<table>
<thead>
<tr>
<th>Revision</th>
<th>Author</th>
<th>Revision History</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Elsa Martins</td>
<td>Created according to Lenovo Diagnostics 4.29</td>
<td>Mar 15, 2019</td>
</tr>
<tr>
<td>1.1</td>
<td>Elsa Martins</td>
<td>Updated according to Lenovo Diagnostics 4.30</td>
<td>May 23, 2019</td>
</tr>
<tr>
<td>1.2</td>
<td>Helano Rocha</td>
<td>Updated according to Lenovo Diagnostics 4.31</td>
<td>July 30, 2019</td>
</tr>
</tbody>
</table>
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1. LENOVO DIAGNOSTICS OVERVIEW

1.1 What is Lenovo Diagnostics?
Lenovo Diagnostics is a diagnostic tool that tests various devices in Lenovo computers providing feedback to the users about their machines health. Lenovo Diagnostics is composed by Modules that allows performing diagnostics for a group of devices and by Tools to create custom executions (diagnostic script), see detailed information about each device (system information) and consult the results for the tests performed in a machine (Log History).

1.2 Understanding the diagnostics
Each module contains one or more tests that may be performed under one or more devices resulting in a diagnostic. This structure is displayed in the image below:
When a diagnostic is finished, Lenovo Diagnostics displays the results for each performed test and create two results codes resuming the test execution.

The tests on Lenovo Diagnostics may have the following statuses:

- **Passed**
  - When the test algorithm is executed and no failure is found.

- **Failed**
  - When the test identifies the diagnosed device is defective.

- **Warning**
  - When the test indicates the diagnosed device may have some defect but the result is not conclusive.

- **Canceled**
  - When the test is canceled in the middle of test execution.

- **Not Applicable**
  - When the test is not applicable for the selected device.

The generated codes are:

- **Result Code**
  - Contains information about the machine serial number, system platform and test execution status and date. This code is generated for each tested device.

- **Final Result Code**
  - Contains information about the machine serial number, system platform and execution date. This code reports also the module where the tests were performed and the tests with failed status.

On the next section, you will learn how to use Lenovo Diagnostics to perform the diagnostics.
1.3 Data Collection

Lenovo Diagnostics tool performs collect anonymous data regarding tests execution for the purpose of improving hardware's diagnostics. You are able to enable or disable that function in accordance to your preferences.

By opening the Lenovo Diagnostics tool for the first time, the application will display a message asking if you agree or not with anonymous data collection.

You also may change this option at any time by clicking at the Settings icon.

![Lenovo Diagnostics tool interface](image)
2. PERFORMING DIAGNOSTICS IN LENOVO DIAGNOSTICS

2.1 Lenovo Diagnostics Main screen

By opening the Lenovo Diagnostics, you will see the main screen with the tabs Diagnostics and Tools.

**Diagnostics:** here, you can see the modules provided by Lenovo Diagnostics and select one of them to perform tests. As you will using the application, the icons will be reordered according to the use. The modules with not supported devices are disabled, like the modules RAID, Sensors and Wireless on the image below. On this tab, you can also select the option “Run All” to perform the diagnostic for all available modules.

![Lenovo Diagnostics Main Screen](image)

**Refresh button** 🔄: you may update the modules after plug or unplug any device.

**Sound Notice button** 🔊: you may choose if you want to be advised regarding tests execution.

**Tools:** By selecting this option, you can access additional Lenovo Diagnostic's features like Diagnostic Script, System Information, Log History screen, Recover Bad Sectors tool, eGather Report and Powercfg Reports.
2.2 Run diagnostic for a module
The diagnostic for a module in Lenovo Diagnostics is based on the following steps:

2.2.1 Select Devices and Tests
By selecting a module in the Diagnostics tab, you will be directed to a screen where you can select which devices and tests will be performed. On this step, all devices and tests supported by the selected module are displayed and you may select one or more of them to perform the tests. It is also possible to select the number of times to run the set of tests in a range from 1 to 20 times.

By clicking to See Device Information, you can view detailed information about the device. The properties displayed depends on the selected module.
By clicking to **See test description**, you can view a brief description of the test and the estimated time to run the test, as the screen below.

![Test Description Screen]

If a test supports parameters customization, the icon ![Customization Icon] is displayed next to the test name. By clicking on this icon, a popup to set the values is displayed. See in in the image below the customization for the Linear Read Test from Storage module:

![Customization Pop-up]

After the devices and test selection, you are able to run the diagnostic. The test execution is detailed in the next section.

