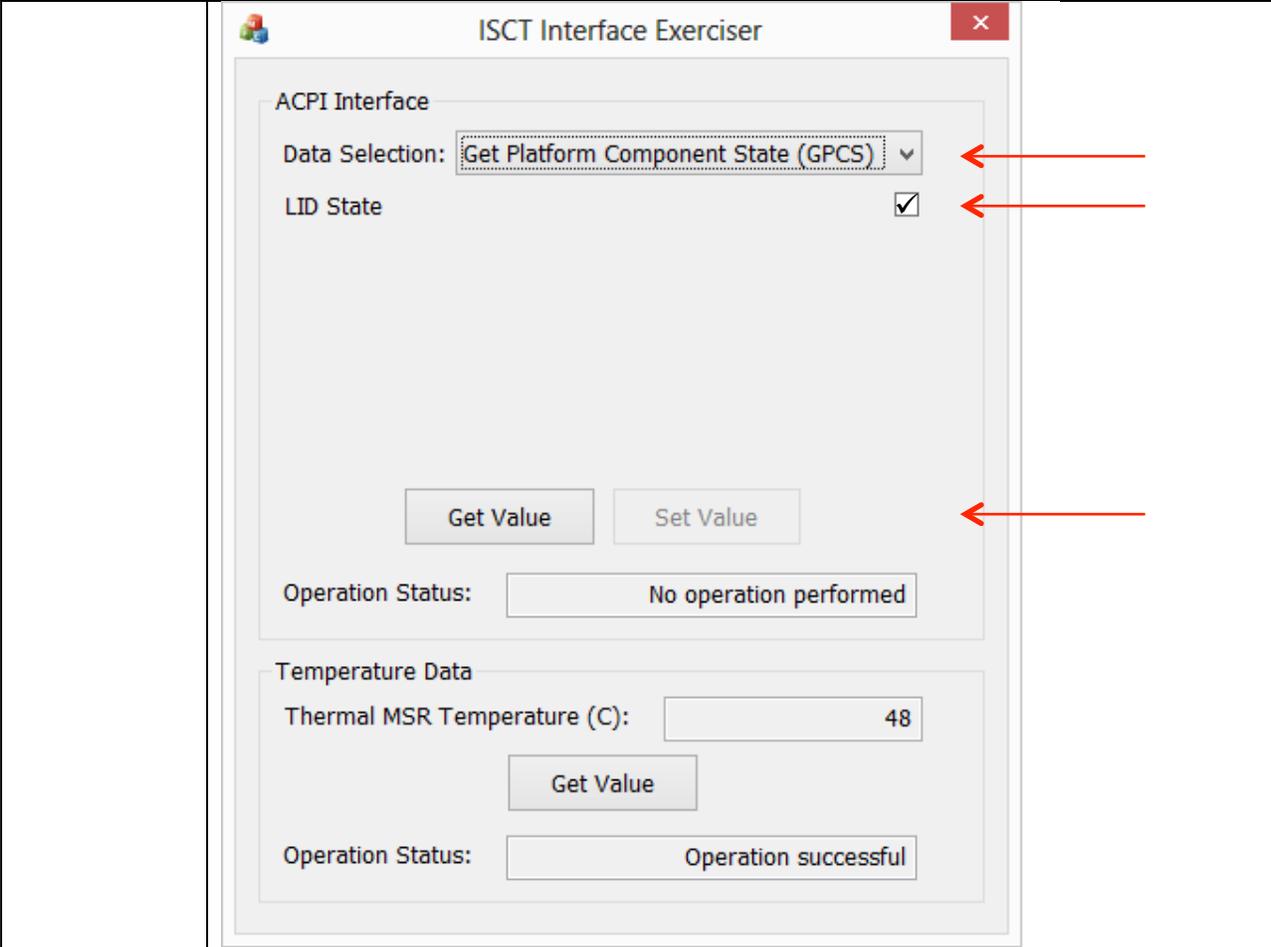
BIOS shall report LID state to IAOE name space	
Tested States	N/A
Tools Used	Pnpexerciser.exe
Preconditions:	<ul style="list-style-type: none">• The platform MUST have been configured via the Intel Smart Connect with Remote Wake Setup and Reference Document• The system MUST be running Win8 (64 bit) or WinBlue (64 bit)• iSCT MUST be enabled in the BIOS.• iSCT Agent MUST be stopped.• A supported WLAN NIC MUST be installed with all required drivers and software.• pnpexerciser MUST be running on the system• Net Detect Test Application MUST be running on the system• The lid switch on the CRB MUST be set to lid open (2-3 or to the left when looking at the board with the lid switch on the edge closest to you)• Within the current power policy, the configuration of what to do on a lid state change MUST be set to 'nothing'.