### 2.2.3 Run Tests

After configure the tests execution and clicking to **Run Test**, you will be directed to the Execution screen. This screen is displayed for both Recommended and Custom tests.
In the image below, you can see a screen of the test execution. See the popup advising you to refrain from using your computer unless requested by some tests. Follow this advisement is important because some tests may not be performed correctly if the needed machine resources are in use.

Once you have pressed OK, the tests execution begins. See in the image below that all devices selected in the previous steps are displayed with their respective tests. You can follow each test execution by tracking the individual test progress and see the test status of each one. In addition, you can see the overall test progress and time that reports the progress for all devices and tests selected.

If you have selected Custom Tests with more than one iteration, you will be able to navigate around these iterations in order to see the executions already finished and the executions not started yet.

Some tests has specific guidelines that should be followed by the user to assure the correct execution. In this case, before to begin the execution of these tests, the application displays a popup with the test instructions.
For instance, the Audio Playback test asks the user to make sure the output device is working correctly and advises a probably loud sound will played.

If you chose to continue by pressing the **OK** button, the execution continues normally. If you clicking on Cancel, the current test is canceled and the execution proceeds to the other tests not executed yet.

If you want abort the whole test execution, you can click on **Stop tests**. In this case, the current test and all tests waiting for execution are canceled, including those from the next iterations. At the same way, the overall status for the current iteration and for all next iterations are changed to Canceled.

After all tests to being finished, system displays the screen below where is possible to analyze the test results.
In this above image, you can see each test results, information about machine, final result code and test date. This section also display a QR Code that containing all those information.

2.3 See Execution Log

After a diagnostic execution, Lenovo Diagnostics generates a log with detailed information about the devices and their test results. This log is composed by the following sections:

**General information**: contains information about machine, test date and final result. This section also display a QR Code containing those information.

**Device information**: displays the technical details of each tested device and their respective result codes.

**Test Results**: displays the results and execution time of each performed test.
3. LENOVO DIAGNOSTICS MODULES AND TESTS

This section provides information about all modules available in Lenovo Diagnostics and their respective tests. Here, you will understand the approach implemented by each test and how these tests should be performed for assure the correct diagnostic of your machine.

3.1 Audio

The Audio module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Playback Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Microphone Interactive Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Audio Playback Test**

The audio playback test tries to play a sound through the audio hardware and asks the user if any sound is heard. The audio playback test is performed according to the following workflow:

- Advise the user that device volume may be loud during the execution.
- Play some audio patterns through the tested device.
- Ask the user if him have listened any sound coming from the tested device.

**Microphone Interactive Test**

This test helps to identify if the microphone is capable of capturing sound properly. The microphone interactive test is performed according to the following workflow:

- Select a microphone device.
- Select a microphone to be tested and click on Next button.
- Press record and speak on the microphone.
3.2 Audio Controller

The Audio Controller module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORB Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Output Stream Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Input Stream Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Bidirectional Stream Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**CORB Status Test**
This test checks the status of the Command Outbound Ring Buffer (CORB) mechanism.

**Output Stream Test**
This test checks the status of the output streams. Before starting the test, Lenovo Diagnostics advises the user that a short audio tune will be played as displayed in the image below.

**Input Stream Test**
This test checks the status of the input streams.

**Bidirectional Stream Test**
This test checks the status of the bidirectional streams.

### 3.3 Battery

The Battery module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Health Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Battery Discharge Test</td>
<td>Extended</td>
<td>Attended</td>
</tr>
<tr>
<td>Battery Charge Test</td>
<td>Extended</td>
<td>Attended</td>
</tr>
<tr>
<td>Battery Temperature Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**Battery Health Test**
Battery Health Test checks the device charge capacity and other important battery properties in order to evaluate device’s health.

**Battery Discharge Test**
Battery Health Test checks the device charge capacity and other important battery properties in order to evaluate device’s health. If there is an AC cable plugged you will must to unplug it before proceeding to the test as displayed below.

**Battery Charge Test**
The test checks if the battery charge increases while the AC cable is connected. If there is no AC cable plugged you should connect it before proceeding to the test.

**Battery Temperature Test**
Temperature test evaluates if the battery temperature is too high, which may prevent it from charging properly.
3.4 Camera

The Camera module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera Capture Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Camera Capture Test**
Verifies if the camera device is working properly based on the user's feedback for the captures images. This test is performed according to the following workflow:

3.5 Fan

The Fan module is composed by the following test:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**Control Test**
Check if the fan controller is able to work on higher speeds according to predefined levels (0-7) in the firmware.

3.6 Processor

The Processor module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT Instruction Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>x87 Floating Point Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>MMX Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>3dnow! Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>
BT Instruction Test
The test checks the processor support for BT instruction.

x87 Floating Point Test
The test checks the processor support for x87 Floating Point instructions. If the processor does not support such feature, the test returns unsupported.

MMX Test
The test checks the processor support for MMX instructions. If the processor does not support such feature, the test returns unsupported.

3dnow! Test
The test checks the processor support for 3Dnow! Instructions. This test only runs in AMD processors. If the processor does not support such feature, the test returns unsupported.

SSE Test
The test checks the processor support for SSE Family (SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2) instructions. If the processor does not support such feature, the test returns unsupported.

AES Test
The test checks the processor support for AES instructions. If the processor does not support such feature, the test returns unsupported.

Stress Test
The stress test performs a sequence of continuous check on all processor cores for 10 minutes. While running this test, the CPU temperature can increase considerably.

3.7 Display

The Display module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Purity test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Green Purity test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Blue Purity test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>
### Black Purity test
This test identifies any dead pixel or burn-in problem within the black channel.

### White Purity test
This test identifies any dead pixel or burn-in problem within the white channel.

### Color Transition Test
This test identifies any problem with the display's color distinction.

### Resolution Fitting Test
This test checks if the system can take full advantage of the display's native resolution.

All attended tests from Display module are performed according to the following workflow:

<table>
<thead>
<tr>
<th>Test</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Purity test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>White test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Color Transition Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Monochromatic Mesh Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Inverted Monochromatic Mesh Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Sharpness Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Resolution Fitting Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>
3.8 Display Interface

The Display module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDID Checksum Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Display Communication Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**EDID Checksum Test**
This test checks the integrity of the Extended Display Identification Data (EDID) checksum provided by the monitor.

**Display Communication Test**
This test checks the communication with the monitor.

3.9 Keyboard

The Keyboard module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS2 Keyboard Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>USB Keyboard Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Keycode Verification Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Advanced Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**PS2 Keyboard Test**
This test tries to identify any defective PS/2 keyboard detected on this machine.

**USB Keyboard Test**
This test tries to identify any defective USB keyboard detected on this machine.

**Keycode Verification Test**
Presents the latest pressed key to the user in a legible format and the current state of the toggle keys.
If the user confirms the all keys that him have pressed was displayed, the test is finished as Passed. Otherwise the test is finished as Failed.
Advanced Test
Interactive test to verify the status of the keyboard keys.
The test will marking the pressed keys until you test all keys. You are able to select the most appropriate keyboard layout.

3.10 Memory

The Memory module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Random Pattern Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Advanced Integrity Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Address Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Bit Low Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Bit High Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Walking Ones Left Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Walking Ones Right Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Modulo-20 Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Moving Inversions 8Bit Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Moving Inversions 32 Bit Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Random Pattern Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Random Number Sequence Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Block Move Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Nibble Move Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
</tbody>
</table>
Quick Random Pattern Test
The test consists of filling the memory with a random generated pattern and then checking that the pattern was correctly written. When checking, it writes the pattern's binary complement and checks again. The test is repeated twice. By default, 15 random patterns are used, therefore, the test runs once for each of these patterns.

Advanced Integrity Test
The test is based on the March C-enhanced algorithm. This test consists of filling the accessible memory with a pattern, checking it, and writing its complement in an 8 bytes block size (64 bits) and then checking it again. This procedure is repeated twice, being the first one addressing the accessible memory from the highest position to the lowest and the second time by doing the inverse path. This test is intended to cover Stuck-At Faults and some Coupling Faults and Transition Faults.

Address Test
This test consists of writing each memory address its own address. After that, the algorithm reads the memory previously written and checks if they still store their own address. This test is intended to cover any addressing fault in the accessible memory range.

Bit Low Test
This test consists of filling the memory buffer with a pattern where all bits are 0 and then checking it. When checking for this pattern, it writes its binary complement, and finally checks if the complement was stored accordingly. Such process is repeated 4 times. This test is intended to identify the most serious Stuck-At Faults, some cases of Transition Faults and some cases of Read Random Faults.

Bit High Test
This test consists of filling the memory buffer with a pattern where all bits are 1 and then checking it. When checking for this pattern, it writes its binary complement, and finally checks if the complement was stored accordingly. Such process is repeated 4 times. This test is intended to identify the most serious Stuck-At Faults, some cases of Transition Faults and some cases of Read Random Faults.

Walking Ones Left Test
The Walking Ones Left Test consists of writing a pattern where only the rightmost bit is set (e.g. 00000001), then shift this pattern to the left (e.g. 00000010) until the end of the size of a byte, writing it again at the same memory address each time such pattern is shifted. Therefore, the test is intended to cover most of the Stuck-At Faults and some cases of Coupling Faults, and also testing the data bus by confirming that every bit can be written.