Test Procedures:

1. Using npexerciser select ISCT Get Platform Component State (GPCS) from the Data Selection dropdown at the top of the tool. Press the Get Value Button.



- a. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
 - b. *Result:* The LID State checkbox MUST NOT be checked
Success Failure
2. Change the state of the lid switch on the CRB.
 3. Using npexerciser select ISCT Get Platform Component State (GPCS) from the Data Selection dropdown at the top of the tool. Press the Get Value Button.



- c. *Result:* The Operation Status area MUST indicate success of the operation.
Success Failure
- d. *Result:* The LID State checkbox MUST be checked
Success Failure

12. iSCT Extended Wake Duration

Requirement Details

The BIOS shall add Bit 1 to SAOS/GAOS ACPI method for extended wake duration.

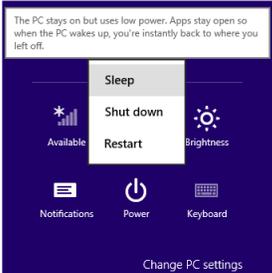
Platform	Shark Bay - Crescent Bay – Bay Trail
Segment	Mobile,Desktop,Ultrabook

Test Procedures

The test for this requirement cannot be completed using pnpexerciser but must be completed with the iSCT application

iSCT Extended Wake Duration	
Tested States	S3, S4 Deep S3, Deep S5
Preconditions:	<ul style="list-style-type: none">• The system MUST be running Win 8 (64 bits) or WinBlue – (64 Bits)• The iSCT capability MUST be enabled in the BIOS• The latest version of iSCT from clientdownload.intel.com for the given platform MUST be installed and running.• iSCT Agent MUST have Periodic Wake enabled and Remote Wake disabled. Use the GUI to accomplish this.• The iSCT Agent MUST be configured for debug operations (allowing a 5 minute sleep-wake cycle). See the introduction above about how to configure the registry settings for debug.• The platform MUST have an active network connection (LAN or WLAN) at the time of the test.• The platform MUST be using AC power during the test.• A mouse or keyboard should be attached to the system USB port.• Configure the OS system power policy to put the system to sleep (S3) after 5 minutes of inactivity.• Verify that the system is connected to a network.• Start a media player playing an audio or video file in a continuous loop; Verify that audio is present at the tested audio output device

Test Procedures:

1. Stop the iSCT Service.
2. Delete the file c:\ProgramData\Intel\Intel Smart Connect Technology\isctlog.txt
3. Start the iSCT Service.
 - a. *Result:* The service MUST successfully start
Success Failure
4. Put the systems to the *test state* (S3/S4/DS3/DS4)


The screenshot shows the Windows 10 Start menu power options. At the top, a message reads: "The PC stays on but uses low power. Apps stay open so when the PC wakes up, you're instantly back to where you left off." Below this, there are four main options: "Sleep", "Shut down", "Restart", and "Brightness". At the bottom, there are three icons: "Notifications", "Power", and "Keyboard". A link at the very bottom says "Change PC settings".

 - a. *Result:* The system MUST successfully enter the test state
Success Failure

5. Wait for iSCT to wake the system (configured ~5 minutes) .The screen will be off so observe the LEDs on the CRB to determine when the system is in S0.
 - a. *Result:* The system MUST wake to S0_iSCT
Success Failure
 - b. *Result:* The audio MUST be muted
Success Failure
6. Wait for the system to return to S3 (< 45 seconds) – observe the LEDs on the CRB to determine when the system is in the test state.
 - a. *Result:* The system MUST return to S3 in <45 seconds
Success Failure
7. Wake the system with a power button press
 - a. *Result:* The system MUST wake to S0
Success Failure
8. Open the file at c:\ProgramData\Intel\Intel Smart Connect Technology\isctlog.txt using notepad
9. Search for the term “Wake up by”
 - a. *Result:* The first match for the term MUST indicate BIOS Timer
Success Failure
 - b. *Result:* The second match for the term MUST indicate Power Button press
Success Failure