Walking Ones Right Test
The Walking Ones Right Test consists of writing a pattern where only the leftmost bit is set (e.g. 10000000), then shift this pattern to the right (e.g. 01000000) until the end of the size of a byte, writing it again at the same memory address each time such pattern is shifted. Therefore, such test is intended to cover most of the Stuck-At Faults and some cases of Coupling Faults, and also testing the data bus by confirming that every bit can be written.

**Modulo-20 Test**
The test consists of writing into an interval of 20 memory locations for each block with a pattern and filling all other locations with its complement 6 times. Unlike the other tests, the Modulo-20 test is not affected by buffering or caching, so it is able to detect most of the Stuck-At Faults, Coupling Faults, Transition Faults and Read Random Faults that are not detected by other testing approaches.

**Moving Inversions 8Bit Test**
The test consists of filling the memory with the 8 bit wide pattern: 10000000 and then checking that the pattern was correctly written. When checking, it writes the pattern’s binary complement (01111111) and checks it again. The procedure described earlier is repeated 8 times, one for each pattern right shifted: 10000000, 01000000, 00100000, 00010000, 00001000, 00000100, 00000010, 00000001.

**Moving Inversions 32 Bit Test**
This test fills all the accessible memory with a shifting pattern, that is, a value which is binary left shifted as it is written out through the accessible memory of every memory block. Once the pattern reaches 0x80000000 (a value with the left most bit set to 1 only) then the pattern is reset to 0x00000001. After that, it checks the written values and writes their binary complements, starting from the first memory address to the last one. Finally, the algorithm checks the memory for the complements written in the previous step, being this checking starting from the last element down to the first one. Such process is repeated 2 times. This test presents a more thorough approach intended to cover most of the Stuck-At Faults and Transition Faults and some cases of Coupling Faults and Read Random Faults...

**Random Pattern Test**
The test consists of filling the memory with a random generated pattern and then checking that the pattern was correctly written. When checking, it writes the pattern’s binary complement and checks it again. This process is repeated twice. By default, 50 random patterns are used, therefore the test runs once for each of these patterns...

**Random Number Sequence Test**
The test consists of filling the memory with one different random generated pattern for each memory address and then checking that the pattern was correctly written. In order to check it, the test must generate these
numbers based on a seed that may be reset to reproduce the sequence. When checking, it writes the pattern's binary complement and it checks again. Such process is repeated several times. This test is intended to cover most of the Stuck-At Faults. Coupling Faults, and some cases of Transition Faults and Read Random Faults.

**Block Move Test**
The test consists of moving memory data around within memory blocks. It repeats the movements described above 80 times. Finally, the test checks every memory address to verify if it is consistent.

**Nibble Move Test**
This test consists of writing to a nibble (a nibble is a group of four bits) a pattern value in each memory address, then it validates every nibble individually. It repeats this process until all nibbles in every address are checked.

### 3.11 Motherboard

The Motherboard module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>PCI/PCI-e Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>RTC Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>USB Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**Chipset Test**
The test checks the status registers of the controllers that form the foundation of the motherboard chipset. These controllers are: EHCI, OHCI, xHCI and SATA.

**PCI/PCI-e Test**
The PCI/PCI-e Test checks the status registers of the PCI Express onboard devices for unexpected errors or power failure.

**RTC Test**
The test checks the following RTC (Real Time Clock) properties: accuracy and rollover. The test attempts to guarantee the correct operation of these properties.

**USB Test**
The test checks the status of USB devices. If any errors are indicated, the test fails.
3.12 Optical Drive

The Optical Drive module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media-Less Optical Self-Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Linear Seek Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Random Seek Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Funnel Seek Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Read and Compare Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Write Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Media-Less Optical Self-Test**
Checks the optical drive's internal components. This test requires that no media is inserted into the drive. Therefore if any media was detected into the drive the application displays the following message:

**Linear Seek Test**
Checks the integrity of the optical drive's mechanism by continuously moving the drive's head all around the media. For execute this test the user must have a media containing at least the following amount of date written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

**Random Seek Test**
Checks the integrity of the optical drive's transmission mechanism by moving the drive's head through random positions on the media. For executing this test the user must have a media containing at least the following amount of date written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

**Funnel Seek Test**
Checks the integrity of the optical drive's mechanism by moving the drive's head in a funnel pattern. For executing this test the user must have a media containing at least the following amount of date written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

**Read and Compare Test**
Checks the drive’s ability to make correct read operations. Performs two linear read operations and compares the information obtained from the two reads. For executing this test the user must have a media containing at least the following amount of data written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

**Write Test**
Checks the capability of the drive to write correctly to an optical media. For executing this test you must have a blank media (CDR, CD-RW, DVD-R, DVD-RW, BD-R, BD-RE).

**Linear Seek Test, Random Seek Test, Funnel Seek Test, Read and Compare Test and Write Test** are performed according the following workflow:

![Insert a valid media](image)

Application opens the optical drive tray and request the user to insert a valid media

![User inserts a valid media](image)

User inserts a valid media and click on "OK" button

![Application validates the media](image)

Application validates the media and continues the test

### 3.13 PCI Express

The PCI Express module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Status Test**
Verifies that all of the PCI Express devices are recognized and communicating with the system.

### 3.14 Mouse Devices

The Mouse Devices module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Precision Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>
**Click Test**

It does a check on the device's buttons, issuing the user to perform some actions regarding them. The Click Test execution is based on the workflow below.

The user must perform one by one, the actions issued by the test. Note that the actions requested depends on the numbers and types of buttons present in your pointing device.

The user has two attempts to execute each requested action. If the requested action was detected by the application, it is considered as passed. Otherwise the action is considered as “Failed”. The Click Test is considered as “Passed” if all actions required are passed.

If the user does not perform any action for 30 seconds, the following popup is displayed:

If the user select “Yes”, reporting that the test was performed according to the instructions the test will fail. In this case, the application assumes that it was not possible to detect the device, indicating a bad working of it. If the user selects “No”, the test is canceled because the actions required were not properly executed.

**Precision Test and Press Precision Test**

Tests the device movement precision. The Precision Test execution is based on the following workflow:
If the user gets to move the pointer through the entire depicted area without reaching the outside area, the test is finished as passed. If the outside area was reached two times, the test will fail. If the pointer is not moved for more than 30 seconds, the test window is going to be closed and the following message is displayed to the user:

If the user selects "Yes", reporting the test was performed according to the instructions, the test will be finished as "failed". In this case, the application assumes that it was not possible to detect the device movement, indicating a bad working of the device. If the user selects "No", the test is canceled because the required actions were not properly executed.

**Note:** For executing Press Precision test, you must press any button from mouse and move the pointer.

### 3.15 RAID

The RAID module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Enclosure Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Logical Drive Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>RAID Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Consistency Check</td>
<td>Extended</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Battery Status Test**
Checks the health of the controller's BBU (Battery Backup Unit)
Enclosure Status Test
Checks the status of the enclosures used by a RAID controller

Logical Drive Status Test
Checks the status of each logical drive in the RAID controller

RAID Status Test
Checks the status of each RAID volume in the RAID controller

Consistency Check
Checks the consistency of each controller's logical drive. This test might take a few hours to run depending on how many logical and physical drives are present in the RAID controller.

3.16 Storage

The Storage module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMART Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Targeted Read Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Random Seek Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Funnel Seek Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Short Self Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Drive Self Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Default Self Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Device Read Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Wearout Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Controller Status Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Temperature Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Reliability Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Spare Space Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Extended Random Seek Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Extended Funnel Seek Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Extended Self Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Device Write Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Linear Read Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>SMART Conveyance Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Full Disk Scan Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

SMART Status Test
Checks the status reported by SMART to quickly identify whether a device is defective or not.
Targeted Read Test
Checks the sectors in the neighborhood of bad sectors reported in the SMART logs.

Random Seek Test
Checks the integrity of the servo mechanism of a device by checking sectors at several randomly chosen addresses.

Funnel Seek Test
Checks the integrity of the servo mechanism of a device by checking sectors following a “funnel” or “butterfly” pattern.

SMART Short Self Test
Checks electrical and mechanical component status as well as the reading ability of the device.

SMART Drive Self Test
Proprietary Lenovo Drive Self-Test (DST) that mixes sequential and random reads to the disk.

Default Self Test
Vendor specific test that runs a quick check.

Device Read Test
Tests if it is possible to correctly read sectors in different areas of the storage device.

SMART Wearout Test
SMART Wearout Test checks the wearout level of the attached SSD device by reading SMART attributes and informs whether the device is in good condition or has reached its wearout limit.

Controller Status Test
This test detects if the device behaves as expected.

SMART Temperature Test
This test detects if the current temperature for the device is in critical state.

SMART Reliability Test
This test detects if the device is still reliable based on SMART metrics.

SMART Spare Space Test
This test detects if the spare space in the device is critically low.

Extended Random Seek Test
Works similar to quick random test, but the number of checked sectors is larger and it does not stop when the first bad sector is found.

Extended Funnel Seek Test
Works similar to quick funnel test, but the number of checked sectors is larger and it does not stop when the first bad sector is found.
Extended Self Test
Works similar to a quick short self test, but checks more sectors.

Device Write Test
The Storage Device Write Test will verify if it is possible to write data on different areas of the device and then read the data correctly.

Linear Read Test
Checks the integrity of the storage device by reading its sectors following a linear pattern.

SMART Conveyance Test
Checks the device’s integrity through the status returned by SMART Conveyance test.

Full Disk Scan Test
This test performs a full verification of the disk.

3.17 Touchscreen

The Touchscreen module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Touch Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Accuracy Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Diagonal Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Grid Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Multi-touch Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

Basic Touch Test
The Basic touch test will verify if the system is receiving touch events. This test is based on the following workflow:

Accuracy test
The Accuracy test will verify if the touchpoints are accurate with the screen mapping. This test is based on the following workflow:
Diagonal Test
The Diagonal test will verify if rows and columns of the touchscreen are sensing through a diagonal gesture on the screen. This test is based on the following workflow:

Grid test
The Grid test will verify if any areas of touchscreen are not able to receive touch events.

Multi-touch Test
The Multi-touch test will verify if the system is receiving multi-touch events.

3.18 Video Card
The Video Card module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Memory Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Memory Fault Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Address Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Moving Inversion Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Block Move Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Random Number Sequence Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Modulo X Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Extended Video Memory Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>Stress Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>DirectCompute Standard Mathematical Operations Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>DirectCompute Advanced Mathematical Operations Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>CUDA Standard Mathematical Operations Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td><strong>CUDA Advanced Mathematical Operations Test</strong></td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**Video Memory Test**
Verifies if some data patterns are consistently read from and written to video card memory.

**CUDA Memory Fault Test**
This test executes the March C-algorithm on memory GPU. This test detects Stuck-at-Faults (SAF), Address Faults (AF), Transition Faults (TF) and Coupling Faults (CF).

**CUDA Address Test**
This test loads each memory location with its own address and then checks for consistency, to detect addressing errors.

**CUDA Moving Inversion Test**
This test detects memory errors by writing a pattern and checking if each memory location holds this pattern.

**CUDA Block Move Test**
Blocks of memory are initialized with 8-bytes shifting patterns that are moved to different locations to detect memory errors.

**CUDA Random Number Sequence Test**
This test generates a random sequence and fills the GPU memory with it, then checks if these blocks still hold the same random pattern sequence.

**CUDA Modulo X Test**
This test detects faults due to interaction of neighboring memory cells. A pattern is written for the addresses starting with an offset equals to zero and increasing by 20 until the end of the allocation. After, all the addresses not filled with pattern are filled with its complement. The pattern is checked for the addresses they supposed to be written and this process start another iteration adding the offset by 1. This process is repeated until all memory locations are tested.

**Extended Video Memory Test**
Similar to Video Memory Test, but performs an extended analysis with more data patterns

**Stress Test**
Executes heavy operations on the video card for the purpose of stressing the GPU and verifying that the results remain reliable under stress.

**DirectCompute Standard Mathematical Operations Test**
Performs several standard mathematical operations in order to test that the video board processing units are in good condition using DirectCompute.

**DirectCompute Advanced Mathematical Operations Test**
Performs several advanced mathematical operations in order to test that the video board processing units are in good condition using DirectCompute.

**CUDA Standard Mathematical Operations Test**
Performs several standard mathematical operations in order to test that the video board processing units are in good condition using CUDA.

**CUDA Advanced Mathematical Operations Test**
Performs several advanced mathematical operations in order to test that the video board processing units are in good condition using CUDA.

### 3.19 Wired Ethernet

The Wired Ethernet module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Internet Connection Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**Link Test**
The Link Test will verify if the Ethernet network device is faulty based on its operational status. The test starts by asking the user if the network device is connected to a network.
The test is performed according to the user answer. If the user selected “Yes”, the test tries to establish a network link and if the user select “No” the tests verifies if the device has, indeed, no network link.

**Internet Connection Test**
Tests the internet connection by initiating a TCP connection with an external host, sending an HTTP request, and waiting for the host's reply. The test is canceled if the tested device has no wired connection using IPv4 to network.

### 3.20 Wireless

The Wired Ethernet module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Enabled Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Network Scan Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Signal Strength Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
</tbody>
</table>

**Radio Enabled Test**
Verifies that the wireless is turned on.

**Network Scan Test**
Verifies that the wireless adapter can detect available networks. Make sure that there is a properly configured router or access point nearby before running this test.

**Signal Strength Test**
Verifies that the wireless adapter can detect available networks. Make sure that there is a properly configured router or access point nearby before running this test.
3.21 Sensors

The Sensors module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerometer Noise Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Gyrometer Noise Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Compass Noise Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>Accelerometer Interactive Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Gyrometer Interactive Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>GPS Communication Test</td>
<td>Quick</td>
<td>Unattended</td>
</tr>
<tr>
<td>GPS Lock Test</td>
<td>Extended</td>
<td>Unattended</td>
</tr>
<tr>
<td>GPS Interactive Test</td>
<td>Extended</td>
<td>Attended</td>
</tr>
<tr>
<td>Lid Closure Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Accelerometer Noise Test**
The Accelerometer Noise Test will verify the variation of the readings from the accelerometer over time and check if the noise detected is acceptable.

**Gyrometer Noise Test**
The Gyrometer Noise Test will verify the variation of the readings from the gyrometer over time and check if the noise detected is acceptable.

**Compass Noise Test**
The Compass Noise Test will verify the variation of the readings from the compass over time and check if the noise detected is acceptable.

**Accelerometer Interactive Test**
The Accelerometer Interactive Test will check if the values returned by the accelerometer in different positions are correct.
Gyrometer Interactive Test
The Gyrometer Interactive Test will check if the values returned by the gyrometer in different positions are correct.
GPS Communication Test
This test communicates with the GPS device and attempts to retrieve data. If data collection is successful within a specified time interval, the test returns Success.

GPS Lock Test
This test verifies that the GPS is receiving signals of sufficient quality from enough satellites to calculate a location. If the GPS device does report a position fix within the specified time, the test returns Success.

GPS Interactive Test
This test communicates with the GPS sensor device and attempts to retrieve the current location coordinates. If the location coordinates collection is successful, a map is displayed of the current location.

The test will show a globe image indicating the current computer localization.

Lid Closure Test
This test verifies if the lid sensor is capturing the events of closing and opening the lid. The test will fail if these events are not captured.

The test will ask the user open and close the notebook lid.

3.22 Bluetooth

The Bluetooth module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>
Scan Test
Scan for nearby active Bluetooth devices. The test starts by asking you to make sure the Bluetooth device is enabled and there is another Bluetooth close and active.

3.23 Fingerprint

The Fingerprint module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

Recognition Test
The test prompts the user to swipe or touch a finger on the fingerprint device. The test starts by asking you to swipe or touch in your device.

If the user does not perform any action for 30 seconds, the following popup is displayed:
If the user select “Yes”, reporting that the test was performed according to the instructions, the test will fail. In this case, the application assumes that it was not possible to detect the device, indicating a bad working of it. If the user selects “No”, the test is canceled because the actions required were not properly executed.

### 3.24 Touchpad Devices

The Touchpad Devices module is composed by the following tests:

<table>
<thead>
<tr>
<th>Test</th>
<th>Test type</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Precision Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
<tr>
<td>Press Precision Test</td>
<td>Quick</td>
<td>Attended</td>
</tr>
</tbody>
</table>

**Click Test**

It does a check on the device's buttons, issuing the user to perform some actions regarding them. The Click Test execution is based on the workflow below.

The user must perform one by one, the actions issued by the test. Note that the actions requested depends on the numbers and types of buttons present in your touchpad device.

The user has two attempts to execute each requested action. If the requested action was detected by the application, it is considered as passed. Otherwise the action is considered as “Failed”. The Click Test is considered as “Passed” if all actions required are passed.

If the user does not perform any action for 30 seconds, the following popup is displayed:
If the user select “Yes”, reporting that the test was performed according to the instructions the test will fail. In this case, the application assumes that it was not possible to detect the device, indicating a bad working of it. If the user selects “No”, the test is canceled because the actions required were not properly executed.

**Precision Test and Press Precision Test**
Tests the device movement precision. The Precision Test execution is based on the following workflow:

If the user gets to move the pointer through the entire depicted area without to reach the outside area the test is finished as passed. If the outside area was reached two times the test will fail. If the pointer is not moved for more than 30 seconds the test window is going to be closed and the following message is displaying to the user:

If the user select “Yes”, reporting the test was performed according to the instructions, the test will be finished as “failed”. In this case, the application assumes that it was not possible to detect the device movement, indicating a bad working of the device. If the user selects “No”, the test is canceled because the required actions were not properly executed.

**Note:** For executing Press Precision test, you must press any button from touchpad and move the pointer.
4. EXPLORING LENOVO RUN ALL OPTION

Run All option allow to perform all supported tests from all supported modules at the same execution. In this flow is not possible to select devices, thus all devices will be tested. It is possible to choose if the Attended tests should be performed or not. When the checkbox is marked, the application will run Unattended + Attended tests from the test execution option selected.

4.1 Quick tests
Click on Quick tests button to perform all quick tests.

4.2 Quick tests (customized option)
Click to Customize to remove any module or test from the list of tests that will be performed.
4.3 Full tests
Click on Quick tests button to perform all tests quick and extended.

4.4 Full tests (customized option)
Click to Customize to remove any module or test from the list of tests that will be performed.
5. EXPLORING LENOVO DIAGNOSTICS TOOLS

This section provides information about:
5.1 Diagnostic Script
The Diagnostic Script is a tool that allows user to create a custom list of tests from any module. By selecting this tool, the following options are displayed:

- **Create**: allows to create a new diagnostic script
- **Edit**: allows editing a diagnostic script saved previously.
- **Execute**: allows to perform the tests configured in a diagnostic script

5.1.1 Create a diagnostic script
By selecting the option “Create” and clicking on the Next button, the screen below will be displayed. This screen allows selecting a set of tests to be performed from a list with all tests present in Lenovo Diagnostics. The tests not supported by the tested machine are marked with the icon 🕳️.

It is also possible to configure the execution of this tests according one of the following parameters:
Number of executions: allows performing the tests according to a specific number of executions in a range from 1 to 999999999. In this case, the diagnostic will be finished when all iterations are completed.

Test duration in minutes: allows performing the tests according to a specific number of minutes in a range from 1 to 999999999. In this case, the diagnostic will be finished when this time is reached and all tests from the current iteration are finished. Notice that even if the time is reached the tests will be performed until the end in the current iteration.

5.1.2 Edit a diagnostic script
By selecting the option “Edit”, the Lenovo Diagnostics displays a field where is possible to select an existing diagnostic script to be edited.
By selecting this file and clicking on the Next button, a screen is displayed with the configuration from the selected diagnostic script. Here it is possible to modify this configuration by changing the list of tests and modify the number of executions or duration minutes. By clicking on Save button all changes are saved in the current file and clicking on Save as it is possible to create a new file with the current configuration.

5.1.3 Execute a diagnostic script
By selecting the option “Execute”, the Lenovo Diagnostics displays a field where is possible to select an existing diagnostic script to be performed.

By selecting a valid diagnostic script file and clicking on the Next button, a screen is displayed with the configuration from the selected diagnostic script. All selected tests are listed and the not supported one are marked with the icon 1. 
By clicking to Run Tests, the diagnostic script execution screen is displayed and all supported tests are performed. The not supported tests are filtered on this execution. It is possible to finish the execution anytime by clicking on Stop Test.

When the diagnostic is finished, the following popup is displayed with the execution summary.
It is also possible to export the diagnostic results to a pdf file by clicking on Export Log. This file contains an execution log for each iteration performed.

5.2 System Information
The system information tool allows the user to see general information about the system and the available module’s devices. See in the screen below that is possible navigating between the modules and export the information by module or export all information at the same time.

5.3 Log History
The Log History tool allows the user to see the logs of all executions performed in a machine. See in the image below it is possible to find logs by informing a period and export all logs.
5.4 Recover Bad Sectors

The Recover Bad Sectors tool allows the user to scan HDD/SSD devices for bad sectors and fix them whenever possible.

Be aware to perform a backup of your disk before performing this operation. The recovery operation can cause data loss and requires your confirmation.
5.5 SMART Tool
SMART tool provides a list of storage devices and shows, for each one, the SMART attributes and its information. You are able to export those information to a PDF or HTML file. It is possible to export information for each storage device separately or for all available devices in the same file.

5.6 eGather Report
This report provides system software and hardware information focused mainly on software and its drivers. You are able to export those information to a HTML or PDF file by clicking on Export All button or export each section separately by clicking on Export button.
5.7 Powercfg Reports
These reports provide information about the battery usage, energy efficiency, power-scheme settings and system power translations. You are able to generate all reports by clicking on the **Generate all reports** button.

5.8 Network Speed Tool
The tool measures the average download/upload speed and the average latency time. You are able to perform the tests by clicking on the button **Run Tests**.
6. GLOSSARY

**Extended Test**: type of test that is performed in some hours.

**Quick test**: type of test that is performed in some minutes.

**Unattended test**: It is a test that does not depend on the user actions to be executed. All steps are performed automatically by the application.

**Attended test**: It is a test that depends on some user action to be executed.

**Module**: a module contains a set of tests that can be performed for a type of devices. It is enabled in the application only if the tested machine has at least one device supported by the module.